Biota Environmental Sciences

Winu Project Fauna Assessment

Prepared for Rio Tinto Winu Pty Limited

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Winu Project Fauna Assessment

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1.0 Executive Summary

Rio Tinto Winu Pty Limited (RTW) is evaluating the potential development of mineralised deposits within the Winu Project Area (WPA), which is located approximately 320 km east of Port Hedland in the northwest of Western Australia. RTW is proposing to utilise an existing access road (hereafter Winu Road Access Corridor (WRAC)) to link the WPA with port facilities. To support the design of the potential development, and to inform the likely pathways for environmental approvals, fauna surveys of both the WPA and the WRAC were required. Biota Environmental Sciences (Biota) was commissioned to undertake these surveys. This document has been structured to address these two spatial components that comprise the project.

The WPA encompasses the mineralised deposit and the surrounding survey area. A Level 2 fauna survey was undertaken within the WPA.

The WRAC encompasses the entire length of an existing access road from the Great Northern Highway to the WPA. The majority of this road intersects another unrelated development: the Asian Renewable Energy Hub (AREH) (hereafter 'WRAC Section 2'). Sampling effort, methodology and results of a previous Level 2 fauna survey undertaken for the AREH project (Biota 2018a) have been made available for use here. To assess the remaining unsurveyed sections of the WRAC connecting the Great Northern Highway to the western AREH boundary (hereafter 'WRAC Section 1'), and the eastern AREH boundary to the WPA (hereafter 'WRAC Section 3'), a Level 1 Reconnaissance survey was undertaken. In addition, a Level 1 Reconnaissance survey was undertaken to investigate a diversion to the existing access road (hereafter 'WRAC Diversion').

The methodology employed for the surveys of the WPA and the WRAC are summarised in Table 1.1. The key findings from the surveys completed within the WPA and WRAC are presented in Table 1.2.

Table 1.1: Summary of survey methods employed for the WPA and WRAC.

		Survey Dates	Systematic Survey	Non-systematic Survey	Targeted Survey	Short-range Endemic Survey
WPA	**Winu Project Area (Level 2)**	Phase 1: • 12 - 20 May 2019 Phase 2: • 18 – 25 September 2019	• 11 fauna trapping sites. • Combination of pitfall, funnel and Elliott trapping. • Dedicated censuses for birds at the trapping sites and opportunistically.	• Motion cameras; • Audible recorders; • Ultrasonic bat recorders; • Nocturnal searches; and • Marsupial mole trenching.	• 2 ha sign plots and transect searches to record sign evidence (tracks, scats, diggings, burrows) of the Bilby (*Macrotis lagotis*).	• Dry pitfall trapping and active searching. • Taxonomic groups targeted included mygalomorph (trapdoor) spiders and scorpions. • Molecular analysis conducted to inform the number of species present and their status as Short-range Endemic (SRE) fauna, where possible.
WRAC	**Section 1 (Level 1)**	21 September 2019	N/A	• Foot traverses to map the broad habitat types present.	• Unbounded transect searches in unburnt habitat to record sign evidence of the Bilby (*Macrotis lagotis*). • Search of rock piles located close to the Diversion for sign evidence (scats, tracks) of the Black-footed Rock-wallaby (*Petrogale lateralis lateralis*).	N/A
	Section 3 (Level 1)	26 September 2019				
	Diversion (Level 1)	24 and 26 August 2019, and the 22 and 26 September 2019				
	Section 2 (Level 2)	Phase 1 • 24 August – 5 September 2017 Phase 2: • 13 – 21 March 2018	• 18 fauna trapping sites. • Combination of pitfall, funnel, Elliott and cage trapping. • Dedicated censuses for birds at the trapping sites and opportunistically.	• Motion cameras; • Audible recorders; • Ultrasonic bat recorders; • Nocturnal searches; • General searches; and • Marsupial mole trenching.	• Transect searches to record sign evidence of the Bilby (*Macrotis lagotis*). • Diurnal searches in rocky habitat for sign evidence (observations, scats, tracks) of the Northern Quoll (*Dasyurus hallucatus*) and Black-footed Rock-wallaby (*Petrogale lateralis lateralis*).	• Dry pitfall trapping and active searching. • Taxonomic groups targeted included mygalomorph spiders, pseudoscorpions, scorpions, millipedes and land snails. • Molecular analysis conducted to inform the number of species present and their status as SRE fauna, where possible.

Table 1.2: Summary of key findings for the surveys of the WPA and the WRAC.

		Vertebrate Fauna Summary	Conservation Significant Fauna Recorded	Conservation Significant Fauna Likely to Occur	Fauna Habitats (ha)	Bilby Habitat Prospectivity (ha)	Taxa of Note	Short-range Endemic Fauna
WPA	**Winu Project Area (Level 2)**	118 species, comprising: • 10 native ground-dwelling mammals; • 4 introduced ground-dwelling mammals; • 5 bats; • 56 reptiles; • 1 amphibian and • 42 birds.	*Biodiversity Conservation Act 2016* (BC Act) and *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Vulnerable: • Bilby (*Macrotis lagotis*); and • Grey Falcon (*Falco hypoleucos*). BC Act Migratory and EPBC Act Marine/Migratory: • Oriental Plover (*Charadrius veredus*); and • Gull-billed Tern (*Gelochelidon nilotica*). Department of Biodiversity, Conservation and Attractions (DBCA) Priority 4: • Northern Marsupial Mole (*Notoryctes caurinus*); and • Brush-tailed Mulgara (*Dasycercus blythi*). DBCA Priority 2: • *Lerista separanda*. 7 EPBC Act Marine listed birds not of true conservation concern.	BC Act Migratory and EPBC Act Marine/Migratory: • Fork-tailed Swift (*Apus pacificus*).	• Shrub and spinifex on sandplain (9,522) • Longitudinal sand dune ridge (3,338); • Gravelly lateritic rise (303); • Clayey sand plain with termitaria (111).	• High (10,201); • Moderate (3,073).	Range extensions: • Pilbara Planigale (*Planigale* 'species 1') • *Lerista separanda;* • *Demansia calodera;* and • *Anilios endoterus*	Potential SRE mygalomorph spider species: • *Idiommata* sp. B39; • *Aname* sp. N147; • *Aname* sp. N148; • *Aname* sp. N149; • *Aname* sp. N152; • *Aname* sp. N153; • *Genus?* sp. N150; and • *Kwonkan* sp. N151. Potential SRE scorpion species: • *Urodachus varians;* • *Urodachus* sp. 'telfer'; • *Urodacus* 'yasohenkoi species complex'.
WRAC	**Section 1, 3 and Diversion (Level 1)**	N/A (no systematic surveying)	BC Act and EPBC Act Endangered: • Black-footed Rock-wallaby (*Petrogale lateralis lateralis*); • Northern Quoll (*Dasyurus hallucatus*). BC Act Vulnerable: • Bilby (*Macrotis lagotis*). BC Act and EPBC Act Migratory: • Oriental Pratincole (*Glareola maldivarum*). DBCA Priority 4: • Western Pebble-mound Mouse (*Pseudomys chapmani*); and • Northern Marsupial Mole (*Notoryctes caurinus*). DBCA Priority 2: • *Lerista separanda*. EPBC Act Marine: • *Australian Pelican (Pelecanus conspicillatus*); • 10 additional Marine listed birds not of true conservation concern.	DBCA Priority 4: • Brush-tailed Mulgara (*Dasycercus blythi*). BC Act Migratory and EPBC Act Marine/Migratory: • Fork-tailed Swift (*Apus pacificus*); • Little Curlew (*Numenius minutus*); and • Oriental Plover (*Charadrius veredus*).	• Shrub and spinifex on sandplain (4,634) • Longitudinal sand dune ridge (73) • Gravelly lateritic rise (1,416); • Rock outcropping (1).	• High (1,800); • Moderate (789); • Low (755).	Range extensions: • *Lerista separanda;* • Stimson's Python (*Antaresia stimsoni)* • Perentie (*Varanus giganteus*); • *Demansia rufescens;* and • *Diporiphora vescus*. Previously unknown colony: • Black-footed Rock-wallaby (*Petrogale lateralis lateralis*).	Potential SRE mygalomorph spider species: • *Aname* N138; • *Aname* N139; and • *Aname* N140.
	Section 2 (Level 2)	144 species, comprising: • 15 native ground-dwelling mammals; • 4 introduced ground-dwelling mammals; • 8 bats; • 62 reptiles; • 2 amphibians and • 53 birds.						

2.0 Introduction

2.1 Project Background

Rio Tinto Winu Pty Limited (RTW) is evaluating the potential development of mineralised deposits within the Winu Project Area (WPA). The WPA is 13,274 ha in size and is located approximately 320 km east of Port Hedland in the northwest of Western Australia. RTW is proposing to utilise an existing access road (hereafter Winu Road Access Corridor (WRAC)) to link the WPA with port facilities.

To support the design of the potential development, and to inform the likely pathways for environmental approvals, fauna surveys of both the WPA and the WRAC were required. Biota Environmental Sciences (Biota) was commissioned to undertake these surveys.

2.2 Report Structure and Survey Objectives

For ease of use, this document has been structured to address the two spatial components that comprise the project: the WPA and the WRAC.

2.2.1 Winu Project Area

The WPA encompasses the mineralised deposit and the surrounding survey area (Figure 2.1). A Level 2 fauna survey was undertaken within the WPA extent. The specific details and objectives of this portion of the work are described in Table 2.1. Section 4.0 and Section 5.0 of this report document the methods, results and discussion for the WPA.

2.2.2 Winu Road Access Corridor

The WRAC encompasses the entire length of an existing access road from the Great Northern Highway to the WPA (Figure 2.1). Numerous potential borrow source areas have also been identified along the WRAC to supply road base required for upgrade works (Figure 2.1). Some of these potential borrow source areas were surveyed as part of this study (and addressed where relevant throughout this report), however additional areas were identified by RTW at the time of report writing, and therefore have not been assessed as part of this study. An additional survey of these areas is planned for early-2020.

The majority of the WRAC (hereafter 'WRAC Section 2') intersects an unrelated development: the Asian Renewable Energy Hub (AREH) (Figure 2.1). Sampling effort, methodology and results of a previous Level 2 fauna survey undertaken for the AREH project (Biota 2018a) have been made available for use here, under the terms of a mutual data sharing arrangement agreed by RTW and NW Interconnected Power (the proponent for the AREH project).

To assess the remaining unsurveyed sections of the WRAC connecting the Great Northern Highway to the western AREH boundary (hereafter 'WRAC Section 1'), and the eastern AREH boundary to the WPA (hereafter 'WRAC Section 3'), a Level 1 Reconnaissance fauna survey was undertaken. In addition, a Level 1Reconnaissance fauna survey was undertaken to investigate a diversion to the existing access road (hereafter 'WRAC Diversion') (Figure 2.1). The Diversion was proposed as part of the AREH development to divert vehicle traffic away from a colony of the Threatened Black-footed Rock-wallaby (*Petrogale lateralis lateralis*), but will potentially be implemented as part of the Winu project.

The WRAC is therefore apportioned into four sections in this report based on differences in survey type, methods and objectives (WRAC Section 1, Section 2, Section 3 and the Diversion; Figure 2.1). The specific details and objectives of this portion of the work are described in Table 2.1. Section 6.0 and Section 7.0 of this report describe the methods, results and discussions for each of the four WRAC sections.

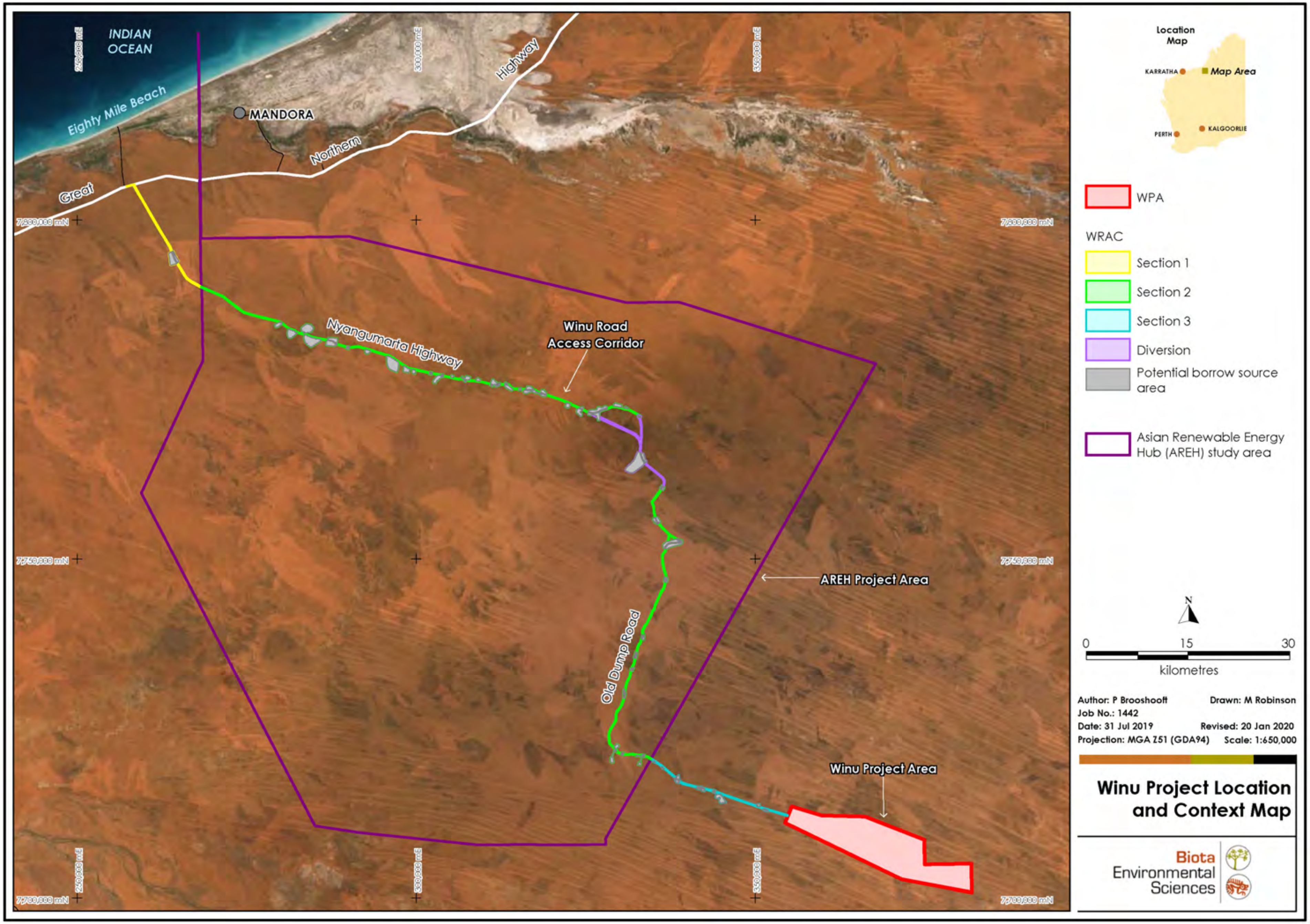

Figure 2.1: Location of the WPA and WRAC.

Table 2.1: Objectives and scope of the fauna surveys undertaken for the Winu project.

<table>
<tr><th>Report Section</th><th>Report Spatial Extents Terminology</th><th>Location</th><th>Area (ha)</th><th>Survey Description</th><th>Survey Dates</th><th>Objectives</th><th>Legislative Framework</th></tr>
<tr><td>WPA</td><td>Winu Project Area</td><td>320 km east of Port Hedland, surveyed over two phases.</td><td>13,362</td><td>Two-phase Level 2 fauna survey</td><td>Phase 1: 12 - 20 May 2019
Phase 2: 18 – 25 September 2019</td><td>• Update the existing desktop biological assessment of a large (120 km) buffer area surrounding the WPA (Jacobs 2019) with survey results from the adjacent AREH proposal (Biota 2018a);
• Identify fauna species from the updated desktop assessment that are likely to occur, or have potential to occur within the WPA, including those of conservation significance;
• Document the vertebrate and Short-range Endemic (SRE) fauna species assemblage of the WPA using established sampling techniques;
• Conduct targeted searches for threatened species listed under State and Federal legislation;
• Describe and map the fauna habitats present and assess their suitability to support fauna species of conservation significance; and
• Identify and assess the local and regional conservation significance of the fauna assemblage and habitats present in the WPA.</td><td rowspan="5">The methodology employed for these surveys was undertaken with consideration of all, or part thereof, the following State and Federal guidance documents:
• Technical Guidance – Sampling Methods for Terrestrial Vertebrate Fauna (EPA 2016a);
• Technical Guidance – Terrestrial Fauna Surveys (EPA 2016b);
• Environmental Factor Guideline – Terrestrial Fauna (EPA 2016c);
• Technical Guidance – Sampling of Short-Range Endemic Invertebrate Fauna (EPA 2016d);
• Matters of National Environmental Significance – Significant Impact Guidelines (DoE 2013);
• Guidelines for surveys to detect the presence of bilbies, and assess the importance of habitat in Western Australia (DBCA 2017a); and
• Interim guideline for preliminary surveys of night parrot (Pezoporus occidentalis) in Western Australia (DBCA 2017b).</td></tr>
<tr><td rowspan="4">WRAC</td><td>Section 1</td><td>18.6 km section of existing access road from the Northwest Coastal Highway to the western edge of the AREH Development Envelope boundary</td><td>458</td><td>Level 1 Reconnaissance fauna habitat mapping and Bilby assessment</td><td>21 September 2019</td><td>• Conduct targeted searches for the Bilby listed as a threatened species under the State and Federal legislation;
• Describe and map the fauna habitats present and assess their suitability to support fauna species of conservation significance.</td></tr>
<tr><td>Section 2</td><td>~137 km of existing access road within the AREH Development Envelope boundary located ~220 km east of Port Hedland</td><td>4,309 ha (out of 660,686 ha AREH study area)</td><td>Two-phase Level 2 fauna survey completed as part of the AREH project</td><td>Phase 1: 24 August – 5 September 2017
Phase 2: 13 – 21 March 2018</td><td>• Conduct a seasonal terrestrial vertebrate and SRE fauna survey, with targeted sampling for conservation significant fauna species.</td></tr>
<tr><td>Section 3</td><td>22.6 km section of existing access road from the eastern edge of the AREH Development Envelope boundary to the WPA</td><td>561</td><td>Level 1 Reconnaissance fauna habitat mapping and Bilby assessment</td><td>26 September 2019</td><td>• Conduct targeted searches for the Bilby listed as a threatened species under State and Federal legislation;
• Describe and map the fauna habitats present and assess their suitability to support fauna species of conservation significance.</td></tr>
<tr><td>Diversion</td><td>~22 km of proposed diversion to the existing access road, including a 'hairpin' diversion to allow heavy/long traffic to negotiate the sharp corner</td><td>830</td><td>Level 1 Reconnaissance fauna habitat mapping, Bilby assessment and Black-footed Rock-wallaby assessment</td><td>24 and 26 August 2019; 22 and 26 September 2019</td><td>• Conduct targeted searches for the Black-footed Rock-wallaby listed as a threatened species under State and Federal legislation;
• Conduct targeted searches for the Bilby listed as a threatened species under State and Federal legislation;
• Describe and map the fauna habitats present and assess their suitability to support fauna species of conservation significance.</td></tr>
</table>

3.0 Existing Environment

3.1 IBRA Bioregion and Subregion

The Interim Biogeographic Regionalisation of Australia (IBRA) identifies 89 bioregions across Australia (Environment Australia 2000). The WPA and WRAC are located within the Great Sandy Desert IBRA bioregion, which is divided into six subregions. Of the six subregions, only two are relevant to the project: the Mackay and Mclarty subregions. The WPA lies entirely within the Mackay subregion (Figure 3.1). The WRAC extends from the Mackay subregion in the south, through the McLarty subregion, with a small portion of the northern extent within the Pindanland subregion of the Dampierland bioregion (Figure 3.1).

These three subregions are summarised below.

- The Mackay subregion (18,636,695 ha) comprises the "tropical inland 'red-centre' desert, and includes the 'Percival' and 'Auld' palaeoriver systems". Mainly tree steppe grading to shrub steppe in south; comprising open hummock grassland of *Triodia pungens* and *Triodia schinzii* with scattered trees of *Owenia reticulata* and bloodwood (*Corymbia* spp.), and shrubs of *Acacia* spp., *Grevillea wickhamii* and *G. refracta*, on Quaternary red longitudinal sand dune fields. The climate is arid tropical with summer rainfall, and monsoonal influences are apparent in the northwestern sector of this region" (Kendrick 2003). The vegetation is similar to the McLarty subregion.
- The McLarty subregion (13,173,266 ha) "includes the Mandora palaeoriver system and red-brown dunefields with finer texture than further south. It also includes gravelly surfaces of Anketell Ridge along its northern margin. The subregion is arid tropical with summer rain and is influenced by monsoonal activity. Morning fogs are recorded during the dry season. The vegetation is mainly tree steppe grading to shrub steppe in the south; comprising open hummock grassland of *Triodia pungens* and *Triodia schinzii* with scattered trees of *Owenia reticulata* and Bloodwoods (*Corymbia* spp.), and shrubs of *Acacia* spp., *Grevillea wickhamii* and *G. refracta*, on Quaternary red longitudinal sand dune fields overlying Jurassic and Cretaceous sandstones of the Canning and Amadeus Basins. Gently undulating lateritised uplands support shrub steppe" (Graham 2003a). Wetland features in the subregion include isolated mound springs supporting *Melaleuca leucadendra* closed forests, and *Melaleuca glomerata - M. lasiandra* shrublands around salt lakes (Graham 2003a).
- The Pindanland subregion (5,198,904 ha) "comprises sandplains of the Dampier Peninsula and western part of Dampier Land, including the hinterland of the Eighty Mile Beach. It is a fine-textured sand-sheet with subdued dunes and includes the paleodelta of the Fitzroy River. This is the coastal, semi-arid, northwestern margin of the Canning Basin. The climate is described as dry hot tropical and semi-arid with summer rainfall. The average annual rainfall is between 450 – 700 mm, slightly lower than the Fitzroy Trough subregion" (Graham 2003b). The vegetation is described primarily as pindan, but includes *Melaleuca alsophila* low forests on coastal plains, and *Spinifex* spp. – *Crotalaria* spp. strand communities (Graham 2003b).

3.2 Native Title

The WPA encompasses two Native Title determination areas, including the Nyangumarta Native Title determination in the north (overlapping 70% of the WPA), and the Martu Native Title determination in the south (Figure 3.1). The WRAC is entirely included in the Nyangumarta Native Title determination (Figure 3.1).

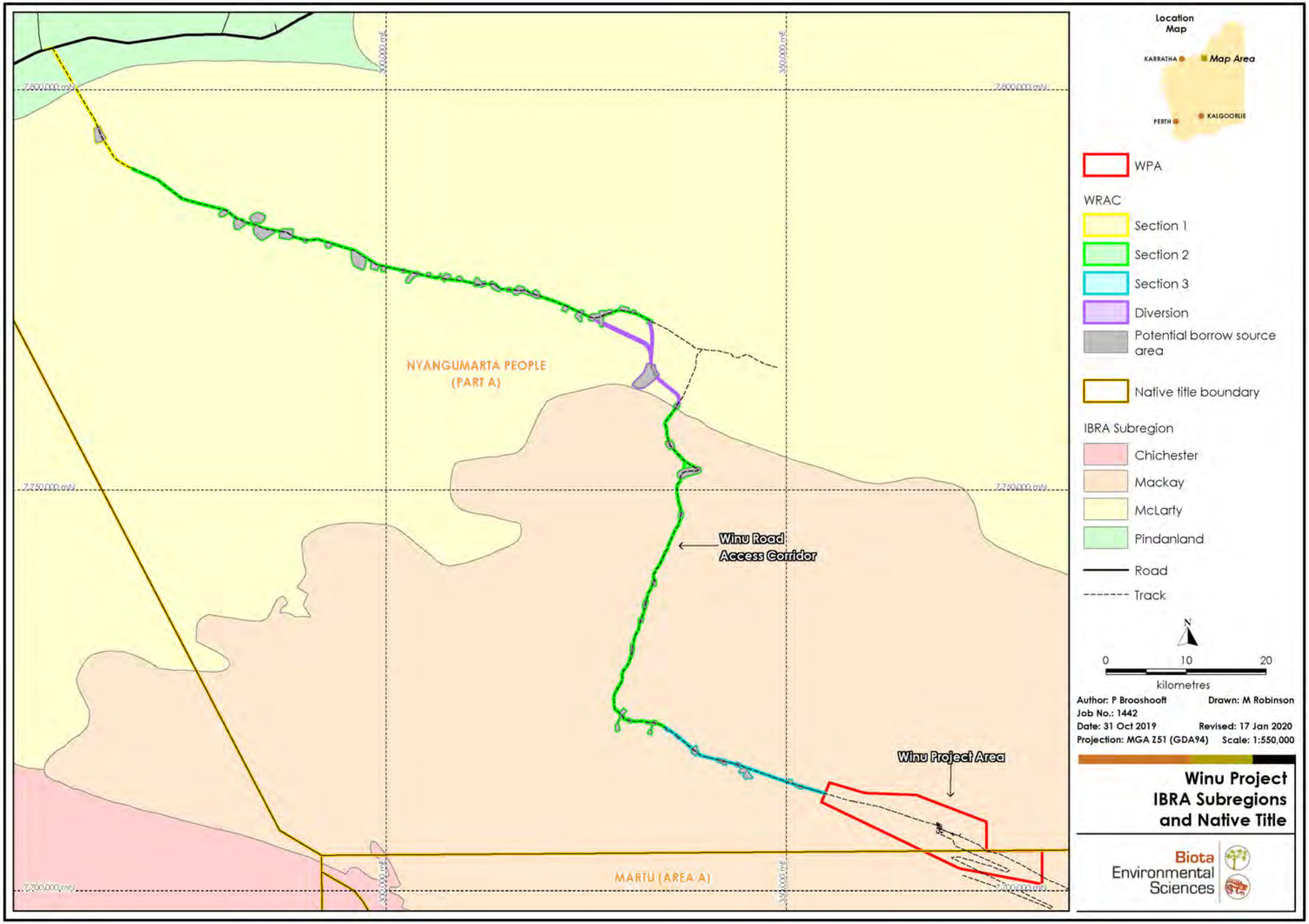

Figure 3.1: IBRA subregion and Native Title boundaries in the locality of the WPA and WRAC.

3.3 Soils

Two broad soil types have been mapped in the WPA (Table 3.1; Figure 3.2). Unit AB39 represents the majority (92%) of the WPA, with small outer pockets of AB40 (8%) (Table 3.1). These two units are both described as gently undulating plains with longitudinal dunes, however AB40 is more elevated in the landscape than AB39 (Table 3.1).

Three broad soil types have been mapped in the WRAC (Table 3.1; Figure 3.2). Unit AB22 mostly dominates (58%), with portions of AB21 (27%) and AB39 (15%) (Table 3.1). Both AB21 and AB22 are similarly described as gently undulating sand plains, however AB22 features many rocky sandstone residuals.

3.4 Surface Geology

Mapping of the surface geological units in the locality was prepared based on data from Geoscience Australia (2014). The majority of the WPA (98%) is dominated by dune geology (Qd), with two smaller areas of sandstone and siltstone with interbedded conglomerate (Ksak) (Table 3.2; Figure 3.3).

The northern section of the WRAC is a mosaic of the broadly dominant sand plains (Czs), intersected with numerous small sections of ferruginous duricust laterite (Czl), and fluviatile sandstone conglomerate (JKsc) (Table 3.2; Figure 3.3). The southern section consists of both sand plains (Czs), and sand dunes (Qd), with dune geology dominating more towards the southern end (Table 3.2; Figure 3.3)

3.5 Land Systems

The then Department of Agriculture Western Australia mapped land systems for the Rangelands regions of WA (DAFWA 1994), however the current land system dataset does not entirely encompass the WPA, with the boundary ending 11.2 km from the WPA's western extent (van Vreeswyk et al. 2004). Soil landscape system mapping does encompass the WPA (DPIRD 2018), and could be matched to the boundary of the land systems mapping. Based on soil landscape mapping, the WPA is entirely represented by the Little Sandy land system. The Little Sandy land system is described as "sand plains with linear and reticulate dunes supporting shrubby hard and soft spinifex grasslands".

The WRAC intersects four land systems along its extent: Little Sandy, Nita, Callawa, and Buckshot (Table 3.3; Figure 3.4). The southern portion of the WRAC is dominated by the Little Sandy land system, while the northern section is a mosaic of the Nita and Callawa land systems. The Nita land system features sandplains supporting shrubs, spinifex grasslands, and occasional trees, while the Callawa land system features highly dissected low hills, mesas, and gravelly plains of sandstone and conglomerate. The Callawa land system is relatively restricted to small mosaic patches regionally, of which the WRAC intersects a long mosaic stretch of this land system, covering almost 3% of the system's total extent (Table 3.3). The Buckshot land system is present in two small areas, and features gravelly sand plains and occasional sand dunes.

3.6 Beard's Regional Vegetation Mapping

Broad-scale vegetation mapping for the locality has been prepared at the 1:1,000,000 scale based on the work of J.S. Beard for the Pilbara (Beard 1975) and the Great Sandy Desert (Beard 1968). The WPA includes only one of Beard's vegetation system associations, mapped as "Great Sandy Desert 134" (Table 3.4; Figure 3.5). The WRAC was mapped as a mosaic of the 'Great Sandy Desert 134', 'Mandora East 80, 101, 117', and 'Pindan 32' vegetation associations (Table 3.4; Figure 3.5). These vegetation associations are described as:

- Great Sandy Desert 134 comprises a mosaic: Hummock grasslands, open low tree steppe; Desert Bloodwood and Feathertop Spinifex (*Triodia schinzii*) on sandhills / Hummock grasslands, shrub steppe; mixed shrubs over spinifex between sandhills.
- Mandora East 80 comprises hummock grasslands and low tree steppe with Desert Walnut over soft spinifex between sand ridges.
- Mandora East 101 comprises hummock grasslands and shrub steppe with *Acacia pachycarpa* over soft spinifex.
- Mandora East 117 comprises hummock grasslands and grass steppe with soft spinifex.
- Pindan 32 comprises of pindan sandplain with *Acacia* shrubland with scattered low trees over *Triodia* spp.

The pre-European and current extents of Beard's vegetation system associations have been calculated using interpretation of imagery to determine areas that have been cleared (see Shepherd et al. 2002, and Government of Western Australia 2018). According to this, none of the system associations have had extensive clearing, with the WPA and the WRAC containing very small proportions of the current extents. The largest of these is the Mandora East -117 association, with the WRAC containing 1.24% of its current extent (Table 3.4).

Table 3.1: Description and extent of soil units in the WPA and WRAC.

(Geoscience Australia 2014)

Soil Unit	Description	Area (ha) in WPA	% of WPA	Area (ha) in WRAC	% of WRAC
AB21	Pindan country: gently undulating sand plain with a few small rocky sandstone residuals; no external drainage: chief soils are red earthy sands (Uc5.21), with associated (Uc5.11) and hummocks of siliceous sands (Uc1.23).	-	-	1,692	27%
AB22	Gently undulating sand plain as for unit AB21 but with many rocky sandstone residuals: chief soils are red earthy sands (Uc5.21), with (Uc5.11) and (Uc1.23) as for unit AB21. Associated are bare rock and shallow sands, probably (Uc1.4), of the sandstone residuals.	-	-	3,564	58%
AB39	Gently undulating plains dominated by longitudinal dunes of varying frequency; some exposures of ironstone gravels on low rises occur in the dune swales: chief soils are red earthy sands (Uc5.21) on dune slopes, and inter-dune plains with red siliceous sands (Uc1.23) on the dunes. Other soils include (KS-Uc5.21) on the gravelly rises where an ironstone (laterite) duricrust is present at about 45 cm depth; and (Um5.11) on small included areas of calcrete (kunkar).	12,291	92%	901	15%
AB40	Gently undulating plain slightly more elevated than unit AB39, and dominated by longitudinal dunes, many exposures of ironstone gravels and some breakaways capped by ironstone (laterite) duricrust: chief soils are red earthy sands (Uc5.21), with red siliceous sands (Uc1.23) on the dunes. There is an increased amount of (KS-Uc5.21) soil compared with unit AB39, and locally it may become dominant.	1,070	8%	-	-

Table 3.2: Description and extent of surface geology units in the WPA and WRAC.

(Geoscience Australia 2014)

Geological Unit	Description	Area (ha) in WPA	% of WPA	Area (ha) in WRAC	% of WRAC
Czl	Ferruginous duricrust: Pisolitic, nodular or vuggy ferruginous laterite; some lateritic soils; ferricrete; magnesite; ferruginous and siliceous duricrusts and reworked products, calcrete, kaolinised rock, gossan; residual ferruginous saprolite.	-	-	3317	20%
Czs	Sand plain: Sand or gravel plains; quartz sand sheets commonly with ferruginous pisoliths or pebbles, minor clay; local calcrete, laterite, silcrete, silt, clay, alluvium, colluvium, aeolian sand.	-	-	9757	61%
JKsc	Callawa Formation: Fluviatile cross-bedded very fine to coarse-grained sandstone, granule conglomerate and minor siltstone; plant and trace fossils.	-	-	236	1%
Ksak	Poorly sorted, cross-bedded and partly bioturbated, paralic fine sandstone and siltstone with interbedded coarse sandstone and conglomerate.	207	2%	-	-
Kspa	Parda Formation: Mudstone, claystone; minor fine-grained sandstone; macrofossils; shallow marine deposits.	-	-	17	0.1%

Geological Unit	Description	Area (ha) in WPA	% of WPA	Area (ha) in WRAC	% of WRAC
Qd	Dunes: Sandplain with dunes and swales; may include numerous interdune claypans; residual and aeolian sand with minor silt and clay; aeolian red quartz sand, clay and silt, in places gypsiferous; yellow hummocky sand.	13,154	98%	2751	17%

Table 3.3: Description of land systems within the WRAC.

(Geoscience Australia 2014)

Land System	Area within WRAC (ha)	% of WRAC	Extent within McLarty, Mackay and Pindanland Subregions (ha)	% of Subregional Extent Within WRAC	Description
Buckshot	96	1%	7,944	1%	Gravelly sandplains and occasional sand dunes supporting hard spinifex grasslands.
Callawa	2922	20%	97,793	3%	Highly dissected low hills, mesas and gravelly plains of sandstone and conglomerate supporting soft and hard spinifex grasslands.
Little Sandy	5007	35%	676,257	1%	Sandplains with linear and reticulate dunes supporting shrubby hard and soft spinifex grasslands.
Nita	6386	44%	1,429,175	0.5%	Sandplains supporting shrubby spinifex grasslands with occasional trees.

Table 3.4: Description and extent of Beard's broad vegetation units in the WPA and WRAC, together with pre-European and current extents.

(from Government of Western Australia 2018)

Beard's Vegetation System Association	System Association Code	Total Extent in McLarty and Mackay Subregions		Area in WPA (ha)	% of WPA	% of Current Extent in WPA	Area in WRAC (ha)	% of WRAC	% of Current Extent in WRAC
		Pre-European Extent	Current Extent						
Great Sandy Desert 134	134.1	11,218,536	11,217,944	13,362	100%	0.1%	1847	30%	0.02%
Mandora - East 80	80.1	294,534	294,534	-	-	-	633	10%	0.2%
Mandora - East 101	101.1	570,039	569,993	-	-	-	657	11%	0.1%
Mandora - East 117	117.1	242,002	235,135	-	-	-	2923	47%	1%
Pindan 32	32.1	244,906	244,875	-	-	-	97	2%	0.04%

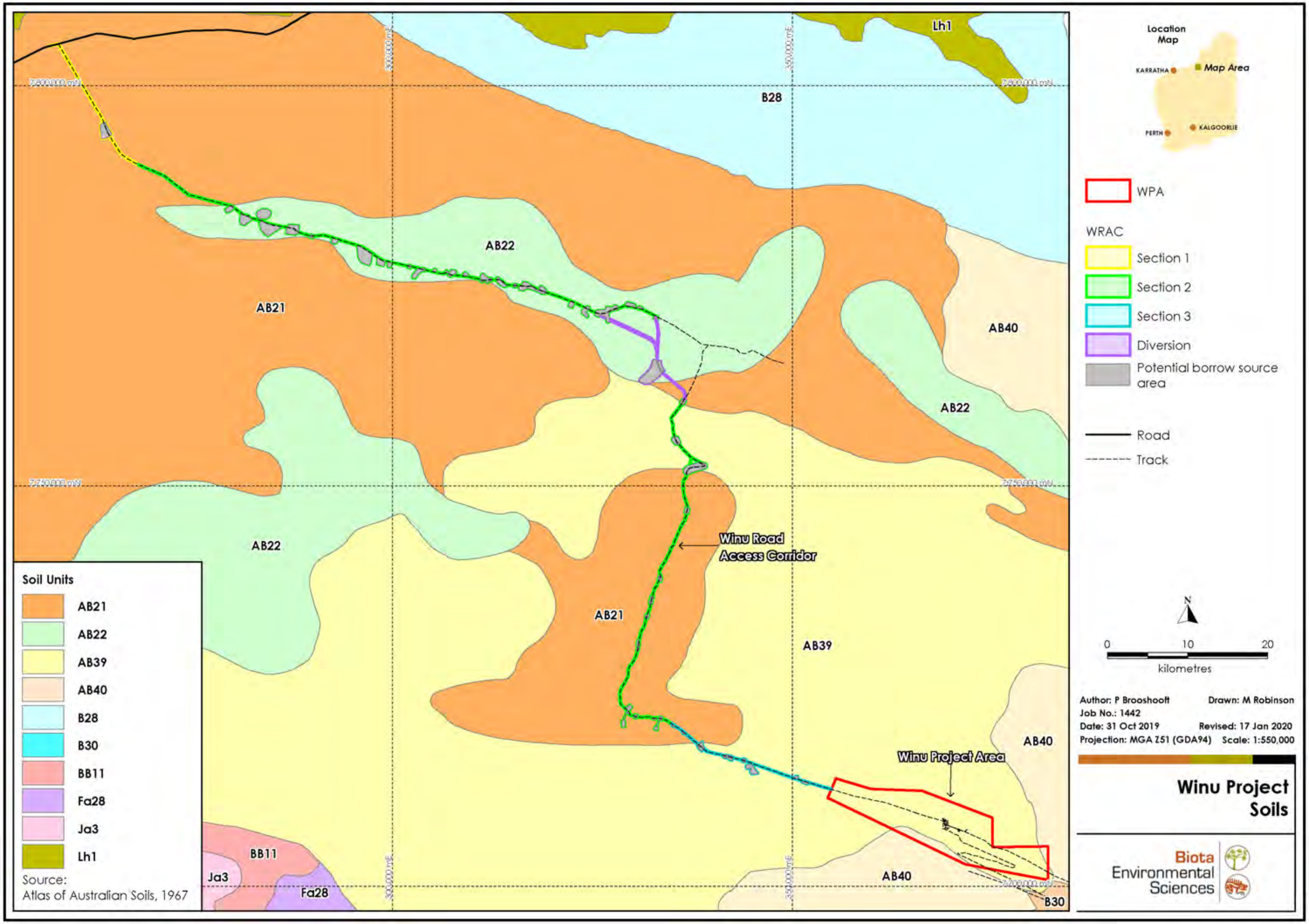

Figure 3.2: **Soil units in the WPA and WRAC.**

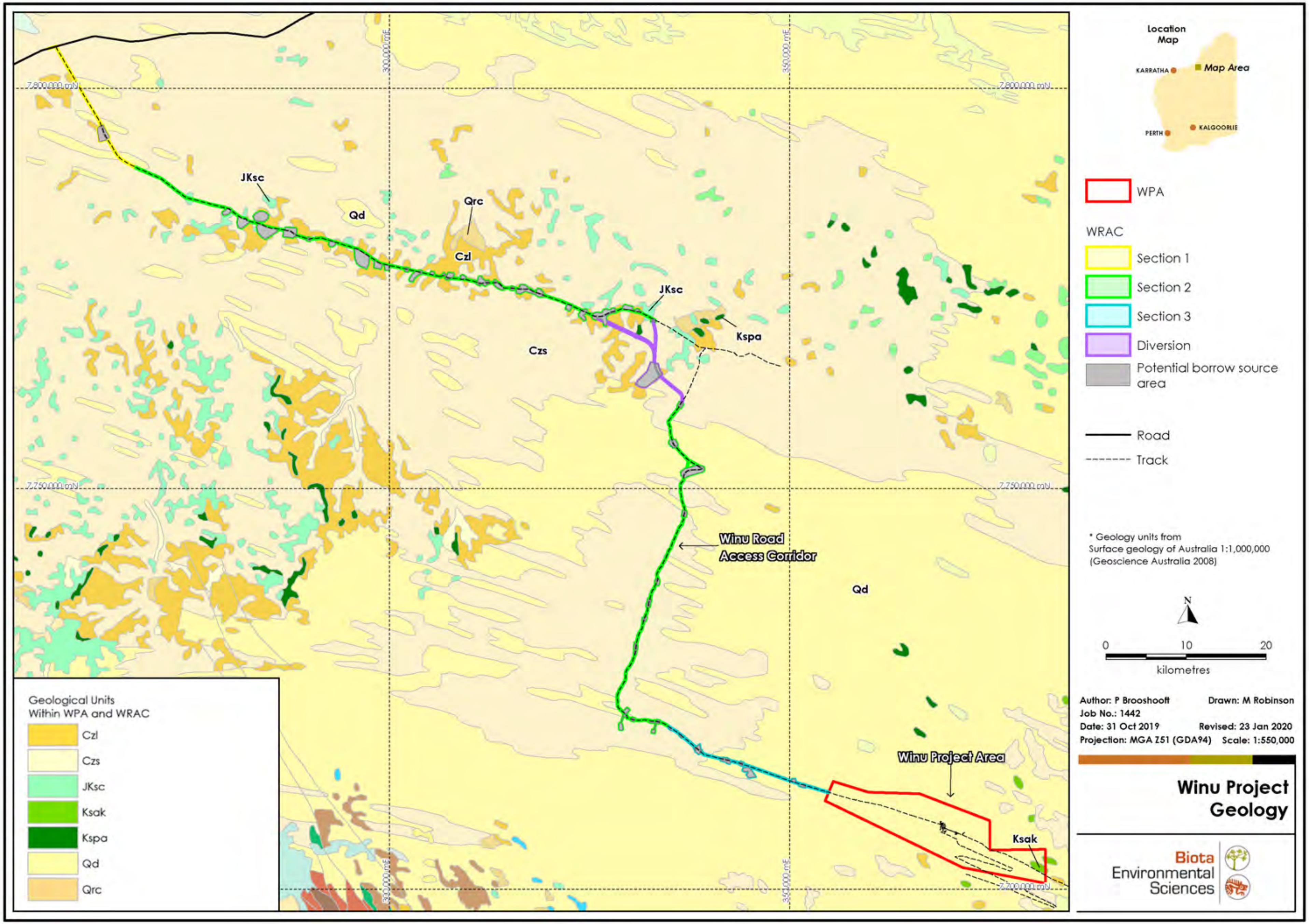

Figure 3.3: Surface geological units in the WPA and WRAC.

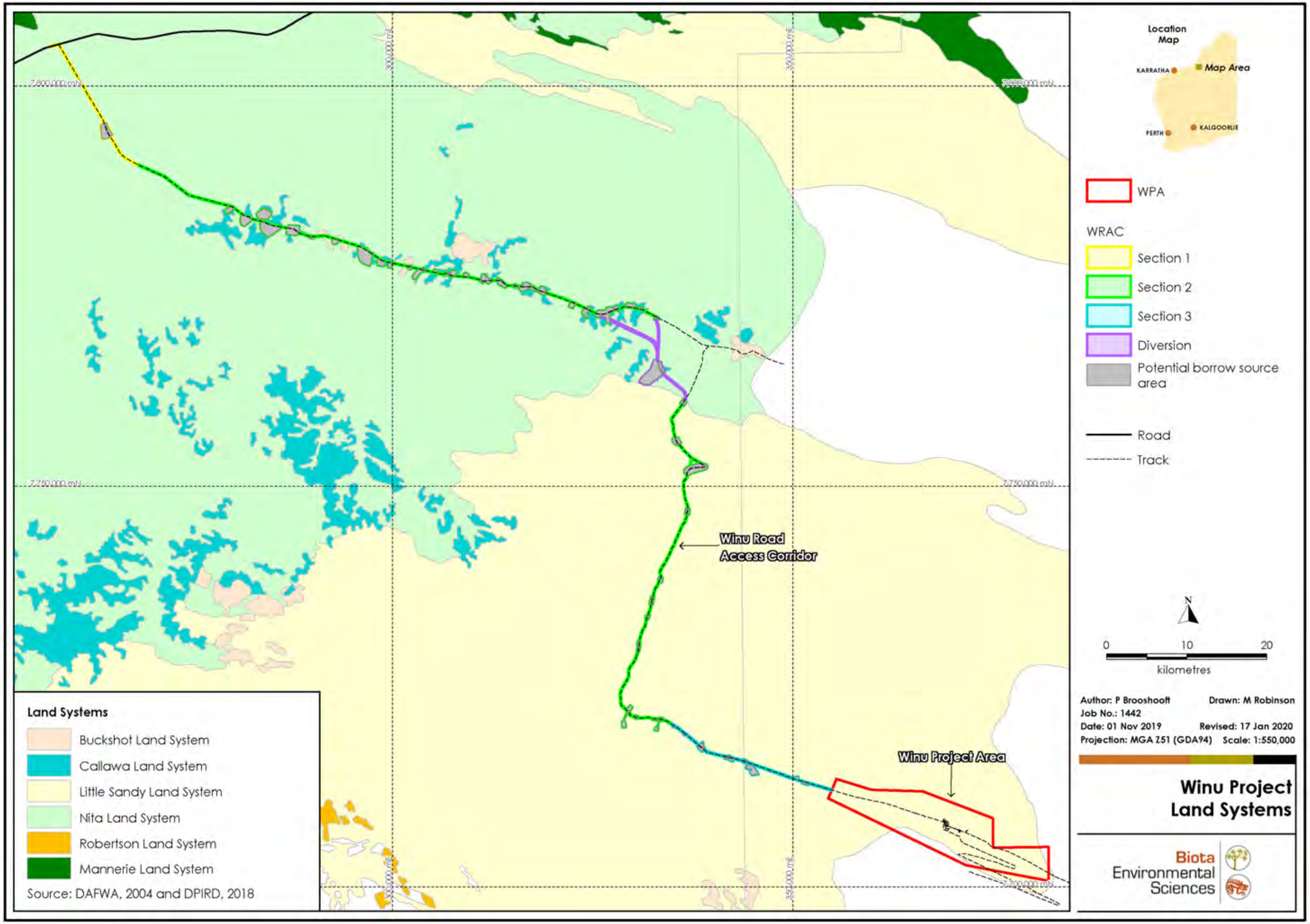

Figure 3.4: Land systems mapping in the WPA and WRAC.

Land system mapping sourced from DAFWA (1994) and soil landscape system mapping (DPIRD 2018) was used to extend the land system mapping to include the WPA.

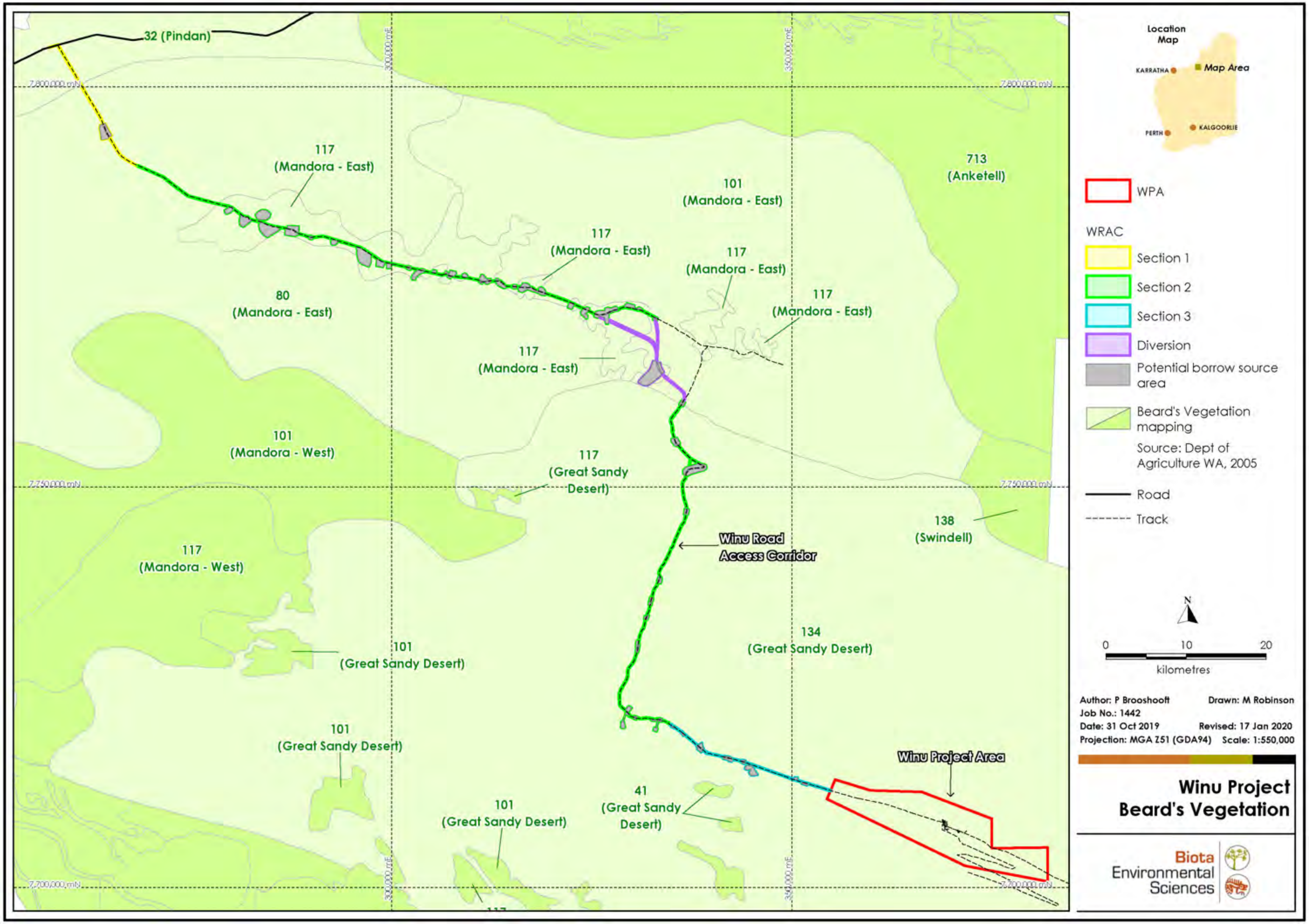

Figure 3.5: Beard's vegetation associations for the WPA and WRAC.

4.0 Winu Project Area Methodology

4.1 Desktop Assessment

A broad desktop biological assessment was completed as part of a pre-feasibility exercise aimed at understanding the existing environment within a large (120 km) buffer surrounding the WPA (Jacobs 2019). This assessment collated data from sources including NatureMap, Atlas of Living Australia (ALA), the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Protected Matters Search Tool (PMST) and the Species Profiles and Threats Database (SPRAT), to identify key biodiversity features and conservation listed fauna species likely to occur within the WPA (Jacobs 2019). Prior to this desktop assessment, the locality of the WPA had been subject to relatively few fauna surveys (Table 4.1). Additionally, of the fauna surveys relevant to the WPA, none were publicly available at the time the desktop assessment was completed. Between late 2017 and early 2019, three Level 1 fauna surveys were completed within and adjacent to the WPA (Astron 2018, 2019a, 2019b), and one Level 2 fauna survey was completed adjacent to the WPA for the AREH project (Biota 2018a) (Table 4.1). The AREH project represents the only recent and comprehensive fauna survey conducted within the locality of the WPA. The results of the broad desktop assessment were consolidated with results from the Level 1 fauna surveys and the AREH project in order to create a potential fauna species list for the WPA, as presented in Appendix 1 (Table 4.1).

Table 4.1: Literature reviewed for the desktop assessment of the WPA.

Report/Survey	Description	Dates of Survey	Location Relative to WPA
Winu Project: Baseline Environmental Assessment (Jacobs 2019)	Desktop assessment; soils, geology, hydrology; climate; conservation significant species and communities, protected areas.	N/A (Databases searched December 2018)	~120 km buffer surrounding the WPA
Asian Renewable Energy Hub Terrestrial Fauna and SRE Fauna Survey (Biota 2018a)	Desktop assessment and two-phase seasonal Level 2 fauna survey	Phase 1: 24 August – 5 September 2017 Phase 2: 13 – 21 March 2018	~27 – 112 km northwest*
Paterson Flora, Vegetation and Fauna Habitat Assessment Survey October/November 2018 (Astron 2018)	Desktop assessment, reconnaissance flora and vegetation survey, Level 1 fauna survey	29 October – 2 November 2018	116 ha portion of the WPA
Paterson Reconnaissance Flora and Vegetation and Level 1 Fauna Survey March 2019 (Astron 2019a)	Desktop assessment, reconnaissance flora and vegetation survey, Level 1 fauna survey	12 – 16 March 2019	292 ha portion of the WPA
Paterson Road Corridor Reconnaissance Flora and Vegetation and Level 1 Fauna Survey May 2019 (Astron 2019b)	Desktop assessment, reconnaissance flora and vegetation survey, Level 1 fauna survey	29 April – 9 May 2019	52 km length of the WRAC, 28 km west from the WPA

* Only results from trapping sites located in similar habitats to the WPA were included here.

4.1.1 Conservation Significant Fauna Likelihood of Occurrence Assessment

Native fauna species that are rare, threatened with extinction, or have high conservation value, are specially protected by law under the State *Biodiversity Conservation Act 2016* (BC Act) and/or the Federal EPBC Act. Migratory and Marine species are also protected under the EPBC Act as Matters of National Environmental Significance. In addition, the Department of Biodiversity, Conservation and Attractions (DBCA) maintains a list of fauna that have not been assigned statutory protection under the BC Act but are still considered to be of conservation priority, or are considered to be rare but not threatened and are in need of monitoring (DBCA 2018a). Appendix 2 details categories of conservation significance recognised under the above frameworks.

In order to determine which conservation significant species potentially occur in the WPA, the results of the consolidated desktop assessment were examined in the context of known habitat preferences, last known records and distributions of species. For each conservation significant species considered, a set of rankings and criteria were applied to assess the likelihood of occurrence within the WPA (Table 4.2). Given the WPA has been relatively unsurveyed, the term "locality" comprises the area up to 120 km from the WPA within similar land systems and habitats.

Table 4.2: Ranking system used to assign the likelihood that a species would occur in the WPA.

Rank	Criteria
Recorded	1. The species has been previously recorded in the WPA.
Likely to occur	1. There are existing records of the species in the locality of the WPA; and • the species is strongly linked to a specific habitat, which is present in the WPA; or • the species has more general habitat preferences, and suitable habitat is present.
May potentially occur	1. There are existing records of the species from the locality, however • the species is strongly linked to a specific habitat, of which only a small amount is present in the WPA; or • the species has more general habitat preferences, but only some suitable habitat is present. 2. There is suitable habitat in the WPA, but the species is recorded infrequently in the locality.
Unlikely to occur	1. The species is linked to a specific habitat, which is absent from the WPA; or 2. Suitable habitat is present, however there are no existing records of the species from the locality despite reasonable previous search effort in suitable habitat; or 3. There is some suitable habitat in the WPA, however the species is very infrequently recorded in the locality.
Would not occur	1. The species is strongly linked to a specific habitat, which is absent from the WPA; and/or 2. The species' range is very restricted and does not include the WPA.

4.2 Vertebrate Fauna Field Survey

4.2.1 Field Survey Timing and Team

Phase 1 of the field survey was completed over a nine-day period from 12 - 20 May 2019 and Phase 2 was completed over an eight-day period from 18 – 25 September 2019. The fauna survey was conducted under "Fauna Taking (Biological Assessment) Licence" No. BA27000051 issued to Ms Penny Brooshooft (Appendix 3). The survey team comprised Mr Roy Teale, Mr Joshua Keen, Ms Penny Brooshooft, Dr Stewart Ford, Mr John Graff, Ms Jacinta King and Mr Nathan Beerkens (all of Biota). Members of the Nyangumarta Ranger Group and the Martu people also assisted with the survey.

4.2.2 Daily Weather Observations

Phase 1 weather observations were taken from data collected within the WPA at Winu camp. Phase 2 weather observations were taken from the Telfer Aero station (number 013030), located 108 km south-southeast of the WPA, as the weather station at Winu camp was not operational at the time.

During Phase 1, minimum temperatures ranged from 7.8°C to 15°C, while maximum temperatures ranged from 27.2°C to 33.9°C (Table 4.3). No rainfall fell during the Phase 1 survey (Table 4.3).

During Phase 2, minimum temperatures ranged from 11.7°C to 22.9°C, and maximum temperatures ranged from 26.5°C to 38.4°C (Table 4.3). A small amount of rainfall (0.2 mm) was recorded on one night of the Phase 2 survey (Table 4.3).

Table 4.3: Daily meteorological observations for the WPA during Phase 1.

	Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Rainfall (mm)
Phase 1	12/05/19	27.2	7.8	0
	13/05/19	27.8	7.8	0
	14/05/19	30.6	12.8	0
	15/05/19	32.2	12.8	0
	16/05/19	32.8	15.0	0
	17/05/19	33.3	10.6	0
	18/05/19	30.0	13.9	0
	19/05/19	31.7	15.0	0
	20/05/19	33.9	12.8	0
Phase 2	18/09/19	38.4	21.9	0
	19/09/19	36.7	22.7	0
	20/09/19	26.9	17.7	0
	21/09/19	26.5	11.7	0
	22/09/19	29.2	13.6	0
	23/09/19	28.8	17	0.2
	24/09/19	28.7	11.9	0
	25/09/19	31.9	13.9	0

4.2.3 Climate

Historical weather data (1974-2019) were obtained from the Telfer Aero weather station. Figure 4.1 charts the average monthly minimum and maximum temperatures and total rainfall for the year preceding the survey, in comparison with long-term averages.

Maximum and minimum temperatures in the six months prior to the Phase 1 survey were higher than long-term averages (Figure 4.1). In the lead up to Phase 2, between June and September 2019, both maximum and minimum temperatures were significantly higher than long-term averages; maximum temperatures were between 5-8°C higher than average, and minimum temperatures were between 6-10°C higher than average (Figure 4.1).

Rainfall data indicate a dry period between May and October 2018, with little to no rainfall received (Figure 4.1). Between November and April 2019, some rainfall was received, however this was significantly below long-term averages (Figure 4.1). This was especially noticeable for February, which has historically received the highest rainfall; just 4 mm of rainfall was received in February 2019, compared to the long-term average of 98 mm.

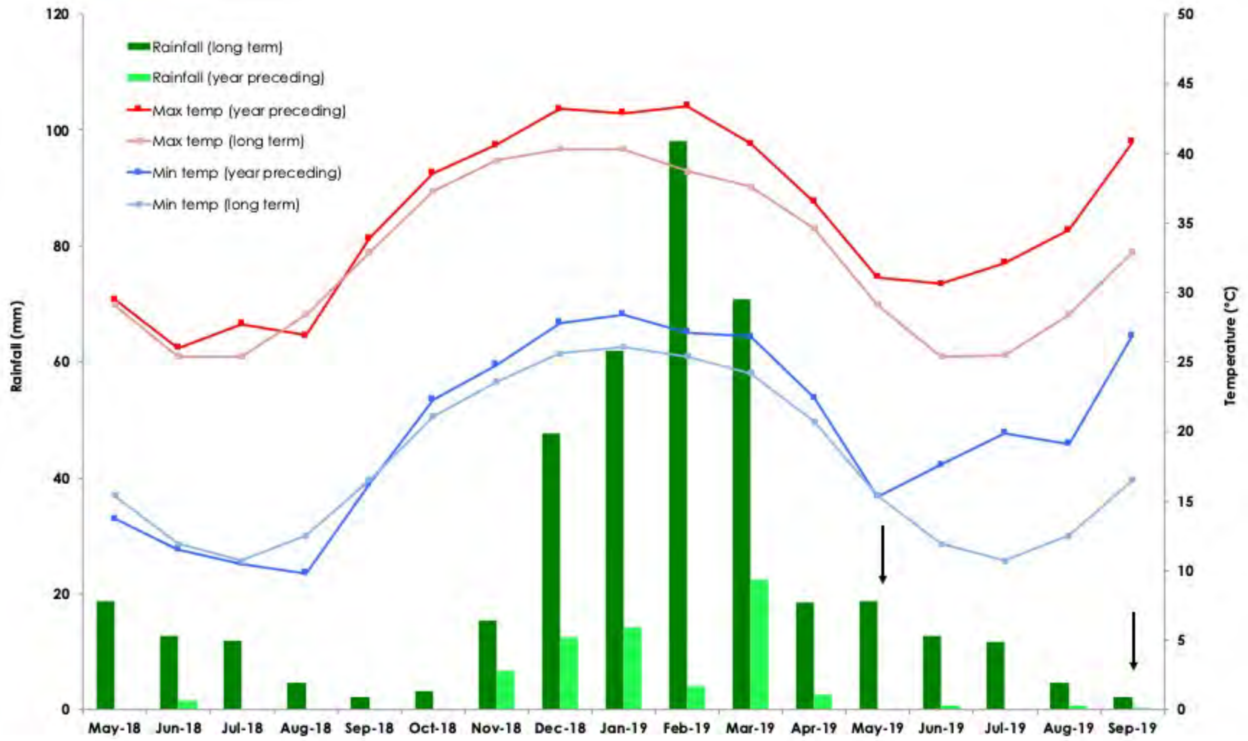

Figure 4.1: Monthly weather data for the year preceding the survey and long-term climate averages. Arrows indicate survey timing.

4.2.4 Systematic Sampling

Systematic sampling comprised pitfall, funnel and Elliott trapping, in addition to bird censuses at each of the systematic pitfall sites. Details of the methods used are discussed in Section 4.2.4.1 and Section 4.2.4.2 below.

4.2.4.1 Trapping Effort

Indicative trapping sites were selected prior to the field survey and were subsequently ground-truthed on site. Twelve final locations were chosen to representatively sample the variety of habitats available (Table 4.4). The locations of the sites are illustrated in Figure 4.3, and are further described in Table 4.5. The systematic trapping sites comprised a combination of pitfall trapping, funnel trapping and Elliott trapping (Table 4.4). Specifically, each site comprised the following:

- Pitfall and funnel trapping transects, consisting of a single row of up to eight pitfall traps arranged as alternating buckets (20 L volume, 280 mm diameter x 410 mm high) and PVC tubes (150 mm diameter x 600 mm high), spaced at approximately 10 m and connected with a 90 m length of 300 mm high flywire fence. Two or more pairs of funnel traps (790 mm long x 180 mm wide x 180 mm high) were also interspersed between the pitfalls (Figure 4.2).
- Elliott box trapping transects were placed in association with some pitfall/funnel transects where habitat was suitable (i.e. unburnt areas with large spinifex hummocks), and two dedicated Elliott trapping transects were also established in prospective habitat for small mammals (in *Acacia* thickets). The Elliott trapping transects comprised medium-sized box traps (330 mm long x 90 mm wide x 90 mm high) spaced approximately 5 m apart, and each trap was baited with a mixture of peanut butter and oats.

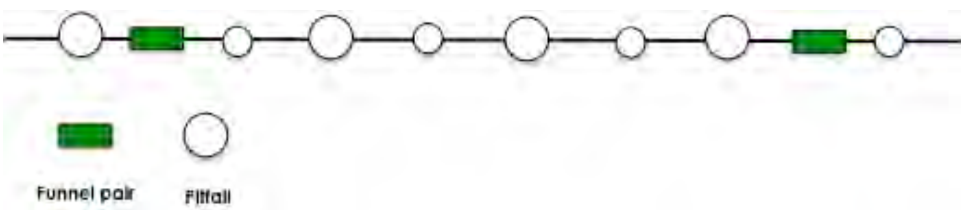

Figure 4.2: Layout of pitfall and funnel trapping grid employed during the survey.

Table 4.4: Trapping site locations and effort during Phase 1 and Phase 2 of the fauna survey of the WPA.

				Phase 1					Phase 2				
Site Name	**Easting**	**Northing**	**Landform**	**Method**	**Date Opened**	**Date Closed**	**Nights Open**	**Trap Effort (Nights)**	**Method**	**Date Opened**	**Date Closed**	**Nights Open**	**Trap Effort (Nights)**
WIN01P	355098	7711962	Sandplain	8 Pitfall, 4 Funnel, 8 Elliot	12/05/2019	19/05/2019	7	P: 56 F: 28 E: 56	8 Pitfall, 4 Funnel	18/09/19	25/09/19	7	P: 56 F: 28
WIN02P	358123	7711089	Sandplain	8 Pitfall, 4 Funnel, 8 Elliot	12/05/2019	19/05/2019	7	P: 56 F: 28 E: 56	8 Pitfall, 4 Funnel,	18/09/19	25/09/19	7	P: 56 F: 28
WIN03P	361000	7710219	Linear dune	8 Pitfall, 4 Funnel	12/05/2019	19/05/2019	7	P: 56 F: 28	8 Pitfall, 4 Funnel	18/09/19	25/09/19	7	P: 56 F: 28
WIN04P	366839	7708742	Sandplain	8 Pitfall, 4 Funnel, 9 Elliot	12/05/2019	19/05/2019	7	P: 56 F: 28 E: 63	8 Pitfall, 4 Funnel	18/09/19	25/09/19	7	P: 56 F: 28
WIN05P	368733	7707123	Linear dune	8 Pitfall, 4 Funnel	12/05/2019	19/05/2019	7	P: 56 F: 28	8 Pitfall, 4 Funnel	18/09/19	25/09/19	7	P: 56 F: 28
WIN06P	371684	7706781	Sandplain	8 Pitfall, 4 Funnel	13/05/2019	20/05/2019	7	P: 56 F: 28	8 Pitfall, 4 Funnel, 8 Elliott	18/09/19	25/09/19	7	P: 56 F: 28 E: 56
WIN07P	373715	7704435	Sandplain	8 Pitfall, 4 Funnel	12/05/2019	20/05/2019	8	P: 64 F: 32	8 Pitfall, 4 Funnel, 9 Elliott	18/09/19	25/09/19	7	P: 56 F: 28 E: 63
WIN08P	377714	7702458	Laterite exposure	7 Pitfall, 4 Funnel	13/05/2019	20/05/2019	7	P: 49 F: 28	7 Pitfall, 6 Funnel, 8 Elliott	18/09/19	25/09/19	7	P: 49 F: 42 E: 56
WIN09P	381638	7701847	Sandplain	6 Pitfall, 4 Funnel	13/05/2019	20/05/2019	7	P: 42 F: 28	6 Pitfall, 8 Funnel	18/09/19	25/09/19	7	P: 42 F: 56
WIN10P	381546	7701680	Linear dune	6 Pitfall, 4 Funnel	13/05/2019	20/05/2019	7	P: 42 F: 28	6 Pitfall, 10 Funnel	18/09/19	25/09/19	7	P: 42 F: 70
WIN11E	361074	7709835	Sandplain	20 Elliott	14/05/2019	19/05/2019	5	E: 100	-	-	-	-	-
WIN12E	375311	7703069	Sandplain	-	-	-	-	-	20 Elliott	20/09/19	25/09/19	5	E: 100
							Phase 1 Pitfall Total	**P: 533**				**Phase 2 Pitfall Total**	**P: 525**
							Phase 1 Funnel Total	**F: 284**				**Phase 2 Funnel Total**	**F: 364**
							Phase 1 Elliott Total	**E: 275**				**Phase 2 Elliott Total**	**E: 275**
							Phase 1 Total	**1,092**				**Phase 2 Total**	**1,164**
												Phase 1 and Phase 2 Total	**2,256**

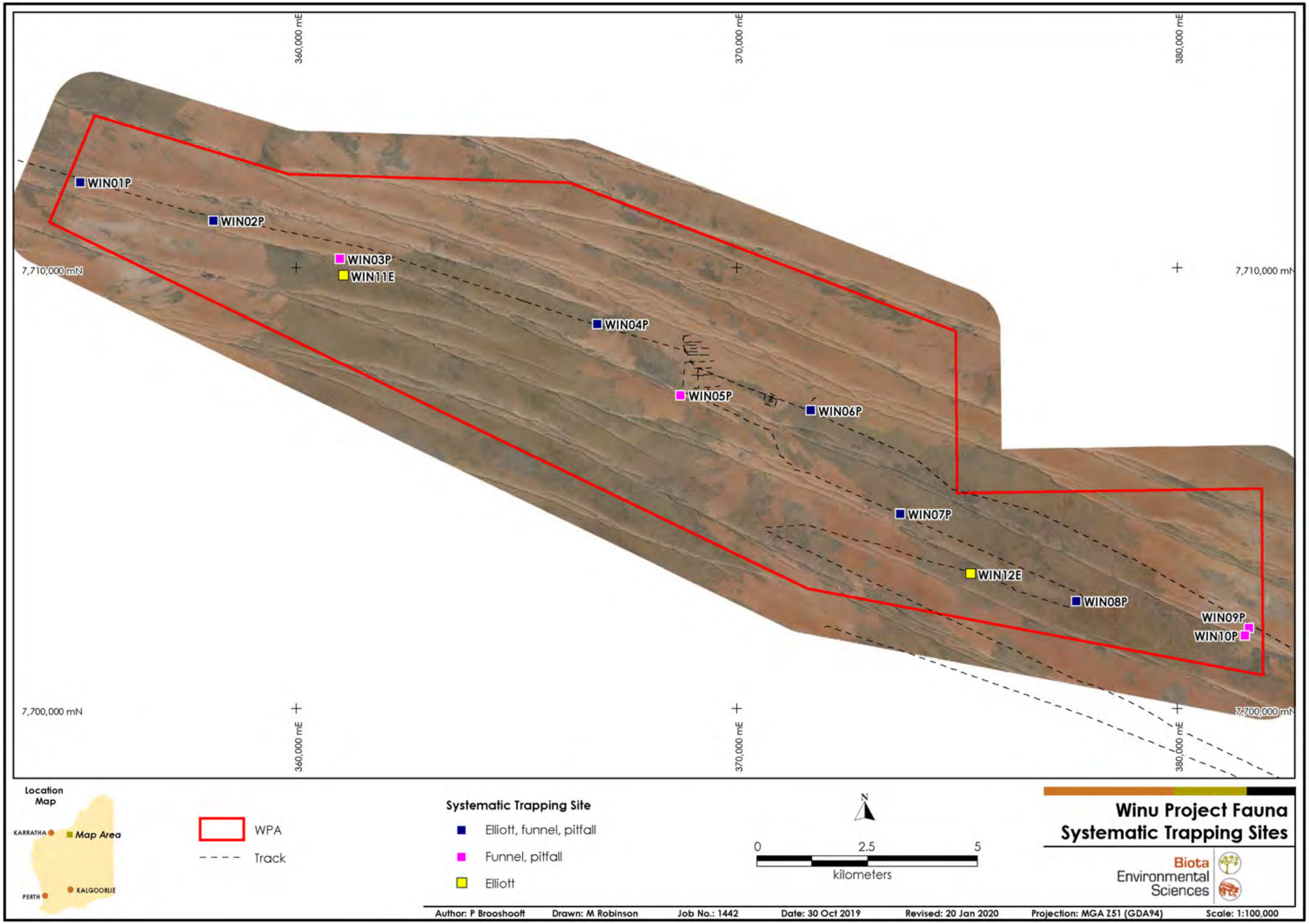

Figure 4.3: Locations of systematic sampling sites within the WPA.

Table 4.5: Descriptions and photographs of trapping sites within the WPA.

<table>
<tr><th>Site Description</th><th>Site Photograph</th></tr>
<tr><td>WIN01P
Landform: Sandplain
Vegetation: Owenia reticulata scattered low trees over Acacia platycarpa open shrubland over Triodia schinzii open hummock grassland.</td><td></td></tr>
<tr><td>WIN02P
Landform: Sandplain
Vegetation: Owenia reticulata scattered low trees over Acacia platycarpa open shrubland over Triodia schinzii open hummock grassland.</td><td></td></tr>
<tr><td>WIN03P
Landform: Linear dune
Vegetation: Corymbia chippendalei and Erythrophleum chlorostachys low open woodland over mixed Acacia spp. over Triodia schinzii open hummock grassland.</td><td></td></tr>
<tr><td>WIN04P
Landform: Sandplain
Vegetation: Owenia reticulata scattered low trees over Acacia platycarpa open shrubland over Triodia schinzii open hummock grassland.</td><td></td></tr>
</table>

Site Description	Site Photograph
WIN05P Landform: Linear dune Vegetation: *Owenia reticulata* and *Erythrophleum chlorostachys* scattered low trees over mixed *Acacia* spp. open shrubland over mixed open low shrubs over *Triodia schinzii* open hummock grassland.	
WIN06P Landform: Sandplain Vegetation: *Owenia reticulata* scattered low trees over *Acacia platycarpa* open shrubland over *Triodia schinzii* open hummock grassland.	
WIN07P Landform: Sandplain Vegetation: *Owenia reticulata* and *Erythrophleum chlorostachys* scattered low trees over *Acacia ancistrocarpa* tall shrubland over *Triodia schinzii* hummock grassland.	
WIN08P Landform: Laterite exposure Vegetation: *Grevillea wickhamii* scattered tall shrubs over *Mirbelia viminalis* low shrubland over *Triodia brizoides* open hummock grassland.	

Site Description	Site Photograph
WIN09P Landform: Clayey sandplain Vegetation: *Acacia orthocarpa* open shrubland over mixed *Triodia schinzii* and *T. brizoides* open hummock grassland.	
WIN10P Landform: Linear Dune Vegetation: *Owenia reticulata* and *Erythrophleum chlorostachys* scattered low trees over *Acacia platycarpa* open shrubland over *Triodia schinzii* open hummock grassland.	
WIN11E Landform: Sandplain Vegetation: *Owenia reticulata* and *Erythrophleum chlorostachys* low trees over *Acacia drepanocarpa* tall shrubland over *Triodia schinzii* hummock grassland.	
WIN12E Landform: Sandplain Vegetation: *Acacia ancistrocarpa* tall shrubland over *Triodia schinzii* hummock grassland.	

4.2.4.2 Bird Censuses

Birds were recorded using the following techniques:

- Unbounded area searches (20-30 minutes duration) were conducted at each of the systematic trapping sites that were open over both survey phases (Table 4.6; Figure 4.3);
- Opportunistic observations whilst traversing the WPA; and
- Automated audio recording devices deployed to target the Night Parrot and other incidental bird records (addressed further in Section 4.2.5.3 below).

A total of 1,100 minutes were dedicated to bird census at the systematic trapping sites (Table 4.6).

Table 4.6: Bird census times at each trapping site within the WPA.

	Phase 1					Phase 2					
	14/05/19	**15/05/19**	**16/05/19**	**17/05/19**	**18/05/19**	**19/09/19**	**20/09/19**	**21/09/19**	**22/09/19**	**23/09/19**	**Total (Minutes)**
WIN01P		0633 - 0703		0617 - 0647		05:55 - 06:25		09:47 - 10:17			**120**
WIN02P		0714 - 0734	0654 - 0724			06:40 - 07:10		09:04 - 09:34			**110**
WIN03P			0738 - 0808	0737 - 0807		07:31 - 08:01		08:16 - 08:46			**120**
WIN04P			0905 - 0935	0847 - 0917				07:27 - 07:57		06:30 - 07:00	**120**
WIN05P	0730 - 0800							06:43 - 07: 13		05:42 - 06:12	**90**
WIN06P	0805 - 0835	0751 - 0821				07:29 - 07:59			08:02 - 08:32		**120**
WIN07P	0703 - 0733	0925 - 0955				06:37 – 07:07		05:57 - 06:27			**120**
WIN08P	0621 - 0651					05:50 - 06:20					**60**
WIN09P		0603 - 0633			0623 - 0653	08:30 - 09:00			05:55 - 06:25		**120**
WIN10P		0637 - 0707	0620 - 0650			09:15 - 09:45			06:27 - 06:57		**120**
Total (Minutes)	**120**	**170**	**120**	**90**	**30**	**240**	**0**	**180**	**90**	**60**	**1,100**

4.2.5 Non-Systematic Sampling

Non-systematic sampling techniques comprising motion cameras, audible recorders, ultrasonic bat recorders, nocturnal searches and marsupial mole trenches were employed to detect additional fauna species not readily trapped using systematic sampling methods. Details of the methods used are discussed below in Sections 4.2.5.1 to 4.2.5.5.

4.2.5.1 Motion Cameras

Infrared motion cameras were deployed at locations where they were considered likely to record fauna (including conservation significant fauna) foraging or moving through habitat. To target conservation significant fauna, including the Bilby (*Macrotis lagotis;* Vulnerable under both the BC Act and EPBC Act) and the Brush-tailed Mulgara (*Dasycercus blythi;* listed as Priority 4 by the DBCA), motion cameras were placed near sign (burrows/diggings) attributed to these species. Details of motion cameras and trap effort are provided in Table 4.7, with locations shown in Figure 4.4.

Table 4.7: Motion camera site locations and effort within the WPA.

	Site Name	Easting	Northing	Target Fauna	Date Opened	Date Closed	Effort (Nights)
Phase 1	**WIN01MC**	380099	7702646	All	14/05/2019	19/05/2019	5
	WIN02MC	381587	7701643	All	14/05/2019	19/05/2019	5
	WIN03MC	381893	7702060	All	14/05/2019	19/05/2019	5
	WIN04MC	370910	7704032	Bilby	15/05/2019	19/05/2019	4
	WIN05MC	371126	7704267	Bilby	15/05/2019	19/05/2019	4
	WIN06MC	371280	7703675	Bilby	19/05/2019	20/05/2019	1
	WIN07MC	373855	7704298	Brush-tailed Mulgara	16/05/2019	19/05/2019	3
	WIN08MC*	361030	7710207	All	16/05/2019	17/05/2019	1
	WIN09MC	368716	7707102	All	16/05/2019	19/05/2019	3
	WIN10MC	371747	7706732	Brush-tailed Mulgara	16/05/2019	19/05/2019	3
	WIN11MC	371440	7703818	Bilby	17/05/2019	19/05/2019	2
Phase 2	**WIN12MC**	370917	7704069	Bilby	19/09/2019	22/09/2019	3
	WIN13MC	370910	7704037	Bilby	19/09/2019	22/09/2019	3
	WIN14MC	358151	7711174	All	19/09/2019	24/09/2019	5
	WIN15MC	377794	7702418	All	20/09/2019	24/09/2019	4
	WIN16MC	366805	7708692	All	20/09/2019	24/09/2019	4
	WIN17MC	354914	7711681	All	20/09/2019	24/09/2019	4
	WIN18MC	371691	7704252	Bilby	20/09/2019	22/09/2019	2
	WIN19MC	370875	7703820	Bilby	22/09/2019	24/09/2019	2
	WIN20MC	371285	7703672	Bilby	22/09/2019	24/09/2019	2
						Phase 1 and 2 Total Effort	**65**

* Only one night of recording due to a camera fault.

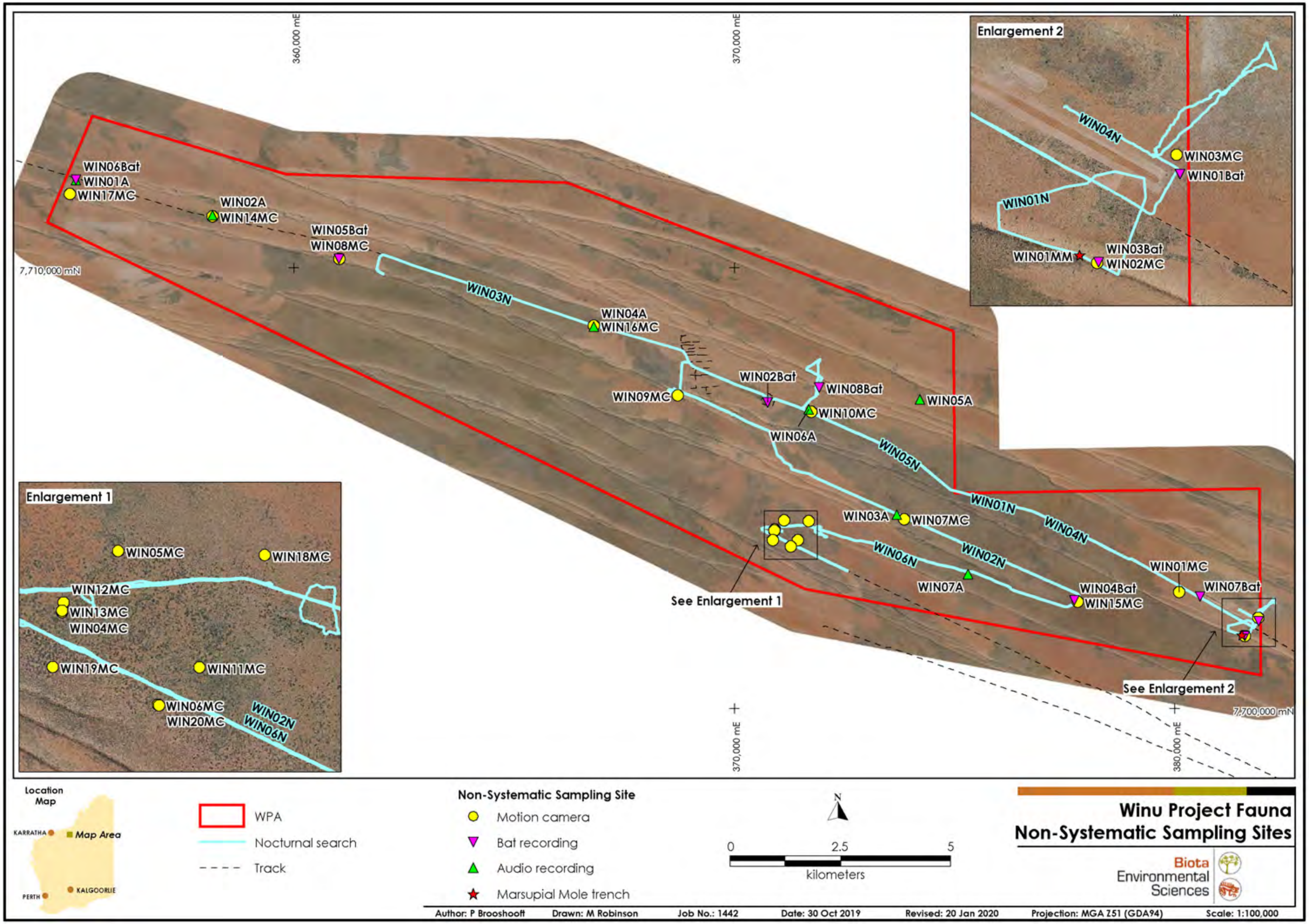

Figure 4.4: Locations of non-systematic sampling sites within the WPA.

4.2.5.2 Ultrasonic Bat Recorders

Bats were surveyed using SongMeter (SM2BAT and SM4BAT) units, which detect and record ultrasonic echolocation calls emitted by bats during flight. The selectable filters and triggers, jumper and audio settings used followed the manufacturer's recommendations for bat detection (Wildlife Acoustics 2010). Over both phases, bat sampling was undertaken at eight sites for a period of two to three nights at each site (Table 4.8). Sites were located in habitats considered likely to provide foraging and commuting opportunities for species potentially present (Table 4.8; Figure 4.4).

Bat call analysis was completed by Mr Dan Kamien, of Biota, using Kaleidoscope Pro software (version 5.1.9), following methods recommended by the Australasian Bat Society (2006) in conjunction with available reference data (Churchill 2008, McKenzie and Bullen 2009). Only sequences containing good quality search phase calls were considered for identification.

Table 4.8: Ultrasonic bat recording site locations and effort within the WPA.

				Phase 1			Phase 2		
Site Name	**Easting**	**Northing**	**Habitat**	**Date Opened**	**Date Closed**	**Effort (Nights)**	**Date Opened**	**Date Closed**	**Effort (Nights)**
WIN01Bat	381906	7701984	Sandplain with Termitaria	13/05/2019*	15/05/2019	-	21/09/2019	23/09/2019	2
WIN02Bat	370756	7706945	Winu camp	13/05/2019*	16/05/2019	-	19/09/2019	21/09/2019	2
WIN03Bat	381592	7701645	Dune	15/05/2019*	17/05/2019	-	-	-	-
WIN04Bat	377719	7702459	Laterite rise	16/05/2019	18/05/2019	2	-	-	-
WIN05Bat	361025	7710210	Dune	17/05/2019*	19/05/2019	-	18/09/2019	20/09/2019	2
WIN06Bat	355050	7712002	Sandplain	18/05/2019	20/05/2019	2	-	-	-
WIN07Bat	380573	7702537	Dam	-	-	-	20/09/2019	23/09/2019	3
WIN08Bat	371923	7707280	Dune	-	-	-	23/09/2019	24/09/2019	1
					Phase 1 Total	**4**		**Phase 2 Total**	**10**

* Equipment failure.

Analysis of the bat recording devices revealed that during Phase 1 equipment failed at four sites (Table 4.8), meaning that data were only available for two sites, WIN04Bat and WIN06Bat. Equipment was redeployed at sites WIN01Bat, WIN02Bat and WIN05Bat during Phase 2. Equipment was not redeployed at site WIN03Bat (a dune site), as a replacement site located in dune habitat (WIN08Bat) was chosen during Phase 2.

4.2.5.3 Recording in the Audible Range

The Interim guideline for surveys of the Night Parrot (*Pezoporus occidentalis*; Critically Endangered under the BC Act and Endangered under the EPBC Act) recommends deployment of passive audible recording devices in areas of suitable roosting and nesting habitat as an effective low impact survey method (DBCA 2017b). Suitable habitat includes areas of old growth spinifex (often >50 years unburnt), particularly ring-forming hummocks (DBCA 2017b). Suitable old-growth spinifex was not located during the ground-truthing of the WPA, however audio recording devices were still deployed at seven locations supporting large spinifex hummocks to address the DBCA guidelines (Table 4.9; Figure 4.4).

Audio files were analysed by Mr John Graff of Biota using a combination of visual scanning of spectrograms using Kaleidoscope Pro software followed by manual confirmations. Spectrograms of reference calls of the Night Parrot from both western Queensland and Western Australia[1] were imported into the software for comparison.

[1] https://nightparrot.com.au/index.php/resources/night-parrot-calls

Table 4.9: Automated audio recording device locations and effort within the WPA.

			Phase 1			Phase 2		
Site Name	**Easting**	**Northing**	**Date Opened**	**Date Closed**	**Effort (Nights)**	**Date Opened**	**Date Closed**	**Effort (Nights)**
WIN01A	355051	7711997	14/05/2019	20/05/2019	6	18/09/2019	24/09/2019	6
WIN02A	358156	7711196	14/05/2019	20/05/2019	6	18/09/2019	24/09/2019	6
WIN03A	373686	7704392	14/05/2019	20/05/2019	6	18/09/2019	24/09/2019	6
WIN04A	366808	7708663	14/05/2019	20/05/2019	6	18/09/2019	24/09/2019	6
WIN05A	374212	7707017	14/05/2019	20/05/2019	6	-	-	-
WIN06A	371690	7706785	14/05/2019	20/05/2019	6	18/09/2019	24/09/2019	6
WIN07A	375308	7703050	-	-	-	20/09/2019	24/09/2019	4
				Phase 1 Total	**36**		**Phase 2 Total**	**34**

4.2.5.4 Nocturnal Searches

Nocturnal searches were conducted to supplement the fauna trapping records to sample for species that are not readily trapped or seen, including nocturnal birds and some snakes. Searches were conducted via road spotting (driving slowly and spotting animals from the car) and on foot. A total of almost 47 hours was dedicated to nocturnal surveying (Table 4.10; Figure 4.4).

Table 4.10: Nocturnal search effort within the WPA.

	Site Name	**Habitat Searched**	**Date**	**No. of People**	**Minutes Searching**	**Effort (Minutes)**
Phase 1	**WIN01N**	Roads, termite mounds, dunes	15/05/2019	2	220	440
	WIN02N	Roads, laterite hill, *Acacia* shrubland	16/05/2019	2	230	460
	WIN03N	Roads, dunes	17/05/2019	2	142	284
Phase 2	**WIN04N**	Roads, termite mounds	21/09/2019	2	150	300
	WIN05N	Roads, dunes	22/09/2019	2	202	404
	WIN06N	Roads, *Acacia* shrubland	23/09/2019	2	464	928
					Total	**2,816**

4.2.5.5 Marsupial Mole Trenching

The Northern Marsupial Mole (*Notoryctes caurinus*; DBCA Priority 4) is a little-known, elusive species inhabiting sandy dunes and swales of the Great Sandy, Little Sandy and northern Gibson Deserts of Western Australia. An effective survey technique for recording presence of this species is to excavate trenches in dunes to search for 'moleholes' (backfilled tunnels that indicate presence) (Benshemesh and Schulz 2009). Trenching was conducted at a single location within the WPA during Phase 1 (Table 4.11; Figure 4.4).

Table 4.11: Marsupial mole trench location within the MPA.

Site Name	**Easting**	**Northing**	**Date**	**Trench Photo**
WIN01MM	381520	7701672	15/05/2019	

4.2.6 Fauna Habitat Mapping

To ensure that survey effort encompassed all fauna habitats present in the WPA, the following sources of information were used to delineate the indicative broad fauna habitats present before field-work commenced:

- aerial imagery;
- elevation modelling in Google Earth; and
- habitats described and sampled for the AREH project (Biota 2018a).

Broad fauna habitats were ground-truthed during the survey, and were subsequently refined based on on-site descriptions and vegetation mapping conducted by Biota's botanical team (Biota 2019a).

A limitation of any habitat classification system is that it is not specific to any one species. Rather, the classification provides a convenient framework to summarise species occurrence. When considering habitat for individual species of elevated conservation significance, the habitat availability within the WPA has been compared to a wider area using a scale appropriate to the species. For example, where these species are widely occurring and have broad habitat requirements, land system mapping may represent an appropriate scale, while for species with more constrained habitat requirements, finer scale mapping has been attempted.

4.2.7 Molecular Analysis

EPA guidance expects that species are identified accurately and verified where needed, especially for those specimens that reflect taxonomic anomalies or are found to occur beyond previously known ranges (EPA 2016b). This presumes that species are morphologically identified with accuracy in the field, and that potential taxonomic anomalies are being detected. This, however, is unlikely to always be the case, especially for poorly sampled areas. Additionally, mammals in particular can be difficult to identify via morphology when they are not sexually mature, and many reptile taxa also represent species complexes that are difficult to identify in the field. DNA barcoding was therefore used here for the purpose of verification of some species identifications and to improve the robustness of the data collected for future environmental impact assessment. This use of DNA barcoding ensures the expectations of EPA guidance are fulfilled, while also enhancing knowledge on species diversity and distributions in Western Australia.

Tissue was taken from most mammal species captured (eight samples, from the families Dasyuridae and Muridae), and from reptile species potentially representing range extensions to current known distributions (three samples, from the families Elapidae, Scincidae and Typhlopidae). Sequencing was completed by Helix Molecular Solutions (Helix). All tissue samples were sequenced for variation at the 16s or cytochrome B (CYB) mtDNA gene. The resulting molecular sequences were placed within an existing molecular taxonomic framework for each genus, using existing sequences on GenBank, and sequence data from Western Australian Museum (WAM) specimens, to assist with taxonomic placement. More detailed methodology is presented in Helix (2019b) (addressed further in Section 5.2.2.6 and 5.2.3.2.

4.3 Targeted Bilby Survey

A targeted Bilby survey was conducted in accordance with DBCA guidelines for surveys to detect the presence of bilbies, which recommend a combination of 2 ha sign plots and transect searches for survey areas larger than 1,600 ha (DBCA 2017a). Both methods were employed, with each detailed in Section 4.3.1 and 4.3.2 below.

A range of sign evidence of the Bilby was recorded during the foot traverses and sign plot searches, discussed further in Section 4.3.3. Where sign evidence was detected, locations were recorded on handheld GPS units.

Following Phase 1, the results of the targeted Bilby survey (see Section 5.6) were discussed in consultation with Dr Martin Dziminski (a DBCA specialist in Bilby monitoring and surveying), who recommended, in part, that a population abundance study, through analysis of DNA from scats, be undertaken. The methods, results and key findings of this study are the subject of a separate report (Biota in prep.).

4.3.1 2 ha Sign Plot Surveys

Sign plots aim to record sign evidence of the Bilby and other animals (tracks, scats, diggings and/or burrows). Ten 2 ha (200 m x 100 m) sign plots were systematically searched by zoologists and Nyangumarta rangers for 20 - 30 minutes each plot during Phase 1 (Table 4.12). Plot locations were selected prior to the field survey based on aerial imagery, to encompass dense vegetation areas of prospective Bilby habitat, of varying fire ages (Figure 4.5).

Table 4.12: Bilby 2 ha sign plot search locations and effort within the WPA.

Site Name	Easting	Northing	Date	Minutes Searching	Number of People	Total Effort (minutes)
WIN01BP	356727	7712340	16/05/2019	30	2	60
WIN02BP	358502	7710563	16/05/2019	30	2	60
WIN03BP	361435	7711157	18/05/2019	20	1	20
WIN04BP	362045	7709784	17/05/2019	30	2	60
WIN05BP	368267	7706811	14/05/2019	30	3	90
WIN06BP	371692	7705513	14/05/2019	20	3	60
WIN07BP	371997	7706965	17/05/2019	20	2	40
WIN08BP	376193	7703402	18/05/2019	20	2	40
WIN09BP	378277	7703842	18/05/2019	20	2	40
WIN10BP	369848	7708873	17/05/2019	30	2	60
					Total	**530**

4.3.2 Transect Searches

Thirteen unbounded foot traverses were undertaken by zoologists throughout the WPA in areas of prospective habitat to record sign evidence of the Bilby (tracks, scats, diggings and/or burrows) (Table 4.13; Figure 4.5). A total distance of 68 km was traversed on foot (Table 4.13). Where sign evidence was detected, a certainty criterion was applied and the location of the sign was recorded (Section 4.3.3).

Table 4.13: Bilby transect effort within the WPA.

	Transect Name	Length (m)
Phase 1	**WIN01BT**	1,492
	WIN02BT	6,018
	WIN03BT	7,989
	WIN04BT	5,648
	WIN05BT	1,877
	WIN06BT	8,763
	WIN07BT	3,637
	WIN08BT	1,399
	WIN09BT	1,012
	WIN10BT	15,665
Phase 2	**WIN11BT**	3,526
	WIN12BT	5,771
	WIN13BT	4,834
	Total (km)	**68**

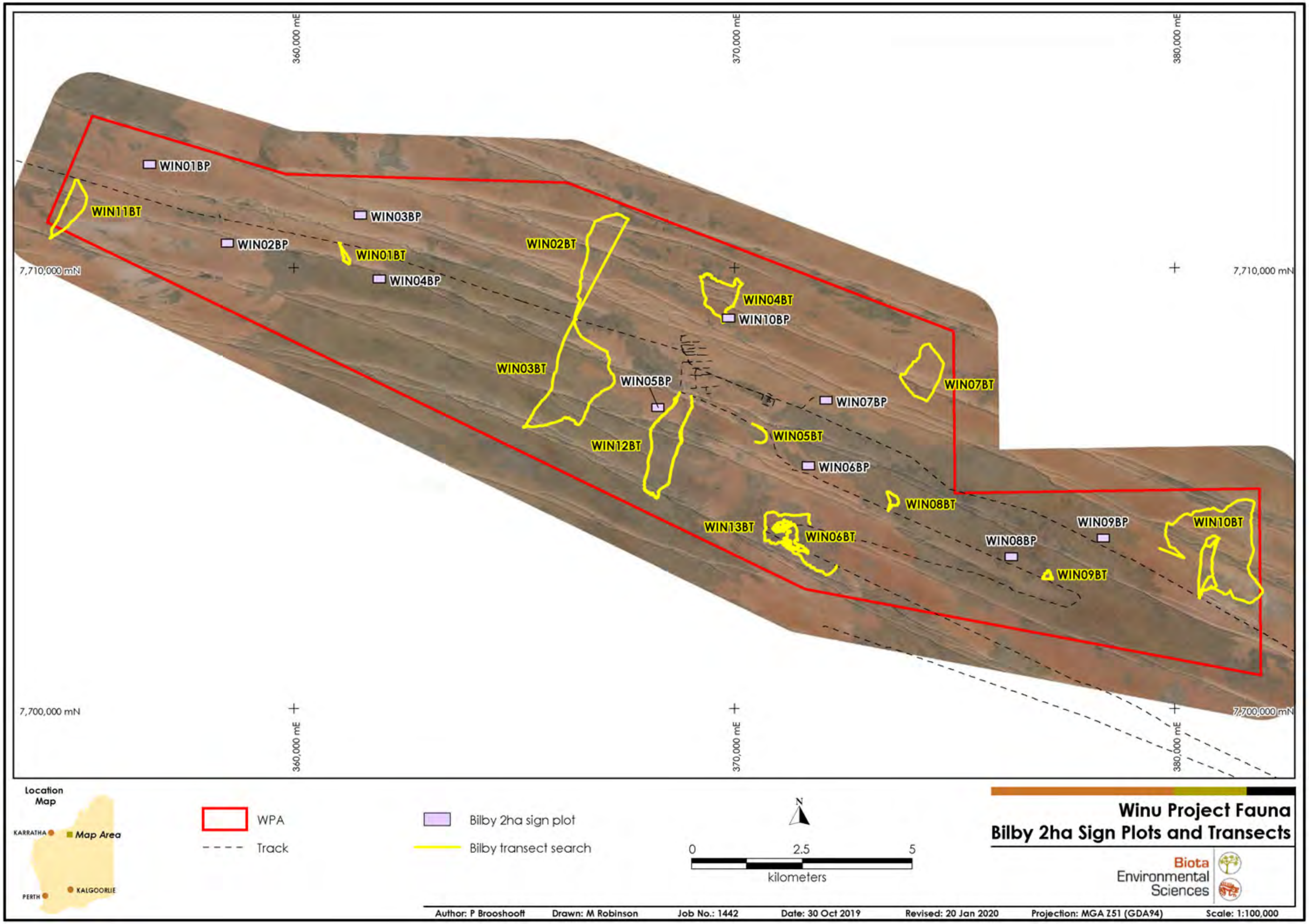

Figure 4.5: **Locations of Bilby 2 ha sign plots and transect searches in the WPA.**

4.3.3 Sign Evidence

4.3.3.1 Tracks

Bilby foot imprints are distinctive when fresh, and readily distinguished from other species that have an otherwise similar track pattern and gait (Southgate et al. 2018). Hind foot imprints are noticeably longer than front foot imprints and bear few conspicuous indentations, while front foot imprints have three distinct parallel lines produced by the toes and claws (Moseby et al. 2012, Southgate et al. 2018). Other species with similar tracks include the rabbit, bandicoot, dasyurids and rodents, however these can be distinguished from the Bilby based on differences in shape, size and toe and claw prints (Southgate et al. 2018).

The gait of the Bilby is a quadrupedal bounding overstep, which produces a pattern of parallel hind foot imprints and slightly offset or in-line front foot imprints (Moseby et al. 2012, Southgate et al. 2018). This gait pattern is consistent with other similar-sized mammals, including quolls, mulgara, bandicoots, rabbits, rats and occasionally possums (Southgate et al. 2018).

As tracks and gait patterns have the potential to be confused with species other than the Bilby, a set of certainty criteria was applied when assessing track evidence in the field (Table 4.14).

Table 4.14: Criteria used to assess certainty of Bilby tracks.

Certainty	Criteria
High	1. Track imprints and gait pattern are clear and consistent with those produced by the Bilby; or 2. Resolution of hind feet and front feet imprints is poor despite a gait pattern consistent with that of the Bilby, however they may be attributed to the Bilby as other species producing similar tracks and gait patterns do not occur, or are unlikely to occur in the WPA.
Low	1. Resolution of hind feet and front feet imprints is poor despite a gait pattern consistent with that of the Bilby, and they cannot reliably be attributed to the Bilby as other species producing similar tracks and gait patterns occur, or are likely to occur in the WPA.

4.3.3.2 Scats

The Bilby produces scats with distinctive characteristics unmatched by any other species on mainland Australia (Southgate et al. 2018). The scats are oblong in shape, longer than they are wide, firm, usually contain a mixture of sand, plant and invertebrate material, have a smooth coating and rounded ends, and are typically deposited in a group of two to five pellets (Southgate et al. 2018). Scats are most commonly found in association with digging activity, deposited on top of or within spoil piles of diggings, and sometimes at burrow entrances (Southgate et al. 2018).

Given that there is no ambiguity in distinguishing Bilby scats from those of other species, scats detected during the survey that were consistent with the above description were considered positive confirmation of Bilby presence.

4.3.3.3 Diggings

Bilbies forage for food at the soil surface, or dig in the subsoil for beetles, termites, root-dwelling larvae, seeds and bulbs (Southgate et al. 2018). Where the Bilby has foraged, diggings are generally conspicuous and distinctive, especially where they occur at the base of shrubs or forbs known to contain root-dwelling larvae, as the Bilby is the only species in mainland Australia that forages for root-dwelling larvae in plant roots (Southgate et al. 2018). Within the Great Sandy Desert bioregion, plant species known to contain root-dwelling larvae include: *Acacia monticola, A. dictyophleba, A. melleodora, A. stellaticeps, A. hilliana, Senna notabilis* and *Indigofera georgei* (DBCA 2018b, Southgate et al. 2018).

Diggings of the Bilby can be of different size and shape, but are typically:

- shallow, 5-10 cm in depth, with the spoil pile evenly distributed around the dig;
- deep conical or cylindrical digs, usually less than 50 cm deep; or

- large ploughed areas of multiple shallow diggings around termite nests.

Other species such as varanids, echidnas, rabbits, wallabies, bandicoots, mulgara and mice can produce diggings that are similar to the Bilby. Varanid diggings can sometimes superficially appear to belong to the Bilby, but can be distinguished by their notable crescent shape, presence of a distinct mid-ridge at the base of the digging and spoil pile often on one side (Moseby et al. 2012, Southgate et al. 2018). Given that diggings may be confused with species other than the Bilby, a set of criteria was applied when assessing digging evidence in the field (Table 4.15).

Table 4.15: Criteria used to assess certainty of Bilby diggings.

Certainty	Criteria
High	1. Single or multiple diggings at the base of shrubs or forbs known to contain root-dwelling larvae; and/or, 2. Confirmed Bilby scats detected within spoil piles of diggings; and/or, 3. Other sign, including clear tracks, scats and burrows, recorded in association with diggings.
Moderate	1. Size and shape of diggings are consistent with known characteristics of Bilby diggings, but occur in isolation of other sign; and/or 2. Isolated diggings occur in habitat supporting plant species suitable for foraging, and the Bilby has been recorded historically from the locality.
Low	1. Diggings exhibit some characteristics typical of the Bilby, however they cannot reliably be attributed to the Bilby due to age, location within the landscape (i.e. not at the base of shrubs or forbs), and/or absence of other positive sign.

4.3.3.4 Burrows

The Bilby constructs burrows that typically have a single round entrance, readily distinguishable from varanids and other reptiles that construct crescent shaped burrows (Southgate et al. 2018). Bilby burrows usually have an apron of excavated sand at the entrance, and are often found under logs, at the base of trees, spinifex tussocks, termite mounds or sand mounds (Triggs 1996, Moseby et al. 2012, Southgate et al. 2018). It is common to observe multiple burrows within an established foraging area, and 'warrens' with multiple burrow entrances can sometimes occur (Southgate et al. 2018).

Inactive Bilby burrows can be utilised by a range of other species, including cats, foxes, varanids, echidnas, hopping mice and mulgara, potentially making them appear active (Southgate et al. 2018). Where burrow evidence was detected, a set of criteria was applied to assess the certainty that they were active (or inactive) Bilby burrows (Table 4.16).

Table 4.16: Criteria used to assess certainty of Bilby burrows.

Certainty	Criteria
High (Active)	1. Fresh, confirmed Bilby tracks detected on/surrounding apron in front of burrow entrance; and/or 2. Fresh, confirmed Bilby scats detected on/surrounding apron in front of burrow entrance; and/or, 3. Fresh, confirmed Bilby diggings detected in a foraging area surrounding the burrow entrance; and/or 4. Multiple burrow entrances detected in a foraging area, displaying evidence from 1-3 above.
Low (Inactive)	1. Burrow entrance exhibits characteristics of the Bilby, and some other sign evidence with longevity persists (e.g. scats/diggings), however it cannot reliably be attributed to the Bilby due to age and absence of fresh, positive signs.

4.3.4 Interpretation of Certainty Criteria

The certainty criteria used to assess sign evidence (Sections 4.3.3 to 4.3.3.4) outline a prescriptive field-based approach aimed at quantifying Bilby presence within the WPA. The results of this approach (see Section 5.6) should be interpreted with the considerations outlined in Table 4.17.

Table 4.17: Considerations for interpretation of certainty criteria.

Certainty Criteria	Interpretation Consideration
High	Sign records were positively attributable to the Bilby, and should be interpreted as evidence of current Bilby presence within the WPA.
Moderate	Individual sign could not be attributed to the Bilby with High certainty, however these records should be regarded as potential evidence of Bilby presence within the WPA. Particularly with respect to digging evidence, mapped locations should be considered together and not in isolation, as this provides an indication of potential Bilby presence at a landscape scale. For example, individual diggings may have been assigned Moderate certainty in the field, however mapped clusters of Moderate diggings may suggest a potential Bilby foraging area when all records are considered together.
Low	Individual sign could not be attributed to the Bilby with Moderate or High certainty, but may be interpreted as past presence of the Bilby, particularly where clusters of Low certainty sign are mapped together.

4.3.5 Bilby Habitat Mapping

At a landscape scale, there are a multitude of factors that affect suitability of habitat for the Bilby, and thus its occurrence, including landform, substrate, vegetation, fire frequency, rainfall, land clearance and presence of introduced herbivores and carnivores (Cramer et al. 2016). Within WA, three landforms have been identified as primary Bilby habitat, described broadly as (1) residual landforms, (2) fluvial landforms and (3) plains and dune fields (Cramer et al. 2016). Additionally, soil, sand, sandy clay or sandy gravel substrates have been identified as critical to the presence of the Bilby, as they enable burrow construction (DBCA 2017c). Within the WPA, suitable landforms present are consistent with (3), plains and dune fields (see Section 4.2.4.1 and Table 4.5), and the substrate is suitably sandy (see Section 3.3).

Acknowledging the complexity of the factors that define Bilby habitat, a finer scale, survey-specific approach has been developed here to map Bilby habitat within the WPA. The approach recognises that Bilby presence is strongly linked to the availability of food resources, which are intrinsically dependent on fire history (Southgate 2005). Bilbies have been recorded in habitats with a range of fire-ages, including recently burnt (1-2 years), unburnt (3-6 years) and long unburnt (>6 years) areas (Southgate 2005, Southgate and Carthew 2007, DBCA 2017a). This has been attributed to fire influencing food availability; fire (and subsequent rainfall) promotes regeneration of some short-lived species such as the grass *Yakirra australiensis*, the seeds of which form dominant components of the Bilby diet when available (Southgate 2005, Liddle 2016). Fire also promotes the growth of other short-lived species such as *Senna notabilis,* the roots of which host larvae, another key component in the Bilby diet (Liddle 2016, DBCA 2018b). Conversely, fire kills long-lived larvae host species, such as *Acacia hilliana* (Liddle 2016). These long-lived species only develop hosting capacity for larvae after the plant reaches a certain age (Liddle 2016), suggesting that unburnt stands of these species are important from the dietary perspective for the Bilby.

Considering the above, a set of criteria was developed to determine the prospectivity of habitat within the WPA (Table 4.18). Habitats were described and mapped based on a joint appraisal of mapped vegetation units (Biota 2019a) and fire history mapping (Department of the Environment 2018). It should be noted that the mapping produced is representative of the habitat at the time of writing: many biotic and abiotic factors determine suitability of Bilby habitat, and temporal changes in these factors influence Bilby presence. The habitat map should therefore be viewed as a guide to delineate areas that may currently be of importance to the Bilby, in the absence of significant change in influencing factors (e.g. post-survey fires and rainfall, or increase in prevalence of introduced predators).

Table 4.18: Criteria used to assess prospective Bilby habitat.

Habitat Prospectivity	Criteria
High	1. Habitat supporting long-lived shrubs or forbs known to contain root-dwelling larvae and other important food source plants in unburnt and long unburnt areas (e.g. *Acacia monticola, A. dictyophleba, A. melleodora, A. stellaticeps, A. hilliana, Senna notabilis* and *Indigofera georgei*), and/or; 2. Habitat supporting short-lived shrubs or forbs known to contain root-dwelling larvae and other important food source plants in recently burnt areas (e.g. *Senna notabilis* and *Yakirra australiensis*).
Moderate	1. Habitat supporting plant species that are broadly typical of suitable Bilby habitat in the Great Sandy Desert (e.g. other *Acacia* spp., *Melaleuca* spp. and *Triodia* grasslands), but with no mapped records of important food source plant species.
Low	1. Habitat does not meet any of the criteria listed above.

4.4 SRE Fauna Survey

4.4.1 Sampling

Sampling of potential SRE invertebrate fauna focused on taxonomic groups known to contain SRE species that were likely to be present within desert environments, including mygalomorph (trapdoor) spiders and scorpions. Other SRE taxa, including land snails, pseudoscorpions and millipedes, that are suited to more mesic microhabitats such as rock piles, accumulated leaf litter at the base of large trees and sheltered locations, were not targeted as these microhabitats were not available in the WPA.

A combination of active searching and dry pitfall trapping (i.e. the systematic pitfall sites used to sample vertebrate fauna) was employed. SRE fauna, particularly mygalomorph spiders, are often cryptic and difficult to detect. Active searching for cryptic burrows by experienced observers is often the most successful method for detecting these fauna. However, occasionally when environmental conditions are suitable, mygalomorph spiders and scorpions are caught in pitfall traps as bycatch. The systematic pitfall traps used to sample vertebrate fauna therefore acted as a supplementary method to active searching (Table 4.19). Details of the active search site locations are provided in Table 4.20, with locations illustrated in Figure 4.6 and habitats depicted in Plate 4.1 to Plate 4.17.

Collected specimens were preserved in 100% ethanol for genetic analysis by Helix; the primary method to place them into context at the species level.

Table 4.19: SRE specimens collected from systematic pitfall sites in the WPA.

	SRE Specimens Collected as Bycatch	
Site Name	**Phase 1**	**Phase 2**
WIN01P	-	✓
WIN02P	✓	✓
WIN03P	-	-
WIN04P	✓	✓
WIN05P	-	✓
WIN06P	-	✓
WIN07P	-	-
WIN08P	✓	-
WIN09P	✓	✓
WIN10P	✓	✓

Table 4.20: SRE search site locations and effort in the WPA.

	Site Name	Date	Easting	Northing	Number of Personnel	Total Search Time (Minutes)	Search Effort (Minutes)
Phase 1	WINSRE01	14/05/2019	381489	7701681	1	25	25
	WINSRE02	13/05/2019	381515	7701670	1	11	11
	WINSRE03	16/05, 17/05, 18/05/2019	360723	7710320	1	146	146
	WINSRE04	18/05/2019	361123	7709804	1	26	26
	WINSRE05	16/05/2019	368729	7707113	1	20	20
	WINSRE06	18/05/2019	371952	7707073	2	49	98
	WINSRE07	18/05/2019	355237	7712270	2	146	292
	WINSRE08	18/05/2019	371070	7705451	2	32	64
	WINSRE09	17/05/2019	361872	7709295	1	52	52
	WINSRE10	18/05/2019	361460	7710735	1	22	22
Phase 2	WINSRE11	21/09/2019	382307	7702774	2	120	240
	WINSRE12	21/09/2019	354023	7712028	2	132	264
	WINSRE13	22/09/2019	376066	7701084	4	68	272
	WINSRE14	23/09/2019	375235	7706153	3	129	387
	WINSRE15	22/09/2019	375419	7703026	2	72	144
	WINSRE16	24/09/2019	381833	7702322	2	128	256
	WINSRE17	19/09/2019	377847	7702480	4	180	720
						Total	**3,039**

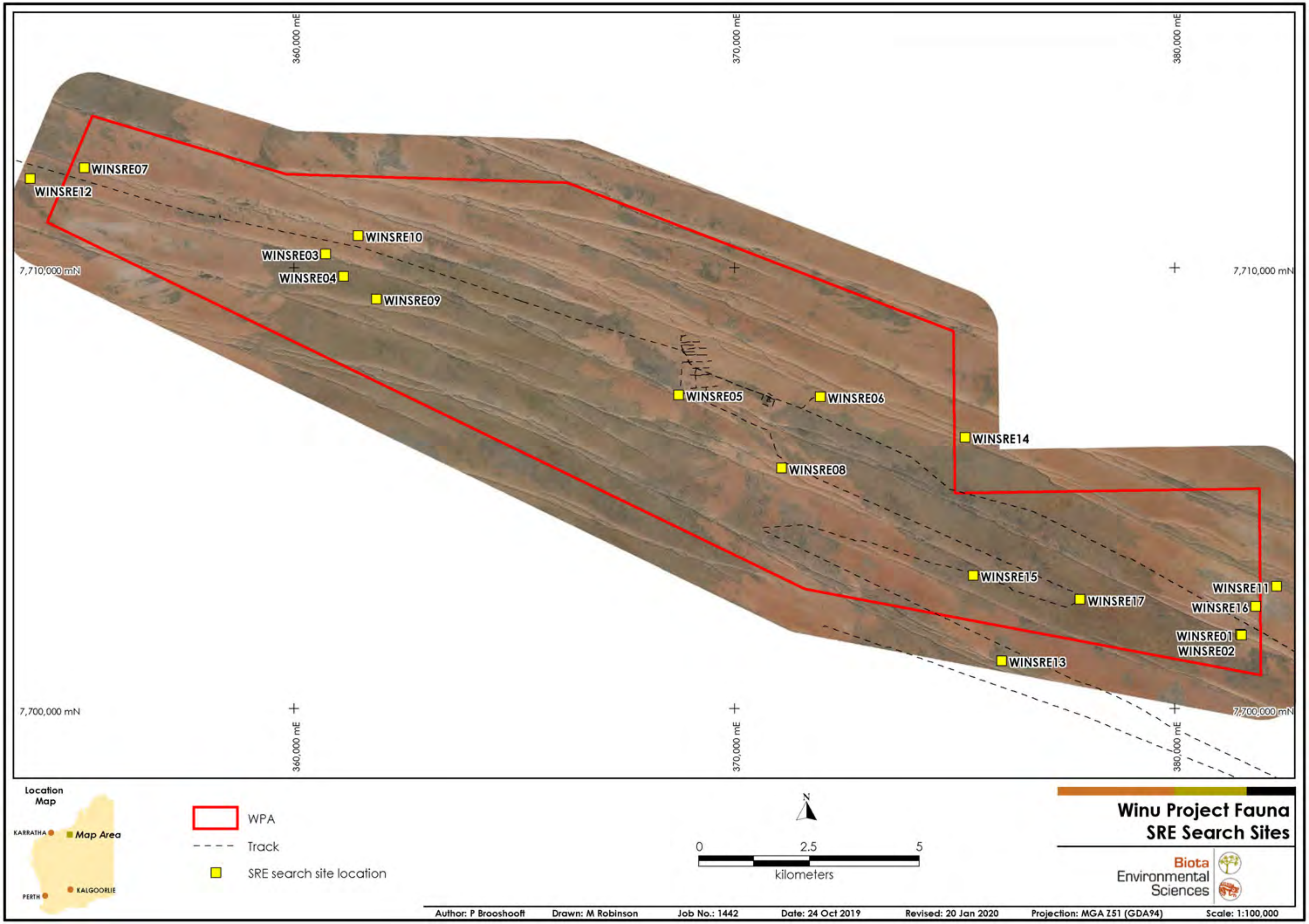

Figure 4.6: **Locations of SRE search sites within the WPA.**

Plate 4.1: **WINSRE01.**

Plate 4.2: **WINSRE02.**

Plate 4.3: **WINSRE03.**

Plate 4.4: **WINSRE04.**

Plate 4.5: **WINSRE05.**

Plate 4.6: **WINSRE06.**

Plate 4.7: **WINSRE07.**

Plate 4.8: **WINSRE08.**

Plate 4.9: WINSRE09.

Plate 4.10: WINSRE10.

Plate 4.11: WINSRE11.

Plate 4.12: WINSRE12.

Plate 4.13: WINSRE13.

Plate 4.14: WINSRE14.

Plate 4.15: WINSRE15.

Plate 4.16: WINSRE16.

Plate 4.17: WINSRE17.

4.4.2 Molecular Analysis

Molecular analysis of invertebrate specimens was conducted to determine the number of species present and their status as SRE fauna, where possible. Sequencing was completed by Helix. All specimens were sequenced for variation at the mitochondrial cytochrome oxidase subunit I gene (COI). The resulting molecular sequences were used in a phylogenetic analysis to determine the number of taxa present and place the WPA taxa into context with reference sequences publicly available on GenBank or within Helix's database. More detailed methodology is presented in Helix (2019a, 2019c) (addressed further in Section 5.7).

4.4.3 Determining SRE Status

The SRE status of species is primarily based on their geographic distributions, which are described by two summary statistics. The first is the 'maximum spanning distance', which is the maximum linear distance between two records. The second statistic is the 'minimum spanning area', which is the area of the smallest polygon that can be drawn around all of the records. The minimum spanning area can be used as a means for objectively establishing SRE status by comparison against the 10,000 km^2 criterion established by Harvey (2002). Table 4.21 details the criteria used to determine the SRE status of putative species for the purposes of this report.

Table 4.21: Criteria used to determine SRE status.

SRE Status	Defining Criteria
Known SRE	• Species, morphotype or genetic type has a documented range of <10,000 km^2. • Species, morphotype or genetic type is well collected with numerous specimens typed and habitat preference understood.
Potential SRE	• Species, morphotype or genetic type has a documented range of <10,000 km^2 but is poorly sampled. • Specimen may not be formally described or assigned to a morphotype / genetic type. • Short-range endemism may be common in genus or family. • May have been collected from restricted, refugial or isolated habitats.
Unlikely to be an SRE	• Species, morphotype or genetic type has a documented range of <10,000 km^2 but is poorly sampled. • Specimen may not be formally described or assigned to a morphotype / genetic type. • Short-range endemism is not common in genus or family. • Taxon was not collected from restricted, refugial or isolated habitats. • Few other individuals of the taxon collected, but records are separated by long distances (>100 km).
Not an SRE	• Specimen formally described or assigned to a morphotype / genetic type. • Species, morphotype or genetic type has a documented range of >10,000 km^2.
Undetermined	• Taxa where there is insufficient taxonomic framework available to provide any informed comment on the species-level distribution of the fauna or, therefore, the risk of small-scale spatial restrictions.

4.5 Nomenclature

Consistent with EPA guidance (EPA 2016a), species nomenclature used in this report for vertebrate fauna follows that of the WAM checklist for reptiles, amphibians and mammals (last updated October 2019), and that of Christidis and Boles (2008) for birds. Nomenclature for invertebrates follows that of the WAM.

4.6 Data Analysis

4.6.1 Species Accumulation Curves

Species accumulation curves graph the detection of new species as a function of increasing sampling effort. When a survey has sampled a high proportion of the fauna assemblage, and few new species are added with additional sampling, the curve will plateau and approach an asymptote. In this way, species accumulation curves provide one means of assessing survey adequacy.

PRIMER v6 software (Clarke and Gorley 2006) was used to calculate smoothed species accumulation curves based on 999 random permutations of the species and abundance data. Actual observed accumulation curves were also plotted. Non-parametric estimators can be applied to estimate the asymptote of the data set, that is, the total number of species, including those that may be present but have not yet been detected. There are a number of non-parametric estimators that can be used to estimate species richness, however their performance can depend upon a number of criteria, including sample size, patchiness and overall abundance (Magurran 2004). For this, and other reasons, there is no clear consensus on which estimator universally performs best (Rajakaruna et al. 2016). Here, three non-parametric estimators were investigated: Chao1, Jacknife 1 and Bootstrap.

Only quantitative data from systematic surveying (of mammals, reptiles and birds) were used to create species accumulation curves, as these data represent consistent sampling effort that can be validly extrapolated. Species recorded from Elliott trapping sites, opportunistically, from non-systematic methods (e.g. bat sampling, nocturnal surveying) or from targeted sampling methods (e.g. targeted Bilby survey) were excluded from the analysis, as these methodologies were not consistent across sites and are limited to recording only the species they target.

4.6.2 Vertebrate Fauna Assemblage Analysis

Similarity in fauna assemblage amongst trapping sites was analysed by Bray-Curtis similarity matrices, calculated in PRIMER v6. A screened site-by-species matrix for each fauna group, including abundance data, was imported into PRIMER and square-root transformed to reduce the influence of high abundance species on the similarity analyses (Clarke and Gorley 2006). A resemblance matrix was then constructed using the Bray-Curtis similarity index, which produces a similarity value for all pairs of sites based on species representation and transformed abundances. The resultant resemblance matrix was then run through PRIMER's CLUSTER routine, using group average linkage to construct a dendrogram, grouping the survey sites into clusters based on similarity of species composition. Lastly, PRIMER's similarity profile (SIMPROF) permutation tests were applied to the outputs to determine if any of the groups were significantly different. Sites with similar assemblages were then further examined to assess whether this related to described habitats.

4.7 Survey Limitations

In accordance with the EPA Technical Guidance 'Sampling Methods for Terrestrial Vertebrate Fauna' (EPA 2016a), potential constraints and limitations of the fauna survey of the WPA are addressed in Table 4.22.

Table 4.22: Potential constraints and limitations of the fauna survey of the WPA.

Potential Constraint	Statement of Limitations
1. Availability of contextual information at a regional and local scale	• There has been little past survey effort in the locality of the WPA. One comprehensive fauna survey (the AREH project) and three Level 1 fauna surveys were relevant to the current study and were considered in association with the existing desktop assessment. The AREH survey provided very recent and comprehensive information on fauna species, including threatened fauna, to provide context to the current study. • Despite recent survey within the locality of the WPA, regional and local level contextual information is considered to be a limiting factor for this study.
2. Competency/ experience of the team carrying out the survey, including experience in the bioregion surveyed	• The survey objective was to provide information on fauna values of the WPA to support the design of the potential development and to inform the likely pathways for environmental approvals. Given the size of the WPA and the scope of the overall project, a seasonal two-phase Level 2 fauna survey, SRE fauna survey, and targeted Bilby survey were considered appropriate. • Field personnel were suitably qualified to identify fauna. Molecular analysis was also undertaken to confirm species identifications where required. There were therefore no limitations due to resourcing or experience.
3. Proportion of fauna recorded and/or collected, any identification issues	• An inventory survey of all fauna species was completed, and habitat assessments were made in order to determine their potential to support conservation significant species; the targeted survey focused on recording evidence of the Bilby. • Identification of fauna was not considered to be a limitation.
4. Appropriate area fully surveyed (effort and extent)	• The WPA was surveyed thoroughly, with numerous sampling sites assessed and foot traverses completed through the majority of the WPA. • Trapping effort was adequate to meet the requirements of environmental impact assessment. Guidance for sampling terrestrial vertebrate fauna generally recommends 10 pitfall traps at each pitfall trapping site (EPA 2016a). Eight pitfall traps were installed at most sites (except where substrate limited installation). Pitfall traps were supplemented with funnel traps to make up the deficit, as funnel traps are equally efficient at trapping animals in sandy environments. • Survey effort targeted at detecting the presence of the Bilby was in accordance with that recommended by DBCA (2017a). • Survey effort and extent for the survey was not considered to be a limitation.
5. Access restrictions within the WPA	• The survey sites were located close to tracks which were in mostly good condition. Some sections of the WPA were a large distance from any tracks and required considerable walking time to ground truth. Installation and regular checking of traps in these areas was therefore not possible. • Access to the entire WPA was considered to be a minor limitation, however aerial imagery and vegetation mapping (Biota 2019a) was used to verify that the habitats systematically sampled were representative of areas that were not feasible to access.
6. Survey timing, rainfall, season of survey	• Extensive and recent fires in the area altered vegetation structure over a large portion of the WPA, limiting suitable areas for systematic site installation. • Historical climate data were not available for the WPA, but were taken from the closest weather station located 108 km to the south-southeast. • Vegetation condition and climate data indicated that the WPA had not received the recent rainfall that might be expected of a ‘wet’ season survey (Phase 1), while the ‘dry’ season (Phase 2) survey followed a period of above average temperatures and below average rainfall. As such, fauna activity and presence may have been affected; therefore recent weather conditions were considered to be a limitation.
7. Disturbance that may have affected the results of survey such as fire, flood or clearing	• The WPA had been affected by recent and extensive fires. Fire may have affected fauna abundance, species distributions and presence within the WPA. • Drill line, track, and airstrip disturbance in the WPA was minimal and was not limiting to the results of the assessment, therefore disturbance was not considered to be a limitation for the study.

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5.0 Winu Project Area Results and Discussion

5.1 Desktop Assessment

5.1.1 Potential Fauna Assemblage

The desktop consolidation yielded a total of 202 vertebrate species with the potential to occur in the WPA, of which 34 are listed as conservation significant (Table 5.1). Two invertebrate species from groups known to contain SREs were also returned (Table 5.1). The combined species list is provided in Appendix 1.

Table 5.1: Overview of vertebrate fauna species with potential to occur in the WPA.

Fauna Group	Status	Number of Species	Number of Conservation Significant Species
Amphibians	Native	5	0
Reptiles	Native	76	3
Ground-dwelling Mammals	Native	22	8
	Introduced	6	0
Bats	Native	7	0
Birds	Native	86	23
Invertebrates	Native	2	0
	Total	**204**	**34**

5.1.2 Likelihood of Conservation Significant Fauna Occurrence

Of the 202 vertebrate species potentially occurring in the WPA, 34 vertebrate species are listed as conservation significant. Appendix 4 summarises the likelihood of occurrence of these conservation significant species.

Prior to undertaking the field survey, 12 of the 34 species were considered likely to occur and six species had potential to occur (Appendix 4). Eight species were considered unlikely to occur, and eight species would not occur in the WPA (Appendix 4). During the survey, 12 conservation significant species were actually recorded, 11 of which had been considered likely to occur, and one assessed as having the potential to occur (see Section 5.2).

5.2 Vertebrate Fauna

5.2.1 Overview

A combined total of 118 vertebrate fauna species were recorded during the survey from systematic trapping, non-systematic sampling and targeted Bilby surveying. This total included 14 species of conservation significance (Table 5.2; see Appendix 5 for site by species matrices).

Across all systematic trapping sites, 1,064 individuals were recorded (including 36 mammals, one amphibian, 494 reptiles and 533 birds). A further 158 individuals were recorded opportunistically (38 reptiles and 120 birds), while seven mammal species were recorded from trace records (scats, tracks, diggings or burrows) or from targeted searches. Five bat species were recorded from the bat detectors. Six bird species were recorded from the automated audible recordings, including two species not recorded by other methods. Forty-four individuals were recorded from the nocturnal searches (one mammal and 43 reptiles), including one species of reptile that had not been recorded by other methods. Eleven individuals (including eight mammals and three reptiles) were recorded on the motion cameras.

Table 5.2: Overview of vertebrate fauna recorded from the WPA.

	Number of Species			Number of Conservation Significant Species
Faunal Group	**Phase 1**	**Phase 2**	**Total**	
Native ground-dwelling mammals	8	7	10	3
Introduced ground-dwelling mammals	3	4	4	0
Bats	1	4	5	0
Reptiles	31	49	56	1
Amphibians	0	1	1	0
Birds	27	28	42	10
Total	**70**	**93**	**118**	**14**

The number of species recorded during Phase 2 was higher than Phase 1, with 23 more species. The species composition between Phase 1 and 2 did not differ markedly, however the number of individuals recorded differed considerably for reptiles; more individuals were trapped in the systematic sites during Phase 2 compared to Phase 1 (358 compared to 174, respectively).

A number of species recorded in this study extended known distributions, the specific examples detailed in Section 5.2.2.6 for mammals and Section 5.2.3.2 for reptiles.

5.2.2 Mammals

5.2.2.1 Ground-dwelling Mammals

Seven ground-dwelling mammal species (all native) were recorded from the trapping sites (Appendix 5). The most abundant species was the Spinifex Hopping-mouse (*Notomys alexis*; 18 individuals were captured at five sites). This species was also recorded from five motion camera sites, and during a nocturnal search (Appendix 5). Three mammal species were only recorded once from a single site: the Kaluta (*Dasykaluta rosamondae*), the Wongai Ningaui (*Ningaui ridei*) and the Desert Mouse (*Pseudomys desertor*) (Appendix 5).

Targeted searching and opportunistic observations resulted in a further seven ground-dwelling mammal records. Three introduced species, comprising the Cat (*Felis catus*), Red Fox (*Vulpes vulpes*) and Camel (*Camelus dromedarius*) were recorded from track and scat sign, and one naturalised exotic species, the Dingo (*Canis familiaris dingo*), was recorded from both track sign and observation. A further three species of conservation significance were recorded from targeted sign searches, comprising the Bilby (*Macrotis lagotis*), Northern Marsupial Mole (*Notoryctes caurinus*) and Brush-tailed Mulgara (*Dasycercus blythi*). Further detail of these conservation significant species is presented in Sections 5.2.2.3 to 5.2.2.5 below.

5.2.2.2 Bats

Five bat species were identified from ultrasonic call recordings (Appendix 5). None of the species recorded were of elevated conservation significance.

5.2.2.3 Bilby (*Macrotis lagotis*)

The Bilby was recorded from the WPA during the survey, as documented in detail (including record location map) in Section 5.6. The Bilby has also been recently recorded within WRAC Section 2 (between approximately 50-100 km northwest of the WPA; see Section 7.2.2.6) (Biota 2018a).

5.2.2.4 Northern Marsupial Mole (*Notoryctes caurinus*)

The Northern Marsupial Mole was delisted from the EPBC Act (where it was previously Endangered) and placed on the DBCA priority species list as a Priority 4 species in 2015 (Threatened Species Scientific Committee 2015). The delisting was based on results of extensive mole trenching surveys that indicated the species was more widespread and common throughout its range than previously thought. The Northern Marsupial Mole was recorded from four moleholes observed at site WIN01MM (Figure 5.1; Plate 5.1). Moleholes have also been recently recorded from trenches within WRAC Section 2 (approximately 41 km northwest of the WPA; see Section 7.2.2.7) (Biota 2018a).

Plate 5.1: Moleholes at site WIN01MM.

5.2.2.5 Brush-tailed Mulgara (*Dasycercus blythi*)

The Brush-tailed Mulgara is listed as a Priority 4 species by the DBCA. It is recognised as a separate species to the Crest-tailed Mulgara (*Dasycercus cristicauda;* DBCA Priority 4/EPBC Act Vulnerable) based on morphological and molecular differences (Woolley 2005, Pavey et al. 2011). Diggings, tracks and one burrow inferred to be that of the Brush-tailed Mulgara were recorded within the WPA (Plate 5.2; Figure 5.1). In the absence of a trapped individual, the sign evidence was attributed to the Brush-tailed Mulgara, as opposed to the Crest-tailed Mulgara, based on location of the sign within preferred habitat of the Brush-tailed Mulgara (the species occupies sand plains whereas the Crest-tailed Mulgara occupies sandridges) (Pavey et al. 2011), and location within the overall distribution of confirmed specimens within Western Australia (R. How pers. comm.). No images of the Brush-tailed Mulgara were recorded from motion cameras. Burrows and diggings of the Brush-tailed Mulgara have been recently recorded within the vicinity of the WPA at the nearby AREH project (approximately 75 km to the northwest) (Biota 2018a).

Plate 5.2: Brush-tailed Mulgara tracks and diggings.

5.2.2.6 Molecular Analysis and Mammal Taxa of Note

Eight mammal tissue samples were sequenced for the purpose of species verification. These samples comprised species morphologically identified as *Notomys alexis, Sminthopsis youngsoni, Ningaui ridei, Planigale ingrami, Pseudomys hermannsburgensis* and *P. desertor.*

Of particular interest was the verification of *Notomys alexis*, given the small possibility that the morphologically similar, presumed extinct species *Notomys longicaudatus* could occur. The species *N. longicaudatus* has not been recorded since 1901, however its occurrence in understudied areas such as the Great Sandy Desert has not been ascertained (Menkhorst and Knight 2011). Phylogenetic analyses placed the *Notomys* specimen from the current study within the *Notomys alexis* clade, showing between 0-1.4% sequence divergence from reference specimens, confirming with high confidence that they were *N. alexis* (Appendix 6).

Phylogenetic analysis of the *Sminthopsis, Ningaui* and *Pseudomys* specimens verified all of the morphological identifications: *Sminthopsis youngsoni, Ningaui ridei, Pseudomys hermannsburgensis* and *P. desertor* (Appendix 6).

Sequencing of the *Planigale* specimen resulted in a different species assignment to the initial morphological identification as *Planigale ingrami.* The specimen displayed between 0.1-0.3% sequence divergence at the 16s mtDNA gene from specimens currently recognised as *Planigale* 'species 1' (Appendix 6). The species *P. ingrami* is known to be a species complex, comprising *Planigale* 'Mt Tom Price' and *Planigale* 'species 1' (Westerman et al. 2016). The species *Planigale* 'species 1' is currently undescribed, and reportedly restricted to the Pilbara-Barrow Island region of WA (Westerman et al. 2016). The placement of the specimen from the WPA as *Planigale* 'species 1' therefore considerably extends the known distribution of the species into the Great Sandy Desert, which is approximately 200 km northeast from the nearest record of the species (Westerman et al. 2016). The results demonstrate the value of molecular analyses, both in the confirmation of field determinations and in extending known distributions for species where taxonomic issues are not fully resolved.

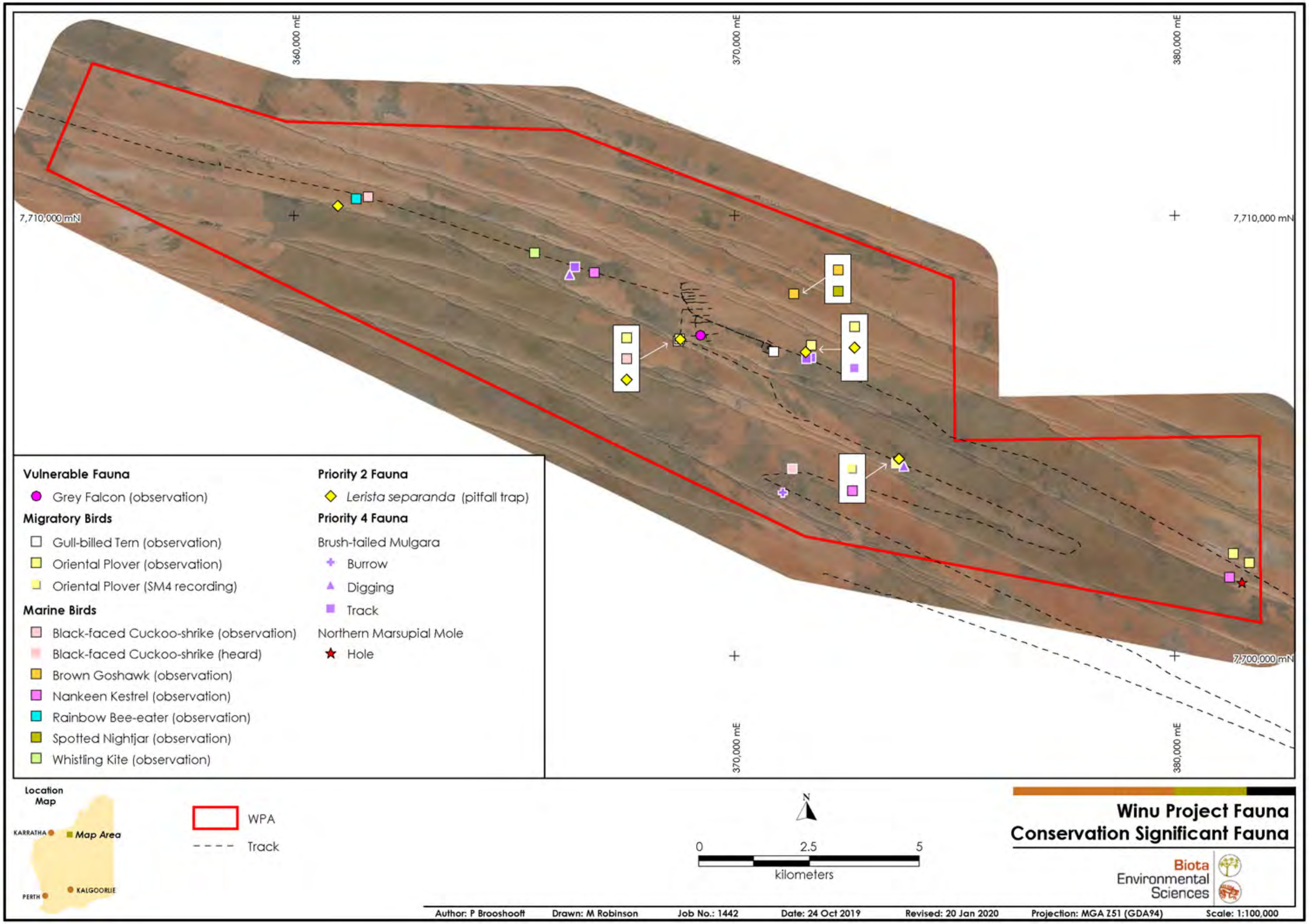

Figure 5.1: Locations of conservation significant fauna recorded in the WPA.

5.2.3 Reptiles

Forty-four reptile species were recorded from the trapping sites (Appendix 5). This total comprised eight gecko species, four flap-footed lizards, five dragons, 17 skinks, three monitor lizards, and seven snakes (Appendix 5). The most abundant species was *Lerista bipes* with 138 records, representing 28% of the total reptile trap records. One skink species recorded during the survey, *Lerista vermicularis,* represents the only vertebrate species recorded that is endemic to the Great Sandy Desert. One conservation significant reptile species was recorded; *Lerista separanda,* and details of this species are presented in Section 5.2.3.1. Records of two reptile species extended their current known distributions, as detailed in Section 5.2.3.2.

In addition to trap records, a further 12 reptile species were recorded from targeted searching and opportunistic observations, including two geckos, one flap-footed lizard, two dragons, two monitor lizards and five snakes (Appendix 5).

5.2.3.1 *Lerista separanda*

Molecular analysis of tissue collected from specimens morphologically identified as *Lerista separanda* (Plate 5.3) verified the identification (Appendix 6). The DBCA Priority 2 species was recorded from four sites within the WPA (WIN03P, WIN05P, WIN06P and WIN07P; see Figure 5.1). This species was originally described as occurring solely from the Dampier Peninsula, however recent records have extended its distribution to include Warrawagine station (100 km west of the WPA) and WRAC Section 2 (between approximately 30-75 km northwest of the WPA) (Doughty et al. 2011, Biota 2018a). The records from the WPA represent a further range extension for this species. The increased knowledge of this species' distribution gained by the current survey provides a basis for potential delisting from the DBCA's priority fauna list.

Plate 5.3: ***Lerista separanda.***

5.2.3.2 Molecular Analysis and Reptile Taxa of Note

Two further reptile tissue samples were sequenced for the purpose of species verification, given morphological identifications indicated significant range extensions. These samples comprised species morphologically identified as the whipsnake *Demansia shinei* and the blind snake *Anilios endoterus.*

The whipsnake specimen was morphologically identified as *Demansia shinei* based on head patterning and scalation (Plate 5.4). Advice from the WAM also indicated that it appeared to be this species, and not the morphologically similar species *D. calodera* (P. Doughty, pers. comm.). *Demansia calodera* can be differentiated from *D. shinei* by the width of the pale postocular bar and pale anterior nuchal band, large size and greater number of ventral scales (Shea and Scanlon 2007). Molecular analyses however revealed that the specimen showed affinity to *D. calodera*, at between 2.6-3.1% sequence divergence (Appendix 6). Although, the placement of the specimen within the species was tentative, as genetic reference material of *D. shinei* was not available for comparison (Appendix 6). Shea and Scanlon (2007) tentatively assigned a specimen from the Little Sandy Desert (less than 100 km south of the WPA) to *D. shinei* based on morphological characteristics. Given the proximity of this specimen, there is potential for some overlap in morphological characters between *D. calodera* and *D. shinei*, and a taxonomic re-evaluation may be needed in future (Appendix 6).

Based on the available data, the specimen recorded from the WPA was putatively assigned to *D. calodera*. This represents a significant range extension to the current known distribution of *D. calodera*: it is known from Shark Bay and Exmouth regions of WA (~750 km to the southwest), with an isolated population in the Gibson Desert Nature Reserve (~600 km southeast) (Shea and Scanlon 2007). This result demonstrates the value of molecular analysis, especially in situations where morphological characteristics between similar species overlap.

Plate 5.4: *Demansia* head pattern.

The blind snake specimen was assigned to the species *A. endoterus* based on morphological identification and advice sought from Ryan Ellis (WAM) (Plate 5.5). However, there was also the possibility that it could be the species *A. pilbarensis* (distribution in the Pilbara) or a new species (R. Ellis pers. comm.). Based on this, verification of species identification was obtained via molecular sequencing, which confirmed the morphological identification. The specimen showed 3.1% sequence divergence from the nearest reference data; a specimen of *A. endoterus* (Appendix 6). This record also represents a range extension to its current known distribution. The most northern records of this species on NatureMap are approximately 300 km south and east of the WPA.

Plate 5.5: *Anilios endoterus* rostrum (left) and side profile (right).

5.2.4 Amphibians

A single frog was recorded during Phase 2 following a night of light rainfall: the Desert Spadefoot, *Notaden nichollsi* (Appendix 5). This species typically burrows in red dune habitats (Cartledge et al. 2006) and is active at night even when conditions are hot (Tyler and Doughty 2009). It is common to record relatively few desert frogs during surveys due to their tendency to aestivate and remain cryptic during dry conditions, but they are typically recorded opportunistically following rainfall.

5.2.5 Birds

A total of 24 bird species were recorded from census at the systematic trapping sites (Appendix 5). A further 16 species were recorded from opportunistic observations, while an additional two species were recorded from the automated audio recording devices (Appendix 5). The overall assemblage displayed a relatively low species richness, with the dominance of open plain habitat and scarcity of dense tree and shrub layers or water sources that are typically found in areas of avifauna diversity. These factors were likely contributors to the lack of species richness.

The most species-rich families recorded were the Accipitridae (all diurnal raptors except falcons and kestrels) with six species, and Meliphagidae (honeyeaters and chats), with seven species (Appendix 5). The most abundant bird species were the Budgerigar (*Melopsittacus undulatus*) and the Crimson Chat (*Epthianura tricolor*), which accounted for 19% and 18% respectively of all individual bird species recorded from the WPA.

Ten bird species of conservation significance were recorded: the Grey Falcon (*Falco hypoleucos*), which is listed as Vulnerable under the BC Act, the Oriental Plover (*Charadrius veredus*) and Gull-billed Tern (*Gelochelidon nilotica*), which are both listed as BC Act Migratory and EPBC Act Migratory/Marine, as well as seven EPBC Act Marine listed species. Details of these species are discussed further in Sections 5.2.5.1 to 5.2.5.4 below.

5.2.5.1 Grey Falcon (*Falco hypoleucos*)

The Grey Falcon is endemic to Australia and is widespread but rare throughout Australia's arid and semi-arid regions, with a distribution centred primarily on inland drainage systems with an average rainfall < 500 mm per annum (Garnett et al. 2011). It inhabits lightly timbered coastal and inland plains, particularly acacia shrublands crossed by tree-lined watercourses (Johnstone and Storr 1998, Garnett et al. 2011). Wetlands where surface water attracts prey may also attract Grey Falcons, but they will hunt over a variety of habitats, even far out over treeless plains (Olsen and Olsen 1986).

The Grey Falcon primarily hunts birds, especially parrots and pigeons, taken using high-speed chases and stoops; reptiles and mammals are also taken. Natural breeding sites are usually in trees, such as *Eucalyptus* spp., typically in the abandoned nests of crows and butcherbirds (Marchant and Higgins 1993, Johnstone and Storr 1998). Telecommunications towers are also used regularly (e.g. Falkenburg 2010). Eggs have been recorded in July and August but its breeding season is not certain.

A single Grey Falcon was observed in the WPA during sampling for subterranean fauna conducted in November (the results of which are subject of a separate report; Biota 2019b), over the main drilling area west of the Winu camp (included as an opportunistic record in this report). It was initially sighted in active flight at relatively low altitude (~10 m above ground) before gaining height and soaring high over the area for an extended period before disappearing to the west. Overall bird numbers observed during the subterranean fauna survey were higher than on the two phases of terrestrial fauna survey, and large numbers of smaller birds, including Zebra Finches, Pied Honeyeaters, Masked Woodswallows and Budgerigars, were observed drinking from surface water retained in sumps around the drilling area. It is likely that the Grey Falcon was hunting within the WPA where it was attracted by the higher bird densities.

5.2.5.2 Oriental Plover (*Charadrius veredus*)

The Oriental Plover was recorded from opportunistic observations and from the automated audio recording devices (Appendix 5; Figure 5.1). This species is a summer migrant to Australia, occurring primarily from September to April, though the earliest arrivals may return in late August, and occasional birds remain into May (Johnstone and Storr 1998, Broome Bird Observatory unpublished data). The species breeds in Mongolia, northern China and southern Siberia, and it is a non-breeding migrant to Australia (Johnstone and Storr 1998). However, unlike most shorebird species, they are not particularly tied to wetland and coastal habitats while in Australia. Their preferred foraging habitats are sparsely vegetated open areas, including short-grassed or bare plains, bare wetland margins, and recently burnt areas (Johnstone and Storr 1998). This also includes similar man-made habitats, such as sports fields and airfields. The species will also use tidal mudflats, beaches, sewage ponds and freshwater wetland areas, primarily while on migration or for roosting during the heat of the day (Johnstone and Storr 1998, Menkhorst et al. 2017). They are mobile in response to conditions, and disperse across inland northern Australia during the wet season (Minton et al. 2013). They feed primarily on insects and other invertebrates captured on the ground, and appear to do much of their foraging in the early morning, evening and at night (e.g. Piersma and Hassell 2010).

Within the WPA, most observations were made on the margins of the airstrip and nearby sparsely-vegetated claypans. Observations were mostly of small flocks of 2-20 individuals (though at least one record was made of a single bird overflying sand dunes to the south of the Winu camp) (Appendix 5). As the species is quite mobile in response to prevailing conditions, they are likely to be somewhat sporadic in occurrence within the WPA between September and April. The species would not be expected to be present between May and late August when they have mostly left to breed, which is supported by the lack of observations during Phase 1 of the survey in May.

5.2.5.3 Gull-billed Tern (*Gelochelidon nilotica*)

The Gull-billed Tern was observed overflying the Winu camp on a single occasion (Appendix 5; Figure 5.1). This species is listed as Migratory and Marine under the EPBC Act, however there are two populations of Gull-billed Tern that occur in Australia; a resident population *G. nilotica macrotarsa* and a migratory population *G. nilotica affinis*. Most authorities now recognise the resident Australian population as a distinct species, Australian (Gull-billed) Tern, based on differences in plumage, structure, ecology and genetics (Rogers et al. 2005). The individual observed in the WPA was of the Australian resident population based on plumage. This species is still listed as Migratory under the EPBC Act due to a lag in updating the recommended taxonomy in the EPBC guidelines.

Australian (Gull-billed) Terns are nomadic and occur widely across Australia, including both coastal and inland areas, but generally remain within Australia. They breed colonially on inland wetlands, and forage over sheltered coastal and inland wetlands, and over open grassland and bare ground (Johnstone and Storr 1998). The individual observed in the WPA was likely prospecting for suitable habitat. The Australian subspecies would only be expected to use the WPA for foraging if heavy rains resulted in the existence of shallow wetland areas, or if large-bodied insects (e.g. grasshoppers) were present in great numbers following good rainfall. The species is unlikely to use the WPA for breeding unless shallow wetlands form following very heavy rainfall events, however if such habitat appeared it would be of lesser importance compared to the extensive habitat at larger wetland areas in the region such as Walyarta (Mandora Marsh), located approximately 105 km north-northwest of the WPA. The migratory subspecies is a non-breeding migrant to Australia and is more coastal in its habit (Menkhorst et al. 2017); therefore it would be less likely to occur within the WPA (and would not breed there as it is a non-breeding visitor to Australia).

5.2.5.4 EPBC Act Marine Listed Birds

The EPBC Act maintains a list of fauna species recognised as Matters of National Environmental Significance that are protected under the Act. Marine species are included under the Act, including bird species that rely upon the marine environment for survival.

However, the Act also erroneously lists some species that do not actually rely upon the marine environment for survival, but instead rely upon land environments and in some cases, are often widespread and common (Garnett 2013). The seven Marine listed bird species recorded during the survey fit into this category; none rely upon marine environments for survival, and all are relatively common and widespread. These species are the Spotted Nightjar (*Eurostopodus argus*), Whistling Kite (*Haliastur sphenurus*), Brown Goshawk (*Accipiter fasciatus*), Nankeen Kestrel (*Falco cenchroides*), Whiskered Tern (*Chlidonias hybrida*), Rainbow Bee-eater (*Merops ornatus*), and Black-faced Cuckoo-shrike (*Coracina novaehollandiae*) (Figure 5.1). These species are therefore not of genuine conservation significance concern in the context of the survey findings.

5.3 Conservation Significant Fauna of the Winu Project Area

5.3.1 Conservation Significant Fauna Recorded Summary

In total, seven species of conservation significance were recorded from the WPA (in addition to the seven erroneously listed Marine avifauna species; Section 5.2.5.4). These were:

- Bilby (*Macrotis lagotis*) –BC Act and EPBC Act Vulnerable;
- Northern Marsupial Mole (*Notoryctes caurinus*) – DBCA Priority 4;
- Brush-tailed Mulgara (*Dasycercus blythi*) – DBCA Priority 4;
- *Lerista separanda* – DBCA Priority 2;
- Grey Falcon (*Falco hypoleucos*) – BC Act Vulnerable;
- Oriental Plover (*Charadrius veredus*) – BC Act Migratory, EPBC Act Marine and Migratory; and
- Gull-billed Tern (*Gelochelidon nilotica*) - BC Act Migratory, EPBC Act Marine and Migratory.

5.3.2 Conservation Significant Fauna Likely to Occur

In addition to the confirmed conservation significant species, previous records and habitat availability reviewed during the desktop assessment indicated two other species were likely to occur within the WPA:

- Australasian Pipit (*Anthus novaeseelandiae*) – EPBC Act Marine (Section 5.3.2.1); and
- Fork-tailed Swift (*Apus pacificus*) – BC Act Migratory, EPBC Act Marine and Migratory (Section 5.3.2.2).

5.3.2.1 Australasian Pipit (*Anthus novaeseelandiae*)

The Australasian Pipit was recorded during the AREH project (Biota 2018a), and suitable habitat (open areas with low and grassy vegetation) is available in the WPA, so it is therefore likely that this species would be present. This species is listed as Marine under the EPBC Act and fits into the same category as other Marine listed bird species recorded, as discussed in Section 5.2.5.4 and would not be of true conservation concern if present.

5.3.2.2 Fork-tailed Swift (*Apus pacificus*)

The Fork-tailed Swift is thought to be exclusively aerial within Australia. Therefore, while it is likely that this species may occur within the WPA on occasion, it would not rely on terrestrial habitat in the WPA.

5.3.3 Conservation Significant Fauna Potentially Occurring

The desktop assessment also indicated that four conservation significant species had potential to occur in the WPA. The species were:

- Princess Parrot (*Polytelis alexandrae*) – DBCA Priority 4, EPBC Act Vulnerable (Section 5.3.3.1);
- Night Parrot (*Pezoporus occidentalis*) – BC Act Critically Endangered, EPBC Act Endangered (Section 5.3.3.2);
- Pallid Cuckoo (*Cacomantis pallidus*) – EPBC Act Marine (Section 5.3.3.3); and
- Tree Martin (*Petrochelidon nigricans*) – EPBC Act Marine (Section 5.3.3.3).

5.3.3.1 Princess Parrot (Polytelis alexandrae)

The Princess Parrot is a highly nomadic species that occupies eastern deserts of Western Australia. The nomadic nature of this species means that it could be present within the WPA on occasion, where it would likely forage on spinifex during seeding events, however it would be difficult to confirm this unless survey timing coincided with this species' periodic presence.

5.3.3.2 Night Parrot (*Pezoporus occidentalis*)

Targeted survey effort was directed at recording the Night Parrot (see Section 4.2.5.3), however no records of this species were made. The adjacent AREH project dedicated 2,340 days of automated acoustic recording over 10 sites to record the species, and it was still not detected (Biota 2018a). Preferred nesting habitat of the species includes old growth spinifex hummocks, at least 40-50 cm in size (DBCA 2017b). Preferred nesting habitat is also likely to be associated with favourable feeding habitat, which typically includes chenopod shrubs (Hamilton et al. 2017, Jones 2017). The WPA is dominated by spinifex on sandplain, potentially supporting suitable sized hummocks for nesting, however much of the locality had been recently and repeatedly burnt (Biota 2019c). Fire reduces habitat suitability for the Night Parrot by removing large and mature spinifex hummocks from the landscape. While it is possible that this species may be present in the WPA, no records were made and no evidence of suitable nesting habitat or foraging habitat was recorded.

5.3.3.3 Pallid Cuckoo (*Cacomantis pallidus*) and Tree Martin (*Petrochelidon nigricans*)

Both the Pallid Cuckoo and Tree Martin are Marine listed species that fit into the category of erroneously listed species, as discussed in Section 5.2.5.4, and would not be of true conservation concern if present.

5.4 Fauna Habitats

The fauna habitats defined for the WPA aligned broadly with the landforms present, with further delineation of some isolated habitat patches that supported distinct fauna assemblages. Four habitat types were described for the WPA. Details and unique attributes of these habitat types are presented in Table 5.3 and mapped in Figure 5.2.

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Table 5.3: Fauna habitats and their attributes within the WPA.

Habitat	Description* and Sites	Area (Ha) and Proportion of WPA (%)	Habitat Condition	Fauna Assemblage	Example Photograph
1. Shrub and spinifex on sandplain	The dominant habitat of the WPA. Substrate consisted of red loose sand to a depth of 5 cm. Vegetation was typical of the Great Sandy Desert bioregion, comprising open hummock grasslands dominated by *Triodia schinzii* with scattered trees of *Owenia reticulata* and shrubs of mixed Acacia species. **Survey sites**: WIN01P, WIN02P, WIN04P, WIN06P, WIN07P, WIN11E, WIN12E	9,522 (72)	Excellent condition, however half (53%) of this habitat had been recently burnt (<1 year) (5,038 ha).	Species with particular associations to spinifex, i.e. mammals that forage on seeds, or species that utilise shrubs and spinifex for cover and/or foraging would be expected to occur in this habitat. This was evidenced with the records of *Pseudomys desertor, P. hermannsburgensis, Sminthopsis youngsoni* and *Dasykaluta rosamondae*, which were only recorded from this habitat type.	
2. Longitudinal sand dune ridge	The sand dunes were typically long linear dunes trending east-west. Substrate consisted of red loose sand to depth of 10 cm. The vegetation was dominated by *Corymbia chippendalei, Erythrophleum chlorostachys* and *Owenia reticulata* low woodland and scattered trees over mixed *Acacia* low open shrublands over open hummock grasslands dominated by *Triodia schinzii.* **Survey sites**: WIN03P, WIN05P, WIN10P	3,338 (25)	Excellent condition, however just over half (57%) of this habitat had been recently burnt (<1 year) (1,906 ha).	Species associated with this habitat include fossorial species and dune specialists. The fossorial skink, *Eremiascincus pallidus,* which prefers loose substrates of dunes, was only recorded from the dune sites. The sand slider *Lerista vermicularis,* endemic to the Great Sandy Desert where it inhabits crests of sand-ridges, was recorded only from the dune sites, where it was abundant (72 individuals). Dune specialist species *Ctenotus brooksi, C. dux* and *C. leae* were also only recorded at the dune sites. Species such as the Northern Marsupial Mole would also preferentially occupy this habitat type, particularly interconnected dunes that provide dispersal opportunity.	
3. Gravelly lateritic rise	A patchy habitat type within the WPA, comprising low rises of laterite gravel and pebble surface cover with sandy clay loam substrate. Vegetation comprised scattered *Grevillea wickhamii* subsp. *hispidula* over *Mirbelia viminalis* low shrubland over *Triodia brizoides* open hummock grassland. **Survey sites**: WIN08P	303 (2)	Excellent condition with a minor portion recently burnt (1 ha; 0.5%).	Species with a preference for rocky substrate would be expected to be associated with this habitat type, for example *Ctenophorus caudicinctus*. However, the assemblage recorded in this habitat did not contain any species with particular preferences for stony areas, which is probably due to the small extent of this habitat type within surrounding sandy dunes and plains. Perhaps of greater interest was the number of Spinifex Hopping Mouse records from this habitat: This species is reported to be restricted to sandy areas for burrowing and foraging, however multiple diggings amongst *Mirbelia viminalis* shrubs indicated that this habitat represented a foraging habitat for adjacent sand plain species.	
4. Clayey sand plain with termitaria	Isolated habitat type within the WPA. Substrate comprised clayey sand to loose depth of 2 cm. The vegetation comprised *Acacia bivenosa* shrubland over *Triodia brizoides* open hummock grassland. **Survey sites**: WIN09P (this site was located just outside of habitat 4 within an ecotone between habitat 1 and 4, as habitat 4 had been mostly burnt and would not have been conducive to trapping fauna).	111 (1)	The majority (93%) of this habitat had been recently burnt (<1 year) (103 ha).	The clayey sand substrate of this habitat type enabled construction of termitaria, which were absent from the rest of the WPA. Species that utilise termitaria as refugia or for foraging purposes would therefore be associated with this habitat. For example, *Gehyra pilbara*, which is a termitaria specialist, was opportunistically recorded from termite mounds in this habitat. Two python species, Stimson's Python (*Antaresia stimsoni*) and the Black-headed Python (*Aspidites melanocephalus*) were also opportunistically recorded from this habitat type, and both of these species are known to shelter in termite mounds. The termite mounds probably represent a significant microhabitat for these species as other shelters, such as logs and caves, are either sparse or absent in the WPA. One species of gecko, *Diplodactylus laevis*, was recorded in high numbers from this habitat. This species utilises spider burrows as diurnal shelters, and the substrate of this habitat type was more prospective for larger mygalomorph spiders, and thus may have provided greater shelter opportunity for this gecko species.	
	Total	**13,274**			

* Vegetation descriptions adapted from (Biota 2019a)

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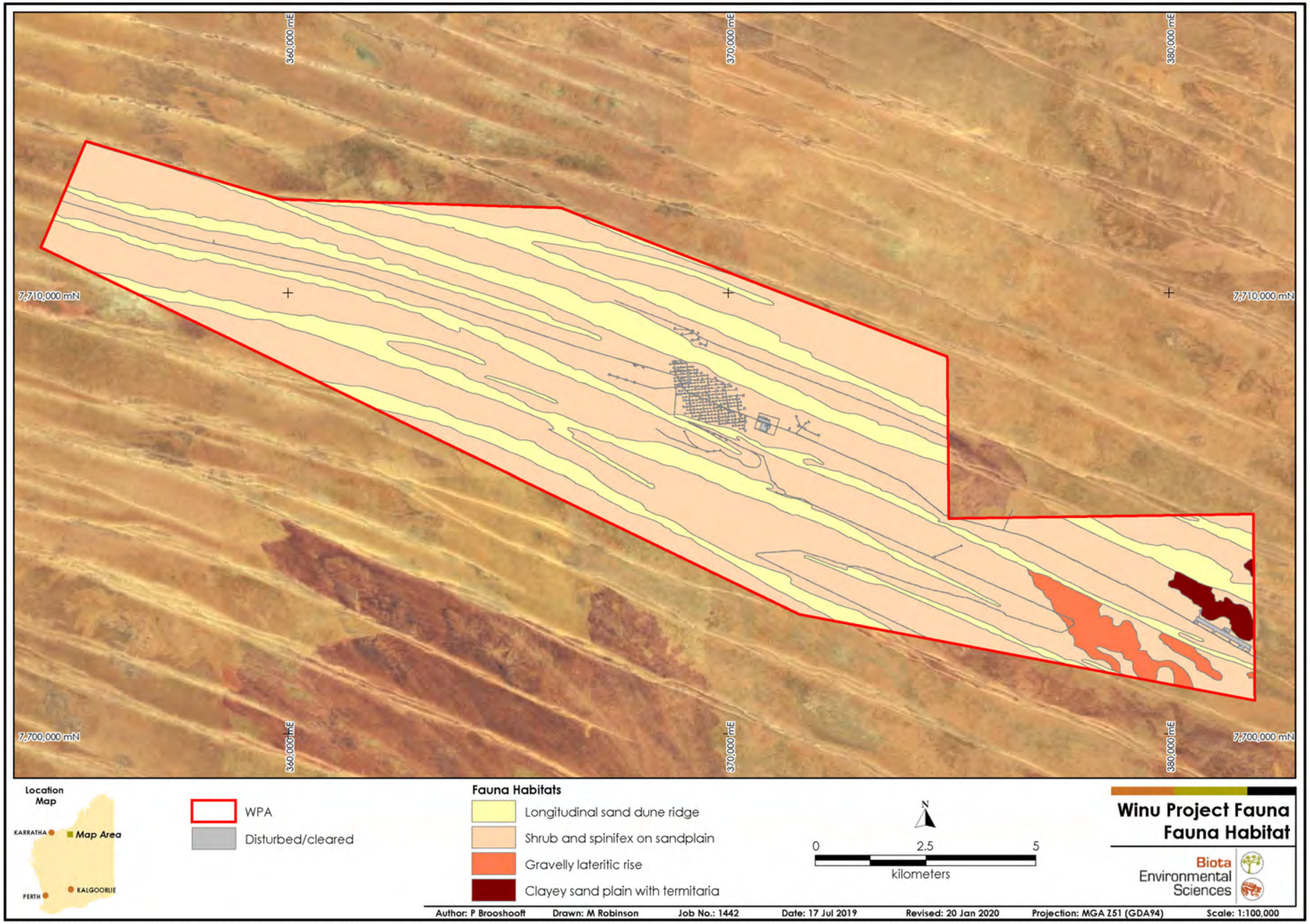

Figure 5.2: **Fauna habitats described for the WPA.**

5.5 Species Accumulation Curves

5.5.1 Ground Fauna

Fifty-one species of ground fauna (mammals, reptiles and amphibians) were recorded from the systematic trapping sites. Figure 5.3 charts the observed number of species plotted against survey day and the randomised rarefaction curve. The rarefaction curve increased rapidly initially in the first few days of sampling, as is the typical pattern of species accumulation. The curve then gradually increased over the sampling period and did not reach asymptote, indicating that additional species would have been recorded with sustained trapping effort (Figure 5.3).

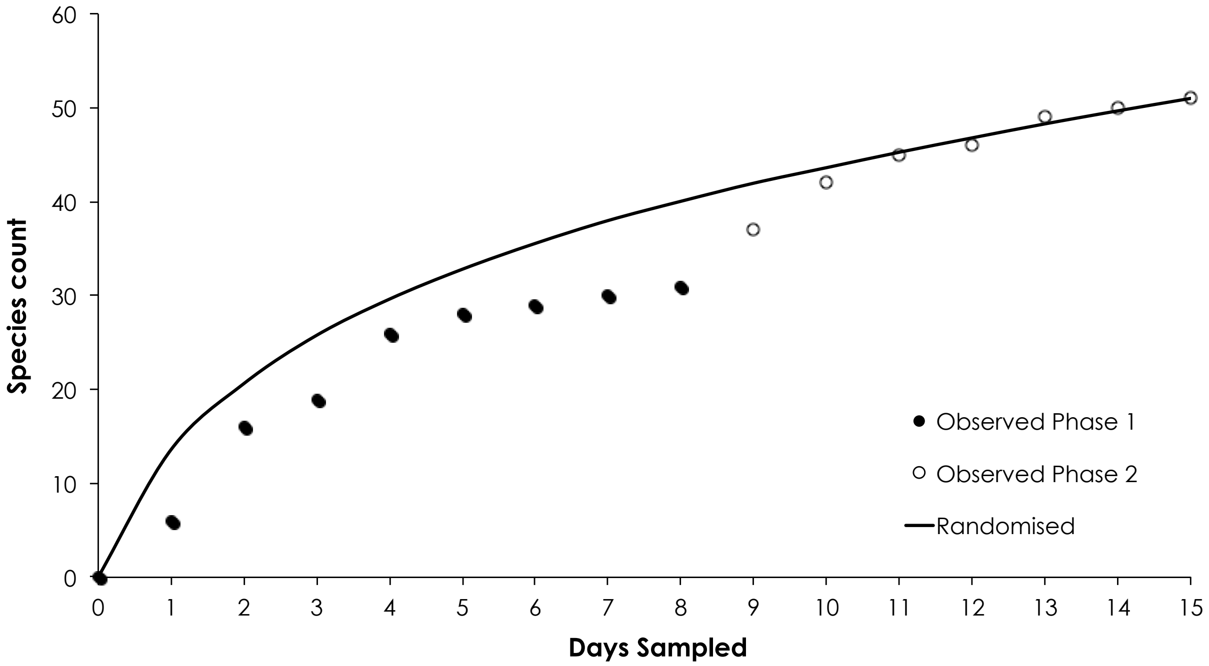

Figure 5.3: Observed species accumulation and rarefaction curve for ground fauna recorded at the systematic trapping sites.

The Chao1 estimator was selected for total species richness estimation here, as it was the most appropriate given the high proportion of singleton and doubleton records in the data (four of seven mammals, a single amphibian and 21 of 43 reptiles). Chao1 is a non-parametric estimator that is based on the concept that rare species are most informative of the number of undetected species, and therefore uses the ratio of singletons and doubletons to obtain a minimum estimate of expected species richness (Gotelli and Chao 2013). Chao1 is also considered to be the most robust in deriving a valid minimum estimate of richness where other estimators are unstable or still rising when all samples have been added to the accumulation curve (Magurran 2004).

Chao1 estimated the expected species richness for ground fauna was 81 species, compared to the observed number of 51 species. This was not unexpected, because the estimate of species richness produced by Chao1 will continue to exceed observed species richness as the frequency of singletons increases (Magurran 2004), which reflects the pattern of species captures in the data. The more rare (in the sense of singletons or doubletons) number of species in a sample, the more likely it is that other 'rare' species are present but not detected through the trapping methods used. It is important to note here that only trappable species have been considered; some species are not trappable and were therefore targeted via other methods (e.g. opportunistically or targeted).

A high frequency of singleton and doubleton records does not necessarily indicate inadequate survey effort, and it can be due to many factors. For example, daily weather (temperature, humidity, rainfall) can affect activity of mammals, reptiles and amphibians, thus also affecting capture rates. This can be seen in the pattern of captures across Phase 1 and Phase 2 (Figure 5.4). Phase 1 captures were overall lower for reptiles and mammals, reflective of the generally cooler and drier temperatures (Figure 5.4). During Phase 2, the number of reptiles trapped on the first two days was high, and coincided with high daytime temperatures (Figure 5.4). Capture rates then substantially dropped off, coinciding with a drop in ambient temperature (Figure 5.4). Following a small rainfall event, one amphibian was captured, which probably would not have been detected otherwise if conditions had remained dry (Figure 5.4). This rainfall event was also not likely to have been substantial enough (0.2 mm total) to activate larger numbers of amphibians, thus only a singleton was recorded. A rise in relative humidity coupled with a small amount of rain also seemed to have a latent effect on reptile activity, with captures increasing again on the penultimate day of trapping (Figure 5.4). Such weather fluctuations mean the number of fauna available for capture and the suite of fauna mobilising in response to conditions differs day to day. This was demonstrated here, and likely to be the reason why additional species would be expected to occur, but were not trapped.

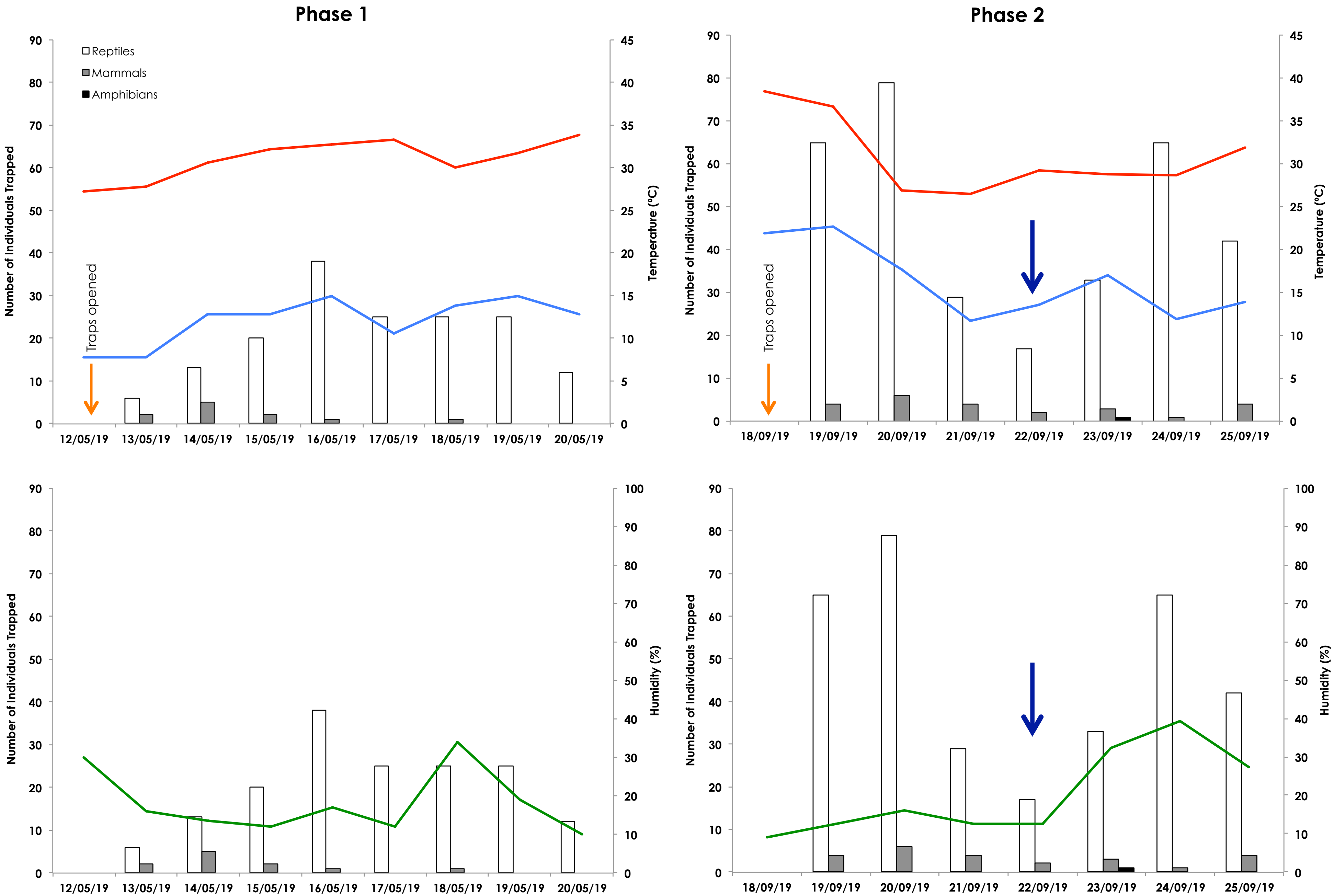

Figure 5.4: Weather and number of trapped reptiles, mammals and amphibians per survey day during Phase 1 and 2.

Blue arrow = overnight rainfall. Red line = maximum temperature. Light blue line = minimum temperature. Green line = relative humidity.

5.5.2 Birds

Twenty-four bird species were recorded during the bird censuses conducted at the systematic trapping sites. Figure 5.5 charts the observed number of species plotted against survey day and the randomised rarefaction curve. The rarefaction curve increased steadily in the first few days of sampling and continued to gradually increase over the sampling period. The curve did not appear to plateau, indicating that additional species would have been recorded with sustained effort.

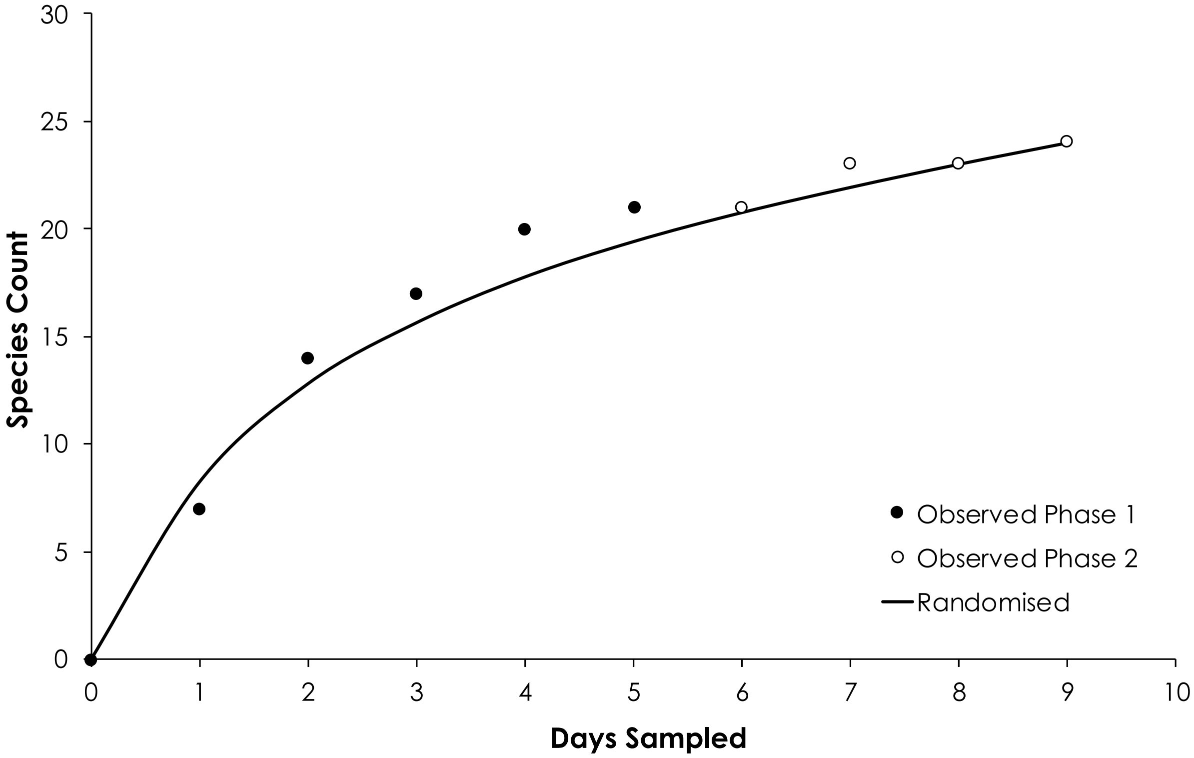

Figure 5.5: Observed species accumulation and rarefaction curve for birds recorded at the systematic trapping sites.

The Chao1 estimator was again explored but was not selected as the best estimator of total avifauna species richness, as there was not a high proportion of singletons and doubletons in the data (only seven of 24 species). Instead the Jackknife1 and Bootstrap estimators were selected as most appropriate to the data. Compared to the observed species richness of 24 species, the Jackknife1 estimator predicted 32 species whereas the Bootstrap estimator predicted 27 species. While additional species may have been present but not detected during the systematic surveys, it is important to note that birds were also often recorded opportunistically and via the use of automated recording units (which were not included in the species accumulation analysis). Together these latter methods added 15 species to the avifauna inventory, bringing the total to 39 species, exceeding the species richness predicted by the Jackknife1 and Bootstrap estimators.

5.5.3 Fauna Assemblage Analysis

The ground fauna species composition was compared across the systematic sampling sites using the Bray-Curtis measure of similarity. The resulting dendrogram, which clustered sites based on similarity in species composition, is illustrated in Figure 5.6, with sites coded according to the habitat type they sampled. All sites within habitat type 2 (longitudinal sand dune ridge) were grouped together and had a significantly different assemblage from all other habitats (Figure 5.6). Sites within habitat type 1 (shrub and spinifex on sandplain) were all grouped together in a higher order branch of the dendrogram with between 50-70% similarity, indicating a distinct ground fauna assemblage associated with this habitat. The remaining habitat types 3 (gravelly lateritic rise) and 4 (clayey sandplain with termitaria) were separated in another branch with less than 50%

similarity similar to each other, indicating that the fauna assemblages within each of these habitats were different from each other, thus supporting the mapping of these habitats as separate units.

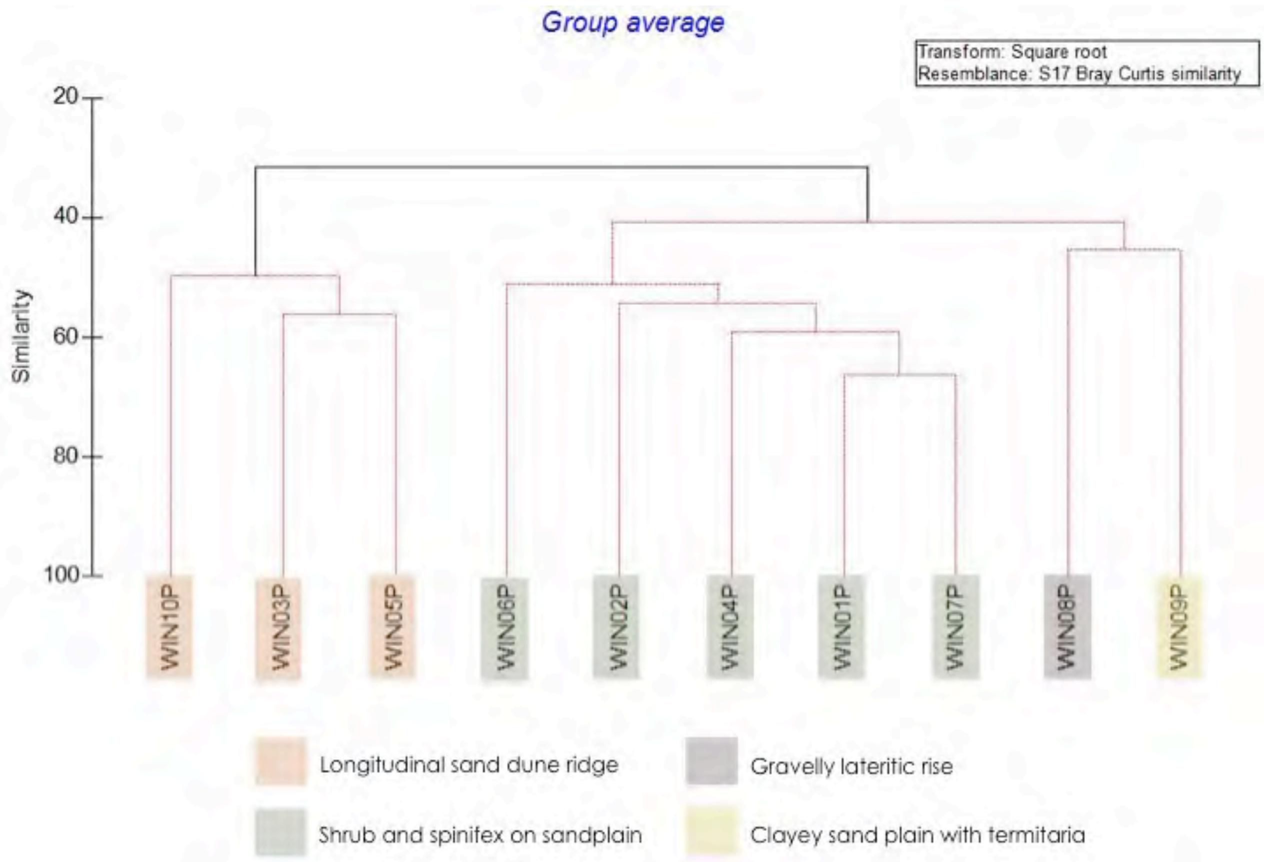

Figure 5.6: Dendrogram of similarity between sites and fauna habitats within the WPA.

5.6 Targeted Bilby Survey

5.6.1 2 ha Sign Plots

5.6.1.1 Tracks

No Bilby tracks were detected during the sign plot searches in the WPA. However, tracks of other animals, including the Dingo (*Canis familiaris dingo*), Australian Bustard (*Ardeotis australis*), Cat (*Felis catus*), *Lerista* (species unidentifiable), birds and mice (species unidentifiable) and small to large lizards (species unidentifiable) were regularly noted during the plot searches.

5.6.1.2 Scats

No Bilby scats were detected during the sign plot searches in the WPA. However, scats of other species including the Dingo, Cat and a macropod (species unidentifiable) were noted during the plot searches.

5.6.1.3 Diggings

No diggings attributable to the Bilby were detected during the sign plot searches, however diggings into roots of plants attributable to varanids (species unidentifiable) were noted.

5.6.1.4 Burrows

No Bilby burrows were detected during the sign plot searches in the WPA, however burrows of small lizards and varanids (species unidentifiable) were detected.

5.6.2 Transects

Sign evidence positively attributable to the Bilby, comprising recent diggings, scats, tracks and active burrows, was found during the unbounded transect searches within one primary locale (Figure 5.7). The specific sign evidence is discussed further below in Sections 5.6.2.1 to 5.6.2.4.

5.6.2.1 Tracks

During Phase 1, tracks assigned to Bilby with High certainty were located in one primary locale in the WPA (Figure 5.7). Another possible track attributable to the Bilby was found elsewhere in the WPA, however this track was assigned Low certainty as it was found in isolation of other sign (Figure 5.7). The tracks assigned as High certainty displayed clear gait pattern and foot imprints consistent with that of the Bilby (Plate 5.6).

During Phase 2, no additional track evidence was found during the unbounded transects completed, however tracks assigned with High certainty were opportunistically recorded in the western section of the WPA (Plate 5.7; Figure 5.7). Based on the gait and movement pattern, the tracks were attributed to the Bilby, however the resolution of hind and front foot imprints was poor due to sandy substrate. The only other species with potential to produce the tracks was the Northern Quoll, however no core habitat for this species was present in the WPA, it was not recorded during the survey, and it is considered unlikely to occur (see Section 5.1.2).

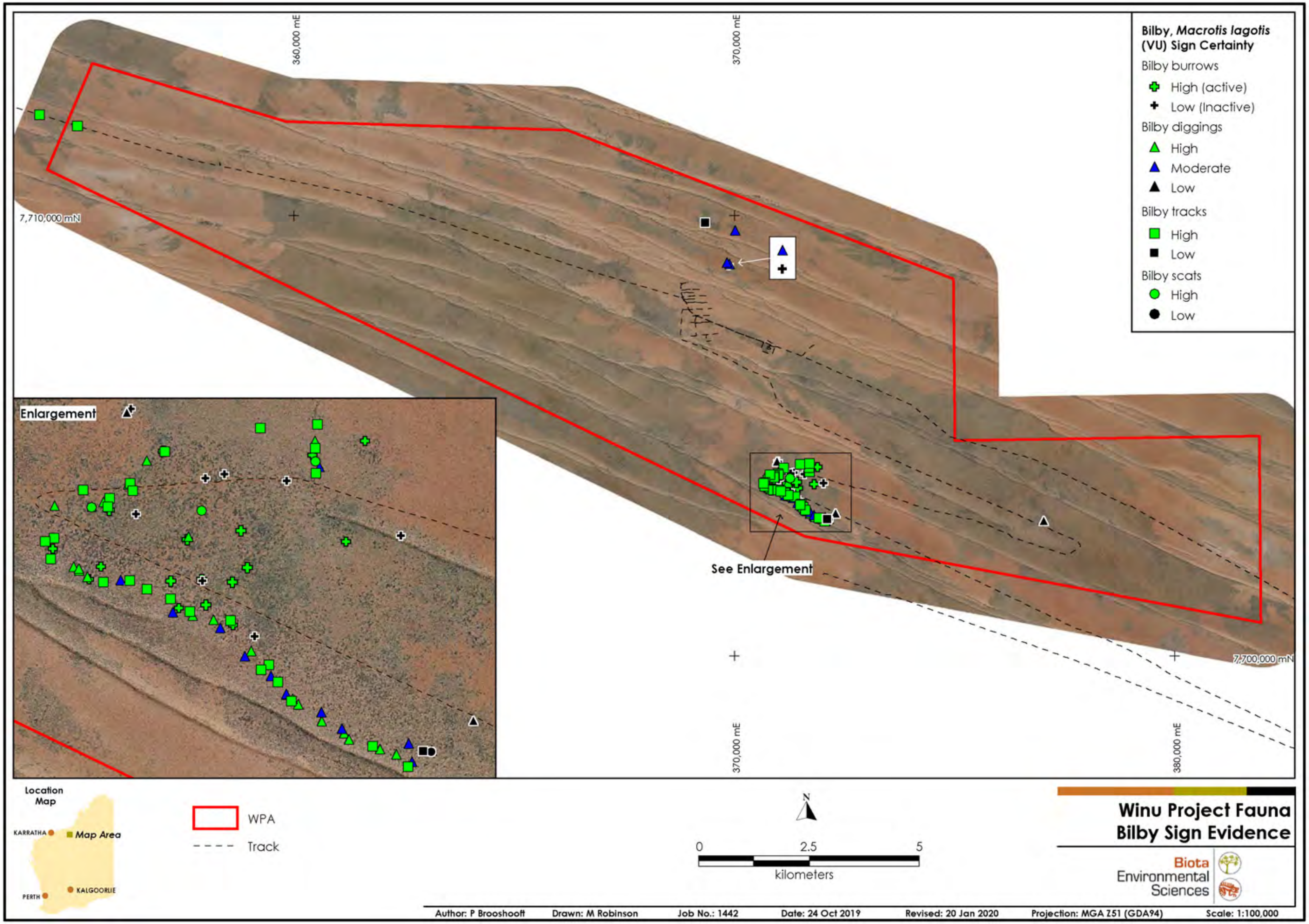

Figure 5.7: **Bilby sign recorded within the WPA.**


Plate 5.6: Bilby track examples showing front foot imprints and gait pattern.

Plate 5.7: Bilby tracks opportunistically recorded during Phase 2.

5.6.2.2 Scats

Scat piles were found in association with digging evidence (see Section 5.6.2.3 below) during both phases (Figure 5.7). The scats were consistent with that produced by the Bilby (Plate 5.8). Dedicated effort to collect scats was undertaken during Phase 2 for a population abundance analysis, the results of which are addressed in a separate report (Biota in prep.).

Plate 5.8: Bilby scats found deposited on top of a digging spoil pile.

5.6.2.3 Diggings

Numerous diggings into the base of *Acacia monticola* and *Acacia ancistrocarpa* shrubs were detected at the primary locale, and were attributed to the Bilby with High certainty (Plate 5.9; Figure 5.7). Other diggings assigned Moderate or Low certainty were detected elsewhere in the WPA (Figure 5.7), some of which were found close to an inactive burrow (see Section 5.6.2.4). These diggings were old and mostly isolated however, and were likely indicative of past presence of the Bilby.

Plate 5.9: Bilby diggings into the base of *Acacia* shrubs, also showing scat piles.

5.6.2.4 Burrows

Numerous burrow entrances were found in association with positively attributable tracks, scats and diggings, and were therefore assigned as High certainty active Bilby burrows (Plate 5.10; Figure 5.7). In addition, other older inactive burrows were located in proximity to the active burrows. A possible burrow was found in the northern portion of the WPA (Figure 5.7), however it could not reliably be attributed to the Bilby due to its age and absence of other fresh, positive sign. No images of the Bilby were recorded from motion cameras established at the entrances of active burrows, however the Bilby does use multiple burrows within a home range, therefore it is possible that the cameras were established on active burrows that were not in use over the recording period.

Plate 5.10: Active Bilby burrows showing apron of excavated sand and fresh tracks.

5.6.3 Bilby Habitat Assessment

The Bilby occurs in low densities throughout its range, and is known to be highly mobile, responding to fluctuations in resource availability by moving into areas of prospective habitat when conditions are favourable, and out of areas when resources are depleted (Cramer et al. 2016). Habitat within the WPA was assessed following criteria outlined in Section 4.3.5, which also considers the nomadic nature of the Bilby and its potential to be present wherever suitable habitat is, at any time, given optimal conditions. The majority of the WPA was therefore assessed as High prospectivity Bilby habitat (10,201 ha, representing 76.8% of the total WPA), based on the presence of suitable food source plants within vegetation of an appropriate fire history age (Figure 5.8). The remaining portions of the WPA were assessed as Moderate (3,073 ha) prospective habitat, while 88 ha was cleared or disturbed, and would not represent Bilby habitat (Figure 5.8).

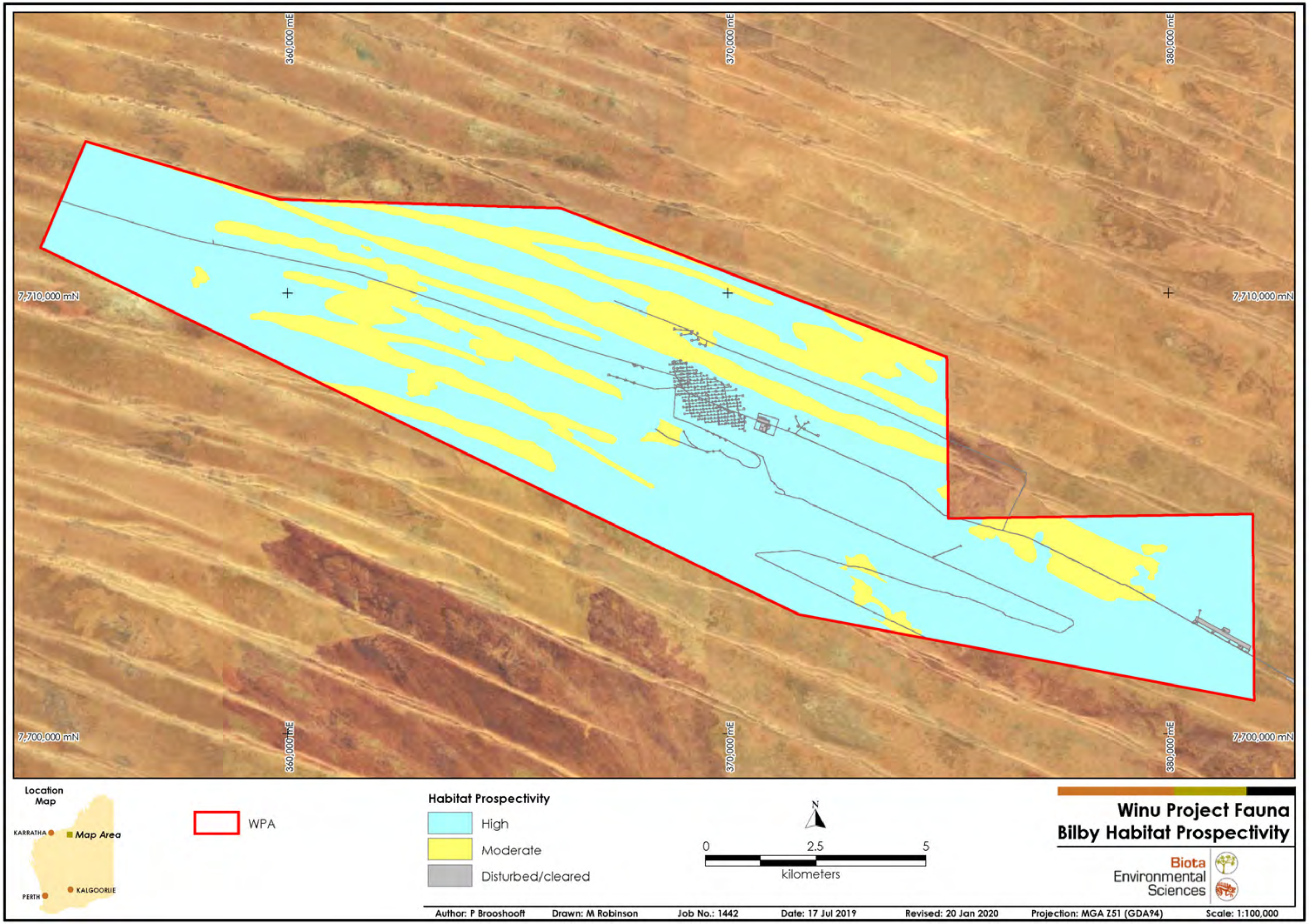

Figure 5.8: **Mapped Bilby habitat within the WPA.**

5.7 SRE Invertebrate Fauna

In total, 41 invertebrate specimens were collected from dry pitfall trapping and targeted searching. The collected specimens comprised 13 scorpions and 28 spiders. Locations of recorded specimens are presented in Figure 5.9.

5.7.1 Spiders

5.7.1.1 Mygalomorphae

Twenty-seven of the spiders collected were mygalomorph (trapdoor) spiders. One of these specimens failed to yield a viable DNA sequence and was not assigned to a genetic lineage (Appendix 7). Of the 26 successfully sequenced specimens, 16 belonged to a single, previously unrecorded, species in the family Nemesiidae (Appendix 8). The remaining 10 specimens were all assigned to species that had not been previously been recorded, comprising six species within the family Nemesiidae and one species within the family Barychelidae (Appendix 8). As none of the taxa showed affinity to previously collected mygalomorph species, they were all conservatively assigned potential SRE status (Appendix 8).

5.7.1.2 Araneomorphae

One specimen collected did not align with other mygalomorph specimens, and was instead placed within the Araneomorphae infraorder (so-called modern spiders). Placement of this species to a family could not be made as numerous identity assignments were found (Appendix 7). Araneomorph spiders are not typically targeted as SRE taxa as they generally do not display short-range endemism, on account of their dispersal mechanisms (aerial ballooning). Given a lack of physical dispersal barriers within the WPA (the specimen was collected from a linear dune), it is unlikely that this specimen would represent an SRE species (Appendix 8).

5.7.2 Scorpions

5.7.2.1 Buthidae

Seven specimens belonging to the family Buthidae were successfully sequenced, while one specimen failed to sequence and was not assigned to a species (Appendix 7). Six of the successfully sequenced specimens were placed within two divergent clades in the species currently recognised as *Lychas annulatus* (Appendix 7). The placement of the specimens into two distinct clades was interesting; two specimens showed no intraspecific divergence from reference specimens located 60 km from the WPA (and were therefore reliably assigned to *L. annulatus*) (Appendix 7). The remaining two specimens (separated by less than 4 km from each other within the WPA) were 7.8% divergent (Appendix 7). This pattern of differentiation suggests two distinct lineages, and possibly separate taxa; however further investigation would be required to resolve this (Appendix 7). Without this resolution, the specimens were assigned to the known species *Lychas annulatus* (also recognised as *Hemilychas alexandrinus*), which has a distribution extending across the arid zone of Australia and is therefore not an SRE (Appendix 8).

The remaining successfully sequenced specimen belonged to a separate clade of *Lychas* scorpions. The specimen showed 9.4% sequence divergence from the *L. annulatus* specimens, one of which was collected at the same locality (Appendix 7). This level of divergence strongly indicated a separate species of *Lychas.* For resolution of this specimen, Dr. Erick Volschenk (of Alacran Environmental Science) was consulted to conduct further molecular analyses. Results from this analysis placed the specimen within the species *Lychas adonis*, which has a widespread distribution across arid parts of Australia and is therefore not an SRE (Appendix 7).

5.7.2.2 Urodacidae

Three species within the family Urodacidae were detected; *Urodacus varians, Urodacus* sp. 'Telfer', and *Urodacus 'yaschenkoi* species complex' (Appendix 7). The species *Urodacus varians* is a rarely collected dune specialist known from the Gibson Desert (Appendix 7). The SRE status of this species is difficult to ascertain, as distributions are patchy, although it is thought that this species is present over much of central Western Australia (Appendix 8).

Two specimens were assigned to the species *Urodacus* sp. 'Telfer'. The specimens represented the fourth and fifth records of the species and the first female specimens collected to date. The species is currently only known from an area south of Telfer and is therefore considered a potential SRE (Appendix 8). The remaining urodacid specimens showed likeness to the species *Urodacus* '*yaschenkoi* species complex', which as its name suggests, is a species complex containing at least three putative species (Appendix 7). The species complex is usually associated with red dune systems and has a collective distribution of central Queensland to WA Goldfields and Broome (Appendix 7). The specimens from the WPA did not show affinity to any reference specimens within this species complex, and as such were considered potential SREs (Appendix 8).

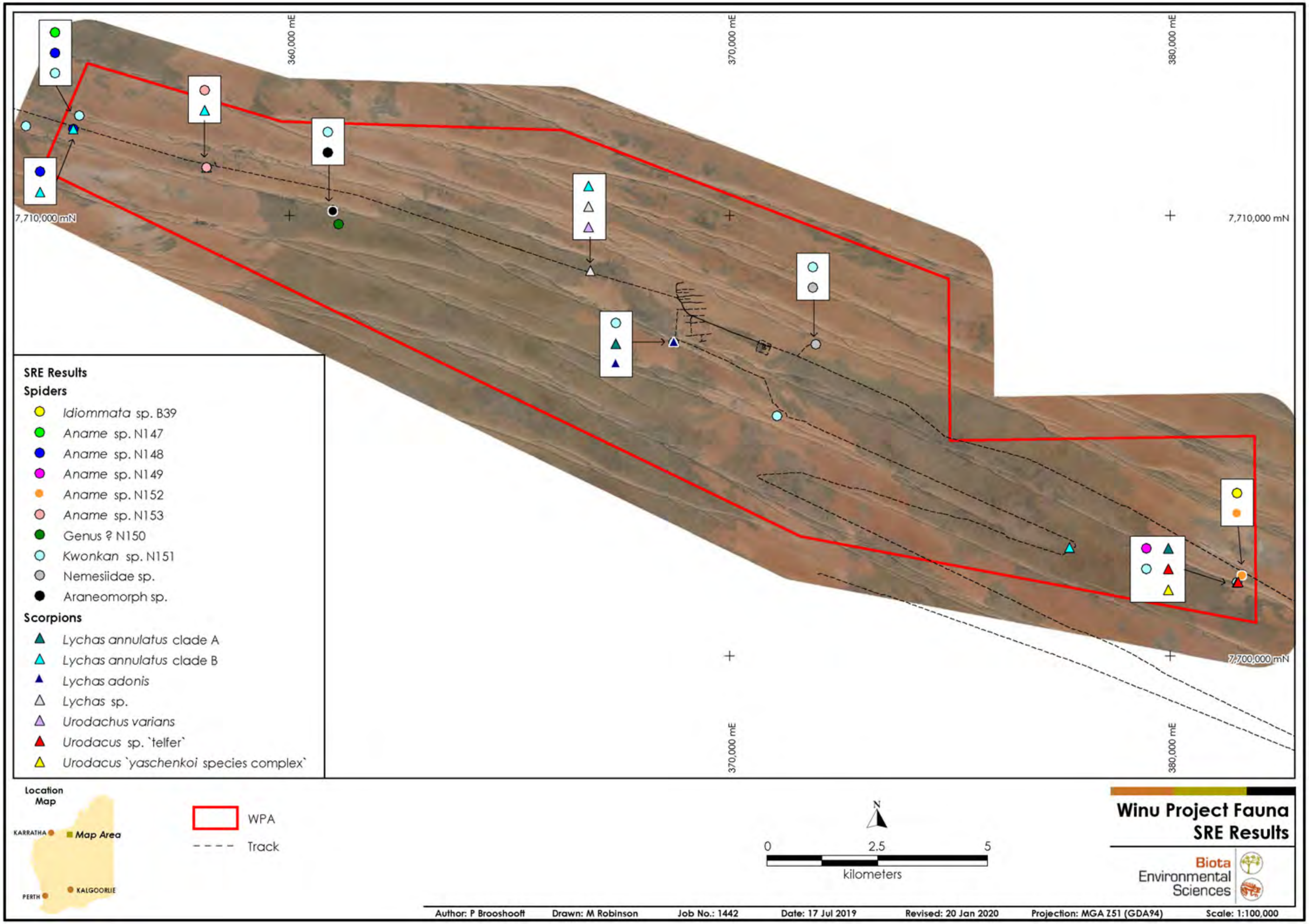

Figure 5.9: Short-range endemic fauna records from the WPA.

6.0 Winu Road Access Corridor Methodology

6.1 Level 1 Surveys (Section 1, 3 and Diversion)

WRAC Section 1, 3 and the Diversion were not systematically surveyed as part of the Level 2 survey of the AREH project (which forms Section 2 of the WRAC; Section 6.2). Level 1 Reconnaissance fauna surveys were therefore undertaken within these portions of the WRAC in order to describe and map fauna habitats, and also target the Bilby and Black-footed Rock-wallaby. Table 6.1 outlines the field survey timing and team, and the tasks undertaken within each portion (WRAC Section 1, 3 or the Diversion). The specific methodology employed is further described in Sections 6.1.1 to 6.1.2 below, with limitations discussed in Section 6.1.4.

Table 6.1: Field survey timing, team and tasks undertaken within WRAC Section 1, 3 and the Diversion.

	Field Survey Timing	Team	Fauna Habitat Mapping	Targeted Bilby Assessment	Targeted Black-Footed Rock-wallaby Assessment
Section 1	21/09/19	Mr John Graff and Mr Nathan Beerkens (zoologists, of Biota).	✓	✓	X
Section 3	26/09/19	Dr Stewart Ford and Ms Jacinta King (zoologists, of Biota).	✓	✓	X
Diversion	24/08/19 and 26/08/19	Mr Simon Colwill and Ms Rebecca Mason (botanists, of Biota).	✓	✓	X
Diversion	22/09/19	Dr Stewart Ford and Mr Nathan Beerkens (zoologists, of Biota).	X	X	✓
Diversion	26/09/19	Ms Penny Brooshooft and Mr Joshua Keen (zoologists, of Biota).	✓	✓	X

6.1.1 Fauna Habitat Mapping

Foot traverses within unburnt segments of WRAC Section 1 and 3, and through the majority of the Diversion, were carried out to map the broad habitat types present. Habitats were described and mapped based on areas that would be likely to offer a range of ecological niches for a suite of different species, with consideration of landform, substrate and vegetation mapped by Biota (2019a).

6.1.2 Targeted Bilby Assessment

Unbounded transects were completed within unburnt prospective areas of Bilby habitat (i.e. as described in Section 4.3.5). The locations of these transects are illustrated in Figure 6.1 for WRAC Section 1; Figure 6.2 for WRAC Section 3; and Figure 6.3 for the WRAC Diversion. The methodology described in Section 4.3.2 for recording sign evidence and assigning a certainty criterion to sign was employed. Bilby habitat was mapped consistent with the methods outlined in Section 4.3.5.

6.1.3 Targeted Black-footed Rock Wallaby Assessment

As the WRAC Diversion was designed to avoid impacts on Black-footed Rock-wallaby (Section 2.2.2), rock piles located close to the Diversion that had not been ground-truthed during the AREH project were searched for sign evidence of the species (scats or tracks) and potential food sources (e.g. *Ficus* spp.) (Figure 6.3).

6.1.4 Limitations

Consistent with a Level 1 survey, no systematic sampling for vertebrate fauna was undertaken in Sections 1, 3 and the Diversion. The fauna assemblage of these portions of the WRAC have therefore not been documented, and it is possible that species of conservation significance (other than those recorded) may be present but not detected. Despite this limitation, the comprehensive survey of the adjacent WRAC Section 2 provides a relatively thorough assessment of the fauna values of the majority of the WRAC, from which inferences can be drawn regarding the fauna values of WRAC Section 1, 3 and the Diversion.

In addition, no surveys of the potential borrow source areas located within WRAC Section 1, 3 or the Diversion has been undertaken. Without ground-truthing of these areas, fauna habitat was inferred based on landforms and vegetation (Biota 2019a), however mapping of bilby habitat within these areas was not possible as this required on-ground assessment of habitat suitability and searches for Bilby sign.

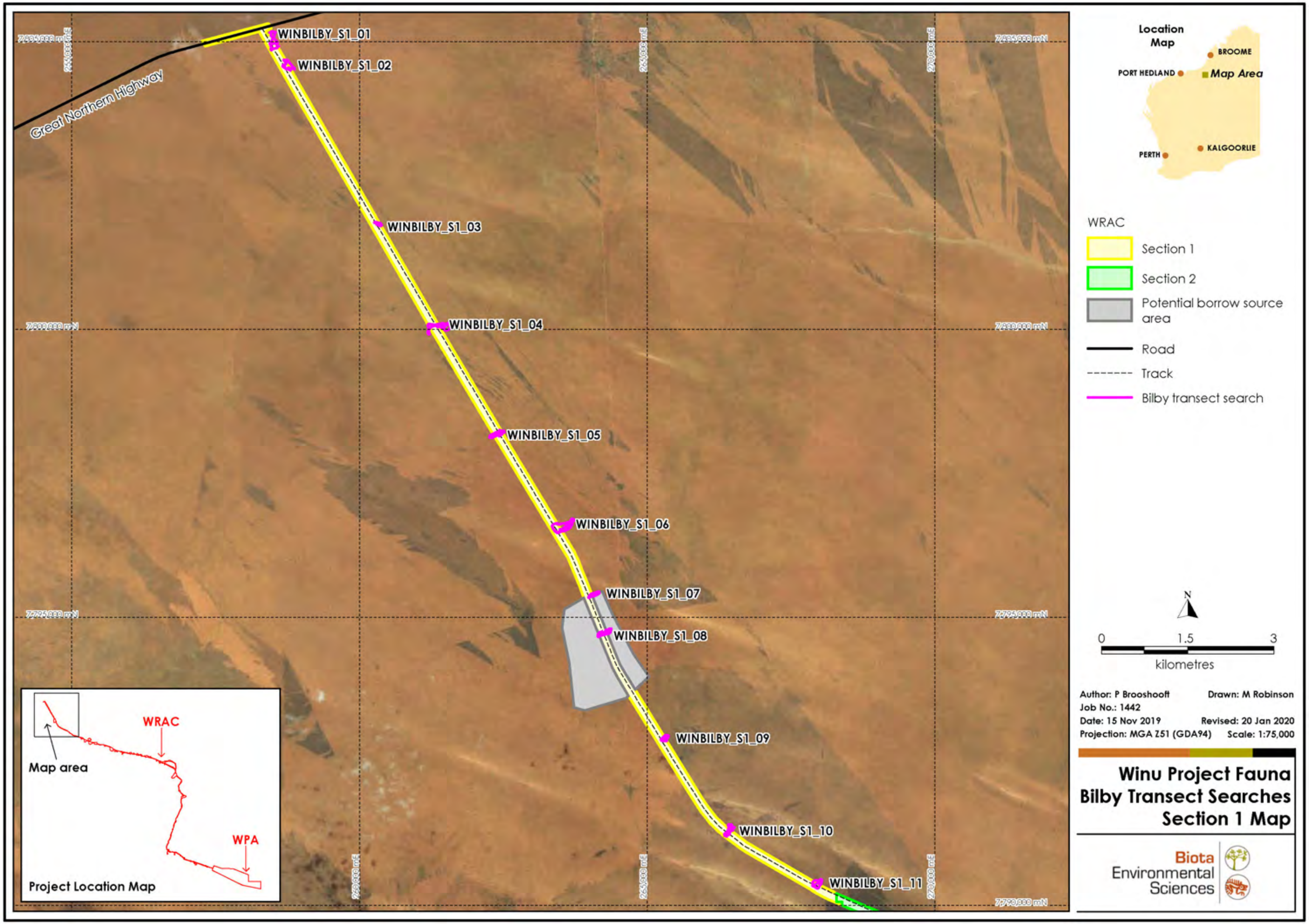

Figure 6.1: Locations of Bilby transect searches conducted in WRAC Section 1.

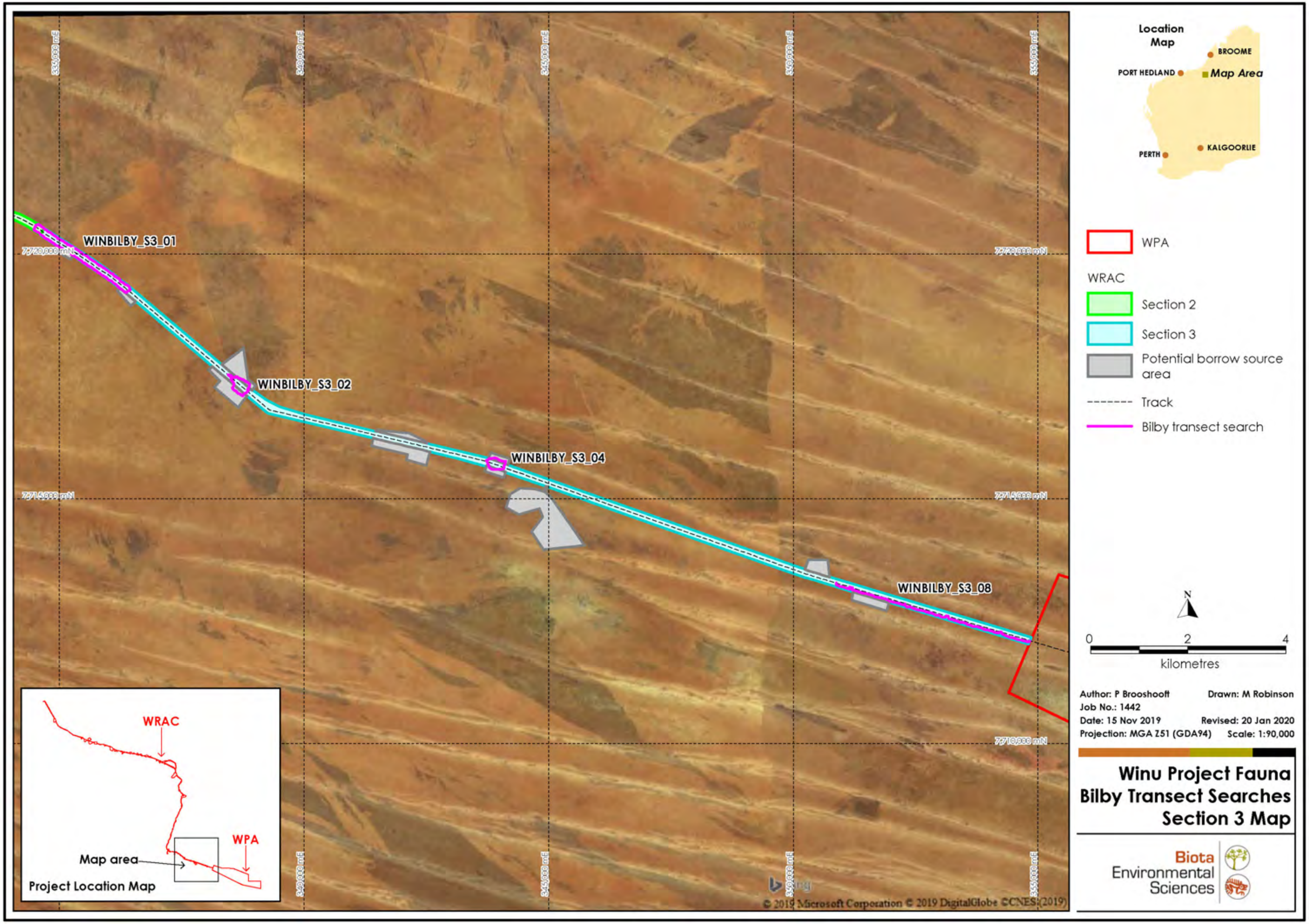

Figure 6.2: Locations of Bilby transect searches conducted in WRAC Section 3.

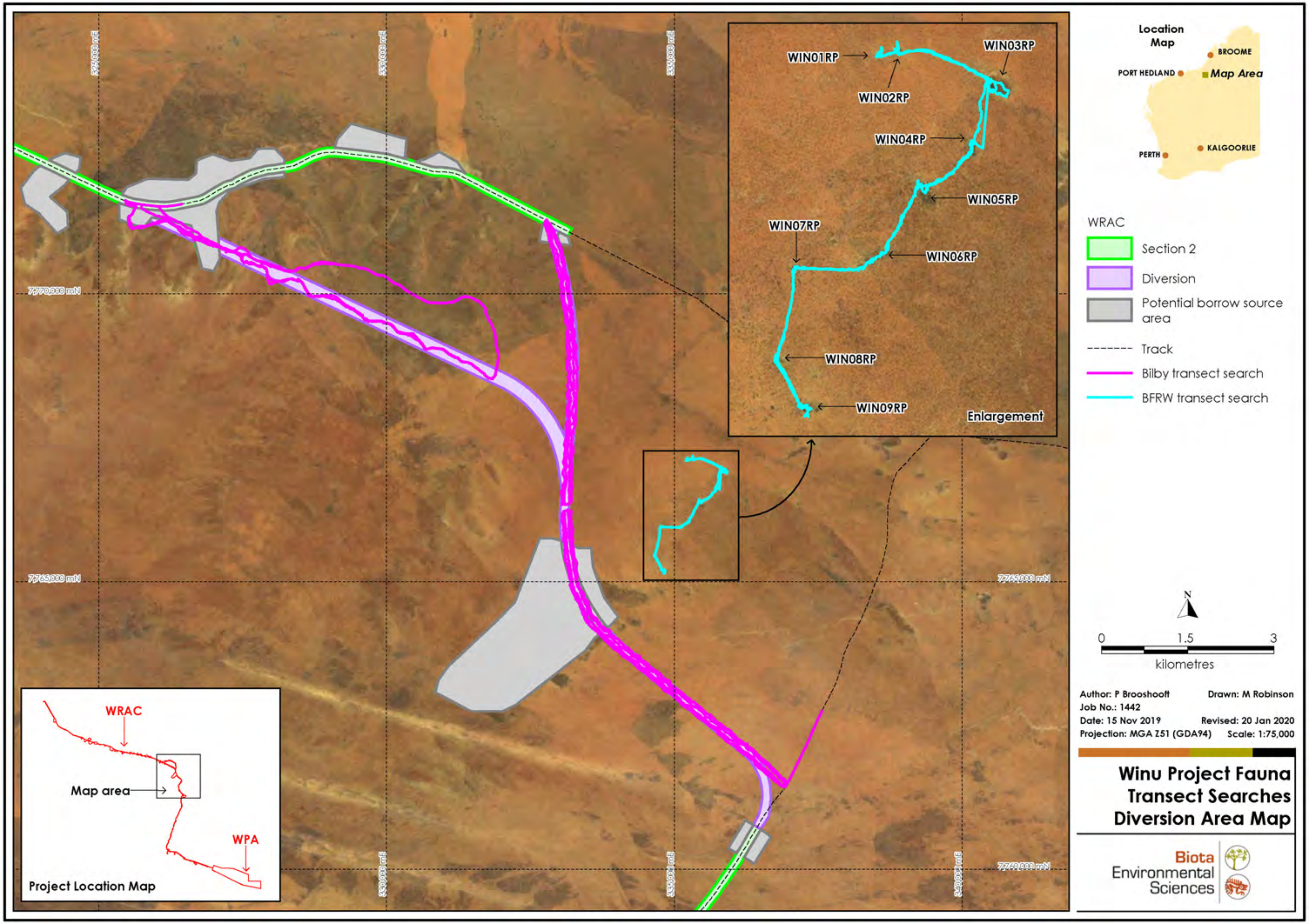

Figure 6.3: **Locations of Bilby transect searches and Black-footed Rock-wallaby searches conducted for the Diversion.**

6.2 Level 2 Survey (WRAC Section 2)

Sampling effort and methodology for WRAC Section 2 were sourced from the recently completed surveys for the AREH project (Biota 2018a). These are re-presented here where relevant to the WRAC.

6.2.1 Desktop Assessment

A comprehensive desktop assessment encompassing WRAC Section 2 was completed as part of the AREH project (Biota 2018a). The results of this desktop assessment have not been presented here, as the search area used was broadly applicable to the AREH project and not specific to WRAC Section 2. The results from the survey completed for the AREH project were of more relevance to informing the potential fauna assemblage of the WRAC, given most sites were located along WRAC Section 2 and the survey was more recent and comprehensive compared to the database and literature results used for the AREH desktop review (Biota 2018a). Therefore, the results of the survey presented here (Section 7.1.3) have been used in lieu of a desktop assessment.

6.2.2 Field Survey Timing and Team

Phase 1 of the AREH survey was carried out from the 24 August – 5 September 2017 and Phase 2 from the 13 – 21 March 2018. The fauna survey was conducted under Regulation 17 "Licence to Take Fauna for Scientific Purposes" Permit No. 08-000993-4 issued by the DBCA to Mr Daniel Kamien (Appendix 9). The survey team comprised Mr Garth Humphreys, Mr Roy Teale, Mr Dan Kamien, Dr Stewart Ford, Mr Michael Greenham, Ms Penny Brooshooft, Ms Jacinta King, Dr Sylvie Schmidt, and Mr David Keirle (all of Biota). Members of the Nyangumarta Ranger Group also assisted with the survey.

6.2.3 Daily Weather Observations

Weather observations during the survey were sourced from data collected at Mandora Station (Bureau of Meteorology weather station number 004019, located 19 km north of the AREH project area) (Table 6.2).

Phase 1 of the study was conducted during the dry season where weather conditions were warm to hot and dry. Daily maximum temperatures ranged from 29.5 - 39.6°C while overnight temperatures were generally cool (Table 6.2). This timing was conducive to the trapping of reptiles and mammals. Conditions were also favourable for the recording of birds, particularly in the cool early mornings. Conditions during Phase 2 were hot and minor rainfall was recorded on two days (Table 6.2). The warmer overnight temperatures were particularly conducive to the recording of nocturnal reptiles.

Table 6.2: Weather conditions during the AREH field survey.

	Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Rainfall (mm)
Phase 1	24/08/17	39.6	14.7	0
	25/08/17	37.5	17.4	0
	26/08/17	34.4	17.9	0
	27/08/17	34.7	13.9	0
	28/08/17	33.3	15.5	0
	29/08/17	33.3	10.6	0
	30/08/17	34.8	11	0
	31/08/17	32.8	11.8	0
	1/09/17	29.5	11.6	0
	2/09/17	31.3	16.4	0

	Date	Maximum Temperature (°C)	Minimum Temperature (°C)	Rainfall (mm)
	3/09/17	34.5	15.1	0
	4/09/17	35.3	19.1	0
	5/09/17	36	19.3	0
Phase 2	13/03/18	39.8	26.9	0
	14/03/18	38.6	23.4	0
	15/03/18	37.9	21.2	0
	16/03/18	38.7	21.6	0
	17/03/18	36.8	24.8	0.2
	18/03/18	41.5	22.6	0
	19/03/18	40.4	24.7	0
	20/03/18	36.3	27.6	0
	21/03/18	36.8	25	6.8

6.2.4 Climatological Data

Historical weather data (1913-2018) was obtained from the Mandora weather station. Figure 6.4 charts the average monthly minimum and maximum temperatures and total rainfall for the year preceding the survey, in comparison with long-term averages.

Conditions in the year preceding Phase 1 of the study were typical, with slightly above average wet season rainfall and slightly lower than average dry season rainfall (Figure 6.4). In the lead up to Phase 2, between January and February 2018, rainfall received far exceeded long term averages. Both maximum and minimum temperatures tended to align with long term averages, with temperatures during Phase 1 being slightly above average (Figure 6.4).

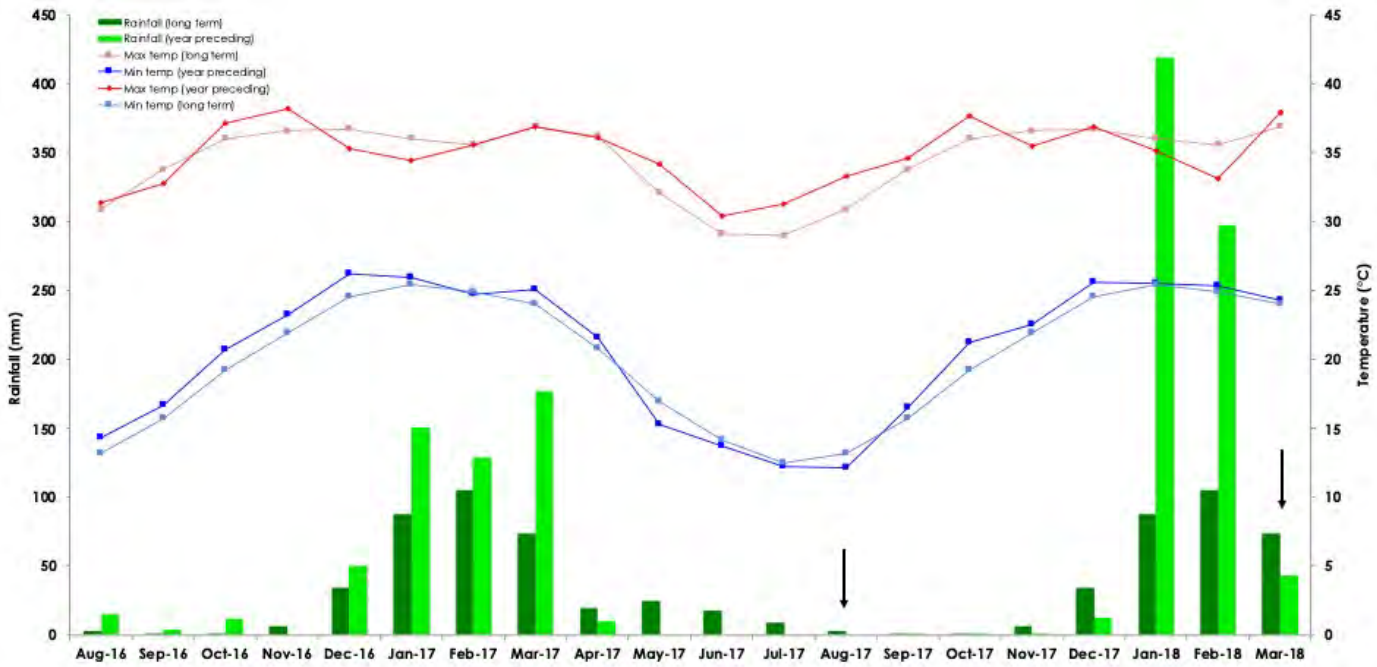

Figure 6.4: Monthly climate data for the year preceding the AREH survey and long-term climate averages.

Arrows indicate survey timing.

6.2.5 Vertebrate Fauna Systematic Sampling

6.2.5.1 Trapping Effort

Indicative trapping sites were identified based on the results of the desktop review and preliminary habitat assessment, and were subsequently ground-truthed during a reconnaissance site visit (6 – 9 August 2017), following which the final location of fauna sampling sites were chosen. The reconnaissance survey also included an aerial over-flight and ground-truthing of the range of habitats within the study area via helicopter.

A total of 18 fauna trapping sites were installed with the aim of trapping as many species from the potential vertebrate assemblage as possible. Sites were distributed to representatively sample the range of fauna habitats available, while giving consideration to access and ensuring traps could be checked in a timely manner each morning to meet fauna sampling ethics requirements.

The locations of the sites are illustrated in Figure 6.5, and are further detailed in Table 6.3 and Table 6.4. The trapping sites comprised the following:

- Fourteen pitfall and funnel trapping transects, consisting of 10 pitfall traps arranged as alternating 20 litre buckets and PVC tubes (diameter: 150 mm, depth: 700 mm) connected by a 110 m long, 30 cm high fly wire fence. One pair of funnel traps was also set at each end. These sites were run during both survey phases.
- One funnel trapping transect, consisting of 20 funnel traps, arranged in pairs and distributed along a 110 m length of 30 cm high fly wire drift fence. This site was run during the first phase only, as hotter temperatures during Phase 2 raised concern for the welfare of potentially trapped animals at this site, which was located in rocky habitat (Table 6.3).
- Three Elliott and cage trapping sites were also deployed. The number of Elliott and cage traps set at each site varied depending on the habitat and target taxa, which included specific conservation significant mammal species such as the Northern Quoll, Bilby, Brush-tailed Mulgara, Western Pebble-mound Mouse and Black-flanked Rock-wallaby.

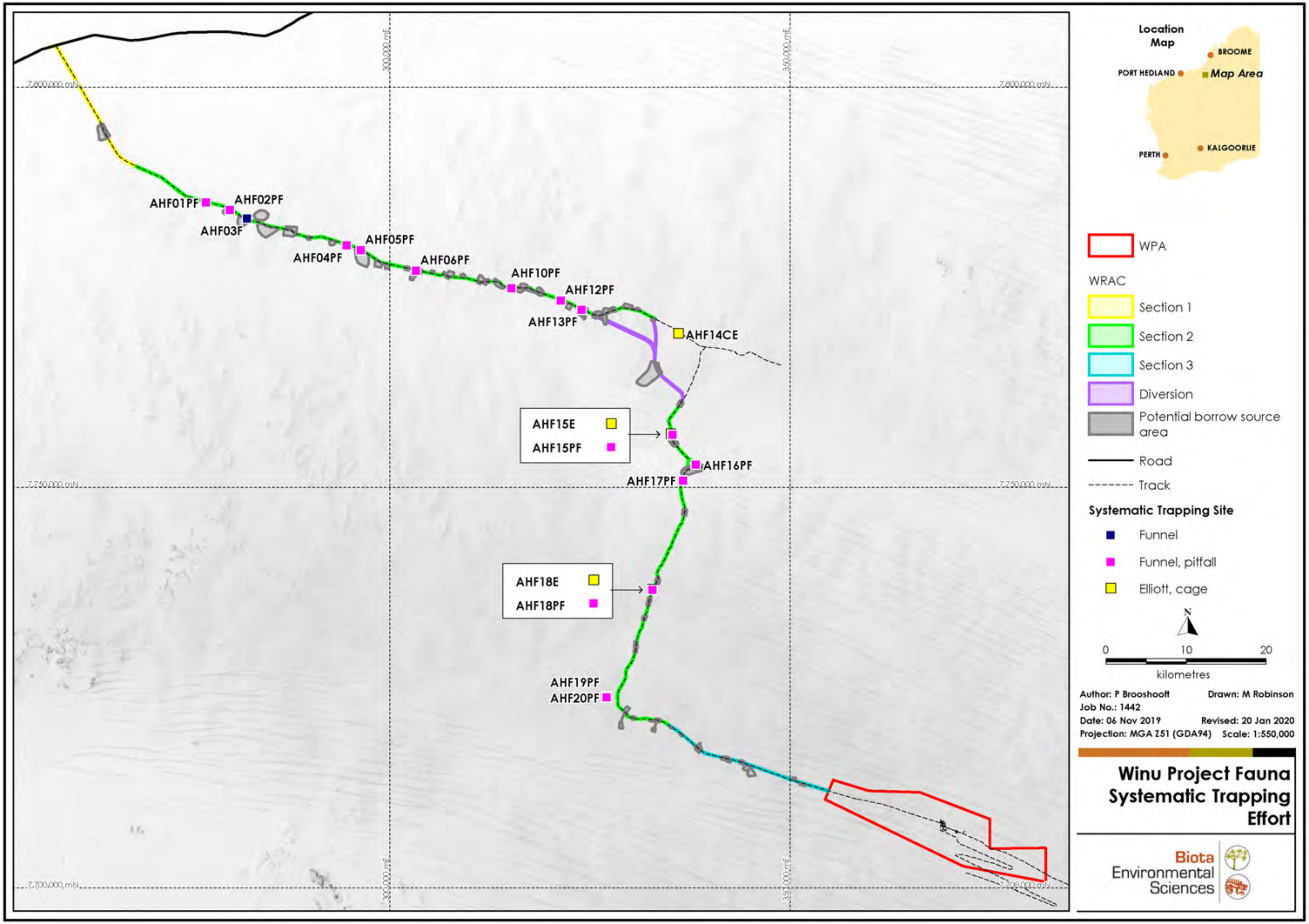

Figure 6.5: Location of AREH project systematic fauna trapping sites within WRAC Section 2.

Table 6.3: Details of AREH project trap site locations within WRAC Section 2 and associated sampling effort per phase.

					Phase 1				Phase 2			
Site Name	**Easting**	**Northing**	**General Habitat**	**Method**	**Date Opened**	**Date Closed**	**Nights Open**	**Trap Effort (Nights)**	**Date Opened**	**Date Closed**	**Nights Open**	**Trap Effort (Nights)**
AHF01PF	277081	7785718	Sandplain	10 Pitfall, 4 Funnel	28/08/17	4/09/17	7	P: 70 F: 28	13/03/18	21/03/18	8	P: 80 F: 32
AHF02PF	280071	7784753	Sandplain	10 Pitfall, 4 Funnel	28/08/17	4/09/17	7	P: 70 F: 28	14/03/18	21/03/18	7	P: 70 F: 28
AHF03F	282196	7783707	Gradual hill slope	20 Funnel	29/08/17	4/09/17	6	F: 120	-	-	-	-
AHF04PF	294622	7780355	Sandplain	10 Pitfall, 4 Funnel	28/08/17	4/09/17	7	P: 70 F: 28	13/03/18	20/03/18	7	P: 70 F: 28
AHF05PF	296396	7779763	Sandplain	10 Pitfall, 4 Funnel	28/08/17	4/09/17	7	P: 70 F: 28	13/03/18	20/03/18	7	P: 70 F: 28
AHF06PF	303310	7777192	Sandplain	10 Pitfall, 4 Funnel	28/08/17	4/09/17	7	P: 70 F: 28	14/03/18	21/03/18	7	P: 70 F: 28
AHF10PF	315221	7774970	Sandplain	10 Pitfall, 4 Funnel	27/08/17	4/09/17	8	P: 80 F: 32	13/03/18	20/03/18	7	P: 70 F: 28
AHF12PF	321404	7773467	Sandplain	10 Pitfall, 4 Funnel	27/08/17	4/09/17	8	P: 70 F: 32	13/03/18	20/03/18	7	P: 70 F: 28
AHF13PF	323977	7772300	Sandplain	10 Pitfall, 4 Funnel	27/08/17	4/09/17	8	P: 70 F: 32	13/03/18	20/03/18	7	P: 70 F: 28
AHF14CE	336050	7769278	Rocky hill slope	60 Elliott, 5 Cage	28/08/17	4/09/17	7	E: 420 C: 35	-	-	-	-
AHF15PF	335364	7756656	Linear dune	10 Pitfall, 4 Funnel	26/08/17	3/09/17	8	P: 70 F: 32	14/03/18	21/03/18	7	P: 70 F: 28
AHF15E	335146	7756700	Linear dune	10 Elliott	28/08/17	3/09/17	6	E: 60	-	-	-	-
AFH16PF	338271	7752943	Sandplain	10 Pitfall, 4 Funnel	27/08/17	3/09/17	7	P: 70 F: 28	14/03/18	21/03/18	7	P: 70 F: 28
AHF17PF	336664	7750966	Sandplain	10 Pitfall, 4 Funnel	27/08/17	3/09/17	7	P: 70 F: 28	14/03/18	21/03/18	7	P: 70 F: 28
AHF18PF	332843	7737322	Sandplain	10 Pitfall, 4 Funnel	27/08/17	3/09/17	7	P: 70 F: 28	14/03/18	21/03/18	7	P: 70 F: 28
AHF18E	332822	7737336	Sandplain	15 medium Elliott	28/08/17	3/09/17	6	E: 90	-	-	-	-
AHF19PF	327135	7724041	Linear dune	10 Pitfall, 4 Funnel	27/08/17	3/09/17	7	P: 70 F: 28	14/03/18	21/03/18	7	P: 70 F: 28
AHF20PF	327103	7723900	Sandplain	10 Pitfall, 4 Funnel	27/08/17	3/09/17	7	P: 70 F: 28	14/03/18	21/03/18	7	P: 70 F: 28
						Phase 1 Pitfall Total		**P: 990**		**Phase 2 Pitfall Total**		**P: 990**
						Phase 1 Funnel Total		**F: 528**		**Phase 2 Funnel Total**		**F: 396**
						Phase 1 Elliott and Cage Total		**EC: 605**				
						Phase 1 Total		**2,123**		**Phase 2 Total**		**1,386**

Table 6.4: Descriptions and photographs of AREH project trapping sites within WRAC Section 2.

Site Description	Site Photograph
AHF01PF Landform: Sandplain Vegetation: Scattered low trees and shrubs 1–2 m over hummock grassland.	
AHF02PF Landform: Sandplain Vegetation: Scattered low trees over closed hummock grassland.	
AHF03F Landform: Gradual hill slope Vegetation: Scattered low shrubs over low open hummock grassland.	
AHF04PF Landform: Sandplain Vegetation: Scattered ironwood trees, open shrubs 1-2 m over hummock grassland (small hummocks).	

Site Description	Site Photograph
AHF05PF Landform: Sandplain Vegetation: Open hummock grassland (hummocks moderate in size).	
AHF06PF Landform: Sandplain Vegetation: Scatttered tall shrubs (>2 m) and low shrubs (1-2 m) over open hummock grassland.	
AHF10PF Landform: Sandplain Vegetation: Scattered tall and low shrubs over open hummock grassland.	
AHF12PF Landform: Sandplain Vegetation: Scattered tall and low shrubs over open hummock grassland.	

Site Description	Site Photograph
AHF13PF Landform: Sandplain Vegetation: Scattered tall and low shrubs over hummock grassland.	
AHF14CE Landform: Rocky Hill slope Vegetation: Scattered Ficus and Acacia shrubs over open hummock grassland.	
AHF15PF/E Landform: Linear dune Vegetation: Scattered tall shrubs, low open shrubland and very open tussock grassland.	
AHF16PF Landform: Sandplain Vegetation: Scattered trees over low shrubland over very open tussock grass.	

Site Description	Site Photograph
AHF17PF Landform: Sandplain Vegetation: Open woodland over open shrubland over very open hummock grassland.	
AHF18PF/E Landform: Sandplain Vegetation: Scattered trees over scattered tall shrubs over hummock grassland.	
AHF19PF Landform: Linear dune Vegetation: Scattered tall shrubs over low open shrubland over open hummock grassland.	
AHF20PF Landform: Sandplain Vegetation: Shrubs of *Erythrophleum*, *Eucalyptus* and *Acacia* over open *Triodia* hummock grassland.	

6.2.5.2 Bird Surveys

Birds were recorded using the following techniques:

- unbounded area searches (20 - 30 minutes in duration) conducted within defined habitats at the systematic trapping sites (Table 6.5);
- unbounded area searches conducted at opportunistic locations containing habitats or microhabitats likely to support previously unrecorded species;
- opportunistic observations of birds whilst traversing the study area; and
- automated audio recording devices deployed to target the Night Parrot and other incidental bird records (addressed further in Section 6.2.6.3).

A total of 20.5 hours were dedicated to avifauna census across both survey phases (Table 6.5). As conditions were hot during the second phase, birds ceased calling early in the morning limiting productive birding opportunities.

A number of species were also recorded opportunistically within the study area by ornithologists conducting work targeting migratory species outside of the survey for a separate study (Biota 2018b). These species have been added to the overall inventory of birds for WRAC Section 2.

Table 6.5: Avifauna census times at each AREH project trapping site within WRAC Section 2 (minutes).

	Phase 1							Phase 2	
	28/08/17	29/08/17	30/08/17	31/08/17	1/09/17	2/09/17	3/09/17	15/03/18	Total (minutes)
AHF01PF		20	20	20	20	20		30	130
AHF02PF		20	20	20	20			30	110
AHF03F			20	20	20				60
AHF04PF		20	20	20				30	90
AHF05PF		20	20	20					60
AHF06PF			20						20
AHF10PF		20		20	40	20		20	120
AHF12PF		20	20	20	20	20			100
AHF13PF		20	20	20	20	20			100
AHF14CE		20	20	40	40				120
AHF15PF/E	40								40
AHF16PF	20	20							40
AHF17PF	20	20							40
AHF18PF/E	20	20	20		20				80
AHF19PF		20	20	20					60
AHF20PF		20	20	20					60
								Total	**1,230**

6.2.6 Vertebrate Fauna Non-systematic Sampling

Non-systematic sampling techniques comprising motion cameras, audible recorders, ultrasonic bat recorders, nocturnal searches and marsupial mole trenches were employed during the AREH project survey to detect additional fauna species not readily trapped using systematic sampling methods. Details of the methods used are discussed below in Sections 6.2.6.1 to 6.2.6.5.

6.2.6.1 Motion Cameras

Infrared motion cameras were primarily used to target the Northern Quoll, Black-footed Rock-wallaby and Bilby, and as such were placed in rocky habitats and at entrances of apparently active Bilby burrows. Details of motion camera sites and trap effort are provided in Table 6.6, with locations shown in Figure 6.6.

Table 6.6: AREH project motion camera sites within WRAC Section 2.

Site Name	Easting (mE)	Northing (mN)	Target Fauna	Date Opened	Date Closed	Effort (Nights)
AHF14E-MC-01	335915	7769230	Northern Quoll, Black-footed Rock-wallaby	29/08/17	03/09/17	5
AHF14E-MC-02	335989	7769318	Northern Quoll, Black-footed Rock-wallaby	29/08/17	03/09/17	5
AHFCAM026-01	280384	7784692	Bilby	30/08/17	02/09/17	3
AHFCAM015-02	280382	7784684	Bilby	31/08/17	03/09/18	3
AHFCAM015-01	280164	7784730	Bilby	28/08/17	31/08/17	3
					Total	**19**

6.2.6.2 Ultrasonic Bat Recorders

Bats were surveyed using SongMeter (SM2BAT and SM4BAT) units. Methodology used was consistent with that employed for sampling bats within the WPA (see Section 4.2.5.2). Bat sampling was undertaken at six sites for a period of two to five nights at each site (Table 6.7; Figure 6.6).

Table 6.7: AREH project ultrasonic bat recording sites within WRAC Section 2.

Site Name	Easting (mE)	Northing (mN)	Date Opened	Date Closed	Effort (Nights)
AHF897-1	280006	7784812	29/08/17	31/08/17	2
AHF827-1	303430	7777230	29/08/17	01/09/17	3
CAM654-14E	335928	7769263	29/08/17	02/09/17	4
AHF1169-02	338025	7768619	01/09/17	03/09/17	2
AHFBat1169-01	336623	7751003	29/08/17	31/08/17	2
AHF897-02	327185	7724008	01/09/17	03/09/17	2
				Total	**15**

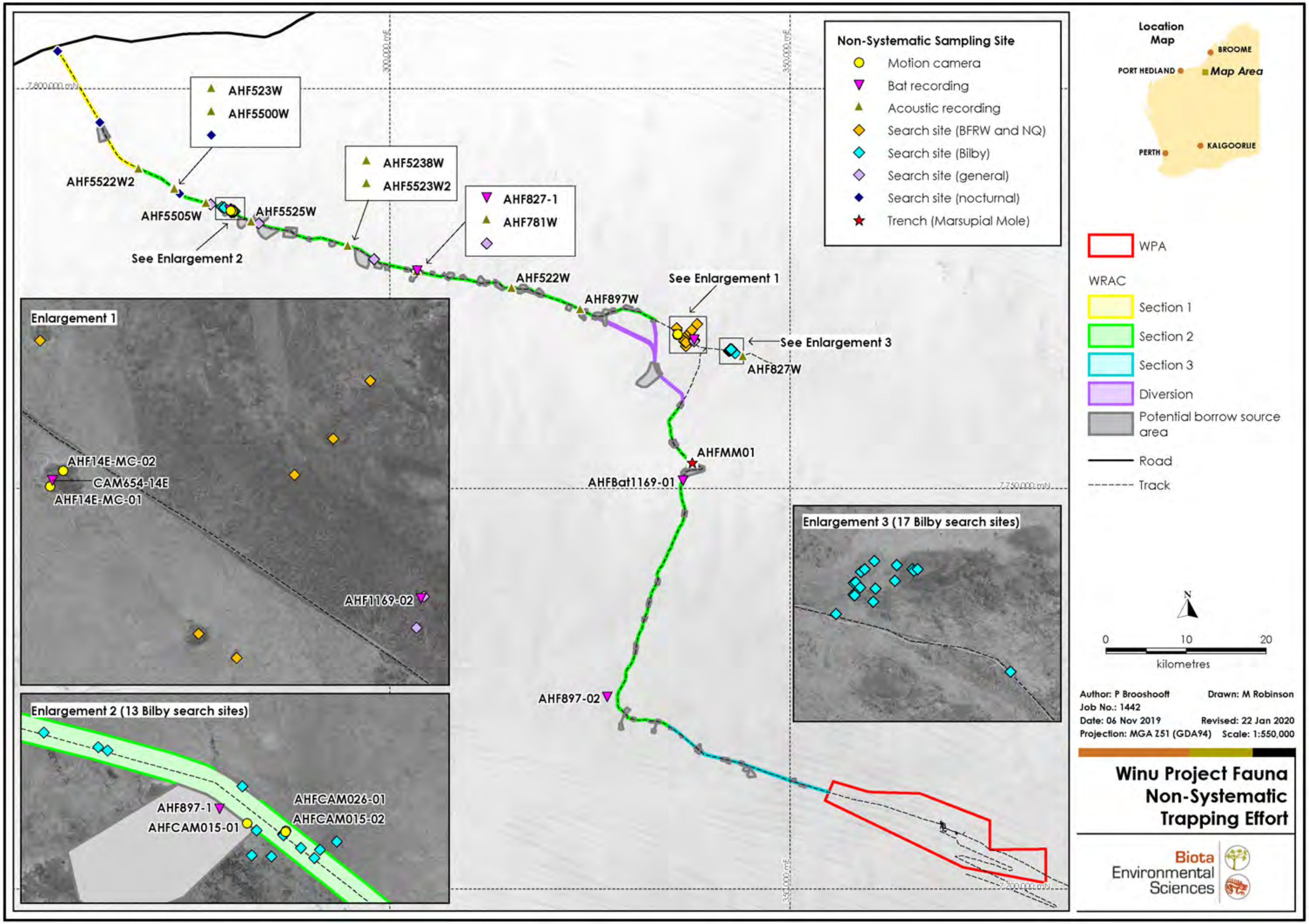

Figure 6.6: Locations of AREH project non-systematic sites within WRAC Section 2.

6.2.6.3 Recording in the Audible Range

Automated audio recording units were set to record in the audible range at 11 sites (Table 6.8). At five of these sites recorders were set for 56 consecutive days while the remaining sites were maintained for 11 months (Table 6.8). Site locations are displayed in Figure 6.6.

Table 6.8: AREH project automated audio recording device locations and effort within WRAC Section 2.

Site Name	Easting (mE)	Northing (mN)	Date Opened	Date Closed	Effort (days)
AHF522W	315226	7775087	04/09/17	30/10/17	56
AHF781W	303397	7777190	04/09/17	30/10/17	56
AHF897W	323798	7772440	04/09/17	30/10/17	56
AHF523W	273101	7787512	04/09/17	30/10/17	56
AHF827W	344122	7766578	04/09/17	30/10/17	56
AHF5238W	294734	7780365	04/09/17	03/08/18	334
AHF5500W	272968	7787608	04/09/17	03/08/18	334
AHF5505W	277058	7785722	04/09/17	03/08/18	334
AHF5522W2	268631	7790016	04/09/17	03/08/18	334
AHF5523W2	294794	7780356	04/09/17	03/08/18	334
AHF5525W	282701	7783377	04/09/17	03/08/18	334
				Total	**2,284**

6.2.6.4 Nocturnal Searches

Nocturnal searches via road spotting (driving slowly and spotting animals from the car) and on foot were conducted on four occasions during the AREH project survey in WRAC Section 1 and 2 (Table 6.9; Figure 6.6). A total of 24 hours was dedicated to nocturnal surveying.

Table 6.9: AREH project nocturnal search effort within WRAC Section 2.

Site Name	Easting (mE)	Northing (mN)	Date	No. of People	Minutes Searching	Effort (Minutes)
Search71	263780	7795870	30/08/17	2	180	360
Search72	273003	7787552	01/09/17	2	180	360
Search73	258581	7804761	16/03/18	2	180	360
Search74	273777	7786977	22/03/18	2	180	360
					Total	**1,440**

6.2.6.5 Marsupial Mole Trenching

Trenching for the Northern Marsupial Mole was conducted at a single location within WRAC Section 2 (Table 6.10; Figure 6.6).

Table 6.10: AREH project marsupial mole trench location within WRAC Section 2.

Site Name	Easting (mE)	Northing (mN)	Date	Trench Photo
AHFMM01	337802	7753285	01/09/17	

6.2.6.6 Targeted Bilby Assessment

Searching for Bilby evidence was undertaken during the AREH project survey via 30 unbounded transect walks (Table 6.11; Figure 6.6). Transect sites were selected on the basis of habitat quality or following incidental detection of Bilby sign. The methodology employed to qualify sign according to the criteria outlined in Section 4.3.3 had not been developed at the time the survey within WRAC Section 2 was undertaken. Instead, experience of the zoologist detecting sign (R. Teale) was drawn upon, and only positively attributable Bilby sign was recorded. The methodology for mapping Bilby habitat according to that outlined in Section 4.3.5 was applied to the WRAC Section 2.

Table 6.11: Bilby transect searches undertaken during the AREH project survey within WRAC Section 2.

Site Name	Easting (mE)	Northing (mN)	Date
Search23	280192	7784551	29/08/17
Search24	280216	7784692	29/08/17
Search25	280368	7784673	29/08/17
Search26	280133	7784938	30/08/17
Search27	280303	7784546	31/08/17
Search28	280547	7784539	02/09/17
Search29	280578	7784587	02/09/17
Search30	280674	7784634	02/09/17
Search31	342368	7767199	02/09/17
Search32	342449	7767288	02/09/17
Search33	342450	7767340	17/03/18
Search34	342453	7767283	02/09/17
Search35	342459	7767343	02/09/17
Search36	342479	7767319	02/09/17
Search37	342483	7767391	02/09/17
Search38	342499	7767403	02/09/17
Search39	342539	7767255	17/03/18
Search40	342544	7767440	02/09/17
Search41	279003	7785228	02/09/17
Search42	279313	7785149	02/09/17
Search43	279366	7785132	02/09/17
Search44	342716	7767403	03/09/17
Search45	342723	7767395	03/09/17
Search46	342740	7767403	17/03/18
Search47	343162	7766936	03/09/17
Search48	342548	7767315	03/09/17
Search49	342637	7767350	03/09/17
Search50	342645	7767421	03/09/17
Search51	280470	7784596	15/03/18
Search52	280369	7784666	15/03/18

6.2.6.7 Targeted Northern Quoll and Black-footed Rock-wallaby Searches

Eight diurnal searches were undertaken in rocky habitat to target the conservation significant Northern Quoll (*Dasyurus hallucatus*) and Black-footed Rock-wallaby (*Petrogale lateralis lateralis*) (Table 6.12; Figure 6.6)

Table 6.12: Targeted searches for the Northern Quoll and Black-footed Rock-wallaby during the AREH project survey in WRAC Section 2.

Site Name	Easting (mE)	Northing (mN)	Date
Search1	337013	7767809	30/08/17
Search2	335849	7770053	30/08/17
Search3	336765	7768406	30/08/17
Search4	336983	7768272	30/08/17
Search5	338396	7770567	01/09/17
Search8	337301	7769309	01/09/17
Search9	337520	7769515	01/09/17
Search10	337725	7769842	01/09/17

6.2.6.8 General Searches

Six general searches were carried out on foot in areas of habitat with the potential to support species of conservation significance or other fauna not readily trapped (Table 6.13; Figure 6.6).

Table 6.13: General search effort during the AREH project survey within WRAC Section 2.

Site Name	Easting (mE)	Northing (mN)	Date
Search55	338042	7768629	29/08/17
Search56	338002	7768451	29/08/17
Search57	303322	7777209	30/08/17
Search59	283630	7783135	01/09/17
Search60	277614	7785550	02/09/17
Search61	298017	7778703	02/09/17

6.2.7 Fauna Habitat Mapping

Methodology used to map fauna habitats aligned with that undertaken for the WPA (see Section 4.2.6).

6.2.8 SRE Invertebrate Fauna Sampling

Methodology for sampling SRE fauna was consistent with that employed for the WPA (see Section 4.4). Specimens were collected from the systematic trapping sites as by-catch during Phase 1 (Table 6.14: no specimens were collected as by-catch during Phase 2) and from targeted search locations (Table 6.15; Plate 6.1 - Plate 6.4). The locations of the SRE sites are displayed in Figure 6.7.

As WRAC Section 2 contained a wider variety of habitats compared to the WPA, additional invertebrate groups known to contain SREs were targeted, including mygalomorph spiders, pseudoscorpions, scorpions, millipedes and land snails. As such, methods used varied according to the target fauna, as summarised in Table 6.16.

Table 6.14: SRE specimens collected from AREH project systematic pitfall sites within WRAC Section 2.

Site Name	SRE Specimens Collected as Bycatch
AHF01PF	✓
AHF02PF	-
AHF03F	-
AHF04PF	-
AHF05PF	-
AHF06PF	✓
AHF10PF	✓
AHF12PF	✓
AHF13PF	✓
AHF14CE	-
AHF15PF/E	✓
AHF16PF	✓
AHF17PF	✓
AHF18PF/E	✓
AHF19PF	✓
AHF20PF	-

Table 6.15: AREH project SRE search site locations and effort within WRAC Section 2.

Site Name	Date	Easting	Northing	Number of Personnel	Total Search Time (Minutes)	Search Effort (Minutes)
AHFSRE01	29/08/17	336039	7769266	3	44	132
AHFSRE02	30/08/17	338833	7752403	2	30	60
AHFSRE03	01/09/17	306151	7776342	2	30	60
AHFSRE07	03/09/17	312042	7775636	1	20	20
					Total	**272**

Plate 6.1: AHFSRE01.

Plate 6.2: AHFSRE02.

Plate 6.3: AHFSRE03.

Plate 6.4: AHFSRE07.

Table 6.16: Summary of methods used to sample for SRE invertebrate fauna within WRAC Section 2 during the AREH project survey.

	Method				
Taxon	Dry Pitfall	Burrow Search	Rock Turning	Raking	Sieving
Mygalomorph Spiders	•	•	•	•	
Pseudoscorpions				•	•
Scorpions	•	•	•	•	
Millipedes	•		•	•	•
Land Snails			•	•	•

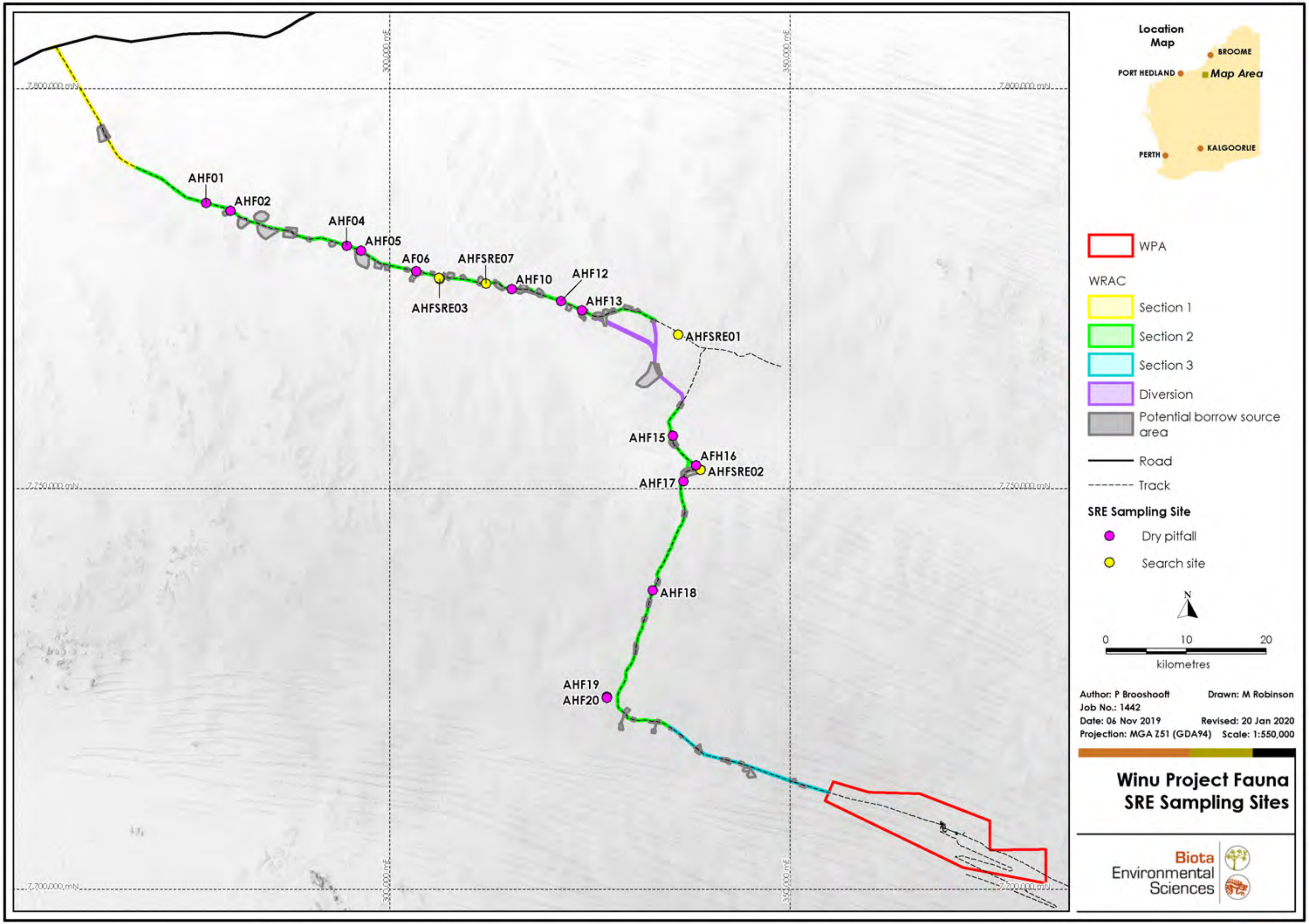

Figure 6.7: Locations of AREH project SRE search sites within WRAC Section 2.

6.2.9 Data Analysis

Survey adequacy was assessed via species accumulation curves for all of the data collected as part of the AREH project (Biota 2018a). The same methods of data analysis that were employed for the WPA (see Section 4.6) were used to analyse survey adequacy for the AREH project. The results of this analysis indicated that the survey adequately sampled the ground fauna and birds available (see Biota 2018a for further detail). Given this, further data analysis of species records specifically within WRAC Section 2 has not been presented here.

6.2.10 Limitations

In accordance with the EPA Technical Guidance 'Sampling Methods for Terrestrial Vertebrate Fauna' (EPA 2016a), potential constraints and limitations of the fauna survey of WRAC Section 2 are addressed in Table 6.17.

Table 6.17: Potential constraints and limitations of the AREH project fauna survey completed within WRAC Section 2.

Potential Constraint	Statement of Limitations
1. Availability of contextual information at a regional and local scale	• There was a general lack of past biological survey effort in the locality, which may have limited some assessments of potential fauna assemblage. • Despite the survey effort within WRAC Section 2, regional and local level contextual information was considered to be a limiting factor.
2. Competency/ experience of the team carrying out the survey, including experience in the bioregion surveyed	• Field personnel were suitably qualified to identify fauna (all personnel had at least six years experience as a consulting zoologist in the arid zone, with specialist experience in a range of areas including ornithology, mammals, reptiles and short-range endemic fauna). • There were therefore no limitations due to resourcing or experience.
3. Proportion of fauna recorded and/or collected, any identification issues	• An inventory survey of all fauna species was completed, and habitat assessments were made in order to determine their potential to support conservation significant species. • Targeted survey focused on recording evidence of the Bilby, Northern Quoll and Black-footed Rock-wallaby. • Identification of fauna was not considered to be a limitation. • Survey adequacy was assessed and was not considered to be a limitation.
4. Appropriate area fully surveyed (effort and extent)	• WRAC Section 2 was surveyed thoroughly, with numerous sampling sites assessed and foot traverses completed. • Survey effort targeted at detecting the presence of the Bilby and the Night Parrot was in accordance with that recommended by DBCA (DBCA 2017b, 2017b). • Survey effort and extent for the survey was not considered to be a limitation.
5. Access restrictions within the WRAC Section 2	• WRAC Section 2 was entirely accessible by means of an existing track. The majority of tracks were in good condition and located close to the survey sites. • Access was not considered to be a limitation.
6. Survey timing, rainfall, season of survey	• Weather during Phase 1 of the survey was conducive to trapping reptiles and mammals. Conditions were also favourable for the recording of birds, particularly in the cool early mornings. Weather during Phase 2 was hotter, therefore Elliott traps were not deployed in consideration of animal welfare. • Phase 2 was conducted following a period of above average rainfall. • Survey timing was not considered to be a limitation.

Potential Constraint	Statement of Limitations
7. Disturbance that may have affected the results of survey such as fire, flood or clearing	• No significant disturbances occurred over the period of the survey. • Disturbance was not considered to be a limitation.

7.0 Winu Road Access Corridor Results and Discussion

7.1 Level 1 Surveys (Section 1, 3 and Diversion)

7.1.1 Fauna Habitats

Fauna habitat within WRAC Sections 1 and 3 was mapped as a single unit for the entire extent of both sections: 'shrub and spinifex on sandplain' (consistent with Habitat 1 described in Section 5.4; see Plate 7.1 and Plate 7.2 for example photographs; Figure 7.1 and Figure 7.2). The majority of WRAC Section 1 and 3 had been recently burnt.

The fauna habitat in the WRAC Diversion was encompassed within the fauna habitat mapping for the AREH project (which is presented in Section 7.2.6). Two fauna habitats were mapped for the WRAC Diversion: habitat type 1 (shrub and spinifex on sandplain) and habitat type 3 (gravelly lateritic rises).

Plate 7.1: Example of shrub and spinifex on sandplain habitat in WRAC Section 1.

Plate 7.2: Example of shrub and spinifex on sandplain habitat in WRAC Section 3.

7.1.2 Targeted Bilby Survey

Sign indicative of past Bilby presence, comprising old diggings and inactive burrows, was found during the unbounded transect searches within WRAC Section 1 (Figure 7.1). No recent tracks or scats were detected. The specific sign recorded in WRAC Section 1 is discussed further below in Sections 7.1.2.1 and 7.1.2.2.

Within WRAC Section 3, tracks positively attributable to the Bilby previously encountered during the Phase 2 survey of the WPA (see Section 5.6.2.1) were also encountered. No other sign was detected in WRAC Section 3.

No sign of the Bilby was detected during the transect walks of the WRAC Diversion.

7.1.2.1 Diggings

Diggings assigned Moderate or Low certainty were detected in WRAC Section 1 (Plate 7.3; Figure 7.1). Some diggings were targeted at the base of *Acacia* shrubs, consistent with Bilby activity, however all diggings were old and mostly isolated, and were likely indicative of past presence of the Bilby.


Plate 7.3: Potential Bilby diggings into the base of *Acacia* shrubs.

7.1.2.2 Burrows

Two possible old burrows were recorded within WRAC Section 1 (Plate 7.4; Figure 7.1). Both exhibited evidence of an old spoil pile, consistent with that produced by the Bilby, however the burrows were old and mostly degraded, making certainty low.


Plate 7.4: Potential old burrows of the Bilby showing spoil piles.

7.1.2.3 Bilby Habitat Assessment

A small portion of WRAC Section 1 (31.7 ha) was assessed as High prospectivity based on the presence of food source plants such as *Acacia monticola*, while the remaining 259.0 ha was assessed as being Moderately prospective (Figure 7.1).

Plate 7.5: Example of High prospective Bilby habitat within WRAC Section 1.

Highly prospective habitat (261 ha) for the Bilby within WRAC Section 3 was located within the western, central and eastern portions, which supported food source plants such as *Acacia* *monticola* and *Yakirra australiensis* (Figure 7.2; Plate 7.6). The remaining 138.8 ha of habitat was assessed as Moderately prospective.

Plate 7.6: Example of High prospective Bilby habitat in the western portion of WRAC Section 3.

The majority (347.3 ha) of the WRAC Diversion was Highly prospective Bilby habitat, with the presence of important food source plants such as *Acacia monitcola, A. hilliana, A. stellaticeps* and *Yakirra australiensis* (Plate 7.7; for mapping see Figure 7.7 in Section 7.2.2.6). The prospectivity of the remaining portion of the WRAC Diversion was assessed as Moderate (25.6 ha).

Plate 7.7: Example of High prospective Bilby habitat in the WRAC Diversion.

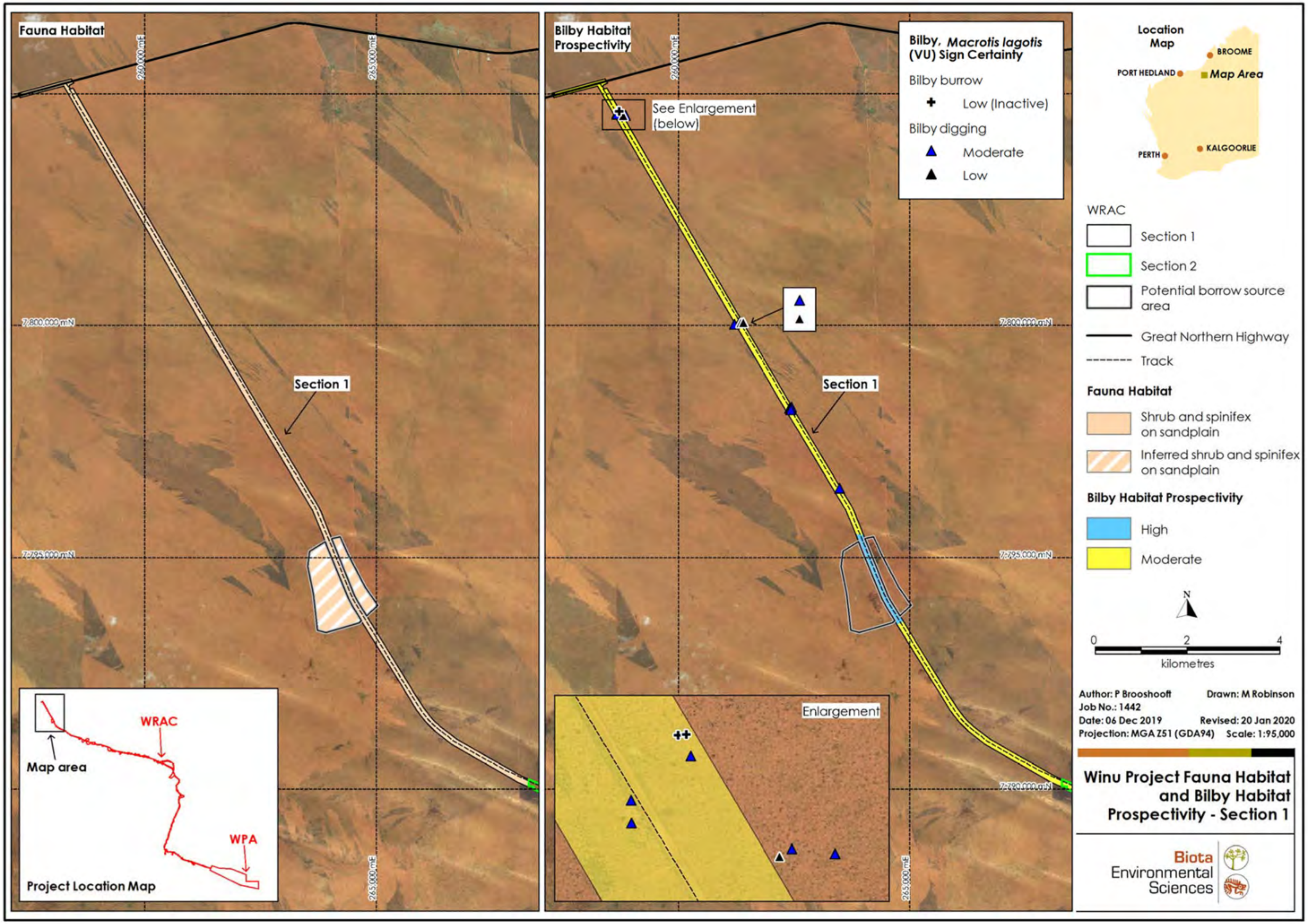

Figure 7.1: Fauna and Bilby habitat mapped, and Bilby sign recorded within WRAC Section 1.

Potential borrow source areas were not surveyed: fauna habitat was inferred only and Bilby habitat could not be mapped.

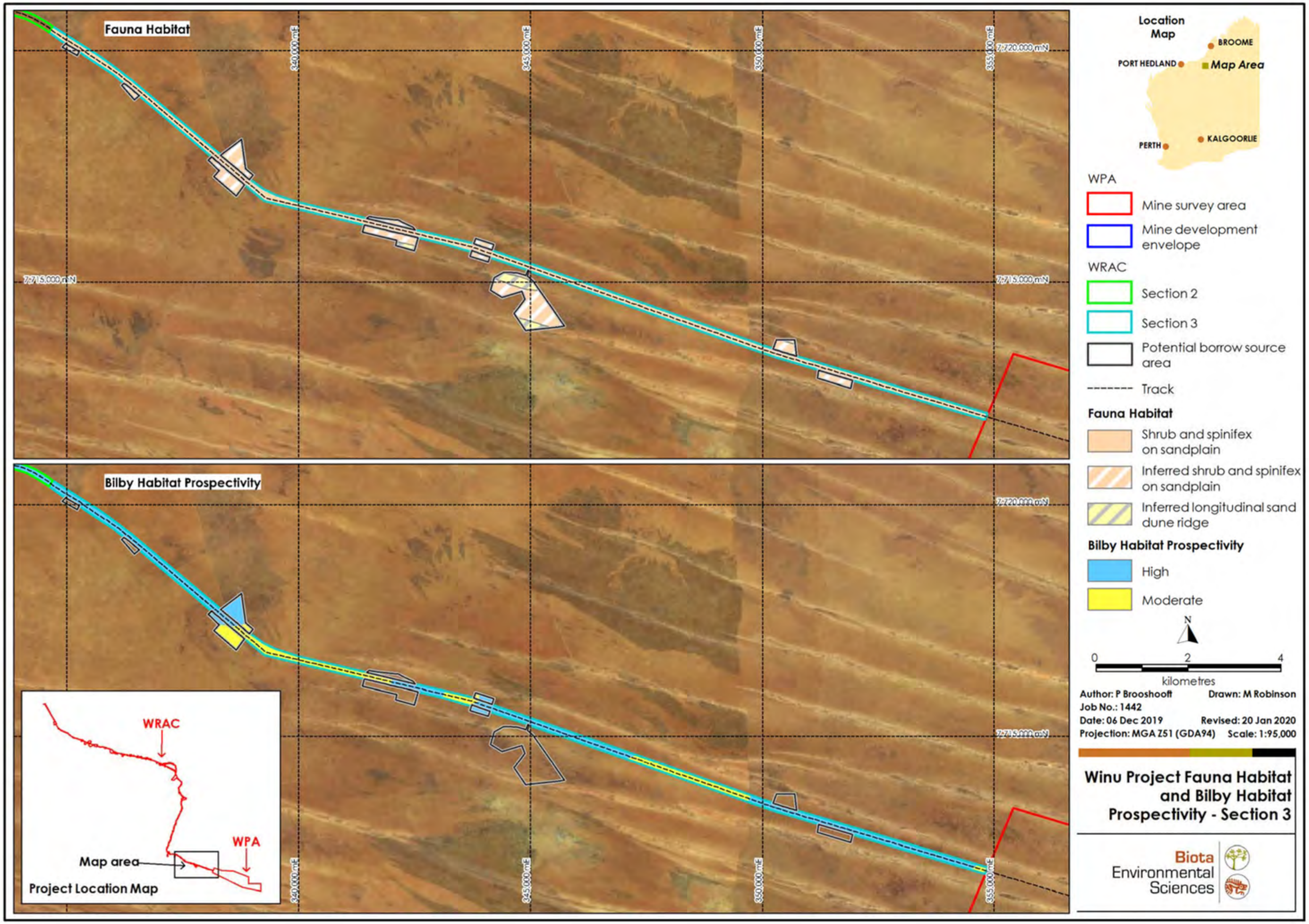

Figure 7.2: Fauna and Bilby habitat mapped within WRAC Section 3.

Not all potential borrow source areas were surveyed: fauna habitat was inferred only and Bilby habitat could not be mapped for some areas.

7.1.3 Targeted Black-footed Rock-wallaby Assessment

Sign evidence (scats) of the Black-footed Rock-wallaby was detected at six of the nine rock piles visited near the WRAC Diversion (Table 7.1; Plate 7.8 - Plate 7.16). Potential food source plants were present at eight of the nine rock piles, except for WIN07RP, which was very small and also devoid of Black-footed Rock-wallaby scats (Table 7.1).

Table 7.1: Black-footed Rock-wallaby evidence from rock piles located in the vicinity of the WRAC Diversion.

Rock Pile ID	Scat Abundance	*Ficus* sp. Present?
WIN01RP	Many	Yes
WIN02RP	Many	Yes
WIN03RP	Few	Yes
WIN04RP	Very few	No
WIN05RP	Many	Yes – small
WIN06RP	None	Yes
WIN07RP	None	No
WIN08RP	None	Yes
WIN09RP	Very few, old	Yes – several large

Plate 7.8: WIN01RP.

Plate 7.9: WIN02RP.

Plate 7.10: WIN03RP.

Plate 7.11: WIN04RP.

Plate 7.12: WIN05RP.

Plate 7.13: WIN06RP.

Plate 7.14: WIN07RP.

Plate 7.15: WIN08RP.

Plate 7.16: WIN09RP.

7.1.4 Other Fauna Records

While conducting transect walks searching for sign of the Bilby and Black-footed Rock-wallaby, sign evidence of other species was also detected. Tracks and scats of a macropod species, most likely either a Euro (*Osphranter robustus*) or Red Kangaroo (*Osphranter rufus*) were recorded (Plate 7.17 and Plate 7.18).

Plate 7.17: Tracks of a macropod species.

Plate 7.18: Scats of macropod species.

7.2 Level 2 Survey (WRAC Section 2)

Results and discussion for WRAC Section 2 were sourced from the recently completed surveys for the AREH project (Biota 2018a). These are re-presented here where relevant to the WRAC.

7.2.1 Vertebrate Fauna Overview

A combined total of 144 vertebrate fauna species were recorded from WRAC Section 2 during the AREH project survey from systematic trapping, non-systematic sampling and targeted Bilby, Northern Quoll and Black-footed Rock-wallaby searches. This total included 17 species of conservation significance (Table 7.2; see Appendix 10 for site by species matrices).

Across all systematic trapping sites, 2,982 individuals were trapped (including 37 mammals, 91 amphibians, 2,303 reptiles and 551 birds). A further 511 individuals were recorded opportunistically (23 reptiles and 488 birds). Nine mammal species were recorded from trace records (scats, tracks, diggings or burrows), opportunistic observations or from targeted searches. Eight bat species were recorded from the bat detectors. Forty bird species were recorded from the automated audible recordings, including 10 species not recorded by other methods. Five individuals were recorded from the nocturnal searches (two birds and three reptiles), including one species of reptile that had not been recorded by other methods.

Table 7.2: Overview of vertebrate fauna recorded from WRAC Section 2 during the AREH project survey.

Faunal Group	Number of Species	Number of Conservation Significant Species
Native ground-dwelling mammals	15	5
Introduced ground-dwelling mammals	4	0
Bats	8	0
Reptiles	62	1
Amphibians	2	0
Birds	53	11
Total	**144**	**17**

A number of species recorded in this study have well understood distributions in the Pilbara but had not previously been recorded as far north as the current study area. Specific examples within each class of fauna are provided below.

7.2.2 Mammals

7.2.2.1 Ground-dwelling Mammals

Ten mammal species (including the introduced House Mouse) were recorded from the trapping sites (Appendix 10). Few were abundant; the tiny dasyurid Long-tailed Planigale (*Planigale ingrami*) and the Sandy Inland Mouse (*Pseudomys hermannsburgensis*) were the most common with 13 and eight captures, respectively (Appendix 10). Four of the species were uncommonly recorded, comprising the Kaluta (*Dasykaluta rosamondae*), Rory's Pseudantechinus (*Pseudantechinus roryi*), Spinifex Hopping-mouse (*Notomys alexis*) and the Desert Mouse (*Pseudomys desertor*), which were only recorded from a single site on one day of trapping (Appendix 10).

A single individual of the Black-footed Rock-wallaby (*Petrogale lateralis lateralis* - Endangered) was captured in a trap at site AHF14CE, which targeted the species in rocky habitat (Appendix 10). The species was further recorded from scats, observations and video footage. An additional five mammal species of elevated conservation significance were recorded from sign evidence (tracks, scats, diggings or burrows) (Appendix 10). These were the Northern Quoll (*Dasyurus hallucatus*), Western Pebble-mound Mouse (*Pseudomys chapmani* – Priority 4), Bilby (*Macrotis lagotis* – Vulnerable) and the Northern Marsupial Mole (*Notoryctes caurinus* – Priority 4). Further detail of these conservation significant mammal species is presented in Sections 7.2.2.3 to 7.2.2.7 below.

Five species were observed opportunistically or from sign only, comprising two native species: the Agile Wallaby (*Notamacropus agilis*) and Red Kangaroo (*Osphranter rufus*); one naturalised exotic species: the Dingo (*Canis familiaris dingo*); and two introduced species: the Cat (*Felis catus*) and Camel (*Camelus dromedarius*) (Appendix 10).

7.2.2.2 Bats

Eight bat species were identified from ultrasonic call recordings (Appendix 10). None of the species recorded were of conservation significance.

7.2.2.3 Black-footed Rock-wallaby (*Petrogale lateralis lateralis*)

The Black-footed Rock-wallaby is listed under the BC Act and the EPBC Act as Endangered. Multiple records of the Black-footed Rock-wallaby were recorded from rock pile habitat northeast of WRAC Section 2 along the existing access road (Figure 7.3). The species is known from a series of isolated, patchily distributed populations in Western Australia and the Northern Territory (Pearson 2013, Woinarski et al. 2014). The records of the species within the vicinity of WRAC Section 2 are significant, not only due to the conservation significance of the species overall, but also because it appears to represent the only recent record of the species from the Great Sandy Desert, and was a previously unknown colony prior to the completion of the AREH project survey.

Most effort targeting this species was directed at recording its presence via secondary sign to maximise the amount of prospective rocky habitat that could be searched. Rocky habitat in the form of breakaways and rock piles (Plate 7.19) was searched, yielding numerous scat and track records (Plate 7.20 and Plate 7.21). In addition, an individual was recorded in a cage trap and on motion cameras (Plate 7.22), and individuals were also sighted on the rock piles just after dawn (Plate 7.23).

Plate 7.19: Typical Black-footed Rock-wallaby habitat.

Plate 7.20: Black-footed Rock-wallaby shelter and scat piles.

Plate 7.21: Black-footed Rock-wallaby tracks.

Plate 7.22: Black-footed Rock-wallaby recorded on a motion camera.

Plate 7.23: Individual observation of a Black-footed Rock-wallaby.

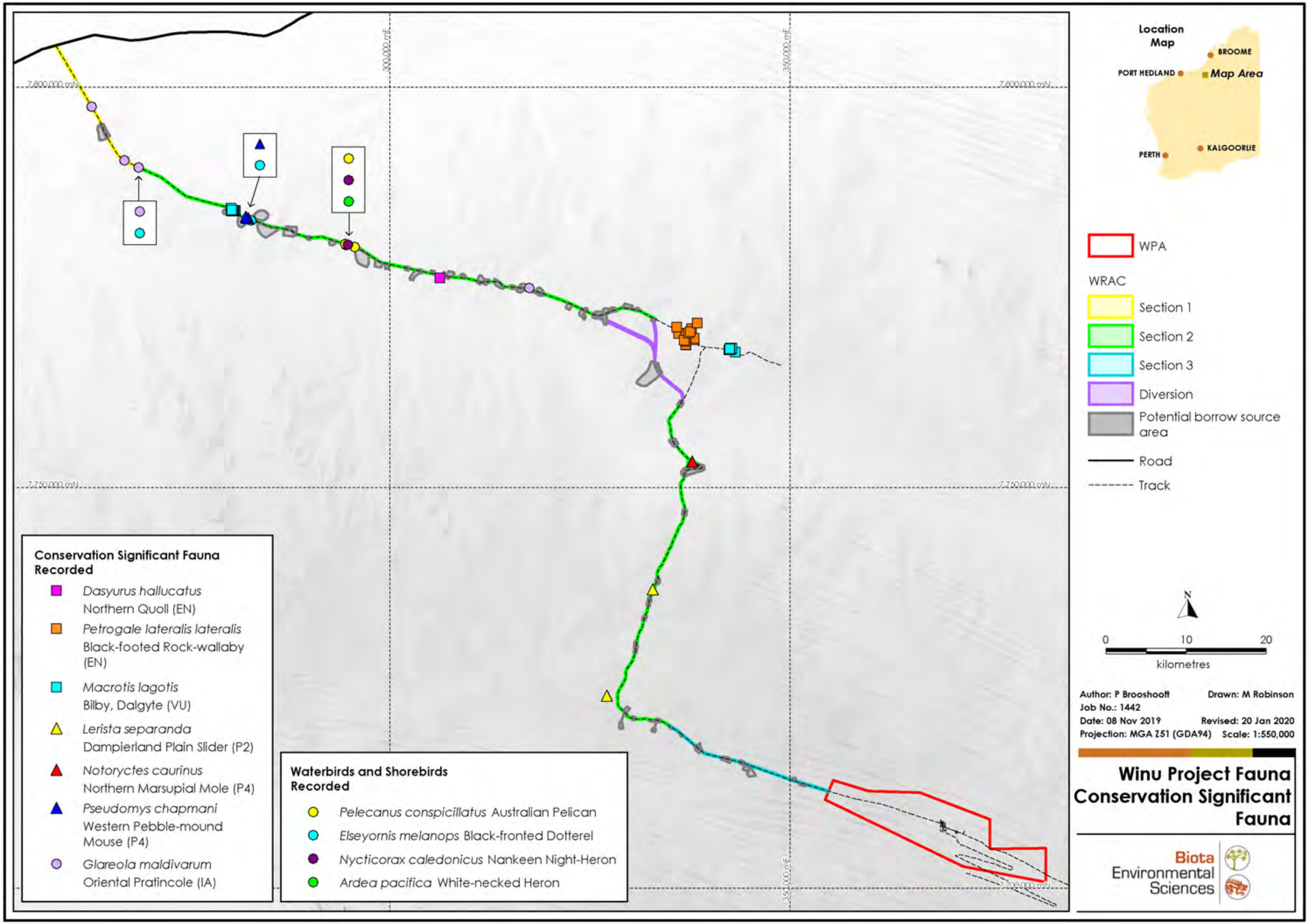

Figure 7.3: Record locations of conservation significant species recorded within or near WRAC Section 2 during the AREH project survey.

7.2.2.4 Northern Quoll (*Dasyurus hallucatus*)

The Northern Quoll is listed under the BC Act and the EPBC Act as Endangered. The Northern Quoll was recorded during the AREH survey from a scat collected from rock substrate (Plate 7.24; Figure 7.3). No evidence of denning in the form of larger scat piles was recorded, no individuals were trapped and none were recorded on automated cameras. On the mainland of Western Australia, the species is generally described as occurring within the Pilbara and the north-west Kimberley, and as such, the record of this species within WRAC Section 2 represents one of the most northerly occurring of the Pilbara records. Given the extensive search of rocky habitat undertaken to target the Black-footed Rock-wallaby within WRAC Section 2, the paucity of denning evidence of the Northern Quoll would seem to indicate that it is occurring at most on a transient basis. Areas utilised intensively by Northern Quolls are readily identified by the presence of latrines at their dens, which remain in the landscape for many years even when the dens cease to be used.

Plate 7.24: Northern Quoll scat recorded within WRAC Section 2.

7.2.2.5 Western Pebble-mound Mouse (*Pseudomys chapmani*)

The Western Pebble-mound Mouse is listed as a Priority 4 species by the DBCA. Three mounds of the species were detected during the AREH survey within WRAC Section 2 (Figure 7.3). Once described as endemic to the central and eastern parts of the Pilbara (Menkhorst and Knight 2011), this species is now much more widely known over the entire Pilbara region and into the Gascoyne (NatureMap records), where it is commonly found on stony hillsides with hummock grasslands within the Hamersley and Chichester subregions of the Pilbara bioregion (Menkhorst and Knight 2011). The occurrence of the species in WRAC Section 2 was notable as it falls north of where the species has typically been recorded, probably reflecting a lack of survey coverage. Active mounds are discernible by factors such as the presence of maintained turrets and lack of debris in the turrets. Inactive mounds generally display a more flattened and consolidated appearance due to the lack of routine maintenance and pebble movement. These parameters are generally used when determining likely mound status. One mound recorded during the survey was classified as active (Plate 7.25) while the remainder were inactive.

Plate 7.25: Active Western Pebble-mound Mouse mound.

7.2.2.6 Bilby (*Macrotis lagotis*)

Evidence of Bilby presence, in the form of recent diggings, burrows (Plate 7.26) and tracks, was found in two general locations within and near WRAC Section 2 (Figure 7.3), and the species was also recorded via motion camera (Plate 7.27).

Plate 7.26: Active Bilby burrow.

Plate 7.27: Bilby record from motion camera.

Bilby habitat mapping

The majority (1,160.4 ha) of WRAC Section 2 was Highly prospective Bilby habitat, with the presence of important food source plants such as *Acacia monitcola, A. hilliana, A. stellaticeps* and *Yakirra australiensis* (Figure 7.4 - Figure 7.10). The prospectivity of the remaining area of WRAC Section 2 was assessed as Moderate (366.2 ha) or Low (755.1 ha) (Figure 7.4 - Figure 7.10).

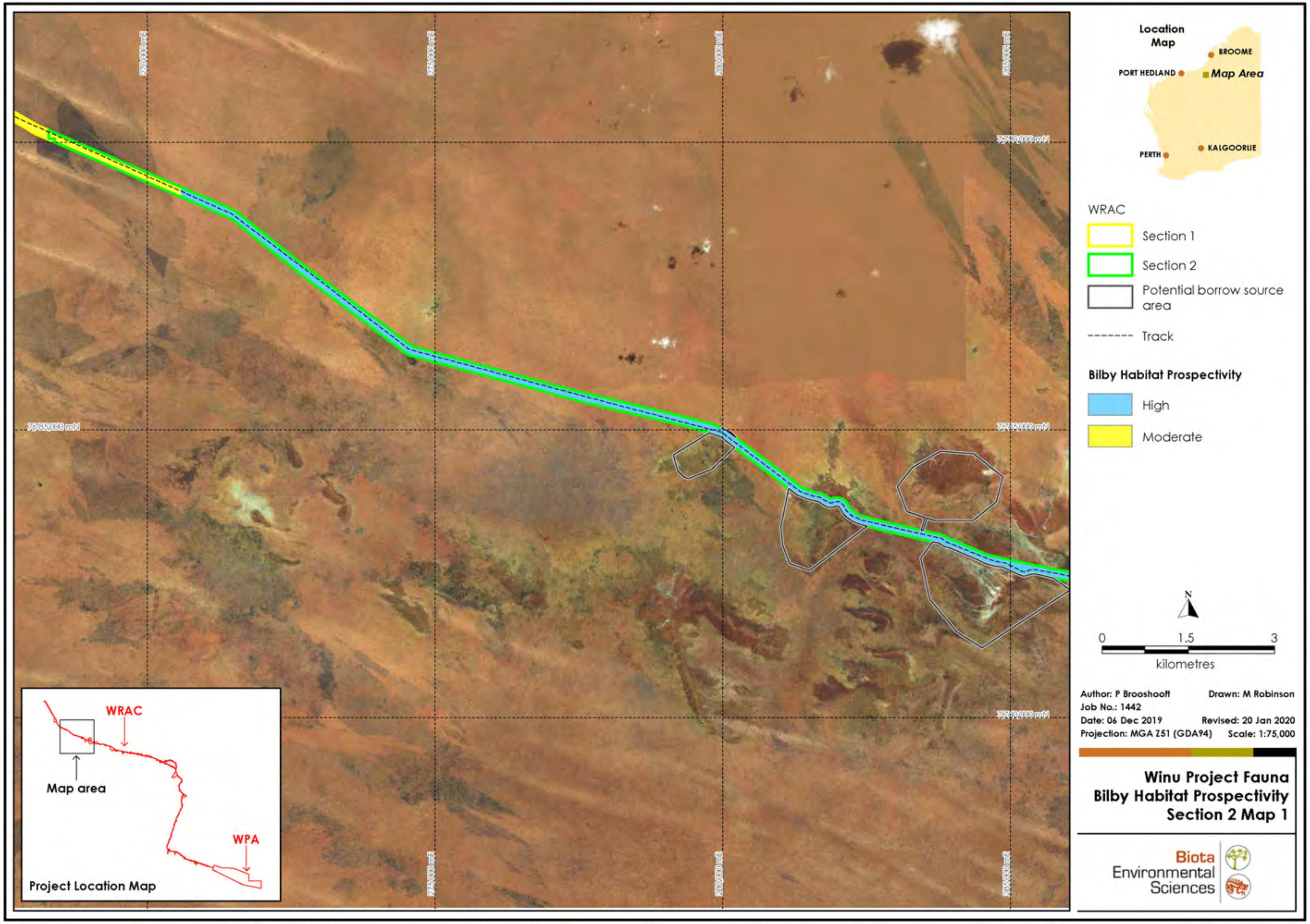

Figure 7.4: Bilby habitat mapping within the WRAC Section 2 (Map 1).

Potential borrow source areas were not surveyed and could not be mapped.

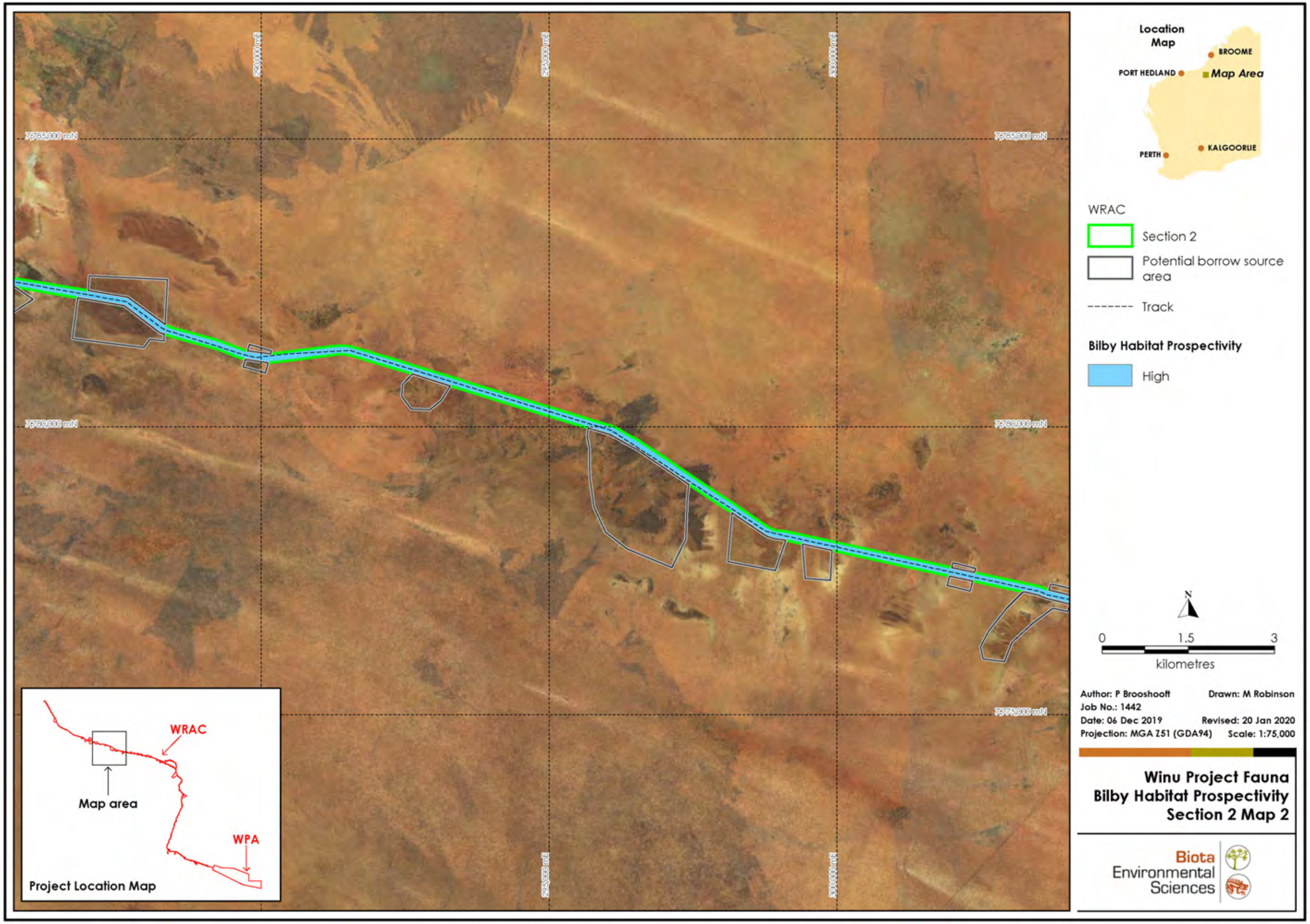

Figure 7.5: Bilby habitat mapping within the WRAC Section 2 (Map 2).

Potential borrow source areas were not surveyed and could not be mapped.

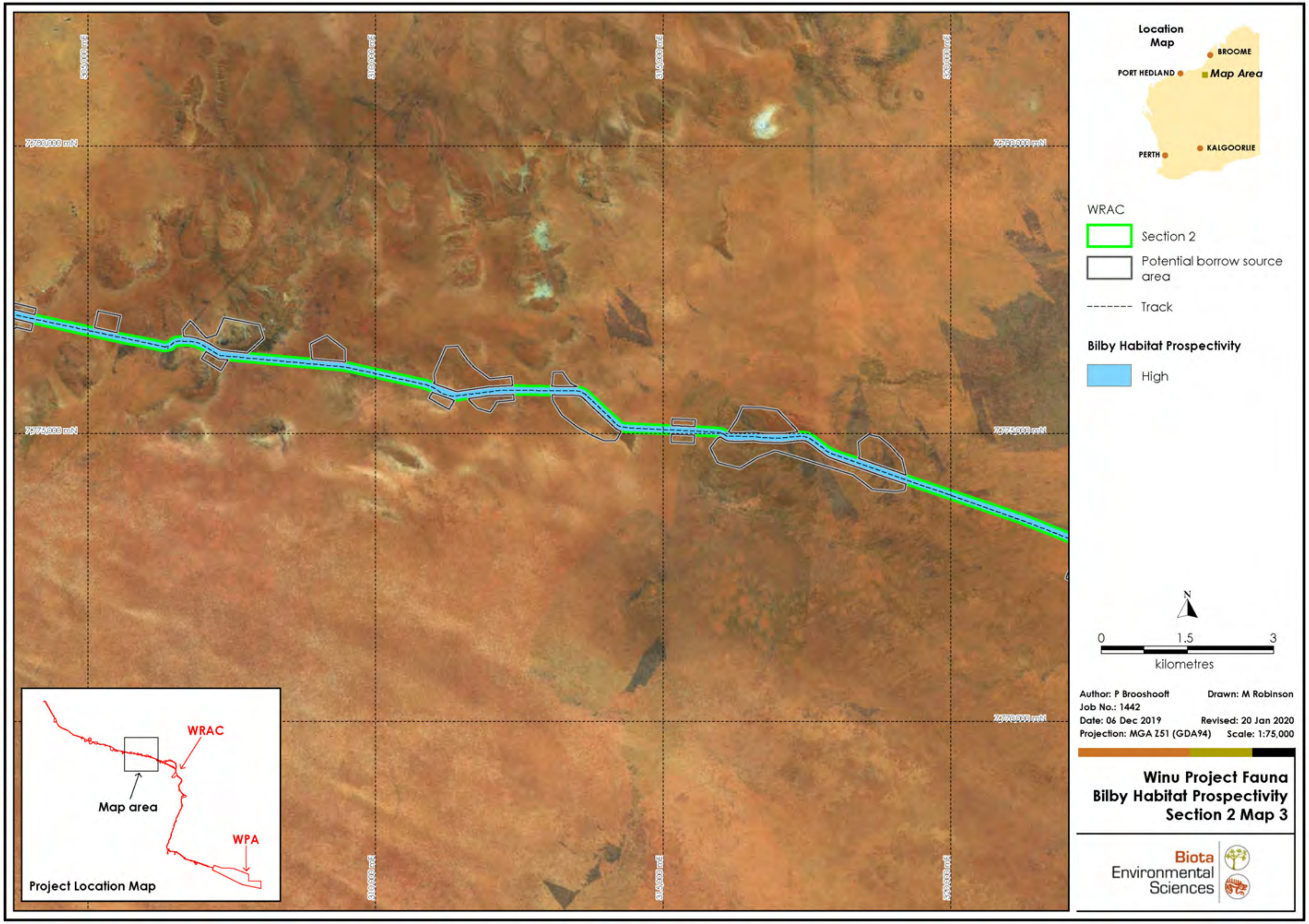

Figure 7.6: **Bilby habitat mapping within the WRAC Section 2 (Map 3).**

Potential borrow source areas were not surveyed and could not be mapped.

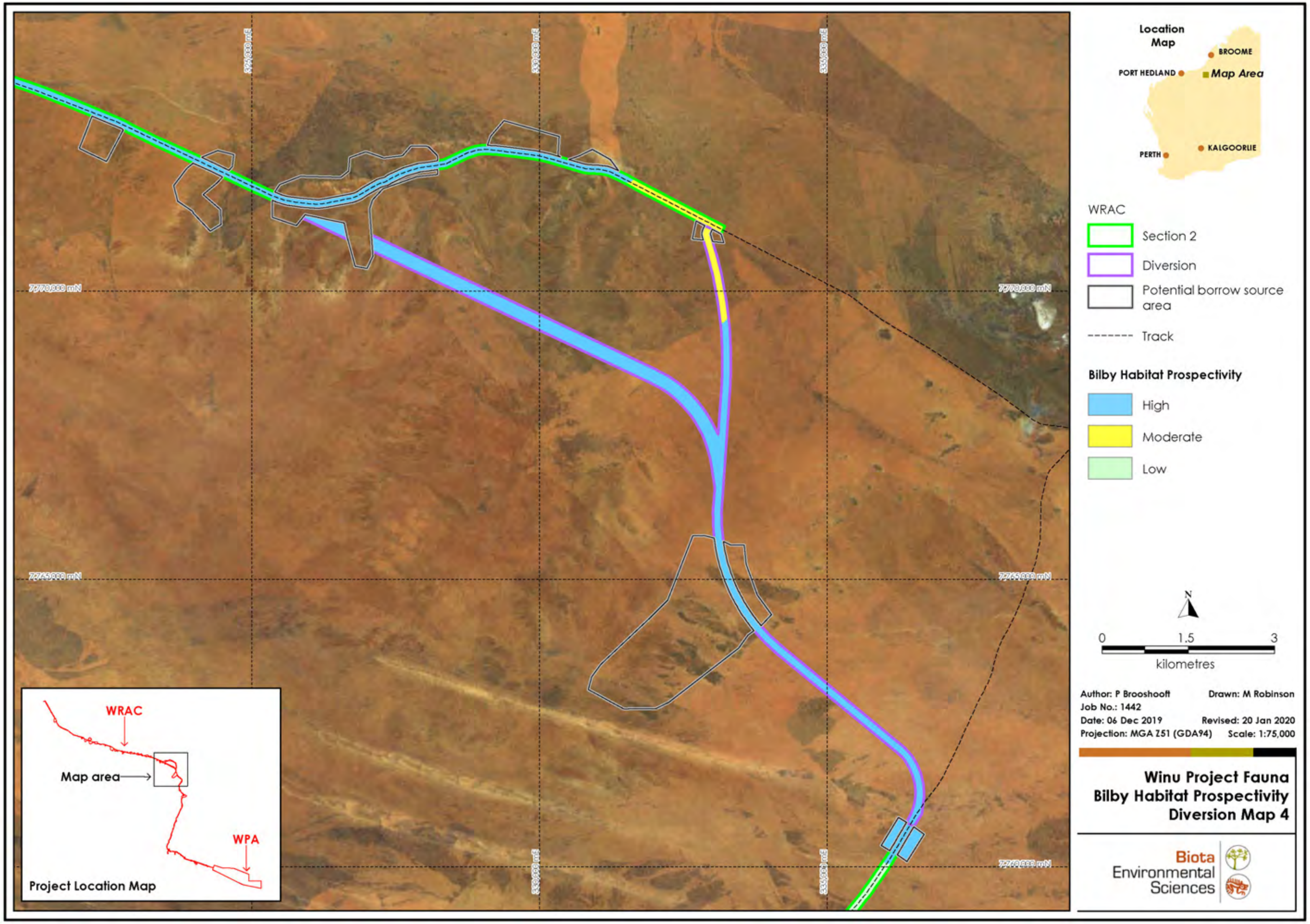

Figure 7.7: Bilby habitat mapping within the WRAC Section 2 (Map 4).

Potential borrow source areas were not surveyed and could not be mapped.

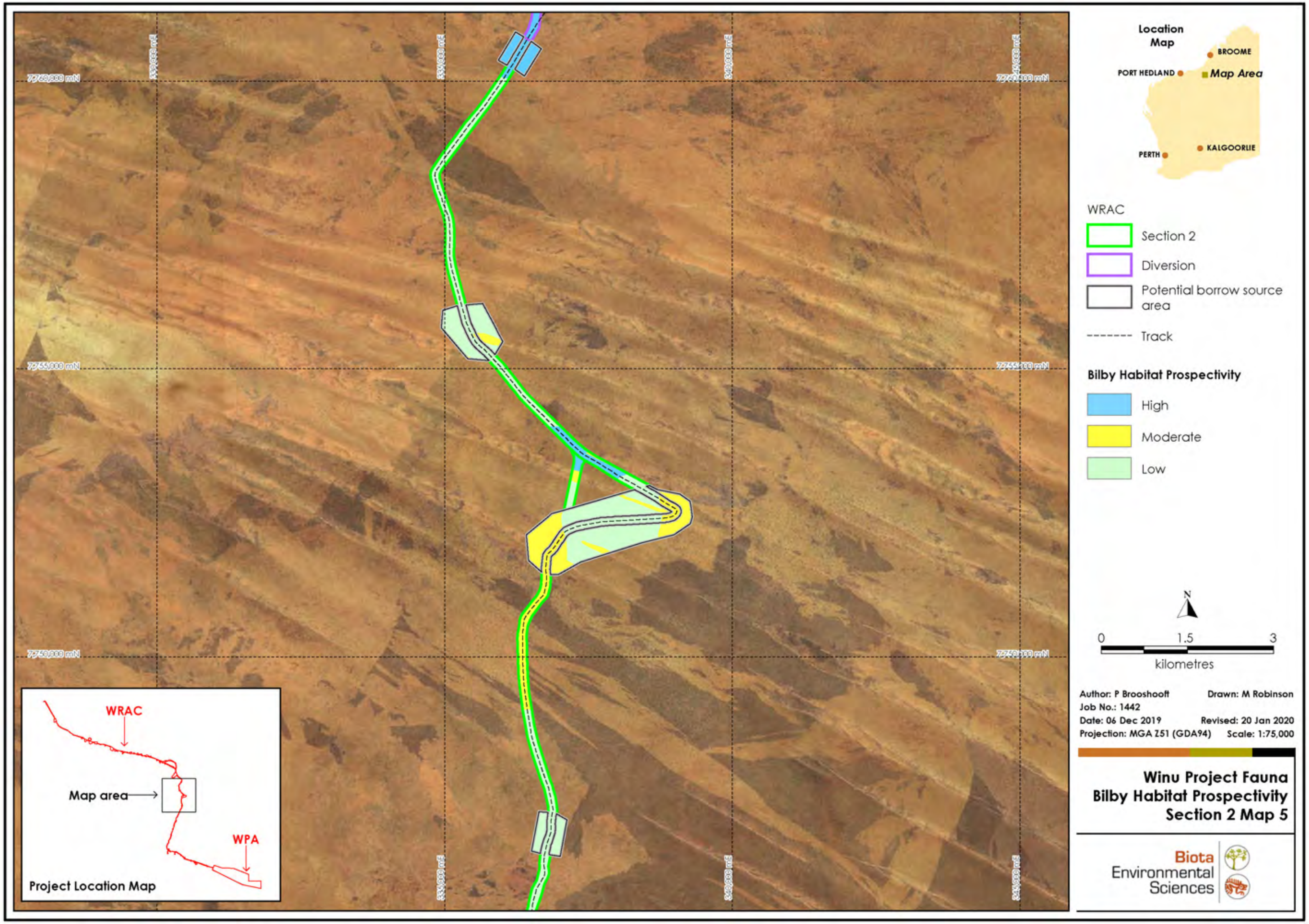

Figure 7.8: Bilby habitat mapping within the WRAC Section 2 (Map 5).

Potential borrow source areas were ground-truthed as part of the Astron surveys of this portion of the WRAC (Astron 2019b).

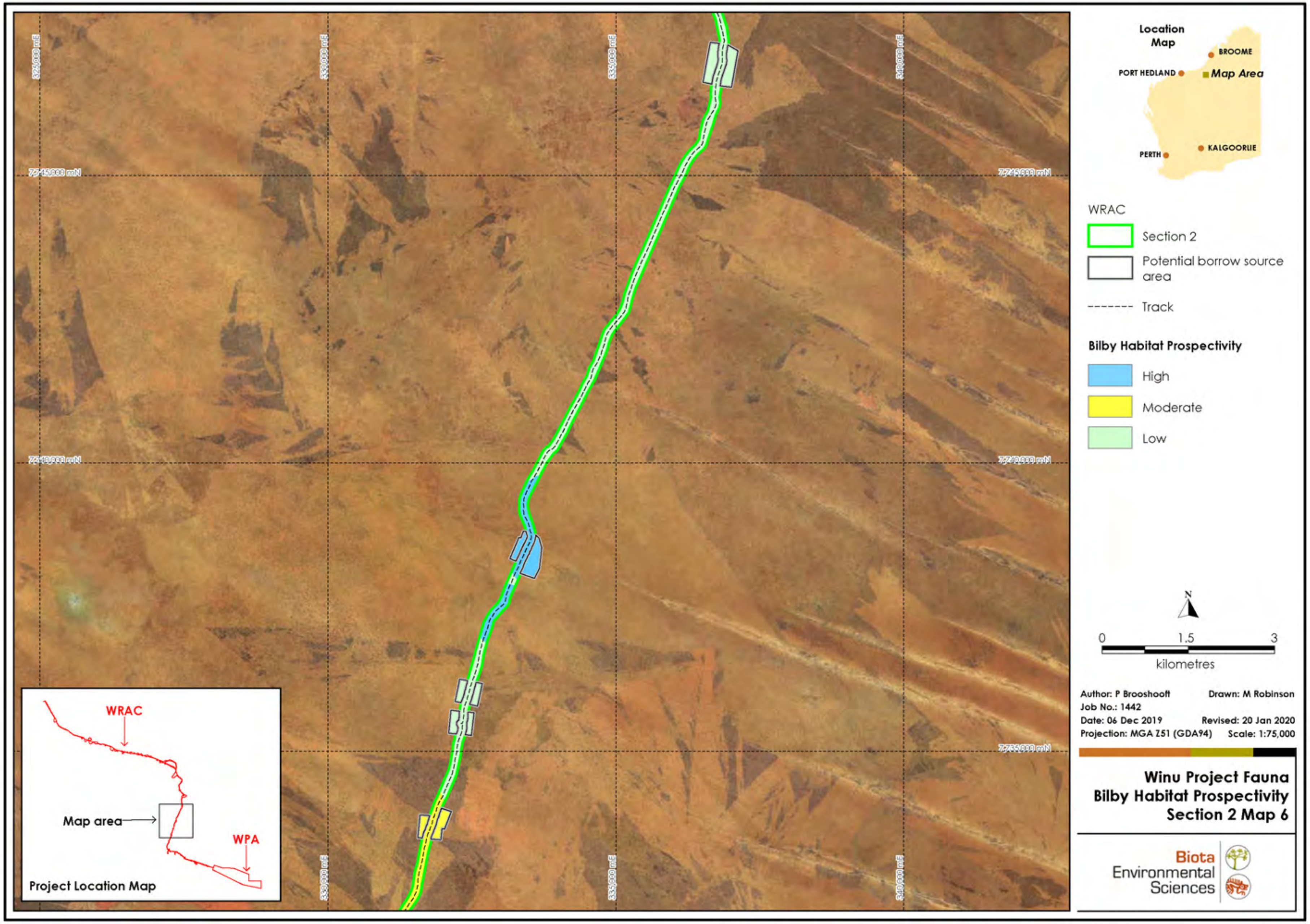

Figure 7.9: Bilby habitat mapping within the WRAC Section 2 (Map 6).

Potential borrow source areas were ground-truthed as part of the Astron surveys of this portion of the WRAC (Astron 2019b).

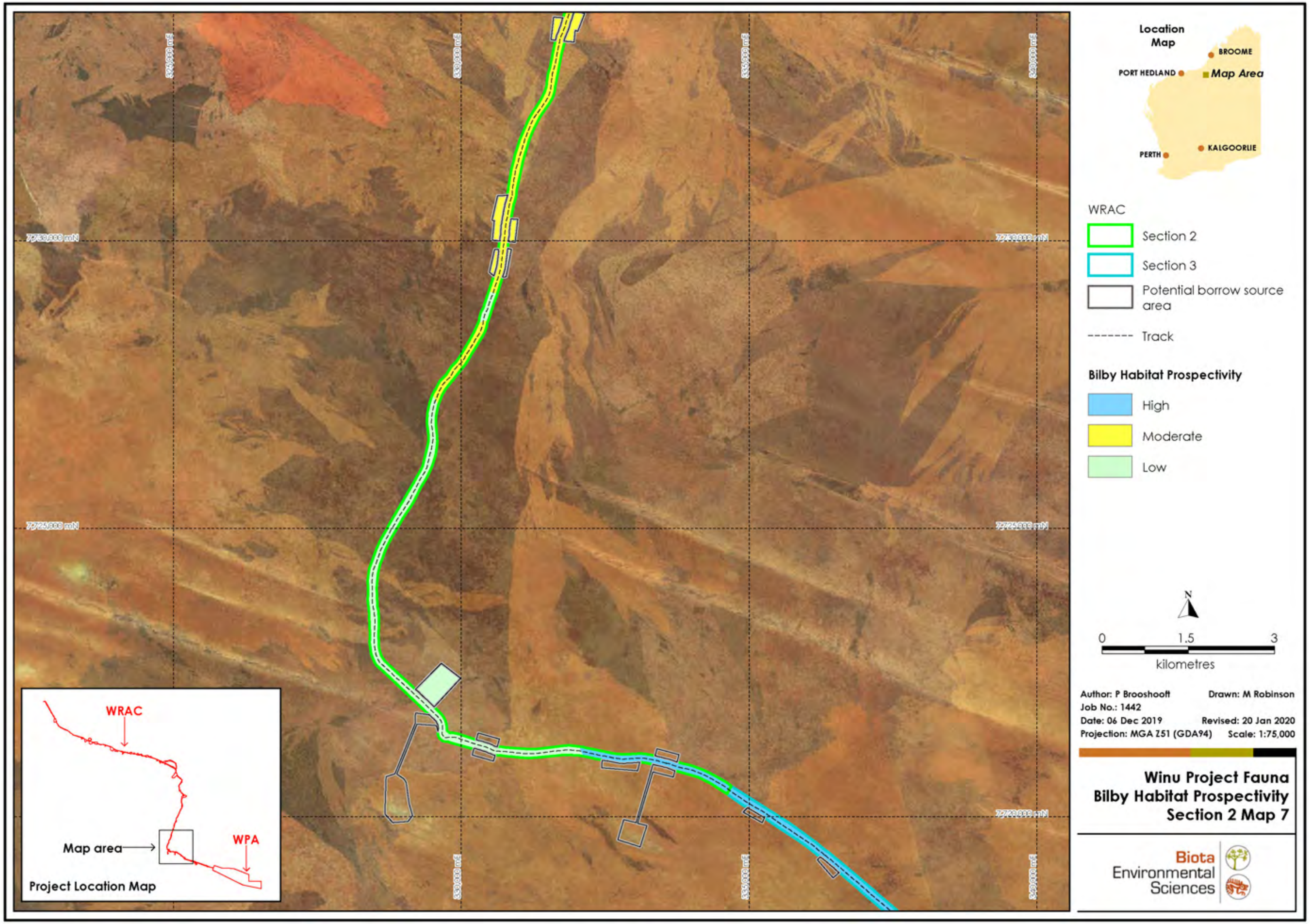

Figure 7.10: Bilby habitat mapping within the WRAC Section 2 (Map 7).

Some potential borrow source areas were ground-truthed as part of the Astron surveys of this portion of the WRAC (Astron 2019b), the remaining potential borrow source areas were not surveyed and could not be mapped.

7.2.2.7 Northern Marsupial Mole (*Notoryctes caurinus*)

This fossorial (burrowing) species has prominent morphological adaptations to its almost entirely subterranean habit, including being blind, lacking ears and the modification of limbs to form paddle-like structures to aid ‘swimming’ through sand (Warburton 2006). Marsupial Moles inhabit sand dunes and, to a lesser extent, adjacent swales where there is suitable deep, loose sand. There is no robust estimate of population size (Department of the Environment and Energy 2018) likely due to their cryptic nature. The Northern Marsupial Mole was recorded during the AREH survey from moleholes observed at site AHFMM01 within WRAC Section 2.

7.2.3 Reptiles

Sixty-two reptile species were recorded from the AREH project trapping sites within WRAC Section 2 (Appendix 10). This total comprised 13 geckos, five flap-footed lizards, eight dragons, 20 skinks, six monitor lizards, and 10 snakes (Appendix 10). The most abundant species were *Lerista bipes* with 596 records and *Ctenophorus caudicinctus* with 482 records, representing 26% and 21% of the total reptile trap records respectively. One conservation significant reptile species was trapped; *Lerista separanda,* details of this species are presented in Section 7.2.3.1.

In addition to trap records, a further 13 reptile species were recorded from targeted searching, nocturnal searches and opportunistic observations, including four geckos, one flap-footed lizard, four dragons, one skink, two monitor lizards and four snakes (Appendix 10).

The recorded assemblage included a large proportion of that known from the Great Sandy Desert (Burbidge and McKenzie 1983), and was dominated by species with Eremean distributions with almost no Kimberley representatives.

7.2.3.1 Lerista separanda

The species *Lerista separanda* was recorded from two sites within WRAC Section 2 (AHF18PF and AHF19PF; see Figure 7.3). The records were notable given how rarely this species has been recorded to date. The records from this study (from both the WPA and WRAC Section 2) indicate it has a considerably broader distribution than was previously known.

7.2.3.2 Taxa of Interest

The records of *Antaresia stimsoni*, *Varanus giganteus* and *Demansia rufescens* all represent minor northerly extensions to the species distributions, based on record locations from NatureMap. One skink species recorded during the AREH project survey, *Lerista vermicularis,* represents the only vertebrate species endemic to the Great Sandy Desert.

One other species recorded during the survey had a known restricted distribution to the northern Pilbara: *Diporiphora vescus*. The records from WRAC Section 2 represent the most northern records to date, which extend the known distribution of this species into the Great Sandy Desert.

7.2.4 Amphibians

Two frog species were recorded; *Notaden nichollsi* and *Uperoleia micromeles* (Appendix 10). Both species typically burrow in red dune habitats, and often burrow together (Cartledge et al. 2006). While additional frog species would probably occur within WRAC Section 2 (Biota 2018a), it is common to record relatively few desert frogs during surveys due to their tendency to aestivate and remain cryptic during dry conditions. They are typically recorded opportunistically following rainfall.

7.2.5 Birds

Sixty-three species from 31 families were recorded from 1,041 individuals during the AREH survey (Appendix 10). Birding at trapping sites within WRAC Section 2 yielded 40 species while 39 species were recorded opportunistically, 12 of which had not been recorded at the trap sites (Appendix 10). Forty species were recorded by the automated recording units, of which ten had not been recorded by other means (Appendix 10). The terrestrial bird assemblage recorded within WRAC Section 2 largely comprised species commonly recorded in the Pilbara, although the overall species richness was relatively low. The dominance of open plain habitat and scarcity of dense tree and shrub layers or water sources that are typically areas of avifauna diversity are likely contributors to the lack of species richness.

The most species-rich family recorded was the Meliphagidae (honeyeaters and chats), with eight species (Appendix 10). The most abundant bird species were the Singing Honeyeater (*Lichenostomus virescens*) and the Crimson Chat (*Epthianura tricolor*), which accounted for 22% and 16% respectively of all individual bird species recorded from WRAC Section 2 (Appendix 10).

There are no bird species endemic to the Great Sandy or Little Sandy Deserts and the only species to be confined to deserts in Western Australia is the Princess Parrot, which was not recorded during this survey (Burbidge and McKenzie 1983). Twelve bird species of conservation significance were recorded: the Oriental Pratincole (*Glareola maldivarum*), which is listed as a Migratory species under both the BC Act and EPBC Act, as well as 11 EPBC Act Marine listed species. Further detail of these species is provided below in Sections 7.2.5.1 to 7.2.5.2.

7.2.5.1 Oriental Pratincole (*Glareola maldivarum*)

The Oriental Pratincole was recorded from five observations and an audio recording (Appendix 10). Two of the observations made were of foraging flocks within WRAC Section 2 (Biota 2018b). The Oriental Pratincole is a non-breeding migrant to Australia, which is typically present from October to May, with the largest numbers present from December to March (Johnstone and Storr 1998, Sitters et al. 2004). The Oriental Pratincole uses broadly similar foraging habitats to the Oriental Plover (see Section 5.2.5.1) and is not tied to water or coastal areas. However, unlike the Oriental Plover, the species takes insect prey aerially (Johnstone and Storr 1998), and so will forage over a wider range of habitat types. Therefore, the WRAC (including Section 1, 2, 3 and the Diversion) would provide suitable foraging habitat for the Oriental Pratincole. The species would occur at similar times of year to the Oriental Plover, with largest concentration expected between December and March.

7.2.5.2 EPBC Act Marine Listed Birds

Of the Marine listed bird species, only the Australian Pelican (*Pelecanus conspicillatus*) represents a true marine species, in that it relies upon marine environments for survival. Despite being recorded within WRAC Section 2 (Figure 7.3), little suitable habitat is available for this species. The occurrence of this species is expected to be limited to flying birds transiting between areas of suitable habitat.

The remaining 10 Marine listed bird species recorded during the survey are erroneously listed as Marine under the EPBC Act; none rely upon marine environments for survival, and all are relatively common and widespread. These species were the Spotted Nightjar (*Eurostopodus argus*), Nankeen Night-Heron (*Nycticorax caledonicus*), Whistling Kite (*Haliastur sphenurus*), Brown Goshawk (*Accipiter fasciatus*), Nankeen Kestrel (*Falco cenchroides*), Black-eared Cuckoo (*Chalcites osculans*), Pallid Cuckoo (*Cacomantis pallidus*), Rainbow Bee-eater (*Merops ornatus*), Black-faced Cuckoo-shrike (*Coracina novaehollandiae*) and Australasian Pipit (*Anthus novaeseelandiae*) (Figure 5.1). These species are therefore not of genuine conservation concern in the context of the survey findings.

7.2.6 Fauna Habitats

The fauna habitats defined for WRAC Section 2 broadly aligned with the land systems present (Table 7.3). Habitats were further delineated where prominent landforms supported a distinct fauna assemblage (Table 7.3).

Table 7.3: Fauna habitats and their attributes within WRAC Section 2.

Habitat	Description* and Sites (AREH project survey)	Area (Ha) and Proportion of WRAC Section 2 (%)	Habitat Condition	Fauna Assemblage	Example Photograph
1. Shrub and spinifex on sandplain	The dominant habitat of WRAC Section 2. Substrate consisted of pink to red pindan soils. The vegetation was dominated by *Corymbia zygophylla*, *Erythrophleum chlorostachys* and *Owenia reticulata* trees over open to moderately dense mixed shrublands, typically dominated by wattes (*Acacia* spp.), over hummock grasslands of *Triodia schinzii* and *T. epactia*. **Survey sites:** AHF01PF, AHF02PF, AHF04PF, AHF05PF, AHF06PF, AHF10PF, AHF12PF, AHF13PF, AHF16PF, AHF17PF, AHF18PF, AHF20PF	2,954 (68)	Excellent	Species with particular associations to spinifex, i.e. mammals that forage on seeds, or species that utilise shrubs and spinifex for cover and/or foraging would be expected to occur in this habitat. For example, the following species were recorded only from this habitat type: *Pseudomys hermannsburgensis* (which is typically found in sandhill country associated with spinifex), *Notomys alexis* (which live close to spinifex hummocks on sandplains and feed on seed, roots and invertebrates), the gecko species *Strophurus jeanae* (which exclusively inhabits spinifex), and the flap-footed lizard *Delma butleri* (which shelters in spinifex).	
2. Longitudinal sand dune ridge	Dominant within the south portion of WRAC Section 2. The sand dunes in inland areas had a pink to red pindan sand substrate, and were typically long linear dunes trending east-west. These were dominated by mixed open shrublands over open hummock grasslands of *Triodia schinzii*. **Survey sites:** AHF15PF, AHF19PF	41 (1)	Excellent	Species associated with this habitat include fossorial species and dune specialists. The sand slider *Lerista vermicularis,* although recorded from sandplain habitat, was more abundantly recorded from dune habitat (124 individuals recorded from dune sites compared to three individuals recorded from sandplain sites). The dune specialist skink species, *Ctenotus brooksi,* was also only recorded at the dune sites. The Northern Marsupial Mole would also preferentially occupy this habitat type, and was recorded from a dune at site AHFMM01.	
3. Gravelly lateritic rise	Patchily distributed habitat type. Low rises with a surface covering of laterite gravel and pebbles occurred sporadically. These supported open hummock grasslands of *Triodia epactia* with a low open shrubland of the wattles *Acacia hilliana* and *A. adoxa* var. *adoxa*; taller shrubs were typically sparse but included species such as *Grevillea refracta* and *G. wickhamii*. **Survey sites:** AHF03F	1,278 (30)	Excellent	This habitat type was the least species diverse, with five bird species, nine reptile species and no mammal records from the funnel traps (although funnel traps are not especially effective at recording mammals). Species with associations to rock substrate would be expected to occur. This was evidenced with the record of *Ctenotus saxatilis* from this habitat, which prefers rocky areas, and is commonly known as the Rock Ctenotus. Although not trapped at this site, the Western-pebble Mound-mouse was recorded from this habitat type nearby. This species is commonly found in areas of gravelly substrate, as they construct mounds out of stones.	
5. Rock outcropping	Patchily distributed and occurs as rock piles and rocky ridge landforms. These rocky areas supported some flora species that were not found in any other habitat, including *Ficus brachypoda*, *Mallotus nesophilus*, *Trichosanthes cucumerina* and *Triumfetta incana*. **Survey sites:** AHF14E	1 (0.02)	Excellent	Species utlising rocky overhangs as shelters or for denning purposes, or species foraging on vegetation restricted to this habitat would be expected to occur. The Black-footed Rock-wallaby was recorded exclusively from this habitat type. This species rarely forages far from rock piles, where it feeds on fruits of *Ficus brachypoda*, and seeks refuge from the desert heat amongst rocky overhangs. Other species such as the Northern Quoll would be expected to utilise this rocky habitat for foraging, shelter and possibly denning.	
6. Cleared (Nyangumarta Highway)	Road reserve	35 (1)	Disturbed	NA	NA
		4,309			

* vegetation description from Biota (2019a)

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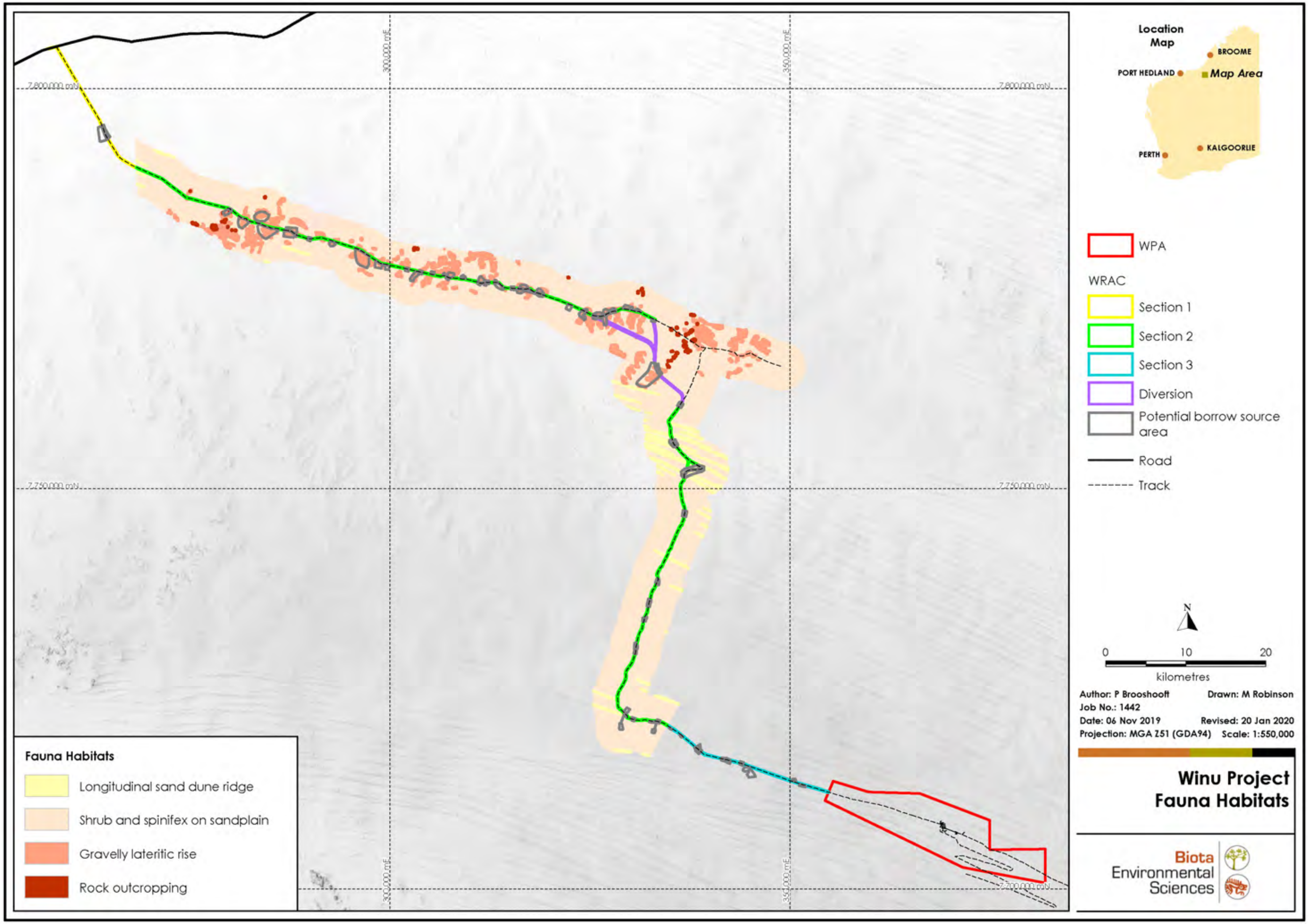

Figure 7.11: Fauna habitats mapped within WRAC Section 2.

Potential borrow source areas and the Diversion were mapped as the AREH project broadly encompassed them.

7.2.7 SRE Invertebrate Fauna

In total, 36 invertebrate specimens were collected from within WRAC Section 2 during the AREH survey from a combination of dry pitfall trapping and targeted searching of microhabitats likely to support SRE taxonomic groups. The collected samples comprised 23 spiders, nine scorpions and four snails. All specimens were sequenced by Helix to assign them to species level taxa and place them into regional context (Appendix 11). Locations of recorded specimens in WRAC Section 2 are presented in Figure 7.12.

7.2.8 Spiders

7.2.8.1 Mygalomorphae

Seventeen of the spiders collected were mygalomorph (trapdoor) spiders. Of these, five failed to yield a viable DNA sequence and were not assigned to a genetic lineage (Appendix 12). Of the 12 successfully sequenced specimens, all belonged to the family Nemesiidae and genus *Aname*. By applying the 9.5% sequence divergence threshold that was tested by Castalanelli et al. (2014), the levels of sequence divergence recorded among the specimens indicated that they belonged to four distinct nemesiid species. These species are all undescribed, and three of the species were newly recorded taxa assigned potential SRE status (Appendix 12). The fourth species, which was associated with a previously collected species from 245 km away, suggested it belonged to a widespread species which was not an SRE (Helix 2018) (Appendix 12).

7.2.8.2 Araneomorphae

Six of the collected spider specimens were placed within the Araneomorphae sub-order of spiders (modern spiders). As no groups within the Aranaemorphae are known to include SRE species, no further analysis was conducted on these specimens.

7.2.9 Scorpions

7.2.9.1 Buthidae

Nine specimens of buthid scorpions were successfully sequenced for the COI gene. Due to limitations on publicly available genetic sequences, Helix sought assistance from the WA Museum (Helix 2018). Collaboration with Dr. Joel Huey, a researcher at the WA Museum, enabled more accurate placement of the buthid scorpions (Appendix 11). The specimens were included in a phylogenetic analysis with a more extensive collection of sequences, which placed them into a species clade with specimens identified as *Lychas annulatus* by Lorenzo Prendini (American Museum of Natural History). This species is also recognised as *Hemilychas alexandrinus,* which has a distribution extending across the Australia arid zone, and the species is therefore not considered to be an SRE (Appendix 12).

7.2.10 Snails

7.2.10.1 Camaenidae

All snails collected were identified as belonging to the family Camaenidae and the genus *Rhagada*; the most species-rich genus of land snails in Australia's semi-arid Pilbara region (Johnson et al. 2004, Hamilton 2015).

Four specimens of camaenid *Rhagada* land snails were sequenced and assessed for variation at the COI mtDNA gene (Helix 2018) (Appendix 10). The molecular data were then placed into an existing molecular taxonomic framework for *Rhagada*, using publicly available COI sequences, which indicated that all specimens collected represented the recently described species: *Rhagada karajarri* (Helix 2018). The records from WRAC Section 2 extend the distribution of the species by approximately 180 km, suggesting that it is not an SRE (Appendix 12).

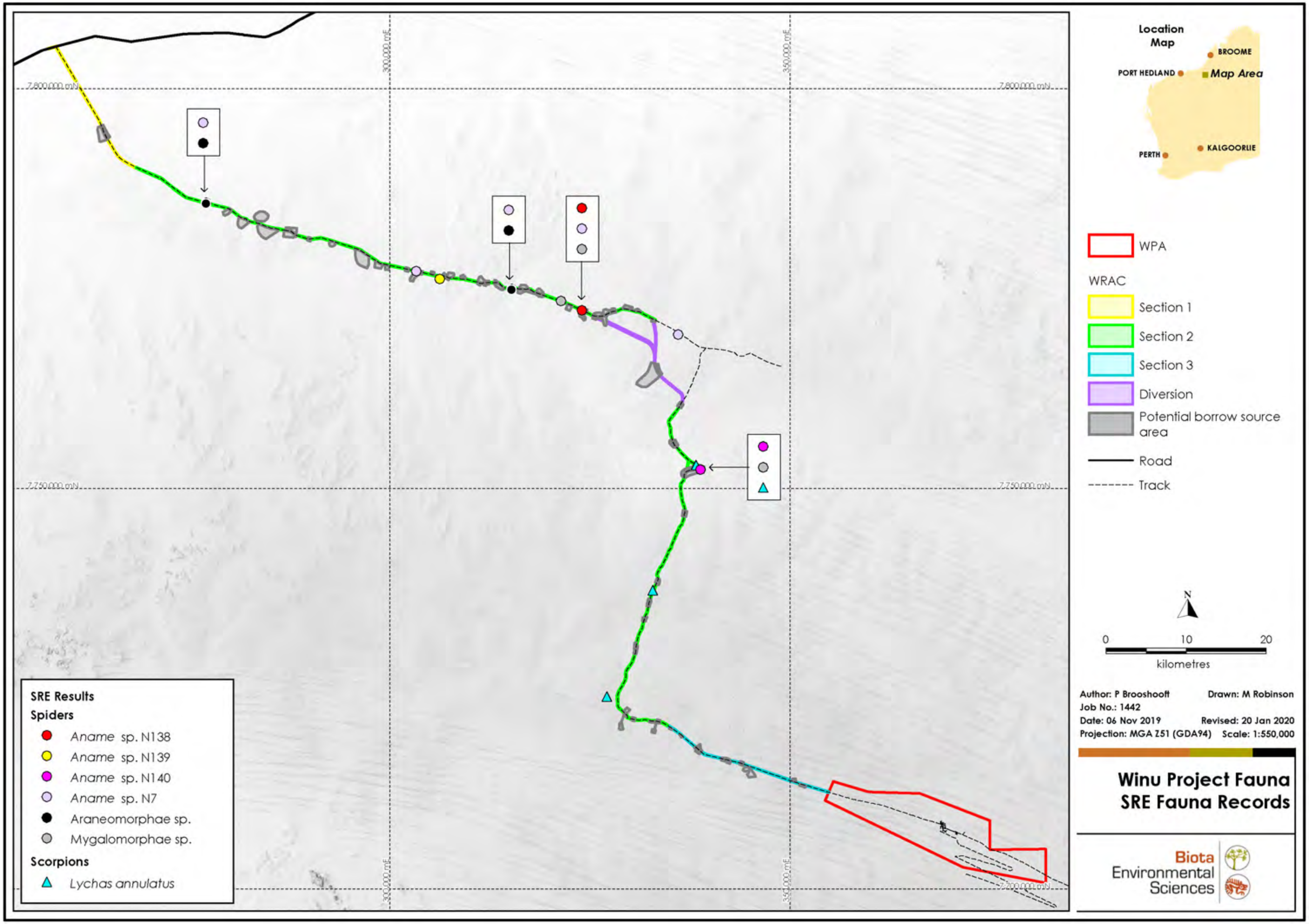

Figure 7.12: Locations of SRE specimens recorded within WRAC Section 2 during the AREH survey.

7.3 Conservation Significant Fauna of the Winu Road Access Corridor

7.3.1 Conservation Significant Fauna Recorded Summary

In total, seven species of conservation significance have been recorded from the WRAC (in addition to the ten erroneously listed Marine avifauna species; Section 7.2.5.2). These were:

- Black-footed Rock-wallaby (*Petrogale lateralis lateralis*) – BC Act and EPBC Act Endangered;
- Northern Quoll (*Dasyurus hallucatus*) - BC Act and EPBC Act Endangered;
- Bilby (*Macrotis lagotis*) – BC Act and EPBC Act Vulnerable;
- Western Pebble-mound Mouse (*Pseudomys chapmani*) – DBCA Priority 4;
- Northern Marsupial Mole (*Notoryctes caurinus*) – DBCA Priority 4;
- *Lerista separanda* - DBCA Priority 2; and
- Oriental Pratincole (*Glareola maldivarum*) – BC Act and EPBC Act Migratory.

7.3.2 Conservation Significant Fauna Likely to Occur

In addition to the recorded conservation significant species within the WRAC, previous records and habitat availability indicated four species were likely to occur within the WRAC. These species were:

- Brush-tailed Mulgara (*Dasycercus blythi*) – DBCA Priority 4 (Section 7.3.2.1);
- Fork-tailed Swift (*Apus pacificus*) – BC Act Migratory, EPBC Act Marine and Migratory (Section 7.3.2.2);
- Little Curlew (*Numenius minutus*) - BC Act Migratory, EPBC Act Marine and Migratory (7.3.2.3); and
- Oriental Plover (*Charadrius veredus*) - BC Act Migratory, EPBC Act Marine and Migratory (Section 7.3.2.4).

7.3.2.1 Brush-tailed Mulgara (*Dasycercus blythi)*

The Brush-tailed Mulgara is known to inhabit spinifex grasslands on sand plains and sandy swale between low dunes from south-western Queensland across the Simpson, Tanami, and Great Sandy Deserts of southern and central Northern Territory and central Western Australia. It is also known to inhabit areas on gibber (rock and pebble covered flat plains), and is closely associated with gently sloping to flat topographic positions rather than steep-sided sandridges (Pavey et al. 2011). This species was recorded elsewhere from within the AREH project (Biota 2018a), and is likely to occur in suitably vegetated habitat within the WRAC that has not been disturbed.

7.3.2.2 Fork-tailed Swift (*Apus pacificus*)

The Fork-tailed Swift is most often observed following thunderstorms and cyclonic weather patterns and the associated emergence of invertebrate fauna, which are a food source for this species (Johnstone et al. 2013). Fork-tailed Swifts are thought to be exclusively aerial in Australia as they breed in the northern hemisphere, migrating south to the Australasian region from October to April. The species is an irregular summer visitor to the Pilbara during November to early April (Johnstone et al. 2013). Fork-tailed Swifts do not rely on terrestrial habitats, but may overfly the WRAC episodically.

7.3.2.3 Little Curlew (*Numenius minutus*)

The Little Curlew forages in large numbers on and over the plains inland from Eighty Mile Beach and Broome (Sitters et al. 2004, Piersma and Hassell 2010), and therefore is considered likely to occur within the WRAC on occasion.

7.3.2.4 Oriental Plover (*Charadrius veredus*)

The Oriental Plover, like the Little Curlew, also forages on and over inland plains. This species was recorded from the WPA (see Section 5.2.5.1) and is likely to utilise open plain habitat for foraging within the WRAC on occasion.

7.3.3 Conservation Significant Fauna Potentially Occurring

Two additional conservation significant species had potential to occur in the WRAC, though neither have been recorded during either the AREH project survey or the Level 2 survey of the WPA. These species were:

- Great Desert Skink (*Liopholis kintorei*) – BC Act and EPBC Act Vulnerable (Section 7.3.3.1); and,
- Short-tailed Mouse (*Leggadina lakedownensis*- DBCA Priority 4 (Section 7.3.3.2).

7.3.3.1 Great Desert Skink (*Liopholis kintorei*)

This species is patchily distributed in the Great Sandy Desert, Gibson Desert and Tanami Desert. It occurs in a variety of desert habitats on sandy, clay and loamy soils (Storr et al. 1999). It is known to inhabit burrow complexes, which are distinctive, especially when latrines are present. Suitable habitat for this species is available throughout undisturbed portions of the WRAC, but burrow complexes were not detected during survey. Given the availability of habitat within the WRAC and lack of previous survey work in the area, this species may occur.

7.3.3.2 Short-tailed Mouse (*Leggadina lakedownensis*)

Prior to 1997, only two specimens of this species had been collected, however the number of records of this species has increased substantially since this time (Cooper et al. 2003). In Western Australia the distribution of *Leggadina lakedownesis* includes the Pilbara and Kimberley regions (Menkhorst and Knight 2011) although NatureMap records also place it within the Great Sandy Desert. Regional records suggest that the primary mainland habitat comprises areas of cracking clay and adjacent habitats. However, other sources provide a more diverse picture of habitat utilisation that includes areas of open tussock and hummock grassland, *Acacia* shrubland and savannah woodland, sandy soils as well as cracking clays (Morris et al. 2008). Some areas of more mixed grasslands and shrublands do occur through undisturbed portions of the WRAC, although not typical habitat for this species. Given this, a precautionary assessment was that this species has potential to occur.

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8.0 Key Findings

A consolidated presentation of key findings for both the WPA and the WRAC is presented in Table 8.1. EPBC Act Marine listed bird species that were not considered to be of true conservation concern were excluded from Table 8.1. These species are listed in relevant report Sections 5.2.5.4 and 7.2.5.2.

Results from targeted surveying for the Bilby (*Macrotis lagotis*) indicate that habitat available within both the WPA and the WRAC is currently favourable for the Bilby, and the species is present, suggesting that the WPA and the WRAC are of importance to the Bilby as viable habitat. Targeted surveys for the Black-footed Rock-wallaby (*Petrogale lateralis lateralis*) revealed a previously unknown colony located near the WRAC Diversion (Biota 2018a). The rock piles that this species was recorded from represent core and restricted habitat for the species in the region. The rock piles were also likely to represent habitat utilised by the Northern Quoll (*Dasyurus hallucatus*) in a transient capacity. The Grey Falcon (*Falco hypoleucos*), Oriental Plover (*Charadrius veredus*), Oriental Pratincole (*Glareola maldivarum*) and Gull-billed Tern (*Gelochelidon nilotica*) are likely to occur through the WPA and WRAC on occasion during appropriate foraging conditions. The dune systems (and surrounding sandplains to a lesser extent) provide suitable connective habitat for the Northern Marsupial Mole (*Notoryctes caurinus*). Areas of gravelly lateritic habitat through the WRAC are suitable for the Western Pebble-mound Mouse (*Pseudomys chapmani*). The vegetated sandplain habitats through both the WPA and WRAC support the Brush-tailed Mulgara (*Dasycercus blythi*) and the sand slider, *Lerista separanda*.

Minor northerly range extensions were demonstrated for the Stimson's Python, *Antaresia stimsoni*, Perentie, *Varanus giganteus,* and whipsnake, *Demansia rufescens*. Of note were the significant range extensions to the known distributions of the Pilbara Planigale, *Planigale* 'species 1', sand slider, *Lerista separanda*, the whipsnake, *Demansia calodera*, the blind snake, *Anilios endoterus*, and the dragon, *Diporiphora vescus*.

Results from surveys for SRE species demonstrated the potential occurrence of short-range endemism within the Great Sandy Desert. Between the WPA and the WRAC, separated by 35-120 km, no mygalomorph spider species were common to both areas. Even within the WPA, all of the mygalomorph spider species recorded were new to science, largely as a reflection of the lack of past collection effort in the locality.

The findings from this survey have added to the knowledge base of fauna assemblages and habitats in the Great Sandy Desert, a relatively unstudied area of Australia. The assessment documented previously unknown occurrences of threatened fauna species, and range extensions for a number of fauna previously unknown from the bioregion.

Table 8.1: Consolidated key findings for the WPA and WRAC.

<table>
<tr><th></th><th></th><th>Vertebrate Fauna Summary</th><th>Conservation Significant Fauna Recorded</th><th>Conservation Significant Fauna Likely to Occur</th><th>Fauna Habitats (ha)</th><th>Bilby Habitat Prospectivity (ha)</th><th>Taxa of Note</th><th>Short-range Endemic Fauna</th></tr>
<tr><td>WPA</td><td>Winu Project Area (Level 2)</td><td>118 species, comprising:
• 10 native ground-dwelling mammals;
• 4 introduced ground-dwelling mammals;
• 5 bats;
• 56 reptiles;
• 1 amphibian and
• 42 birds.</td><td>BC Act and EPBC Act Vulnerable:
• Bilby (Macrotis lagotis); and
• Grey Falcon (Falco hypoleucos).

BC Act Migratory and EPBC Act Marine/Migratory:
• Oriental Plover (Charadrius veredus); and
• Gull-billed Tern (Gelochelidon nilotica).

DBCA Priority 4:
• Northern Marsupial Mole (Notoryctes caurinus); and
• Brush-tailed Mulgara (Dasycercus blythi).

DBCA Priority 2:
• Lerista separanda.</td><td>BC Act Migratory and EPBC Act Marine/Migratory:
• Fork-tailed Swift (Apus pacificus).</td><td>• Shrub and spinifex on sandplain (9,522)
• Longitudinal sand dune ridge (3,338);
• Gravelly lateritic rise (303);
• Clayey sand plain with termitaria (111).</td><td>• High (10,201);
• Moderate (3,073).</td><td>Range extensions:
• Pilbara Planigale (Planigale 'species 1')
• Lerista separanda;
• Demansia calodera; and
• Anilios endoterus</td><td>Potential SRE mygalomorph spider species:
• Idommata sp. B39;
• Aname sp.N147;
• Aname sp. N148;
• Aname sp. N149;
• Aname sp. N152;
• Aname sp. N153;
• Genus? sp. N150; and
• Kwonkan sp. N151.

Potential SRE scorpion species:
• Urodachus varians;
• Urodachus sp. 'telfer';
• Urodacus 'yasohenkoi species complex'.</td></tr>
<tr><td rowspan="2">WRAC</td><td>Section 1, 3 and Diversion (Level 1)</td><td>N/A (no systematic surveying)</td><td rowspan="2">BC Act and EPBC Act Endangered:
• Black-footed Rock-wallaby (Petrogale lateralis lateralis);
• Northern Quoll (Dasyurus hallucatus).

BC Act Vulnerable:
• Bilby (Macrotis lagotis).

BC Act and EPBC Act Migratory:
• Oriental Pratincole (Glareola maldivarum).

DBCA Priority 4:
• Western Pebble-mound Mouse (Pseudomys chapmani); and
• Northern Marsupial Mole (Notoryctes caurinus).

DBCA Priority 2:
• Lerista separanda.</td><td rowspan="2">DBCA Priority 4:
• Brush-tailed Mulgara (Dasycercus blythi).

BC Act Migratory and EPBC Act Marine/Migratory:
• Fork-tailed Swift (Apus pacificus);
• Little Curlew (Numenius minutus); and
• Oriental Plover (Charadrius veredus).</td><td rowspan="2">• Shrub and spinifex on sandplain (4,634)
• Longitudinal sand dune ridge (73)
• Gravelly lateritic rise (1,416);
• Rock outcropping (1).</td><td rowspan="2">• High (1,800);
• Moderate (789);
• Low (755).</td><td rowspan="2">Range extensions:
• Lerista separanda;
• Stimson's Python (Antaresia stimsoni)
• Perentie (Varanus giganteus);
• Demansia rufescens; and
• Diporiphora vescus.

Previously unknown colony:
• Black-footed Rock-wallaby (Petrogale lateralis lateralis).</td><td rowspan="2">Potential SRE mygalomorph spider species:
• Aname N138;
• Aname N139; and
• Aname N140.</td></tr>
<tr><td>Section 2 (Level 2)</td><td>144 species, comprising:
• 15 native ground-dwelling mammals;
• 4 introduced ground-dwelling mammals;
• 8 bats;
• 62 reptiles;
• 2 amphibians and
• 53 birds.</td></tr>
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9.0 Glossary

AREH	Asian Renewable Energy Hub project.
BC Act	The WA *Biodiversity Conservation Act 2016*.
Biota	Biota Environmental Sciences.
Conservation significant	A species listed under the EPBC Act, BC Act or as a DBCA Priority species.
COI	Cytochrome oxidase subunit I gene.
DBCA	Department of Biodiversity, Conservation and Attractions formerly Department of Parks and Wildlife, Department of Environment and Conservation (DEC), and Department of Conservation and Land Management (CALM).
Elliott trap	A collapsible aluminium box trap.
EPA	Environmental Protection Authority, Western Australia.
EPBC Act	The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.
Fauna habitat	A collection of similar landforms likely to a discrete assemblage.
IBRA	Interim Biogeographic Regionalisation for Australia.
Land System	A system of land classification. This system divides the region into broad units, each consisting of a series of "land units" that occur on characteristic physiographic types within the land system.
Opportunistic record	Recorded by non-systematic sampling methods.
SRE	Short-range endemic.
Systematic sampling	Sampling using trapping (including pitfall traps, Elliott traps and/or funnel traps) installed in a defined habitat.
WPA	Winu Project Area, the area in which the Level 2 fauna survey was conducted.
WRAC	Winu Road Access Corridor.
WRAC Section 1	18.6 km section of existing access road from the Northwest Coastal Highway to the western edge of the AREH Development Envelope boundary.
WRAC Section 2	~137 km of existing access road within the AREH Development Envelope boundary. The area in which the Level 2 fauna survey for the AREH project was undertaken.
WRAC Section 3	22.6 km section of existing access road from the eastern edge of the AREH Development Envelope boundary to the WPA.

WRAC Diversion	~22 km of proposed diversion to the existing access road, including a 'hairpin' diversion to allow heavy/long traffic to negotiate the sharp corner.

10.0 References

Astron (2018). Paterson Flora, Vegetation and Fauna Habitat Assessment Survey October/November 2018. Unpublished report prepared for Rio Tinto Exploration, Astron Environmental Services.

Astron (2019a). Paterson Reconnaissance Flora and Vegetation and Level 1 Fauna Survey March 2019. Unpublished report prepared for Rio Tinto Exploration, Astron Environmental Services.

Astron (2019b). Paterson Road Corridor Reconnaissance Flora and Vegetation and Level 1 Fauna Survey May 2019. Unpublished report prepared for Rio Tinto Exploration, Astron Environmental Services.

Australasian Bat Society (2006). Recommendations of the Australasian Bat Society Inc for reporting standards for insectivorous bat surveys using bat detectors. *The Australian Bat Society Newsletter* 27:6–9.

Beard, J. S. (1968). Vegetation Survey of Western Australia 1:1,000,000 Vegetation Series. Map Sheet 2 - Great Sandy Desert. University of Western Australia Press, Western Australia.

Beard, J. S. (1975). Vegetation Survey of Western Australia 1:1,000,000 Vegetation Series. Map Sheet 5 - Pilbara. University of Western Australia Press, Western Australia.

Benshemesh, J., and M. Schulz (2009). Survey of the underground signs of marsupial moles in the WA Great Victoria Desert. Report Prepared for AngloGold Ashanti Australia, URS Australia Pty Ltd.

Biota (2018a). Asian Renewable Energy Hub Fauna Survey. Unpublished report prepared for NW Interconnected Power, Biota Environmental Sciences, Western Australia.

Biota (2018b). Asian Renewable Energy Hub Specialist Fauna Studies: Waterbirds and Migratory Shorebirds. Unpublished report prepared for NW Interconnected Power, Biota Environmental Sciences, Western Australia.

Biota (2019a). Winu Project Detailed Flora and Vegetation Survey. Unpublished Report Prepared for Rio Tinto Winu Pty Limited, Biota Environmental Sciences, Perth, WA.

Biota (2019b). Winu Project Subterranean Fauna Desktop Study and Verification Survey. Unpublished Report Prepared for Rio Tinto Winu Pty Limited, Biota Environmental Sciences.

Biota (2019c). Asian Renewable Energy Hub Fire Management Strategy. Unpublished report prepared for NW Interconnected Power, Biota Environmental Sciences.

Burbidge, A. A., and N. L. McKenzie (1983). Wildlife of the Great Sandy Desert, Western Australia. Page 127. Wildlife Research Bulletin No. 12, Western Australian Wildlife Research Centre, Department of Fisheries and Wildlife.

Cartledge, V. A., P. C. Withers, K. A. McMaster, G. G. Thompson, and S. D. Bradshaw (2006). Water balance of field-excavated aestivating Australian desert frogs, the cocoon forming *Neobatrachus aquilonius* and the non-cocooning *Notaden nichollsi* (Amphibia: Myobatrachidae). *The Journal of Experimental Biology* 209:3309–3321.

Castalanelli, M. A., R. Teale, M. G. Rix, J. Kennington, and M. S. Harvey (2014). Barcoding of mygalomorph spiders (Araneae: Mygalomorphae) in the Pilbara bioregion of Western Australia reveals highly diverse fauna. *Invertebrate Systematics* 28:375–385.

Christidis, L., and W. E. Boles (2008). *Systematics and Taxonomy of Australian Birds*. CSIRO Publishing, Melbourne.

Churchill, S. K. (2008). *Australian Bats*, 2nd edition. Allen and Unwin, Australia.

Clarke, K., and R. Gorley (2006). *Primer v6 : User Manual/Tutorial.* PRIMER-E Ltd, Plymouth, UK.

Cooper, N. K., M. Adams, C. Anthony, and L. H. Schmitt (2003). Morphological and genetic variation in *Leggadina* (Thomas, 1910) with special reference to Western Australian populations. *Records of the Western Australian Museum* 21:333–351.

Cramer, V. A., M. A. Dziminski, R. Southgate, F. M. Carpenter, R. J. Ellis, and S. van Leeuwen (2016). A conceptual framework for habitat use and research priorities for the greater bilby (*Macrotis lagotis*) in the north of Western Australia. *Australian Mammalogy* 39(2):137–151.

DAFWA (1994). Rangeland Land system Mapping for Western Australia. Department of Agriculture Western Australia.

DBCA (2017a). Guidelines for Surveys to Detect the Presence of Bilbies, and Assess the Importance of Habitat in Western Australia. Department of Biodiversity, Conservation and Attractions.

DBCA (2017b). Interim guideline for preliminary surveys of night parrot (*Pezoporus occidentalis*) in Western Australia. Department of Biodiversity, Conservation and Attractions.

DBCA (2017c). The conservation and management of the bilby (*Macrotis lagotis*) in the Pilbara. Department of Biodiversity, Conservation and Attractions, Perth, WA.

DBCA (2018a). Threatened and Priority Fauna List, 11 September 2018. Species and Communities Branch, Department of Biodiversity, Conservation and Attractions.

DBCA (2018b). Greater Bilby Survey: La Grange Project Area. Department of Biodiversity, Conservation and Attractions, Perth, WA.

Department of the Environment (2018). North Australia and Rangelands Fire Information [WWW Document]. Retrieved from http://www.firenorth.org.au/nafi3/.

Department of the Environment and Energy (2018). *Notorcytes caurinus* — Kakarratul, Karrkaratul, Northern Marsupial Mole SPRAT Profile [WWW Document]. Retrieved from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=295.

DoE (2013). Matters of National Environmental Significance - Significant Impact Guidelines 1.1 *Environment Protection and Biodiversity Conservation Act 1999*. Department of the Environment, Canberra, Australia.

Doughty, P., J. K. Rolfe, A. H. Burbidge, D. J. Pearson, and P. G. Kendrick (2011). Herpetological assemblages of the Pilbara biogeographic region, Western Australia: ecological associations, biogeographic patterns and conservation. *Records of the Western Australian Museum* 78:315–341.

DPIRD (2018). Soil landscape mapping Western Australia - best available soils. Department of Primary Industries and Regional Development.

Environment Australia (2000). Revision of the Interim Biogeographic Regionalisation for Australia (IBRA) and development of Version 6.1, Summary Report. Environment Australia, Canberra.

EPA (2016a). *Technical Guidance: Sampling Methods for Terrestrial Vertebrate Fauna*. Environmental Protection Authority, Western Australia.

EPA (2016b). *Technical Guidance: Terrestrial Fauna Surveys*. Environmental Protection Authority, Western Australia.

EPA (2016c). *Environmental Factor Guideline: Terrestrial Fauna*. Environmental Protection Authority, Western Australia.

EPA (2016d). *Technical Guidance: Sampling of Short Range Endemic Invertebrate Fauna*. Environmental Protection Authority, Western Australia.

Falkenburg, I. D. (2010). Aspects of the ecology of the Grey Falcon *Falco hypoleucos* in the South Australian arid zone. *Corella* 35:23–28.

Garnett, S. (2013). *Making Australian threatened species legislation more effective and efficient*. Professional Lecture Series 2, Charles Darwin University. Retrieved from https://www.cdu.edu.au/sites/default/files/Garnett-leaflet.pdf.

Garnett, S. T., J. K. Szabo, and G. Dutson (2011). *The Action Plan for Australian Birds 2010*. CSIRO Publishing.

Geoscience Australia (2014). Geoscience Australia [WWW Document]. Retrieved from http://www.ga.gov.au.

Gotelli, N. J., and A. Chao (2013). Measuring and Estimating Species Richness, Species Diversity, and Biotic Similarity from Sampling Data. Pages 195–211 *Encyclopedia of Biodiversity*second.

Government of Western Australia (2018). *2017 Statewide Vegetation Statistics incorporating the CAR Reserve Analysis (Full Report). Current as of December 2017*. Department of Biodiversity, Conservation and Attractions, Government of Western Australia, Perth, Western Australia.

Graham, G. (2003a). Great Sandy Desert 1 (GSD1 - McLarty subregion). Pages 326–331 *in* J. E. May and N. L. McKenzie, editors. *A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions*. Department of Conservation and Land Management, Western Australia.

Graham, G. (2003b). Dampierland 2 (DL2 - Pindanland subregion). Pages 179–187 *in* J. E. May and N. L. McKenzie, editors. *A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions*. Department of Conservation and Land Management, Western Australia.

Hamilton, N., M. Onus, B. Withnell, and K. Withness (2017). Recent sightings of the Night Parrot *Pezoporus occidentalis* from Matuwa (Lorna Glen) and Millrose Station in Western Australia. *Australian Field Ornithology* 34:71–75.

Hamilton, Z. R. (2015). DNA barcoding reveals a contact zone in cryptic lineages of *Rhagada* land snails (Pulmonata: Camaenidae) in an ancient landscape. *in prep*.

Harvey, M. S. (2002). Short-Range Endemism Among the Australian Fauna: Some Examples from Non-Marine Environments. *Invertebrate Systematics* 16:555–570.

Helix (2018). Report on the molecular systematics of the targeted SRE invertebrates from the Asian RE Hub fauna survey. Unpublished letter report prepared for Biota Environmental Sciences, 9 August 2018, Helix Molecular Solutions.

Helix (2019a). Report on the molecular systematics of the mygalomorph and scorpion specimens from Winu - Phase 1. Unpublished Report Prepared for BHP Billiton Iron Ore, Helix Molecular Solutions.

Helix (2019b). Report on the molecular verification of taxonomic field identifications of the mammal, and reptile tissue specimens from Winu. Unpublished report prepared for Biota Environmental Sciences, Helix Molecular Solutions.

Helix (2019c). Report on the molecular systematics of the mygalomorph and scorpion specimens from Winu - Phase 2. Unpublished report prepared for Biota Environmental Sciences, Helix Molecular Solutions.

Jacobs (2019). Winu Project: Baseline Environmental Assessment. Unpublished Report Prepared for Rio Tinto Exploration, Jacobs Group (Australia) Pty Limited.

Johnson, M. S., Z. R. Hamilton, C. E. Murphy, C. A. MacLeay, B. Roberts, and P. G. Kendrick (2004). Evolutionary genetics of island and mainland species of *Rhagada* (Gastropoda: Pulmonata) in the Pilbara Region, Western Australia. *Australian Journal of Zoology* 52:341–355.

Johnstone, R. E., A. H. Burbidge, and J. C. Darnell (2013). Birds of the Pilbara region, including seas and offshore islands, Western Australia: distribution, status and historical changes. *Records of the Western Australian Museum* Supplement 78:343–441.

Johnstone, R. E., and G. M. Storr (1998). *Handbook of Western Australian Birds Volume I - Non-Passerines (Emu to Dollarbird)*. Western Australian Museum, Perth.

Jones, A. (2017, March 23). Night parrot sighting in Western Australia shocks birdwatching world. *ABC News*. Perth, Western Australia. Retrieved from http://www.abc.net.au/news/2017-03-23/night-parrot-sighting-in-wa-shocks-birdwatching-world/8377624.

Kendrick, P. (2003). Great Sandy Desert 2 (GSD2 - Mackay subregion). Pages 332–342 *in* J. E. May and N. L. McKenzie, editors. *A Biodiversity Audit of Western Australia's 53 Biogeographical Subregions*. Department of Conservation and Land Management, Western Australia.

Liddle, N. R. (2016). The availability and use of root-dwelling larvae as a food source for the greater bilby, *Macrotis lagotis*, in the fire prone Tanami Desert of the Northern Territory. Charles Darwin University.

Magurran, A. E. (2004). *Measuring Biological Diversity*. Blackwell Publishing.

Marchant, S., and P. J. Higgins (1993). *Handbook of Australian, New Zealand and Antarctic Birds. Volume 2: Raptors to Lapwings*. Oxford University Press, Melbourne.

McKenzie, N. L., and R. Bullen (2009). The echolocation calls, habitat relationships, foraging niches and communities of Pilbara microbats. *Records of the Western Australian Museum* Supplement 78:123–155.

Menkhorst, P., and F. Knight (2011). *A Field Guide to the Mammals of Australia*, 3rd edition. Oxford University Press, Australia.

Menkhorst, P., D. Rogers, R. Clarke, J. Davies, P. Marsack, and K. Franklin (2017). *The Australian Bird Guide*. CSIRO Publishing.

Minton, C., M. Connor, D. Price, R. Jessop, P. Collins, H. Sitters, C. Hassell, G. Pearson, and D. Rogers (2013). Wader numbers and distribution on Eighty Mile Beach, north-west Australia: baseline counts for the period 1981-2003. *Conservation Science Western Australia* 8:345–366.

Morris, K., J. Woinarski, and K. Aplin (2008). *Leggadina lakedownensis* [WWW Document]. Retrieved June 13, 2012, from http://www.iucnredlist.org/apps/redlist/details/11384/0.

Moseby, K., T. Nano, and R. Southgate (2012). *Tales in the sand: a guide to identifying Australian arid zone fauna using spoor and other signs*. Ecological Horizons Pty Ltd.

Olsen, P. D., and J. Olsen (1986). Distibution, status, movements and breeding of the Grey Falcon *Falco hypoleucos*. *Emu* 86:47–51.

Pavey, C. R., C. E. M. Nano, J. B. Cooper, J. R. Cole, and P. J. McDonald (2011). Habitat use, population dynamics and species identification of mulgara, *Dasycercus blythi* and *D. cristicauda*, in a zone of sympatry in central Australia. *Australian Journal of Zoology* 59:156–169.

Pearson, D. (2013). Recovery plan for five species of rock wallabies: Black-footed rock wallaby (*Petrogale lateralis*), Short-eared rock wallaby (*Petrogale brachyotis*), Monjon (*Petrogale burbidgei*), Nabarlek (*Petrogale concinna*), Rothschild rock wallaby (*Petrogale rothschildi*). Department of Parks and Wildlife.

Piersma, T., and C. Hassell (2010). Record numbers of grasshopper-eating waders (Oriental Pratincole, Oriental Plover, Little Curlew) on coastal west-Kimberley grasslands of NW Australia in mid February 2010. *Wader Study Group Bulletin* 117:1–6.

Rajakaruna, H., R. Drake, D. Andrew, F. T. Chan, and S. A. Bailey (2016). Optimizing performance of nonparametric species richness estimators under constrained sampling. *Ecology and Evolution* 6:7311–7322.

Rogers, D. I., P. Collins, R. E. Jessop, C. D. T. Minton, and C. J. Hassell (2005). Gull-billed Terns in north-western Australia: subspecies identification, moults and behavioural notes 105:145–158.

Shea, G. M., and J. D. Scanlon (2007). Revision of the Small Tropical Whipsnakes Previously Referred to *Demansia olivacea* (Gray, 1842) and *Demansia torquata* (Günther, 1862) (Squamata: Elapidae). *Records of the Australian Museum* 59:117–142.

Shepherd, D. P., G. R. Beeston, and A. J. M. Hopkins (2002). Native vegetation in Western Australia: Extent, Type and Status. Technical Report 249, Department of Agriculture and Food, Western Australia, Perth.

Sitters, H., C. Minton, P. Collins, B. Etheridge, C. Hassell, and F. O'Connor (2004). Extraordinary numbers of Oriental Pratincoles in NW Australia. *Wader Study Group Bulletin* 103:26–31.

Southgate, R. (2005). The results from animal track sampling in the Western Desert Tanami Project (Coyote and Larranganni Deposits). Unpublished report prepared for Biota Environmental Sciences, Envisage Environmental Services.

Southgate, R., and S. Carthew (2007). Post-fire ephemerals and spinifex-fuelled fires: a decision model for bilby habitat management in the Tanami Desert, Australia. *International Journal of Wildland Fire* 16:741–754.

Southgate, R., M. Dziminski, R. Paltridge, A. Schubert, and G. Gaikhorst (2018). Verifying bilby presence and the systematic sampling of wild populations using sign-based protocol – with notes on aerial and ground survey techniques and asserting absence. *Australian Mammalogy*:published online 28 June 2018.

Storr, G. M., L. A. Smith, and R. E. Johnstone (1999). *Lizards of Western Australia. 1: Skinks*. Western Australian Museum, Perth.

Threatened Species Scientific Committee (2015). Listing Advice *Notoryctes caurinus*.

Triggs, B. (1996). *Tracks, Scats and Other Traces - A Field Guide to Australian Mammals*. Oxford University Press.

Tyler, M. J., and P. Doughty (2009). *Field Guide to Frogs of Western Australia*. Western Australia Museum, Welshpool, Western Australia.

van Vreeswyk, A. M. E., A. L. Payne, K. A. Leighton, and P. Hennig (2004). *Technical Bulletin No. 92: An inventory and condition survey of the Pilbara region, Western Australia*. Department of Agriculture, South Perth WA.

Warburton, N. (2006). Functional morphology of marsupial moles (Marsupialia: Notoryctidae). *Verh. naturwissenschaftlicher Verlag Hamburg* NF (42):39–142.

Westerman, M., M. J. Blacket, A. Hintz, K. Armstrong, P. Woolley, and C. Krajewski (2016). A plethora of planigales: genetic veriability and cryptic species in a genus of dasyurid marsupials from northern Australia. *CSIRO Publishing*.

Wildlife Acoustics (2010). *Song Meter User Manual, Model SM2, with Song Meter SM2BAT 192kHz Stereo or 384kHz Mono Ultrasonic Recorders addendum.*

Woinarski, J. C. Z., A. A. Burbidge, and P. L. Harrison (2014). *The Action Plan for Australian Mammals 2012*. CSIRO Publishing, Victoria.

Woolley, P. A. (2005). The species of *Dasycercus* Peters 1875 (Marsupialia: Dasyuridae). *Memoirs of Museum Victoria* 62:213–221.

Appendix 1

Potential Fauna Species List of the Winu Project Area

Amphibians

Family	Species Name	Common Name	Conservation Status	Winu Desktop (Jacobs 2019)	AREH (Biota 2018)
Pelodryadidae	*Cyclorana australis*	Giant Frog	-		✓
Pelodryadidae	*Cyclorana longipes*	Long-footed Frog	-		✓
Pelodryadidae	*Cyclorana maini*	Sheep Frog	-	✓	
Limnodynastidae	*Notaden nichollsi*	Desert Spadefoot	-		✓
Myobatrachidae	*Uperoleia russelli*	Northwest Toadlet	-		✓

Reptiles

Family	Species Name	Common Name	Conservation Status		Winu Desktop (Jacobs 2019)	AREH (Biota 2018)	Winu Level 1 (Astron 2018)	Winu Level 1 (Astron 2019a)	Winu Level 1 (Astron 2019b)
			State	Federal					
Carphodactylidae	*Nephrurus laevissimus*		-			✓			
Carphodactylidae	*Nephrurus levis*				✓	✓			
Diplodactylidae	*Diplodactylus conspicillatus*	Variable Fat-tailed Gecko			✓				
Diplodactylidae	*Diplodactylus laevis*	Desert Fat-tailed Gecko				✓			
Diplodactylidae	*Lucasium stenodactylum*					✓			
Diplodactylidae	*Rhynchoedura ornata*	Western Beaked Gecko			✓	✓			
Diplodactylidae	*Strophurus ciliaris*					✓			
Diplodactylidae	*Strophurus elderi*					✓			
Diplodactylidae	*Strophurus jeanae*				✓	✓			
Gekkonidae	*Gehyra kimberleyi*	Robust Termitaria Gecko				✓			
Gekkonidae	*Gehyra montium*					✓			
Gekkonidae	*Gehyra pilbara*				✓	✓			
Gekkonidae	*Gehyra punctata*					✓			
Gekkonidae	*Gehyra purpurascens*					✓			
Gekkonidae	*Gehyra variegata*				✓	✓			
Gekkonidae	*Heteronotia binoei*	Bynoe's Gecko			✓	✓			
Pygopodidae	*Delma butleri*					✓			
Pygopodidae	*Delma desmosa*				✓	✓			
Pygopodidae	*Delma nasuta*				✓	✓			
Pygopodidae	*Lialis burtonis*				✓	✓			
Pygopodidae	*Pygopus nigriceps*					✓			
Agamidae	*Ctenophorus caudicinctus*	Ring-tailed Dragon			✓	✓			✓
Agamidae	*Ctenophorus isolepis*	Military Dragon			✓	✓	✓	✓	✓
Agamidae	*Ctenophorus nuchalis*	Central Netted Dragon			✓	✓			
Agamidae	*Diporiphora paraconvergens*	Grey-striped Western Desert Dragon				✓	✓		
Agamidae	*Diporiphora pindan*	Pindan Dragon			✓	✓			
Agamidae	*Diporiphora vescus*	Northern Pilbara Tree Dragon				✓			
Agamidae	*Gowidon longirostris*	Long-nosed Dragon			✓	✓			
Agamidae	*Moloch horridus*	Thorny Devil			✓	✓			✓
Agamidae	*Pogona minor*				✓	✓			
Scincidae	*Carlia triacantha*				✓	✓			
Scincidae	*Ctenotus brooksi*					✓			
Scincidae	*Ctenotus calurus*				✓	✓			

			Conservation Status						
Family	**Species Name**	**Common Name**	**State**	**Federal**	**Winu Desktop (Jacobs 2019)**	**AREH (Biota 2018)**	**Winu Level 1 (Astron 2018)**	**Winu Level 1 (Astron 2019a)**	**Winu Level 1 (Astron 2019b)**
Scincidae	*Ctenotus duricola*				✓				
Scincidae	*Ctenotus grandis*				✓	✓			
Scincidae	*Ctenotus helenae*				✓	✓			✓
Scincidae	*Ctenotus nasutus*				✓				
Scincidae	*Ctenotus pantherinus*	Leopard Ctenotus			✓	✓			
Scincidae	*Ctenotus piankai*					✓			
Scincidae	*Ctenotus quattuordecimlineatus*				✓	✓			
Scincidae	*Ctenotus rufescens*					✓			
Scincidae	*Ctenotus saxatilis*	Rock Ctenotus			✓	✓			
Scincidae	*Ctenotus schomburgkii*					✓			
Scincidae	Ctenotus uber johnstonei		P2		✓				
Scincidae	*Cyclodomorphus melanops*	Slender Blue-tongue			✓				
Scincidae	*Eremiascincus isolepis*					✓			
Scincidae	*Eremiascincus musivus*	Mosaic Desert Skink			✓	✓			
Scincidae	*Eremiascincus pallidus*	Western Narrow-banded Skink			✓	✓			
Scincidae	*Eremiascincus richardsonii*	Broad-banded Sand Swimmer				✓			
Scincidae	*Lerista bipes*				✓	✓			
Scincidae	*Lerista clara*					✓			
Scincidae	*Lerista separanda*		P2			✓			
Scincidae	*Lerista vermicularis*					✓			
Scincidae	*Menetia greyii*					✓			
Scincidae	*Morethia ruficauda*				✓	✓			✓
Scincidae	*Notoscincus ornatus*				✓	✓			
Scincidae	*Tiliqua multifasciata*	Central Blue-tongue				✓			
Varanidae	*Varanus acanthurus*	Spiny-tailed Goanna			✓	✓			
Varanidae	*Varanus brevicauda*	Short-tailed Pygmy Goanna				✓			
Varanidae	*Varanus eremius*	Pygmy Desert Goanna			✓	✓			
Varanidae	*Varanus gilleni*	Pygmy Mulga Goanna				✓			
Varanidae	*Varanus gouldii*	Bungarra or Sand Goanna				✓		✓	✓
Typhlopidae	*Anilios ammodytes*					✓			
Typhlopidae	*Anilios grypus*					✓			
Typhlopidae	*Anilios pilbarensis*					✓			
Pythonidae	*Antaresia stimsoni*	Stimson's Python				✓			
Pythonidae	*Aspidites melanocephalus*	Black-headed Python			✓	✓			
Pythonidae	*Aspidites ramsayi*	Woma	P1		✓				
Pythonidae	Liasis olivaceus barroni	Pilbara Olive Python	Schedule 3	Vulnerable	✓				
Elapidae	*Demansia psammophis*	Yellow-faced Whipsnake				✓			
Elapidae	*Demansia rufescens*	Rufous Whipsnake				✓			
Elapidae	*Furina ornata*	Moon Snake				✓			
Elapidae	*Pseudechis australis*	Mulga Snake			✓	✓			
Elapidae	*Pseudonaja mengdeni*	Western Brown Snake				✓			
Elapidae	*Pseudonaja modesta*	Ringed Brown Snake			✓	✓			
Elapidae	*Simoselaps anomalus*	Desert Banded Snake				✓			

Ground-dwelling Mammals

Family	Species Name	Common Name	Conservation Status: State	Conservation Status: Federal	Winu Desktop (Jacobs 2019)	AREH (Biota 2018)	Winu Level 1 (Astron 2018)	Winu Level 1 (Astron 2019a)	Winu Level 1 (Astron 2019b)
Tachyglossidae	*Tachyglossus aculeatus*	Short-beaked Echidna							✓
Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara, Ampurta	Priority 4			✓			
Dasyuridae	*Dasykaluta rosamondae*	Kaluta			✓	✓	✓		
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	Schedule 2	Endangered		✓			
Dasyuridae	*Ningaui timealeyi*	Pilbara Ningaui				✓			
Dasyuridae	*Planigale ingrami*	Long-tailed Planigale				✓			
Dasyuridae	*Pseudantechinus macdonnellensis*	Fat-tailed Pseudantechinus			✓				
Dasyuridae	*Pseudantechinus roryi*	Rory's Pseudantechinus			✓	✓			
Dasyuridae	*Sminthopsis youngsoni*	Lesser Hairy-footed Dunnart			✓	✓			
Thylacomyidae	*Macrotis lagotis*	Bilby, Dalgyte	Schedule 3	Vulnerable		✓			
Notoryctidae	*Notoryctes caurinus*	Northern Marsupial Mole	Priority 4			✓			
Macropodidae	*Notamacropus agilis*	Agile Wallaby				✓			
Macropodidae	*Osphranter rufus*	Red Kangaroo, Marlu				✓		✓	
Muridae	Leggadina lakedownensis	Short-tailed Mouse	Priority 4		✓				
Muridae	*Mus musculus*	House Mouse			✓	✓			
Muridae	*Notomys alexis*	Spinifex Hopping-mouse			✓	✓		✓	✓
Muridae	*Pseudomys chapmani*	Western Pebble-mound Mouse	Priority 4			✓			
Muridae	*Pseudomys desertor*	Desert Mouse			✓	✓			
Muridae	*Pseudomys hermannsburgensis*	Sandy Inland Mouse			✓	✓			
Muridae	*Zyzomys argurus*	Common Rock-rat			✓				
Rhinonycteridae	Rhinonicteris aurantia	Pilbara Leaf-nosed Bat	Schedule 3	Vulnerable	✓				
Megadermatidae	Macroderma gigas	Ghost Bat	Schedule 3	Vulnerable	✓				
Canidae	*Canis familiaris dingo*	Dingo				✓			
Canidae	*Canis familiaris familiaris*	Dog				✓	✓	✓	✓
Canidae	*Vulpes vulpes*	Red Fox				✓			
Felidae	*Felis catus*	Cat				✓	✓	✓	✓
Equidae	*Equus asinus*	Donkey					✓		
Camelidae	*Camelus dromedarius*	Dromedary, Camel				✓	✓		✓

Bats

Family	Species	Common Name	Conservation Status	Winu Desktop (Jacobs 2019)	AREH (Biota 2018)	Winu Level 1 (Astron 2019a)	Winu Level 1 (Astron 2019b)
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheath-tailed Bat	-	-	✓		
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat	-	-	✓		
Molossidae	*Chaerephon jobensis*	Greater Northern Free-tailed Bat	-	-		✓	
Molossidae	*Ozimops lumsdenae*	Northern Free-tailed Bat	-	-			✓
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	-	-	✓	✓	✓
Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat	-	-	✓	✓	✓
Vespertilionidae	*Vespadelus finlaysoni*	Finlayson's Cave-bat	-	-			✓

Birds

Family	Species Name	Common Name	Conservation Status		Winu Desktop (Jacobs 2019)	AREH (Biota 2018)	Winu Level 1 (Astron 2018)	Winu Level 1 (Astron 2019a)	Winu Level 1 (Astron 2019b)
			State	Federal					
Phasianidae	*Coturnix ypsilophora*	Brown Quail			✓				✓
Anatidae	*Anas gracilis*	Grey Teal			✓				✓
Podicipedidae	*Tachybaptus novaehollandiae*	Australasian Grebe			✓				
Podicipedidae	*Poliocephalus poliocephalus*	Hoary-headed Grebe			✓				
Columbidae	*Phaps chalcoptera*	Common Bronzewing				✓			
Columbidae	*Ocyphaps lophotes*	Crested Pigeon			✓	✓			✓
Columbidae	*Geopelia cuneata*	Diamond Dove			✓	✓		✓	✓
Podargidae	*Podargus strigoides*	Tawny Frogmouth				✓			✓
Eurostopodidae	*Eurostopodus argus*	Spotted Nightjar		Marine	✓	✓			
Aegothelidae	*Aegotheles cristatus*	Australian Owlet-nightjar			✓				
Apodidae	*Apus pacificus*	Fork-tailed Swift	Schedule 5	Marine/Migratory	✓				
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		Marine		✓			
Ardeidae	*Ardea pacifica*	White-necked Heron				✓			
Accipitridae	*Pandion cristatus*	Eastern Osprey	Schedule 5	Migratory/Marine	✓				
Accipitridae	*Elanus axillaris*	Black-shouldered Kite				✓			
Accipitridae	*Hamirostra melanosternon*	Black-breasted Buzzard				✓			
Accipitridae	*Haliastur sphenurus*	Whistling Kite		Marine		✓			✓
Accipitridae	*Accipiter fasciatus*	Brown Goshawk		Marine		✓			
Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk				✓			
Accipitridae	*Circus assimilis*	Spotted Harrier			✓	✓		✓	✓
Accipitridae	*Aquila audax*	Wedge-tailed Eagle			✓	✓			
Accipitridae	*Hieraaetus morphnoides*	Little Eagle			✓	✓			
Falconidae	*Falco cenchroides*	Nankeen Kestrel		Marine	✓	✓		✓	✓
Falconidae	*Falco berigora*	Brown Falcon			✓	✓		✓	✓
Falconidae	*Falco longipennis*	Australian Hobby				✓	✓		
Rallidae	*Fulica atra*	Eurasian Coot			✓				
Otididae	*Ardeotis australis*	Australian Bustard			✓	✓	✓	✓	✓
Recurvirostridae	*Cladorhynchus leucocephalus*	Banded Stilt			✓				
Charadriidae	*Charadrius veredus*	Oriental Plover	Schedule 5	Migratory/Marine	✓				
Charadriidae	*Elseyornis melanops*	Black-fronted Dotterel			✓				
Rostratulidae	*Rostratula australis*	Australian Painted Snipe	Schedule 2	Endangered	✓				
Scolopacidae	*Numenius madagascariensis*	eastern curlew	Schedule 3; Schedule 5	Critically Endangered/ Migratory/Marine	✓				
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	Schedule 5	Migratory/Marine	✓				
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	Schedule 5	Migratory/Marine	✓				
Scolopacidae	*Calidris ferruginea*	curlew sandpiper	Schedule 3; Schedule 5	Critically Endangered/ Migratory/Marine	✓				
Turnicidae	*Turnix velox*	Little Button-quail			✓	✓	✓	✓	
Glareolidae	*Glareola maldivarum*	Oriental Pratincole	Schedule 5	Migratory	✓				
Cacatuidae	*Calyptorhynchus banksii samuelli*	Red-tailed Black-Cockatoo				✓			
Cacatuidae	*Eolophus roseicapillus*	Galah			✓				

			Conservation Status						
Family	**Species Name**	**Common Name**	**State**	**Federal**	**Winu Desktop (Jacobs 2019)**	**AREH (Biota 2018)**	**Winu Level 1 (Astron 2018)**	**Winu Level 1 (Astron 2019a)**	**Winu Level 1 (Astron 2019b)**
Cacatuidae	*Nymphicus hollandicus*	Cockatiel			✓	✓			✓
Psittacidae	*Polytelis alexandrae*	princess parrot	Priority 4	Vulnerable	✓				
Psittacidae	*Melopsittacus undulatus*	Budgerigar			✓	✓	✓	✓	✓
Psittacidae	*Pezoporus occidentalis*	night parrot	Schedule 1	Endangered	✓				
Cuculidae	*Centropus phasianinus*	Pheasant Coucal				✓			
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-Cuckoo				✓			
Cuculidae	*Cacomantis pallidus*	Pallid Cuckoo		Marine	✓				
Halcyonidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher				✓			✓
Meropidae	*Merops ornatus*	Rainbow Bee-eater		Marine		✓		✓	
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren			✓	✓		✓	✓
Maluridae	*Malurus lamberti*	Variegated Fairy-wren			✓	✓			
Maluridae	*Amytornis striatus*	Striated Grasswren				✓			
Acanthizidae	*Gerygone fusca*	Western Gerygone			✓				
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater			✓	✓		✓	✓
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater			✓	✓	✓	✓	✓
Meliphagidae	*Lichenostomus keartlandi*	Grey-headed Honeyeater				✓		✓	✓
Meliphagidae	*Lichenostomus penicillatus*	White-Plumed Honeyeater							✓
Meliphagidae	*Manorina flavigula*	Yellow-throated Miner			✓	✓			✓
Meliphagidae	*Epthianura tricolor*	Crimson Chat			✓	✓	✓	✓	
Meliphagidae	*Sugomel niger*	Black Honeyeater				✓			
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater			✓	✓			
Eupetidae	*Psophodes occidentalis*	Chiming Wedgebill			✓	✓			
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		Marine	✓	✓			✓
Campephagidae	*Lalage sueurii*	White-winged Triller				✓			✓
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler				✓			
Pachycephalidae	*Colluricincla harmonica*	Grey Shrike-thrush			✓				
Pachycephalidae	*Oreoica gutturalis*	Crested Bellbird			✓	✓	✓		
Artamidae	*Artamus personatus*	Masked Woodswallow			✓	✓		✓	✓
Artamidae	*Artamus superciliosus*	White-browed Woodswallow			✓				
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			✓	✓	✓		
Artamidae	*Cracticus torquatus*	Grey Butcherbird			✓				
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird			✓	✓			
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail			✓	✓			✓
Corvidae	*Corvus bennetti*	Little Crow				✓		✓	
Corvidae	*Corvus orru*	Torresian Crow				✓		✓	
Monarchidae	*Grallina cyanoleuca*	Magpie-lark		Marine	✓				
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark			✓	✓			
Megaluridae	*Cincloramphus mathewsi*	Rufous Songlark				✓			
Megaluridae	*Cincloramphus cruralis*	Brown Songlark				✓			
Megaluridae	*Eremiornis carteri*	Spinifexbird			✓				✓
Hirundinidae	*Hirundo rustica*	Barn Swallow	Schedule 5	Migratory	✓				
Hirundinidae	*Petrochelidon ariel*	Fairy Martin				✓			
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		Marine	✓				
Estrildidae	*Taeniopygia guttata*	Zebra Finch			✓	✓	✓	✓	✓

Family	Species Name	Common Name	Conservation Status		Winu Desktop (Jacobs 2019)	AREH (Biota 2018)	Winu Level 1 (Astron 2018)	Winu Level 1 (Astron 2019a)	Winu Level 1 (Astron 2019b)
			State	Federal					
Estrildidae	*Emblema pictum*	Painted Finch			✓	✓		✓	
Estrildidae	*Heteromunia pectoralis*	Pictorella Mannikin				✓			
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit		Marine		✓			

Invertebrates

Family	Species Name	Conservation Status	Winu Desktop (Jacobs 2019)	AREH (Biota 2018)
Buthidae	*Lychas annulatus*	-		✓
Nemesiidae	Nemesiidae 'N140'	-		✓

References

Astron (2018). Paterson Flora, Vegetation and Fauna Habitat Assessment Survey October/November 2018. Unpublished Report Prepared for Rio Tinto Exploration, Astron Environmental Services.

Astron (2019a). Paterson Reconnaissance Flora and Vegetation and Level 1 Fauna Survey March 2019. Unpublished Report Prepared for Rio Tinto Exploration, Astron Environmental Services.

Astron (2019b). Paterson Road Corridor Reconnaissance Flora and Vegetation and Level 1 Fauna Survey May 2019. Unpublished Report Prepared for Rio Tinto Exploration, Astron Environmental Services.

Biota (2018). Asian Renewable Energy Hub Fauna Survey. Unpublished report prepared for NW Interconnected Power, Biota Environmental Sciences, Western Australia.

Jacobs (2019). Winu Project: Baseline Environmental Assessment. Unpublished Report Prepared for Rio Tinto Exploration, Jacobs Group (Australia) Pty Limited.

Appendix 2

Threatened Fauna Statutory Framework

Commonwealth *EPBC Act 1999*

Fauna species of national environmental significance are listed under the Commonwealth *EPBC Act*, and may be classified as 'critically endangered', 'endangered', 'vulnerable' or 'lower risk', which are consistent with IUCN categories.

Critically Endangered (CR): a taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.

Endangered (EN): a taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.

Vulnerable (VU): a taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.

Lower Risk (LR): a taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

1. **Conservation Dependent (CD).** Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation program targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
2. **Near Threatened (NT).** Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
3. **Least Concern (LC).** Taxa which do not qualify for Conservation Dependent or Near Threatened.

Migratory species are also protected under the *EPBC Act* as species of national environmental significance. Migratory species are those animals that migrate to Australia and its external territories, or pass through or over Australian waters during their annual migrations. The list of migratory species consists of those species listed under the following international conventions:

1. Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention);
2. China-Australia Migratory Bird Agreement (CAMBA);
3. Japan-Australia Migratory Bird Agreement (JAMBA); and,
4. Republic of Korea-Australia Migratory Bird Agreement (ROKAMBA).

Marine species are also protected under the *EPBC Act*, and are listed to ensure the long-term conservation of the species. Marine species include all Australian sea snakes, seals, crocodiles, dugongs, marine turtles, seahorses and seabirds that naturally occur in the Commonwealth marine area.

Western Australian *Biodiversity Conservation Act 2016*

The Wildlife Conservation (Specially Protected Fauna) Notice 2018 has been transitioned under regulations 170, 171 and 172 of the Biodiversity Conservation Regulations 2018 to be the lists of Threatened, Extinct and Specially Protected species under Part 2 of the Biodiversity Conservation Act 2016:

Threatened Species

- **Critically Endangered (CR):** Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines.
- **Endangered (EN):** Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines".
- **Vulnerable (VU):** Threatened species considered to be "facing a high risk of extinction in the wild in the medium term future, as determined in accordance with criteria set out in the ministerial guidelines".

Extinct Species

- **Extinct Species (EX):** Species where "there is no reasonable doubt that the last member of the species has died"
- **Extinct in the wild (EW):** Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form"

Specially Protected Species

- **Migratory (MI):** Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth.

  Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program
- **Species of special conservation interest (conservation dependent fauna) (CD):** Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened.
- **Other specially protected fauna (OS):** Fauna otherwise in need of special protection to ensure their conservation.

Department of Biodiversity, Conservation and Attractions Priority Listing

The DBCA maintains a list of Priority species that have not been assigned statutory protection under the *Biodiversity Conservation Act 2016*. Species on this list are considered to be of conservation priority because there is insufficient information to make an assessment of their conservation status or they are considered to be rare but not threatened and are in need of monitoring. Under this list, species are classified according to four Priority categories:

Priority 1: Poorly known species
Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.

Priority 2: Poorly known species
Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.

Priority 3: Poorly known species
Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.

Priority 4: Rare, Near Threatened and other species in need of monitoring
(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection, but could be if present circumstances change. These species are usually represented on conservation lands.

(b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable, but are not listed as Conservation Dependent.

(c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy. conservation lands.

Appendix 3

Fauna Taking (Biological Assessment) Licence BA27000051

FAUNA TAKING (BIOLOGICAL ASSESSMENT) LICENCE

Regulation 27, Biodiversity Conservation Regulations 2018

Licence Number:	BA27000051
Licence Holder:	Ms Penny Brooshooft Biota Environmental Sciences PO Box 155 Leederville WA 6903
Date of Issue:	24/04/2019
Date Valid From:	10/05/2019
Date of Expiry:	09/05/2020

LICENSED ACTIVITIES

Subject to the terms and conditions on this licence, the licence holder may –

1. Take and disturb fauna for level 2 fauna survey and short range endemic (SRE) invertebrate survey using dry pit traps, cage traps, Elliott traps, funnel traps and by hand capture techniques (searching, raking and sieving); for the purpose of determine the fauna assemblage present for Rio Tinto Exploration (RTX) evaluating the potential development of mineralised deposits in the Winu.project area.

LOCATIONS

1. Winu exploration approximately 320 km east of Port Hedland

AUTHORISED PERSONS

The following persons or persons of the specified class may assist in carrying out the licensed activities:

1. Roy Teale
2. Jacinta King
3. Daniel Kamien
4. Stewart Ford
5. Sylvie Schmidt
6. Garth Humphreys
7. Michael Greenham
8. Victoria Ford
9. Joshua Keen
10. John Graff
11. Nathan Beerkens

CONDITIONS

1. Fauna must not be taken on CALM land, (as defined in the Conservation and Land Management Regulations 2002*),* unless authorised by a written notice of a lawful authority issued under regulations 4 and 8 of the Conservation and Land Management Regulations 2002.
2. If persons, other than the licence holder, are authorised to carry out/assist in carrying out the activities under the licence, the licence holder must ensure those persons have read and understand the licence terms and conditions.

3. The written authorisation of the person in possession or occupation of the land accessed and upon which fauna is taken, as required under regulation 101(2) and referred to in “Additional information” below, must:
    a) state location details (including lot or location number, street/road, suburb and local government authority);
    b) state land owner or occupier name, and contact phone number;
    c) specify the time period that the authorisation is valid for;
    d) be signed and dated; and
    e) be attached to this licence at all times.
4. This licence, and any written authorisation or lawful authority which authorises the take of fauna on specified locations must be carried at all times while conducting licensed activities and be produced on demand by a wildlife officer.
5. If a species of fauna listed as a threatened species under Section 19 of the *Biodiversity Conservation Act 2016* is inadvertently captured, that species is to be released immediately at the point of capture. If the fauna is injured or deceased, the licence holder shall contact the DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) for advice on treatment or disposal. Details of any capture of threatened fauna must be included in the “Return of Fauna Taken.”
6. The licence holder must not:
    a) release any fauna in any area where it does not naturally occur;
    b) transfer fauna to any other person or authority (other than the Western Australian Museum) unless approved in writing by the CEO; or
    c) dispose of the remains of fauna in any manner likely to interfere the natural or present day distribution of the species.
7. The licence holder must not take and remove more than ten specimens of any one protected species of fauna from any location less than 20km apart. Where exceptional circumstances make it necessary to take a larger number of specimens from a particular location in order to obtain adequate statistical data, the collector must proceed with circumspection and justify their actions to the Director General in advance.
8. All holotypes and syntypes and a half share of paratypes of species or subspecies permitted to be permanently taken under this licence must be donated to the Western Australian Museum. Duplicates (one pair in each case) of any species collected, which represents a significant extension of geographic range must be offered to the Western Australian Museum.
9. All specimens and material retained under the authority of this licence must be offered to the Western Australian Museum for loan, for inclusion in its collection, or on request be made available to other persons involved in relevant scientific studies.
10. The licence holder must create, compile and maintain records and information as required in a DBCA approved “Return of Fauna Taken” of all fauna taking activities as they occur.
11. A DBCA approved “Return of Fauna Taken” must be completed in full (including nil taking details) and submitted to DBCA Wildlife Licensing Section (wildlifelicensing@dbca.wa.gov.au) prior to the end of each annual period of the licence (from the valid from date) (refer to “Additional Information” section below).

Danny Stefoni
LICENSING OFFICER
WILDLIFE PROTECTION BRANCH

Delegate of CEO

ADDITIONAL INFORMATION

1. It is an offence to take any species of fauna listed as a threatened species under Section 19 of the *Biodiversity Conservation Act 2016* unless the person is authorised under Section 40. The penalty ranges between $300 000 and $500 000; Section 150 Biodiversity Conservation Act 2016.
2. Regulation 82 empowers the CEO to add, substitute or delete a term or condition of a licence or to correct errors. Such power may be exercised on application of a licence holder or by the CEO's own initiative. If an amendment to a licence term or condition is required, please contact the CEO or the Licensing Section on wildlifelicensing@dbca.wa.gov.au in the first instance. The licence holder, if adversely affected by a condition imposed in this licence, may apply to the State Administrative Tribunal for review of the decision of the CEO to impose that condition on a licence: regulation 89(2) Biodiversity Conservation Regulations 2018.
3. A person must not contravene a condition of a licence. The penalty for an offence involving the contravention of a condition of a licence is a fine of $10 000: regulation 84 of the Biodiversity Conservation Regulations 2018.
4. It is an offence for persons authorised by this licence to enter land that is not in their possession or under their control without first having the *prior* written authorisation of the current owner or occupier of the land to:

   a) enter the land; and

   b) carry out the activity authorised by this licence.

   The penalty for this offence is a fine of $5 000: regulation 101(2) of the Biodiversity Conservation Regulations 2018.
5. The licence holder must be able to produce for inspection upon request any information or records required by regulation 85(2) of the Biodiversity Conservation Regulations 2018 Penalty $10 000. It is an offence to knowingly include false or misleading information or make statements in records: regulation 85(3) of the Biodiversity Conservation Regulations 2018 Penalty $10 000. It is an offence to include any information or make any statement in a return that the licence holder knows to be false or misleading in a material particular: regulation 86 (2) of the Biodiversity Conservation Regulations 2018 Penalty $10 000.
6. The approved DBCA "Return of Fauna Taken" data file can be downloaded from the DBCA webpage (https://www.dpaw.wa.gov.au/plants-and-animals/licences-and-authorities).
7. The issuing of a licence under the Biodiversity Conservation Regulations 2018 does not constitute an animal ethics approval or a licence to use animals for scientific purposes as required under the *Animal Welfare Act 2002,* Animal Welfare (Scientific Purposes) Regulations 2003. It is the responsibility of a licence applicant / licence holder to ensure that they comply with the requirements of all applicable legislation. Enquiries relating to the Animal Welfare Act licences and animal ethics approvals are to be

directed to the Department of Primary Industries and Regional Development (https://www.agric.wa.gov.au/animalwelfare).

8. Threatened fauna can only be taken under a *Biodiversity Conservation Act 2016* Section 40 authorisation, Occurrences of threatened species must be reported to the CEO. For more information please see https://www.dpaw.wa.gov.au/plants-and-animals/threatened-species-and-communities/threatened-animals.

9. Any interaction involving Nationally Listed Threatened Fauna that may be invasive and/or harmful to the fauna may require approval from the Commonwealth Department of the Environment and Energy http://www.environment.gov.au/about-us/business-us/permits-assessments-licences. Interaction with such species is controlled by the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and Environment Protection and Biodiversity Conservation Regulations 2000 as well as the *Biodiversity Conservation Act 2016* and Biodiversity Conservation Regulations 2018.

Appendix 4

Conservation Significant Fauna Likelihood of Occurrence in the Winu Project Area

			Conservation Status								
Family	**Species Name**	**Common Name**	**State**	**Federal**	**Winu Desktop (Jacobs 2019)**	**AREH (Biota 2018)**	**Winu Level 1 (Astron 2018, 2019a, 2019b)**	**Preferred Habitat**	**Habitat Available in Survey Area?**	**Likelihood of Occurrence (Prior to Survey)**	**Occurrence (Post Phase 1 and 2 Survey)**
REPTILES											
Scincidae	*Ctenotus uber johnstonei*		P2		✓			Known from a single location in the arid north-eastern interior of WA, from low chenopod shrubs growing on colluvium at the foot of a sandstone hill	-	Unlikely to occur	-
Scincidae	*Lerista separanda*		P2			✓		Dune crests and sandy areas	✓	Likely to occur	Recorded
Pythonidae	*Liasis olivaceus barroni*	Pilbara Olive Python	VU	Vulnerable	✓			Rocky areas within the Pilbara, showing a preference for rocky gorges containing water in streams and rock pools	-	Unlikely to occur	-
MAMMALS											
Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara, Ampurta	P4			✓		Spinifex grasslands on sand plains and sandy swale between low dunes from south-western Queensland across the Simpson, Tanami, and Great Sandy Deserts of southern and central Northern Territory and central Western Australia	✓	Likely to occur	Recorded
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	EN	Endangered		✓		Rocky areas and tall open coastal eucalypt forests, sandstone escarpment	-	Unlikely to occur	-
Thylacomyidae	*Macrotis lagotis*	Bilby, Dalgyte	VU	Vulnerable		✓		Acacia shrubland, open tussock grassland on uplands and hills, mulga woodland/ shrubland growing on ridges and rises, and hummock grassland in plains and alluvial areas	✓	Likely to occur	Recorded
Notoryctidae	*Notoryctes caurinus*	Northern Marsupial Mole	P4			✓		Vast sandy deserts of central Australia	✓	Likely to occur	Recorded
Muridae	*Leggadina lakedownensis*	Short-tailed Mouse	P4		✓			Cracking clay and adjacent habitats	-	Unlikely to occur	-
Muridae	*Pseudomys chapmani*	Western Pebble-mound Mouse	P4			✓		Stony hillsides with hummock grasslands in the central and eastern parts of the Pilbara	-	Unlikely to occur	-
Rhinonycteridae	*Rhinonicteris aurantia*	Pilbara Leaf-nosed Bat	VU	Vulnerable	✓			Across northern Australia the Orange Leaf-nosed bat is reliant on roost sites in caves or mine adits with stable, very hot (28 – 32°C) and very humid (96 – 100 %) microclimates	-	Would not occur	-
Megadermatidae	*Macroderma gigas*	Ghost Bat	VU	Vulnerable	✓			Occurs in a broad range of habitats, with their distribution being influenced by the availability of suitable caves and mines for roost sites	-	Would not occur	-
BIRDS											
Eurostopodidae	*Eurostopodus argus*	Spotted Nightjar		Marine	✓	✓		Woodlands, grasslands, scrublands	✓	Likely to occur	Recorded
Apodidae	*Apus pacificus*	Fork-tailed Swift	MI	Marine/ Migratory	✓			Thought to be exclusively aerial	✓	Likely to occur	-
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		Marine		✓		Freshwater, estuarine and maring waterways	✓	Unlikely to occur	-
Accipitridae	*Pandion cristatus*	Eastern Osprey	MI	Migratory/ Marine	✓			Dependent on the presence of significant water bodies	-	Would not occur	-
Accipitridae	*Haliastur sphenurus*	Whistling Kite		Marine		✓	✓	Woodlands, open country, near wetlands	✓	Likely to occur	Recorded
Accipitridae	*Accipiter fasciatus*	Brown Goshawk		Marine		✓		Most wooded habitats	✓	Likely to occur	Recorded
Falconidae	*Falco cenchroides*	Nankeen Kestrel		Marine	✓	✓	✓	Lightly wooded areas	✓	Likely to occur	Recorded
Charadriidae	*Charadrius veredus*	Oriental Plover	MI	Migratory/ Marine	✓			Open plains, bare, rolling country, muddy or	-	May potentially	Recorded

			Conservation Status								
Family	**Species Name**	**Common Name**	**State**	**Federal**	**Winu Desktop (Jacobs 2019)**	**AREH (Biota 2018)**	**Winu Level 1 (Astron 2018, 2019a, 2019b)**	**Preferred Habitat**	**Habitat Available in Survey Area?**	**Likelihood of Occurrence (Prior to Survey)**	**Occurrence (Post Phase 1 and 2 Survey)**
								sandy wastes near inland swamps or tidal mudflats; bare claypans, margins of coastal marshes; grassy airfields, sportsfields, lawns and coastal dune areas		occur	
Rostratulidae	*Rostratula australis*	Australian Painted Snipe	EN	Endangered	✓			Distribution of the Australian Painted Snipe generally correlates to areas of wetland throughout Western Australia	-	Would not occur	-
Scolopacidae	*Numenius madagascariensis*	Eastern Curlew	CR; MI	Critically Endangered/ Migratory/Marine	✓			Coastal and mangrove areas	-	Would not occur	-
Scolopacidae	*Actitis hypoleucos*	Common Sandpiper	MI	Migratory/ Marine	✓			Coastal and inland wetland	-	Would not occur	-
Scolopacidae	*Calidris acuminata*	Sharp-tailed Sandpiper	MI	Migratory/ Marine	✓			Freshwater wetlands	-	Would not occur	-
Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	CR; MI	Critically Endangered/ Migratory/Marine	✓			Intertidal zones	-	Would not occur	-
Glareolidae	*Glareola maldivarum*	Oriental Pratincole	MI	Migratory	✓			Wide variety of habitats including watered habitats	-	May potentially occur	-
Psittacidae	*Polytelis alexandrae*	Princess Parrot	P4	Vulnerable	✓			Sand dunes and sand flats in the arid zone	✓	May potentially occur	-
Psittacidae	*Pezoporus occidentalis*	Night Parrot	CR	Endangered	✓			Old growth spinifex, often in association with samphire		May potentially occur	-
Cuculidae	*Cacomantis pallidus*	Pallid Cuckoo		Marine	✓			Most open forests and woodlands	✓	May potentially occur	-
Meropidae	*Merops ornatus*	Rainbow Bee-eater		Marine		✓	✓	Variety of habitats that are generally well watered, lightly wooded with suitable (sandy) soil for nesting and a tall stratum of vegetation for perching	✓	Likely to occur	Recorded
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		Marine	✓	✓	✓	Most wooded habitats	✓	Likely to occur	Recorded
Monarchidae	*Grallina cyanoleuca*	Magpie-lark		Marine	✓			Most habitats except rainforests and dry deserts	-	Unlikely to occur	-
Hirundinidae	*Hirundo rustica*	Barn Swallow	MI	Migratory	✓			Open country with low vegetation, often near manmade structures		Unlikely to occur	-
Hirundinidae	*Petrochelidon nigricans*	Tree Martin		Marine	✓			Mostly aerial, above a range of habitats	✓	May potentially occur	-
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit		Marine		✓		Range of open habitats including shrublands and woodlands	✓	Likely to occur	-

P2 = Priority 2, P4 = Priority 4, VU = Vulnerable, EN = Endangered, CR = Critically Endangered, MI = Migratory

Appendix 5

Site x Species Records for the Winu Project Area

Reptiles

Family	Species Name	Common Name	State	Federal	WIN01P		WIN02P		WIN03P		WIN04P		WIN05P		WIN06P		WIN07P		WIN08P		WIN09P		WIN10P		WIN11E	WIN12E	WINOpp	
					P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
Carphodactylidae	*Nephrurus laevissimus*					1		1	1				1	1									2					
Carphodactylidae	*Nephrurus levis*																											
Diplodactylidae	*Diplodactylus laevis*	Desert Fat-tailed Gecko				6	1	5		1		3			1	1	1	4		2	2	21	1	5			1	
Diplodactylidae	*Lucasium stenodactylum*					1								4		1								1				
Diplodactylidae	*Rhynchoedura ornata*	Western Beaked Gecko											5	1	1	1			1									
Diplodactylidae	*Strophurus ciliaris*																							1				
Diplodactylidae	*Strophurus elderi*							1		1									1									
Gekkonidae	*Gehyra pilbara*																										1	
Gekkonidae	*Gehyra variegata*																							1			1	
Gekkonidae	*Heteronotia binoei*	Bynoe's Gecko							1							1							2	1				
Pygopodidae	*Delma butleri*																											1
Pygopodidae	*Delma desmosa*										1											1						
Pygopodidae	*Delma nasuta*									1																		2
Pygopodidae	*Lialis burtonis*																		1									11
Pygopodidae	*Pygopus nigriceps*							2																1				4
Agamidae	*Ctenophorus isolepis*	Military Dragon			2		2		1		4	3	3	4	1	1	1				2	1	3	2				
Agamidae	*Ctenophorus nuchalis*	Central Netted Dragon																										2
Agamidae	*Ctenophorus reticulatus*	Western Netted Dragon																										1
Agamidae	*Diporiphora paraconvergens*	Grey-striped Western Desert Dragon						1					2			1												
Agamidae	*Diporiphora pindan*	Pindan Dragon					1		1																			
Agamidae	*Moloch horridus*	Thorny Devil			2	1	1				3	1																
Agamidae	*Pogona minor*				1																							
Scincidae	*Ctenotus brooksi*												5	3									1				1	
Scincidae	*Ctenotus calurus*											1												1				
Scincidae	*Ctenotus dux*									1																		
Scincidae	*Ctenotus grandis*				1	2		1	2						1		2	1		1		1						
Scincidae	*Ctenotus helenae*														1													
Scincidae	*Ctenotus leae*													1														
Scincidae	*Ctenotus pantherinus*	Leopard Ctenotus			5		6	5	2	2		1			3	1		2	3	1	4	1	1	2				
Scincidae	*Ctenotus piankai*					1																						
Scincidae	*Ctenotus quattuordecimlineatus*								1	1																		
Scincidae	*Eremiascincus pallidus*	Western Narrow-banded Skink							3	4			2	6														
Scincidae	*Lerista bipes*				4	18	2	18	1	3	10	21	1	3	5	24	6	10		4		1	3	4				
Scincidae	*Lerista separanda*		P2							1				1	1			1										
Scincidae	*Lerista vermicularis*								4	16			10	12									7	23				
Scincidae	*Menetia greyii*											1																
Scincidae	*Morethia ruficauda*				1	3	1				1	1					1	1										
Scincidae	*Notoscincus ornatus*																	1										
Scincidae	*Tiliqua multifasciata*	Central Blue-tongue																								1		
Varanidae	*Varanus acanthurus*	Spiny-tailed Goanna																									1	
Varanidae	*Varanus brevicauda*	Short-tailed Pygmy Goanna			2					1								2		1								
Varanidae	*Varanus eremius*	Pygmy Desert Goanna			1	1			1	2		2	2				1	3										

Family	Species Name	Common Name	State	Federal	WIN01P		WIN02P		WIN03P		WIN04P		WIN05P		WIN06P		WIN07P		WIN08P		WIN09P		WIN10P		WIN11E	WIN12E	WINOpp	
					P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
Varanidae	*Varanus gilleni*	Pygmy Mulga Goanna			1																						3	
Varanidae	*Varanus gouldii*	Bungarra or Sand Goanna																									1	1
Typhlopidae	*Anilios ammodytes*									1				2														
Typhlopidae	*Anilios endoterus*									1				1														
Typhlopidae	*Anilios grypus*					1		1												2		1						
Pythonidae	*Antaresia stimsoni*	Stimson's Python																										1
Pythonidae	*Aspidites melanocephalus*	Black-headed Python																										1
Pythonidae	*Aspidites ramsayi*	Woma																										1
Elapidae	*Demansia calodera*	Black-faced Whipsnake				1																						
Elapidae	*Demansia psammophis*	Yellow-faced Whipsnake																										1
Elapidae	*Demansia rufescens*	Rufous Whipsnake					1																					
Elapidae	*Pseudechis australis*	Mulga Snake												1														
Elapidae	*Pseudonaja mengdeni*	Western Brown Snake																									2	1
Elapidae	*Simoselaps anomalus*	Desert Banded Snake						2		2				4				1				1		3				

Reptiles (Motion Camera)

Family	Species Name	Common Name	State	Federal	WIN01MC	WIN02MC	WIN03MC	WIN04MC	WIN05MC	WIN06MC	WIN07MC	WIN08MC	WIN09MC	WIN10MC	WIN11MC	WIN12MC	WIN13MC	WIN14MC	WIN15MC	WIN16MC	WIN17MC	WIN18MC	WIN19MC	WIN20MC
					P1	P1	P1	P1	P1	P1	P1	P1	P1	P1	P1	P2	P2	P2	P2	P2	P2	P2	P2	P2
Agamidae	*Ctenophorus isolepis*	Military Dragon				1																		
Scincidae	*Ctenotus pantherinus*	Leopard Ctenotus									1													
Varanidae	*Varanus gouldii*	Bungarra or Sand Goanna																				1		

Reptiles (Nocturnal Searches)

Family	Species Name	Common Name	State	Federal	WIN01N	WIN02N	WIN03N	WIN04N	WIN05N	WIN06N
					P1	P1	P1	P2	P2	P2
Carphodactylidae	*Nephrurus laevissimus*				2	1				4
Carphodactylidae	*Nephrurus levis*									1
Diplodactylidae	*Diplodactylus laevis*	Desert Fat-tailed Gecko						1		13
Diplodactylidae	*Lucasium stenodactylum*									4
Diplodactylidae	*Rhynchoedura ornata*	Western Beaked Gecko								
Diplodactylidae	*Strophurus ciliaris*				1	1		1	2	1
Diplodactylidae	*Strophurus elderi*									
Gekkonidae	*Gehyra pilbara*									
Gekkonidae	*Gehyra variegata*						2			
Gekkonidae	*Heteronotia binoei*	Bynoe's Gecko				1				
Pygopodidae	*Delma butleri*									
Pygopodidae	*Delma desmosa*									
Pygopodidae	*Delma nasuta*									
Pygopodidae	*Lialis burtonis*									4
Pygopodidae	*Pygopus nigriceps*									4

Amphibians

Family	Species	Common Name	State	Federal	WIN01P		WIN02P		WIN03P		WIN04P		WIN05P		WIN06P		WIN07P		WIN08P		WIN09P		WIN10P		WIN11E	WIN12E	WINOpp	
					P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2
Limnodynastidae	*Notaden nichollsi*	Desert Spadefoot								1																		

Ground-dwelling Mammals

Family	Species Name	Common Name	State	Federal	WIN01P		WIN02P		WIN03P		WIN04P		WIN05P		WIN06P		WIN07P		WIN08P		WIN09P		WIN10P		WIN11E	WIN12E	WINOpp		WIN01MM
					P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1
Dasyuridae	*Dasycercus blythi*	Brush-tailed Mulgara, Ampurta	P4												1T												4T	1T	
Dasyuridae	*Dasykaluta rosamondae*	Kaluta																1											
Dasyuridae	*Ningaui ridei*	Wongai Ningaui						1																					
Dasyuridae	*Planigale* 'species 1'	Pilbara Planigale																			1	1							
Dasyuridae	*Sminthopsis youngsoni*	Lesser Hairy-footed Dunnart			1						1	1			1	1	2												
Thylacomyidae	*Macrotis lagotis*	Bilby, Dalgyte	VU	Vulnerable																									
Notoryctidae	*Notoryctes caurinus*	Northern Marsupial Mole	P4																										1T
Muridae	*Notomys alexis*	Spinifex Hopping-mouse						1			1							1	1	12					2				
Muridae	*Pseudomys desertor*	Desert Mouse					1																						
Muridae	*Pseudomys hermannsburgensis*	Sandy Inland Mouse				1		2									2			1									
Canidae	*Canis familiaris*	Dingo			T		T		T		T		T		T	T	T		T		T		T				1	1	
Felidae	*Felis catus*	Cat			T	T	T	T	T	T	T	T	T	T	T	T	T	T	T		T	T	T	T			1		
Camelidae	*Camelus dromedarius*	Dromedary, Camel			T	T	T	T	T	T	T	T	T	T	T	T	S	T	S	T	T	T	T	T			1		
Canidae	*Vulpes vulpes*	Red Fox																										1	

T = Track

Ground-dwelling Mammals (Motion Cameras)

Family	Species Name	Common Name	State	Federal	WIN01MC	WIN02MC	WIN03MC	WIN04MC	WIN05MC	WIN06MC	WIN07MC	WIN08MC	WIN09MC	WIN10MC	WIN11MC	WIN12MC	WIN13MC	WIN14MC	WIN15MC	WIN16MC	WIN17MC	WIN18MC	WIN19MC	WIN20MC
					P1	P1	P1	P1	P1	P1	P1	P1	P1	P1	P1	P2	P2	P2	P2	P2	P2	P2	P2	P2
Muridae	*Notomys alexis*	Spinifex Hopping-mouse			2						2							1	1	1				

Ground-dwelling Mammals (Nocturnal Searches)

Family	Species Name	Common Name	State	Federal	WIN01N	WIN02N	WIN03N	WIN04N	WIN05N	WIN06N
					P1	P1	P1	P2	P2	P2
Muridae	*Notomys alexis*	Spinifex Hopping-mouse								1

Bilby Transects

Family	Species Name	Common Name	State	Federal	WIN01BT	WIN02BT	WIN03BT	WIN04BT	WIN05BT	WIN06BT	WIN07BT	WIN08BT	WIN09BT	WIN10BT	WIN11BT	WIN12BT	WIN13BT
					P1	P1	P1	P1	P1	P1	P1	P1	P1	P1	P2	P2	P2
Thylacomyidae	*Macrotis lagotis*	Bilby, Dalgyte	VU	Vulnerable						S, T, D, B							S, T, D, B

S = scat, T = track, D = digging, B = burrow

Bats

Family	Species Name	Common Name	State	Federal	WIN01Bat		WIN02Bat		WIN03Bat	WIN04Bat	WIN05Bat		WIN06Bat	WIN07Bat	WIN08Bat
					P1	P2	P1	P2	P1	P1	P1	P2	P1	P2	P2
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat											•		
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat												•	
Molossidae	*Chaerephon jobensis*	Greater Northern Free-tailed Bat										•			
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheath-tailed Bat										•			
Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat												•	

Birds

Family	Species Name	Common Name	State	Federal	WIN01P		WiIN02P		WIN03P		WIN04P		WIN05P		WIN06P		WIN07P		WIN08P		WIN09P		WIN10P		WIN01BP	WIN02BP	WIN03BP	WIN05BP	WIN06BP	WIN07BP	WIN08BP	WIN10BP	WINOpp	
					P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P1	P1	P1	P1	P1	P1	P1	P1	P2
Eurostopodidae	*Eurostopodus argus*	Spotted Nightjar		Marine																													1	
Accipitridae	*Hamirostra melanosternon*	Black-breasted Buzzard																																2
Accipitridae	*Haliastur sphenurus*	Whistling Kite		Marine																													1	
Accipitridae	*Milvus migrans*	Black Kite																															1	
Accipitridae	*Accipiter fasciatus*	Brown Goshawk		Marine																													1	
Accipitridae	*Circus assimilis*	Spotted Harrier																			1												2	2
Accipitridae	*Wedge-tailed Eagle*	Aquila audax																																1
Accipitridae	*Hieraaetus morphnoides*	Little Eagle																															1	
Falconidae	*Falco cenchroides*	Nankeen Kestrel		Marine							1						1							1										
Falconidae	*Falco berigora*	Brown Falcon																			3												2	
Falconidae	*Falco hypoleucos*	Grey Falcon	VU																															1
Otididae	*Ardeotis australis*	Australian Bustard			1	1	1		1	5											1	1	1		T	T	T	T	T	T	T	T	3	9
Charadriidae	*Charadrius veredus*	Oriental Plover	MI	Migratory/ Marine										1																				10
Laridae	*Gelochelidon nilotica*	Gull-billed Tern	MI	Migratory/ Marine																														1
Laridae	*Chlidonias hybrida*	Whiskered Tern		Marine																														1
Cacatuidae	*Nymphicus hollandicus*	Cockatiel			20																													
Psittacidae	*Melopsittacus undulatus*	Budgerigar			8		19		12			37		12			25	1																
Halcyonidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher			1									2																				
Meropidae	*Merops ornatus*	Rainbow Bee-eater		Marine																													2	
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren			2	4														1		2												

Family	Species Name	Common Name	State	Federal	WIN01P		WIN02P		WIN03P		WIN04P		WIN05P		WIN06P		WIN07P		WIN08P		WIN09P		WIN10P		WIN01BP	WIN02BP	WIN03BP	WIN05BP	WIN06BP	WIN07BP	WIN08BP	WIN10BP	WINOpp	
					P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P1	P1	P1	P1	P1	P1	P1	P1	P2
Maluridae	*Malurus lamberti*	Variegated Fairy-wren			2									4																				7
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater					5				10	2			3								2										1	1
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater			3	3	3	5	2	4	2	6		1	1	6		6		2		2	1	5										
Meliphagidae	*Lichenostomus keartlandi*	Grey-headed Honeyeater			2		7				9				1								3											6
Meliphagidae	*Purnella albifrons*	White-fronted Honeyeater									1																							
Meliphagidae	*Manorina flavigula*	Yellow-throated Miner								1																								
Meliphagidae	*Epthianura tricolor*	Crimson Chat			8		2			3	2	16	30	3	10				1		10			22										
Meliphagidae	*Sugomel niger*	Black Honeyeater																																1
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		Marine									1																				1	1
Campephagidae	*Lalage sueurii*	White-winged Triller								2		9												1										
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler							1																									
Artamidae	*Artamus personatus*	Masked Woodswallow																																50
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			1							4	20		1			3				1		4										
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird																																
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail			1		1		1		1		1								1		1											
Corvidae	*Corvus bennetti*	Little Crow																			10													3
Petroicidae	*Melanodryas cucullata*	Hooded Robin					1																											
Megaluridae	*Cincloramphus cruralis*	Brown Songlark																																1
Megaluridae	*Eremiornis carteri*	Spinifexbird																																
Hirundinidae	*Cheramoeca leucosterna*	White-backed Swallow																																1
Estrildidae	*Taeniopygia guttata*	Zebra Finch				5	1	8	2		1		1		6			2			8	39	8	9									5	
Estrildidae	*Emblema pictum*	Painted Finch																																3

T= track

<u>Birds (Automated Audio Recordings)</u>

Family	Species Name	Common Name	State	Federal	WIN01A	WIN01A	WIN02A	WIN02A	WIN03A	WIN03A	WIN04A	WIN04A	WIN05A	WIN06A	WIN06A	WIN07A
					P1	P2	P1	P2	P1	P2	P1	P2	P1	P1	P2	P2
Charadriidae	*Charadrius veredus*	Oriental Plover	MI	Migratory/Marine						•						
Maluridae	*Malurus lamberti*	Variegated Fairy-wren								•						
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater					•		•	•	•	•		•		•
Meliphagidae	*Lichenostomus keartlandi*	Grey-headed Honeyeater					•				•			•		
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird					•									
Megaluridae	*Eremiornis carteri*	Spinifexbird								•						

Appendix 6

Helix Molecular Solutions Report for Mammal and Reptile Tissue Sequencing

Helix
Molecular
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3rd December 2019

Penny Brooshooft
Senior Zoologist
Biota Environmental Sciences Pty Ltd
Level 1, 228 Carr Place
Leederville WA 6007

Via email

Re. Helix Job 602 - Report on the molecular verification of taxonomic field identifications of the mammal, and reptile tissue specimens from Winu.

Dear Penny,

Following is a summary of the results of the vertebrate molecular investigation we have completed for the Winu Fauna survey. Amongst the eleven sequenced vertebrate specimens from Winu, there were eight mammal specimens and three reptile specimens. Species identification, based on the available molecular data for comparison, including the ten tissue specimens obtained from the WA Museum and sequenced herein, enabled placement into existing molecular groups corresponding to previously detected species from WA Museum collections. Two specimens were not assigned to the field morphological species identification, namely *Planigale* sp. 1 and *Demansia calodera* based on our molecular investigations. However the former requires further morphological evaluation as it comprises a molecular group that does not correspond to a described species and the latter assignment may require further molecular investigation, as we lack suitable reference material for definitive resolution between *D. calodera* and *D. shinei*.

Thanks once again for collaborating on this project with Helix. We hope we can continue to provide you with useful information, in particular in this important, yet often ignored, area of molecular verification of vertebrate taxonomic identification. Feel free to contact us if you have any questions or would like to discuss the results in detail.

Sincerely,

Dr. Zoë Hamilton, Dr. Terrie Finston and Yvette Hitchen
Helix Molecular Solutions

Background and Objective

Regulatory Information
The Environmental Protection Authority (EPA) have listed an expectation within their Guidance statement No. 56 for Terrestrial Fauna Surveys for Environmental Impact Assessment (EIA) in Western Australia (2004, page 19, Section 3.4) that "*animal specimens collected and not readily identified as common, would be vouchered to the Western Australian Museum and that specimens which reflect taxonomic anomalies or which are found to occur beyond the previously known range of a taxon would be highlighted in the fauna and faunal assemblage survey report and brought to the attention of relevant authorities* ". Furthermore it is stated "*fauna and faunal assemblage survey reports should identify whether any animal taxa or assemblages present are restricted or whether the survey area is an outlier or known extremity of the range of those taxa/assemblages*". At the very least and consistent with guidance for flora surveys (EPA, 2004) voucher specimens should be provided to verify field identifications. It is unlikely that this requirement is currently being fulfilled.

There are obvious difficulties, such as keeping animals alive (feeding, housing cleanliness), as well as ethical issues such as euthanasia of live specimens or transportation of live animals from a survey area to the appropriate institution (WA Museum). Furthermore, the timing of lodgement of live specimens with the WA Museum has historically been challenging, as museum staff need to assign a number of hours to processing (euthanising), identifying, and lodging the specimens. So for example delivering specimens late in the day or towards the end of the week does not permit sufficient time for processing. To complicate the issue even further, the WA Museum Taxonomic Service (WATS) are no longer undertaking any morphological identification. Ideally, all identifications made during fauna surveys should be supported by verified specimens. This raises significant issues in satisfying the EPA guidelines for biological surveys, and may pose problems during the assessment of approvals.

Molecular Verification and DNA Barcoding
The use of sequences of the mtDNA gene cytochrome oxidase I (*COI*) as taxon 'barcodes' has been proposed to serve as the core of a global identification system for animals (Hebert *et al*., 2003). Its merits include identifying taxa when morphological variants of a single taxon exist, aiding the identification of cryptic taxa (e.g. Wilke & Pfenniger, 2002; Hebert *et al*., 2004a; Pfenniger & Schwenk, 2007), and identifying juveniles, carcasses or remnants of specimens that would not otherwise be identifiable (Hebert *et al*., 2003). Barcoding has been applied across numerous taxa (Hebert *et al*., 2004a; Hebert *et al*., 2004b; Barrett & Hebert, 2005; Meyer & Paulay, 2005; Ward *et al*., 2005; Wiemers & Fiedler, 2007; Davison *et al*., 2009), and has become popular as a short-cut to investigate species divergence and distribution in the context of conservation and management (e.g. Harvey *et al*., 2008; Crawford *et al*., 2013; Humphreys *et al*., 2013; Nevill *et al*., 2013).

Whether using the universally accepted *COI* mtDNA gene for DNA barcoding or an alternative gene that has been demonstrated to show differentiating power amongst particular species, the DNA barcoding concept is an extremely effective tool when used appropriately, i.e. in taxonomically well-understood, and thoroughly sampled taxa. The theory is that by consistently using the same region of mtDNA sequences, DNA obtained from new samples are compared against others in an easily accessible database, such as GenBank. Combined with solid taxonomic foundations, such comparisons will reveal important information on the new samples. Fundamental to such applications is adequate sampling and a robust taxonomy, which enables informed interpretations of the levels of molecular divergence with respect to a level associated with a species threshold.

Using DNA barcoding to identify juvenile or sub-adult specimens, potentially cryptic species, or for the purpose of verification of species identification, is an expeditive and proven tool that can fulfil the EPA guidance statement and improve the standard of fauna surveys.

Procurement of tissue samples during fauna surveys to accompany an identification should be considered best practice. Sequencing tissue samples provides verification of taxonomic identification with the additional advantage of resolving taxonomic ambiguities. Since 1994 there have been numerous discoveries of new mammalian taxa, equating to ~10 % of the previously known fauna, 60 % of which have been cryptic taxa (Ceballos & Ehrlich, 2009). Cryptic species have been even more recently uncovered in Australian mammalian taxa (Kemper *et al*., 2011; Bryant, 2013). The value of incorporating molecular analyses has been demonstrated with the discovery of the grey-bellied dunnart, *Sminthopsis griseoventer*, in South Australia (Kemper *et al*., 2011). To further complicate field IDs, many mammal species, such as many *Sminthopsis*, are difficult to ID when they aren't sexually mature.

Recent publications on species complexes in reptiles (e.g. Kealley *et al*., 2018; Moritz *et al*., 2018; Doughty *et al*., 2012) have highlighted the necessity for molecular identifications. For example, geckos from the genus *Gehyra* have long been a problematic group owing to interspecific morphological conservatism coupled with extensive variation within some species complexes (Doughty *et al*., 2012). The recent comprehensive revision of the *Gehyra variegata* (Gekkonidae) group in Western Australia (Kealley *et al*., 2018), which incorporated molecular, morphological and geographical information, reported hundreds of incorrectly identified and unidentified specimens that were subsequently linked to existing lineages and new species. Some of these species are phenotypically identical (e.g. *G. variegata* & *G. versicolour*), whilst others show overlap in morphological characters (e.g. *G. montium*), which is further complicated by the co-occurrence of several species.

The presumption that morphological field identifications are detecting anomalies and satisfying the EPA guidance statement is precarious. Consequently biological surveys and environmental impact assessments, which assume that most mammal (and other vertebrate) species are known, may considerably under-estimate species diversity and hence the conservation value of a region or impact of a major project development (Kemper *et al.,* 2011).

This study

Eleven specimens of vertebrate fauna belonging to two families of mammals (Dasyuridae and Muridae), and three reptile specimens belonging to three families (Elapidae, Scinicidae and Typhlopidae) from the Winu survey area in the Little Sandy Desert were sequenced for molecular variation for the purpose of species assignment of specimens within a phylogenetic framework. This investigation included a total of three mtDNA genes and comprised the ND4 gene for the genus *Lerista* (Scincidae), cytochrome B for *Anlilios* (Typhlopidae), cytochrome B and ND4 for *Demansia* (Elapidae), 16s for *Planigale, Ningaui* and *Sminthopsis* specimens (all Dasyuridae), and cytochrome B (CYB) for the *Pseudomys* and *Notomys* (Muridae) specimens. For the *Sminthopsis*, *Anilios*, *Lerista* and *Demansia*, WA Museum tissue samples were also sequenced to ensure species assignment was accurate.

The eleven successful resulting Winu molecular sequences were then assessed to determine the species assignment by comparison of these results to those sequences publically available on GenBank, and the WA Museum tissue samples (n=10) also sequenced during the current study solely for the purposes of taxonomic assignment for context.

Executive summary

- Eight mammal tissue specimens from Winu, belonging to two families (Dasyuridae and Muridae) from the Winu survey area, were sequenced and assessed for molecular variation at the 16s, or cytochrome B (CYB) mtDNA gene. The molecular data were then placed within an existing molecular taxonomic framework for each genus, using existing sequences on GenBank, and those sequenced from the WA Museum within this study to assist taxonomic placement;
- Three reptile tissue specimens from three families (Elapidae, Schincidae and Typhlopidae) from the Winu survey area in the Little Sandy Desert, were sequenced and assessed for variation at the cytochrome B or ND4 mtDNA gene. The molecular data were then placed within an existing molecular taxonomic framework for each

group, with the addition of the sequenced WA Museum tissue specimens and using sequences from GenBank;
- Mammal species identifications based on available molecular data resulted in the detection of the species *Sminthopsis youngsoni, Ninguai ridei, Planigale* sp. *Pseudomys hermannsburgensis*, and *Pseudomys desetor* from Winu;
- Reptile species identification based on available molecular data for comparison resulted in the detection of the species *Lerista separanda*, putative *Demansia calodera* and *Anilios endoterus* from Winu.

Methods

Eight mammal tissue specimens from seven sampling locations (Table 1) and three reptile tissue specimens from three sampling locations all from Winu, as well as two WA museum mammal tissue specimens (Registration codes M49038 & M56120), and eight WA museum reptile tissue specimens (Registration codes R168487, R156732, R165700, R123560, R163583, R163965, R163487) were sequenced for the purposes of molecular verification of morphological field identification of species.

The following mtDNA genes were sequenced for the Winu and WA Museum mammals and reptiles:
- *Planigale* (Dasyuridae) 16s using the primers L1002, L1095, and H2673 from (Krajewski *et al*., 2004);
- *Sminthopsis* (Dasyuridae)16s using the primers L1095, and H2673 from (Krajewski *et al.,* 2004);
- *Ningaui* (Dasyuridae) the Control Region (CR) was initially trialled using the primers L1599M, H16498, L16517M and H605M from (Fumagalli *et al*., 1997), however PCRs were unsuccessful. Specimens were then sequenced for 16s using the primers L1002, L1095, and H2673 from (Krajewski *et al*., 2004);
- *Notomys* (Muridae) cytochrome B using primers MVZ05 and MVZ16 from Smith & Patton (1993);
- *Pseudomys* (Muridae) cytochrome B using primers MVZ05 and MVZ16 from Smith & Patton (1993);
- *Lerista* (Scincidae) ND4 using primers ND4 and M246 from Forstner *et al.,* (1995) and Skinner *et al*., (2005);
- *Demansia* (Elapidae) cytochrome B using primers L14910 and L14919 from (Burbrink *et al*., 2000) and ND4 using primers ND4 and M246 from Forstner *et al.,* (1995) and Skinner *et al*., (2005); and
- *Anilios* (Typhlopidae) cytochrome B using primers L14919 and H16064 from (Burbrink *et al*., 2000).

The sequences from the total twenty-one successfully sequenced vertebrate individuals were edited using Geneious version 6.1.8 software (https://www.geneious.com) performed within MEGA version 6 (Tamura *et al*., 2013) using the built-in alignment tool using CLUSTAL W (Thompson *et al*., 1994) using default parameters. DNA nucleotide sequences were translated into protein sequences to ensure that the amplified sequences corresponded to the target mtDNA. The translated protein sequences were then checked for the presence of stop codons, to ensure that pseudogenes hadn't been amplified. Pseudogenes have a DNA sequence that is similar to the functional gene (e.g. *COI*) however, they do not code for a functioning protein despite the shared ancestry with the functional gene. The presence of pseudogenes can complicate molecular analyses, producing odd results. DNA sequences were translated into proteins with ExPASy using the invertebrate genetic code. All sequences analysed were of high quality with no evidence of heterogeneous peaks. All resulting sequences were 'BLAST'ed (Basic Local Alignment Search Tool) with the NCBI (National Centre for Biotechnology Information). This program compares DNA nucleotide sequences with a library of sequences and identifies sequences within the database that resemble the query sequences above a certain threshold. Genetic distances between unique genetic sequences (haplotypes) were measured using uncorrected p-distances (total percentage of nucleotides different between sequences). To account for polymorphism within lineages, the net genetic diversity of Nei (1987) was calculated to give a 'corrected' distance between lineages.

For phylogenetic analysis, likelihood ratio tests using the Bayesian Information Criterion were calculated in MEGA 7.0 (Kumar *et al*., 2016) to determine the best-fit model of evolution. The phylogenetic analyses were calculated in MEGA 7.0 (Kumar *et al*., 2016) using maximum likelihood (ML) with 1000 bootstrap replicates, based on the genetic distances with the best-fit model of evolution calculated for each family.

For the *Sminthopsis* 16s data, the best model of evolution was the General Time Reversible model with gamma distribution and invariant sites (GTR+G+I). The value for the gamma distribution was 0.38. The Dasyurid specimens *Antechinus godmani* (EF11636.1), *Sminthopsis granulipes* (JQ413959.1), *Dasyurus goefroii* (AY52892.1), *Dasyurus maculatus* (AY528918.1), *Dasycercus cristicauda* (AY528916.1, EU086652.1, KJ868107.1), and *Macrotus lagotis* (AJ639871.1) obtained from Genbank were used as outgroups for analyses.

For the *Ningaui* 16s data, the best model of evolution was the Tamura Nei model with invariant sites (TN93 +I). The Dasyurid specimen *Antechinomys laniger* (KJ868097.1) was used the outgroup during analyses.

For the *Planigale* 16s data the best model of evolution was the General Time Reversible model with gamma distribution (GTR+G), with a gamma distribution of 0.20.The Dasyurid specimens *Dasyurus geofroii* (AY52892.1), *Dasyurus maculatus* (AY528918.1), *Dasycercus cristicauda* (AY528916.1, EU086652.1, KJ868107.1), and *Macrotus lagotis* (AJ639871.1) obtained from Genbank were used as outgroups for analyses.

For the *Notomys* CYB data the best model of evolution was the Tamura Nei model with gamma distribution (TN93+G) with the parameter for gamma distribution of 0.38. The Murid species *Zyzomys argurus* (EU349792.1), *Hydromys chrysogaster* (KM603499.1), and *Rattus rattus* (HM217740.1) obtained from Genbank were used as outgroups for analyses.

For the *Pseudomys* CYB data, the best model of evolution was the General Time Reversible model with gamma distribution and invariant sites (GTR+G+I). The value for the gamma distribution was 2.17. The Murid specimen *Rattus rattus* (HM217740.1) obtained from Genbank was used as the outgroup for analyses.

For the *Demansia* CYB data the best model of evolution was the Hasegawa_Kishino-Yano model with gamma distribution and invariant sites (HKY+G+I), with the parameter for gamma distribution of 1.33. The specimens *Furina ornata* (EU547054.1), *Laticauda laticaudata* (FJ587153.1), *Aspidomorphus schlegeli* (GQ397169.1), *Cacophis squamulosus* (EU547052.1) and *Demansia atra* (AY058966.1) obtained from Genbank were used as outgroups for analyses.

For the *Demansia* ND4 data the best model of evolution was the Hasegawa_Kishino-Yano model with gamma distribution (HKY+G), with the parameter for gamma distribution of 0.31. The specimens *Furina ornata* (EU5470009.1), *Laticauda laticaudata* (FJ593291.1), *Aspidomorphus schlegeli* (GQ397210.1) and *Cacophis squamulosus* (EU547007.1) obtained from Genbank were used as outgroups for analyses.

For the *Lerista*, the best model of evolution was the Hasegawa_Kishino-Yano model with gamma distribution and invariant sites (HKY+G+I), with the parameter for gamma distribution of 0.91. The specimens *Ctenotus robustus* (KJ504860.1) and *Lerista dorsalis* (EF672981.1) obtained from Genbank were used as outgroups for analyses.

For the *Anilios*, the best model of evolution was the Hasegawa_Kishino-Yano model with gamma distribution and invariant sites (HKY+G+I), with the parameter for gamma distribution of 1.04. The specimens *Ramphotyphlops lineatus* (KT316550.1) and *Anilios affinis* (JQ910526.1) obtained from Genbank were used as outgroups for analyses.

Phylogenetic analysis were performed separately for each genus, and included the successfully sequenced specimens from the survey area, as well as a total of four hundred and forty-six reference specimens obtained from GenBank databases (Appendix 1).

Results

Mammals

***Sminthopsis* – family Dasyuridae**

The two *Sminthopsis* specimens from Winu (PQ06 & PQ07) were sequenced for 16s mtDNA using the primers L1095 & H2673 from Krajewski *et al*., (2004) along with two specimens of *S. youngsonii* from the WA Museum tissue collection (PQ12 & PQ13) and a total of nine *Sminthopsis* reference specimens from GenBank. Based on phylogenetic analyses, the two *Sminthopsis* Winu specimens show affinity to the species *Sminthopsis youngsonii* (Table 2, Figure 1).

Phylogenetic Analyses
A 1456 to 1475 base-pair (bp) fragment of 16s mtDNA was isolated for the four *Sminthopsis* specimens from this study.

Differentiation within and between lineages
The two *Sminthopsis* specimens from Winu show 0.1 % sequence divergence (at 16s) from each other. Based on the available molecular data, the closest relatives to the Winu *Sminthopsis* were the two WA Museum *S. youngsoni* specimens also sequenced during this study (PQ12, WAM49038 & PQ13, WAM56120) at 0.2 % & 0.3 % sequence divergence collected from Onslow and the Tanami desert respectively followed by *S. youngsoni* (JQ413956.1 generated in Krajewski *et al*., 2012) from Genbank (6.3 %) (Figure 1, Table 2). These results confirm the field identifications that were based on morphological characters.

***Ningaui* – family Dasyuridae**

The single *Ningaui* specimen from Winu (PQ08) (Table 1) was analysed along with five *Ningaui* reference specimens from GenBank. The species *Antechinomys laniger* (KJ868097.1) was used as the outgroup during analyses. Based on phylogenetic analyses, the single Winu *Ningaui* specimen shows affinity to the species *Ningaui ridei* (Table 3, Figure 2).

Phylogenetic Analyses
An 825 base-pair (bp) fragment of the 16s mtDNA gene was isolated for the *Ningaui* specimen from Winu.

Differentiation within and between lineages
The *Ningaui* specimen from Winu shows just 0.1 % sequence divergence (at 16s) from the nearest relative, an individual belonging to the species *Ningaui ridei* (KJ868131.1 generated from Mitchell *et al*., 2015, Table 3). The Winu specimen sits within the Ningaui ridei phylogenetic clade with extremely high statistical support (Figure 2). The species, *Ningaui ridei* is distributed west of Kalgoorlie (WA) across northern South Australia and southern Northern territory to southwestern Queensland according to the Atlas of Living Australia (ala.org.au). Based on the molecular data of the specimens available for comparison, the species shows up to 1.1 % intraspecific sequence divergence at the 16s mtDNA gene (Table 3).

***Planigale* – family Dasyuridae**

The single *Planigale* tissue specimen from Winu (PQ05) was analysed along with thirteen *Planigale* reference specimens obtained from GenBank.

Phylogenetic Analyses
An 825 base-pair (bp) fragment of the 16s mtDNA gene was isolated for the *Planigale* specimen from Winu.

Differentiation within and between lineages
The Winu specimen shows between 0.1 % and 0.3 % sequence divergence at the 16s mtDNA gene from specimens recognised as *Planigale* sp. 1 (Westerman *et al*., 2016) (Table 4)

and sits within this species clade with extremely high statistical support (Figure 3). The other specimens from this clade have been recorded from Millstream (GB# KX034147.1, WAM #M86905) 500 km from the Winu specimen, and Woodstock (GB# KX34148.1, WAM #M28097) 300 km from the Winu specimen. Based on the currently available molecular data, analyses place the single Winu *Planigale* specimen with the species *Planigale* sp. 1 (Westerman *et al*., 2016) (Table 4, Figure 3).

The Winu specimen (PQ05) shows between 3.1 % and 3.2 % sequence divergence (16s) from the next closest species, *Planigale ingrami* (Table 4).

***Notomys* – family Muridae**

The single *Notomys* specimen from Winu (PQ04) was analysed along with fourteen *Notomys* reference specimens from GenBank (Table 5).).

Phylogenetic Analyses

A 757 base-pair (bp) fragment of CYB was isolated for the Winu specimen.

Differentiation within and between lineages

Phylogenetic analyses placed the *Notomys* specimen from Winu (PQ04) within the *Notomys alexis* clade with average statistic support (Figure 4). The Winu *Notomys* (PQ04) shows 0.0 % sequence divergence at cytochrome B (CYB) from the three *N. alexis* specimens in this clade (MH741764.1, MH 741763.1 & MH741762.1); the remaining *N. alexis* specimens in this clade show 0.7 % & 1.4 % sequence divergence from the Winu *N. alexis* specimen (Table 5). The species is widely distributed throughout much of the arid zone (Van Dyck & Strahan, 2008).

***Pseudomys* – family Muridae**

The three *Pseudomys* specimens from Winu (PQ01, PQ02 & PQ03) were analysed along with a total of fifty-two *Pseudomys* reference specimens from GenBank. The species *Rattus rattus* (HM217740.1) obtained from Genbank was used as the outgroup during analyses.

Phylogenetic Analyses

A 756 to 808 base-pair (bp) fragment of CYB was isolated for the three *Pseudomys* specimens from Winu.

Differentiation within and between lineages

Two of the *Pseudomys* specimens from Winu (PQ01 & PQ02) align within the *P. hermannsburgensis* clade (Figure 5) with extremely high statistical support. They share the same haplotype (0.0 % sequence divergence, Table 6) and show up to 0.9 % sequence divergence (CYB) from other specimens of that species) (Table 6). *Pseudomys hermansburgensis* is distributed throughout much of the arid zone ((Van Dyck & Strahan, 2008), in central southern and western Australia.

The third *Pseudomys* specimen from Winu (PQ03) aligns with specimens of the species *Pseudomys desetor* (Figure 5), also with extremely high statistical support. Based on the molecular data of the specimens available for comparison, this Winu *Pseudomys* specimen shows up to 0.4 % sequence divergence (Table 6) from the other specimens of *P. desetor*. *Pseudomys desetor* is distributed across most of the arid and semiarid lands and into the northern dry tropical savannas, with historical records in Victoria and New South Wales (Van Dyck & Strahan, 2008).

Based on phylogenetic analyses, two of the *Pseudomys* specimens (PQ01 & PQ02) align with the species *Pseudomys hermannsburgensis*, and the third specimen (PQ03) aligns with *Pseudomys desetor* (Table 6, Figure 5).

Reptiles

Demansia – family Elapidae

The single *Demansia* specimen from Winu (PQ11), and the six WA Museum specimens (PQ14, PQ15, PQ16, PQ17, PQ18 and PQ19) were analysed along with the five additional *Demansia* specimens from the WA Museum, sequenced during the current study, and four reference specimens from GenBank for the CYB data. For the ND4 data, the Winu *Demansia* was analysed along with six additional *Demansia* specimens from the WA Museum, sequenced during the current study, in addition to the three *Demansia* reference specimens from Genbank. The WA museum specimens of *D. calodera* from geographically disparate locations, were sequenced, along with a *D. papuensis* tissue sample (PQ19), and two *D. augusticeps* tissue samples (PQ14 & PQ15) during this study to assist in taxonomic assignment. Unfortunately there was no *D. shinei* tissue available in the WA Museum tissue collection.

Phylogenetic Analyses

A 1022 base-pair (bp) fragment of the CYB gene and a 885 bp fragment of the ND4 gene was isolated for the *Demansia* specimen from Winu (PQ11). For the WA Museum *D. calodera, D. papuensis* and *D. augusticeps* tissues, a 1005 to 1111 bp fragment of the CYB gene and a 838 to 890 fragment of the ND4 gene was isolated and sequenced.

Differentiation within and between lineages

Based on phylogenetic analyses for both genes (ND4 & CYB), the Winu *Demansia* specimen (PQ11) shows affinity to the species <u>*Demansia calodera*</u> (Table 3, Figure 1). This is based on the placement of the Winu *Demansia* specimen within the *D. calodera* clade for both genes, with strong statistical support (Figures 7 & 8). Based on the available molecular data, there is up to up to 2.6 % divergence at the CYB gene (Table 6) and up to 3.1 % divergence at the ND4 gene (Table 7) between the Winu *Demansia* specimen (PQ11) and the *Demansia calodera* reference specimens. The species, *D. calodera* is distributed in the Shark Bay and Exmouth regions of Western Australia with a known apparent isolated population in the Gibson Desert (Shea and Scanlon, 2007).

Comments

The Winu specimen PQ11 was morphologically identified as, *Demansia shinei*. This species is distributed in northern central Australia, with two additional records from the Little Sandy Desert (R102712 & R127178), one of which is less than 100km from the sampling location of the Winu *Demansia* specimen. Shea and Scanlon (2007) state that *D. shinei* can be differentiated morphologically from *D. calodera* by the width of the pale postocular bar and pale anterior nuchal band, larger size and greater number of ventral scales. Without any *D. shinei* sequences or tissue for molecular comparison, we cannot elucidate the phylogenetic relationship between *D. shinei* and *D. calodera*, nor definitely assign the Winu specimen to *D. calodera*. Given the proximity of the WA Museum specimen R127178, tentatively also assigned to *D. shinei* based on morphological characters, (see Shea & Scanlon, 2007), there may be some overlap in morphological characters between the two species, and a taxonomic re-evaluation may be merited. Based on the available data, the Winu specimen is closely allied with *D. calodera* and will putatively be assigned to that species, however this issue can only be fully resolved with sequencing of *D. shinei* material.

Lerista – family Scincidae

The single *Lerista* specimen from Winu (PQ09) and two *L. separanda* specimens from the WA Museum collection (PQ20 & PQ21) were analysed along with a total of one-hundred and sixty-six *Lerista* reference specimens from GenBank (see Appendix 1). The species *Ctenotus robustus* (KJ504860.1) was used as the outgroup during analyses.

Phylogenetic Analyses

An 889 base-pair (bp) fragment of the ND4 gene was isolated for the *Lerista* specimen from Winu. For the WA museum *L. separanda* tissue specimens (PQ20 & PQ21) 861 to 880 bp fragments of ND4 were isolated and sequenced.

Differentiation within and between lineages
The single Winu *Lerista* specimen (PQ09) shows affinity to *L. separanda* species (Table 9, Figure 8), with just 0.2 % sequence divergence (ND4) from the nearest relative (PQ20 - WAM# R163965, Table 3). The species clade where the Winu specimen sits (PQ09) is extremely well supported (Figure 8). The species is distributed in Dampierland (Cogger, 2014) on the Kimberley coast between Kimbleton and Nita Downs (Wilson and Swan, 2010).

***Anilios* – family Typhlopidae**

There were six hundred and seventy-nine *Anilios* GenBank sequences available for analysis to assist placement of the Winu *Anilios* specimen. This large dataset was subsequently collapsed to include representative haplotypes only. The single Winu *Anilios* specimen (PQ10) was then analysed along with one hundred and fifty-five *Anilios* haplotype sequences (representing the 679 specimens available on Genbank).

Phylogenetic Analyses
A 1048 base-pair (bp) fragment of CYB gene was isolated for the *Anilios* specimen from Winu (PQ10).

Differentiation within and between lineages
The *Anilios* specimen from Winu (PQ10) shows 3.1 % sequence divergence from the nearest relative, a specimen of *A. endoterus* (GB# KC490211.1, Table 10). Based on the available molecular data for comparison, the species shows up to 7.5 % intraspecific sequence divergence at the cytochrome B (CYB) gene (Table 10). The species is distributed in deserts and semi-desert regions of Australia (Cogger, 2014).

Based on the phylogenetic analyses, the single Winu *Anilios* specimen shows a close affinity to the species *Anlios endoterus* (Table 10, Figure 9).

Conclusions

In summary, we detected a total of six mammal species from two families (Dasyuridae & Muridae), and three reptile species from three families (Elapidae, Scincidae & Typhlopidae) amongst the eleven specimens from Winu. The ten WA Museum specimens sequenced during this study were invaluable with taxonomic placement of the Winu specimens.

References

Barrett RDH, Hebert PDN. 2005. Identifying spiders through DNA barcodes. *Canadian Journal of Zoology* **83**: 481-491.

Bryant LM. 2013. Cryptic diversity and evolutionary relationships among Australian closed-forest *Melomys* (Rodentia: Muridae) and related Australo-Papuan mosaic-tailed rats. PhD thesis

Burbrink FT, Lawson R, Slowinski JB 2000. Mitochondrial DNA phylogeography of the polytypic North American rat snake (*Elaphe obsoleta*): a critique of the subspecies concept. *Evolution* **54**: 2107– 2118.

Ceballos G, Ehrlich PR. 2009. Discoveries of new mammal species and their implications for conservation and ecosystem services. *Proceedings of the National Academy of Sciences of the United States of America.* **106**: 3841-3846.

Cogger HG. 2014. *Reptiles & Amphibians of Australia.* Seventh edition. CSIRO Publishing Collingwood VIC Australia.

Crawford AJ, Cruz C, Griffith E, Ross H, Ibáñez R, Lips KR, Driskell AC, Bermingham E, Crump. 2013. DNA barcoding applied to ex situ tropical amphibian conservation programme reveals cryptic diversity in captive populations. *Molecular Ecology Resources* **13**: 1005-1018.

Davison A, Blackie RLE, Scotherm GP. 2009. DNA barcoding of stylommatophoran land snails: a test of existing sequences. *Molecular Ecology Resources* **9**: 1092-1101.

Doughty P, Palmer R, Sistrom MJ, Bauer AM, Donnellan SC. 2012. Two new species of *Gehyra* (Squamata: Gekkonidae) geckos from the north-west Kimberley region of Western Australia. *Records of the Western Australian Museum* **27**:117-134.

Forstner MRJ, Davis SK, Arévalo E. 1995. Support for the hypothesis of anguimorph ancestry for the suborder Serpentes from phylogenetic analysis of mitochondrial DNA sequences. *Molecular Phylogenetics and Evolution* **4**: 93–102.

Fumagalli L, Pope LC, Taberlet P & Moritz C 1997. Versatile primers for the amplification of the mitochondrial DNA control region in marsupials. *Molecular Ecology* **6**: 1199– 1201.

Harvey MS, Berry O, Edward, KL & Humphreys G. 2008. Molecular and morphological systematics of hypogean schizomids (Schizomida: Hubbaerdiidae) in semiarid Australia. *Invertebrate Systematics* **22**: 167- 194.

Hebert PDN, Penton EH, Burns JM, Janzen DH, Hallwachs W. 2004a. Ten species in one: DNA barcoding reveals cryptic species in the neotropical skipper butterfly *Astraptes fulgerator*. *PNAS* **101**: 14812-14817.

Hebert PDN, Stoeckle MY, Zemlak TS, Francis CM. 2004b. Identification of birds through DNA barcodes. *PLoS Biology* **2**: 1657-1663.

Hebert PDN, Cywinska A, Ball SL, deWaard JR. 2003. Biological identifications through DNA barcodes. *Proceedings of the Royal Society of London B* **270**:313-321.

Humphreys G, Alexander J, Harvey MS, , Humphreys WF. 2013. The subterranean fauna of Barrow Island, north-western Australia: 10 years on. *Records of the Western Australian Museum Supplement* **83**: 145-158.

Kealley L, Doughty P, Pepper M, Keough JS, Hillyer M, Huey J. 2018. Conspicuously concealed: revision of the arid clade of the *Gehyra variegata* (Gekkonidae) group in Western Australia using an integrative molecular and molecular approach, with the description of five cryptic species. **PeerJ 6:e5334; DOI 10.7717/peerj.5334**

Kemper CM, Cooper SJB, Medlin GC, Adams M, Stemmer D, Saint KM, McDowell MC, Austin JJ. 2011. Cryptic grey-bellied dunnart (*Sminthopsis griseoventer*) discovered in South Australia: genetic, morphological and subfossil analyses show the value of collecting voucher material. *Australian Journal of Zoology* **59**:127-144.

Krajewski C, Moyer GR, Sipiorski, JT, Fain MG, Westerman M. 2004. Molecular systematics of the enigmatic 'phascolosoricine' marsupials of New Guinea. *Australian Journal of Zoology* **52**: 389-415

Krajewski C, Anderson FE, Woolley PA, Westerman M. 2012. Molecular evidence for a deep clade of dunnarts (Marsupialia: Dasyurridae: *Sminthopsis*). *Journal of Mammalian Evolution* **12**: 265-276.

Kumar S, Stecher G, Tamura K. 2016. MEGA 7: Molecular Evolutionary Genetic Analysis version 7.0 for bigger datasets. *Molecular Biology and Evolution* **33**: 1870-1874.

Meyer CP, Paulay G. 2005. DNA Barcoding: Error rates based on comprehensive sampling. *PLoS Biology* **3**: 229-2238.

Mitchell KJ, Pratt RC, Watson LN, Gibb GC, Llamas B, Kasper M, Edson J, Hopwood B, Male D, Armstrong K, Meyer M, Hofreiter M, Austin J, Donnelan SC, Lee MSY, Phillips MJ, Cooper A. 2015. Molecular phylogeny, biogeography and habitat preference evolution of marsupials. Molecular Biology and Evolution **9:** 2322-2230.

Moritz C, Pratt RC, Bank S, Bourke G, Bragg JG, Doughty P, Keough JS, Laver RJ, Potter S, Teasdale Lc, Tedeschi LG, Oliver PM. 2018. Cryptic lineage diversity, body size, divergence, and sympatry in a species complex of Australian lizards (*Gehyra*). *Evolution* **72**: 54-66.

Nei M. 1987. DNA polymorphism within and between populations. In: *Molecular Evolutionary Genetics*. pp.254-286. Columbia University Press New York, NY.

Nevill PG, Wallace MJ, Miller JT, Krauss SL. 2013. DNA barcoding for conservation, seed banking and ecological restoration of *Acacia* in the Midwest of Western Australia. *Molecular Ecology Resources* **13**: 1033-1042.

Pfenniger M, Schwenk K. 2007. Cryptic animal species are homogeneously distributed among taxa and biogeographical regions. *BMC Evolutionary Biology* **7**: 121.

Shea GM, Scanlon JD. 2007. Revision of the small tropical whipsnakes previously referred to *Demansia olivacea* (Gray, 1842) and *Demansia torquata* (Günther, 1862) (Squamata: Elapidae). *Records of the Western Australian Museum* **59**: 117-142.

Skinner A, Donnellan SC, Hutchinson MN, Hutchinson RG. 2005. A phylogenetic analysis of *Pseudonaja* (Hydrophiinae, Elapidae, Serpentes) based on mitochondrial DNA sequences. *Molecular Phylogenetics and Evolution* **37**: 558–571.

Smith, M.F., Patton, J.L., 1993. The diversification of South American murid rodents: evidence from mitochondrial DNA sequence data for the akodontine tribe. *Biological Journal of the Linnean Society* **50**: 149–177.

Tamura K, Stecher G, Peterson D, Filipski A, Kumar S. 2013. MEGA 6: Molecular Evolutionary Genetic Analysis using Maximum Likelihood, evolutionary distance, and Maximum Parsimony methods. *Molecular Biology and Evolution* **30**: 2725 – 2729.

Thompson J, Higgins D, Gibson T. 1994. CLUSTAL W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice. *Nucleic Acids Research* **22**, 4673–4680. doi:10.1093/nar/ 22.22.4673.

Van Dyck S, Strahan R. 2008. *The Mammals of Australia*. Third edition. New Holland Publishers (Australia) Pty Ltd.

Ward RD, Zemlak TS, Innes BH, Last PR, Hebert PDN. 2005. DNA barcoding in Australia's fish species. *Philosophical transactions of the Royal Society of London B Biological Sciences* **360**: 1847-1857.

Westerman M, Blackat MJ, Hintz A, Armstrong K, Wooley PA, Krajewski C. 2016. A plethora of planigales: Genetic variability and cryptic species in a genus of dasyurid marsupials from northern Australia. *Australian Journal of Zoology* **65**: 303-311.

Wilke T, Pfenniger M. 2002. Separating historic events from recurrent processes in cryptic species: phylogeography of mud snails (*Hydrobia* spp.). *Molecular Ecology* **11**: 1439-1451.

Wilson S, Swan g. 2010. *A complete guide to Reptiles of Australia*. Third edition. New Holland Publishers (Australia) Pty Ltd.

Wiemers M, Fiedler K. 2007. Does the DNA barcoding gap exist? - a case study in blue butterflies (Lepidoptera: *Lyaenicidae*). *Frontiers in Zoology* **4**: 8.

Table 1. . Vertebrate tissue specimens sequenced in the present study (Mammals n=10; Reptiles n=11), and the species to which they were assigned, based on molecular analyses. Coloured shading refers to colour-coding used to highlight species in Figures 1 to 9.

Biota Sample ID	Helix ID	WA Museum Registration Number	Family	Genus	Morphological Species Assignment	Molecular Species Assignment
T20190514.WIN07Pseher-01	**PQ01**	n/a	Muridae	*Pseudomys*	*hermannsburgensis*	*hermannsburgensis*
T20190514.WIN02Psedes-01	**PQ03**	n/a	Muridae	*Pseudomys*	*desertor*	*desertor*
T20190516.WIN04Notale-01	**PQ04**	n/a	Muridae	*Notomys*	*alexis*	*alexis*
T20190514.WIN06Smiyou-01	**PQ06**	n/a	Dasyuridae	*Sminthopsis*	*youngsoni*	*youngsoni*
T20190514.WIN07Smiyou-01	**PQ07**	n/a	Dasyuridae	*Sminthopsis*	*youngsoni*	*youngsoni*
T20190919WIN02P.NIN.REI-01	**PQ08**	n/a	Dasyuridae	*Ningaui*	*ridei*	*ridei*
T20190919WIN02P.PSE.HER-01	**PQ02**	n/a	Muridae	*Pseudomys*	*hermannsburgensis*	*hermannsburgensis*
T20190925WIN07P.LER.SEP-01	**PQ09**	n/a	Scincidae	*Lerista*	*separanda*	*separanda*
V20190924WIN03P.ANI.sp-01	**PQ10**	n/a	Typhlopidae	*Anilios*	*endoterus*	*endoterus*
T20190920WIN01P.DEM.SHI-01	**PQ11**	n/a	Elapidae	*Demansia*	*shinei*	*calodera*
T20190515.WIN09Plaing-01	**PQ05**	n/a	Dasyuridae	*Planigale*	*ingrami*	sp. 1
n/a	**PQ12**	49038	Dasyuridae	*Sminthopsis*	*n/a*	*youngsoni*
n/a	**PQ13**	56120	Dasyuridae	*Sminthopsis*	*n/a*	*youngsoni*
n/a	**PQ14**	168487	Elapidae	*Demansia*	*n/a*	*angusticeps*
n/a	**PQ15**	156732	Elapidae	*Demansia*	*n/a*	*angusticeps*
n/a	**PQ16**	165700	Elapidae	*Demansia*	*n/a*	*calodera*
n/a	**PQ17**	126915	Elapidae	*Demansia*	*n/a*	*calodera*
n/a	**PQ18**	123650	Elapidae	*Demansia*	*n/a*	*calodera*
n/a	**PQ19**	163583	Elapidae	*Demansia*	*n/a*	*papuensis*
n/a	**PQ20**	163965	Scincidae	*Lerista*	*n/a*	*separanda*
n/a	**PQ21**	163487	Scincidae	*Lerista*	*n/a*	*separanda*

Table 2. Genetic p-distance (below) and the associated standard error (above – blue text) between the *Sminthopsis* individuals sequenced from the Winu survey area (16s), and all reference specimens as shown in Figure 1. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 2 attached separately as a PDF document due to the size and detail.

Table 3. Genetic p-distance (below) and the associated standard error (above – blue text) between the Winu *Ningaui* specimen (16s), and all reference specimens as shown in Figure 2. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 3 attached separately as a PDF document due to the size and detail.

Table 4. Genetic p-distance (below) and the associated standard error (above – blue text) between the *Planigale* from Winu (16s) and all reference specimens as shown in Figure 3. Colour coding corresponds to Figure 3. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 4 attached separately as a PDF document due to the size and detail.

Table 5. Genetic p-distance (below) and the associated standard error (above – blue text) between the *Notomys* specimens from Winu (CYB) and all reference specimens as shown in Figure 4. Colour coding corresponds to Figure 4. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 5 attached separately as a PDF document due to the size and detail.

Table 6. Genetic p-distance (below) and the associated standard error (above – blue text) between the *Demansia* specimen from Winu (CYB) and all reference specimens as shown in Figure 5. Colour coding corresponds to Figure 5. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 6 attached separately as a PDF document due to the size and detail.

Table 7. Genetic p-distance (below) and the associated standard error (above – blue text) between the *Demansia* specimens from Winu (ND4) and all reference specimens as shown in Figure 6. Colour coding corresponds to Figure 6. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 7 attached separately as a PDF document due to the size and detail.

Table 8. Genetic p-distance (below) and the associated standard error (above – blue text) between the *Leritsa* specimens from Winu (ND4) and all reference specimens as shown in Figure 7. Colour coding corresponds to Figure 7. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 8 attached separately as a PDF document due to the size and detail.

Table 9. Genetic p-distance (below) and the associated standard error (above – blue text) between the *Anilios* specimen from Winu (CYB) and all reference specimens as shown in Figure 8. Colour coding corresponds to Figure 8. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 9 attached separately as a PDF document due to the size and detail.

Figure 1 attached separately as a PDF document due to the size and detail.

Figure 1. Maximum likelihood analysis of 16s gene mtDNA sequences, showing the placement of the Winu *Sminthopsis* specimen (in bold text) within the current taxonomic framework of the family Dasyuridae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. WA Museum registration codes indicated on tree. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

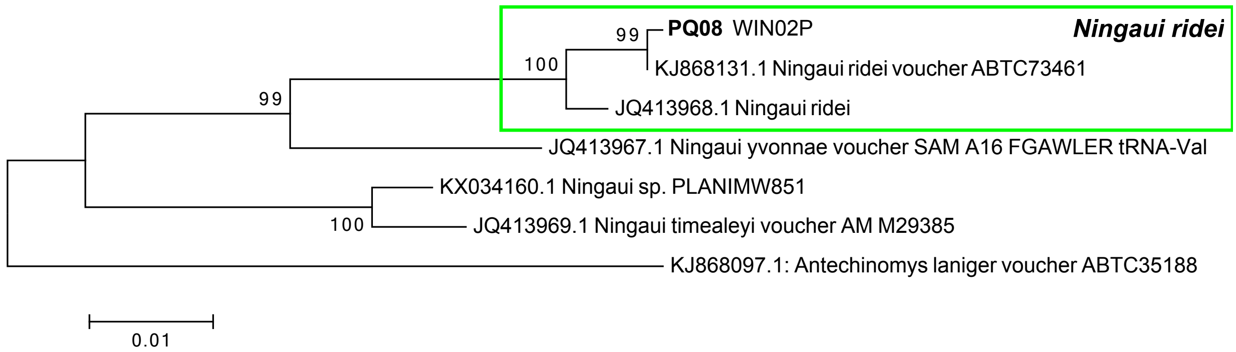


Figure 2. Maximum likelihood analysis of 16s gene mtDNA sequences, showing the placement of the Winu *Ningaui* specimen (in bold text) within the current taxonomic framework of the family Dasyuridae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. WA Museum registration codes indicated on tree. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

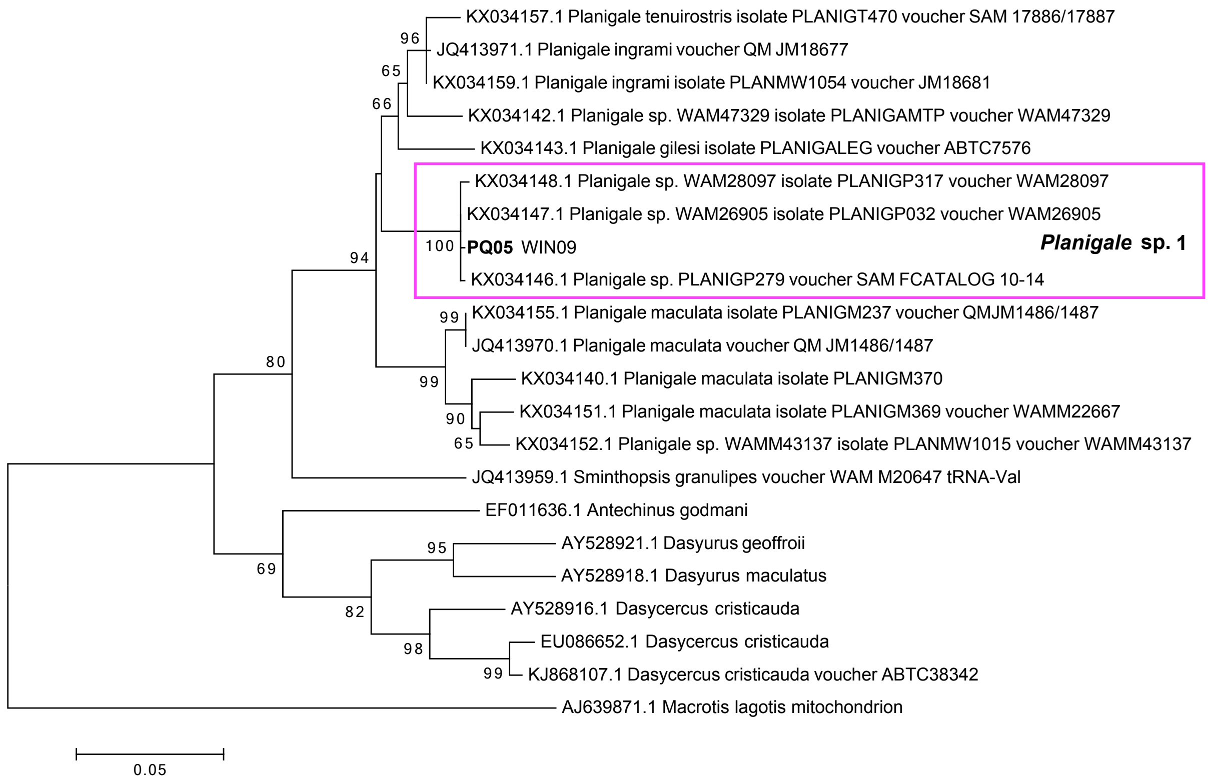


Figure 3. Maximum likelihood analysis of 16s gene mtDNA sequences, showing the placement of the Winu *Planigale* specimen (in bold text) within the current taxonomic framework of the family Dasyuridae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. WA Museum registration codes indicated on tree. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

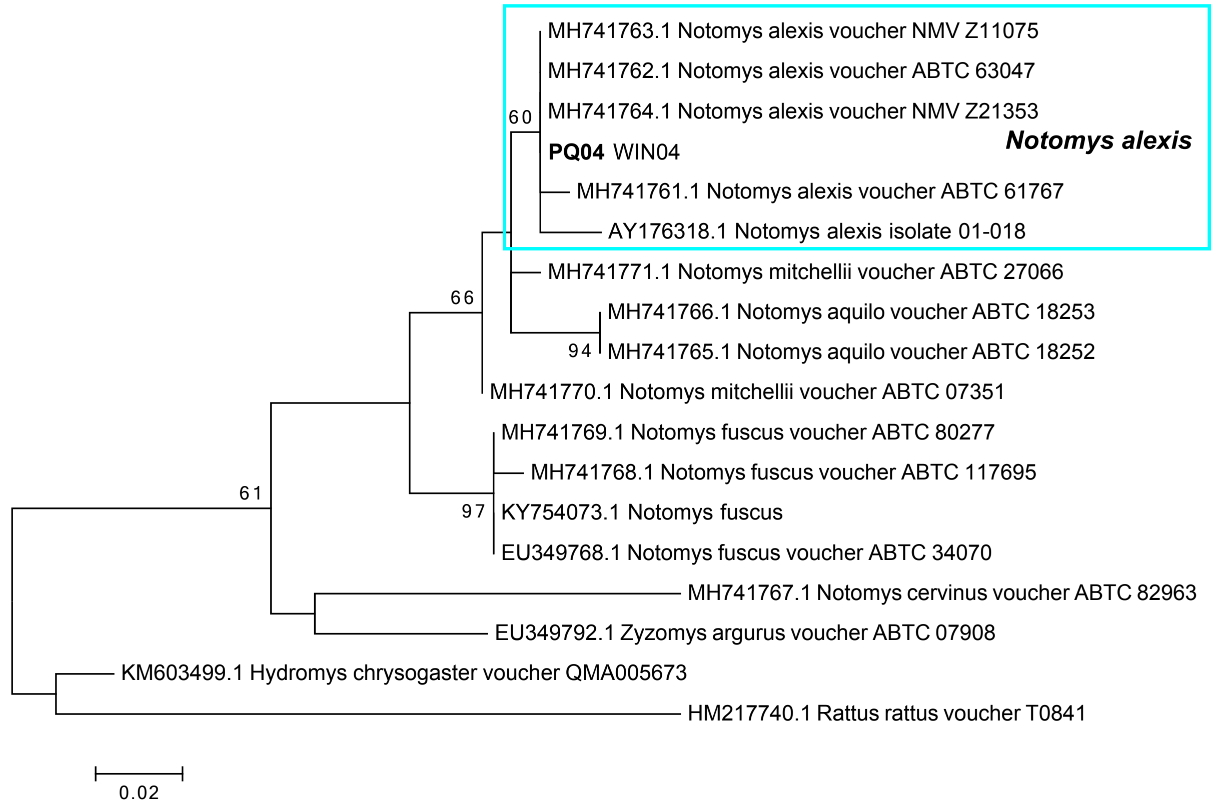


Figure 4. Maximum likelihood analysis of CYB gene mtDNA sequences, showing the placement of the Winu *Notomys* specimen (in bold text) within the current taxonomic framework of the family Dasyuridae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. WA Museum registration codes indicated on tree. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

Figure 5 attached separately as a PDF document due to the size and detail.

Figure 5. Maximum likelihood analysis of CYB gene mtDNA sequences, showing the placement of the Winu *Pseudomys* specimen (in bold text) within the current taxonomic framework of the family Muridae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. WA Museum registration codes indicated on tree. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

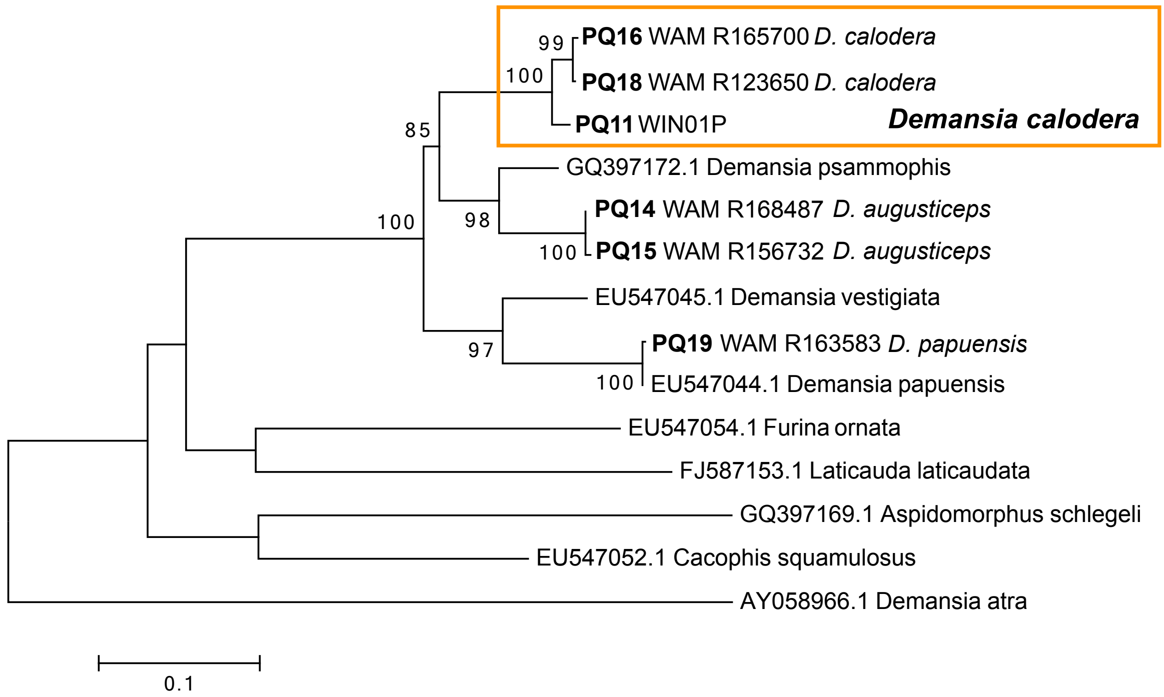


Figure 6. Maximum likelihood analysis of CYB gene mtDNA sequences, showing the placement of the Winu *Demansia* specimen (in bold text) within the current taxonomic framework of the family Elapidae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. WA Museum registration codes indicated on tree. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

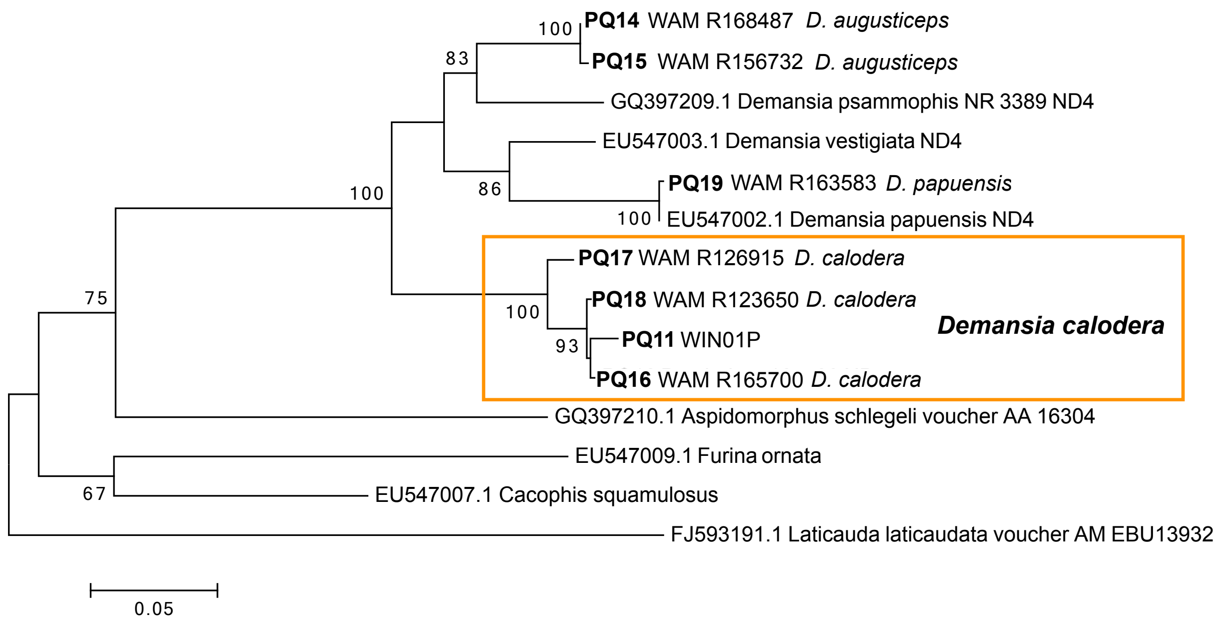


Figure 7. Maximum likelihood analysis of ND4 gene mtDNA sequences, showing the placement of the Winu *Demansia* specimen (in bold text) within the current taxonomic framework of the family Elapidae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. WA Museum registration codes indicated on tree. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

Figure 8 attached separately as a PDF document due to the size and detail.

Figure 8. Maximum likelihood analysis of ND4 gene mtDNA sequences, showing the placement of the Winu *Lerista* specimen (in bold text) within the current taxonomic framework of the family Scincidae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. WA Museum registration codes indicated on tree. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

Figure 9 attached separately as a PDF document due to the size and detail.

Figure 9. Maximum likelihood analysis of CYB gene mtDNA sequences, showing the placement of the Winu *Anilios* specimen (in bold text) within the current taxonomic framework of the family Typhlopidae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. WA Museum registration codes indicated on tree. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

Appendix 1. Vertebrate specimens utilized during analysis in the present study, the source of the data, and the species to which they belong.

Appendix 1 attached separately as a PDF document due to the size and detail.

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	KC489909.1	*Anilios*	*australis*	R115828	Typhlopidae	GenBank
n/a	KT316484.1	*Anilios*	*australis*	WAM-R90968	Typhlopidae	GenBank
n/a	KC489948.1	*Anilios*	*australis*	R126554	Typhlopidae	GenBank
n/a	KC489983.1	*Anilios*	*australis*	R144650	Typhlopidae	GenBank
n/a	KC489929.1	*Anilios*	*australis*	R121161	Typhlopidae	GenBank
n/a	KC489897.1	*Anilios*	*australis*	R114691	Typhlopidae	GenBank
n/a	KC490010.1	*Anilios*	*australis*	R165620	Typhlopidae	GenBank
n/a	KC489997.1	*Anilios*	*australis*	R151249	Typhlopidae	GenBank
n/a	KC489984.1	*Anilios*	*australis*	R144892	Typhlopidae	GenBank
n/a	KC489920.1	*Anilios*	*australis*	R119246	Typhlopidae	GenBank
n/a	KC489995.1	*Anilios*	*australis*	R146904	Typhlopidae	GenBank
n/a	KC490003.1	*Anilios*	*australis*	R156217	Typhlopidae	GenBank
n/a	KC490020.1	*Anilios*	*australis*	R90181	Typhlopidae	GenBank
n/a	KC489946.1	*Anilios*	*australis*	R126078	Typhlopidae	GenBank
n/a	KC490000.1	*Anilios*	*australis*	R151271	Typhlopidae	GenBank
n/a	KC489952.1	*Anilios*	*australis*	R129080	Typhlopidae	GenBank
n/a	KC490017.1	*Anilios*	*australis*	R166810	Typhlopidae	GenBank
n/a	KC489986.1	*Anilios*	*australis*	R146402	Typhlopidae	GenBank
n/a	KC489988.1	*Anilios*	*australis*	R146453	Typhlopidae	GenBank
n/a	KC490401.1	*Anilios*	*waitii*	R104279	Typhlopidae	GenBank
n/a	KT316499.1	*Anilios*	*waitii*	R166874	Typhlopidae	GenBank
n/a	KC490421.1	*Anilios*	*waitii*	R136815	Typhlopidae	GenBank
n/a	KC490409.1	*Anilios*	*waitii*	R115123	Typhlopidae	GenBank
n/a	KC490203.1	*Anilios*	*endoterus*	R102629	Typhlopidae	GenBank
n/a	KC490206.1	*Anilios*	*endoterus*	R102725	Typhlopidae	GenBank
n/a	KC490211.1	*Anilios*	*endoterus*	R137920	Typhlopidae	GenBank
n/a	KC490210.1	*Anilios*	*endoterus*	R127182	Typhlopidae	GenBank
n/a	KC490131.1	*Anilios*	*endoterus*	SAMAR36170	Typhlopidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	KC490173.1	*Anilios*	*endoterus*	SAMAR62054	Typhlopidae	GenBank
n/a	KC490176.1	*Anilios*	*endoterus*	R166254	Typhlopidae	GenBank
n/a	KC490171.1	*Anilios*	*endoterus*	R166251	Typhlopidae	GenBank
n/a	KC490130.1	*Anilios*	*endoterus*	SAMAR26787	Typhlopidae	GenBank
n/a	KC490183.1	*Anilios*	*endoterus*	R166256	Typhlopidae	GenBank
n/a	KC490160.1	*Anilios*	*endoterus*	CUMV14302	Typhlopidae	GenBank
n/a	KC490216.1	*Anilios*	*endoterus*	R156836	Typhlopidae	GenBank
n/a	KC490164.1	*Anilios*	*endoterus*	AMSR155217	Typhlopidae	GenBank
n/a	KC490154.1	*Anilios*	*endoterus*	NTMR16606	Typhlopidae	GenBank
n/a	KC490217.1	*Anilios*	*endoterus*	R164298	Typhlopidae	GenBank
n/a	JQ910627.1	*Anilios*	*pinguis*	n/a	Typhlopidae	GenBank
n/a	KT316497.1	*Anilios*	*splendidus*	R119900	Typhlopidae	GenBank
n/a	KC490058.1	*Anilios*	*bicolor*	R141277	Typhlopidae	GenBank
n/a	KC490052.1	*Anilios*	*bicolor*	R113883	Typhlopidae	GenBank
n/a	KC490053.1	*Anilios*	*bicolor*	R125641	Typhlopidae	GenBank
n/a	KC490043.1	*Anilios*	*bicolor*	SAMAR55342	Typhlopidae	GenBank
n/a	KC490048.1	*Anilios*	*bicolor*	SAMAR56557	Typhlopidae	GenBank
n/a	KC490023.1	*Anilios*	*bicolor*	SAMAR29195	Typhlopidae	GenBank
n/a	KC490062.1	*Anilios*	*bicolor*	R154460	Typhlopidae	GenBank
n/a	KC490120.1	*Anilios*	*diversus*	SAMAR51126	Typhlopidae	GenBank
n/a	KC490116.1	*Anilios*	*diversus*	QMJ85421	Typhlopidae	GenBank
n/a	KC490119.1	*Anilios*	*diversus*	NTMR35329	Typhlopidae	GenBank
n/a	KT316487.1	*Anilios*	*diversus*	R166605	Typhlopidae	GenBank
n/a	KC490121.1	*Anilios*	*diversus*	NTMR19071	Typhlopidae	GenBank
n/a	JQ910554.1	*Anilios*	*diversus*	n/a	Typhlopidae	GenBank
n/a	KC490125.1	*Anilios*	*diversus*	R157464	Typhlopidae	GenBank
n/a	JQ910574.1	*Anilios*	*guentheri*	n/a	Typhlopidae	GenBank
n/a	KT316491.1	*Anilios*	*guentheri*	WAM-R129303	Typhlopidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	JQ910575.1	*Anilios*	*guentheri*	n/a	Typhlopidae	GenBank
n/a	JQ910615.1	*Anilios*	*unguirostris*	n/a	Typhlopidae	GenBank
n/a	KC490356.1	*Anilios*	*nigrescens*	QMJ54856	Typhlopidae	GenBank
n/a	KC490349.1	*Anilios*	*nigrescens*	SAMAR31022	Typhlopidae	GenBank
n/a	KC490354.1	*Anilios*	*nigrescens*	ABTC100627	Typhlopidae	GenBank
n/a	KC490352.1	*Anilios*	*nigrescens*	ABTC03940	Typhlopidae	GenBank
n/a	KC490361.1	*Anilios*	*nigrescens*	AMSR157265	Typhlopidae	GenBank
n/a	KC490351.1	*Anilios*	*nigrescens*	SAMAR31024	Typhlopidae	GenBank
n/a	KC490350.1	*Anilios*	*nigrescens*	SAMAR31023	Typhlopidae	GenBank
n/a	KC490362.1	*Anilios*	*nigrescens*	ANWCR06776	Typhlopidae	GenBank
n/a	KC490348.1	*Anilios*	*nigrescens*	SAMAR31020	Typhlopidae	GenBank
n/a	JQ910526.1	*Anilios*	*affinis*	n/a	Typhlopidae	GenBank
n/a	KC490262.1	*Anilios*	*grypus*	R146362	Typhlopidae	GenBank
n/a	KC490269.1	*Anilios*	*grypus*	R157094	Typhlopidae	GenBank
n/a	KC490276.1	*Anilios*	*grypus*	R16123	Typhlopidae	GenBank
n/a	KC490232.1	*Anilios*	*grypus*	R110165	Typhlopidae	GenBank
n/a	KC490265.1	*Anilios*	*grypus*	R156167	Typhlopidae	GenBank
n/a	KC490275.1	*Anilios*	*grypus*	R160036	Typhlopidae	GenBank
n/a	KC490280.1	*Anilios*	*grypus*	R162150	Typhlopidae	GenBank
n/a	KC490268.1	*Anilios*	*grypus*	R157031	Typhlopidae	GenBank
n/a	KC490240.1	*Anilios*	*grypus*	R112185	Typhlopidae	GenBank
n/a	KC490286.1	*Anilios*	*grypus*	R166004	Typhlopidae	GenBank
n/a	KC490254.1	*Anilios*	*grypus*	R135313	Typhlopidae	GenBank
n/a	KC490233.1	*Anilios*	*grypus*	R110221	Typhlopidae	GenBank
n/a	KC490289.1	*Anilios*	*grypus*	R170781	Typhlopidae	GenBank
n/a	KC490283.1	*Anilios*	*grypus*	R162738	Typhlopidae	GenBank
n/a	KC490281.1	*Anilios*	*grypus*	R162224	Typhlopidae	GenBank
n/a	KC490249.1	*Anilios*	*grypus*	R127774	Typhlopidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	KC490271.1	*Anilios*	*grypus*	R157297	Typhlopidae	GenBank
n/a	KC490267.1	*Anilios*	*grypus*	R156473	Typhlopidae	GenBank
n/a	KC490244.1	*Anilios*	*grypus*	R114908	Typhlopidae	GenBank
n/a	KC490258.1	*Anilios*	*grypus*	R135918	Typhlopidae	GenBank
n/a	KC490279.1	*Anilios*	*grypus*	R161483	Typhlopidae	GenBank
n/a	KC490224.1	*Anilios*	*grypus*	SAMAR55460	Typhlopidae	GenBank
n/a	KC490221.1	*Anilios*	*grypus*	SAMAR45005	Typhlopidae	GenBank
n/a	JQ910565.1	*Anilios*	*grypus*	n/a	Typhlopidae	GenBank
n/a	KC490363.1	*Anilios*	*pilbarensis*	R90643	Typhlopidae	GenBank
n/a	KC490379.1	*Anilios*	*pilbarensis*	R139141	Typhlopidae	GenBank
n/a	KC490382.1	*Anilios*	*pilbarensis*	R139400	Typhlopidae	GenBank
n/a	KC490388.1	*Anilios*	*pilbarensis*	R160167	Typhlopidae	GenBank
n/a	KC490384.1	*Anilios*	*pilbarensis*	R141303	Typhlopidae	GenBank
n/a	KC490113.1	*Anilios*	*centralis*	NTMR14361	Typhlopidae	GenBank
n/a	KC490115.1	*Anilios*	*centralis*	SAMAR51244	Typhlopidae	GenBank
n/a	KC490324.1	*Anilios*	*hamatus*	R157986	Typhlopidae	GenBank
n/a	KC490294.1	*Anilios*	*hamatus*	R110954	Typhlopidae	GenBank
n/a	KC490298.1	*Anilios*	*hamatus*	R111744	Typhlopidae	GenBank
n/a	KC490325.1	*Anilios*	*hamatus*	R162241	Typhlopidae	GenBank
n/a	KC490303.1	*Anilios*	*hamatus*	R112742	Typhlopidae	GenBank
n/a	KC490305.1	*Anilios*	*hamatus*	R120654	Typhlopidae	GenBank
n/a	KC490318.1	*Anilios*	*hamatus*	R137443	Typhlopidae	GenBank
n/a	KC489843.1	*Anilios*	*ammodytes*	R154251	Typhlopidae	GenBank
n/a	KC489877.1	*Anilios*	*ammodytes*	R170832	Typhlopidae	GenBank
n/a	KC489832.1	*Anilios*	*ammodytes*	R145609	Typhlopidae	GenBank
n/a	KC489827.1	*Anilios*	*ammodytes*	R139373	Typhlopidae	GenBank
n/a	KC489840.1	*Anilios*	*ammodytes*	R146623	Typhlopidae	GenBank
n/a	KC489826.1	*Anilios*	*ammodytes*	R135908	Typhlopidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	KC489858.1	*Anilios*	*ammodytes*	R160859	Typhlopidae	GenBank
n/a	KC489881.1	*Anilios*	*ammodytes*	R99362	Typhlopidae	GenBank
n/a	KC489833.1	*Anilios*	*ammodytes*	R145620	Typhlopidae	GenBank
n/a	KC489836.1	*Anilios*	*ammodytes*	R146546	Typhlopidae	GenBank
n/a	KC489875.1	*Anilios*	*ammodytes*	R166638	Typhlopidae	GenBank
n/a	KC489800.1	*Anilios*	*ammodytes*	R102560	Typhlopidae	GenBank
n/a	KC489876.1	*Anilios*	*ammodytes*	R170620	Typhlopidae	GenBank
n/a	KC489864.1	*Anilios*	*ammodytes*	R162018	Typhlopidae	GenBank
n/a	KC489871.1	*Anilios*	*ammodytes*	R165285	Typhlopidae	GenBank
n/a	JQ910525.2	*Anilios*	*longissimus*	n/a	Typhlopidae	GenBank
n/a	KC490345.1	*Anilios*	*leptosomus*	R146456	Typhlopidae	GenBank
n/a	KC490342.1	*Anilios*	*leptosomus*	R125963	Typhlopidae	GenBank
n/a	KC490341.1	*Anilios*	*leptosomus*	R114893	Typhlopidae	GenBank
n/a	KC490343.1	*Anilios*	*leptosomus*	R146400	Typhlopidae	GenBank
n/a	KC490432.1	*Anilios*	*wiedii*	QMJ59020	Typhlopidae	GenBank
n/a	JQ910621.1	*Anilios*	*wiedii*	n/a	Typhlopidae	GenBank
n/a	KC490336.1	*Anilios*	*kimberleyensis*	R158055	Typhlopidae	GenBank
n/a	KC490335.1	*Anilios*	*kimberleyensis*	R133193	Typhlopidae	GenBank
n/a	KT316498.1	*Anilios*	*troglodytes*	R146051	Typhlopidae	GenBank
n/a	KT316493.1	*Anilios*	*howi*	R146381	Typhlopidae	GenBank
n/a	KC490347.1	*Anilios*	*ligatus*	R137954	Typhlopidae	GenBank
n/a	KT316495.1	*Anilios*	*ligatus*	R141065	Typhlopidae	GenBank
n/a	KC490337.1	*Anilios*	*kimberleyensis*	R164213	Typhlopidae	GenBank
n/a	KC490338.1	*Anilios*	*kimberleyensis*	R165886	Typhlopidae	GenBank
n/a	KC490396.1	*Anilios*	*proximus*	AMSR132486	Typhlopidae	GenBank
n/a	KC490395.1	*Anilios*	*proximus*	SAMAR22713	Typhlopidae	GenBank
n/a	KC490394.1	*Anilios*	*proximus*	ABTC100639	Typhlopidae	GenBank
n/a	KC490397.1	*Anilios*	*proximus*	AMSR132486.2	Typhlopidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	JQ910563.1	*Anilios*	*ganei*	n/a	Typhlopidae	GenBank
n/a	KT316489.1	*Anilios*	*ganei*	R165000	Typhlopidae	GenBank
n/a	JQ910597.1	*Anilios*	*ligatus*	n/a	Typhlopidae	GenBank
n/a	KC490065.1	*Anilios*	*bituberculatus*	SAMAR39658	Typhlopidae	GenBank
n/a	KC490098.1	*Anilios*	*bituberculatus*	AMSR161792	Typhlopidae	GenBank
n/a	KC490072.1	*Anilios*	*bituberculatus*	SAMAR51005	Typhlopidae	GenBank
n/a	KC490095.1	*Anilios*	*bituberculatus*	AMSR143548	Typhlopidae	GenBank
n/a	KC490067.1	*Anilios*	*bituberculatus*	SAMAR46448	Typhlopidae	GenBank
n/a	KC490069.1	*Anilios*	*bituberculatus*	SAMAR47286	Typhlopidae	GenBank
n/a	KC490083.1	*Anilios*	*bituberculatus*	SAMAR28385	Typhlopidae	GenBank
n/a	KC490079.1	*Anilios*	*bituberculatus*	SAMAR20806	Typhlopidae	GenBank
n/a	KC490076.1	*Anilios*	*bituberculatus*	SAMAR40911	Typhlopidae	GenBank
n/a	KC490112.1	*Anilios*	*bituberculatus*	SAMAR62693	Typhlopidae	GenBank
n/a	KC490399.2	*Anilios*	*unguirostris*	R151036	Typhlopidae	GenBank
PQ10	n/a	*Anilios*	*endoterus*	n/a	Typhlopidae	this study
n/a	KJ868097.1:	*Antechinomys*	*laniger*	ABTC35188	Dasyuridae	GenBank
n/a	EF011636.1	*Antechinus*	*godmani*	n/a	Dasyuridae	GenBank
n/a	EF011636.1	*Antechinus*	*godmani*	n/a	Dasyuridae	GenBank
n/a	GQ397210.1	*Aspidomorphus*	*schlegeli*	16304	Elapidae	GenBank
n/a	GQ397169.1	*Aspidomorphus*	*schlegeli*	n/a	Elapidae	GenBank
n/a	KC493653.1	*Austrotyphlops*	*silvia*	QMJ46128	Typhlopidae	GenBank
n/a	EU547007.1	*Cacophis*	*squamulosus*	n/a	Elapidae	GenBank
n/a	EU547052.1	*Cacophis*	*squamulosus*	n/a	Elapidae	GenBank
n/a	KJ504860.1	*Ctenotus*	*robustus*	SAMAR48684	Scincidae	GenBank
n/a	EU086652.1	*Dasycercus*	*cristicauda*	n/a	Dasyuridae	GenBank
n/a	AY528916.1	*Dasycercus*	*cristicauda*	n/a	Dasyuridae	GenBank
n/a	KJ868107.1	*Dasycercus*	*cristicauda*	ABTC38342	Dasyuridae	GenBank
n/a	AY528921.1	*Dasyurus*	*geoffroii*	n/a	Dasyuridae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	AY528918.1	*Dasyurus*	*maculatus*	n/a	Dasyuridae	GenBank
n/a	EU547003.1	*Demansia*	*vestigiata*	n/a	Elapidae	GenBank
n/a	EU547002.1	*Demansia*	*papuensis*	n/a	Elapidae	GenBank
n/a	GQ397209.1	*Demansia*	*psammophis*	3389	Elapidae	GenBank
PQ11	n/a	*Demansia*	*calodera*	n/a	Elapidae	this study
PQ14	n/a	*Demansia*	*augusticeps*	168487	Elapidae	this study & WAM
PQ15	n/a	*Demansia*	*augusticeps*	156732	Elapidae	this study & WAM
PQ16	n/a	*Demansia*	*calodera*	165700	Elapidae	this study & WAM
PQ17	n/a	*Demansia*	*calodera*	126915	Elapidae	this study & WAM
PQ18	n/a	*Demansia*	*calodera*	123650	Elapidae	this study & WAM
PQ19	n/a	*Demansia*	*papuensis*	163583	Elapidae	this study & WAM
n/a	AY058966.1	*Demansia*	*atra*	n/a	Elapidae	GenBank
n/a	GQ397172.1	*Demansia*	*psammophis*	n/a	Elapidae	GenBank
n/a	EU547044.1	*Demansia*	*papuensis*	n/a	Elapidae	GenBank
n/a	EU547045.1	*Demansia*	*vestigiata*	n/a	Elapidae	GenBank
n/a	EU547009.1	*Furina*	*ornata*	n/a	Elapidae	GenBank
n/a	EU547054.1	*Furina*	*ornata*	n/a	Elapidae	GenBank
n/a	KM603499.1	*Hydromys*	*chrysogaster*	QMA005673	Muridae	GenBank
n/a	FJ593191.1	*Laticauda*	*laticaudata*	EBU13932	Elapidae	GenBank
n/a	FJ587153.1	*Laticauda*	*laticaudata*	n/a	Elapidae	GenBank
n/a	MH643584.1	*Lerista*	*sp.*	QMJ95806	Scincidae	GenBank
n/a	MH643583.1	*Lerista*	*sp.*	QMJ95792	Scincidae	GenBank
n/a	MH643582.1	*Lerista*	*sp.*	QMJ95787	Scincidae	GenBank
n/a	MH643581.1	*Lerista*	*sp.*	QMJ95783	Scincidae	GenBank
n/a	MH643579.1	*Lerista*	*sp.*	QMJ94337	Scincidae	GenBank
n/a	MH643578.1	*Lerista*	*sp.*	QMJ94312	Scincidae	GenBank
n/a	MH643577.1	*Lerista*	*sp.*	QMJ94309	Scincidae	GenBank
n/a	MH643576.1	*Lerista*	*sp.*	QMJ94308	Scincidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	MH643575.1	*Lerista*	*sp.*	QMJ94306	Scincidae	GenBank
n/a	MH643574.1	*Lerista*	*sp.*	QMJ95798	Scincidae	GenBank
n/a	KU309302.1	*Lerista*	*vanderduysi*	n/a	Scincidae	GenBank
n/a	KU309297.1	*Lerista*	*hobsoni*	n/a	Scincidae	GenBank
n/a	MK140647.1	*Lerista*	*anyara*	QMJ95773	Scincidae	GenBank
n/a	MK140646.1	*Lerista*	*anyara*	QMJ95666	Scincidae	GenBank
n/a	MK140645.1	*Lerista*	*anyara*	QMJ95663	Scincidae	GenBank
n/a	MK140644.1	*Lerista*	*anyara*	QMJ95659	Scincidae	GenBank
n/a	MK140643.1	*Lerista*	*anyara*	QMJ94490	Scincidae	GenBank
n/a	MH643586.1	*Lerista*	*storri*	QMJ94333	Scincidae	GenBank
n/a	MH643585.1	*Lerista*	*storri*	QMJ94325	Scincidae	GenBank
n/a	MH643580.1	*Lerista*	*colliveri*	QMJ95429	Scincidae	GenBank
n/a	AY169667.1	*Lerista*	*bougainvillii*	n/a	Scincidae	GenBank
n/a	MF589222.1	*Lerista*	*rochfordensis*	QMJ93694	Scincidae	GenBank
n/a	MF589221.1	*Lerista*	*rochfordensis*	QMJ93693	Scincidae	GenBank
n/a	MF589220.1	*Lerista*	*rochfordensis*	QMJ93692	Scincidae	GenBank
n/a	MF589219.1	*Lerista*	*rochfordensis*	QMJ93704	Scincidae	GenBank
n/a	MF589218.1	*Lerista*	*rochfordensis*	QMJ93703	Scincidae	GenBank
n/a	MF589217.1	*Lerista*	*rochfordensis*	QMJ93702	Scincidae	GenBank
n/a	MF589216.1	*Lerista*	*rochfordensis*	QMJ93701	Scincidae	GenBank
n/a	MF589215.1	*Lerista*	*rochfordensis*	QMJ93700	Scincidae	GenBank
n/a	MF589214.1	*Lerista*	*rochfordensis*	QMJ93699	Scincidae	GenBank
n/a	MF589213.1	*Lerista*	*rochfordensis*	QMJ93698	Scincidae	GenBank
n/a	MF589212.1	*Lerista*	*rochfordensis*	QMJ93697	Scincidae	GenBank
n/a	MF959818.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	MF959817.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	MF959816.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	MF959815.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	MF959814.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	MF959813.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	MF959812.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	MF959811.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	MF959810.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	MF959809.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	MF959808.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	KU309310.1	*Lerista*	*wilkinsi*	n/a	Scincidae	GenBank
n/a	KU309309.1	*Lerista*	*wilkinsi*	n/a	Scincidae	GenBank
n/a	KU309308.1	*Lerista*	*wilkinsi*	n/a	Scincidae	GenBank
n/a	KU309307.1	*Lerista*	*wilkinsi*	n/a	Scincidae	GenBank
n/a	KU309306.1	*Lerista*	*vittata*	n/a	Scincidae	GenBank
n/a	KU309305.1	*Lerista*	*vittata*	n/a	Scincidae	GenBank
n/a	KU309304.1	*Lerista*	*vittata*	n/a	Scincidae	GenBank
n/a	KU309303.1	*Lerista*	*vittata*	n/a	Scincidae	GenBank
n/a	KU309301.1	*Lerista*	*vanderduysi*	n/a	Scincidae	GenBank
n/a	KU309300.1	*Lerista*	*storri*	n/a	Scincidae	GenBank
n/a	KU309299.1	*Lerista*	*rochfordensis*	n/a	Scincidae	GenBank
n/a	KU309298.1	*Lerista*	*rochfordensis*	n/a	Scincidae	GenBank
n/a	KU309296.1	*Lerista*	*hobsoni*	n/a	Scincidae	GenBank
n/a	KU309295.1	*Lerista*	*hobsoni*	n/a	Scincidae	GenBank
n/a	KU309294.1	*Lerista*	*colliveri*	n/a	Scincidae	GenBank
n/a	KU309293.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309292.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309291.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309290.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309289.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309288.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	KU309287.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309286.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309285.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309284.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309283.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309282.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309281.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309280.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309279.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309278.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	KU309277.1	*Lerista*	*ameles*	n/a	Scincidae	GenBank
n/a	KU309276.1	*Lerista*	*ameles*	n/a	Scincidae	GenBank
n/a	KU309275.1	*Lerista*	*ameles*	n/a	Scincidae	GenBank
n/a	KU309274.1	*Lerista*	*ameles*	n/a	Scincidae	GenBank
n/a	KU309273.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	KU309272.1	*Lerista*	*allanae*	n/a	Scincidae	GenBank
n/a	KF823006.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF823005.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF823007.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF823004.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF823003.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF823002.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF823001.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF823000.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF822999.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF822998.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	KF822997.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	EF673035.1	*Lerista*	*zietzi*	n/a	Scincidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	EF673036.1	*Lerista*	*zonulata*	n/a	Scincidae	GenBank
n/a	EF673034.1	*Lerista*	*yuna*	n/a	Scincidae	GenBank
n/a	EF673033.1	*Lerista*	*xanthura*	n/a	Scincidae	GenBank
n/a	EF673032.1	*Lerista*	*wilkinsi*	n/a	Scincidae	GenBank
n/a	EF673031.1	*Lerista*	*walkeri*	n/a	Scincidae	GenBank
n/a	EF673030.1	*Lerista*	*viduata*	n/a	Scincidae	GenBank
n/a	EF673029.1	*Lerista*	*vermicularis*	n/a	Scincidae	GenBank
n/a	EF673028.1	*Lerista*	*varia*	n/a	Scincidae	GenBank
n/a	EF673027.1	*Lerista*	*uniduo*	n/a	Scincidae	GenBank
n/a	EF673026.1	*Lerista*	*tridactyla*	n/a	Scincidae	GenBank
n/a	EF673025.1	*Lerista*	*terdigitata*	n/a	Scincidae	GenBank
n/a	EF673024.1	*Lerista*	*taeniata*	n/a	Scincidae	GenBank
n/a	EF673023.1	*Lerista*	*stylis*	n/a	Scincidae	GenBank
n/a	EF673022.1	*Lerista*	*stictopleura*	n/a	Scincidae	GenBank
n/a	EF673021.1	*Lerista*	*chordae*	n/a	Scincidae	GenBank
n/a	EF673020.1	*Lerista*	*speciosa*	n/a	Scincidae	GenBank
n/a	EF673019.1	*Lerista*	*simillima*	n/a	Scincidae	GenBank
n/a	EF673018.1	*Lerista*	*robusta*	n/a	Scincidae	GenBank
n/a	EF673017.1	*Lerista*	*puncticauda*	n/a	Scincidae	GenBank
n/a	EF673016.1	*Lerista*	*punctatovittata*	n/a	Scincidae	GenBank
n/a	EF673015.1	*Lerista*	*praepedita*	n/a	Scincidae	GenBank
n/a	EF673014.1	*Lerista*	*planiventralis*	n/a	Scincidae	GenBank
n/a	EF673013.1	*Lerista*	*picturata*	n/a	Scincidae	GenBank
n/a	EF673012.1	*Lerista*	*petersoni*	n/a	Scincidae	GenBank
n/a	EF673011.1	*Lerista*	*orientalis*	n/a	Scincidae	GenBank
n/a	EF673010.1	*Lerista*	*onsloviana*	n/a	Scincidae	GenBank
n/a	EF673009.1	*Lerista*	*nichollsi*	n/a	Scincidae	GenBank
n/a	EF673008.1	*Lerista*	*neander*	n/a	Scincidae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	EF673007.1	*Lerista*	*muelleri*	n/a	Scincidae	GenBank
n/a	EF673006.1	*Lerista*	*microtis*	n/a	Scincidae	GenBank
n/a	EF673005.1	*Lerista*	*macropisthopus*	n/a	Scincidae	GenBank
n/a	EF673004.1	*Lerista*	*lineopunctulata*	n/a	Scincidae	GenBank
n/a	EF673003.1	*Lerista*	*lineata*	n/a	Scincidae	GenBank
n/a	EF673002.1	*Lerista*	*labialis*	n/a	Scincidae	GenBank
n/a	EF673001.1	*Lerista*	*kennedyensis*	n/a	Scincidae	GenBank
n/a	EF673000.1	*Lerista*	*kendricki*	n/a	Scincidae	GenBank
n/a	EF672999.1	*Lerista*	*karlschmidti*	n/a	Scincidae	GenBank
n/a	EF672998.1	*Lerista*	*kalumburu*	n/a	Scincidae	GenBank
n/a	EF672997.1	*Lerista*	*ips*	n/a	Scincidae	GenBank
n/a	EF672996.1	*Lerista*	*ingrami*	n/a	Scincidae	GenBank
n/a	EF672995.1	*Lerista*	*humphriesi*	n/a	Scincidae	GenBank
n/a	EF672994.1	*Lerista*	*haroldi*	n/a	Scincidae	GenBank
n/a	EF672993.1	*Lerista*	*griffini*	n/a	Scincidae	GenBank
n/a	EF672992.1	*Lerista*	*greeri*	n/a	Scincidae	GenBank
n/a	EF672991.1	*Lerista*	*gerrardii*	n/a	Scincidae	GenBank
n/a	EF672990.1	*Lerista*	*gascoynensis*	n/a	Scincidae	GenBank
n/a	EF672989.1	*Lerista*	*frosti*	n/a	Scincidae	GenBank
n/a	EF672988.1	*Lerista*	*fragilis*	n/a	Scincidae	GenBank
n/a	EF672987.1	*Lerista*	*flammicauda*	n/a	Scincidae	GenBank
n/a	EF672986.1	*Lerista*	*eupoda*	n/a	Scincidae	GenBank
n/a	EF672985.1	*Lerista*	*emmotti*	n/a	Scincidae	GenBank
n/a	EF672984.1	*Lerista*	*elongata*	n/a	Scincidae	GenBank
n/a	EF672983.1	*Lerista*	*elegans*	n/a	Scincidae	GenBank
n/a	EF672982.1	*Lerista*	*edwardsae*	n/a	Scincidae	GenBank
n/a	EF672981.1	*Lerista*	*dorsalis*	n/a	Scincidae	GenBank
n/a	EF672980.1	*Lerista*	*distinguenda*	n/a	Scincidae	GenBank

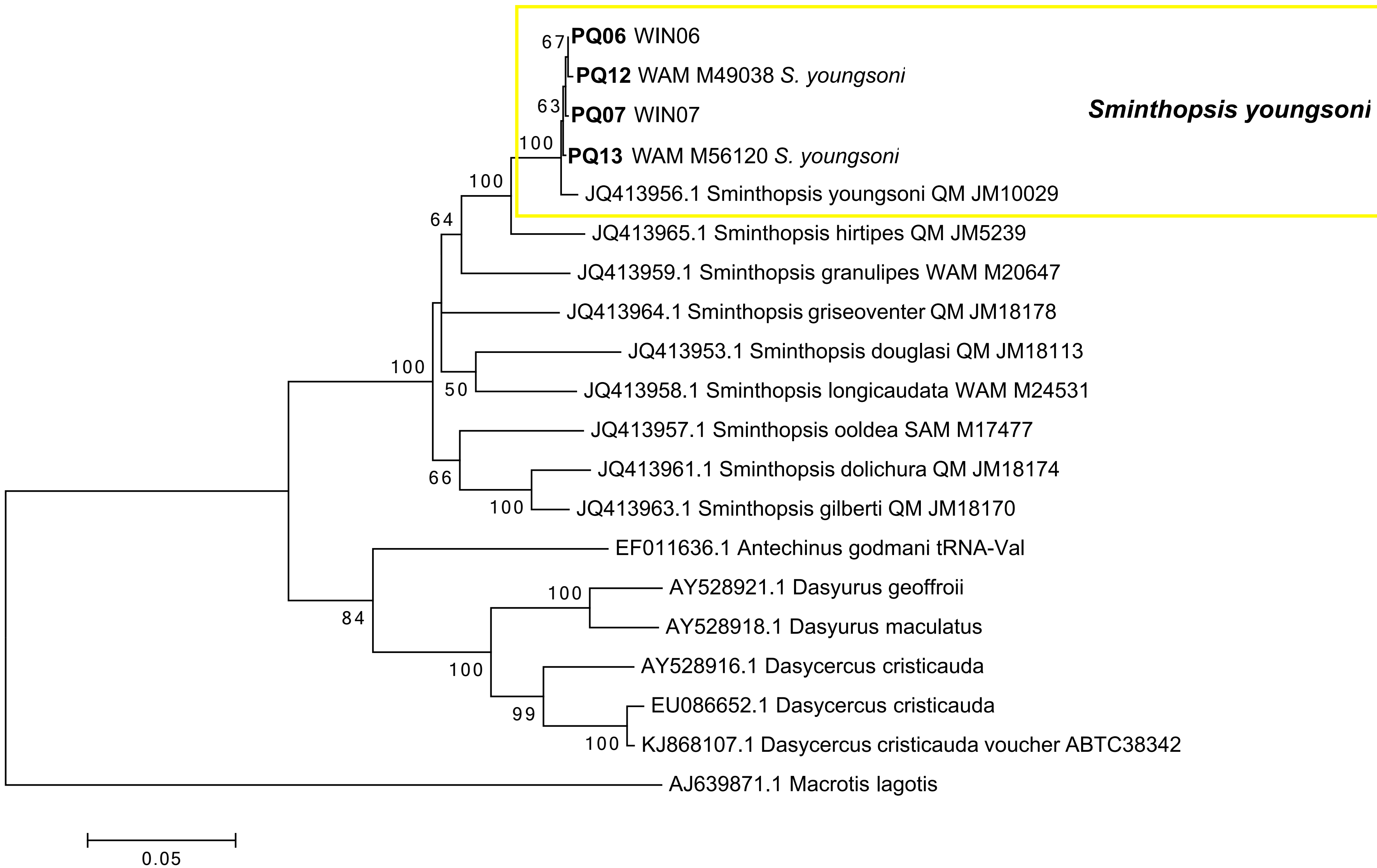
Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	EF672979.1	*Lerista*	*desertorum*	n/a	Scincidae	GenBank
n/a	EF672978.1	*Lerista*	*connivens*	n/a	Scincidae	GenBank
n/a	EF672977.1	*Lerista*	*cinerea*	n/a	Scincidae	GenBank
n/a	EF672976.1	*Lerista*	*christinae*	n/a	Scincidae	GenBank
n/a	EF672975.1	*Lerista*	*carpentariae*	n/a	Scincidae	GenBank
n/a	EF672974.1	*Lerista*	*borealis*	n/a	Scincidae	GenBank
n/a	EF672973.1	*Lerista*	*bipes*	n/a	Scincidae	GenBank
n/a	EF672972.1	*Lerista*	*baynesi*	n/a	Scincidae	GenBank
n/a	EF672971.1	*Lerista*	*axillaris*	n/a	Scincidae	GenBank
n/a	EF672970.1	*Lerista*	*arenicola*	n/a	Scincidae	GenBank
n/a	EF672969.1	*Lerista*	*apoda*	n/a	Scincidae	GenBank
n/a	EF672968.1	*Lerista*	*ameles*	n/a	Scincidae	GenBank
n/a	EF672967.1	*Lerista*	*allochira*	n/a	Scincidae	GenBank
n/a	EF672966.1	*Lerista*	*aericeps*	n/a	Scincidae	GenBank
n/a	DQ915332.1	*Lerista*	*bougainvillii*	n/a	Scincidae	GenBank
n/a	DQ915331.1	*Lerista*	*bipes*	n/a	Scincidae	GenBank
n/a	AY169666.1	*Lerista*	*bipes*	n/a	Scincidae	GenBank
n/a	EU109216.1	*Lerista*	*macropisthopus*	n/a	Scincidae	GenBank
PQ09	n/a	*Lerista*	*separanda*	n/a	Scincidae	this study
PQ20	n/a	*Lerista*	*separanda*	163965	Scincidae	this study & WAM
PQ21	n/a	*Lerista*	*separanda*	163487	Scincidae	this study & WAM
n/a	AJ639871.1	*Macrotis*	*lagotis*		Dasyuridae	GenBank
n/a	AJ639871.1	*Macrotis*	*lagotis*	n/a	Dasyuridae	GenBank
n/a	KJ868131.1	*Ningaui*	*ridei*	ABTC73461	Dasyuridae	GenBank
n/a	JQ413968.1	*Ningaui*	*ridei*	n/a	Dasyuridae	GenBank
n/a	JQ413967.1	*Ningaui*	*yvonnae*	n/a	Dasyuridae	GenBank
n/a	KX034160.1	*Ningaui*	*sp.*	n/a	Dasyuridae	GenBank
n/a	JQ413969.1	*Ningaui*	*timealeyi*	M29385	Dasyuridae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
PQ08	n/a	*Ningaui*	*ridei*	n/a	Dasyuridae	this study
n/a	AY176318.1	*Notomys*	*alexis*	n/a	Muridae	GenBank
n/a	MH741771.1	*Notomys*	*mitchellii*	27066	Muridae	GenBank
n/a	MH741770.1	*Notomys*	*mitchellii*	7351	Muridae	GenBank
n/a	MH741769.1	*Notomys*	*fuscus*	80277	Muridae	GenBank
n/a	MH741768.1	*Notomys*	*fuscus*	117695	Muridae	GenBank
n/a	MH741767.1	*Notomys*	*cervinus*	82963	Muridae	GenBank
n/a	MH741766.1	*Notomys*	*aquilo*	18253	Muridae	GenBank
n/a	MH741765.1	*Notomys*	*aquilo*	18252	Muridae	GenBank
n/a	MH741764.1	*Notomys*	*alexis*	Z21353	Muridae	GenBank
n/a	MH741763.1	*Notomys*	*alexis*	Z11075	Muridae	GenBank
n/a	MH741762.1	*Notomys*	*alexis*	63047	Muridae	GenBank
n/a	MH741761.1	*Notomys*	*alexis*	61767	Muridae	GenBank
n/a	KY754073.1	*Notomys*	*fuscus*		Muridae	GenBank
n/a	EU349768.1	*Notomys*	*fuscus*	34070	Muridae	GenBank
PQ04	n/a	*Notomys*	*alexis*	n/a	Muridae	this study
n/a	KX034155.1	*Planigale*	*maculata*	QMJM1486/1487	Dasyuridae	GenBank
n/a	KX034151.1	*Planigale*	*maculata*	WAMM22667	Dasyuridae	GenBank
n/a	KX034140.1	*Planigale*	*maculata*	n/a	Dasyuridae	GenBank
n/a	KX034159.1	*Planigale*	*ingrami*	JM18681	Dasyuridae	GenBank
n/a	KX034157.1	*Planigale*	*tenuirostris*	17886/17887	Dasyuridae	GenBank
n/a	KX034152.1	*Planigale*	*sp.*	WAMM43137	Dasyuridae	GenBank
n/a	KX034148.1	*Planigale*	*sp.*	WAM28097	Dasyuridae	GenBank
n/a	KX034147.1	*Planigale*	*sp.*	WAM26905	Dasyuridae	GenBank
n/a	KX034146.1	*Planigale*	*sp.*	FCATALOG	Dasyuridae	GenBank
n/a	KX034143.1	*Planigale*	*gilesi*	ABTC7576	Dasyuridae	GenBank
n/a	KX034142.1	*Planigale*	*sp.*	WAM47329	Dasyuridae	GenBank
n/a	JQ413970.1	*Planigale*	*maculata*	JM1486/1487	Dasyuridae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	JQ413971.1	*Planigale*	*ingrami*	JM18677	Dasyuridae	GenBank
PQ05	n/a	*Planigale*	*ingrami*	n/a	Dasyuridae	this study
n/a	MH741810.1	*Pseudomys*	*johnsoni*	30351	Muridae	GenBank
n/a	MH741809.1	*Pseudomys*	*johnsoni*	84990	Muridae	GenBank
n/a	MH741808.1	*Pseudomys*	*johnsoni*	8055	Muridae	GenBank
n/a	MH741807.1	*Pseudomys*	*higginsi*	8139	Muridae	GenBank
n/a	MH741802.1	*Pseudomys*	*fumeus*	Z25963	Muridae	GenBank
n/a	MH741803.1	*Pseudomys*	*gracilicaudatus*	8031	Muridae	GenBank
n/a	MH741800.1	*Pseudomys*	*fumeus*	Z22890	Muridae	GenBank
n/a	MH741801.1	*Pseudomys*	*fumeus*	Z25138	Muridae	GenBank
n/a	MH741799.1	*Pseudomys*	*fumeus*	8169	Muridae	GenBank
n/a	MH741798.1	*Pseudomys*	*fumeus*	816	Muridae	GenBank
n/a	MH741797.1	*Pseudomys*	*fieldi*	8164	Muridae	GenBank
n/a	MH741796.1	*Pseudomys*	*fieldi*	M56289	Muridae	GenBank
n/a	MH741795.1	*Pseudomys*	*fieldi*	M53674	Muridae	GenBank
n/a	MH741794.1	*Pseudomys*	*fieldi*	M53673	Muridae	GenBank
n/a	MH741790.1	*Pseudomys*	*delicatulus*	M55250	Muridae	GenBank
n/a	MH741791.1	*Pseudomys*	*delicatulus*	Z18879	Muridae	GenBank
n/a	MH741789.1	*Pseudomys*	*delicatulus*	M53733	Muridae	GenBank
n/a	MH741788.1	*Pseudomys*	*delicatulus*	72733	Muridae	GenBank
n/a	MH741787.1	*Pseudomys*	*delicatulus*	62035	Muridae	GenBank
n/a	MH741786.1	*Pseudomys*	*delicatulus*	41185	Muridae	GenBank
n/a	MH741826.1	*Pseudomys*	*shortridgei*	Z25113	Muridae	GenBank
n/a	MH741825.1	*Pseudomys*	*shortridgei*	Z24891	Muridae	GenBank
n/a	MH741824.1	*Pseudomys*	*shortridgei*	8079	Muridae	GenBank
n/a	MH741823.1	*Pseudomys*	*patrius*	32211	Muridae	GenBank
n/a	MH741822.1	*Pseudomys*	*patrius*	32205	Muridae	GenBank
n/a	MH741821.1	*Pseudomys*	*oralis*	KR149	Muridae	GenBank

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
n/a	MH741820.1	*Pseudomys*	*oralis*	KR122	Muridae	GenBank
n/a	MH741819.1	*Pseudomys*	*oralis*	KR034	Muridae	GenBank
n/a	MH741818.1	*Pseudomys*	*oralis*	KR033	Muridae	GenBank
n/a	MH741817.1	*Pseudomys*	*oralis*	KR013	Muridae	GenBank
n/a	MH741816.1	*Pseudomys*	*occidentalis*	8144	Muridae	GenBank
n/a	MH741815.1	*Pseudomys*	*occidentalis*	8042	Muridae	GenBank
n/a	MH741814.1	*Pseudomys*	*novaehollandiae*	75991	Muridae	GenBank
n/a	MH741813.1	*Pseudomys*	*novaehollandiae*	8140	Muridae	GenBank
n/a	MH741785.1	*Pseudomys*	*delicatulus*	30016	Muridae	GenBank
n/a	MH741782.1	*Pseudomys*	*bolami*	96553	Muridae	GenBank
n/a	MH741781.1	*Pseudomys*	*bolami*	8065	Muridae	GenBank
n/a	MH741778.1	*Pseudomys*	*apodemoides*	Z7296	Muridae	GenBank
n/a	MH741777.1	*Pseudomys*	*apodemoides*	37663	Muridae	GenBank
n/a	MH741776.1	*Pseudomys*	*albocinereus*	8091	Muridae	GenBank
n/a	MH741775.1	*Pseudomys*	*albocinereus*	8044	Muridae	GenBank
n/a	MH741805.1	*Pseudomys*	*hermannsburgensis*	91375	Muridae	GenBank
n/a	MH741804.1	*Pseudomys*	*hermannsburgensis*	65589	Muridae	GenBank
n/a	MH741806.1	*Pseudomys*	*hermannsburgensis*	Z1100	Muridae	GenBank
n/a	MH741811.1	*Pseudomys*	*nanus*	8056	Muridae	GenBank
n/a	MH741812.1	*Pseudomys*	*nanus*	30578	Muridae	GenBank
n/a	MH741793.1	*Pseudomys*	*desertor*	Z21274	Muridae	GenBank
n/a	MH741792.1	*Pseudomys*	*desertor*	113870	Muridae	GenBank
n/a	MH741784.1	*Pseudomys*	*chapmani*	M40577	Muridae	GenBank
n/a	MH741780.1	*Pseudomys*	*australis*	35951	Muridae	GenBank
n/a	MH741783.1	*Pseudomys*	*chapmani*	62178	Muridae	GenBank
n/a	MH741779.1	*Pseudomys*	*australis*	118844	Muridae	GenBank
PQ01	n/a	*Pseudomys*	*hermannsburgensis*	n/a	Muridae	this study
PQ02	n/a	*Pseudomys*	*hermannsburgensis*	n/a	Muridae	this study

Helix ID	GenBank Acession No	Genus	Species	Voucher Source	Family	Source
PQ03	n/a	*Pseudomys*	*desertor*	n/a	Muridae	this study
	KT316550.1	*Ramphotyphlops*	*lineatus*	MVZ239633	Typhlopidae	GenBank
n/a	HM217740.1	*Rattus*	*rattus*	T0841	Muridae	GenBank
n/a	HM217740.1	*Rattus*	*rattus*	T0841	Muridae	GenBank
n/a	JQ413961.1	*Sminthopsis*	*dolichura*	JM18174	Dasyuridae	GenBank
n/a	JQ413953.1	*Sminthopsis*	*douglasi*	JM18113	Dasyuridae	GenBank
n/a	JQ413963.1	*Sminthopsis*	*gilberti*	JM18170	Dasyuridae	GenBank
n/a	JQ413959.1	*Sminthopsis*	*granulipes*	M20647	Dasyuridae	GenBank
n/a	JQ413964.1	*Sminthopsis*	*griseoventer*	JM18178	Dasyuridae	GenBank
n/a	JQ413965.1	*Sminthopsis*	*hirtipes*	JM5239	Dasyuridae	GenBank
n/a	JQ413958.1	*Sminthopsis*	*longicaudata*	M24531	Dasyuridae	GenBank
n/a	JQ413957.1	*Sminthopsis*	*ooldea*	M17477	Dasyuridae	GenBank
n/a	JQ413956.1	*Sminthopsis*	*youngsoni*	JM10029	Dasyuridae	GenBank
PQ06	n/a	*Sminthopsis*	*youngsoni*	n/a	Dasyuridae	this study
PQ07	n/a	*Sminthopsis*	*youngsoni*	n/a	Dasyuridae	this study
PQ12	n/a	*Sminthopsis*	*youngsoni*	49038	Dasyuridae	this study & WAM
PQ13	n/a	*Sminthopsis*	*youngsoni*	56120	Dasyuridae	this study & WAM
n/a	JQ413959.1	*Sminthopsis*	*granulipes*	M20647	Dasyuridae	GenBank
n/a	EU349792.1	*Zyzomys*	*argurus*	7908	Muridae	GenBank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JQ413964.1 Sminthopsis griseoventer QM JM18178
JQ413953.1 Sminthopsis douglasi QM JM18113
JQ413958.1 Sminthopsis longicaudata WAM M24531
JQ413957.1 Sminthopsis ooldea SAM M17477
JQ413961.1 Sminthopsis dolichura QM JM18174
JQ413963.1 Sminthopsis gilberti QM JM18170
EF011636.1 Antechinus godmani tRNA-Val
AY528921.1 Dasyurus geoffroii
AY528918.1 Dasyurus maculatus
AY528916.1 Dasycercus cristicauda
EU086652.1 Dasycercus cristicauda
KJ868107.1 Dasycercus cristicauda voucher ABTC38342
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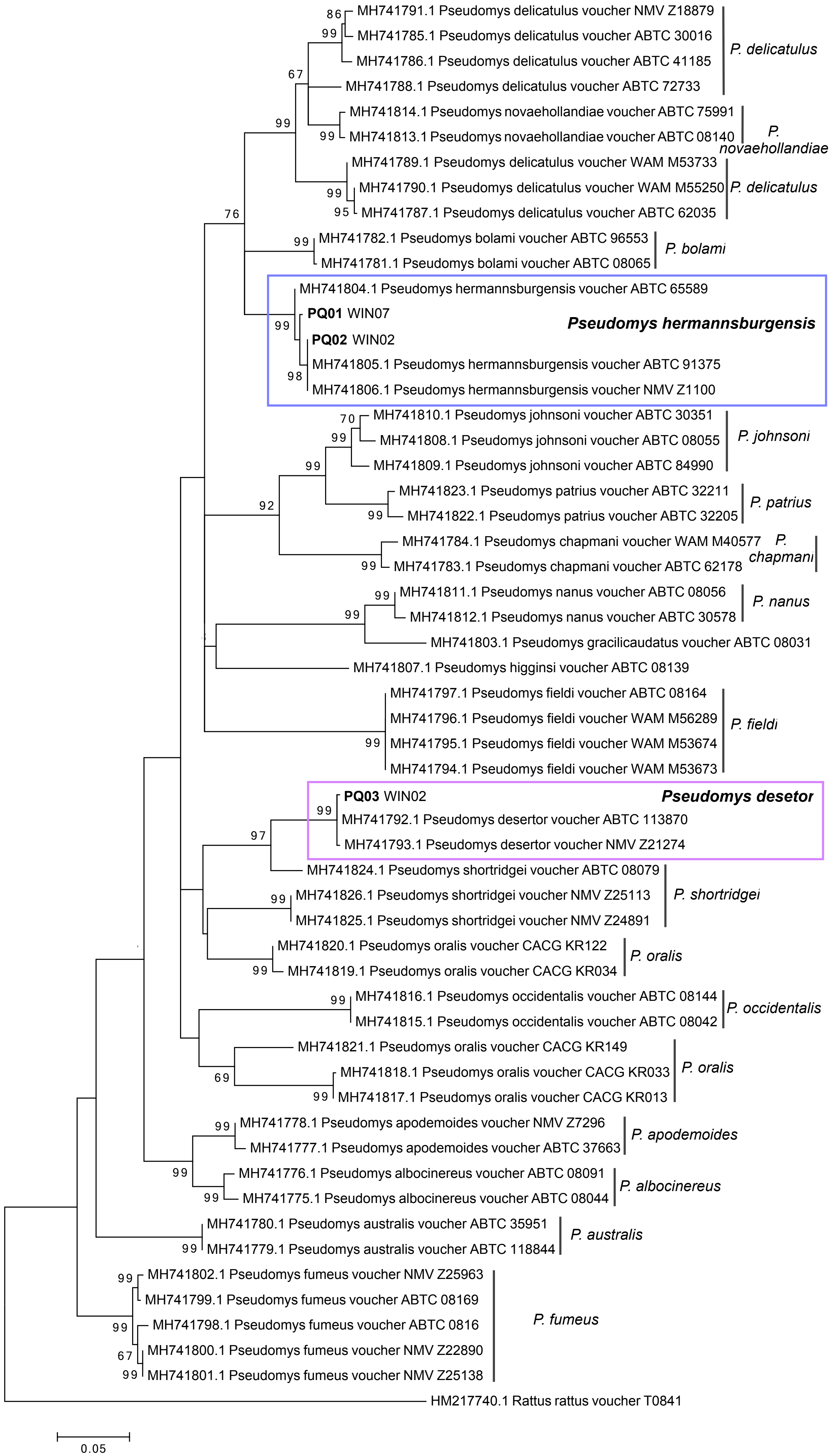

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MH741813.1 Pseudomys novaehollandiae voucher ABTC 08140
P. novaehollandiae
MH741789.1 Pseudomys delicatulus voucher WAM M53733
MH741790.1 Pseudomys delicatulus voucher WAM M55250
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PQ02 WIN02
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Pseudomys hermannsburgensis
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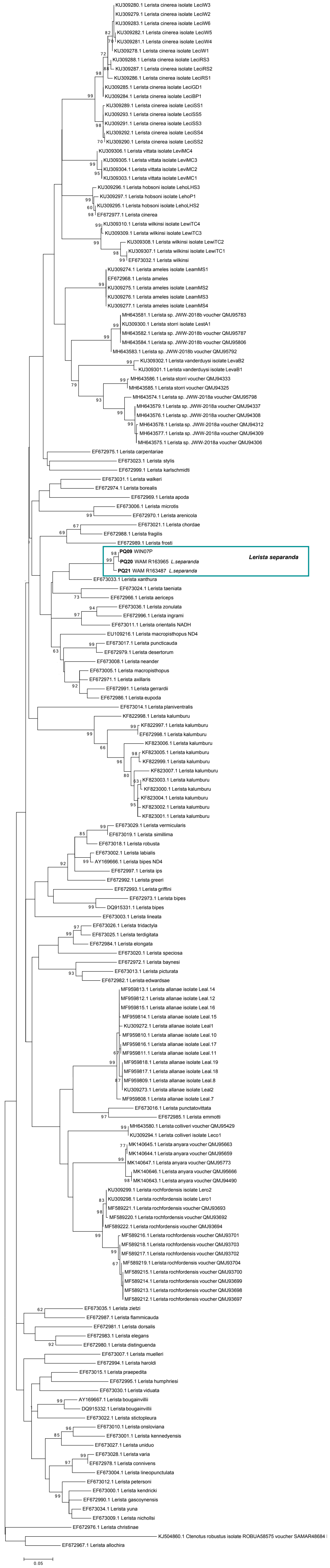
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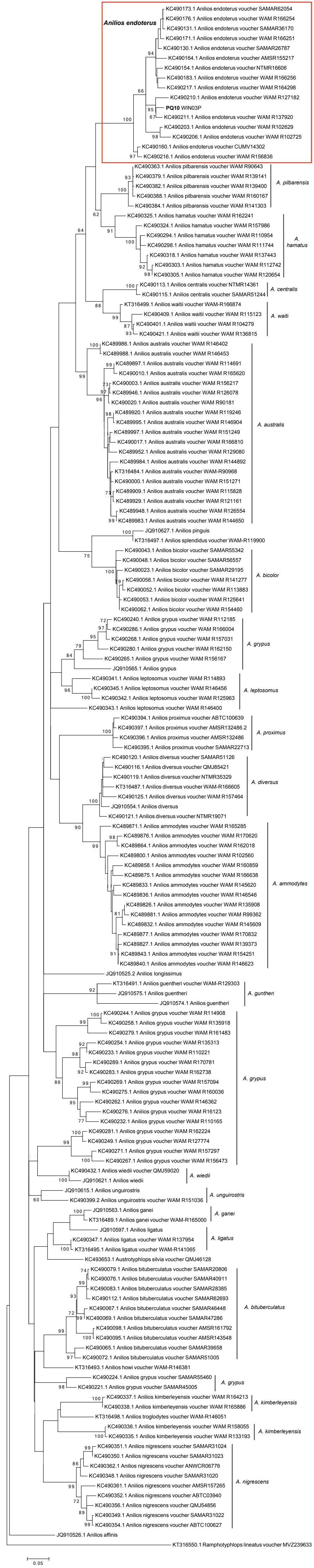
MF589217.1 Lerista rochfordensis voucher QMJ93702
MF589219.1 Lerista rochfordensis voucher QMJ93704
MF589215.1 Lerista rochfordensis voucher QMJ93700
MF589214.1 Lerista rochfordensis voucher QMJ93699
MF589213.1 Lerista rochfordensis voucher QMJ93698
MF589212.1 Lerista rochfordensis voucher QMJ93697
EF673035.1 Lerista zietzi
EF672987.1 Lerista flammicauda
EF672981.1 Lerista dorsalis
EF672983.1 Lerista elegans
EF672980.1 Lerista distinguenda
EF673007.1 Lerista muelleri
EF672994.1 Lerista haroldi
EF673015.1 Lerista praepedita
EF672995.1 Lerista humphriesi
EF673030.1 Lerista viduata
AY169667.1 Lerista bougainvillii
DQ915332.1 Lerista bougainvillii
EF673022.1 Lerista stictopleura
EF673010.1 Lerista onsloviana
EF673001.1 Lerista kennedyensis
EF673027.1 Lerista uniduo
EF673028.1 Lerista varia
EF672978.1 Lerista connivens
EF673004.1 Lerista lineopunctulata
EF673012.1 Lerista petersoni
EF673000.1 Lerista kendricki
EF672990.1 Lerista gascoynensis
EF673034.1 Lerista yuna
EF673009.1 Lerista nichollsi
EF672976.1 Lerista christinae
KJ504860.1 Ctenotus robustus isolate ROBUA58575 voucher SAMAR48684
EF672967.1 Lerista allochira
0.05



Anilios endoterus
KC490173.1 Anilios endoterus voucher SAMAR62054
KC490176.1 Anilios endoterus voucher WAM R166254
KC490131.1 Anilios endoterus voucher SAMAR36170
KC490171.1 Anilios endoterus voucher WAM R166251
KC490130.1 Anilios endoterus voucher SAMAR26787
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KC490154.1 Anilios endoterus voucher NTMR16606
KC490183.1 Anilios endoterus voucher WAM R166256
KC490217.1 Anilios endoterus voucher WAM R164298
KC490210.1 Anilios endoterus voucher WAM R127182
PQ10 WIN03P
KC490211.1 Anilios endoterus voucher WAM R137920
KC490203.1 Anilios endoterus voucher WAM R102629
KC490206.1 Anilios endoterus voucher WAM R102725
KC490160.1 Anilios endoterus voucher CUMV14302
KC490216.1 Anilios endoterus voucher WAM R156836
KC490363.1 Anilios pilbarensis voucher WAM R90643
KC490379.1 Anilios pilbarensis voucher WAM R139141
KC490382.1 Anilios pilbarensis voucher WAM R139400
KC490388.1 Anilios pilbarensis voucher WAM R160167
KC490384.1 Anilios pilbarensis voucher WAM R141303
A. pilbarensis
KC490325.1 Anilios hamatus voucher WAM R162241
KC490324.1 Anilios hamatus voucher WAM R157986
KC490294.1 Anilios hamatus voucher WAM R110954
KC490298.1 Anilios hamatus voucher WAM R111744
KC490318.1 Anilios hamatus voucher WAM R137443
KC490303.1 Anilios hamatus voucher WAM R112742
KC490305.1 Anilios hamatus voucher WAM R120654
A. hamatus
KC490113.1 Anilios centralis voucher NTMR14361
KC490115.1 Anilios centralis voucher SAMAR51244
A. centralis
KT316499.1 Anilios waitii voucher WAM-R166874
KC490409.1 Anilios waitii voucher WAM R115123
KC490401.1 Anilios waitii voucher WAM R104279
KC490421.1 Anilios waitii voucher WAM R136815
A. waiti
KC489986.1 Anilios australis voucher WAM R146402
KC489988.1 Anilios australis voucher WAM R146453
KC489897.1 Anilios australis voucher WAM R114691
KC490010.1 Anilios australis voucher WAM R165620
KC490003.1 Anilios australis voucher WAM R156217
KC489946.1 Anilios australis voucher WAM R126078
KC490020.1 Anilios australis voucher WAM R90181
KC489920.1 Anilios australis voucher WAM R119246
KC489995.1 Anilios australis voucher WAM R146904
KC489997.1 Anilios australis voucher WAM R151249
KC490017.1 Anilios australis voucher WAM R166810
KC489952.1 Anilios australis voucher WAM R129080
KC489984.1 Anilios australis voucher WAM R144892
KT316484.1 Anilios australis voucher WAM-R90968
KC490000.1 Anilios australis voucher WAM R151271
KC489909.1 Anilios australis voucher WAM R115828
KC489929.1 Anilios australis voucher WAM R121161
KC489948.1 Anilios australis voucher WAM R126554
KC489983.1 Anilios australis voucher WAM R144650
A. australis
JQ910627.1 Anilios pinguis
KT316497.1 Anilios splendidus voucher WAM-R119900
KC490043.1 Anilios bicolor voucher SAMAR55342
KC490048.1 Anilios bicolor voucher SAMAR56557
KC490023.1 Anilios bicolor voucher SAMAR29195
KC490058.1 Anilios bicolor voucher WAM R141277
KC490052.1 Anilios bicolor voucher WAM R113883
KC490053.1 Anilios bicolor voucher WAM R125641
KC490062.1 Anilios bicolor voucher WAM R154460
A. bicolor
KC490240.1 Anilios grypus voucher WAM R112185
KC490286.1 Anilios grypus voucher WAM R166004
KC490268.1 Anilios grypus voucher WAM R157031
KC490280.1 Anilios grypus voucher WAM R162150
KC490265.1 Anilios grypus voucher WAM R156167
JQ910565.1 Anilios grypus
A. grypus
KC490341.1 Anilios leptosomus voucher WAM R114893
KC490345.1 Anilios leptosomus voucher WAM R146456
KC490342.1 Anilios leptosomus voucher WAM R125963
KC490343.1 Anilios leptosomus voucher WAM R146400
A. leptosomus
KC490394.1 Anilios proximus voucher ABTC100639
KC490397.1 Anilios proximus voucher AMSR132486.2
KC490396.1 Anilios proximus voucher AMSR132486
KC490395.1 Anilios proximus voucher SAMAR22713
A. proximus
KC490120.1 Anilios diversus voucher SAMAR51126
KC490116.1 Anilios diversus voucher QMJ85421
KC490119.1 Anilios diversus voucher NTMR35329
KT316487.1 Anilios diversus voucher WAM-R166605
KC490125.1 Anilios diversus voucher WAM R157464
JQ910554.1 Anilios diversus
KC490121.1 Anilios diversus voucher NTMR19071
A. diversus
KC489871.1 Anilios ammodytes voucher WAM R165285
KC489876.1 Anilios ammodytes voucher WAM R170620
KC489864.1 Anilios ammodytes voucher WAM R162018
KC489800.1 Anilios ammodytes voucher WAM R102560
KC489858.1 Anilios ammodytes voucher WAM R160859
KC489875.1 Anilios ammodytes voucher WAM R166638
KC489833.1 Anilios ammodytes voucher WAM R145620
KC489836.1 Anilios ammodytes voucher WAM R146546
KC489826.1 Anilios ammodytes voucher WAM R135908
KC489881.1 Anilios ammodytes voucher WAM R99362
KC489832.1 Anilios ammodytes voucher WAM R145609
KC489877.1 Anilios ammodytes voucher WAM R170832
KC489827.1 Anilios ammodytes voucher WAM R139373
KC489843.1 Anilios ammodytes voucher WAM R154251
KC489840.1 Anilios ammodytes voucher WAM R146623
A. ammodytes
JQ910525.2 Anilios longissimus
KT316491.1 Anilios guentheri voucher WAM-R129303
JQ910575.1 Anilios guentheri
JQ910574.1 Anilios guentheri
A. guntheri
KC490244.1 Anilios grypus voucher WAM R114908
KC490258.1 Anilios grypus voucher WAM R135918
KC490279.1 Anilios grypus voucher WAM R161483
KC490254.1 Anilios grypus voucher WAM R135313
KC490233.1 Anilios grypus voucher WAM R110221
KC490289.1 Anilios grypus voucher WAM R170781
KC490283.1 Anilios grypus voucher WAM R162738
KC490269.1 Anilios grypus voucher WAM R157094
KC490275.1 Anilios grypus voucher WAM R160036
KC490262.1 Anilios grypus voucher WAM R146362
KC490276.1 Anilios grypus voucher WAM R16123
KC490232.1 Anilios grypus voucher WAM R110165
KC490281.1 Anilios grypus voucher WAM R162224
KC490249.1 Anilios grypus voucher WAM R127774
KC490271.1 Anilios grypus voucher WAM R157297
KC490267.1 Anilios grypus voucher WAM R156473
A. grypus
KC490432.1 Anilios wiedii voucher QMJ59020
JQ910621.1 Anilios wiedii
A. wiedii
JQ910615.1 Anilios unguirostris
KC490399.2 Anilios unguirostris voucher WAM R151036
A. unguirostris
JQ910563.1 Anilios ganei
KT316489.1 Anilios ganei voucher WAM-R165000
A. ganei
JQ910597.1 Anilios ligatus
KC490347.1 Anilios ligatus voucher WAM R137954
KT316495.1 Anilios ligatus voucher WAM-R141065
A. ligatus
KC493653.1 Austrotyphlops silvia voucher QMJ46128
KC490079.1 Anilios bituberculatus voucher SAMAR20806
KC490076.1 Anilios bituberculatus voucher SAMAR40911
KC490083.1 Anilios bituberculatus voucher SAMAR28385
KC490112.1 Anilios bituberculatus voucher SAMAR62693
KC490067.1 Anilios bituberculatus voucher SAMAR46448
KC490069.1 Anilios bituberculatus voucher SAMAR47286
KC490098.1 Anilios bituberculatus voucher AMSR161792
KC490095.1 Anilios bituberculatus voucher AMSR143548
KC490065.1 Anilios bituberculatus voucher SAMAR39658
KC490072.1 Anilios bituberculatus voucher SAMAR51005
A. bituberculatus
KT316493.1 Anilios howi voucher WAM-R146381
KC490224.1 Anilios grypus voucher SAMAR55460
KC490221.1 Anilios grypus voucher SAMAR45005
A. grypus
KC490337.1 Anilios kimberleyensis voucher WAM R164213
KC490338.1 Anilios kimberleyensis voucher WAM R165886
A. kimberleyensis
KT316498.1 Anilios troglodytes voucher WAM-R146051
KC490336.1 Anilios kimberleyensis voucher WAM R158055
KC490335.1 Anilios kimberleyensis voucher WAM R133193
A. kimberleyensis
KC490351.1 Anilios nigrescens voucher SAMAR31024
KC490350.1 Anilios nigrescens voucher SAMAR31023
KC490362.1 Anilios nigrescens voucher ANWCR06776
KC490348.1 Anilios nigrescens voucher SAMAR31020
KC490361.1 Anilios nigrescens voucher AMSR157265
KC490352.1 Anilios nigrescens voucher ABTC03940
KC490356.1 Anilios nigrescens voucher QMJ54856
KC490349.1 Anilios nigrescens voucher SAMAR31022
KC490354.1 Anilios nigrescens voucher ABTC100627
A. nigrescens
JQ910526.1 Anilios affinis
KT316550.1 Ramphotyphlops lineatus voucher MVZ239633
0.05

		1	2	3	4	5	6	7	8	9	10	11	12	13
1	**PQ06** *S.youngsoni* WIN06 16S		0.001	0.001	0.001	0.006	0.007	0.006	0.006	0.006	0.005	0.006	0.006	0.002
2	**PQ07** *S.youngsoni* WIN07 16S	0.001		0.001	0.001	0.006	0.007	0.006	0.006	0.006	0.005	0.006	0.006	0.002
3	**PQ12** *S.youngsoni* 49038 16S	0.001	0.003		0.002	0.007	0.007	0.006	0.006	0.006	0.005	0.006	0.006	0.002
4	**PQ13** *S.youngsoni* 56120 16S	0.002	0.002	0.004		0.007	0.007	0.006	0.006	0.006	0.005	0.006	0.006	0.002
5	JQ413961.1 *Sminthopsis dolichura* QM JM18174	0.063	0.061	0.063	0.063		0.007	0.004	0.007	0.006	0.007	0.007	0.006	0.007
6	JQ413953.1 *Sminthopsis douglasi* QM JM18113	0.066	0.065	0.066	0.067	0.065		0.007	0.007	0.006	0.007	0.006	0.007	0.007
7	JQ413963.1 *Sminthopsis gilberti* QM JM18170	0.057	0.057	0.058	0.058	0.027	0.068		0.006	0.006	0.007	0.006	0.006	0.006
8	JQ413959.1 *Sminthopsis granulipes* WAM M20647	0.052	0.052	0.053	0.051	0.065	0.066	0.059		0.006	0.006	0.006	0.006	0.006
9	JQ413964.1 *Sminthopsis griseoventer* QM JM18178	0.052	0.052	0.053	0.054	0.060	0.062	0.056	0.055		0.006	0.006	0.006	0.006
10	JQ413965.1 *Sminthopsis hirtipes* QM JM5239	0.035	0.035	0.036	0.034	0.067	0.067	0.065	0.054	0.058		0.006	0.007	0.005
11	JQ413958.1 *Sminthopsis longicaudata* WAM M24531	0.058	0.058	0.059	0.057	0.063	0.060	0.058	0.060	0.059	0.057		0.006	0.006
12	JQ413957.1 *Sminthopsis ooldea* SAM M17477	0.060	0.060	0.061	0.061	0.057	0.073	0.054	0.060	0.059	0.064	0.058		0.007
13	JQ413956.1 *Sminthopsis youngsoni* QM JM10029	0.007	0.007	0.009	0.006	0.066	0.068	0.062	0.055	0.058	0.038	0.060	0.064	
14	EF011636.1 *Antechinus godmani*	0.105	0.105	0.105	0.107	0.101	0.106	0.098	0.106	0.100	0.108	0.101	0.103	0.106
15	EU086652.1 *Dasycercus cristicauda*	0.104	0.103	0.104	0.105	0.108	0.113	0.106	0.106	0.109	0.110	0.110	0.109	0.106
16	AY528921.1 *Dasyurus geoffroii*	0.111	0.111	0.111	0.111	0.117	0.116	0.116	0.114	0.116	0.119	0.116	0.114	0.111
17	AY528918.1 *Dasyurus maculatus*	0.106	0.105	0.106	0.107	0.111	0.110	0.109	0.111	0.111	0.116	0.114	0.111	0.107
18	AY528916.1 *Dasycercus cristicauda*	0.106	0.106	0.106	0.107	0.109	0.114	0.108	0.111	0.111	0.111	0.114	0.114	0.107
19	KJ868107.1 *Dasycercus cristicauda* voucher ABTC38342	0.103	0.102	0.103	0.104	0.107	0.112	0.103	0.105	0.106	0.108	0.108	0.107	0.106
20	AJ639871.1 *Macrotis lagotis*	0.154	0.154	0.154	0.152	0.154	0.159	0.149	0.149	0.148	0.162	0.154	0.155	0.152

		14	15	16	17	18	19	20
1	**PQ06** *S.youngsoni* WIN06 16S	0.008	0.008	0.008	0.008	0.008	0.008	0.010
2	**PQ07** *S.youngsoni* WIN07 16S	0.008	0.008	0.008	0.008	0.008	0.008	0.010
3	**PQ12** *S.youngsoni* 49038 16S	0.008	0.008	0.008	0.008	0.008	0.008	0.010
4	**PQ13** *S.youngsoni* 56120 16S	0.008	0.008	0.008	0.008	0.008	0.008	0.010
5	JQ413961.1 *Sminthopsis dolichura* QM JM18174	0.008	0.008	0.009	0.008	0.008	0.008	0.010
6	JQ413953.1 *Sminthopsis douglasi* QM JM18113	0.008	0.008	0.009	0.008	0.009	0.008	0.010
7	JQ413963.1 *Sminthopsis gilberti* QM JM18170	0.008	0.008	0.009	0.008	0.008	0.008	0.010
8	JQ413959.1 *Sminthopsis granulipes* WAM M20647	0.008	0.008	0.009	0.008	0.008	0.008	0.010
9	JQ413964.1 *Sminthopsis griseoventer* QM JM18178	0.008	0.008	0.009	0.008	0.008	0.008	0.010
10	JQ413965.1 *Sminthopsis hirtipes* QM JM5239	0.008	0.008	0.009	0.009	0.008	0.008	0.010
11	JQ413958.1 *Sminthopsis longicaudata* WAM M24531	0.008	0.008	0.009	0.009	0.009	0.008	0.010
12	JQ413957.1 *Sminthopsis ooldea* SAM M17477	0.008	0.008	0.009	0.008	0.009	0.008	0.010
13	JQ413956.1 *Sminthopsis youngsoni* QM JM10029	0.008	0.008	0.008	0.008	0.008	0.008	0.010
14	EF011636.1 *Antechinus godmani*		0.008	0.008	0.008	0.008	0.008	0.010
15	EU086652.1 *Dasycercus cristicauda*	0.101		0.007	0.007	0.006	0.002	0.010
16	AY528921.1 *Dasyurus geoffroii*	0.103	0.073		0.005	0.007	0.007	0.010
17	AY528918.1 *Dasyurus maculatus*	0.098	0.072	0.039		0.007	0.007	0.010
18	AY528916.1 *Dasycercus cristicauda*	0.103	0.051	0.070	0.073		0.006	0.010
19	KJ868107.1 *Dasycercus cristicauda* voucher ABTC38342	0.099	0.007	0.075	0.073	0.047		0.010
20	AJ639871.1 *Macrotis lagotis*	0.156	0.164	0.156	0.157	0.162	0.163	

		1	2	3	4	5	6	7
1	**PQ08** *N.ridei* WIN02P 16S		0.001	0.004	0.007	0.009	0.009	0.010
2	KJ868131.1 *Ningaui ridei* voucher ABTC73461	0.001		0.003	0.007	0.009	0.009	0.010
3	JQ413968.1 *Ningaui ridei*	0.011	0.010		0.007	0.008	0.009	0.010
4	JQ413967.1 *Ningaui yvonnae* voucher SAM A16 FGAWLER tRNA-Val	0.045	0.044	0.044		0.008	0.008	0.010
5	KX034160.1 *Ningaui* sp. PLANIMW851	0.067	0.066	0.060	0.060		0.004	0.009
6	JQ413969.1 *Ningaui timealeyi* voucher AM M29385	0.071	0.070	0.065	0.062	0.012		0.009
7	KJ868097.1 *Antechinomys laniger* voucher ABTC35188	0.090	0.089	0.087	0.082	0.078	0.079	

		1	2	3	4	5	6	7	8	9
1	**PQ05** *P.ingrami* WIN09 16S		0.007	0.007	0.007	0.006	0.007	0.007	0.002	0.001
2	KX034155.1 *Planigale maculata* isolate PLANIGM237 voucher QMJM1486/1487	0.042		0.005	0.005	0.006	0.007	0.005	0.007	0.007
3	KX034151.1 *Planigale maculata* isolate PLANIGM369 voucher WAMM22667	0.045	0.021		0.005	0.006	0.007	0.004	0.007	0.007
4	KX034140.1 *Planigale maculata* isolate PLANIGM370	0.050	0.023	0.022		0.007	0.007	0.005	0.007	0.007
5	KX034159.1 *Planigale ingrami* isolate PLANMW1054 voucher JM18681	0.031	0.032	0.039	0.044		0.003	0.007	0.006	0.006
6	KX034157.1 *Planigale tenuirostris* isolate PLANIGT470 voucher SAM 17886/17887	0.040	0.041	0.048	0.053	0.009		0.007	0.007	0.006
7	KX034152.1 *Planigale* sp. WAMM43137 isolate PLANMW1015 voucher WAMM43137	0.050	0.019	0.017	0.020	0.042	0.051		0.007	0.007
8	KX034148.1 *Planigale* sp. WAM28097 isolate PLANIGP317 voucher WAM28097	0.003	0.044	0.046	0.051	0.032	0.041	0.051		0.002
9	KX034147.1 *Planigale* sp. WAM26905 isolate PLANIGP032 voucher WAM26905	0.001	0.041	0.044	0.049	0.030	0.039	0.049	0.002	
10	KX034146.1 *Planigale* sp. PLANIGP279 voucher SAM FCATALOG 10-14	0.002	0.042	0.045	0.050	0.031	0.040	0.050	0.003	0.001
11	KX034143.1 *Planigale gilesi* isolate PLANIGALEG voucher ABTC7576	0.044	0.044	0.051	0.055	0.026	0.032	0.053	0.045	0.042
12	KX034142.1 *Planigale* sp. WAM47329 isolate PLANIGAMTP voucher WAM47329	0.038	0.037	0.045	0.049	0.019	0.028	0.045	0.039	0.037
13	JQ413970.1 *Planigale maculata* voucher QM JM1486/1487	0.042	0.000	0.021	0.023	0.032	0.041	0.019	0.044	0.041
14	JQ413971.1 *Planigale ingrami* voucher QM JM18677	0.032	0.034	0.040	0.045	0.001	0.010	0.044	0.034	0.031
15	JQ413959.1 *Sminthopsis granulipes* voucher WAM M20647 tRNA-Val	0.072	0.075	0.078	0.079	0.067	0.073	0.082	0.073	0.070
16	EF011636.1 *Antechinus godmani*	0.096	0.094	0.103	0.107	0.089	0.096	0.099	0.097	0.095
17	EU086652.1 *Dasycercus cristicauda*	0.104	0.108	0.116	0.113	0.094	0.101	0.111	0.105	0.103
18	AY528916.1 *Dasycercus cristicauda*	0.095	0.098	0.105	0.105	0.087	0.094	0.101	0.096	0.094
19	KJ868107.1 *Dasycercus cristicauda* voucher ABTC38342	0.101	0.103	0.111	0.109	0.088	0.095	0.105	0.102	0.099
20	AY528921.1 *Dasyurus geoffroii*	0.106	0.106	0.113	0.113	0.101	0.107	0.112	0.107	0.105
21	AY528918.1 *Dasyurus maculatus*	0.104	0.105	0.113	0.115	0.097	0.104	0.109	0.105	0.103
22	AJ639871.1 *Macrotis lagotis*	0.161	0.162	0.169	0.164	0.161	0.170	0.168	0.162	0.160

		10	11	12	13	14	15	16	17	18
1	**PQ05** *P.ingrami* WIN09 16S	0.002	0.007	0.006	0.007	0.006	0.009	0.010	0.010	0.010
2	KX034155.1 *Planigale maculata* isolate PLANIGM237 voucher QMJM1486/1487	0.007	0.007	0.006	0.000	0.006	0.009	0.010	0.010	0.010
3	KX034151.1 *Planigale maculata* isolate PLANIGM369 voucher WAMM22667	0.007	0.007	0.007	0.005	0.007	0.009	0.010	0.011	0.010
4	KX034140.1 *Planigale maculata* isolate PLANIGM370	0.007	0.008	0.007	0.005	0.007	0.009	0.010	0.011	0.010
5	KX034159.1 *Planigale ingrami* isolate PLANMW1054 voucher JM18681	0.006	0.005	0.005	0.006	0.001	0.008	0.010	0.010	0.009
6	KX034157.1 *Planigale tenuirostris* isolate PLANIGT470 voucher SAM 17886/17887	0.007	0.006	0.006	0.007	0.003	0.009	0.010	0.010	0.010
7	KX034152.1 *Planigale* sp. WAMM43137 isolate PLANMW1015 voucher WAMM43137	0.007	0.007	0.007	0.005	0.007	0.009	0.010	0.010	0.010
8	KX034148.1 *Planigale* sp. WAM28097 isolate PLANIGP317 voucher WAM28097	0.002	0.007	0.006	0.007	0.006	0.009	0.010	0.010	0.010
9	KX034147.1 *Planigale* sp. WAM26905 isolate PLANIGP032 voucher WAM26905	0.001	0.007	0.006	0.007	0.006	0.009	0.010	0.010	0.010
10	KX034146.1 *Planigale* sp. PLANIGP279 voucher SAM FCATALOG 10-14		0.007	0.006	0.007	0.006	0.009	0.010	0.010	0.010
11	KX034143.1 *Planigale gilesi* isolate PLANIGALEG voucher ABTC7576	0.044		0.006	0.007	0.005	0.008	0.010	0.010	0.010
12	KX034142.1 *Planigale* sp. WAM47329 isolate PLANIGAMTP voucher WAM47329	0.038	0.035		0.006	0.005	0.009	0.010	0.010	0.010
13	JQ413970.1 *Planigale maculata* voucher QM JM1486/1487	0.042	0.044	0.037		0.006	0.009	0.010	0.010	0.010
14	JQ413971.1 *Planigale ingrami* voucher QM JM18677	0.032	0.027	0.020	0.034		0.008	0.010	0.010	0.009
15	JQ413959.1 *Sminthopsis granulipes* voucher WAM M20647 tRNA-Val	0.072	0.068	0.076	0.075	0.068		0.010	0.010	0.010
16	EF011636.1 *Antechinus godmani*	0.096	0.098	0.091	0.094	0.091	0.104		0.010	0.010
17	EU086652.1 *Dasycercus cristicauda*	0.104	0.105	0.103	0.108	0.093	0.104	0.092		0.007
18	AY528916.1 *Dasycercus cristicauda*	0.095	0.104	0.092	0.098	0.088	0.107	0.094	0.046	
19	KJ868107.1 *Dasycercus cristicauda* voucher ABTC38342	0.101	0.102	0.097	0.103	0.089	0.102	0.089	0.010	0.041
20	AY528921.1 *Dasyurus geoffroii*	0.106	0.105	0.103	0.106	0.102	0.104	0.092	0.073	0.068
21	AY528918.1 *Dasyurus maculatus*	0.104	0.097	0.101	0.105	0.098	0.101	0.087	0.072	0.074
22	AJ639871.1 *Macrotis lagotis*	0.161	0.169	0.162	0.162	0.162	0.160	0.168	0.169	0.169

		19	20	21	22
1	**PQ05** *P.ingrami* WIN09 16S	0.010	0.010	0.010	0.012
2	KX034155.1 *Planigale maculata* isolate PLANIGM237 voucher QMJM1486/1487	0.010	0.010	0.010	0.012
3	KX034151.1 *Planigale maculata* isolate PLANIGM369 voucher WAMM22667	0.010	0.011	0.011	0.013
4	KX034140.1 *Planigale maculata* isolate PLANIGM370	0.010	0.011	0.011	0.012
5	KX034159.1 *Planigale ingrami* isolate PLANMW1054 voucher JM18681	0.009	0.010	0.010	0.012
6	KX034157.1 *Planigale tenuirostris* isolate PLANIGT470 voucher SAM 17886/17887	0.010	0.010	0.010	0.013
7	KX034152.1 *Planigale* sp. WAMM43137 isolate PLANMW1015 voucher WAMM43137	0.010	0.011	0.010	0.012
8	KX034148.1 *Planigale* sp. WAM28097 isolate PLANIGP317 voucher WAM28097	0.010	0.010	0.010	0.012
9	KX034147.1 *Planigale* sp. WAM26905 isolate PLANIGP032 voucher WAM26905	0.010	0.010	0.010	0.012
10	KX034146.1 *Planigale* sp. PLANIGP279 voucher SAM FCATALOG 10-14	0.010	0.010	0.010	0.012
11	KX034143.1 *Planigale gilesi* isolate PLANIGALEG voucher ABTC7576	0.010	0.010	0.010	0.013
12	KX034142.1 *Planigale* sp. WAM47329 isolate PLANIGAMTP voucher WAM47329	0.010	0.010	0.010	0.012
13	JQ413970.1 *Planigale maculata* voucher QM JM1486/1487	0.010	0.010	0.010	0.012
14	JQ413971.1 *Planigale ingrami* voucher QM JM18677	0.010	0.010	0.010	0.012
15	JQ413959.1 *Sminthopsis granulipes* voucher WAM M20647 tRNA-Val	0.010	0.010	0.010	0.012
16	EF011636.1 *Antechinus godmani*	0.010	0.010	0.009	0.012
17	EU086652.1 *Dasycercus cristicauda*	0.003	0.009	0.009	0.013
18	AY528916.1 *Dasycercus cristicauda*	0.007	0.008	0.009	0.013
19	KJ868107.1 *Dasycercus cristicauda* voucher ABTC38342		0.009	0.009	0.012
20	AY528921.1 *Dasyurus geoffroii*	0.076		0.007	0.012
21	AY528918.1 *Dasyurus maculatus*	0.074	0.050		0.012
22	AJ639871.1 *Macrotis lagotis*	0.166	0.158	0.166	

		1	2	3	4	5	6	7	8	9	10	11	12
1	**PQ04** *N.alexis* WIN04 Cytb		0.010	0.010	0.010	0.018	0.019	0.025	0.012	0.012	0.000	0.000	0.000
2	AY176318.1 *Notomys alexis* isolate 01-018	0.014		0.013	0.013	0.020	0.021	0.026	0.015	0.015	0.010	0.010	0.010
3	MH741771.1 *Notomys mitchellii* voucher ABTC 27066	0.014	0.027		0.010	0.018	0.019	0.026	0.013	0.013	0.010	0.010	0.010
4	MH741770.1 *Notomys mitchelli*i voucher ABTC 07351	0.014	0.027	0.014		0.015	0.016	0.025	0.013	0.013	0.010	0.010	0.010
5	MH741769.1 *Notomys fuscu*s voucher ABTC 80277	0.048	0.061	0.048	0.034		0.007	0.024	0.020	0.020	0.018	0.018	0.018
6	MH741768.1 *Notomys fuscus* voucher ABTC 117695	0.054	0.068	0.054	0.041	0.007		0.025	0.021	0.021	0.019	0.019	0.019
7	MH741767.1 *Notomys cervinus* voucher ABTC 82963	0.102	0.116	0.109	0.102	0.095	0.102		0.024	0.024	0.025	0.025	0.025
8	MH741766.1 *Notomys aquilo* voucher ABTC 18253	0.020	0.034	0.027	0.027	0.061	0.068	0.095		0.000	0.012	0.012	0.012
9	MH741765.1 *Notomys aquilo* voucher ABTC 18252	0.020	0.034	0.027	0.027	0.061	0.068	0.095	0.000		0.012	0.012	0.012
10	MH741764.1 *Notomys alexis* voucher NMV Z21353	0.000	0.014	0.014	0.014	0.048	0.054	0.102	0.020	0.020		0.000	0.000
11	MH741763.1 *Notomys alexis* voucher NMV Z11075	0.000	0.014	0.014	0.014	0.048	0.054	0.102	0.020	0.020	0.000		0.000
12	MH741762.1 *Notomys alexis* voucher ABTC 63047	0.000	0.014	0.014	0.014	0.048	0.054	0.102	0.020	0.020	0.000	0.000	
13	MH741761.1 *Notomys alexis* voucher ABTC 61767	0.007	0.020	0.020	0.020	0.054	0.061	0.109	0.027	0.027	0.007	0.007	0.007
14	KY754073.1 *Notomys fuscus*	0.048	0.061	0.048	0.034	0.000	0.007	0.095	0.061	0.061	0.048	0.048	0.048
15	EU349768.1 *Notomys fuscus* voucher ABTC 34070	0.048	0.061	0.048	0.034	0.000	0.007	0.095	0.061	0.061	0.048	0.048	0.048
16	KM603499.1 *Hydromys chrysogaster* voucher QMA005673	0.116	0.116	0.122	0.109	0.102	0.109	0.109	0.122	0.122	0.116	0.116	0.116
17	EU349792.1 *Zyzomys argurus* voucher ABTC 07908	0.082	0.095	0.095	0.082	0.088	0.095	0.102	0.102	0.102	0.082	0.082	0.082
18	HM217740.1 *Rattus rattus* voucher T0841	0.122	0.122	0.116	0.116	0.136	0.143	0.163	0.136	0.136	0.122	0.122	0.122

		13	14	15	16	17	18
1	**PQ04** *N.alexis* WIN04 Cytb	0.007	0.018	0.018	0.026	0.023	0.027
2	AY176318.1 *Notomys alexis* isolate 01-018	0.012	0.020	0.020	0.026	0.024	0.027
3	MH741771.1 *Notomys mitchellii* voucher ABTC 27066	0.012	0.018	0.018	0.027	0.024	0.026
4	MH741770.1 *Notomys mitchelli*i voucher ABTC 07351	0.012	0.015	0.015	0.026	0.023	0.026
5	MH741769.1 *Notomys fuscu*s voucher ABTC 80277	0.019	0.000	0.000	0.025	0.023	0.028
6	MH741768.1 *Notomys fuscus* voucher ABTC 117695	0.020	0.007	0.007	0.026	0.024	0.029
7	MH741767.1 *Notomys cervinus* voucher ABTC 82963	0.026	0.024	0.024	0.026	0.025	0.030
8	MH741766.1 *Notomys aquilo* voucher ABTC 18253	0.013	0.020	0.020	0.027	0.025	0.028
9	MH741765.1 *Notomys aquilo* voucher ABTC 18252	0.013	0.020	0.020	0.027	0.025	0.028
10	MH741764.1 *Notomys alexis* voucher NMV Z21353	0.007	0.018	0.018	0.026	0.023	0.027
11	MH741763.1 *Notomys alexis* voucher NMV Z11075	0.007	0.018	0.018	0.026	0.023	0.027
12	MH741762.1 *Notomys alexis* voucher ABTC 63047	0.007	0.018	0.018	0.026	0.023	0.027
13	MH741761.1 *Notomys alexis* voucher ABTC 61767		0.019	0.019	0.027	0.023	0.027
14	KY754073.1 *Notomys fuscus*	0.054		0.000	0.025	0.023	0.028
15	EU349768.1 *Notomys fuscus* voucher ABTC 34070	0.054	0.000		0.025	0.023	0.028
16	KM603499.1 *Hydromys chrysogaster* voucher QMA005673	0.122	0.102	0.102		0.023	0.026
17	EU349792.1 *Zyzomys argurus* voucher ABTC 07908	0.088	0.088	0.088	0.088		0.029
18	HM217740.1 *Rattus rattus* voucher T0841	0.122	0.136	0.136	0.116	0.143	

		1	2	3	4	5	6	7	8	9	10	11
1	**PQ01** *P.hermannsburgensis* WIN07 Cytb		0.004	0.013	0.013	0.014	0.014	0.013	0.013	0.014	0.013	0.013
2	**PQ02** *P.hermannsburgensis* WIN02 Cytb	0.007		0.013	0.014	0.014	0.014	0.013	0.014	0.014	0.014	0.014
3	**PQ03** *P.desertor* WIN02 Cytb	0.100	0.104		0.014	0.014	0.014	0.014	0.014	0.015	0.014	0.014
4	MH741810.1 *Pseudomys johnsoni* voucher ABTC 30351	0.111	0.115	0.126		0.007	0.005	0.015	0.014	0.015	0.015	0.015
5	MH741809.1 *Pseudomys johnsoni* voucher ABTC 84990	0.120	0.124	0.128	0.024		0.007	0.015	0.014	0.015	0.015	0.015
6	MH741808.1 *Pseudomys johnsoni* voucher ABTC 08055	0.119	0.122	0.128	0.016	0.026		0.015	0.014	0.015	0.014	0.014
7	MH741807.1 *Pseudomys higginsi* voucher ABTC 08139	0.109	0.109	0.128	0.133	0.141	0.139		0.015	0.014	0.015	0.015
8	MH741802.1 *Pseudomys fumeus* voucher NMV Z25963	0.111	0.115	0.130	0.128	0.130	0.120	0.133		0.014	0.005	0.005
9	MH741803.1 *Pseudomys gracilicaudatus* voucher ABTC 08031	0.128	0.128	0.139	0.139	0.137	0.139	0.124	0.128		0.014	0.014
10	MH741800.1 *Pseudomys fumeus* voucher NMV Z22890	0.111	0.115	0.126	0.135	0.137	0.128	0.137	0.015	0.128		0.000
11	MH741801.1 *Pseudomys fumeus* voucher NMV Z25138	0.111	0.115	0.126	0.135	0.137	0.128	0.137	0.015	0.128	0.000	
12	MH741799.1 *Pseudomys fumeus* voucher ABTC 08169	0.109	0.113	0.128	0.126	0.128	0.119	0.131	0.005	0.126	0.013	0.013
13	MH741798.1 *Pseudomys fumeus* voucher ABTC 0816	0.115	0.115	0.126	0.135	0.137	0.128	0.137	0.018	0.128	0.011	0.011
14	MH741797.1 *Pseudomys fieldi* voucher ABTC 08164	0.115	0.119	0.128	0.122	0.122	0.120	0.124	0.119	0.126	0.117	0.117
15	MH741796.1 *Pseudomys fieldi* voucher WAM M56289	0.115	0.119	0.128	0.122	0.122	0.120	0.124	0.119	0.126	0.117	0.117
16	MH741795.1 *Pseudomys fieldi* voucher WAM M53674	0.115	0.119	0.128	0.122	0.122	0.120	0.124	0.119	0.126	0.117	0.117
17	MH741794.1 *Pseudomys fieldi* voucher WAM M53673	0.115	0.119	0.128	0.122	0.122	0.120	0.124	0.119	0.126	0.117	0.117
18	MH741790.1 *Pseudomys delicatulus* voucher WAM M55250	0.088	0.089	0.115	0.120	0.122	0.120	0.122	0.128	0.131	0.128	0.128
19	MH741791.1 *Pseudomys delicatulus* voucher NMV Z18879	0.075	0.080	0.113	0.115	0.120	0.119	0.128	0.120	0.124	0.120	0.120
20	MH741789.1 *Pseudomys delicatulus* voucher WAM M53733	0.086	0.088	0.113	0.115	0.117	0.115	0.117	0.122	0.131	0.122	0.122
21	MH741788.1 *Pseudomys delicatulus* voucher ABTC 72733	0.075	0.080	0.113	0.104	0.108	0.108	0.128	0.113	0.139	0.120	0.120
22	MH741787.1 *Pseudomys delicatulus* voucher ABTC 62035	0.089	0.091	0.117	0.122	0.124	0.122	0.124	0.130	0.133	0.130	0.130
23	MH741786.1 *Pseudomys delicatulus* voucher ABTC 41185	0.071	0.077	0.109	0.113	0.119	0.117	0.122	0.115	0.117	0.115	0.115
24	MH741826.1 *Pseudomys shortridgei* voucher NMV Z25113	0.093	0.100	0.089	0.124	0.126	0.124	0.139	0.104	0.142	0.097	0.097
25	MH741825.1 *Pseudomys shortridgei* voucher NMV Z24891	0.093	0.100	0.089	0.124	0.126	0.124	0.139	0.104	0.142	0.097	0.097
26	MH741824.1 *Pseudomys shortridgei* voucher ABTC 08079	0.102	0.102	0.058	0.120	0.122	0.120	0.108	0.117	0.122	0.124	0.124
27	MH741823.1 *Pseudomys patrius* voucher ABTC 32211	0.126	0.130	0.139	0.062	0.058	0.068	0.150	0.142	0.142	0.146	0.146
28	MH741822.1 *Pseudomys patrius* voucher ABTC 32205	0.126	0.130	0.139	0.066	0.062	0.071	0.151	0.139	0.148	0.142	0.142
29	MH741821.1 *Pseudomys oralis* voucher CACG KR149	0.091	0.095	0.102	0.122	0.124	0.122	0.119	0.106	0.117	0.099	0.099
30	MH741820.1 *Pseudomys oralis* voucher CACG KR122	0.097	0.099	0.102	0.104	0.104	0.104	0.126	0.106	0.120	0.106	0.106
31	MH741819.1 *Pseudomys oralis* voucher CACG KR034	0.104	0.106	0.109	0.106	0.106	0.106	0.133	0.113	0.126	0.113	0.113
32	MH741818.1 *Pseudomys oralis* voucher CACG KR033	0.109	0.106	0.109	0.131	0.137	0.139	0.131	0.135	0.126	0.126	0.126
33	MH741817.1 *Pseudomys oralis* voucher CACG KR013	0.108	0.104	0.111	0.133	0.139	0.137	0.130	0.133	0.124	0.124	0.124
34	MH741816.1 *Pseudomys occidentalis* voucher ABTC 08144	0.115	0.119	0.124	0.131	0.133	0.133	0.141	0.117	0.141	0.109	0.109
35	MH741815.1 *Pseudomys occidentalis* voucher ABTC 08042	0.115	0.119	0.124	0.131	0.133	0.133	0.141	0.117	0.141	0.109	0.109
36	MH741814.1 *Pseudomys novaehollandiae* voucher ABTC 75991	0.077	0.082	0.115	0.115	0.122	0.119	0.133	0.119	0.130	0.119	0.119

		1	2	3	4	5	6	7	8	9	10	11
37	MH741813.1 *Pseudomys novaehollandiae* voucher ABTC 08140	0.080	0.086	0.111	0.115	0.122	0.115	0.130	0.119	0.131	0.119	0.119
38	MH741785.1 *Pseudomys delicatulus* voucher ABTC 30016	0.071	0.077	0.113	0.115	0.120	0.119	0.131	0.113	0.122	0.113	0.113
39	MH741782.1 *Pseudomys bolami* voucher ABTC 96553	0.071	0.071	0.117	0.111	0.113	0.113	0.117	0.124	0.128	0.128	0.128
40	MH741781.1 *Pseudomys bolami* voucher ABTC 08065	0.073	0.073	0.119	0.113	0.115	0.115	0.119	0.122	0.130	0.126	0.126
41	MH741778.1 *Pseudomys apodemoides* voucher NMV Z7296	0.113	0.113	0.122	0.120	0.126	0.120	0.115	0.104	0.135	0.100	0.100
42	MH741777.1 *Pseudomys apodemoides* voucher ABTC 37663	0.117	0.117	0.126	0.120	0.126	0.117	0.119	0.111	0.133	0.108	0.108
43	MH741776.1 *Pseudomys albocinereus* voucher ABTC 08091	0.119	0.115	0.124	0.119	0.124	0.115	0.122	0.102	0.128	0.099	0.099
44	MH741775.1 *Pseudomys albocinereus* voucher ABTC 08044	0.126	0.122	0.131	0.131	0.137	0.128	0.128	0.106	0.133	0.102	0.102
45	MH741805.1 *Pseudomys hermannsburgensis* voucher ABTC 91375	0.007	0.000	0.104	0.115	0.124	0.122	0.109	0.115	0.128	0.115	0.115
46	MH741804.1 *Pseudomys hermannsburgensis* voucher ABTC 65589	0.005	0.009	0.099	0.113	0.119	0.120	0.104	0.113	0.122	0.113	0.113
47	MH741806.1 *Pseudomys hermannsburgensis* voucher NMV Z1100	0.007	0.000	0.104	0.115	0.124	0.122	0.109	0.115	0.128	0.115	0.115
48	MH741811.1 *Pseudomys nanus* voucher ABTC 08056	0.122	0.119	0.133	0.122	0.124	0.122	0.115	0.133	0.057	0.137	0.137
49	MH741812.1 *Pseudomys nanus* voucher ABTC 30578	0.122	0.119	0.133	0.124	0.126	0.124	0.119	0.133	0.060	0.137	0.137
50	MH741793.1 *Pseudomys desertor* voucher NMV Z21274	0.097	0.100	0.004	0.122	0.124	0.124	0.124	0.130	0.135	0.126	0.126
51	MH741792.1 *Pseudomys desertor* voucher ABTC 113870	0.099	0.102	0.002	0.124	0.126	0.126	0.126	0.128	0.137	0.124	0.124
52	MH741784.1 *Pseudomys chapmani* voucher WAM M40577	0.113	0.119	0.148	0.095	0.104	0.106	0.131	0.148	0.141	0.150	0.150
53	MH741780.1 *Pseudomys australis* voucher ABTC 35951	0.106	0.102	0.113	0.124	0.126	0.117	0.130	0.099	0.133	0.097	0.097
54	MH741783.1 *Pseudomys chapman*i voucher ABTC 62178	0.119	0.124	0.142	0.091	0.100	0.102	0.130	0.151	0.135	0.150	0.150
55	MH741779.1 *Pseudomys australis* voucher ABTC 118844	0.106	0.102	0.113	0.124	0.126	0.117	0.130	0.099	0.133	0.097	0.097
56	HM217740.1 *Rattus rattus* voucher T0841	0.151	0.153	0.168	0.159	0.162	0.153	0.184	0.142	0.182	0.141	0.141

		12	13	14	15	16	17	18	19	20	21	22
1	**PQ01** *P.hermannsburgensis* WIN07 Cytb	0.013	0.014	0.014	0.014	0.014	0.014	0.012	0.011	0.012	0.011	0.012
2	**PQ02** *P.hermannsburgensis* WIN02 Cytb	0.014	0.014	0.014	0.014	0.014	0.014	0.012	0.012	0.012	0.012	0.012
3	**PQ03** *P.desertor* WIN02 Cytb	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
4	MH741810.1 *Pseudomys johnsoni* voucher ABTC 30351	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014
5	MH741809.1 *Pseudomys johnsoni* voucher ABTC 84990	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014
6	MH741808.1 *Pseudomys johnsoni* voucher ABTC 08055	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014
7	MH741807.1 *Pseudomys higginsi* voucher ABTC 08139	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
8	MH741802.1 *Pseudomys fumeus* voucher NMV Z25963	0.003	0.006	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
9	MH741803.1 *Pseudomys gracilicaudatus* voucher ABTC 08031	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.015
10	MH741800.1 *Pseudomys fumeus* voucher NMV Z22890	0.005	0.004	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
11	MH741801.1 *Pseudomys fumeus* voucher NMV Z25138	0.005	0.004	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
12	MH741799.1 *Pseudomys fumeus* voucher ABTC 08169		0.005	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014
13	MH741798.1 *Pseudomys fumeus* voucher ABTC 0816	0.016		0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
14	MH741797.1 *Pseudomys fieldi* voucher ABTC 08164	0.117	0.120		0.000	0.000	0.000	0.014	0.014	0.014	0.014	0.014
15	MH741796.1 *Pseudomys fieldi* voucher WAM M56289	0.117	0.120	0.000		0.000	0.000	0.014	0.014	0.014	0.014	0.014
16	MH741795.1 *Pseudomys fieldi* voucher WAM M53674	0.117	0.120	0.000	0.000		0.000	0.014	0.014	0.014	0.014	0.014
17	MH741794.1 *Pseudomys fieldi* voucher WAM M53673	0.117	0.120	0.000	0.000	0.000		0.014	0.014	0.014	0.014	0.014
18	MH741790.1 *Pseudomys delicatulus* voucher WAM M55250	0.126	0.126	0.130	0.130	0.130	0.130		0.010	0.003	0.010	0.002
19	MH741791.1 *Pseudomys delicatulus* voucher NMV Z18879	0.119	0.117	0.120	0.120	0.120	0.120	0.060		0.010	0.009	0.010
20	MH741789.1 *Pseudomys delicatulus* voucher WAM M53733	0.120	0.120	0.124	0.124	0.124	0.124	0.005	0.058		0.010	0.004
21	MH741788.1 *Pseudomys delicatulus* voucher ABTC 72733	0.111	0.115	0.124	0.124	0.124	0.124	0.060	0.046	0.055		0.010
22	MH741787.1 *Pseudomys delicatulus* voucher ABTC 62035	0.128	0.128	0.131	0.131	0.131	0.131	0.002	0.062	0.007	0.062	
23	MH741786.1 *Pseudomys delicatulus* voucher ABTC 41185	0.113	0.111	0.115	0.115	0.115	0.115	0.064	0.015	0.062	0.047	0.066
24	MH741826.1 *Pseudomys shortridgei* voucher NMV Z25113	0.102	0.100	0.130	0.130	0.130	0.130	0.117	0.108	0.119	0.109	0.115
25	MH741825.1 *Pseudomys shortridgei* voucher NMV Z24891	0.102	0.100	0.130	0.130	0.130	0.130	0.117	0.108	0.119	0.109	0.115
26	MH741824.1 *Pseudomys shortridgei* voucher ABTC 08079	0.115	0.120	0.117	0.117	0.117	0.117	0.124	0.115	0.119	0.111	0.126
27	MH741823.1 *Pseudomys patrius* voucher ABTC 32211	0.141	0.142	0.137	0.137	0.137	0.137	0.130	0.128	0.128	0.117	0.131
28	MH741822.1 *Pseudomys patrius* voucher ABTC 32205	0.137	0.142	0.137	0.137	0.137	0.137	0.133	0.131	0.128	0.115	0.135
29	MH741821.1 *Pseudomys oralis* voucher CACG KR149	0.104	0.099	0.128	0.128	0.128	0.128	0.106	0.088	0.100	0.095	0.108
30	MH741820.1 *Pseudomys oralis* voucher CACG KR122	0.104	0.109	0.106	0.106	0.106	0.106	0.108	0.099	0.106	0.102	0.109
31	MH741819.1 *Pseudomys oralis* voucher CACG KR034	0.111	0.117	0.113	0.113	0.113	0.113	0.115	0.106	0.113	0.109	0.117
32	MH741818.1 *Pseudomys oralis* voucher CACG KR033	0.133	0.128	0.120	0.120	0.120	0.120	0.122	0.120	0.120	0.126	0.124
33	MH741817.1 *Pseudomys oralis* voucher CACG KR013	0.131	0.126	0.122	0.122	0.122	0.122	0.120	0.119	0.119	0.124	0.122
34	MH741816.1 *Pseudomys occidentalis* voucher ABTC 08144	0.115	0.115	0.126	0.126	0.126	0.126	0.126	0.119	0.124	0.131	0.128
35	MH741815.1 *Pseudomys occidentalis* voucher ABTC 08042	0.115	0.115	0.126	0.126	0.126	0.126	0.126	0.119	0.124	0.131	0.128
36	MH741814.1 *Pseudomys novaehollandiae* voucher ABTC 75991	0.117	0.120	0.133	0.133	0.133	0.133	0.062	0.049	0.064	0.046	0.064

		12	13	14	15	16	17	18	19	20	21	22
37	MH741813.1 *Pseudomys novaehollandiae* voucher ABTC 08140	0.117	0.120	0.130	0.130	0.130	0.130	0.066	0.049	0.060	0.046	0.068
38	MH741785.1 *Pseudomys delicatulus* voucher ABTC 30016	0.111	0.109	0.113	0.113	0.113	0.113	0.060	0.011	0.058	0.049	0.062
39	MH741782.1 *Pseudomys bolami* voucher ABTC 96553	0.119	0.124	0.122	0.122	0.122	0.122	0.095	0.097	0.093	0.091	0.093
40	MH741781.1 *Pseudomys bolami* voucher ABTC 08065	0.117	0.122	0.120	0.120	0.120	0.120	0.093	0.099	0.091	0.093	0.091
41	MH741778.1 *Pseudomys apodemoides* voucher NMV Z7296	0.102	0.108	0.130	0.130	0.130	0.130	0.122	0.119	0.117	0.117	0.124
42	MH741777.1 *Pseudomys apodemoides* voucher ABTC 37663	0.109	0.115	0.130	0.130	0.130	0.130	0.126	0.122	0.120	0.124	0.128
43	MH741776.1 *Pseudomys albocinereus* voucher ABTC 08091	0.100	0.099	0.133	0.133	0.133	0.133	0.126	0.126	0.122	0.124	0.128
44	MH741775.1 *Pseudomys albocinereus* voucher ABTC 08044	0.104	0.102	0.137	0.137	0.137	0.137	0.124	0.130	0.120	0.124	0.126
45	MH741805.1 *Pseudomys hermannsburgensis* voucher ABTC 91375	0.113	0.115	0.119	0.119	0.119	0.119	0.089	0.080	0.088	0.080	0.091
46	MH741804.1 *Pseudomys hermannsburgensis* voucher ABTC 65589	0.111	0.117	0.113	0.113	0.113	0.113	0.086	0.077	0.084	0.077	0.088
47	MH741806.1 *Pseudomys hermannsburgensis* voucher NMV Z1100	0.113	0.115	0.119	0.119	0.119	0.119	0.089	0.080	0.088	0.080	0.091
48	MH741811.1 *Pseudomys nanus* voucher ABTC 08056	0.131	0.137	0.133	0.133	0.133	0.133	0.146	0.131	0.141	0.133	0.148
49	MH741812.1 *Pseudomys nanus* voucher ABTC 30578	0.131	0.137	0.135	0.135	0.135	0.135	0.142	0.131	0.141	0.137	0.144
50	MH741793.1 *Pseudomys desertor* voucher NMV Z21274	0.128	0.126	0.124	0.124	0.124	0.124	0.111	0.113	0.109	0.109	0.113
51	MH741792.1 *Pseudomys desertor* voucher ABTC 113870	0.126	0.124	0.126	0.126	0.126	0.126	0.113	0.111	0.111	0.111	0.115
52	MH741784.1 *Pseudomys chapmani* voucher WAM M40577	0.146	0.144	0.130	0.130	0.130	0.130	0.126	0.120	0.120	0.108	0.128
53	MH741780.1 *Pseudomys australis* voucher ABTC 35951	0.097	0.095	0.111	0.111	0.111	0.111	0.102	0.113	0.100	0.108	0.104
54	MH741783.1 *Pseudomys chapmani* voucher ABTC 62178	0.150	0.144	0.128	0.128	0.128	0.128	0.126	0.120	0.120	0.111	0.128
55	MH741779.1 *Pseudomys australis* voucher ABTC 118844	0.097	0.095	0.111	0.111	0.111	0.111	0.102	0.113	0.100	0.108	0.104
56	HM217740.1 *Rattus rattus* voucher T0841	0.141	0.142	0.170	0.170	0.170	0.170	0.172	0.161	0.173	0.166	0.173

		23	24	25	26	27	28	29	30	31	32	33
1	**PQ01** *P.hermannsburgensis* WIN07 Cytb	0.011	0.012	0.012	0.013	0.014	0.014	0.012	0.013	0.013	0.013	0.013
2	**PQ02** *P.hermannsburgensis* WIN02 Cytb	0.011	0.013	0.013	0.013	0.014	0.014	0.013	0.013	0.013	0.013	0.013
3	**PQ03** *P.desertor* WIN02 Cytb	0.013	0.012	0.012	0.010	0.015	0.015	0.013	0.013	0.013	0.013	0.013
4	MH741810.1 *Pseudomys johnsoni* voucher ABTC 30351	0.014	0.014	0.014	0.014	0.010	0.011	0.014	0.013	0.013	0.014	0.015
5	MH741809.1 *Pseudomys johnsoni* voucher ABTC 84990	0.014	0.014	0.014	0.014	0.010	0.010	0.014	0.013	0.013	0.015	0.015
6	MH741808.1 *Pseudomys johnsoni* voucher ABTC 08055	0.014	0.014	0.014	0.014	0.011	0.011	0.014	0.013	0.013	0.015	0.015
7	MH741807.1 *Pseudomys higginsi* voucher ABTC 08139	0.014	0.015	0.015	0.013	0.015	0.015	0.014	0.014	0.015	0.014	0.014
8	MH741802.1 *Pseudomys fumeus* voucher NMV Z25963	0.014	0.013	0.013	0.014	0.015	0.015	0.013	0.013	0.014	0.015	0.015
9	MH741803.1 *Pseudomys gracilicaudatus* voucher ABTC 08031	0.014	0.015	0.015	0.014	0.015	0.015	0.014	0.014	0.014	0.014	0.014
10	MH741800.1 *Pseudomys fumeus* voucher NMV Z22890	0.014	0.013	0.013	0.014	0.015	0.015	0.013	0.013	0.014	0.014	0.014
11	MH741801.1 *Pseudomys fumeus* voucher NMV Z25138	0.014	0.013	0.013	0.014	0.015	0.015	0.013	0.013	0.014	0.014	0.014
12	MH741799.1 *Pseudomys fumeus* voucher ABTC 08169	0.014	0.013	0.013	0.014	0.015	0.015	0.013	0.013	0.013	0.015	0.014
13	MH741798.1 *Pseudomys fumeus* voucher ABTC 0816	0.013	0.013	0.013	0.014	0.015	0.015	0.013	0.013	0.014	0.014	0.014
14	MH741797.1 *Pseudomys fieldi* voucher ABTC 08164	0.014	0.014	0.014	0.014	0.015	0.015	0.014	0.013	0.014	0.014	0.014
15	MH741796.1 *Pseudomys fieldi* voucher WAM M56289	0.014	0.014	0.014	0.014	0.015	0.015	0.014	0.013	0.014	0.014	0.014
16	MH741795.1 *Pseudomys fieldi* voucher WAM M53674	0.014	0.014	0.014	0.014	0.015	0.015	0.014	0.013	0.014	0.014	0.014
17	MH741794.1 *Pseudomys fieldi* voucher WAM M53673	0.014	0.014	0.014	0.014	0.015	0.015	0.014	0.013	0.014	0.014	0.014
18	MH741790.1 *Pseudomys delicatulus* voucher WAM M55250	0.010	0.014	0.014	0.014	0.014	0.015	0.013	0.013	0.014	0.014	0.014
19	MH741791.1 *Pseudomys delicatulus* voucher NMV Z18879	0.005	0.013	0.013	0.014	0.014	0.014	0.012	0.013	0.013	0.014	0.014
20	MH741789.1 *Pseudomys delicatulus* voucher WAM M53733	0.010	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.014	0.014	0.014
21	MH741788.1 *Pseudomys delicatulus* voucher ABTC 72733	0.009	0.013	0.013	0.013	0.014	0.014	0.013	0.013	0.013	0.014	0.014
22	MH741787.1 *Pseudomys delicatulus* voucher ABTC 62035	0.011	0.014	0.014	0.014	0.014	0.015	0.013	0.013	0.014	0.014	0.014
23	MH741786.1 *Pseudomys delicatulus* voucher ABTC 41185		0.013	0.013	0.013	0.014	0.014	0.012	0.013	0.013	0.013	0.013
24	MH741826.1 *Pseudomys shortridgei* voucher NMV Z25113	0.106		0.000	0.013	0.014	0.014	0.012	0.011	0.012	0.014	0.014
25	MH741825.1 *Pseudomys shortridgei* voucher NMV Z24891	0.106	0.000		0.013	0.014	0.014	0.012	0.011	0.012	0.014	0.014
26	MH741824.1 *Pseudomys shortridgei* voucher ABTC 08079	0.108	0.097	0.097		0.015	0.015	0.012	0.012	0.013	0.013	0.013
27	MH741823.1 *Pseudomys patrius* voucher ABTC 32211	0.126	0.126	0.126	0.135		0.005	0.014	0.013	0.014	0.015	0.015
28	MH741822.1 *Pseudomys patrius* voucher ABTC 32205	0.130	0.126	0.126	0.139	0.015		0.014	0.013	0.014	0.015	0.015
29	MH741821.1 *Pseudomys oralis* voucher CACG KR149	0.086	0.089	0.089	0.091	0.122	0.126		0.013	0.013	0.012	0.012
30	MH741820.1 *Pseudomys oralis* voucher CACG KR122	0.097	0.078	0.078	0.089	0.111	0.111	0.102		0.004	0.014	0.014
31	MH741819.1 *Pseudomys oralis* voucher CACG KR034	0.104	0.086	0.086	0.097	0.113	0.113	0.109	0.007		0.014	0.014
32	MH741818.1 *Pseudomys oralis* voucher CACG KR033	0.109	0.122	0.122	0.106	0.141	0.144	0.086	0.124	0.131		0.002
33	MH741817.1 *Pseudomys oralis* voucher CACG KR013	0.108	0.120	0.120	0.104	0.142	0.146	0.084	0.122	0.130	0.002	
34	MH741816.1 *Pseudomys occidentalis* voucher ABTC 08144	0.120	0.124	0.124	0.124	0.131	0.131	0.104	0.122	0.126	0.117	0.115
35	MH741815.1 *Pseudomys occidentalis* voucher ABTC 08042	0.120	0.124	0.124	0.124	0.131	0.131	0.104	0.122	0.126	0.117	0.115
36	MH741814.1 *Pseudomys novaehollandiae* voucher ABTC 75991	0.046	0.109	0.109	0.124	0.131	0.135	0.104	0.102	0.109	0.120	0.119

		23	24	25	26	27	28	29	30	31	32	33
37	MH741813.1 *Pseudomys novaehollandiae* voucher ABTC 08140	0.046	0.113	0.113	0.120	0.135	0.135	0.100	0.099	0.106	0.124	0.122
38	MH741785.1 *Pseudomys delicatulus* voucher ABTC 30016	0.015	0.104	0.104	0.115	0.124	0.124	0.088	0.095	0.102	0.117	0.115
39	MH741782.1 *Pseudomys bolami* voucher ABTC 96553	0.089	0.113	0.113	0.100	0.120	0.117	0.111	0.093	0.097	0.128	0.126
40	MH741781.1 *Pseudomys bolami* voucher ABTC 08065	0.091	0.115	0.115	0.102	0.119	0.115	0.113	0.091	0.095	0.130	0.128
41	MH741778.1 *Pseudomys apodemoides* voucher NMV Z7296	0.111	0.104	0.104	0.113	0.120	0.120	0.106	0.095	0.099	0.113	0.111
42	MH741777.1 *Pseudomys apodemoides* voucher ABTC 37663	0.115	0.111	0.111	0.117	0.120	0.120	0.106	0.102	0.106	0.115	0.113
43	MH741776.1 *Pseudomys albocinereus* voucher ABTC 08091	0.115	0.102	0.102	0.104	0.117	0.120	0.100	0.093	0.097	0.117	0.115
44	MH741775.1 *Pseudomys albocinereus* voucher ABTC 08044	0.119	0.108	0.108	0.119	0.128	0.128	0.111	0.100	0.104	0.122	0.120
45	MH741805.1 *Pseudomys hermannsburgensis* voucher ABTC 91375	0.077	0.100	0.100	0.102	0.130	0.130	0.095	0.099	0.106	0.106	0.104
46	MH741804.1 *Pseudomys hermannsburgensis* voucher ABTC 65589	0.073	0.095	0.095	0.097	0.120	0.124	0.093	0.091	0.099	0.108	0.106
47	MH741806.1 *Pseudomys hermannsburgensis* voucher NMV Z1100	0.077	0.100	0.100	0.102	0.130	0.130	0.095	0.099	0.106	0.106	0.104
48	MH741811.1 *Pseudomys nanus* voucher ABTC 08056	0.124	0.142	0.142	0.109	0.137	0.139	0.119	0.115	0.117	0.120	0.119
49	MH741812.1 *Pseudomys nanus* voucher ABTC 30578	0.124	0.142	0.142	0.113	0.131	0.137	0.122	0.115	0.117	0.117	0.115
50	MH741793.1 *Pseudomys desertor* voucher NMV Z21274	0.109	0.089	0.089	0.058	0.135	0.135	0.099	0.102	0.109	0.106	0.108
51	MH741792.1 *Pseudomys desertor* voucher ABTC 113870	0.108	0.088	0.088	0.057	0.137	0.137	0.100	0.100	0.108	0.108	0.109
52	MH741784.1 *Pseudomys chapmani* voucher WAM M40577	0.109	0.141	0.141	0.137	0.109	0.113	0.130	0.126	0.124	0.133	0.135
53	MH741780.1 *Pseudomys australis* voucher ABTC 35951	0.106	0.117	0.117	0.109	0.128	0.128	0.120	0.109	0.117	0.115	0.113
54	MH741783.1 *Pseudomys chapmani* voucher ABTC 62178	0.113	0.142	0.142	0.139	0.104	0.111	0.124	0.124	0.122	0.135	0.137
55	MH741779.1 *Pseudomys australis* voucher ABTC 118844	0.106	0.117	0.117	0.109	0.128	0.128	0.120	0.109	0.117	0.115	0.113
56	HM217740.1 *Rattus rattus* voucher T0841	0.159	0.159	0.159	0.153	0.168	0.172	0.177	0.146	0.150	0.166	0.164

		34	35	36	37	38	39	40	41	42	43	44
1	**PQ01** *P.hermannsburgensis* WIN07 Cytb	0.014	0.014	0.011	0.012	0.011	0.011	0.011	0.014	0.014	0.014	0.014
2	**PQ02** *P.hermannsburgensis* WIN02 Cytb	0.014	0.014	0.012	0.012	0.011	0.011	0.011	0.014	0.014	0.014	0.014
3	**PQ03** *P.desertor* WIN02 Cytb	0.014	0.014	0.014	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.014
4	MH741810.1 *Pseudomys johnsoni* voucher ABTC 30351	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.014	0.014	0.014	0.014
5	MH741809.1 *Pseudomys johnsoni* voucher ABTC 84990	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.015
6	MH741808.1 *Pseudomys johnsoni* voucher ABTC 08055	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
7	MH741807.1 *Pseudomys higginsi* voucher ABTC 08139	0.015	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
8	MH741802.1 *Pseudomys fumeus* voucher NMV Z25963	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013
9	MH741803.1 *Pseudomys gracilicaudatus* voucher ABTC 08031	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.015	0.015	0.014	0.015
10	MH741800.1 *Pseudomys fumeus* voucher NMV Z22890	0.013	0.013	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013
11	MH741801.1 *Pseudomys fumeus* voucher NMV Z25138	0.013	0.013	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013
12	MH741799.1 *Pseudomys fumeus* voucher ABTC 08169	0.014	0.014	0.014	0.014	0.013	0.014	0.014	0.013	0.013	0.013	0.013
13	MH741798.1 *Pseudomys fumeus* voucher ABTC 0816	0.014	0.014	0.014	0.014	0.013	0.014	0.014	0.013	0.014	0.013	0.013
14	MH741797.1 *Pseudomys fieldi* voucher ABTC 08164	0.014	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.015
15	MH741796.1 *Pseudomys fieldi* voucher WAM M56289	0.014	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.015
16	MH741795.1 *Pseudomys fieldi* voucher WAM M53674	0.014	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.015
17	MH741794.1 *Pseudomys fieldi* voucher WAM M53673	0.014	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.015
18	MH741790.1 *Pseudomys delicatulus* voucher WAM M55250	0.014	0.014	0.010	0.011	0.010	0.013	0.012	0.014	0.014	0.014	0.014
19	MH741791.1 *Pseudomys delicatulus* voucher NMV Z18879	0.014	0.014	0.009	0.009	0.004	0.013	0.013	0.014	0.014	0.014	0.014
20	MH741789.1 *Pseudomys delicatulus* voucher WAM M53733	0.014	0.014	0.010	0.010	0.010	0.012	0.012	0.014	0.014	0.014	0.014
21	MH741788.1 *Pseudomys delicatulus* voucher ABTC 72733	0.014	0.014	0.009	0.009	0.009	0.012	0.012	0.014	0.014	0.014	0.014
22	MH741787.1 *Pseudomys delicatulus* voucher ABTC 62035	0.014	0.014	0.010	0.011	0.010	0.012	0.012	0.014	0.014	0.014	0.014
23	MH741786.1 *Pseudomys delicatulus* voucher ABTC 41185	0.014	0.014	0.009	0.009	0.005	0.012	0.012	0.013	0.014	0.014	0.014
24	MH741826.1 *Pseudomys shortridgei* voucher NMV Z25113	0.014	0.014	0.013	0.014	0.013	0.014	0.014	0.013	0.013	0.013	0.013
25	MH741825.1 *Pseudomys shortridgei* voucher NMV Z24891	0.014	0.014	0.013	0.014	0.013	0.014	0.014	0.013	0.013	0.013	0.013
26	MH741824.1 *Pseudomys shortridgei* voucher ABTC 08079	0.014	0.014	0.014	0.014	0.014	0.013	0.013	0.014	0.014	0.013	0.014
27	MH741823.1 *Pseudomys patrius* voucher ABTC 32211	0.014	0.014	0.014	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014
28	MH741822.1 *Pseudomys patrius* voucher ABTC 32205	0.014	0.014	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.014
29	MH741821.1 *Pseudomys oralis* voucher CACG KR149	0.013	0.013	0.013	0.013	0.012	0.013	0.014	0.013	0.013	0.013	0.013
30	MH741820.1 *Pseudomys oralis* voucher CACG KR122	0.014	0.014	0.013	0.013	0.013	0.012	0.012	0.013	0.013	0.012	0.013
31	MH741819.1 *Pseudomys oralis* voucher CACG KR034	0.014	0.014	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013	0.013
32	MH741818.1 *Pseudomys oralis* voucher CACG KR033	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
33	MH741817.1 *Pseudomys oralis* voucher CACG KR013	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.014	0.014
34	MH741816.1 *Pseudomys occidentalis* voucher ABTC 08144		0.000	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.014
35	MH741815.1 *Pseudomys occidentalis* voucher ABTC 08042	0.000		0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013	0.014
36	MH741814.1 *Pseudomys novaehollandiae* voucher ABTC 75991	0.124	0.124		0.004	0.009	0.012	0.012	0.014	0.014	0.014	0.014

		34	35	36	37	38	39	40	41	42	43	44
37	MH741813.1 *Pseudomys novaehollandiae* voucher ABTC 08140	0.124	0.124	0.007		0.009	0.012	0.012	0.014	0.014	0.014	0.014
38	MH741785.1 *Pseudomys delicatulus* voucher ABTC 30016	0.117	0.117	0.049	0.049		0.012	0.012	0.014	0.014	0.014	0.014
39	MH741782.1 *Pseudomys bolami* voucher ABTC 96553	0.113	0.113	0.088	0.091	0.093		0.002	0.013	0.014	0.013	0.013
40	MH741781.1 *Pseudomys bolami* voucher ABTC 08065	0.111	0.111	0.089	0.093	0.091	0.002		0.013	0.014	0.013	0.013
41	MH741778.1 *Pseudomys apodemoides* voucher NMV Z7296	0.108	0.108	0.124	0.124	0.122	0.109	0.111		0.004	0.009	0.010
42	MH741777.1 *Pseudomys apodemoides* voucher ABTC 37663	0.111	0.111	0.131	0.131	0.124	0.113	0.115	0.007		0.010	0.010
43	MH741776.1 *Pseudomys albocinereus* voucher ABTC 08091	0.108	0.108	0.119	0.120	0.122	0.108	0.106	0.051	0.055		0.005
44	MH741775.1 *Pseudomys albocinereus* voucher ABTC 08044	0.113	0.113	0.122	0.124	0.126	0.111	0.109	0.055	0.058	0.016	
45	MH741805.1 *Pseudomys hermannsburgensis* voucher ABTC 91375	0.119	0.119	0.082	0.086	0.077	0.071	0.073	0.113	0.117	0.115	0.122
46	MH741804.1 *Pseudomys hermannsburgensis* voucher ABTC 65589	0.113	0.113	0.078	0.082	0.077	0.069	0.071	0.108	0.111	0.113	0.120
47	MH741806.1 *Pseudomys hermannsburgensis* voucher NMV Z1100	0.119	0.119	0.082	0.086	0.077	0.071	0.073	0.113	0.117	0.115	0.122
48	MH741811.1 *Pseudomys nanus* voucher ABTC 08056	0.142	0.142	0.133	0.130	0.130	0.120	0.122	0.117	0.115	0.113	0.124
49	MH741812.1 *Pseudomys nanus* voucher ABTC 30578	0.139	0.139	0.133	0.133	0.126	0.124	0.122	0.120	0.119	0.113	0.124
50	MH741793.1 *Pseudomys desertor* voucher NMV Z21274	0.120	0.120	0.115	0.111	0.113	0.113	0.115	0.122	0.126	0.124	0.131
51	MH741792.1 *Pseudomys desertor* voucher ABTC 113870	0.122	0.122	0.113	0.109	0.111	0.115	0.117	0.120	0.124	0.122	0.130
52	MH741784.1 *Pseudomys chapmani* voucher WAM M40577	0.128	0.128	0.124	0.124	0.113	0.109	0.108	0.115	0.120	0.117	0.128
53	MH741780.1 *Pseudomys australis* voucher ABTC 35951	0.122	0.122	0.109	0.113	0.102	0.104	0.102	0.111	0.109	0.109	0.108
54	MH741783.1 *Pseudomys chapmani* voucher ABTC 62178	0.128	0.128	0.124	0.124	0.120	0.111	0.109	0.113	0.119	0.119	0.130
55	MH741779.1 *Pseudomys australis* voucher ABTC 118844	0.122	0.122	0.109	0.113	0.102	0.104	0.102	0.111	0.109	0.109	0.108
56	HM217740.1 *Rattus rattus* voucher T0841	0.159	0.159	0.161	0.168	0.159	0.155	0.153	0.142	0.150	0.139	0.150

		45	46	47	48	49	50	51	52	53	54	55
1	**PQ01** *P.hermannsburgensis* WIN07 Cytb	0.004	0.003	0.004	0.014	0.014	0.013	0.013	0.014	0.013	0.014	0.013
2	**PQ02** *P.hermannsburgensis* WIN02 Cytb	0.000	0.004	0.000	0.014	0.014	0.013	0.013	0.014	0.013	0.014	0.013
3	**PQ03** *P.desertor* WIN02 Cytb	0.013	0.013	0.013	0.015	0.015	0.003	0.002	0.015	0.014	0.015	0.014
4	MH741810.1 *Pseudomys johnsoni* voucher ABTC 30351	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.012	0.014
5	MH741809.1 *Pseudomys johnsoni* voucher ABTC 84990	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.013	0.014
6	MH741808.1 *Pseudomys johnsoni* voucher ABTC 08055	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.013	0.014
7	MH741807.1 *Pseudomys higginsi* voucher ABTC 08139	0.013	0.013	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
8	MH741802.1 *Pseudomys fumeus* voucher NMV Z25963	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.015	0.013	0.015	0.013
9	MH741803.1 *Pseudomys gracilicaudatus* voucher ABTC 08031	0.014	0.014	0.014	0.010	0.010	0.015	0.015	0.015	0.015	0.015	0.015
10	MH741800.1 *Pseudomys fumeus* voucher NMV Z22890	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.015	0.013	0.015	0.013
11	MH741801.1 *Pseudomys fumeus* voucher NMV Z25138	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.015	0.013	0.015	0.013
12	MH741799.1 *Pseudomys fumeus* voucher ABTC 08169	0.014	0.013	0.014	0.014	0.014	0.014	0.014	0.015	0.013	0.015	0.013
13	MH741798.1 *Pseudomys fumeus* voucher ABTC 0816	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.015	0.013	0.015	0.013
14	MH741797.1 *Pseudomys fieldi* voucher ABTC 08164	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.014	0.013	0.014	0.013
15	MH741796.1 *Pseudomys fieldi* voucher WAM M56289	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.014	0.013	0.014	0.013
16	MH741795.1 *Pseudomys fieldi* voucher WAM M53674	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.014	0.013	0.014	0.013
17	MH741794.1 *Pseudomys fieldi* voucher WAM M53673	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.014	0.013	0.014	0.013
18	MH741790.1 *Pseudomys delicatulus* voucher WAM M55250	0.012	0.012	0.012	0.015	0.015	0.013	0.014	0.014	0.013	0.014	0.013
19	MH741791.1 *Pseudomys delicatulus* voucher NMV Z18879	0.012	0.011	0.012	0.014	0.014	0.014	0.013	0.014	0.014	0.014	0.014
20	MH741789.1 *Pseudomys delicatulus* voucher WAM M53733	0.012	0.012	0.012	0.015	0.015	0.013	0.013	0.014	0.013	0.014	0.013
21	MH741788.1 *Pseudomys delicatulus* voucher ABTC 72733	0.012	0.011	0.012	0.015	0.015	0.013	0.013	0.013	0.013	0.013	0.013
22	MH741787.1 *Pseudomys delicatulus* voucher ABTC 62035	0.012	0.012	0.012	0.015	0.015	0.014	0.014	0.014	0.013	0.014	0.013
23	MH741786.1 *Pseudomys delicatulus* voucher ABTC 41185	0.011	0.011	0.011	0.014	0.014	0.013	0.013	0.013	0.013	0.014	0.013
24	MH741826.1 *Pseudomys shortridgei* voucher NMV Z25113	0.013	0.013	0.013	0.015	0.015	0.012	0.012	0.015	0.014	0.015	0.014
25	MH741825.1 *Pseudomys shortridgei* voucher NMV Z24891	0.013	0.013	0.013	0.015	0.015	0.012	0.012	0.015	0.014	0.015	0.014
26	MH741824.1 *Pseudomys shortridgei* voucher ABTC 08079	0.013	0.013	0.013	0.013	0.014	0.010	0.010	0.015	0.013	0.015	0.013
27	MH741823.1 *Pseudomys patrius* voucher ABTC 32211	0.014	0.014	0.014	0.015	0.014	0.015	0.015	0.013	0.014	0.013	0.014
28	MH741822.1 *Pseudomys patrius* voucher ABTC 32205	0.014	0.014	0.014	0.015	0.015	0.015	0.015	0.014	0.014	0.013	0.014
29	MH741821.1 *Pseudomys oralis* voucher CACG KR149	0.013	0.012	0.013	0.014	0.014	0.013	0.013	0.014	0.014	0.014	0.014
30	MH741820.1 *Pseudomys oralis* voucher CACG KR122	0.013	0.012	0.013	0.014	0.014	0.013	0.013	0.014	0.013	0.014	0.013
31	MH741819.1 *Pseudomys oralis* voucher CACG KR034	0.013	0.013	0.013	0.014	0.014	0.013	0.013	0.014	0.014	0.014	0.014
32	MH741818.1 *Pseudomys oralis* voucher CACG KR033	0.013	0.013	0.013	0.014	0.014	0.013	0.013	0.015	0.014	0.015	0.014
33	MH741817.1 *Pseudomys oralis* voucher CACG KR013	0.013	0.013	0.013	0.014	0.014	0.013	0.013	0.015	0.014	0.015	0.014
34	MH741816.1 *Pseudomys occidentalis* voucher ABTC 08144	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014
35	MH741815.1 *Pseudomys occidentalis* voucher ABTC 08042	0.014	0.014	0.014	0.015	0.015	0.014	0.014	0.014	0.014	0.014	0.014
36	MH741814.1 *Pseudomys novaehollandiae* voucher ABTC 75991	0.012	0.011	0.012	0.015	0.015	0.014	0.014	0.014	0.013	0.014	0.013

		45	46	47	48	49	50	51	52	53	54	55
37	MH741813.1 *Pseudomys novaehollandiae* voucher ABTC 08140	0.012	0.012	0.012	0.014	0.015	0.013	0.013	0.014	0.014	0.014	0.014
38	MH741785.1 *Pseudomys delicatulus* voucher ABTC 30016	0.011	0.011	0.011	0.014	0.014	0.014	0.013	0.014	0.013	0.014	0.013
39	MH741782.1 *Pseudomys bolami* voucher ABTC 96553	0.011	0.011	0.011	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013
40	MH741781.1 *Pseudomys bolami* voucher ABTC 08065	0.011	0.011	0.011	0.014	0.014	0.014	0.014	0.013	0.013	0.013	0.013
41	MH741778.1 *Pseudomys apodemoides* voucher NMV Z7296	0.014	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.013
42	MH741777.1 *Pseudomys apodemoides* voucher ABTC 37663	0.014	0.013	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.013
43	MH741776.1 *Pseudomys albocinereus* voucher ABTC 08091	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.013
44	MH741775.1 *Pseudomys albocinereus* voucher ABTC 08044	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.013	0.014	0.013
45	MH741805.1 *Pseudomys hermannsburgensis* voucher ABTC 91375		0.004	0.000	0.014	0.014	0.013	0.013	0.014	0.013	0.014	0.013
46	MH741804.1 *Pseudomys hermannsburgensis* voucher ABTC 65589	0.009		0.004	0.014	0.014	0.013	0.013	0.014	0.013	0.014	0.013
47	MH741806.1 *Pseudomys hermannsburgensis* voucher NMV Z1100	0.000	0.009		0.014	0.014	0.013	0.013	0.014	0.013	0.014	0.013
48	MH741811.1 *Pseudomys nanus* voucher ABTC 08056	0.119	0.117	0.119		0.004	0.014	0.014	0.014	0.014	0.014	0.014
49	MH741812.1 *Pseudomys nanus* voucher ABTC 30578	0.119	0.117	0.119	0.007		0.014	0.014	0.014	0.014	0.014	0.014
50	MH741793.1 *Pseudomys desertor* voucher NMV Z21274	0.100	0.095	0.100	0.130	0.130		0.002	0.015	0.013	0.015	0.013
51	MH741792.1 *Pseudomys desertor* voucher ABTC 113870	0.102	0.097	0.102	0.131	0.131	0.002		0.015	0.013	0.015	0.013
52	MH741784.1 *Pseudomys chapmani* voucher WAM M40577	0.119	0.119	0.119	0.128	0.128	0.144	0.146		0.014	0.005	0.014
53	MH741780.1 *Pseudomys australis* voucher ABTC 35951	0.102	0.104	0.102	0.126	0.122	0.109	0.111	0.130		0.015	0.000
54	MH741783.1 *Pseudomys chapmani* voucher ABTC 62178	0.124	0.120	0.124	0.128	0.128	0.139	0.141	0.016	0.133		0.015
55	MH741779.1 *Pseudomys australis* voucher ABTC 118844	0.102	0.104	0.102	0.126	0.122	0.109	0.111	0.130	0.000	0.133	
56	HM217740.1 *Rattus rattus* voucher T0841	0.153	0.151	0.153	0.175	0.172	0.168	0.166	0.172	0.153	0.175	0.153

		56
1	**PQ01** *P.hermannsburgensis* WIN07 Cytb	0.015
2	**PQ02** *P.hermannsburgensis* WIN02 Cytb	0.015
3	**PQ03** *P.desertor* WIN02 Cytb	0.016
4	MH741810.1 *Pseudomys johnsoni* voucher ABTC 30351	0.016
5	MH741809.1 *Pseudomys johnsoni* voucher ABTC 84990	0.016
6	MH741808.1 *Pseudomys johnsoni* voucher ABTC 08055	0.015
7	MH741807.1 *Pseudomys higginsi* voucher ABTC 08139	0.017
8	MH741802.1 *Pseudomys fumeus* voucher NMV Z25963	0.015
9	MH741803.1 *Pseudomys gracilicaudatus* voucher ABTC 08031	0.016
10	MH741800.1 *Pseudomys fumeus* voucher NMV Z22890	0.015
11	MH741801.1 *Pseudomys fumeus* voucher NMV Z25138	0.015
12	MH741799.1 *Pseudomys fumeus* voucher ABTC 08169	0.015
13	MH741798.1 *Pseudomys fumeus* voucher ABTC 0816	0.015
14	MH741797.1 *Pseudomys fieldi* voucher ABTC 08164	0.016
15	MH741796.1 *Pseudomys fieldi* voucher WAM M56289	0.016
16	MH741795.1 *Pseudomys fieldi* voucher WAM M53674	0.016
17	MH741794.1 *Pseudomys fieldi* voucher WAM M53673	0.016
18	MH741790.1 *Pseudomys delicatulus* voucher WAM M55250	0.016
19	MH741791.1 *Pseudomys delicatulus* voucher NMV Z18879	0.016
20	MH741789.1 *Pseudomys delicatulus* voucher WAM M53733	0.016
21	MH741788.1 *Pseudomys delicatulus* voucher ABTC 72733	0.016
22	MH741787.1 *Pseudomys delicatulus* voucher ABTC 62035	0.016
23	MH741786.1 *Pseudomys delicatulus* voucher ABTC 41185	0.016
24	MH741826.1 *Pseudomys shortridgei* voucher NMV Z25113	0.016
25	MH741825.1 *Pseudomys shortridgei* voucher NMV Z24891	0.016
26	MH741824.1 *Pseudomys shortridgei* voucher ABTC 08079	0.015
27	MH741823.1 *Pseudomys patrius* voucher ABTC 32211	0.016
28	MH741822.1 *Pseudomys patrius* voucher ABTC 32205	0.016
29	MH741821.1 *Pseudomys oralis* voucher CACG KR149	0.016
30	MH741820.1 *Pseudomys oralis* voucher CACG KR122	0.015
31	MH741819.1 *Pseudomys oralis* voucher CACG KR034	0.015
32	MH741818.1 *Pseudomys oralis* voucher CACG KR033	0.016
33	MH741817.1 *Pseudomys oralis* voucher CACG KR013	0.016
34	MH741816.1 *Pseudomys occidentalis* voucher ABTC 08144	0.016
35	MH741815.1 *Pseudomys occidentalis* voucher ABTC 08042	0.016
36	MH741814.1 *Pseudomys novaehollandiae* voucher ABTC 75991	0.016

		56
37	MH741813.1 *Pseudomys novaehollandiae* voucher ABTC 08140	0.016
38	MH741785.1 *Pseudomys delicatulus* voucher ABTC 30016	0.016
39	MH741782.1 *Pseudomys bolami* voucher ABTC 96553	0.015
40	MH741781.1 *Pseudomys bolami* voucher ABTC 08065	0.015
41	MH741778.1 *Pseudomys apodemoides* voucher NMV Z7296	0.015
42	MH741777.1 *Pseudomys apodemoides* voucher ABTC 37663	0.015
43	MH741776.1 *Pseudomys albocinereus* voucher ABTC 08091	0.015
44	MH741775.1 *Pseudomys albocinereus* voucher ABTC 08044	0.015
45	MH741805.1 *Pseudomys hermannsburgensis* voucher ABTC 91375	0.015
46	MH741804.1 *Pseudomys hermannsburgensis* voucher ABTC 65589	0.015
47	MH741806.1 *Pseudomys hermannsburgensis* voucher NMV Z1100	0.015
48	MH741811.1 *Pseudomys nanus* voucher ABTC 08056	0.016
49	MH741812.1 *Pseudomys nanus* voucher ABTC 30578	0.016
50	MH741793.1 *Pseudomys desertor* voucher NMV Z21274	0.016
51	MH741792.1 *Pseudomys desertor* voucher ABTC 113870	0.016
52	MH741784.1 *Pseudomys chapmani* voucher WAM M40577	0.016
53	MH741780.1 *Pseudomys australis* voucher ABTC 35951	0.015
54	MH741783.1 *Pseudomys chapmani* voucher ABTC 62178	0.016
55	MH741779.1 *Pseudomys australis* voucher ABTC 118844	0.015
56	HM217740.1 *Rattus rattus* voucher T0841	

		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	**PQ11** *D. calodera* WIN01P Cytb		0.012	0.012	0.006	0.006	0.014	0.017	0.012	0.014	0.013	0.016	0.016	0.016	0.016
2	**PQ14** *D.angusticeps* 168487 Cytb	0.114		0.002	0.013	0.013	0.014	0.017	0.010	0.014	0.013	0.016	0.016	0.015	0.016
3	**PQ15** *D.angusticeps* 156732 Cytb	0.111	0.003		0.013	0.013	0.014	0.017	0.010	0.014	0.013	0.016	0.016	0.015	0.016
4	**PQ16** *D.calodera* 165700 Cytb	0.026	0.120	0.117		0.003	0.013	0.017	0.012	0.014	0.013	0.017	0.016	0.016	0.016
5	**PQ18** *D.calodera* 123650 Cytb	0.023	0.119	0.116	0.006		0.013	0.017	0.012	0.014	0.013	0.017	0.016	0.016	0.016
6	**PQ19** *D.papuensis* 163583 Cytb	0.143	0.145	0.145	0.136	0.136		0.017	0.013	0.002	0.012	0.017	0.016	0.016	0.016
7	AY058966.1 *Demansia atra*	0.230	0.242	0.245	0.233	0.230	0.240		0.017	0.017	0.017	0.017	0.017	0.017	0.017
8	GQ397172.1 *Demansia psammophis*	0.105	0.072	0.076	0.112	0.108	0.128	0.231		0.013	0.013	0.016	0.016	0.016	0.016
9	EU547044.1 *Demansia papuensis*	0.142	0.143	0.143	0.137	0.137	0.002	0.240	0.126		0.012	0.017	0.016	0.016	0.016
10	EU547045.1 *Demansia vestigiata*	0.128	0.117	0.117	0.131	0.128	0.105	0.231	0.122	0.103		0.016	0.016	0.016	0.016
11	GQ397169.1 *Aspidomorphus schlegeli*	0.223	0.210	0.210	0.231	0.230	0.234	0.245	0.227	0.233	0.216		0.016	0.017	0.016
12	EU547052.1 *Cacophis squamulosus*	0.196	0.199	0.197	0.200	0.199	0.200	0.231	0.219	0.200	0.194	0.200		0.016	0.016
13	EU547054.1 *Furina ornata*	0.202	0.191	0.191	0.210	0.210	0.219	0.260	0.202	0.217	0.203	0.230	0.199		0.016
14	FJ587153.1 *Laticauda laticaudata*	0.206	0.208	0.208	0.205	0.208	0.219	0.234	0.206	0.217	0.213	0.225	0.202	0.203	

		1	2	3	4	5	6	7	8	9	10
1	**PQ09** *L.separanda* WIN07P ND4		0.002	0.005	0.018	0.017	0.017	0.017	0.017	0.017	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.002		0.006	0.018	0.017	0.017	0.017	0.017	0.017	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.012	0.014		0.018	0.017	0.017	0.017	0.017	0.017	0.017
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.167	0.169	0.157		0.019	0.019	0.019	0.019	0.019	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.135	0.135	0.138	0.181		0.006	0.000	0.000	0.016	0.016
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.135	0.135	0.138	0.184	0.014		0.006	0.006	0.016	0.016
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.135	0.135	0.138	0.181	0.000	0.014		0.000	0.016	0.016
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.135	0.135	0.138	0.181	0.000	0.014	0.000		0.016	0.016
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.140	0.140	0.143	0.179	0.123	0.114	0.123	0.123		0.003
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.140	0.140	0.143	0.179	0.123	0.114	0.123	0.123	0.005	
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.140	0.143	0.143	0.179	0.126	0.116	0.126	0.126	0.005	0.005
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.140	0.140	0.143	0.179	0.123	0.114	0.123	0.123	0.000	0.005
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.143	0.143	0.145	0.181	0.126	0.116	0.126	0.126	0.002	0.002
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.147	0.147	0.150	0.179	0.111	0.101	0.111	0.111	0.027	0.031
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.147	0.147	0.150	0.193	0.121	0.116	0.121	0.121	0.123	0.128
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.135	0.135	0.128	0.169	0.106	0.097	0.106	0.106	0.123	0.123
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.145	0.145	0.143	0.176	0.138	0.140	0.138	0.138	0.152	0.152
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.152	0.152	0.150	0.186	0.147	0.150	0.147	0.147	0.152	0.152
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.143	0.143	0.140	0.179	0.140	0.143	0.140	0.140	0.155	0.155
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.143	0.143	0.140	0.179	0.140	0.143	0.140	0.140	0.155	0.155
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.152	0.152	0.150	0.186	0.147	0.150	0.147	0.147	0.152	0.152
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.145	0.145	0.147	0.193	0.106	0.106	0.106	0.106	0.077	0.082
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.145	0.145	0.147	0.196	0.109	0.109	0.109	0.109	0.075	0.080
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.135	0.138	0.128	0.193	0.135	0.138	0.135	0.135	0.159	0.159
25	AY169667.1 *Lerista bougainvillii*	0.140	0.138	0.128	0.171	0.130	0.128	0.130	0.130	0.147	0.147
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.118	0.121	0.111	0.169	0.118	0.121	0.118	0.118	0.143	0.138
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.123	0.126	0.116	0.169	0.118	0.121	0.118	0.118	0.143	0.138
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.126	0.123	0.118	0.171	0.118	0.121	0.118	0.118	0.143	0.138
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.128	0.130	0.126	0.171	0.138	0.140	0.138	0.138	0.143	0.138
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.130	0.133	0.128	0.174	0.140	0.138	0.140	0.140	0.140	0.135
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.130	0.133	0.128	0.174	0.140	0.138	0.140	0.140	0.140	0.135
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.135	0.138	0.128	0.174	0.140	0.138	0.140	0.140	0.145	0.140
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.130	0.133	0.128	0.174	0.140	0.143	0.140	0.140	0.145	0.140
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.130	0.133	0.128	0.174	0.140	0.143	0.140	0.140	0.145	0.140
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.130	0.133	0.128	0.174	0.140	0.143	0.140	0.140	0.145	0.140
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.130	0.133	0.128	0.174	0.140	0.143	0.140	0.140	0.145	0.140

		1	2	3	4	5	6	7	8	9	10
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.116	0.118	0.114	0.181	0.140	0.138	0.140	0.140	0.159	0.164
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.116	0.118	0.114	0.181	0.140	0.138	0.140	0.140	0.159	0.164
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.118	0.121	0.116	0.184	0.143	0.140	0.143	0.143	0.157	0.162
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.118	0.121	0.116	0.184	0.143	0.140	0.143	0.143	0.157	0.162
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.116	0.118	0.114	0.186	0.145	0.143	0.145	0.145	0.159	0.164
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.118	0.121	0.116	0.184	0.143	0.140	0.143	0.143	0.157	0.162
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.118	0.121	0.116	0.184	0.143	0.140	0.143	0.143	0.157	0.162
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.118	0.121	0.116	0.184	0.143	0.140	0.143	0.143	0.157	0.162
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.118	0.121	0.116	0.184	0.143	0.140	0.143	0.143	0.157	0.162
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.116	0.118	0.114	0.181	0.140	0.138	0.140	0.140	0.159	0.164
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.123	0.126	0.116	0.186	0.147	0.145	0.147	0.147	0.152	0.157
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.116	0.118	0.114	0.171	0.116	0.111	0.116	0.116	0.128	0.128
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.118	0.121	0.116	0.169	0.118	0.114	0.118	0.118	0.126	0.126
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.130	0.128	0.123	0.169	0.116	0.116	0.116	0.116	0.130	0.135
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.135	0.133	0.128	0.171	0.118	0.118	0.118	0.118	0.133	0.133
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.133	0.133	0.126	0.162	0.116	0.106	0.116	0.116	0.130	0.130
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.140	0.140	0.133	0.164	0.123	0.114	0.123	0.123	0.138	0.138
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.140	0.140	0.133	0.164	0.123	0.114	0.123	0.123	0.138	0.138
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.140	0.140	0.133	0.164	0.123	0.114	0.123	0.123	0.138	0.138
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.143	0.143	0.150	0.193	0.118	0.114	0.118	0.118	0.121	0.126
57	KU309300.1 *Lerista storri* isolate LestA1	0.135	0.135	0.138	0.181	0.000	0.014	0.000	0.000	0.123	0.123
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.123	0.126	0.116	0.169	0.118	0.121	0.118	0.118	0.143	0.138
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.123	0.126	0.116	0.169	0.118	0.121	0.118	0.118	0.143	0.138
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.130	0.130	0.128	0.171	0.094	0.089	0.094	0.094	0.118	0.118
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.135	0.135	0.133	0.171	0.104	0.094	0.104	0.104	0.118	0.118
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.135	0.138	0.128	0.193	0.135	0.138	0.135	0.135	0.159	0.159
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.128	0.128	0.118	0.162	0.116	0.121	0.116	0.116	0.126	0.126
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.130	0.130	0.121	0.164	0.118	0.123	0.118	0.118	0.128	0.128
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.128	0.128	0.118	0.162	0.116	0.121	0.116	0.116	0.126	0.126
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.130	0.130	0.121	0.164	0.118	0.123	0.118	0.118	0.128	0.128
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.130	0.130	0.121	0.164	0.118	0.123	0.118	0.118	0.128	0.128
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.133	0.133	0.126	0.167	0.114	0.118	0.114	0.114	0.130	0.130
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.133	0.133	0.126	0.171	0.118	0.123	0.118	0.118	0.135	0.135
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.130	0.130	0.123	0.167	0.116	0.121	0.116	0.116	0.128	0.128
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.121	0.121	0.114	0.164	0.106	0.111	0.106	0.106	0.123	0.123
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.121	0.121	0.114	0.164	0.106	0.111	0.106	0.106	0.123	0.123

		1	2	3	4	5	6	7	8	9	10
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.138	0.138	0.130	0.176	0.118	0.123	0.118	0.118	0.135	0.135
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.135	0.135	0.128	0.174	0.116	0.121	0.116	0.116	0.133	0.133
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.135	0.135	0.128	0.174	0.116	0.121	0.116	0.116	0.133	0.133
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.138	0.138	0.130	0.176	0.118	0.123	0.118	0.118	0.135	0.135
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.138	0.138	0.130	0.176	0.118	0.123	0.118	0.118	0.135	0.135
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.135	0.135	0.128	0.174	0.116	0.121	0.116	0.116	0.133	0.133
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.138	0.140	0.130	0.159	0.094	0.097	0.094	0.094	0.116	0.116
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.138	0.140	0.130	0.159	0.094	0.097	0.094	0.094	0.116	0.116
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.138	0.140	0.130	0.159	0.094	0.097	0.094	0.094	0.116	0.116
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.138	0.140	0.130	0.159	0.094	0.097	0.094	0.094	0.116	0.116
83	KU309273.1 *Lerista allanae* isolate Leal2	0.116	0.118	0.114	0.181	0.140	0.138	0.140	0.140	0.159	0.164
84	KU309272.1 *Lerista allanae* isolate Leal1	0.123	0.126	0.121	0.188	0.147	0.145	0.147	0.147	0.162	0.167
85	KF823006.1 *Lerista kalumburu*	0.140	0.143	0.135	0.186	0.164	0.155	0.164	0.164	0.167	0.171
86	KF823005.1 *Lerista kalumburu*	0.140	0.143	0.133	0.164	0.155	0.155	0.155	0.155	0.164	0.164
87	KF823007.1 *Lerista kalumburu*	0.147	0.150	0.140	0.179	0.171	0.167	0.171	0.171	0.169	0.174
88	KF823004.1 *Lerista kalumburu*	0.150	0.152	0.145	0.179	0.169	0.164	0.169	0.169	0.176	0.176
89	KF823003.1 *Lerista kalumburu*	0.152	0.155	0.147	0.186	0.169	0.164	0.169	0.169	0.174	0.174
90	KF823002.1 *Lerista kalumburu*	0.155	0.157	0.150	0.184	0.174	0.169	0.174	0.174	0.181	0.181
91	KF823001.1 *Lerista kalumburu*	0.155	0.157	0.150	0.181	0.171	0.167	0.171	0.171	0.181	0.181
92	KF823000.1 *Lerista kalumburu*	0.155	0.157	0.150	0.184	0.167	0.162	0.167	0.167	0.171	0.171
93	KF822999.1 *Lerista kalumburu*	0.145	0.147	0.138	0.164	0.157	0.159	0.157	0.157	0.169	0.169
94	KF822998.1 *Lerista kalumburu*	0.145	0.147	0.138	0.169	0.152	0.150	0.152	0.152	0.179	0.179
95	KF822997.1 *Lerista kalumburu*	0.169	0.171	0.162	0.176	0.174	0.169	0.174	0.174	0.181	0.181
96	EF673035.1 *Lerista zietzi*	0.121	0.123	0.118	0.179	0.128	0.126	0.128	0.128	0.140	0.140
97	EF673036.1 *Lerista zonulata*	0.123	0.121	0.116	0.176	0.157	0.147	0.157	0.157	0.147	0.150
98	EF673034.1 *Lerista yuna*	0.128	0.130	0.118	0.155	0.128	0.126	0.128	0.128	0.150	0.150
99	EF673033.1 *Lerista xanthura*	0.087	0.089	0.085	0.143	0.118	0.111	0.118	0.118	0.121	0.121
100	EF673032.1 *Lerista wilkinsi*	0.135	0.133	0.128	0.171	0.118	0.118	0.118	0.118	0.133	0.133
101	EF673031.1 *Lerista walkeri*	0.106	0.109	0.094	0.159	0.133	0.133	0.133	0.133	0.128	0.128
102	EF673030.1 *Lerista viduata*	0.140	0.140	0.133	0.167	0.138	0.138	0.138	0.138	0.169	0.169
103	EF673029.1 *Lerista vermicularis*	0.143	0.145	0.133	0.176	0.133	0.145	0.133	0.133	0.176	0.176
104	EF673028.1 *Lerista varia*	0.126	0.128	0.116	0.155	0.130	0.133	0.130	0.130	0.143	0.143
105	EF673027.1 *Lerista uniduo*	0.155	0.157	0.145	0.176	0.133	0.138	0.133	0.133	0.176	0.176
106	EF673026.1 *Lerista tridactyla*	0.140	0.138	0.133	0.164	0.138	0.135	0.138	0.138	0.152	0.150
107	EF673025.1 *Lerista terdigitata*	0.133	0.130	0.130	0.162	0.130	0.133	0.130	0.130	0.159	0.157
108	EF673024.1 *Lerista taeniata*	0.111	0.114	0.101	0.167	0.130	0.128	0.130	0.130	0.150	0.147

		1	2	3	4	5	6	7	8	9	10
109	EF673023.1 *Lerista stylis*	0.135	0.138	0.123	0.184	0.140	0.135	0.140	0.140	0.159	0.159
110	EF673022.1 *Lerista stictopleura*	0.121	0.123	0.116	0.167	0.126	0.121	0.126	0.126	0.145	0.150
111	EF673021.1 *Lerista chordae*	0.135	0.135	0.133	0.169	0.135	0.133	0.135	0.135	0.140	0.140
112	EF673020.1 *Lerista speciosa*	0.145	0.147	0.135	0.169	0.145	0.145	0.145	0.145	0.155	0.152
113	EF673019.1 *Lerista simillima*	0.138	0.140	0.128	0.169	0.133	0.140	0.133	0.133	0.167	0.167
114	EF673018.1 *Lerista robusta*	0.140	0.143	0.133	0.174	0.147	0.155	0.147	0.147	0.152	0.152
115	EF673017.1 *Lerista puncticauda*	0.099	0.097	0.101	0.157	0.128	0.133	0.128	0.128	0.138	0.138
116	EF673016.1 *Lerista punctatovittata*	0.128	0.126	0.121	0.184	0.162	0.155	0.162	0.162	0.152	0.152
117	EF673015.1 *Lerista praepedita*	0.147	0.147	0.135	0.167	0.130	0.133	0.130	0.130	0.157	0.157
118	EF673014.1 *Lerista planiventralis*	0.143	0.143	0.143	0.169	0.133	0.133	0.133	0.133	0.150	0.150
119	EF673013.1 *Lerista picturata*	0.128	0.130	0.121	0.181	0.128	0.135	0.128	0.128	0.155	0.155
120	EF673012.1 *Lerista petersoni*	0.145	0.143	0.140	0.174	0.138	0.135	0.138	0.138	0.167	0.167
121	EF673011.1 *Lerista orientalis* NADH	0.121	0.123	0.114	0.159	0.130	0.133	0.130	0.130	0.150	0.150
122	EF673010.1 *Lerista onsloviana*	0.147	0.150	0.143	0.174	0.138	0.126	0.138	0.138	0.152	0.152
123	EF673009.1 *Lerista nichollsi*	0.140	0.143	0.130	0.167	0.140	0.133	0.140	0.140	0.162	0.162
124	EF673008.1 *Lerista neander*	0.121	0.123	0.118	0.164	0.135	0.130	0.135	0.135	0.143	0.143
125	EF673007.1 *Lerista muelleri*	0.138	0.138	0.133	0.181	0.140	0.135	0.140	0.140	0.159	0.159
126	EF673006.1 *Lerista microtis*	0.152	0.150	0.140	0.169	0.133	0.130	0.133	0.133	0.157	0.157
127	EF673005.1 *Lerista macropisthopus*	0.106	0.104	0.104	0.162	0.123	0.123	0.123	0.123	0.135	0.135
128	EF673004.1 *Lerista lineopunctulata*	0.135	0.138	0.128	0.167	0.138	0.135	0.138	0.138	0.152	0.152
129	EF673003.1 *Lerista lineata*	0.143	0.143	0.135	0.164	0.143	0.143	0.143	0.143	0.147	0.147
130	EF673002.1 *Lerista labialis*	0.135	0.138	0.133	0.171	0.152	0.150	0.152	0.152	0.147	0.147
131	EF673001.1 *Lerista kennedyensis*	0.164	0.162	0.155	0.169	0.147	0.135	0.147	0.147	0.167	0.171
132	EF673000.1 Lerista *kendricki*	0.135	0.138	0.128	0.150	0.138	0.135	0.138	0.138	0.157	0.157
133	EF672999.1 *Lerista karlschmidti*	0.135	0.135	0.138	0.184	0.138	0.135	0.138	0.138	0.167	0.167
134	EF672998.1 *Lerista kalumburu*	0.171	0.174	0.164	0.179	0.176	0.171	0.176	0.176	0.184	0.184
135	EF672997.1 *Lerista ips*	0.128	0.130	0.126	0.176	0.147	0.145	0.147	0.147	0.130	0.130
136	EF672996.1 *Lerista ingrami*	0.135	0.133	0.123	0.181	0.152	0.150	0.152	0.152	0.157	0.155
137	EF672995.1 *Lerista humphriesi*	0.143	0.143	0.135	0.184	0.140	0.143	0.140	0.140	0.169	0.169
138	EF672994.1 *Lerista haroldi*	0.123	0.123	0.126	0.181	0.121	0.126	0.121	0.121	0.157	0.157
139	EF672993.1 *Lerista griffini*	0.126	0.128	0.128	0.188	0.147	0.150	0.147	0.147	0.152	0.152
140	EF672992.1 *Lerista greeri*	0.150	0.152	0.147	0.167	0.135	0.143	0.135	0.135	0.164	0.164
141	EF672991.1 *Lerista gerrardii*	0.123	0.126	0.121	0.169	0.121	0.121	0.121	0.121	0.147	0.147
142	EF672990.1 *Lerista gascoynensis*	0.135	0.138	0.128	0.155	0.135	0.133	0.135	0.135	0.159	0.159
143	EF672989.1 *Lerista frosti*	0.128	0.126	0.121	0.181	0.126	0.126	0.126	0.126	0.145	0.145
144	EF672988.1 *Lerista fragilis*	0.140	0.140	0.133	0.162	0.114	0.109	0.114	0.114	0.140	0.145

		1	2	3	4	5	6	7	8	9	10
145	EF672987.1 *Lerista flammicauda*	0.138	0.135	0.130	0.179	0.138	0.140	0.138	0.138	0.150	0.155
146	EF672986.1 *Lerista eupoda*	0.121	0.118	0.118	0.171	0.128	0.123	0.128	0.128	0.140	0.140
147	EF672985.1 *Lerista emmotti*	0.159	0.157	0.157	0.196	0.167	0.159	0.167	0.167	0.164	0.164
148	EF672984.1 *Lerista elongata*	0.130	0.128	0.128	0.155	0.123	0.121	0.123	0.123	0.152	0.150
149	EF672983.1 *Lerista elegans*	0.128	0.126	0.116	0.159	0.140	0.138	0.140	0.140	0.133	0.133
150	EF672982.1 *Lerista edwardsae*	0.133	0.130	0.126	0.176	0.128	0.138	0.128	0.128	0.147	0.152
151	EF672981.1 *Lerista dorsalis*	0.123	0.121	0.116	0.147	0.147	0.150	0.147	0.147	0.155	0.150
152	EF672980.1 *Lerista distinguenda*	0.128	0.126	0.126	0.174	0.126	0.128	0.126	0.126	0.140	0.140
153	EF672979.1 *Lerista desertorum*	0.104	0.106	0.106	0.155	0.126	0.130	0.126	0.126	0.140	0.140
154	EF672978.1 *Lerista connivens*	0.118	0.121	0.109	0.155	0.126	0.128	0.126	0.126	0.143	0.143
155	EF672977.1 *Lerista cinerea*	0.135	0.135	0.133	0.171	0.104	0.094	0.104	0.104	0.118	0.118
156	EF672976.1 *Lerista christinae*	0.152	0.152	0.150	0.167	0.133	0.135	0.133	0.133	0.162	0.164
157	EF672975.1 *Lerista carpentariae*	0.130	0.130	0.128	0.169	0.116	0.116	0.116	0.116	0.143	0.143
158	EF672974.1 *Lerista borealis*	0.111	0.114	0.101	0.157	0.135	0.130	0.135	0.135	0.140	0.145
159	EF672973.1 *Lerista bipes*	0.150	0.152	0.152	0.196	0.143	0.145	0.143	0.143	0.155	0.155
160	EF672972.1 *Lerista baynesi*	0.155	0.152	0.143	0.167	0.143	0.143	0.143	0.143	0.157	0.157
161	EF672971.1 *Lerista axillaris*	0.104	0.106	0.101	0.164	0.114	0.123	0.114	0.114	0.140	0.140
162	EF672970.1 *Lerista arenicola*	0.162	0.164	0.152	0.176	0.164	0.157	0.164	0.164	0.191	0.191
163	EF672969.1 *Lerista apoda*	0.145	0.145	0.145	0.179	0.114	0.111	0.114	0.114	0.135	0.135
164	EF672968.1 *Lerista ameles*	0.138	0.140	0.130	0.159	0.094	0.097	0.094	0.094	0.116	0.116
165	EF672967.1 *Lerista allochira*	0.126	0.128	0.118	0.138	0.123	0.121	0.123	0.123	0.147	0.147
166	EF672966.1 *Lerista aericeps*	0.106	0.109	0.109	0.145	0.140	0.135	0.140	0.140	0.138	0.138
167	DQ915332.1 *Lerista bougainvillii*	0.138	0.135	0.130	0.169	0.126	0.123	0.126	0.126	0.162	0.162
168	DQ915331.1 *Lerista bipes*	0.143	0.145	0.140	0.171	0.143	0.140	0.143	0.143	0.145	0.145
169	AY169666.1 *Lerista bipes* ND4	0.138	0.140	0.135	0.169	0.145	0.143	0.145	0.145	0.140	0.140
170	EU109216.1 *Lerista macropisthopus* ND4	0.128	0.130	0.126	0.164	0.145	0.143	0.145	0.145	0.143	0.143

		11	12	13	14	15	16	17	18	19	20
1	**PQ09** *L.separanda* WIN07P ND4	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.017	0.017	0.017	0.018	0.018	0.016	0.017	0.018	0.017	0.017
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.019	0.019	0.019	0.019	0.019	0.018	0.019	0.019	0.019	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.016	0.016	0.016	0.015	0.016	0.015	0.017	0.017	0.017	0.017
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.016	0.016	0.016	0.015	0.016	0.015	0.017	0.018	0.017	0.017
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.016	0.016	0.016	0.015	0.016	0.015	0.017	0.017	0.017	0.017
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.016	0.016	0.016	0.015	0.016	0.015	0.017	0.017	0.017	0.017
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.003	0.000	0.002	0.008	0.016	0.016	0.018	0.018	0.018	0.018
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.003	0.003	0.002	0.009	0.016	0.016	0.018	0.018	0.018	0.018
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309		0.003	0.002	0.008	0.016	0.016	0.018	0.018	0.018	0.018
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.005		0.002	0.008	0.016	0.016	0.018	0.018	0.018	0.018
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.002	0.002		0.008	0.016	0.016	0.018	0.018	0.018	0.018
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.029	0.027	0.029		0.016	0.016	0.018	0.018	0.018	0.018
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.126	0.123	0.126	0.123		0.016	0.018	0.018	0.018	0.018
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.126	0.123	0.126	0.116	0.114		0.017	0.017	0.017	0.017
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.155	0.152	0.155	0.162	0.159	0.140		0.005	0.002	0.002
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.155	0.152	0.155	0.162	0.164	0.145	0.010		0.005	0.005
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.157	0.155	0.157	0.164	0.162	0.143	0.002	0.012		0.000
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.157	0.155	0.157	0.164	0.162	0.143	0.002	0.012	0.000	
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.155	0.152	0.155	0.162	0.164	0.145	0.010	0.000	0.012	0.012
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.080	0.077	0.080	0.075	0.109	0.104	0.164	0.159	0.167	0.167
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.077	0.075	0.077	0.072	0.111	0.106	0.164	0.159	0.167	0.167
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.159	0.159	0.162	0.171	0.181	0.147	0.128	0.135	0.130	0.130
25	AY169667.1 *Lerista bougainvillii*	0.150	0.147	0.150	0.147	0.135	0.121	0.140	0.140	0.143	0.143
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.138	0.143	0.140	0.145	0.147	0.133	0.101	0.101	0.104	0.104
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.138	0.143	0.140	0.145	0.147	0.133	0.104	0.104	0.106	0.106
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.140	0.143	0.140	0.145	0.147	0.133	0.104	0.104	0.106	0.106
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.138	0.143	0.140	0.150	0.157	0.143	0.121	0.121	0.123	0.123
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.135	0.140	0.138	0.147	0.159	0.145	0.118	0.118	0.121	0.121
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.135	0.140	0.138	0.147	0.159	0.145	0.118	0.118	0.121	0.121
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.140	0.145	0.143	0.147	0.164	0.145	0.123	0.123	0.126	0.126
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.140	0.145	0.143	0.152	0.159	0.145	0.123	0.123	0.126	0.126
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.140	0.145	0.143	0.152	0.159	0.145	0.123	0.123	0.126	0.126
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.140	0.145	0.143	0.152	0.159	0.145	0.123	0.123	0.126	0.126
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.140	0.145	0.143	0.152	0.159	0.145	0.123	0.123	0.126	0.126

		11	12	13	14	15	16	17	18	19	20
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.159	0.159	0.162	0.162	0.169	0.152	0.128	0.138	0.126	0.126
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.159	0.159	0.162	0.162	0.169	0.152	0.128	0.138	0.126	0.126
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.157	0.157	0.159	0.159	0.171	0.155	0.130	0.140	0.128	0.128
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.157	0.157	0.159	0.159	0.171	0.155	0.128	0.138	0.126	0.126
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.159	0.159	0.162	0.162	0.174	0.157	0.130	0.140	0.128	0.128
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.157	0.157	0.159	0.159	0.171	0.155	0.128	0.138	0.126	0.126
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.157	0.157	0.159	0.159	0.171	0.155	0.128	0.138	0.126	0.126
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.157	0.157	0.159	0.159	0.171	0.155	0.130	0.140	0.128	0.128
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.157	0.157	0.159	0.159	0.171	0.155	0.130	0.140	0.128	0.128
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.159	0.159	0.162	0.162	0.169	0.152	0.128	0.138	0.126	0.126
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.152	0.152	0.155	0.159	0.171	0.155	0.123	0.133	0.121	0.121
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.128	0.128	0.130	0.123	0.147	0.085	0.164	0.164	0.167	0.167
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.126	0.126	0.128	0.121	0.150	0.087	0.167	0.167	0.169	0.169
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.133	0.130	0.133	0.135	0.159	0.097	0.164	0.169	0.167	0.167
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.135	0.133	0.135	0.138	0.167	0.099	0.167	0.171	0.169	0.169
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.133	0.130	0.133	0.128	0.128	0.082	0.143	0.145	0.145	0.145
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.140	0.138	0.140	0.135	0.130	0.085	0.145	0.147	0.147	0.147
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.140	0.138	0.140	0.135	0.130	0.085	0.145	0.147	0.147	0.147
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.140	0.138	0.140	0.135	0.130	0.085	0.145	0.147	0.147	0.147
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.123	0.121	0.123	0.121	0.012	0.116	0.162	0.167	0.164	0.164
57	KU309300.1 *Lerista storri* isolate LestA1	0.126	0.123	0.126	0.111	0.121	0.106	0.138	0.147	0.140	0.140
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.138	0.143	0.140	0.145	0.147	0.133	0.104	0.104	0.106	0.106
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.138	0.143	0.140	0.145	0.147	0.133	0.104	0.104	0.106	0.106
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.121	0.118	0.121	0.111	0.121	0.014	0.135	0.140	0.138	0.138
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.121	0.118	0.121	0.111	0.116	0.010	0.140	0.145	0.143	0.143
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.159	0.159	0.162	0.171	0.181	0.147	0.128	0.135	0.130	0.130
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.130	0.126	0.128	0.130	0.123	0.089	0.138	0.138	0.140	0.140
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.133	0.128	0.130	0.133	0.126	0.092	0.140	0.140	0.143	0.143
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.130	0.126	0.128	0.130	0.123	0.089	0.138	0.138	0.140	0.140
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.133	0.128	0.130	0.133	0.126	0.092	0.140	0.140	0.143	0.143
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.133	0.128	0.130	0.133	0.126	0.092	0.140	0.135	0.143	0.143
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.135	0.130	0.133	0.128	0.135	0.097	0.138	0.143	0.140	0.140
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.140	0.135	0.138	0.133	0.140	0.101	0.143	0.147	0.145	0.145
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.133	0.128	0.130	0.130	0.128	0.094	0.140	0.145	0.143	0.143
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.128	0.123	0.126	0.121	0.123	0.085	0.135	0.140	0.138	0.138
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.128	0.123	0.126	0.121	0.123	0.085	0.135	0.140	0.138	0.138

		11	12	13	14	15	16	17	18	19	20
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.140	0.135	0.138	0.133	0.140	0.101	0.147	0.152	0.150	0.150
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.138	0.133	0.135	0.130	0.138	0.099	0.145	0.150	0.147	0.147
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.138	0.133	0.135	0.130	0.138	0.099	0.145	0.150	0.147	0.147
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.140	0.135	0.138	0.133	0.140	0.101	0.147	0.152	0.150	0.150
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.140	0.135	0.138	0.133	0.140	0.101	0.147	0.152	0.150	0.150
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.138	0.133	0.135	0.130	0.138	0.099	0.145	0.150	0.147	0.147
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.116	0.116	0.118	0.118	0.116	0.101	0.147	0.152	0.150	0.150
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.116	0.116	0.118	0.118	0.116	0.101	0.147	0.152	0.150	0.150
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.116	0.116	0.118	0.118	0.116	0.101	0.147	0.152	0.150	0.150
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.116	0.116	0.118	0.118	0.116	0.101	0.147	0.152	0.150	0.150
83	KU309273.1 *Lerista allanae* isolate Leal2	0.159	0.159	0.162	0.162	0.169	0.152	0.128	0.138	0.126	0.126
84	KU309272.1 *Lerista allanae* isolate Leal1	0.162	0.162	0.164	0.164	0.176	0.159	0.133	0.143	0.130	0.130
85	KF823006.1 *Lerista kalumburu*	0.167	0.167	0.169	0.179	0.169	0.143	0.167	0.174	0.169	0.169
86	KF823005.1 *Lerista kalumburu*	0.164	0.164	0.167	0.169	0.174	0.130	0.171	0.179	0.174	0.174
87	KF823007.1 *Lerista kalumburu*	0.169	0.169	0.171	0.179	0.181	0.140	0.167	0.174	0.169	0.169
88	KF823004.1 *Lerista kalumburu*	0.176	0.176	0.179	0.179	0.184	0.140	0.181	0.188	0.184	0.184
89	KF823003.1 *Lerista kalumburu*	0.174	0.174	0.176	0.176	0.184	0.143	0.179	0.186	0.181	0.181
90	KF823002.1 *Lerista kalumburu*	0.181	0.181	0.184	0.184	0.188	0.145	0.188	0.196	0.191	0.191
91	KF823001.1 *Lerista kalumburu*	0.181	0.181	0.184	0.184	0.191	0.147	0.186	0.193	0.188	0.188
92	KF823000.1 *Lerista kalumburu*	0.171	0.171	0.174	0.174	0.186	0.140	0.176	0.184	0.179	0.179
93	KF822999.1 *Lerista kalumburu*	0.169	0.169	0.171	0.174	0.179	0.135	0.174	0.181	0.176	0.176
94	KF822998.1 *Lerista kalumburu*	0.179	0.179	0.181	0.184	0.174	0.147	0.150	0.157	0.152	0.152
95	KF822997.1 *Lerista kalumburu*	0.181	0.181	0.184	0.191	0.198	0.157	0.152	0.159	0.155	0.155
96	EF673035.1 *Lerista zietzi*	0.140	0.140	0.143	0.152	0.143	0.116	0.140	0.145	0.143	0.143
97	EF673036.1 *Lerista zonulata*	0.147	0.147	0.147	0.159	0.176	0.143	0.157	0.155	0.159	0.159
98	EF673034.1 *Lerista yuna*	0.150	0.150	0.152	0.150	0.159	0.116	0.143	0.147	0.145	0.145
99	EF673033.1 *Lerista xanthura*	0.121	0.121	0.123	0.133	0.138	0.106	0.138	0.140	0.140	0.140
100	EF673032.1 *Lerista wilkinsi*	0.135	0.133	0.135	0.138	0.167	0.099	0.167	0.171	0.169	0.169
101	EF673031.1 *Lerista walkeri*	0.128	0.128	0.130	0.138	0.155	0.116	0.145	0.140	0.143	0.143
102	EF673030.1 *Lerista viduata*	0.171	0.169	0.171	0.171	0.155	0.143	0.159	0.155	0.157	0.157
103	EF673029.1 *Lerista vermicularis*	0.176	0.176	0.179	0.176	0.167	0.145	0.155	0.159	0.157	0.157
104	EF673028.1 *Lerista varia*	0.143	0.143	0.145	0.145	0.140	0.126	0.126	0.128	0.128	0.128
105	EF673027.1 *Lerista uniduo*	0.176	0.176	0.179	0.176	0.155	0.140	0.140	0.145	0.143	0.143
106	EF673026.1 *Lerista tridactyla*	0.152	0.152	0.152	0.159	0.164	0.123	0.140	0.140	0.143	0.143
107	EF673025.1 *Lerista terdigitata*	0.159	0.159	0.159	0.157	0.152	0.118	0.143	0.143	0.145	0.145
108	EF673024.1 *Lerista taeniata*	0.147	0.150	0.150	0.157	0.167	0.130	0.164	0.167	0.167	0.167

		11	12	13	14	15	16	17	18	19	20
109	EF673023.1 *Lerista stylis*	0.159	0.159	0.162	0.164	0.147	0.114	0.176	0.176	0.179	0.179
110	EF673022.1 *Lerista stictopleura*	0.145	0.145	0.147	0.145	0.145	0.128	0.140	0.145	0.143	0.143
111	EF673021.1 *Lerista chordae*	0.143	0.140	0.143	0.147	0.157	0.140	0.162	0.162	0.159	0.159
112	EF673020.1 *Lerista speciosa*	0.152	0.155	0.155	0.162	0.164	0.138	0.147	0.152	0.150	0.150
113	EF673019.1 *Lerista simillima*	0.167	0.167	0.169	0.167	0.162	0.135	0.150	0.155	0.152	0.152
114	EF673018.1 *Lerista robusta*	0.152	0.152	0.155	0.155	0.167	0.138	0.143	0.143	0.145	0.145
115	EF673017.1 *Lerista puncticauda*	0.140	0.138	0.140	0.145	0.159	0.128	0.133	0.135	0.135	0.135
116	EF673016.1 *Lerista punctatovittata*	0.155	0.152	0.155	0.152	0.159	0.145	0.145	0.150	0.143	0.143
117	EF673015.1 *Lerista praepedita*	0.159	0.157	0.159	0.157	0.130	0.116	0.130	0.126	0.133	0.133
118	EF673014.1 *Lerista planiventralis*	0.155	0.150	0.152	0.167	0.143	0.138	0.150	0.150	0.152	0.152
119	EF673013.1 *Lerista picturata*	0.155	0.155	0.157	0.157	0.167	0.135	0.145	0.145	0.147	0.147
120	EF673012.1 *Lerista petersoni*	0.169	0.167	0.169	0.164	0.167	0.130	0.145	0.150	0.147	0.147
121	EF673011.1 *Lerista orientalis* NADH	0.150	0.150	0.152	0.157	0.171	0.121	0.159	0.162	0.157	0.157
122	EF673010.1 *Lerista onsloviana*	0.152	0.152	0.155	0.155	0.159	0.118	0.152	0.152	0.155	0.155
123	EF673009.1 *Lerista nichollsi*	0.162	0.162	0.164	0.167	0.174	0.130	0.159	0.164	0.162	0.162
124	EF673008.1 *Lerista neander*	0.143	0.143	0.145	0.150	0.176	0.121	0.150	0.147	0.147	0.147
125	EF673007.1 *Lerista muelleri*	0.162	0.159	0.162	0.162	0.157	0.140	0.159	0.159	0.162	0.162
126	EF673006.1 *Lerista microtis*	0.159	0.157	0.159	0.167	0.157	0.126	0.157	0.167	0.159	0.159
127	EF673005.1 *Lerista macropisthopus*	0.138	0.135	0.138	0.135	0.155	0.118	0.140	0.143	0.138	0.138
128	EF673004.1 *Lerista lineopunctulata*	0.152	0.152	0.155	0.152	0.162	0.145	0.143	0.145	0.145	0.145
129	EF673003.1 *Lerista lineata*	0.152	0.147	0.150	0.162	0.159	0.135	0.145	0.145	0.147	0.147
130	EF673002.1 *Lerista labialis*	0.143	0.147	0.145	0.150	0.150	0.138	0.145	0.150	0.147	0.147
131	EF673001.1 *Lerista kennedyensis*	0.169	0.167	0.169	0.167	0.176	0.130	0.147	0.152	0.150	0.150
132	EF673000.1 Lerista *kendricki*	0.157	0.157	0.159	0.152	0.169	0.128	0.150	0.155	0.152	0.152
133	EF672999.1 *Lerista karlschmidti*	0.169	0.167	0.169	0.167	0.186	0.143	0.171	0.174	0.174	0.174
134	EF672998.1 *Lerista kalumburu*	0.184	0.184	0.186	0.193	0.196	0.159	0.155	0.162	0.157	0.157
135	EF672997.1 *Lerista ips*	0.130	0.130	0.133	0.138	0.157	0.126	0.126	0.130	0.128	0.128
136	EF672996.1 *Lerista ingrami*	0.157	0.157	0.157	0.159	0.186	0.138	0.155	0.152	0.152	0.152
137	EF672995.1 *Lerista humphriesi*	0.171	0.169	0.171	0.169	0.169	0.152	0.152	0.157	0.150	0.150
138	EF672994.1 *Lerista haroldi*	0.159	0.157	0.159	0.162	0.140	0.133	0.155	0.159	0.157	0.157
139	EF672993.1 *Lerista griffini*	0.152	0.152	0.155	0.147	0.162	0.140	0.150	0.145	0.152	0.152
140	EF672992.1 *Lerista greeri*	0.164	0.164	0.167	0.162	0.159	0.147	0.143	0.143	0.145	0.145
141	EF672991.1 *Lerista gerrardii*	0.147	0.147	0.150	0.155	0.169	0.126	0.135	0.138	0.133	0.133
142	EF672990.1 *Lerista gascoynensis*	0.159	0.159	0.162	0.164	0.167	0.133	0.140	0.145	0.143	0.143
143	EF672989.1 *Lerista frosti*	0.147	0.145	0.147	0.157	0.143	0.140	0.155	0.157	0.152	0.152
144	EF672988.1 *Lerista fragilis*	0.143	0.140	0.143	0.140	0.152	0.130	0.150	0.157	0.152	0.152

		11	12	13	14	15	16	17	18	19	20
145	EF672987.1 *Lerista flammicauda*	0.152	0.150	0.152	0.155	0.140	0.123	0.135	0.135	0.138	0.138
146	EF672986.1 *Lerista eupoda*	0.143	0.140	0.143	0.145	0.159	0.118	0.140	0.143	0.138	0.138
147	EF672985.1 *Lerista emmotti*	0.167	0.164	0.167	0.159	0.167	0.167	0.159	0.164	0.162	0.162
148	EF672984.1 *Lerista elongata*	0.152	0.152	0.152	0.150	0.159	0.123	0.150	0.150	0.152	0.152
149	EF672983.1 *Lerista elegans*	0.135	0.133	0.135	0.143	0.159	0.130	0.147	0.147	0.150	0.150
150	EF672982.1 *Lerista edwardsae*	0.150	0.147	0.150	0.150	0.164	0.133	0.138	0.143	0.140	0.140
151	EF672981.1 *Lerista dorsalis*	0.152	0.155	0.152	0.157	0.167	0.138	0.140	0.140	0.143	0.143
152	EF672980.1 *Lerista distinguenda*	0.143	0.140	0.143	0.147	0.167	0.121	0.135	0.130	0.138	0.138
153	EF672979.1 *Lerista desertorum*	0.140	0.140	0.143	0.147	0.159	0.130	0.135	0.138	0.138	0.138
154	EF672978.1 *Lerista connivens*	0.143	0.143	0.145	0.145	0.140	0.126	0.128	0.130	0.130	0.130
155	EF672977.1 *Lerista cinerea*	0.121	0.118	0.121	0.111	0.116	0.010	0.140	0.145	0.143	0.143
156	EF672976.1 *Lerista christinae*	0.164	0.162	0.164	0.155	0.155	0.140	0.147	0.152	0.150	0.150
157	EF672975.1 *Lerista carpentariae*	0.145	0.143	0.145	0.145	0.138	0.099	0.147	0.147	0.150	0.150
158	EF672974.1 *Lerista borealis*	0.140	0.140	0.143	0.145	0.145	0.116	0.150	0.155	0.147	0.147
159	EF672973.1 *Lerista bipes*	0.155	0.155	0.157	0.169	0.162	0.126	0.159	0.159	0.162	0.162
160	EF672972.1 *Lerista baynesi*	0.159	0.157	0.159	0.159	0.176	0.138	0.145	0.150	0.147	0.147
161	EF672971.1 *Lerista axillaris*	0.140	0.140	0.143	0.145	0.159	0.121	0.143	0.145	0.140	0.140
162	EF672970.1 *Lerista arenicola*	0.191	0.191	0.193	0.198	0.176	0.150	0.171	0.171	0.169	0.169
163	EF672969.1 *Lerista apoda*	0.138	0.135	0.138	0.135	0.135	0.111	0.152	0.152	0.155	0.155
164	EF672968.1 *Lerista ameles*	0.116	0.116	0.118	0.118	0.116	0.101	0.147	0.152	0.150	0.150
165	EF672967.1 *Lerista allochira*	0.147	0.147	0.150	0.150	0.133	0.111	0.140	0.145	0.143	0.143
166	EF672966.1 *Lerista aericeps*	0.138	0.138	0.140	0.150	0.147	0.123	0.159	0.162	0.162	0.162
167	DQ915332.1 *Lerista bougainvillii*	0.164	0.162	0.164	0.167	0.143	0.128	0.150	0.150	0.152	0.152
168	DQ915331.1 *Lerista bipes*	0.145	0.145	0.147	0.155	0.162	0.133	0.145	0.145	0.147	0.147
169	AY169666.1 *Lerista bipes* ND4	0.135	0.140	0.138	0.147	0.143	0.130	0.143	0.147	0.145	0.145
170	EU109216.1 *Lerista macropisthopus* ND4	0.143	0.143	0.145	0.152	0.167	0.135	0.150	0.150	0.152	0.152

		21	22	23	24	25	26	27	28	29	30
1	**PQ09** *L.separanda* WIN07P ND4	0.018	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.018	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.017	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.018	0.017	0.017	0.016	0.016	0.015	0.016	0.016	0.016	0.016
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.019	0.019	0.019	0.019	0.019	0.018	0.018	0.019	0.019	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.017	0.015	0.015	0.017	0.017	0.016	0.016	0.016	0.017	0.017
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.018	0.015	0.015	0.017	0.016	0.016	0.016	0.016	0.017	0.017
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.017	0.015	0.015	0.017	0.017	0.016	0.016	0.016	0.017	0.017
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.017	0.015	0.015	0.017	0.017	0.016	0.016	0.016	0.017	0.017
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.018	0.013	0.013	0.018	0.017	0.017	0.017	0.017	0.017	0.017
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.018	0.013	0.013	0.018	0.017	0.017	0.017	0.017	0.017	0.017
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.018	0.013	0.013	0.018	0.018	0.017	0.017	0.017	0.017	0.017
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.018	0.013	0.013	0.018	0.017	0.017	0.017	0.017	0.017	0.017
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.018	0.013	0.013	0.018	0.018	0.017	0.017	0.017	0.017	0.017
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.018	0.013	0.013	0.019	0.017	0.017	0.017	0.017	0.018	0.017
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.018	0.015	0.015	0.019	0.017	0.017	0.017	0.017	0.018	0.018
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.017	0.015	0.015	0.017	0.016	0.017	0.017	0.017	0.017	0.017
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.005	0.018	0.018	0.016	0.017	0.015	0.015	0.015	0.016	0.016
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.000	0.018	0.018	0.017	0.017	0.015	0.015	0.015	0.016	0.016
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.005	0.018	0.018	0.017	0.017	0.015	0.015	0.015	0.016	0.016
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.005	0.018	0.018	0.017	0.017	0.015	0.015	0.015	0.016	0.016
21	MK140643.1 *Lerista anyara* voucher QMJ94490		0.018	0.018	0.017	0.017	0.015	0.015	0.015	0.016	0.016
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.159		0.002	0.018	0.017	0.017	0.017	0.017	0.017	0.017
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.159	0.002		0.018	0.017	0.017	0.017	0.017	0.017	0.017
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.135	0.169	0.169		0.018	0.015	0.016	0.016	0.017	0.017
25	AY169667.1 *Lerista bougainvillii*	0.140	0.135	0.135	0.152		0.015	0.016	0.015	0.017	0.016
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.101	0.135	0.135	0.111	0.109		0.003	0.004	0.008	0.008
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.104	0.135	0.135	0.116	0.114	0.005		0.002	0.008	0.009
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.104	0.135	0.135	0.118	0.111	0.007	0.002		0.009	0.009
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.121	0.140	0.140	0.133	0.130	0.024	0.029	0.031		0.002
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.118	0.143	0.143	0.135	0.128	0.027	0.031	0.034	0.002	
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.118	0.143	0.143	0.135	0.128	0.027	0.031	0.034	0.002	0.000
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.123	0.143	0.143	0.135	0.128	0.027	0.031	0.034	0.007	0.005
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.123	0.143	0.143	0.135	0.133	0.027	0.031	0.034	0.002	0.005
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.123	0.143	0.143	0.135	0.133	0.027	0.031	0.034	0.002	0.005
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.123	0.143	0.143	0.135	0.133	0.027	0.031	0.034	0.002	0.005
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.123	0.143	0.143	0.135	0.133	0.027	0.031	0.034	0.002	0.005

		21	22	23	24	25	26	27	28	29	30
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.138	0.179	0.179	0.126	0.138	0.101	0.104	0.106	0.116	0.114
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.138	0.179	0.179	0.126	0.138	0.101	0.104	0.106	0.116	0.114
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.140	0.176	0.176	0.121	0.143	0.104	0.106	0.109	0.118	0.116
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.138	0.176	0.176	0.121	0.143	0.104	0.106	0.109	0.118	0.116
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.140	0.179	0.179	0.123	0.145	0.106	0.109	0.111	0.121	0.118
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.138	0.176	0.176	0.121	0.143	0.104	0.106	0.109	0.118	0.116
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.138	0.176	0.176	0.121	0.143	0.104	0.106	0.109	0.118	0.116
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.140	0.176	0.176	0.121	0.143	0.104	0.106	0.109	0.118	0.116
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.140	0.176	0.176	0.121	0.143	0.104	0.106	0.109	0.118	0.116
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.138	0.179	0.179	0.126	0.138	0.101	0.104	0.106	0.116	0.114
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.133	0.181	0.181	0.123	0.140	0.109	0.111	0.114	0.128	0.126
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.164	0.126	0.128	0.145	0.116	0.111	0.116	0.118	0.126	0.123
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.167	0.128	0.130	0.147	0.118	0.114	0.118	0.121	0.128	0.126
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.169	0.140	0.143	0.155	0.123	0.128	0.133	0.130	0.138	0.135
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.171	0.147	0.150	0.157	0.121	0.130	0.135	0.133	0.140	0.138
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.145	0.128	0.130	0.147	0.118	0.114	0.114	0.114	0.126	0.123
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.147	0.135	0.138	0.150	0.121	0.121	0.121	0.121	0.133	0.130
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.147	0.135	0.138	0.150	0.121	0.121	0.121	0.121	0.133	0.130
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.147	0.135	0.138	0.150	0.121	0.121	0.121	0.121	0.133	0.130
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.167	0.106	0.109	0.184	0.138	0.150	0.150	0.150	0.159	0.162
57	KU309300.1 *Lerista storri* isolate LestA1	0.147	0.106	0.109	0.135	0.130	0.118	0.118	0.118	0.138	0.140
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.104	0.135	0.135	0.116	0.114	0.005	0.000	0.002	0.029	0.031
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.104	0.135	0.135	0.116	0.114	0.005	0.000	0.002	0.029	0.031
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.140	0.104	0.106	0.147	0.123	0.128	0.128	0.128	0.138	0.140
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.145	0.099	0.101	0.152	0.123	0.133	0.133	0.133	0.143	0.145
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.135	0.169	0.169	0.000	0.152	0.111	0.116	0.118	0.133	0.135
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.138	0.114	0.116	0.140	0.116	0.128	0.128	0.128	0.143	0.140
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.140	0.116	0.118	0.143	0.114	0.130	0.130	0.130	0.145	0.143
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.138	0.114	0.116	0.140	0.116	0.128	0.128	0.128	0.143	0.140
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.140	0.116	0.118	0.143	0.114	0.130	0.130	0.130	0.145	0.143
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.135	0.111	0.114	0.143	0.114	0.126	0.126	0.126	0.140	0.138
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.143	0.123	0.126	0.145	0.114	0.135	0.135	0.135	0.155	0.152
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.147	0.128	0.130	0.150	0.118	0.140	0.140	0.140	0.159	0.157
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.145	0.121	0.123	0.143	0.106	0.133	0.133	0.133	0.152	0.150
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.140	0.116	0.118	0.143	0.106	0.128	0.128	0.128	0.143	0.140
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.140	0.116	0.118	0.143	0.106	0.128	0.128	0.128	0.143	0.140

		21	22	23	24	25	26	27	28	29	30
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.152	0.128	0.130	0.150	0.109	0.140	0.140	0.140	0.159	0.157
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.150	0.130	0.133	0.147	0.111	0.138	0.138	0.138	0.157	0.155
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.150	0.130	0.133	0.147	0.111	0.138	0.138	0.138	0.157	0.155
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.152	0.128	0.130	0.150	0.109	0.140	0.140	0.140	0.159	0.157
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.152	0.128	0.130	0.150	0.109	0.140	0.140	0.140	0.159	0.157
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.150	0.126	0.128	0.147	0.106	0.138	0.138	0.138	0.157	0.155
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.152	0.106	0.109	0.152	0.114	0.116	0.111	0.114	0.128	0.126
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.152	0.106	0.109	0.152	0.114	0.116	0.111	0.114	0.128	0.126
81	KU309275.1 *Lerista amele*s isolate LeamMS2	0.152	0.106	0.109	0.152	0.114	0.116	0.111	0.114	0.128	0.126
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.152	0.106	0.109	0.152	0.114	0.116	0.111	0.114	0.128	0.126
83	KU309273.1 *Lerista allanae* isolate Leal2	0.138	0.179	0.179	0.126	0.138	0.101	0.104	0.106	0.116	0.114
84	KU309272.1 *Lerista allanae* isolate Leal1	0.143	0.176	0.176	0.126	0.143	0.109	0.111	0.114	0.118	0.116
85	KF823006.1 *Lerista kalumburu*	0.174	0.169	0.171	0.155	0.157	0.147	0.150	0.152	0.157	0.155
86	KF823005.1 *Lerista kalumburu*	0.179	0.174	0.176	0.152	0.147	0.145	0.147	0.150	0.155	0.152
87	KF823007.1 *Lerista kalumburu*	0.174	0.179	0.181	0.169	0.162	0.169	0.171	0.174	0.179	0.176
88	KF823004.1 *Lerista kalumburu*	0.188	0.174	0.176	0.167	0.164	0.157	0.159	0.162	0.167	0.164
89	KF823003.1 *Lerista kalumburu*	0.186	0.171	0.174	0.169	0.164	0.155	0.157	0.159	0.169	0.167
90	KF823002.1 *Lerista kalumburu*	0.196	0.179	0.181	0.171	0.169	0.162	0.164	0.167	0.171	0.169
91	KF823001.1 *Lerista kalumburu*	0.193	0.181	0.184	0.171	0.171	0.162	0.164	0.167	0.171	0.169
92	KF823000.1 *Lerista kalumburu*	0.184	0.174	0.176	0.167	0.162	0.157	0.159	0.162	0.171	0.169
93	KF822999.1 *Lerista kalumburu*	0.181	0.179	0.181	0.157	0.152	0.150	0.152	0.155	0.159	0.157
94	KF822998.1 *Lerista kalumburu*	0.157	0.167	0.167	0.152	0.155	0.140	0.143	0.145	0.155	0.152
95	KF822997.1 *Lerista kalumburu*	0.159	0.179	0.181	0.155	0.164	0.145	0.147	0.150	0.155	0.152
96	EF673035.1 *Lerista zietzi*	0.145	0.145	0.145	0.121	0.116	0.130	0.135	0.138	0.150	0.147
97	EF673036.1 *Lerista zonulata*	0.155	0.159	0.162	0.150	0.135	0.145	0.145	0.143	0.159	0.157
98	EF673034.1 *Lerista yuna*	0.147	0.147	0.147	0.157	0.097	0.109	0.114	0.116	0.123	0.126
99	EF673033.1 *Lerista xanthura*	0.140	0.116	0.118	0.135	0.111	0.111	0.116	0.118	0.123	0.121
100	EF673032.1 *Lerista wilkinsi*	0.171	0.147	0.150	0.157	0.121	0.130	0.135	0.133	0.140	0.138
101	EF673031.1 *Lerista walkeri*	0.140	0.143	0.145	0.147	0.126	0.109	0.114	0.116	0.118	0.121
102	EF673030.1 *Lerista viduata*	0.155	0.155	0.157	0.157	0.101	0.123	0.128	0.128	0.135	0.138
103	EF673029.1 *Lerista vermicularis*	0.159	0.167	0.169	0.162	0.135	0.135	0.135	0.138	0.147	0.150
104	EF673028.1 *Lerista varia*	0.128	0.143	0.143	0.155	0.104	0.118	0.118	0.121	0.133	0.135
105	EF673027.1 *Lerista uniduo*	0.145	0.164	0.164	0.157	0.101	0.133	0.138	0.140	0.143	0.145
106	EF673026.1 *Lerista tridactyla*	0.140	0.152	0.155	0.147	0.114	0.123	0.128	0.126	0.138	0.135
107	EF673025.1 *Lerista terdigitata*	0.143	0.150	0.152	0.143	0.114	0.118	0.123	0.121	0.133	0.135
108	EF673024.1 *Lerista taeniata*	0.167	0.157	0.159	0.155	0.130	0.128	0.133	0.135	0.140	0.138

		21	22	23	24	25	26	27	28	29	30
109	EF673023.1 *Lerista stylis*	0.176	0.145	0.147	0.150	0.138	0.130	0.135	0.138	0.138	0.140
110	EF673022.1 *Lerista stictopleura*	0.145	0.138	0.135	0.147	0.089	0.121	0.126	0.128	0.133	0.130
111	EF673021.1 *Lerista chordae*	0.162	0.157	0.159	0.150	0.145	0.143	0.147	0.147	0.152	0.150
112	EF673020.1 *Lerista speciosa*	0.152	0.162	0.164	0.133	0.126	0.116	0.121	0.123	0.130	0.133
113	EF673019.1 *Lerista simillima*	0.155	0.157	0.159	0.152	0.130	0.130	0.130	0.133	0.143	0.145
114	EF673018.1 *Lerista robusta*	0.143	0.143	0.145	0.145	0.126	0.130	0.135	0.138	0.143	0.145
115	EF673017.1 *Lerista puncticauda*	0.135	0.145	0.147	0.133	0.121	0.114	0.118	0.116	0.118	0.121
116	EF673016.1 *Lerista punctatovittata*	0.150	0.176	0.176	0.135	0.130	0.114	0.118	0.116	0.121	0.118
117	EF673015.1 *Lerista praepedita*	0.126	0.138	0.140	0.145	0.089	0.101	0.106	0.106	0.126	0.128
118	EF673014.1 *Lerista planiventralis*	0.150	0.133	0.135	0.159	0.140	0.152	0.152	0.152	0.157	0.159
119	EF673013.1 *Lerista picturata*	0.145	0.140	0.140	0.123	0.128	0.101	0.106	0.109	0.111	0.114
120	EF673012.1 *Lerista petersoni*	0.150	0.155	0.155	0.159	0.097	0.128	0.133	0.130	0.143	0.140
121	EF673011.1 *Lerista orientalis* NADH	0.162	0.157	0.159	0.147	0.133	0.133	0.133	0.135	0.145	0.147
122	EF673010.1 *Lerista onsloviana*	0.152	0.135	0.135	0.169	0.099	0.130	0.135	0.138	0.135	0.133
123	EF673009.1 *Lerista nichollsi*	0.164	0.169	0.169	0.152	0.111	0.126	0.130	0.133	0.140	0.138
124	EF673008.1 *Lerista neander*	0.147	0.150	0.152	0.159	0.150	0.135	0.140	0.143	0.143	0.145
125	EF673007.1 *Lerista muelleri*	0.159	0.145	0.145	0.164	0.114	0.147	0.152	0.152	0.162	0.159
126	EF673006.1 *Lerista microtis*	0.167	0.157	0.157	0.152	0.123	0.128	0.133	0.130	0.145	0.147
127	EF673005.1 *Lerista macropisthopus*	0.143	0.143	0.145	0.138	0.114	0.123	0.128	0.126	0.133	0.135
128	EF673004.1 *Lerista lineopunctulata*	0.145	0.155	0.155	0.162	0.123	0.130	0.130	0.133	0.145	0.143
129	EF673003.1 *Lerista lineata*	0.145	0.159	0.162	0.152	0.128	0.138	0.143	0.143	0.147	0.145
130	EF673002.1 *Lerista labialis*	0.150	0.147	0.150	0.150	0.123	0.133	0.138	0.140	0.145	0.143
131	EF673001.1 *Lerista kennedyensis*	0.152	0.159	0.159	0.164	0.118	0.135	0.140	0.138	0.145	0.143
132	EF673000.1 Lerista *kendricki*	0.155	0.157	0.157	0.167	0.116	0.130	0.130	0.133	0.143	0.140
133	EF672999.1 *Lerista karlschmidti*	0.174	0.167	0.169	0.152	0.167	0.140	0.145	0.145	0.147	0.145
134	EF672998.1 *Lerista kalumburu*	0.162	0.181	0.184	0.157	0.167	0.147	0.150	0.152	0.157	0.155
135	EF672997.1 *Lerista ips*	0.130	0.143	0.145	0.123	0.126	0.126	0.130	0.133	0.143	0.140
136	EF672996.1 *Lerista ingrami*	0.152	0.164	0.167	0.155	0.130	0.138	0.138	0.135	0.152	0.150
137	EF672995.1 *Lerista humphriesi*	0.157	0.157	0.159	0.171	0.121	0.130	0.135	0.135	0.145	0.147
138	EF672994.1 *Lerista haroldi*	0.159	0.135	0.138	0.155	0.118	0.126	0.130	0.130	0.135	0.138
139	EF672993.1 *Lerista griffini*	0.145	0.145	0.147	0.159	0.138	0.128	0.133	0.135	0.135	0.138
140	EF672992.1 *Lerista greeri*	0.143	0.152	0.155	0.155	0.121	0.126	0.130	0.133	0.138	0.140
141	EF672991.1 *Lerista gerrardii*	0.138	0.155	0.157	0.140	0.114	0.121	0.126	0.128	0.135	0.133
142	EF672990.1 *Lerista gascoynensis*	0.145	0.159	0.159	0.155	0.106	0.118	0.123	0.126	0.133	0.130
143	EF672989.1 *Lerista frosti*	0.157	0.145	0.147	0.150	0.138	0.128	0.133	0.130	0.138	0.140
144	EF672988.1 *Lerista fragilis*	0.157	0.155	0.157	0.138	0.128	0.128	0.133	0.133	0.138	0.135

		21	22	23	24	25	26	27	28	29	30
145	EF672987.1 *Lerista flammicauda*	0.135	0.138	0.138	0.145	0.104	0.114	0.118	0.116	0.130	0.133
146	EF672986.1 *Lerista eupoda*	0.143	0.150	0.152	0.147	0.114	0.133	0.138	0.135	0.143	0.140
147	EF672985.1 *Lerista emmotti*	0.164	0.169	0.169	0.150	0.133	0.118	0.123	0.121	0.135	0.133
148	EF672984.1 *Lerista elongata*	0.150	0.155	0.157	0.150	0.104	0.126	0.130	0.128	0.130	0.128
149	EF672983.1 *Lerista elegans*	0.147	0.147	0.147	0.135	0.116	0.135	0.140	0.138	0.143	0.140
150	EF672982.1 *Lerista edwardsae*	0.143	0.143	0.140	0.143	0.140	0.114	0.118	0.116	0.118	0.121
151	EF672981.1 *Lerista dorsalis*	0.140	0.157	0.157	0.140	0.109	0.114	0.114	0.111	0.128	0.130
152	EF672980.1 *Lerista distinguenda*	0.130	0.143	0.143	0.138	0.126	0.121	0.126	0.123	0.128	0.130
153	EF672979.1 *Lerista desertorum*	0.138	0.143	0.145	0.138	0.118	0.114	0.118	0.121	0.123	0.126
154	EF672978.1 *Lerista connivens*	0.130	0.143	0.143	0.150	0.101	0.114	0.118	0.121	0.128	0.130
155	EF672977.1 *Lerista cinerea*	0.145	0.099	0.101	0.152	0.123	0.133	0.133	0.133	0.143	0.145
156	EF672976.1 *Lerista christinae*	0.152	0.147	0.150	0.157	0.121	0.128	0.133	0.133	0.143	0.140
157	EF672975.1 *Lerista carpentariae*	0.147	0.126	0.128	0.147	0.118	0.135	0.140	0.140	0.145	0.147
158	EF672974.1 *Lerista borealis*	0.155	0.143	0.145	0.147	0.123	0.116	0.121	0.123	0.130	0.133
159	EF672973.1 *Lerista bipes*	0.159	0.150	0.152	0.155	0.130	0.138	0.138	0.140	0.150	0.152
160	EF672972.1 *Lerista baynesi*	0.150	0.169	0.169	0.152	0.138	0.130	0.135	0.133	0.143	0.140
161	EF672971.1 *Lerista axillaris*	0.145	0.147	0.150	0.138	0.121	0.118	0.123	0.126	0.128	0.130
162	EF672970.1 *Lerista arenicola*	0.171	0.179	0.179	0.167	0.138	0.133	0.138	0.140	0.140	0.138
163	EF672969.1 *Lerista apoda*	0.152	0.130	0.133	0.155	0.140	0.138	0.133	0.133	0.150	0.152
164	EF672968.1 *Lerista ameles*	0.152	0.106	0.109	0.152	0.114	0.116	0.111	0.114	0.128	0.126
165	EF672967.1 *Lerista allochira*	0.145	0.138	0.138	0.150	0.099	0.114	0.116	0.118	0.123	0.126
166	EF672966.1 *Lerista aericeps*	0.162	0.140	0.143	0.155	0.123	0.130	0.135	0.138	0.135	0.138
167	DQ915332.1 *Lerista bougainvillii*	0.150	0.138	0.138	0.152	0.041	0.114	0.118	0.116	0.130	0.128
168	DQ915331.1 *Lerista bipes*	0.145	0.159	0.162	0.157	0.121	0.130	0.135	0.138	0.147	0.145
169	AY169666.1 *Lerista bipes* ND4	0.147	0.140	0.143	0.143	0.123	0.130	0.135	0.138	0.140	0.138
170	EU109216.1 *Lerista macropisthopus* ND4	0.150	0.159	0.162	0.143	0.145	0.135	0.140	0.143	0.143	0.145

		31	32	33	34	35	36	37	38	39	40
1	**PQ09** *L.separanda* WIN07P ND4	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.016
2	**PQ20** *L.separanda* 163965 ND4	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.016
3	**PQ21** *L.separanda* 163487 ND4	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018	0.018
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018	0.018
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018	0.018
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018	0.018
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018	0.018
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.019	0.019
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018	0.018
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.016
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017	0.017
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017	0.017
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.017	0.017	0.017	0.017	0.017	0.017	0.019	0.019	0.019	0.019
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.017	0.017	0.017	0.017	0.017	0.017	0.019	0.019	0.019	0.019
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.016
25	AY169667.1 *Lerista bougainvillii*	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.008	0.008	0.008	0.008	0.008	0.008	0.015	0.015	0.015	0.015
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.009	0.009	0.009	0.009	0.009	0.009	0.015	0.015	0.015	0.015
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.009	0.009	0.009	0.009	0.009	0.009	0.015	0.015	0.015	0.015
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.002	0.004	0.002	0.002	0.002	0.002	0.016	0.016	0.016	0.016
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.000	0.003	0.003	0.003	0.003	0.003	0.016	0.016	0.016	0.016
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702		0.003	0.003	0.003	0.003	0.003	0.016	0.016	0.016	0.016
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.005		0.005	0.005	0.005	0.005	0.016	0.016	0.016	0.016
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.005	0.010		0.000	0.000	0.000	0.016	0.016	0.016	0.016
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.005	0.010	0.000		0.000	0.000	0.016	0.016	0.016	0.016
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.005	0.010	0.000	0.000		0.000	0.016	0.016	0.016	0.016
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.005	0.010	0.000	0.000	0.000		0.016	0.016	0.016	0.016

		31	32	33	34	35	36	37	38	39	40
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.114	0.114	0.118	0.118	0.118	0.118		0.000	0.004	0.003
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.114	0.114	0.118	0.118	0.118	0.118	0.000		0.004	0.003
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.116	0.116	0.121	0.121	0.121	0.121	0.007	0.007		0.002
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.116	0.116	0.121	0.121	0.121	0.121	0.005	0.005	0.002	
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.118	0.118	0.123	0.123	0.123	0.123	0.007	0.007	0.005	0.002
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.116	0.116	0.121	0.121	0.121	0.121	0.005	0.005	0.002	0.000
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.116	0.116	0.121	0.121	0.121	0.121	0.005	0.005	0.002	0.000
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.116	0.116	0.121	0.121	0.121	0.121	0.007	0.007	0.000	0.002
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.116	0.116	0.121	0.121	0.121	0.121	0.007	0.007	0.005	0.002
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.114	0.114	0.118	0.118	0.118	0.118	0.000	0.000	0.007	0.005
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.126	0.126	0.130	0.130	0.130	0.130	0.014	0.014	0.012	0.010
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.123	0.123	0.128	0.128	0.128	0.128	0.135	0.135	0.138	0.138
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.126	0.126	0.130	0.130	0.130	0.130	0.138	0.138	0.140	0.140
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.135	0.135	0.140	0.140	0.140	0.140	0.133	0.133	0.135	0.135
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.138	0.138	0.143	0.143	0.143	0.143	0.145	0.145	0.147	0.147
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.123	0.123	0.128	0.128	0.128	0.128	0.140	0.140	0.143	0.143
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.130	0.130	0.135	0.135	0.135	0.135	0.147	0.147	0.150	0.150
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.130	0.130	0.135	0.135	0.135	0.135	0.147	0.147	0.150	0.150
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.130	0.130	0.135	0.135	0.135	0.135	0.147	0.147	0.150	0.150
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.162	0.167	0.162	0.162	0.162	0.162	0.171	0.171	0.174	0.174
57	KU309300.1 *Lerista storri* isolate LestA1	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.143	0.143
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.031	0.031	0.031	0.031	0.031	0.031	0.104	0.104	0.106	0.106
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.031	0.031	0.031	0.031	0.031	0.031	0.104	0.104	0.106	0.106
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.140	0.140	0.140	0.140	0.140	0.140	0.147	0.147	0.150	0.150
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.145	0.145	0.145	0.145	0.145	0.145	0.152	0.152	0.155	0.155
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.135	0.135	0.135	0.135	0.135	0.135	0.126	0.126	0.121	0.121
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.140	0.140	0.145	0.145	0.145	0.145	0.140	0.140	0.143	0.143
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.143	0.143	0.147	0.147	0.147	0.147	0.143	0.143	0.145	0.145
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.140	0.140	0.145	0.145	0.145	0.145	0.140	0.140	0.143	0.143
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.143	0.143	0.147	0.147	0.147	0.147	0.143	0.143	0.145	0.145
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.138	0.138	0.143	0.143	0.143	0.143	0.143	0.143	0.145	0.145
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.152	0.152	0.157	0.157	0.157	0.157	0.145	0.145	0.147	0.147
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.157	0.157	0.162	0.162	0.162	0.162	0.150	0.150	0.152	0.152
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.150	0.145	0.155	0.155	0.155	0.155	0.143	0.143	0.145	0.145
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.140	0.140	0.145	0.145	0.145	0.145	0.133	0.133	0.135	0.135
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.140	0.140	0.145	0.145	0.145	0.145	0.133	0.133	0.135	0.135

		31	32	33	34	35	36	37	38	39	40
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.157	0.157	0.162	0.162	0.162	0.162	0.145	0.145	0.147	0.147
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.155	0.155	0.159	0.159	0.159	0.159	0.143	0.143	0.145	0.145
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.155	0.155	0.159	0.159	0.159	0.159	0.143	0.143	0.145	0.145
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.157	0.157	0.162	0.162	0.162	0.162	0.145	0.145	0.147	0.147
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.157	0.157	0.162	0.162	0.162	0.162	0.145	0.145	0.147	0.147
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.155	0.155	0.159	0.159	0.159	0.159	0.143	0.143	0.145	0.145
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.126	0.126	0.130	0.130	0.130	0.130	0.155	0.155	0.157	0.157
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.126	0.126	0.130	0.130	0.130	0.130	0.155	0.155	0.157	0.157
81	KU309275.1 *Lerista amele*s isolate LeamMS2	0.126	0.126	0.130	0.130	0.130	0.130	0.155	0.155	0.157	0.157
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.126	0.126	0.130	0.130	0.130	0.130	0.155	0.155	0.157	0.157
83	KU309273.1 *Lerista allanae* isolate Leal2	0.114	0.114	0.118	0.118	0.118	0.118	0.000	0.000	0.007	0.005
84	KU309272.1 *Lerista allanae* isolate Leal1	0.116	0.116	0.121	0.121	0.121	0.121	0.010	0.010	0.007	0.005
85	KF823006.1 *Lerista kalumburu*	0.155	0.150	0.159	0.159	0.159	0.159	0.147	0.147	0.150	0.150
86	KF823005.1 *Lerista kalumburu*	0.152	0.147	0.157	0.157	0.157	0.157	0.147	0.147	0.150	0.150
87	KF823007.1 *Lerista kalumburu*	0.176	0.171	0.181	0.181	0.181	0.181	0.155	0.155	0.157	0.157
88	KF823004.1 *Lerista kalumburu*	0.164	0.159	0.169	0.169	0.169	0.169	0.157	0.157	0.159	0.159
89	KF823003.1 *Lerista kalumburu*	0.167	0.162	0.171	0.171	0.171	0.171	0.159	0.159	0.162	0.162
90	KF823002.1 *Lerista kalumburu*	0.169	0.164	0.174	0.174	0.174	0.174	0.164	0.164	0.167	0.167
91	KF823001.1 *Lerista kalumburu*	0.169	0.164	0.174	0.174	0.174	0.174	0.162	0.162	0.164	0.164
92	KF823000.1 *Lerista kalumburu*	0.169	0.164	0.174	0.174	0.174	0.174	0.157	0.157	0.159	0.159
93	KF822999.1 *Lerista kalumburu*	0.157	0.152	0.162	0.162	0.162	0.162	0.152	0.152	0.155	0.155
94	KF822998.1 *Lerista kalumburu*	0.152	0.147	0.157	0.157	0.157	0.157	0.143	0.143	0.143	0.143
95	KF822997.1 *Lerista kalumburu*	0.152	0.147	0.157	0.157	0.157	0.157	0.157	0.157	0.157	0.157
96	EF673035.1 *Lerista zietzi*	0.147	0.147	0.152	0.152	0.152	0.152	0.126	0.126	0.126	0.126
97	EF673036.1 *Lerista zonulata*	0.157	0.157	0.157	0.157	0.157	0.157	0.147	0.147	0.147	0.147
98	EF673034.1 *Lerista yuna*	0.126	0.126	0.126	0.126	0.126	0.126	0.128	0.128	0.133	0.133
99	EF673033.1 *Lerista xanthura*	0.121	0.121	0.126	0.126	0.126	0.126	0.135	0.135	0.138	0.138
100	EF673032.1 *Lerista wilkinsi*	0.138	0.138	0.143	0.143	0.143	0.143	0.145	0.145	0.147	0.147
101	EF673031.1 *Lerista walkeri*	0.121	0.116	0.121	0.121	0.121	0.121	0.126	0.126	0.128	0.128
102	EF673030.1 *Lerista viduata*	0.138	0.138	0.138	0.138	0.138	0.138	0.152	0.152	0.155	0.152
103	EF673029.1 *Lerista vermicularis*	0.150	0.145	0.145	0.145	0.145	0.145	0.147	0.147	0.152	0.152
104	EF673028.1 *Lerista varia*	0.135	0.135	0.135	0.135	0.135	0.135	0.143	0.143	0.143	0.143
105	EF673027.1 *Lerista uniduo*	0.145	0.140	0.145	0.145	0.145	0.145	0.135	0.135	0.135	0.135
106	EF673026.1 *Lerista tridactyla*	0.135	0.135	0.140	0.140	0.140	0.140	0.133	0.133	0.138	0.138
107	EF673025.1 *Lerista terdigitata*	0.135	0.135	0.135	0.135	0.135	0.135	0.130	0.130	0.135	0.135
108	EF673024.1 *Lerista taeniata*	0.138	0.138	0.143	0.143	0.143	0.143	0.143	0.143	0.145	0.145

		31	32	33	34	35	36	37	38	39	40
109	EF673023.1 *Lerista stylis*	0.140	0.140	0.140	0.140	0.140	0.140	0.162	0.162	0.164	0.164
110	EF673022.1 *Lerista stictopleura*	0.130	0.130	0.135	0.135	0.135	0.135	0.121	0.121	0.121	0.121
111	EF673021.1 *Lerista chordae*	0.150	0.150	0.155	0.155	0.155	0.155	0.157	0.157	0.157	0.157
112	EF673020.1 *Lerista speciosa*	0.133	0.133	0.133	0.133	0.133	0.133	0.128	0.128	0.128	0.128
113	EF673019.1 *Lerista simillima*	0.145	0.140	0.145	0.145	0.145	0.145	0.143	0.143	0.147	0.147
114	EF673018.1 *Lerista robusta*	0.145	0.140	0.145	0.145	0.145	0.145	0.157	0.157	0.157	0.157
115	EF673017.1 *Lerista puncticauda*	0.121	0.126	0.121	0.121	0.121	0.121	0.133	0.133	0.128	0.128
116	EF673016.1 *Lerista punctatovittata*	0.118	0.118	0.123	0.123	0.123	0.123	0.114	0.114	0.114	0.114
117	EF673015.1 *Lerista praepedita*	0.128	0.128	0.128	0.128	0.128	0.128	0.152	0.152	0.152	0.152
118	EF673014.1 *Lerista planiventralis*	0.159	0.164	0.159	0.159	0.159	0.159	0.167	0.167	0.162	0.162
119	EF673013.1 *Lerista picturata*	0.114	0.114	0.114	0.114	0.114	0.114	0.123	0.123	0.118	0.118
120	EF673012.1 *Lerista petersoni*	0.140	0.140	0.145	0.145	0.145	0.145	0.128	0.128	0.128	0.128
121	EF673011.1 *Lerista orientalis* NADH	0.147	0.147	0.147	0.147	0.147	0.147	0.138	0.138	0.138	0.138
122	EF673010.1 *Lerista onsloviana*	0.133	0.133	0.138	0.138	0.138	0.138	0.140	0.140	0.140	0.140
123	EF673009.1 *Lerista nichollsi*	0.138	0.138	0.143	0.143	0.143	0.143	0.126	0.126	0.130	0.130
124	EF673008.1 *Lerista neander*	0.145	0.145	0.145	0.145	0.145	0.145	0.147	0.147	0.143	0.143
125	EF673007.1 *Lerista muelleri*	0.159	0.159	0.159	0.159	0.159	0.159	0.147	0.147	0.150	0.150
126	EF673006.1 *Lerista microtis*	0.147	0.143	0.147	0.147	0.147	0.147	0.140	0.140	0.143	0.143
127	EF673005.1 *Lerista macropisthopus*	0.135	0.135	0.135	0.135	0.135	0.135	0.133	0.133	0.133	0.133
128	EF673004.1 *Lerista lineopunctulata*	0.143	0.143	0.147	0.147	0.147	0.147	0.145	0.145	0.145	0.145
129	EF673003.1 *Lerista lineata*	0.145	0.145	0.150	0.150	0.150	0.150	0.155	0.155	0.155	0.155
130	EF673002.1 *Lerista labialis*	0.143	0.138	0.147	0.147	0.147	0.147	0.145	0.145	0.145	0.145
131	EF673001.1 *Lerista kennedyensis*	0.143	0.143	0.143	0.143	0.143	0.143	0.135	0.135	0.135	0.135
132	EF673000.1 Lerista *kendricki*	0.140	0.140	0.145	0.145	0.145	0.145	0.133	0.133	0.138	0.138
133	EF672999.1 *Lerista karlschmidti*	0.145	0.140	0.150	0.150	0.150	0.150	0.157	0.157	0.157	0.157
134	EF672998.1 *Lerista kalumburu*	0.155	0.150	0.159	0.159	0.159	0.159	0.159	0.159	0.159	0.159
135	EF672997.1 *Lerista ips*	0.140	0.140	0.145	0.145	0.145	0.145	0.128	0.128	0.128	0.128
136	EF672996.1 *Lerista ingrami*	0.150	0.150	0.155	0.155	0.155	0.155	0.159	0.159	0.159	0.159
137	EF672995.1 *Lerista humphriesi*	0.147	0.143	0.147	0.147	0.147	0.147	0.159	0.159	0.162	0.162
138	EF672994.1 *Lerista haroldi*	0.138	0.133	0.138	0.138	0.138	0.138	0.150	0.150	0.150	0.150
139	EF672993.1 *Lerista griffini*	0.138	0.138	0.138	0.138	0.138	0.138	0.135	0.135	0.143	0.140
140	EF672992.1 *Lerista greeri*	0.140	0.135	0.140	0.140	0.140	0.140	0.155	0.155	0.155	0.155
141	EF672991.1 *Lerista gerrardii*	0.133	0.133	0.138	0.138	0.138	0.138	0.138	0.138	0.138	0.138
142	EF672990.1 *Lerista gascoynensis*	0.130	0.130	0.135	0.135	0.135	0.135	0.118	0.118	0.123	0.123
143	EF672989.1 *Lerista frosti*	0.140	0.140	0.135	0.135	0.135	0.135	0.143	0.143	0.145	0.145
144	EF672988.1 *Lerista fragilis*	0.135	0.135	0.140	0.140	0.140	0.140	0.140	0.140	0.140	0.140

		31	32	33	34	35	36	37	38	39	40
145	EF672987.1 *Lerista flammicauda*	0.133	0.128	0.133	0.133	0.133	0.133	0.128	0.128	0.133	0.133
146	EF672986.1 *Lerista eupoda*	0.140	0.140	0.145	0.145	0.145	0.145	0.143	0.143	0.143	0.143
147	EF672985.1 *Lerista emmotti*	0.133	0.133	0.138	0.138	0.138	0.138	0.128	0.128	0.128	0.128
148	EF672984.1 *Lerista elongata*	0.128	0.128	0.133	0.133	0.133	0.133	0.123	0.123	0.128	0.128
149	EF672983.1 *Lerista elegans*	0.140	0.140	0.145	0.145	0.145	0.145	0.145	0.145	0.140	0.140
150	EF672982.1 *Lerista edwardsae*	0.121	0.121	0.121	0.121	0.121	0.121	0.126	0.126	0.121	0.121
151	EF672981.1 *Lerista dorsalis*	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.126	0.126
152	EF672980.1 *Lerista distinguenda*	0.130	0.130	0.130	0.130	0.130	0.130	0.140	0.140	0.135	0.135
153	EF672979.1 *Lerista desertorum*	0.126	0.130	0.126	0.126	0.126	0.126	0.143	0.143	0.138	0.138
154	EF672978.1 *Lerista connivens*	0.130	0.130	0.130	0.130	0.130	0.130	0.140	0.140	0.140	0.140
155	EF672977.1 *Lerista cinerea*	0.145	0.145	0.145	0.145	0.145	0.145	0.152	0.152	0.155	0.155
156	EF672976.1 *Lerista christinae*	0.140	0.135	0.145	0.145	0.145	0.145	0.133	0.133	0.128	0.128
157	EF672975.1 *Lerista carpentariae*	0.147	0.143	0.147	0.147	0.147	0.147	0.143	0.143	0.143	0.143
158	EF672974.1 *Lerista borealis*	0.133	0.128	0.133	0.133	0.133	0.133	0.128	0.128	0.130	0.130
159	EF672973.1 *Lerista bipes*	0.152	0.152	0.152	0.152	0.152	0.152	0.159	0.159	0.159	0.159
160	EF672972.1 *Lerista baynesi*	0.140	0.140	0.145	0.145	0.145	0.145	0.138	0.138	0.135	0.135
161	EF672971.1 *Lerista axillaris*	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130	0.130
162	EF672970.1 *Lerista arenicola*	0.138	0.133	0.143	0.143	0.143	0.143	0.155	0.155	0.159	0.159
163	EF672969.1 *Lerista apoda*	0.152	0.147	0.152	0.152	0.152	0.152	0.150	0.150	0.155	0.155
164	EF672968.1 *Lerista ameles*	0.126	0.126	0.130	0.130	0.130	0.130	0.155	0.155	0.157	0.157
165	EF672967.1 *Lerista allochira*	0.126	0.126	0.126	0.126	0.126	0.126	0.133	0.133	0.135	0.135
166	EF672966.1 *Lerista aericeps*	0.138	0.143	0.138	0.138	0.138	0.138	0.145	0.145	0.145	0.145
167	DQ915332.1 *Lerista bougainvillii*	0.128	0.128	0.133	0.133	0.133	0.133	0.133	0.133	0.138	0.138
168	DQ915331.1 *Lerista bipes*	0.145	0.140	0.150	0.150	0.150	0.150	0.143	0.143	0.147	0.147
169	AY169666.1 *Lerista bipes* ND4	0.138	0.133	0.143	0.143	0.143	0.143	0.140	0.140	0.140	0.140
170	EU109216.1 *Lerista macropisthopus* ND4	0.145	0.145	0.145	0.145	0.145	0.145	0.135	0.135	0.135	0.135

		41	42	43	44	45	46	47	48	49	50
1	**PQ09** *L.separanda* WIN07P ND4	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
3	**PQ21** *L.separanda* 163487 ND4	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.018	0.018
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.015	0.016	0.016
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.016	0.017
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.019	0.019	0.019	0.019	0.019	0.018	0.019	0.017	0.018	0.018
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.014	0.014	0.015
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.017	0.016	0.016	0.017	0.017	0.016	0.016	0.018	0.018	0.018
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.018	0.018	0.018
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.018	0.018	0.018
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.016	0.016	0.017
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.016	0.017	0.017
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.018
25	AY169667.1 *Lerista bougainvillii*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.016
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.016	0.017
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.016	0.016	0.017
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.016	0.017	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.016	0.017	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.016	0.017	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.016	0.017	0.017

		41	42	43	44	45	46	47	48	49	50
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.004	0.003	0.003	0.004	0.004	0.000	0.006	0.017	0.017	0.017
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.004	0.003	0.003	0.004	0.004	0.000	0.006	0.017	0.017	0.017
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.003	0.002	0.002	0.000	0.003	0.004	0.005	0.017	0.017	0.017
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.002	0.000	0.000	0.002	0.002	0.003	0.005	0.017	0.017	0.017
41	MF959814.1 *Lerista allanae* isolate Leal.15		0.002	0.002	0.003	0.003	0.004	0.005	0.017	0.017	0.017
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.002		0.000	0.002	0.002	0.003	0.005	0.017	0.017	0.017
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.002	0.000		0.002	0.002	0.003	0.005	0.017	0.017	0.017
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.005	0.002	0.002		0.003	0.004	0.005	0.017	0.017	0.017
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.005	0.002	0.002	0.005		0.004	0.005	0.017	0.017	0.017
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.007	0.005	0.005	0.007	0.007		0.006	0.017	0.017	0.017
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.012	0.010	0.010	0.012	0.012	0.014		0.017	0.017	0.017
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.140	0.138	0.138	0.138	0.138	0.135	0.143		0.002	0.009
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.143	0.140	0.140	0.140	0.140	0.138	0.145	0.002		0.009
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.138	0.135	0.135	0.135	0.135	0.133	0.135	0.036	0.039	
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.150	0.147	0.147	0.147	0.147	0.145	0.147	0.039	0.036	0.017
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.145	0.143	0.143	0.143	0.143	0.140	0.145	0.089	0.092	0.099
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.152	0.150	0.150	0.150	0.150	0.147	0.152	0.087	0.089	0.097
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.152	0.150	0.150	0.150	0.150	0.147	0.152	0.087	0.089	0.097
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.152	0.150	0.150	0.150	0.150	0.147	0.152	0.087	0.089	0.097
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.176	0.174	0.174	0.174	0.174	0.171	0.174	0.145	0.147	0.157
57	KU309300.1 *Lerista storri* isolate LestA1	0.145	0.143	0.143	0.143	0.143	0.140	0.147	0.116	0.118	0.116
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.109	0.106	0.106	0.106	0.106	0.104	0.111	0.116	0.118	0.133
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.109	0.106	0.106	0.106	0.106	0.104	0.111	0.116	0.118	0.133
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.152	0.150	0.150	0.150	0.150	0.147	0.150	0.089	0.092	0.092
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.157	0.155	0.155	0.155	0.155	0.152	0.155	0.089	0.092	0.101
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.123	0.121	0.121	0.121	0.121	0.126	0.123	0.145	0.147	0.155
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.145	0.143	0.143	0.143	0.143	0.140	0.145	0.101	0.104	0.111
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.147	0.145	0.145	0.145	0.145	0.143	0.147	0.099	0.101	0.109
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.145	0.143	0.143	0.143	0.143	0.140	0.145	0.101	0.104	0.111
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.147	0.145	0.145	0.145	0.145	0.143	0.147	0.099	0.101	0.109
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.147	0.145	0.145	0.145	0.145	0.143	0.147	0.099	0.101	0.109
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.150	0.147	0.147	0.147	0.147	0.145	0.152	0.106	0.109	0.114
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.155	0.152	0.152	0.152	0.152	0.150	0.157	0.111	0.114	0.118
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.147	0.145	0.145	0.145	0.145	0.143	0.150	0.104	0.106	0.111
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.138	0.135	0.135	0.135	0.135	0.133	0.140	0.094	0.097	0.106
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.138	0.135	0.135	0.135	0.135	0.133	0.140	0.094	0.097	0.106

		41	42	43	44	45	46	47	48	49	50
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.150	0.147	0.147	0.147	0.147	0.145	0.152	0.111	0.114	0.114
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.147	0.145	0.145	0.145	0.145	0.143	0.150	0.109	0.111	0.111
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.147	0.145	0.145	0.145	0.145	0.143	0.150	0.109	0.111	0.111
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.150	0.147	0.147	0.147	0.147	0.145	0.152	0.111	0.114	0.114
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.150	0.147	0.147	0.147	0.147	0.145	0.152	0.111	0.114	0.114
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.147	0.145	0.145	0.145	0.145	0.143	0.150	0.109	0.111	0.111
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.159	0.157	0.157	0.157	0.157	0.155	0.162	0.106	0.104	0.121
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.159	0.157	0.157	0.157	0.157	0.155	0.162	0.106	0.104	0.121
81	KU309275.1 *Lerista amele*s isolate LeamMS2	0.159	0.157	0.157	0.157	0.157	0.155	0.162	0.106	0.104	0.121
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.159	0.157	0.157	0.157	0.157	0.155	0.162	0.106	0.104	0.121
83	KU309273.1 *Lerista allanae* isolate Leal2	0.007	0.005	0.005	0.007	0.007	0.000	0.014	0.135	0.138	0.133
84	KU309272.1 *Lerista allanae* isolate Leal1	0.007	0.005	0.005	0.007	0.007	0.010	0.014	0.143	0.145	0.140
85	KF823006.1 *Lerista kalumburu*	0.152	0.150	0.150	0.150	0.152	0.147	0.150	0.143	0.145	0.150
86	KF823005.1 *Lerista kalumburu*	0.152	0.150	0.150	0.150	0.152	0.147	0.152	0.128	0.126	0.138
87	KF823007.1 *Lerista kalumburu*	0.159	0.157	0.157	0.157	0.159	0.155	0.155	0.155	0.152	0.159
88	KF823004.1 *Lerista kalumburu*	0.162	0.159	0.159	0.159	0.162	0.157	0.164	0.140	0.138	0.152
89	KF823003.1 *Lerista kalumburu*	0.164	0.162	0.162	0.162	0.164	0.159	0.167	0.143	0.140	0.159
90	KF823002.1 *Lerista kalumburu*	0.169	0.167	0.167	0.167	0.164	0.164	0.171	0.145	0.143	0.157
91	KF823001.1 *Lerista kalumburu*	0.167	0.164	0.164	0.164	0.167	0.162	0.169	0.147	0.145	0.155
92	KF823000.1 *Lerista kalumburu*	0.162	0.159	0.159	0.159	0.162	0.157	0.164	0.140	0.138	0.157
93	KF822999.1 *Lerista kalumburu*	0.157	0.155	0.155	0.155	0.157	0.152	0.157	0.133	0.130	0.143
94	KF822998.1 *Lerista kalumburu*	0.145	0.143	0.143	0.143	0.140	0.143	0.145	0.152	0.155	0.147
95	KF822997.1 *Lerista kalumburu*	0.159	0.157	0.157	0.157	0.159	0.157	0.155	0.157	0.155	0.152
96	EF673035.1 *Lerista zietzi*	0.123	0.126	0.126	0.126	0.126	0.126	0.123	0.123	0.126	0.126
97	EF673036.1 *Lerista zonulata*	0.150	0.147	0.147	0.147	0.147	0.147	0.147	0.152	0.150	0.143
98	EF673034.1 *Lerista yuna*	0.135	0.133	0.133	0.133	0.133	0.128	0.133	0.121	0.123	0.128
99	EF673033.1 *Lerista xanthura*	0.140	0.138	0.138	0.138	0.138	0.135	0.138	0.104	0.106	0.114
100	EF673032.1 *Lerista wilkinsi*	0.150	0.147	0.147	0.147	0.147	0.145	0.147	0.039	0.036	0.017
101	EF673031.1 *Lerista walkeri*	0.130	0.128	0.128	0.128	0.128	0.126	0.128	0.123	0.126	0.126
102	EF673030.1 *Lerista viduata*	0.155	0.152	0.152	0.155	0.152	0.152	0.162	0.147	0.150	0.150
103	EF673029.1 *Lerista vermicularis*	0.155	0.152	0.152	0.152	0.152	0.147	0.150	0.150	0.152	0.162
104	EF673028.1 *Lerista varia*	0.145	0.143	0.143	0.143	0.143	0.143	0.140	0.143	0.140	0.145
105	EF673027.1 *Lerista uniduo*	0.138	0.135	0.135	0.135	0.135	0.135	0.135	0.147	0.150	0.150
106	EF673026.1 *Lerista tridactyla*	0.140	0.138	0.138	0.138	0.138	0.133	0.130	0.111	0.109	0.121
107	EF673025.1 *Lerista terdigitata*	0.138	0.135	0.135	0.135	0.135	0.130	0.133	0.111	0.109	0.126
108	EF673024.1 *Lerista taeniata*	0.147	0.145	0.145	0.145	0.145	0.143	0.147	0.118	0.116	0.123

		41	42	43	44	45	46	47	48	49	50
109	EF673023.1 *Lerista stylis*	0.162	0.164	0.164	0.164	0.164	0.162	0.164	0.118	0.121	0.128
110	EF673022.1 *Lerista stictopleura*	0.123	0.121	0.121	0.121	0.121	0.121	0.123	0.116	0.118	0.121
111	EF673021.1 *Lerista chordae*	0.159	0.157	0.157	0.157	0.157	0.157	0.157	0.143	0.140	0.145
112	EF673020.1 *Lerista speciosa*	0.130	0.128	0.128	0.128	0.128	0.128	0.121	0.135	0.133	0.143
113	EF673019.1 *Lerista simillima*	0.150	0.147	0.147	0.147	0.147	0.143	0.145	0.140	0.143	0.152
114	EF673018.1 *Lerista robusta*	0.159	0.157	0.157	0.157	0.157	0.157	0.152	0.140	0.143	0.150
115	EF673017.1 *Lerista puncticauda*	0.130	0.128	0.128	0.128	0.128	0.133	0.133	0.118	0.121	0.123
116	EF673016.1 *Lerista punctatovittata*	0.116	0.114	0.114	0.114	0.114	0.114	0.111	0.138	0.135	0.140
117	EF673015.1 *Lerista praepedita*	0.155	0.152	0.152	0.152	0.152	0.152	0.152	0.128	0.130	0.138
118	EF673014.1 *Lerista planiventralis*	0.164	0.162	0.162	0.162	0.162	0.167	0.164	0.152	0.155	0.152
119	EF673013.1 *Lerista picturata*	0.121	0.118	0.118	0.118	0.118	0.123	0.126	0.118	0.121	0.135
120	EF673012.1 *Lerista petersoni*	0.130	0.128	0.128	0.128	0.128	0.128	0.128	0.147	0.150	0.145
121	EF673011.1 *Lerista orientalis* NADH	0.140	0.138	0.138	0.138	0.138	0.138	0.138	0.135	0.138	0.126
122	EF673010.1 *Lerista onsloviana*	0.143	0.140	0.140	0.140	0.140	0.140	0.140	0.128	0.130	0.135
123	EF673009.1 *Lerista nichollsi*	0.133	0.130	0.130	0.130	0.130	0.126	0.130	0.140	0.143	0.143
124	EF673008.1 *Lerista neander*	0.145	0.143	0.143	0.143	0.143	0.147	0.143	0.133	0.130	0.138
125	EF673007.1 *Lerista muelleri*	0.152	0.150	0.150	0.150	0.150	0.147	0.152	0.150	0.152	0.152
126	EF673006.1 *Lerista microtis*	0.145	0.143	0.143	0.143	0.143	0.140	0.143	0.130	0.133	0.130
127	EF673005.1 *Lerista macropisthopus*	0.135	0.133	0.133	0.133	0.133	0.133	0.133	0.114	0.116	0.123
128	EF673004.1 *Lerista lineopunctulata*	0.147	0.145	0.145	0.145	0.145	0.145	0.150	0.147	0.145	0.162
129	EF673003.1 *Lerista lineata*	0.157	0.155	0.155	0.155	0.155	0.155	0.155	0.135	0.138	0.135
130	EF673002.1 *Lerista labialis*	0.147	0.145	0.145	0.145	0.145	0.145	0.140	0.135	0.138	0.143
131	EF673001.1 *Lerista kennedyensis*	0.138	0.135	0.135	0.135	0.135	0.135	0.135	0.140	0.143	0.143
132	EF673000.1 Lerista *kendricki*	0.140	0.138	0.138	0.138	0.138	0.133	0.140	0.138	0.140	0.135
133	EF672999.1 *Lerista karlschmidti*	0.155	0.157	0.157	0.157	0.157	0.157	0.162	0.130	0.128	0.133
134	EF672998.1 *Lerista kalumburu*	0.162	0.159	0.159	0.159	0.162	0.159	0.157	0.159	0.157	0.155
135	EF672997.1 *Lerista ips*	0.130	0.128	0.128	0.128	0.128	0.128	0.123	0.118	0.118	0.128
136	EF672996.1 *Lerista ingrami*	0.162	0.159	0.159	0.159	0.159	0.159	0.162	0.145	0.143	0.143
137	EF672995.1 *Lerista humphriesi*	0.164	0.162	0.162	0.162	0.162	0.159	0.164	0.150	0.152	0.143
138	EF672994.1 *Lerista haroldi*	0.147	0.150	0.150	0.150	0.150	0.150	0.155	0.138	0.140	0.140
139	EF672993.1 *Lerista griffini*	0.143	0.140	0.140	0.143	0.140	0.135	0.145	0.130	0.133	0.143
140	EF672992.1 *Lerista greeri*	0.157	0.155	0.155	0.155	0.155	0.155	0.157	0.152	0.150	0.162
141	EF672991.1 *Lerista gerrardii*	0.140	0.138	0.138	0.138	0.138	0.138	0.138	0.114	0.116	0.123
142	EF672990.1 *Lerista gascoynensis*	0.126	0.123	0.123	0.123	0.123	0.118	0.123	0.138	0.140	0.138
143	EF672989.1 *Lerista frosti*	0.147	0.145	0.145	0.145	0.145	0.143	0.140	0.140	0.143	0.135
144	EF672988.1 *Lerista fragilis*	0.143	0.140	0.140	0.140	0.140	0.140	0.140	0.133	0.135	0.135

		41	42	43	44	45	46	47	48	49	50
145	EF672987.1 *Lerista flammicauda*	0.135	0.133	0.133	0.133	0.133	0.128	0.130	0.128	0.130	0.121
146	EF672986.1 *Lerista eupoda*	0.145	0.143	0.143	0.143	0.143	0.143	0.143	0.116	0.118	0.121
147	EF672985.1 *Lerista emmotti*	0.130	0.128	0.128	0.128	0.128	0.128	0.135	0.164	0.167	0.176
148	EF672984.1 *Lerista elongata*	0.126	0.128	0.128	0.128	0.128	0.123	0.130	0.114	0.111	0.109
149	EF672983.1 *Lerista elegans*	0.143	0.140	0.140	0.140	0.140	0.145	0.135	0.133	0.135	0.130
150	EF672982.1 *Lerista edwardsae*	0.123	0.121	0.121	0.121	0.121	0.126	0.123	0.116	0.118	0.114
151	EF672981.1 *Lerista dorsalis*	0.128	0.126	0.126	0.126	0.126	0.130	0.128	0.133	0.135	0.135
152	EF672980.1 *Lerista distinguenda*	0.133	0.135	0.135	0.135	0.135	0.140	0.140	0.121	0.123	0.118
153	EF672979.1 *Lerista desertorum*	0.140	0.138	0.138	0.138	0.138	0.143	0.143	0.123	0.121	0.133
154	EF672978.1 *Lerista connivens*	0.143	0.140	0.140	0.140	0.140	0.140	0.138	0.138	0.135	0.140
155	EF672977.1 *Lerista cinerea*	0.157	0.155	0.155	0.155	0.155	0.152	0.155	0.089	0.092	0.101
156	EF672976.1 *Lerista christinae*	0.130	0.128	0.128	0.128	0.128	0.133	0.130	0.130	0.133	0.123
157	EF672975.1 *Lerista carpentariae*	0.140	0.143	0.143	0.143	0.143	0.143	0.143	0.121	0.123	0.123
158	EF672974.1 *Lerista borealis*	0.128	0.130	0.130	0.130	0.130	0.128	0.133	0.126	0.128	0.130
159	EF672973.1 *Lerista bipes*	0.162	0.159	0.159	0.159	0.159	0.159	0.162	0.118	0.121	0.126
160	EF672972.1 *Lerista baynesi*	0.138	0.135	0.135	0.135	0.135	0.138	0.135	0.128	0.126	0.126
161	EF672971.1 *Lerista axillaris*	0.133	0.130	0.130	0.130	0.130	0.130	0.130	0.118	0.121	0.123
162	EF672970.1 *Lerista arenicola*	0.162	0.159	0.159	0.159	0.159	0.155	0.162	0.147	0.150	0.150
163	EF672969.1 *Lerista apoda*	0.157	0.155	0.155	0.155	0.155	0.150	0.159	0.135	0.138	0.147
164	EF672968.1 *Lerista ameles*	0.159	0.157	0.157	0.157	0.157	0.155	0.162	0.106	0.104	0.121
165	EF672967.1 *Lerista allochira*	0.138	0.135	0.135	0.135	0.138	0.133	0.138	0.128	0.130	0.133
166	EF672966.1 *Lerista aericeps*	0.147	0.145	0.145	0.145	0.145	0.145	0.150	0.126	0.123	0.128
167	DQ915332.1 *Lerista bougainvillii*	0.140	0.138	0.138	0.138	0.138	0.133	0.140	0.114	0.116	0.121
168	DQ915331.1 *Lerista bipes*	0.150	0.147	0.147	0.147	0.147	0.143	0.150	0.126	0.123	0.123
169	AY169666.1 *Lerista bipes* ND4	0.143	0.140	0.140	0.140	0.140	0.140	0.138	0.133	0.135	0.135
170	EU109216.1 *Lerista macropisthopus* ND4	0.138	0.135	0.135	0.135	0.135	0.135	0.130	0.133	0.130	0.143

		51	52	53	54	55	56	57	58	59	60
1	**PQ09** *L.separanda* WIN07P ND4	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.016	0.016	0.017	0.017	0.017	0.018	0.017	0.016	0.016	0.016
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.019	0.018	0.018	0.018	0.018	0.019	0.019	0.018	0.018	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.016	0.016	0.016	0.016	0.016	0.016	0.000	0.016	0.016	0.014
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.016	0.015	0.016	0.016	0.016	0.016	0.006	0.016	0.016	0.014
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.016	0.016	0.016	0.016	0.016	0.016	0.000	0.016	0.016	0.014
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.016	0.016	0.016	0.016	0.016	0.016	0.000	0.016	0.016	0.014
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.017	0.016
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.017	0.016
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.017	0.016
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.017	0.016
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.017	0.016
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.017	0.016	0.017	0.017	0.017	0.016	0.015	0.017	0.017	0.015
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.018	0.016	0.017	0.017	0.017	0.005	0.016	0.017	0.017	0.016
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.015	0.013	0.014	0.014	0.014	0.016	0.015	0.017	0.017	0.006
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.018	0.017	0.017	0.017	0.017	0.018	0.017	0.015	0.015	0.017
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.019	0.017	0.017	0.017	0.017	0.018	0.017	0.015	0.015	0.017
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.018	0.017	0.017	0.017	0.017	0.018	0.017	0.015	0.015	0.017
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.018	0.017	0.017	0.017	0.017	0.018	0.017	0.015	0.015	0.017
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.019	0.017	0.017	0.017	0.017	0.018	0.017	0.015	0.015	0.017
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.017	0.016	0.017	0.017	0.017	0.015	0.015	0.017	0.017	0.015
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.018	0.017	0.017	0.017	0.017	0.015	0.015	0.017	0.017	0.015
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.018	0.017	0.018	0.018	0.018	0.019	0.017	0.016	0.016	0.017
25	AY169667.1 *Lerista bougainvillii*	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.016	0.016	0.016
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.017	0.016	0.016	0.016	0.016	0.018	0.016	0.003	0.003	0.016
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.017	0.016	0.016	0.016	0.016	0.018	0.016	0.000	0.000	0.016
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.017	0.016	0.016	0.016	0.016	0.018	0.016	0.002	0.002	0.016
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.008	0.008	0.017
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.009	0.009	0.017
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.009	0.009	0.017
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.009	0.009	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.009	0.009	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.009	0.009	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.009	0.009	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.009	0.009	0.017

		51	52	53	54	55	56	57	58	59	60
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.017	0.017	0.017	0.017	0.017	0.019	0.017	0.015	0.015	0.017
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.017	0.017	0.017	0.017	0.017	0.019	0.017	0.015	0.015	0.017
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.017	0.017	0.018	0.018	0.018	0.019	0.017	0.015	0.015	0.018
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.017	0.017	0.018	0.018	0.018	0.019	0.017	0.015	0.015	0.018
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.018	0.017	0.018	0.018	0.018	0.019	0.017	0.015	0.015	0.018
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.017	0.017	0.018	0.018	0.018	0.019	0.017	0.015	0.015	0.018
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.017	0.017	0.018	0.018	0.018	0.019	0.017	0.015	0.015	0.018
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.017	0.017	0.018	0.018	0.018	0.019	0.017	0.015	0.015	0.018
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.017	0.017	0.018	0.018	0.018	0.019	0.017	0.015	0.015	0.018
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.017	0.017	0.017	0.017	0.017	0.019	0.017	0.015	0.015	0.017
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.017	0.017	0.018	0.018	0.018	0.019	0.017	0.015	0.015	0.018
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.009	0.014	0.014	0.014	0.014	0.017	0.016	0.016	0.016	0.014
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.009	0.014	0.014	0.014	0.014	0.017	0.016	0.016	0.016	0.014
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.006	0.015	0.015	0.015	0.015	0.018	0.016	0.017	0.017	0.014
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1		0.015	0.015	0.015	0.015	0.018	0.016	0.017	0.017	0.014
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.101		0.004	0.004	0.004	0.016	0.016	0.016	0.016	0.014
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.099	0.007		0.000	0.000	0.017	0.016	0.016	0.016	0.014
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.099	0.007	0.000		0.000	0.017	0.016	0.016	0.016	0.014
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.099	0.007	0.000	0.000		0.017	0.016	0.016	0.016	0.014
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.164	0.126	0.133	0.133	0.133		0.016	0.018	0.018	0.016
57	KU309300.1 *Lerista storri* isolate LestA1	0.118	0.116	0.123	0.123	0.123	0.118		0.016	0.016	0.014
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.135	0.114	0.121	0.121	0.121	0.150	0.118		0.000	0.016
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.135	0.114	0.121	0.121	0.121	0.150	0.118	0.000		0.016
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.094	0.092	0.094	0.094	0.094	0.123	0.094	0.128	0.128	
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.104	0.087	0.089	0.089	0.089	0.118	0.104	0.133	0.133	0.010
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.157	0.147	0.150	0.150	0.150	0.184	0.135	0.116	0.116	0.147
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.111	0.089	0.092	0.092	0.092	0.130	0.116	0.128	0.128	0.089
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.109	0.092	0.089	0.089	0.089	0.133	0.118	0.130	0.130	0.092
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.111	0.089	0.092	0.092	0.092	0.130	0.116	0.128	0.128	0.089
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.109	0.092	0.089	0.089	0.089	0.133	0.118	0.130	0.130	0.092
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.109	0.087	0.089	0.089	0.089	0.133	0.118	0.126	0.126	0.092
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.118	0.094	0.092	0.092	0.092	0.143	0.114	0.135	0.135	0.097
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.123	0.099	0.097	0.097	0.097	0.147	0.118	0.140	0.140	0.101
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.116	0.097	0.094	0.094	0.094	0.135	0.116	0.133	0.133	0.094
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.106	0.087	0.085	0.085	0.085	0.130	0.106	0.128	0.128	0.085
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.106	0.087	0.085	0.085	0.085	0.130	0.106	0.128	0.128	0.085

		51	52	53	54	55	56	57	58	59	60
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.118	0.099	0.097	0.097	0.097	0.147	0.118	0.140	0.140	0.101
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.116	0.097	0.094	0.094	0.094	0.145	0.116	0.138	0.138	0.099
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.116	0.097	0.094	0.094	0.094	0.145	0.116	0.138	0.138	0.099
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.118	0.099	0.097	0.097	0.097	0.147	0.118	0.140	0.140	0.101
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.118	0.099	0.097	0.097	0.097	0.147	0.118	0.140	0.140	0.101
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.116	0.097	0.094	0.094	0.094	0.145	0.116	0.138	0.138	0.099
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.118	0.099	0.106	0.106	0.106	0.118	0.094	0.111	0.111	0.106
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.118	0.099	0.106	0.106	0.106	0.118	0.094	0.111	0.111	0.106
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.118	0.099	0.106	0.106	0.106	0.118	0.094	0.111	0.111	0.106
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.118	0.099	0.106	0.106	0.106	0.118	0.094	0.111	0.111	0.106
83	KU309273.1 *Lerista allanae* isolate Leal2	0.145	0.140	0.147	0.147	0.147	0.171	0.140	0.104	0.104	0.147
84	KU309272.1 *Lerista allanae* isolate Leal1	0.152	0.143	0.150	0.150	0.150	0.179	0.147	0.111	0.111	0.155
85	KF823006.1 *Lerista kalumburu*	0.150	0.147	0.150	0.150	0.150	0.171	0.164	0.150	0.150	0.147
86	KF823005.1 *Lerista kalumburu*	0.128	0.143	0.145	0.145	0.145	0.176	0.155	0.147	0.147	0.135
87	KF823007.1 *Lerista kalumburu*	0.155	0.159	0.162	0.162	0.162	0.184	0.171	0.171	0.171	0.145
88	KF823004.1 *Lerista kalumburu*	0.143	0.150	0.152	0.152	0.152	0.186	0.169	0.159	0.159	0.145
89	KF823003.1 *Lerista kalumburu*	0.150	0.152	0.155	0.155	0.155	0.186	0.169	0.157	0.157	0.143
90	KF823002.1 *Lerista kalumburu*	0.147	0.155	0.157	0.157	0.157	0.191	0.174	0.164	0.164	0.150
91	KF823001.1 *Lerista kalumburu*	0.145	0.152	0.155	0.155	0.155	0.193	0.171	0.164	0.164	0.152
92	KF823000.1 *Lerista kalumburu*	0.147	0.150	0.152	0.152	0.152	0.188	0.167	0.159	0.159	0.140
93	KF822999.1 *Lerista kalumburu*	0.133	0.147	0.150	0.150	0.150	0.181	0.157	0.152	0.152	0.140
94	KF822998.1 *Lerista kalumburu*	0.152	0.157	0.159	0.159	0.159	0.181	0.152	0.143	0.143	0.143
95	KF822997.1 *Lerista kalumburu*	0.147	0.157	0.155	0.155	0.155	0.200	0.174	0.147	0.147	0.162
96	EF673035.1 *Lerista zietzi*	0.133	0.126	0.128	0.128	0.128	0.150	0.128	0.135	0.135	0.111
97	EF673036.1 *Lerista zonulata*	0.147	0.138	0.140	0.140	0.140	0.181	0.157	0.145	0.145	0.145
98	EF673034.1 *Lerista yuna*	0.135	0.133	0.140	0.140	0.140	0.162	0.128	0.114	0.114	0.116
99	EF673033.1 *Lerista xanthura*	0.116	0.109	0.116	0.116	0.116	0.133	0.118	0.116	0.116	0.109
100	EF673032.1 *Lerista wilkinsi*	0.000	0.101	0.099	0.099	0.099	0.164	0.118	0.135	0.135	0.094
101	EF673031.1 *Lerista walkeri*	0.126	0.118	0.126	0.126	0.126	0.157	0.133	0.114	0.114	0.114
102	EF673030.1 *Lerista viduata*	0.143	0.138	0.140	0.140	0.140	0.162	0.138	0.128	0.128	0.138
103	EF673029.1 *Lerista vermicularis*	0.164	0.155	0.162	0.162	0.162	0.169	0.133	0.135	0.135	0.145
104	EF673028.1 *Lerista varia*	0.143	0.123	0.130	0.130	0.130	0.138	0.130	0.118	0.118	0.123
105	EF673027.1 *Lerista uniduo*	0.152	0.147	0.155	0.155	0.155	0.157	0.133	0.138	0.138	0.145
106	EF673026.1 *Lerista tridactyla*	0.114	0.135	0.143	0.143	0.143	0.162	0.138	0.128	0.128	0.130
107	EF673025.1 *Lerista terdigitata*	0.123	0.133	0.140	0.140	0.140	0.150	0.130	0.123	0.123	0.126
108	EF673024.1 *Lerista taeniata*	0.123	0.133	0.140	0.140	0.140	0.164	0.130	0.133	0.133	0.128

		51	52	53	54	55	56	57	58	59	60
109	EF673023.1 *Lerista stylis*	0.126	0.121	0.123	0.123	0.123	0.150	0.140	0.135	0.135	0.114
110	EF673022.1 *Lerista stictopleura*	0.118	0.118	0.126	0.126	0.126	0.143	0.126	0.126	0.126	0.121
111	EF673021.1 *Lerista chordae*	0.147	0.162	0.164	0.164	0.164	0.159	0.135	0.147	0.147	0.130
112	EF673020.1 *Lerista speciosa*	0.145	0.130	0.138	0.138	0.138	0.167	0.145	0.121	0.121	0.133
113	EF673019.1 *Lerista simillima*	0.155	0.145	0.152	0.152	0.152	0.164	0.133	0.130	0.130	0.135
114	EF673018.1 *Lerista robusta*	0.147	0.150	0.157	0.157	0.157	0.164	0.147	0.135	0.135	0.133
115	EF673017.1 *Lerista puncticauda*	0.126	0.121	0.128	0.128	0.128	0.157	0.128	0.118	0.118	0.126
116	EF673016.1 *Lerista punctatovittata*	0.133	0.140	0.147	0.147	0.147	0.162	0.162	0.118	0.118	0.145
117	EF673015.1 *Lerista praepedita*	0.140	0.126	0.128	0.128	0.128	0.138	0.130	0.106	0.106	0.114
118	EF673014.1 *Lerista planiventralis*	0.155	0.143	0.145	0.145	0.145	0.150	0.133	0.152	0.152	0.133
119	EF673013.1 *Lerista picturata*	0.133	0.133	0.140	0.140	0.140	0.169	0.128	0.106	0.106	0.140
120	EF673012.1 *Lerista petersoni*	0.152	0.143	0.145	0.145	0.145	0.169	0.138	0.133	0.133	0.121
121	EF673011.1 *Lerista orientalis* NADH	0.126	0.121	0.128	0.128	0.128	0.174	0.130	0.133	0.133	0.118
122	EF673010.1 *Lerista onsloviana*	0.143	0.133	0.138	0.138	0.138	0.162	0.138	0.135	0.135	0.118
123	EF673009.1 *Lerista nichollsi*	0.145	0.143	0.150	0.150	0.150	0.176	0.140	0.130	0.130	0.126
124	EF673008.1 *Lerista neander*	0.135	0.130	0.138	0.138	0.138	0.174	0.135	0.140	0.140	0.118
125	EF673007.1 *Lerista muelleri*	0.155	0.143	0.150	0.150	0.150	0.159	0.140	0.152	0.152	0.133
126	EF673006.1 *Lerista microtis*	0.138	0.138	0.145	0.145	0.145	0.159	0.133	0.133	0.133	0.126
127	EF673005.1 *Lerista macropisthopus*	0.126	0.123	0.130	0.130	0.130	0.152	0.123	0.128	0.128	0.116
128	EF673004.1 *Lerista lineopunctulata*	0.159	0.145	0.152	0.152	0.152	0.164	0.138	0.130	0.130	0.143
129	EF673003.1 *Lerista lineata*	0.143	0.145	0.152	0.152	0.152	0.150	0.143	0.143	0.143	0.133
130	EF673002.1 *Lerista labialis*	0.147	0.145	0.152	0.152	0.152	0.152	0.152	0.138	0.138	0.133
131	EF673001.1 *Lerista kennedyensis*	0.150	0.147	0.152	0.152	0.152	0.179	0.147	0.140	0.140	0.133
132	EF673000.1 Lerista *kendricki*	0.138	0.133	0.140	0.140	0.140	0.171	0.138	0.130	0.130	0.121
133	EF672999.1 *Lerista karlschmidti*	0.130	0.126	0.133	0.133	0.133	0.179	0.138	0.145	0.145	0.135
134	EF672998.1 *Lerista kalumburu*	0.150	0.159	0.157	0.157	0.157	0.198	0.176	0.150	0.150	0.164
135	EF672997.1 *Lerista ips*	0.128	0.143	0.145	0.145	0.145	0.159	0.147	0.130	0.130	0.121
136	EF672996.1 *Lerista ingrami*	0.143	0.138	0.140	0.140	0.140	0.188	0.152	0.138	0.138	0.138
137	EF672995.1 *Lerista humphriesi*	0.145	0.143	0.150	0.150	0.150	0.162	0.140	0.135	0.135	0.147
138	EF672994.1 *Lerista haroldi*	0.138	0.143	0.150	0.150	0.150	0.138	0.121	0.130	0.130	0.128
139	EF672993.1 *Lerista griffini*	0.150	0.152	0.155	0.155	0.155	0.157	0.147	0.133	0.133	0.135
140	EF672992.1 *Lerista greeri*	0.155	0.150	0.157	0.157	0.157	0.157	0.135	0.130	0.130	0.143
141	EF672991.1 *Lerista gerrardii*	0.121	0.123	0.130	0.130	0.130	0.167	0.121	0.126	0.126	0.118
142	EF672990.1 *Lerista gascoynensis*	0.145	0.138	0.145	0.145	0.145	0.169	0.135	0.123	0.123	0.126
143	EF672989.1 *Lerista frosti*	0.138	0.138	0.140	0.140	0.140	0.145	0.126	0.133	0.133	0.133
144	EF672988.1 *Lerista fragilis*	0.147	0.135	0.143	0.143	0.143	0.155	0.114	0.133	0.133	0.123

		51	52	53	54	55	56	57	58	59	60
145	EF672987.1 *Lerista flammicauda*	0.128	0.128	0.130	0.130	0.130	0.147	0.138	0.118	0.118	0.121
146	EF672986.1 *Lerista eupoda*	0.118	0.123	0.130	0.130	0.130	0.157	0.128	0.138	0.138	0.116
147	EF672985.1 *Lerista emmotti*	0.174	0.155	0.162	0.162	0.162	0.169	0.167	0.123	0.123	0.169
148	EF672984.1 *Lerista elongata*	0.106	0.128	0.135	0.135	0.135	0.157	0.123	0.130	0.130	0.121
149	EF672983.1 *Lerista elegans*	0.133	0.126	0.133	0.133	0.133	0.162	0.140	0.140	0.140	0.130
150	EF672982.1 *Lerista edwardsae*	0.126	0.135	0.143	0.143	0.143	0.167	0.128	0.118	0.118	0.135
151	EF672981.1 *Lerista dorsalis*	0.133	0.140	0.147	0.147	0.147	0.164	0.147	0.114	0.114	0.135
152	EF672980.1 *Lerista distinguenda*	0.121	0.111	0.118	0.118	0.118	0.164	0.126	0.126	0.126	0.116
153	EF672979.1 *Lerista desertorum*	0.130	0.128	0.135	0.135	0.135	0.157	0.126	0.118	0.118	0.128
154	EF672978.1 *Lerista connivens*	0.138	0.123	0.130	0.130	0.130	0.138	0.126	0.118	0.118	0.123
155	EF672977.1 *Lerista cinerea*	0.104	0.087	0.089	0.089	0.089	0.118	0.104	0.133	0.133	0.010
156	EF672976.1 *Lerista christinae*	0.128	0.138	0.145	0.145	0.145	0.152	0.133	0.133	0.133	0.130
157	EF672975.1 *Lerista carpentariae*	0.126	0.114	0.121	0.121	0.121	0.135	0.116	0.140	0.140	0.097
158	EF672974.1 *Lerista borealis*	0.143	0.128	0.135	0.135	0.135	0.147	0.135	0.121	0.121	0.121
159	EF672973.1 *Lerista bipes*	0.133	0.147	0.150	0.150	0.150	0.159	0.143	0.138	0.138	0.123
160	EF672972.1 *Lerista baynesi*	0.128	0.126	0.133	0.133	0.133	0.179	0.143	0.135	0.135	0.140
161	EF672971.1 *Lerista axillaris*	0.126	0.126	0.133	0.133	0.133	0.157	0.114	0.123	0.123	0.114
162	EF672970.1 *Lerista arenicola*	0.157	0.143	0.145	0.145	0.145	0.188	0.164	0.138	0.138	0.155
163	EF672969.1 *Lerista apoda*	0.150	0.133	0.140	0.140	0.140	0.135	0.114	0.133	0.133	0.114
164	EF672968.1 *Lerista ameles*	0.118	0.099	0.106	0.106	0.106	0.118	0.094	0.111	0.111	0.106
165	EF672967.1 *Lerista allochira*	0.130	0.123	0.126	0.126	0.126	0.140	0.123	0.116	0.116	0.106
166	EF672966.1 *Lerista aericeps*	0.128	0.123	0.128	0.128	0.128	0.150	0.140	0.135	0.135	0.116
167	DQ915332.1 *Lerista bougainvillii*	0.123	0.123	0.130	0.130	0.130	0.145	0.126	0.118	0.118	0.130
168	DQ915331.1 *Lerista bipes*	0.121	0.145	0.152	0.152	0.152	0.159	0.143	0.135	0.135	0.126
169	AY169666.1 *Lerista bipes* ND4	0.143	0.138	0.145	0.145	0.145	0.145	0.145	0.135	0.135	0.126
170	EU109216.1 *Lerista macropisthopus* ND4	0.145	0.140	0.147	0.147	0.147	0.164	0.145	0.140	0.140	0.140

		61	62	63	64	65	66	67	68	69	70
1	**PQ09** *L.separanda* WIN07P ND4	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.017	0.017	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.017	0.017	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.017	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018	0.019	0.018
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.015	0.017	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.014	0.017	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.015	0.017	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.015	0.017	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.016	0.018	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.016
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.016	0.018	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.016
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.016	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.016	0.018	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.016
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.016	0.018	0.016	0.017	0.016	0.017	0.017	0.017	0.017	0.017
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.015	0.019	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.017
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.016	0.019	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.016
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.005	0.017	0.014	0.014	0.014	0.014	0.014	0.015	0.015	0.014
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.015	0.018	0.016	0.016	0.016	0.016	0.015	0.016	0.016	0.016
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.015	0.018	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.016
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.018	0.000	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
25	AY169667.1 *Lerista bougainvillii*	0.016	0.018	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.017	0.015	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.017
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.017	0.016	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.017
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.017	0.016	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.017
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018

		61	62	63	64	65	66	67	68	69	70
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.017
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.018	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.018
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.014	0.017	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.014	0.017	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.015
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.015	0.018	0.015	0.015	0.015	0.015	0.015	0.016	0.016	0.015
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.015	0.018	0.015	0.015	0.015	0.015	0.015	0.016	0.016	0.016
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.014	0.017	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.015
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.014	0.018	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.014
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.014	0.018	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.014
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.014	0.018	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.014
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.016	0.019	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
57	KU309300.1 *Lerista storri* isolate LestA1	0.015	0.017	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.017	0.016	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.017
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.017	0.016	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.017
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.005	0.017	0.014	0.014	0.014	0.014	0.014	0.015	0.015	0.014
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2		0.018	0.014	0.015	0.014	0.015	0.015	0.015	0.015	0.015
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.152		0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.094	0.140		0.002	0.000	0.002	0.002	0.009	0.010	0.009
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.097	0.143	0.002		0.002	0.000	0.003	0.009	0.009	0.009
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.094	0.140	0.000	0.002		0.002	0.002	0.009	0.010	0.009
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.097	0.143	0.002	0.000	0.002		0.003	0.009	0.009	0.009
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.097	0.143	0.002	0.005	0.002	0.005		0.009	0.010	0.009
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.101	0.145	0.036	0.034	0.036	0.034	0.039		0.003	0.005
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.106	0.150	0.041	0.039	0.041	0.039	0.043	0.005		0.006
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.099	0.143	0.034	0.031	0.034	0.031	0.036	0.012	0.017	
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.089	0.143	0.024	0.022	0.024	0.022	0.027	0.012	0.017	0.014
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.089	0.143	0.024	0.022	0.024	0.022	0.027	0.012	0.017	0.014

		61	62	63	64	65	66	67	68	69	70
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.106	0.150	0.041	0.039	0.041	0.039	0.043	0.014	0.014	0.017
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.104	0.147	0.043	0.041	0.043	0.041	0.046	0.017	0.017	0.019
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.104	0.147	0.043	0.041	0.043	0.041	0.046	0.017	0.017	0.019
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.106	0.150	0.041	0.039	0.041	0.039	0.043	0.014	0.014	0.017
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.106	0.150	0.041	0.039	0.041	0.039	0.043	0.014	0.014	0.017
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.104	0.147	0.039	0.036	0.039	0.036	0.041	0.012	0.017	0.014
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.101	0.152	0.097	0.099	0.097	0.099	0.099	0.109	0.114	0.101
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.101	0.152	0.097	0.099	0.097	0.099	0.099	0.109	0.114	0.101
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.101	0.152	0.097	0.099	0.097	0.099	0.099	0.109	0.114	0.101
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.101	0.152	0.097	0.099	0.097	0.099	0.099	0.109	0.114	0.101
83	KU309273.1 *Lerista allanae* isolate Leal2	0.152	0.126	0.140	0.143	0.140	0.143	0.143	0.145	0.150	0.143
84	KU309272.1 *Lerista allanae* isolate Leal1	0.159	0.126	0.143	0.145	0.143	0.145	0.145	0.147	0.152	0.145
85	KF823006.1 *Lerista kalumburu*	0.150	0.155	0.150	0.152	0.150	0.152	0.152	0.159	0.159	0.152
86	KF823005.1 *Lerista kalumburu*	0.138	0.152	0.140	0.143	0.140	0.143	0.143	0.150	0.155	0.143
87	KF823007.1 *Lerista kalumburu*	0.147	0.169	0.147	0.150	0.147	0.150	0.150	0.159	0.159	0.152
88	KF823004.1 *Lerista kalumburu*	0.147	0.167	0.143	0.145	0.143	0.145	0.145	0.157	0.162	0.150
89	KF823003.1 *Lerista kalumburu*	0.145	0.169	0.145	0.147	0.145	0.147	0.147	0.159	0.164	0.152
90	KF823002.1 *Lerista kalumburu*	0.152	0.171	0.147	0.150	0.147	0.150	0.150	0.162	0.167	0.155
91	KF823001.1 *Lerista kalumburu*	0.155	0.171	0.150	0.152	0.150	0.152	0.152	0.164	0.169	0.157
92	KF823000.1 *Lerista kalumburu*	0.143	0.167	0.143	0.145	0.143	0.145	0.145	0.157	0.162	0.150
93	KF822999.1 *Lerista kalumburu*	0.143	0.157	0.143	0.145	0.143	0.145	0.145	0.152	0.157	0.145
94	KF822998.1 *Lerista kalumburu*	0.145	0.152	0.152	0.155	0.152	0.155	0.155	0.155	0.159	0.147
95	KF822997.1 *Lerista kalumburu*	0.159	0.155	0.157	0.159	0.157	0.159	0.159	0.167	0.171	0.159
96	EF673035.1 *Lerista zietzi*	0.116	0.121	0.121	0.123	0.121	0.123	0.123	0.126	0.130	0.123
97	EF673036.1 *Lerista zonulata*	0.145	0.150	0.126	0.128	0.126	0.128	0.123	0.130	0.135	0.128
98	EF673034.1 *Lerista yuna*	0.118	0.157	0.128	0.130	0.128	0.130	0.130	0.138	0.143	0.135
99	EF673033.1 *Lerista xanthura*	0.106	0.135	0.114	0.116	0.114	0.116	0.111	0.130	0.135	0.128
100	EF673032.1 *Lerista wilkinsi*	0.104	0.157	0.111	0.109	0.111	0.109	0.109	0.118	0.123	0.116
101	EF673031.1 *Lerista walkeri*	0.118	0.147	0.121	0.123	0.121	0.123	0.118	0.128	0.133	0.121
102	EF673030.1 *Lerista viduata*	0.145	0.157	0.133	0.130	0.133	0.130	0.130	0.140	0.145	0.133
103	EF673029.1 *Lerista vermicularis*	0.150	0.162	0.138	0.140	0.138	0.140	0.140	0.145	0.145	0.143
104	EF673028.1 *Lerista varia*	0.130	0.155	0.118	0.121	0.118	0.121	0.118	0.135	0.140	0.133
105	EF673027.1 *Lerista uniduo*	0.147	0.157	0.123	0.126	0.123	0.126	0.126	0.133	0.133	0.123
106	EF673026.1 *Lerista tridactyla*	0.130	0.147	0.138	0.140	0.138	0.140	0.135	0.145	0.150	0.143
107	EF673025.1 *Lerista terdigitata*	0.126	0.143	0.133	0.135	0.133	0.135	0.130	0.138	0.143	0.135
108	EF673024.1 *Lerista taeniata*	0.133	0.155	0.133	0.135	0.133	0.135	0.130	0.143	0.147	0.140

		61	62	63	64	65	66	67	68	69	70
109	EF673023.1 *Lerista stylis*	0.118	0.150	0.123	0.126	0.123	0.126	0.121	0.140	0.145	0.138
110	EF673022.1 *Lerista stictopleura*	0.128	0.147	0.114	0.116	0.114	0.116	0.111	0.123	0.128	0.121
111	EF673021.1 *Lerista chordae*	0.135	0.150	0.138	0.140	0.138	0.140	0.140	0.155	0.159	0.152
112	EF673020.1 *Lerista speciosa*	0.135	0.133	0.126	0.128	0.126	0.128	0.128	0.138	0.143	0.135
113	EF673019.1 *Lerista simillima*	0.140	0.152	0.133	0.135	0.133	0.135	0.135	0.140	0.140	0.138
114	EF673018.1 *Lerista robusta*	0.138	0.145	0.138	0.140	0.138	0.140	0.135	0.143	0.143	0.140
115	EF673017.1 *Lerista puncticauda*	0.130	0.133	0.140	0.143	0.140	0.143	0.138	0.147	0.152	0.145
116	EF673016.1 *Lerista punctatovittata*	0.145	0.135	0.138	0.140	0.138	0.140	0.140	0.143	0.143	0.140
117	EF673015.1 *Lerista praepedita*	0.121	0.145	0.118	0.121	0.118	0.121	0.116	0.138	0.143	0.130
118	EF673014.1 *Lerista planiventralis*	0.135	0.159	0.133	0.135	0.133	0.135	0.130	0.143	0.145	0.140
119	EF673013.1 *Lerista picturata*	0.138	0.123	0.126	0.128	0.126	0.128	0.123	0.130	0.135	0.128
120	EF673012.1 *Lerista petersoni*	0.128	0.159	0.126	0.128	0.126	0.128	0.128	0.140	0.145	0.138
121	EF673011.1 *Lerista orientalis* NADH	0.123	0.147	0.130	0.133	0.130	0.133	0.128	0.135	0.140	0.138
122	EF673010.1 *Lerista onsloviana*	0.116	0.169	0.138	0.138	0.138	0.138	0.135	0.143	0.147	0.140
123	EF673009.1 *Lerista nichollsi*	0.133	0.152	0.133	0.135	0.133	0.135	0.135	0.138	0.143	0.135
124	EF673008.1 *Lerista neander*	0.114	0.159	0.145	0.147	0.145	0.147	0.143	0.143	0.147	0.150
125	EF673007.1 *Lerista muelleri*	0.133	0.164	0.111	0.114	0.111	0.114	0.114	0.135	0.140	0.133
126	EF673006.1 *Lerista microtis*	0.126	0.152	0.143	0.145	0.143	0.145	0.145	0.150	0.155	0.143
127	EF673005.1 *Lerista macropisthopus*	0.111	0.138	0.143	0.145	0.143	0.145	0.140	0.150	0.155	0.147
128	EF673004.1 *Lerista lineopunctulata*	0.150	0.162	0.138	0.140	0.138	0.140	0.138	0.143	0.147	0.140
129	EF673003.1 *Lerista lineata*	0.138	0.152	0.116	0.118	0.116	0.118	0.118	0.133	0.135	0.130
130	EF673002.1 *Lerista labialis*	0.138	0.150	0.135	0.138	0.135	0.138	0.138	0.135	0.140	0.138
131	EF673001.1 *Lerista kennedyensis*	0.130	0.164	0.138	0.138	0.138	0.138	0.140	0.143	0.147	0.140
132	EF673000.1 Lerista *kendricki*	0.123	0.167	0.126	0.128	0.126	0.128	0.123	0.135	0.140	0.133
133	EF672999.1 *Lerista karlschmidti*	0.145	0.152	0.143	0.145	0.143	0.145	0.140	0.147	0.152	0.145
134	EF672998.1 *Lerista kalumburu*	0.162	0.157	0.159	0.162	0.159	0.162	0.162	0.169	0.174	0.162
135	EF672997.1 *Lerista ips*	0.126	0.123	0.128	0.130	0.128	0.130	0.130	0.133	0.138	0.130
136	EF672996.1 *Lerista ingrami*	0.140	0.155	0.135	0.138	0.135	0.138	0.133	0.140	0.145	0.143
137	EF672995.1 *Lerista humphriesi*	0.155	0.171	0.147	0.150	0.147	0.150	0.145	0.155	0.159	0.152
138	EF672994.1 *Lerista haroldi*	0.130	0.155	0.123	0.126	0.123	0.126	0.126	0.133	0.138	0.126
139	EF672993.1 *Lerista griffini*	0.135	0.159	0.145	0.143	0.145	0.143	0.143	0.152	0.152	0.150
140	EF672992.1 *Lerista greeri*	0.145	0.155	0.152	0.155	0.152	0.155	0.150	0.157	0.162	0.155
141	EF672991.1 *Lerista gerrardii*	0.118	0.140	0.140	0.143	0.140	0.143	0.138	0.140	0.145	0.143
142	EF672990.1 *Lerista gascoynensis*	0.133	0.155	0.126	0.128	0.126	0.128	0.128	0.135	0.140	0.133
143	EF672989.1 *Lerista frosti*	0.138	0.150	0.133	0.135	0.133	0.135	0.130	0.143	0.147	0.140
144	EF672988.1 *Lerista fragilis*	0.128	0.138	0.140	0.143	0.140	0.143	0.143	0.145	0.150	0.143

		61	62	63	64	65	66	67	68	69	70
145	EF672987.1 *Lerista flammicauda*	0.128	0.145	0.123	0.126	0.123	0.126	0.121	0.130	0.135	0.123
146	EF672986.1 *Lerista eupoda*	0.111	0.147	0.138	0.140	0.138	0.140	0.135	0.147	0.152	0.145
147	EF672985.1 *Lerista emmotti*	0.164	0.150	0.157	0.159	0.157	0.159	0.159	0.159	0.159	0.157
148	EF672984.1 *Lerista elongata*	0.126	0.150	0.130	0.133	0.130	0.133	0.128	0.140	0.145	0.138
149	EF672983.1 *Lerista elegans*	0.138	0.135	0.118	0.121	0.118	0.121	0.121	0.138	0.143	0.130
150	EF672982.1 *Lerista edwardsae*	0.135	0.143	0.121	0.123	0.121	0.123	0.118	0.130	0.135	0.128
151	EF672981.1 *Lerista dorsalis*	0.138	0.140	0.130	0.133	0.130	0.133	0.128	0.140	0.145	0.143
152	EF672980.1 *Lerista distinguenda*	0.123	0.138	0.126	0.128	0.126	0.128	0.123	0.126	0.130	0.128
153	EF672979.1 *Lerista desertorum*	0.133	0.138	0.143	0.145	0.143	0.145	0.140	0.145	0.150	0.143
154	EF672978.1 *Lerista connivens*	0.130	0.150	0.123	0.126	0.123	0.126	0.123	0.140	0.145	0.138
155	EF672977.1 *Lerista cinerea*	0.000	0.152	0.094	0.097	0.094	0.097	0.097	0.101	0.106	0.099
156	EF672976.1 *Lerista christinae*	0.138	0.157	0.126	0.128	0.126	0.128	0.123	0.140	0.143	0.133
157	EF672975.1 *Lerista carpentariae*	0.099	0.147	0.114	0.116	0.114	0.116	0.111	0.126	0.123	0.118
158	EF672974.1 *Lerista borealis*	0.121	0.147	0.130	0.133	0.130	0.133	0.133	0.133	0.138	0.126
159	EF672973.1 *Lerista bipes*	0.128	0.155	0.147	0.145	0.147	0.145	0.145	0.157	0.162	0.150
160	EF672972.1 *Lerista baynesi*	0.140	0.152	0.126	0.128	0.126	0.128	0.123	0.138	0.143	0.140
161	EF672971.1 *Lerista axillaris*	0.114	0.138	0.135	0.138	0.135	0.138	0.133	0.143	0.147	0.140
162	EF672970.1 *Lerista arenicola*	0.155	0.167	0.147	0.150	0.147	0.150	0.145	0.159	0.164	0.152
163	EF672969.1 *Lerista apoda*	0.116	0.155	0.133	0.135	0.133	0.135	0.135	0.138	0.143	0.135
164	EF672968.1 *Lerista ameles*	0.101	0.152	0.097	0.099	0.097	0.099	0.099	0.109	0.114	0.101
165	EF672967.1 *Lerista allochira*	0.111	0.150	0.109	0.111	0.109	0.111	0.111	0.116	0.121	0.114
166	EF672966.1 *Lerista aericeps*	0.121	0.155	0.130	0.133	0.130	0.133	0.128	0.135	0.140	0.133
167	DQ915332.1 *Lerista bougainvillii*	0.130	0.152	0.118	0.121	0.118	0.121	0.116	0.126	0.130	0.118
168	DQ915331.1 *Lerista bipes*	0.135	0.157	0.128	0.130	0.128	0.130	0.130	0.138	0.143	0.135
169	AY169666.1 *Lerista bipes* ND4	0.130	0.143	0.133	0.135	0.133	0.135	0.135	0.133	0.138	0.135
170	EU109216.1 *Lerista macropisthopus* ND4	0.135	0.143	0.143	0.145	0.143	0.145	0.140	0.157	0.162	0.155

		71	72	73	74	75	76	77	78	79	80
1	**PQ09** *L.separanda* WIN07P ND4	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.016	0.016	0.017	0.016	0.016	0.017	0.017	0.016	0.017	0.017
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.018	0.018	0.019	0.019	0.019	0.019	0.019	0.019	0.018	0.018
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.014	0.014
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.015
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.014	0.014
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.014	0.014
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.014	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.017	0.017	0.018	0.017	0.017	0.018	0.018	0.017	0.018	0.018
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.017	0.017	0.018	0.017	0.017	0.018	0.018	0.017	0.018	0.018
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.016	0.016	0.016	0.017	0.017	0.016	0.016	0.016	0.015	0.015
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.016	0.015	0.015
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.017	0.017	0.018	0.017	0.017	0.018	0.018	0.017	0.018	0.018
25	AY169667.1 *Lerista bougainvillii*	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.016
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.015	0.015
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.016	0.016
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017

		71	72	73	74	75	76	77	78	79	80
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.017	0.017	0.018	0.017	0.017	0.018	0.018	0.017	0.018	0.018
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.014	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.015	0.015	0.016	0.015	0.015	0.016	0.016	0.015	0.015	0.015
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.015	0.015	0.016	0.015	0.015	0.016	0.016	0.015	0.016	0.016
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.014	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.014	0.014	0.015	0.014	0.014	0.015	0.015	0.014	0.015	0.015
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.014	0.014	0.015	0.014	0.014	0.015	0.015	0.014	0.015	0.015
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.014	0.014	0.015	0.014	0.014	0.015	0.015	0.014	0.015	0.015
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
57	KU309300.1 *Lerista storri* isolate LestA1	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.014	0.014
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.015	0.015
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.015	0.015
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.014	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.014	0.014	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.015
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.017	0.017	0.018	0.017	0.017	0.018	0.018	0.017	0.018	0.018
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.008	0.008	0.010	0.010	0.010	0.010	0.010	0.009	0.015	0.015
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.007	0.007	0.009	0.010	0.010	0.009	0.009	0.009	0.015	0.015
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.008	0.008	0.010	0.010	0.010	0.010	0.010	0.009	0.015	0.015
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.007	0.007	0.009	0.010	0.010	0.009	0.009	0.009	0.015	0.015
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.008	0.008	0.010	0.010	0.010	0.010	0.010	0.010	0.015	0.015
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.005	0.005	0.006	0.006	0.006	0.006	0.006	0.005	0.015	0.015
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.006	0.016	0.016
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.006	0.006	0.006	0.007	0.007	0.006	0.006	0.006	0.015	0.015
71	KU309285.1 *Lerista cinerea* isolate LeciGD1		0.000	0.006	0.007	0.007	0.006	0.006	0.006	0.015	0.015
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.000		0.006	0.007	0.007	0.006	0.006	0.006	0.015	0.015

		71	72	73	74	75	76	77	78	79	80
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.017	0.017		0.002	0.002	0.000	0.000	0.002	0.016	0.016
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.019	0.019	0.002		0.000	0.002	0.002	0.003	0.015	0.015
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.019	0.019	0.002	0.000		0.002	0.002	0.003	0.015	0.015
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.017	0.017	0.000	0.002	0.002		0.000	0.002	0.016	0.016
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.017	0.017	0.000	0.002	0.002	0.000		0.002	0.016	0.016
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.014	0.014	0.002	0.005	0.005	0.002	0.002		0.015	0.015
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.097	0.097	0.114	0.111	0.111	0.114	0.114	0.111		0.000
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.097	0.097	0.114	0.111	0.111	0.114	0.114	0.111	0.000	
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.097	0.097	0.114	0.111	0.111	0.114	0.114	0.111	0.000	0.000
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.097	0.097	0.114	0.111	0.111	0.114	0.114	0.111	0.000	0.000
83	KU309273.1 *Lerista allanae* isolate Leal2	0.133	0.133	0.145	0.143	0.143	0.145	0.145	0.143	0.155	0.155
84	KU309272.1 *Lerista allanae* isolate Leal1	0.135	0.135	0.147	0.150	0.150	0.147	0.147	0.145	0.157	0.157
85	KF823006.1 *Lerista kalumburu*	0.147	0.147	0.159	0.157	0.157	0.159	0.159	0.157	0.167	0.167
86	KF823005.1 *Lerista kalumburu*	0.138	0.138	0.150	0.147	0.147	0.150	0.150	0.147	0.155	0.155
87	KF823007.1 *Lerista kalumburu*	0.147	0.147	0.155	0.152	0.152	0.155	0.155	0.157	0.167	0.167
88	KF823004.1 *Lerista kalumburu*	0.145	0.145	0.157	0.155	0.155	0.157	0.157	0.155	0.167	0.167
89	KF823003.1 *Lerista kalumburu*	0.147	0.147	0.159	0.157	0.157	0.159	0.159	0.157	0.169	0.169
90	KF823002.1 *Lerista kalumburu*	0.150	0.150	0.162	0.159	0.159	0.162	0.162	0.159	0.171	0.171
91	KF823001.1 *Lerista kalumburu*	0.152	0.152	0.159	0.157	0.157	0.159	0.159	0.157	0.174	0.174
92	KF823000.1 *Lerista kalumburu*	0.145	0.145	0.157	0.155	0.155	0.157	0.157	0.155	0.167	0.167
93	KF822999.1 *Lerista kalumburu*	0.140	0.140	0.152	0.150	0.150	0.152	0.152	0.150	0.159	0.159
94	KF822998.1 *Lerista kalumburu*	0.147	0.147	0.159	0.157	0.157	0.159	0.159	0.157	0.162	0.162
95	KF822997.1 *Lerista kalumburu*	0.159	0.159	0.171	0.169	0.169	0.171	0.171	0.169	0.167	0.167
96	EF673035.1 *Lerista zietzi*	0.118	0.118	0.130	0.128	0.128	0.130	0.130	0.128	0.128	0.128
97	EF673036.1 *Lerista zonulata*	0.123	0.123	0.135	0.133	0.133	0.135	0.135	0.133	0.155	0.155
98	EF673034.1 *Lerista yuna*	0.126	0.126	0.143	0.143	0.143	0.143	0.143	0.140	0.109	0.109
99	EF673033.1 *Lerista xanthura*	0.118	0.118	0.135	0.133	0.133	0.135	0.135	0.133	0.116	0.116
100	EF673032.1 *Lerista wilkinsi*	0.106	0.106	0.118	0.116	0.116	0.118	0.118	0.116	0.118	0.118
101	EF673031.1 *Lerista walkeri*	0.116	0.116	0.133	0.130	0.130	0.133	0.133	0.130	0.130	0.130
102	EF673030.1 *Lerista viduata*	0.133	0.133	0.140	0.138	0.138	0.140	0.140	0.138	0.130	0.130
103	EF673029.1 *Lerista vermicularis*	0.138	0.138	0.155	0.152	0.152	0.155	0.155	0.152	0.130	0.130
104	EF673028.1 *Lerista varia*	0.123	0.123	0.140	0.140	0.140	0.140	0.140	0.138	0.118	0.118
105	EF673027.1 *Lerista uniduo*	0.126	0.126	0.133	0.133	0.133	0.133	0.133	0.130	0.135	0.135
106	EF673026.1 *Lerista tridactyla*	0.133	0.133	0.150	0.150	0.150	0.150	0.150	0.147	0.135	0.135
107	EF673025.1 *Lerista terdigitata*	0.126	0.126	0.138	0.138	0.138	0.138	0.138	0.135	0.133	0.133
108	EF673024.1 *Lerista taeniata*	0.130	0.130	0.143	0.143	0.143	0.143	0.143	0.140	0.123	0.123

		71	72	73	74	75	76	77	78	79	80
109	EF673023.1 *Lerista stylis*	0.128	0.128	0.145	0.143	0.143	0.145	0.145	0.143	0.135	0.135
110	EF673022.1 *Lerista stictopleura*	0.116	0.116	0.128	0.128	0.128	0.128	0.128	0.126	0.126	0.126
111	EF673021.1 *Lerista chordae*	0.143	0.143	0.159	0.157	0.157	0.159	0.159	0.157	0.135	0.135
112	EF673020.1 *Lerista speciosa*	0.130	0.130	0.138	0.138	0.138	0.138	0.138	0.135	0.138	0.138
113	EF673019.1 *Lerista simillima*	0.133	0.133	0.150	0.147	0.147	0.150	0.150	0.147	0.126	0.126
114	EF673018.1 *Lerista robusta*	0.135	0.135	0.152	0.150	0.150	0.152	0.152	0.150	0.133	0.133
115	EF673017.1 *Lerista puncticauda*	0.135	0.135	0.147	0.145	0.145	0.147	0.147	0.145	0.145	0.145
116	EF673016.1 *Lerista punctatovittata*	0.135	0.135	0.145	0.143	0.143	0.145	0.145	0.143	0.150	0.150
117	EF673015.1 *Lerista praepedita*	0.130	0.130	0.143	0.140	0.140	0.143	0.143	0.140	0.111	0.111
118	EF673014.1 *Lerista planiventralis*	0.135	0.135	0.140	0.138	0.138	0.140	0.140	0.140	0.123	0.123
119	EF673013.1 *Lerista picturata*	0.118	0.118	0.135	0.135	0.135	0.135	0.135	0.133	0.118	0.118
120	EF673012.1 *Lerista petersoni*	0.128	0.128	0.145	0.145	0.145	0.145	0.145	0.143	0.133	0.133
121	EF673011.1 *Lerista orientalis* NADH	0.128	0.128	0.140	0.138	0.138	0.140	0.140	0.138	0.128	0.128
122	EF673010.1 *Lerista onsloviana*	0.135	0.135	0.147	0.147	0.147	0.147	0.147	0.145	0.133	0.133
123	EF673009.1 *Lerista nichollsi*	0.130	0.130	0.143	0.143	0.143	0.143	0.143	0.140	0.128	0.128
124	EF673008.1 *Lerista neander*	0.140	0.140	0.157	0.155	0.155	0.157	0.157	0.155	0.150	0.150
125	EF673007.1 *Lerista muelleri*	0.123	0.123	0.135	0.138	0.138	0.135	0.135	0.133	0.130	0.130
126	EF673006.1 *Lerista microtis*	0.138	0.138	0.150	0.147	0.147	0.150	0.150	0.147	0.133	0.133
127	EF673005.1 *Lerista macropisthopus*	0.138	0.138	0.150	0.147	0.147	0.150	0.150	0.147	0.138	0.138
128	EF673004.1 *Lerista lineopunctulata*	0.140	0.140	0.147	0.147	0.147	0.147	0.147	0.145	0.123	0.123
129	EF673003.1 *Lerista lineata*	0.121	0.121	0.135	0.133	0.133	0.135	0.135	0.135	0.145	0.145
130	EF673002.1 *Lerista labialis*	0.128	0.128	0.145	0.143	0.143	0.145	0.145	0.143	0.128	0.128
131	EF673001.1 *Lerista kennedyensis*	0.135	0.135	0.147	0.147	0.147	0.147	0.147	0.145	0.145	0.145
132	EF673000.1 *Lerista kendricki*	0.123	0.123	0.140	0.140	0.140	0.140	0.140	0.138	0.116	0.116
133	EF672999.1 *Lerista karlschmidti*	0.140	0.140	0.157	0.155	0.155	0.157	0.157	0.155	0.145	0.145
134	EF672998.1 *Lerista kalumburu*	0.162	0.162	0.174	0.171	0.171	0.174	0.174	0.171	0.169	0.169
135	EF672997.1 *Lerista ips*	0.126	0.126	0.133	0.130	0.130	0.133	0.133	0.130	0.123	0.123
136	EF672996.1 *Lerista ingrami*	0.138	0.138	0.145	0.143	0.143	0.145	0.145	0.143	0.150	0.150
137	EF672995.1 *Lerista humphriesi*	0.152	0.152	0.159	0.157	0.157	0.159	0.159	0.157	0.140	0.140
138	EF672994.1 *Lerista haroldi*	0.121	0.121	0.138	0.138	0.138	0.138	0.138	0.135	0.130	0.130
139	EF672993.1 *Lerista griffini*	0.140	0.140	0.152	0.150	0.150	0.152	0.152	0.150	0.135	0.135
140	EF672992.1 *Lerista greeri*	0.150	0.150	0.162	0.159	0.159	0.162	0.162	0.159	0.130	0.130
141	EF672991.1 *Lerista gerrardii*	0.138	0.138	0.145	0.143	0.143	0.145	0.145	0.143	0.130	0.130
142	EF672990.1 *Lerista gascoynensis*	0.123	0.123	0.140	0.140	0.140	0.140	0.140	0.138	0.126	0.126
143	EF672989.1 *Lerista frosti*	0.130	0.130	0.147	0.147	0.147	0.147	0.147	0.145	0.133	0.133
144	EF672988.1 *Lerista fragilis*	0.138	0.138	0.150	0.147	0.147	0.150	0.150	0.147	0.133	0.133

		71	72	73	74	75	76	77	78	79	80
145	EF672987.1 *Lerista flammicauda*	0.118	0.118	0.135	0.138	0.138	0.135	0.135	0.133	0.133	0.133
146	EF672986.1 *Lerista eupoda*	0.135	0.135	0.152	0.150	0.150	0.152	0.152	0.150	0.135	0.135
147	EF672985.1 *Lerista emmotti*	0.157	0.157	0.152	0.152	0.152	0.152	0.152	0.150	0.159	0.159
148	EF672984.1 *Lerista elongata*	0.128	0.128	0.145	0.145	0.145	0.145	0.145	0.143	0.130	0.130
149	EF672983.1 *Lerista elegans*	0.130	0.130	0.143	0.145	0.145	0.143	0.143	0.140	0.128	0.128
150	EF672982.1 *Lerista edwardsae*	0.118	0.118	0.135	0.135	0.135	0.135	0.135	0.133	0.123	0.123
151	EF672981.1 *Lerista dorsalis*	0.133	0.133	0.145	0.143	0.143	0.145	0.145	0.143	0.138	0.138
152	EF672980.1 *Lerista distinguenda*	0.128	0.128	0.135	0.133	0.133	0.135	0.135	0.133	0.135	0.135
153	EF672979.1 *Lerista desertorum*	0.138	0.138	0.140	0.138	0.138	0.140	0.140	0.138	0.138	0.138
154	EF672978.1 *Lerista connivens*	0.128	0.128	0.145	0.145	0.145	0.145	0.145	0.143	0.118	0.118
155	EF672977.1 *Lerista cinerea*	0.089	0.089	0.106	0.104	0.104	0.106	0.106	0.104	0.101	0.101
156	EF672976.1 *Lerista christinae*	0.133	0.133	0.143	0.140	0.140	0.143	0.143	0.143	0.140	0.140
157	EF672975.1 *Lerista carpentariae*	0.114	0.114	0.128	0.126	0.126	0.128	0.128	0.128	0.118	0.118
158	EF672974.1 *Lerista borealis*	0.126	0.126	0.133	0.130	0.130	0.133	0.133	0.130	0.126	0.126
159	EF672973.1 *Lerista bipes*	0.145	0.145	0.157	0.155	0.155	0.157	0.157	0.155	0.128	0.128
160	EF672972.1 *Lerista baynesi*	0.130	0.130	0.143	0.143	0.143	0.143	0.143	0.140	0.130	0.130
161	EF672971.1 *Lerista axillaris*	0.130	0.130	0.143	0.140	0.140	0.143	0.143	0.140	0.130	0.130
162	EF672970.1 *Lerista arenicola*	0.147	0.147	0.164	0.167	0.167	0.164	0.164	0.162	0.150	0.150
163	EF672969.1 *Lerista apoda*	0.135	0.135	0.147	0.145	0.145	0.147	0.147	0.145	0.118	0.118
164	EF672968.1 *Lerista ameles*	0.097	0.097	0.114	0.111	0.111	0.114	0.114	0.111	0.000	0.000
165	EF672967.1 *Lerista allochira*	0.104	0.104	0.121	0.118	0.118	0.121	0.121	0.118	0.121	0.121
166	EF672966.1 *Lerista aericeps*	0.123	0.123	0.135	0.135	0.135	0.135	0.135	0.133	0.128	0.128
167	DQ915332.1 *Lerista bougainvillii*	0.118	0.118	0.126	0.123	0.123	0.126	0.126	0.123	0.118	0.118
168	DQ915331.1 *Lerista bipes*	0.135	0.135	0.143	0.140	0.140	0.143	0.143	0.140	0.123	0.123
169	AY169666.1 *Lerista bipes* ND4	0.126	0.126	0.143	0.140	0.140	0.143	0.143	0.140	0.121	0.121
170	EU109216.1 *Lerista macropisthopus* ND4	0.145	0.145	0.157	0.155	0.155	0.157	0.157	0.155	0.150	0.150

		81	82	83	84	85	86	87	88	89	90
1	**PQ09** *L.separanda* WIN07P ND4	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.018	0.018	0.018
2	**PQ20** *L.separanda* 163965 ND4	0.017	0.017	0.016	0.016	0.017	0.017	0.018	0.018	0.018	0.018
3	**PQ21** *L.separanda* 163487 ND4	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.018
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.018	0.018	0.019	0.019	0.019	0.018	0.019	0.019	0.019	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.014	0.014	0.017	0.017	0.018	0.018	0.019	0.018	0.018	0.019
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.015	0.015	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.014	0.014	0.017	0.017	0.018	0.018	0.019	0.018	0.018	0.019
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.014	0.014	0.017	0.017	0.018	0.018	0.019	0.018	0.018	0.019
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.016	0.016	0.018	0.018	0.018	0.018	0.018	0.019	0.019	0.019
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.016	0.016	0.018	0.018	0.019	0.018	0.019	0.019	0.019	0.019
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.016	0.016	0.018	0.018	0.018	0.018	0.018	0.019	0.019	0.019
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.016	0.016	0.018	0.018	0.018	0.018	0.018	0.019	0.019	0.019
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.016	0.016	0.018	0.018	0.018	0.018	0.019	0.019	0.019	0.019
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.016	0.016	0.018	0.018	0.019	0.018	0.019	0.019	0.019	0.019
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.016	0.016	0.018	0.019	0.018	0.019	0.019	0.019	0.019	0.019
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.015	0.015	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.017	0.017	0.016	0.017	0.018	0.019	0.018	0.019	0.019	0.019
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.018	0.018	0.017	0.017	0.019	0.019	0.019	0.019	0.019	0.019
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.018	0.018	0.016	0.017	0.018	0.019	0.018	0.019	0.019	0.019
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.018	0.018	0.016	0.017	0.018	0.019	0.018	0.019	0.019	0.019
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.018	0.018	0.017	0.017	0.019	0.019	0.019	0.019	0.019	0.019
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.015	0.015	0.019	0.019	0.018	0.019	0.019	0.019	0.019	0.019
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.015	0.015	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.018	0.018	0.016	0.016	0.018	0.018	0.018	0.018	0.018	0.019
25	AY169667.1 *Lerista bougainvillii*	0.016	0.016	0.017	0.017	0.018	0.017	0.018	0.018	0.018	0.018
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.016	0.016	0.015	0.015	0.017	0.017	0.018	0.018	0.018	0.018
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.015	0.015	0.015	0.015	0.018	0.017	0.019	0.018	0.018	0.018
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.016	0.016	0.015	0.016	0.018	0.018	0.019	0.018	0.018	0.018
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.016	0.016	0.016	0.016	0.018	0.018	0.019	0.018	0.018	0.019
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.016	0.016	0.016	0.016	0.018	0.018	0.019	0.018	0.018	0.018
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.016	0.016	0.016	0.016	0.018	0.018	0.019	0.018	0.018	0.018
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.016	0.016	0.016	0.016	0.018	0.017	0.019	0.018	0.018	0.018
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.017	0.017	0.016	0.016	0.018	0.018	0.019	0.018	0.019	0.019
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.017	0.017	0.016	0.016	0.018	0.018	0.019	0.018	0.019	0.019
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.017	0.017	0.016	0.016	0.018	0.018	0.019	0.018	0.019	0.019
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.017	0.017	0.016	0.016	0.018	0.018	0.019	0.018	0.019	0.019

		81	82	83	84	85	86	87	88	89	90
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.018	0.018	0.000	0.005	0.017	0.017	0.018	0.018	0.018	0.018
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.018	0.018	0.000	0.005	0.017	0.017	0.018	0.018	0.018	0.018
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.018	0.018	0.004	0.004	0.018	0.018	0.018	0.018	0.018	0.018
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.018	0.018	0.003	0.003	0.018	0.018	0.018	0.018	0.018	0.018
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.018	0.018	0.004	0.004	0.018	0.018	0.018	0.018	0.018	0.018
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.018	0.018	0.003	0.003	0.018	0.018	0.018	0.018	0.018	0.018
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.018	0.018	0.003	0.003	0.018	0.018	0.018	0.018	0.018	0.018
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.018	0.018	0.004	0.004	0.018	0.018	0.018	0.018	0.018	0.018
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.018	0.018	0.004	0.004	0.018	0.018	0.018	0.018	0.018	0.018
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.018	0.018	0.000	0.005	0.017	0.017	0.018	0.018	0.018	0.018
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.018	0.018	0.006	0.006	0.018	0.018	0.018	0.018	0.018	0.019
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.015	0.015	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.017
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.015	0.015	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.017
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.016	0.016	0.017	0.017	0.018	0.017	0.018	0.018	0.018	0.018
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.016	0.016	0.017	0.018	0.018	0.016	0.018	0.017	0.018	0.017
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.015	0.015	0.017	0.017	0.017	0.017	0.018	0.018	0.018	0.018
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.015	0.015	0.017	0.018	0.018	0.017	0.018	0.018	0.018	0.018
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.015	0.015	0.017	0.018	0.018	0.017	0.018	0.018	0.018	0.018
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.015	0.015	0.017	0.018	0.018	0.017	0.018	0.018	0.018	0.018
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.016	0.016	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
57	KU309300.1 *Lerista storri* isolate LestA1	0.014	0.014	0.017	0.017	0.018	0.018	0.019	0.018	0.018	0.019
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.015	0.015	0.015	0.015	0.018	0.017	0.019	0.018	0.018	0.018
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.015	0.015	0.015	0.015	0.018	0.017	0.019	0.018	0.018	0.018
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.015	0.015	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.018
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.015	0.015	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.018
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.018	0.018	0.016	0.016	0.018	0.018	0.018	0.018	0.018	0.019
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.015	0.015	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.015	0.015	0.017	0.017	0.018	0.017	0.018	0.017	0.017	0.018
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.015	0.015	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.015	0.015	0.017	0.017	0.018	0.017	0.018	0.017	0.017	0.018
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.015	0.015	0.017	0.017	0.018	0.017	0.018	0.017	0.017	0.018
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.015	0.015	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.016	0.016	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.015	0.015	0.017	0.017	0.018	0.017	0.018	0.018	0.018	0.018
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.015	0.015	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.015	0.015	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018

		81	82	83	84	85	86	87	88	89	90
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.016	0.016	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.015	0.015	0.017	0.018	0.018	0.017	0.018	0.018	0.018	0.018
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.015	0.015	0.017	0.018	0.018	0.017	0.018	0.018	0.018	0.018
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.016	0.016	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.016	0.016	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.015	0.015	0.017	0.017	0.018	0.017	0.018	0.018	0.018	0.018
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.000	0.000	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.019
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.000	0.000	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.019
81	KU309275.1 *Lerista ameles* isolate LeamMS2		0.000	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.019
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.000		0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.019
83	KU309273.1 *Lerista allanae* isolate Leal2	0.155	0.155		0.005	0.017	0.017	0.018	0.018	0.018	0.018
84	KU309272.1 *Lerista allanae* isolate Leal1	0.157	0.157	0.010		0.018	0.018	0.018	0.018	0.018	0.019
85	KF823006.1 *Lerista kalumburu*	0.167	0.167	0.147	0.155		0.011	0.011	0.010	0.011	0.011
86	KF823005.1 *Lerista kalumburu*	0.155	0.155	0.147	0.155	0.048		0.009	0.007	0.008	0.008
87	KF823007.1 *Lerista kalumburu*	0.167	0.167	0.155	0.162	0.053	0.039		0.009	0.009	0.009
88	KF823004.1 *Lerista kalumburu*	0.167	0.167	0.157	0.164	0.041	0.022	0.031		0.004	0.004
89	KF823003.1 *Lerista kalumburu*	0.169	0.169	0.159	0.167	0.048	0.029	0.034	0.007		0.005
90	KF823002.1 *Lerista kalumburu*	0.171	0.171	0.164	0.171	0.048	0.029	0.034	0.007	0.010	
91	KF823001.1 *Lerista kalumburu*	0.174	0.174	0.162	0.169	0.048	0.029	0.034	0.007	0.010	0.010
92	KF823000.1 *Lerista kalumburu*	0.167	0.167	0.157	0.164	0.051	0.031	0.036	0.010	0.002	0.012
93	KF822999.1 *Lerista kalumburu*	0.159	0.159	0.152	0.159	0.053	0.005	0.039	0.027	0.029	0.029
94	KF822998.1 *Lerista kalumburu*	0.162	0.162	0.143	0.147	0.094	0.087	0.099	0.087	0.094	0.089
95	KF822997.1 *Lerista kalumburu*	0.167	0.167	0.157	0.162	0.089	0.080	0.085	0.077	0.085	0.085
96	EF673035.1 *Lerista zietzi*	0.128	0.128	0.126	0.130	0.147	0.145	0.162	0.152	0.155	0.157
97	EF673036.1 *Lerista zonulata*	0.155	0.155	0.147	0.152	0.147	0.152	0.157	0.157	0.164	0.162
98	EF673034.1 *Lerista yuna*	0.109	0.109	0.128	0.135	0.152	0.143	0.155	0.152	0.157	0.157
99	EF673033.1 *Lerista xanthura*	0.116	0.116	0.135	0.143	0.140	0.135	0.140	0.140	0.143	0.145
100	EF673032.1 *Lerista wilkinsi*	0.118	0.118	0.145	0.152	0.150	0.128	0.155	0.143	0.150	0.147
101	EF673031.1 *Lerista walkeri*	0.130	0.130	0.126	0.133	0.138	0.133	0.140	0.143	0.145	0.147
102	EF673030.1 *Lerista viduata*	0.130	0.130	0.152	0.157	0.150	0.147	0.155	0.157	0.162	0.162
103	EF673029.1 *Lerista vermicularis*	0.130	0.130	0.147	0.157	0.167	0.164	0.169	0.167	0.174	0.171
104	EF673028.1 *Lerista varia*	0.118	0.118	0.143	0.145	0.162	0.143	0.162	0.157	0.162	0.162
105	EF673027.1 *Lerista uniduo*	0.135	0.135	0.135	0.138	0.150	0.155	0.164	0.162	0.167	0.167
106	EF673026.1 *Lerista tridactyla*	0.135	0.135	0.133	0.140	0.138	0.133	0.145	0.147	0.152	0.152
107	EF673025.1 *Lerista terdigitata*	0.133	0.133	0.130	0.138	0.143	0.140	0.147	0.152	0.157	0.157
108	EF673024.1 *Lerista taeniata*	0.123	0.123	0.143	0.147	0.147	0.138	0.147	0.145	0.145	0.150

		81	82	83	84	85	86	87	88	89	90
109	EF673023.1 *Lerista stylis*	0.135	0.135	0.162	0.167	0.159	0.162	0.169	0.171	0.169	0.171
110	EF673022.1 *Lerista stictopleura*	0.126	0.126	0.121	0.123	0.152	0.152	0.157	0.162	0.169	0.167
111	EF673021.1 *Lerista chordae*	0.135	0.135	0.157	0.162	0.150	0.135	0.150	0.145	0.147	0.150
112	EF673020.1 *Lerista speciosa*	0.138	0.138	0.128	0.126	0.162	0.159	0.159	0.167	0.167	0.167
113	EF673019.1 *Lerista simillima*	0.126	0.126	0.143	0.152	0.157	0.155	0.159	0.157	0.164	0.162
114	EF673018.1 *Lerista robusta*	0.133	0.133	0.157	0.162	0.167	0.159	0.167	0.174	0.176	0.179
115	EF673017.1 *Lerista puncticauda*	0.145	0.145	0.133	0.133	0.140	0.126	0.143	0.140	0.145	0.145
116	EF673016.1 *Lerista punctatovittata*	0.150	0.150	0.114	0.118	0.159	0.155	0.176	0.169	0.176	0.174
117	EF673015.1 *Lerista praepedita*	0.111	0.111	0.152	0.157	0.162	0.155	0.167	0.162	0.162	0.167
118	EF673014.1 *Lerista planiventralis*	0.123	0.123	0.167	0.167	0.162	0.159	0.159	0.155	0.162	0.159
119	EF673013.1 *Lerista picturata*	0.118	0.118	0.123	0.121	0.143	0.143	0.162	0.147	0.155	0.152
120	EF673012.1 *Lerista petersoni*	0.133	0.133	0.128	0.130	0.162	0.159	0.171	0.164	0.169	0.169
121	EF673011.1 *Lerista orientalis* NADH	0.128	0.128	0.138	0.143	0.145	0.138	0.150	0.150	0.157	0.155
122	EF673010.1 *Lerista onsloviana*	0.133	0.133	0.140	0.143	0.152	0.157	0.162	0.164	0.169	0.169
123	EF673009.1 *Lerista nichollsi*	0.128	0.128	0.126	0.133	0.152	0.152	0.169	0.162	0.167	0.167
124	EF673008.1 *Lerista neander*	0.150	0.150	0.147	0.147	0.159	0.140	0.155	0.155	0.159	0.159
125	EF673007.1 *Lerista muelleri*	0.130	0.130	0.147	0.150	0.171	0.171	0.181	0.176	0.176	0.176
126	EF673006.1 *Lerista microtis*	0.133	0.133	0.140	0.147	0.155	0.147	0.167	0.159	0.157	0.164
127	EF673005.1 *Lerista macropisthopus*	0.138	0.138	0.133	0.138	0.138	0.128	0.147	0.145	0.150	0.150
128	EF673004.1 *Lerista lineopunctulata*	0.123	0.123	0.145	0.147	0.169	0.155	0.169	0.164	0.169	0.169
129	EF673003.1 *Lerista lineata*	0.145	0.145	0.155	0.159	0.155	0.145	0.143	0.155	0.157	0.159
130	EF673002.1 *Lerista labialis*	0.128	0.128	0.145	0.150	0.147	0.145	0.147	0.159	0.167	0.164
131	EF673001.1 *Lerista kennedyensis*	0.145	0.145	0.135	0.138	0.155	0.159	0.164	0.167	0.169	0.171
132	EF673000.1 Lerista *kendricki*	0.116	0.116	0.133	0.140	0.155	0.145	0.162	0.150	0.155	0.155
133	EF672999.1 *Lerista karlschmidti*	0.145	0.145	0.157	0.162	0.171	0.155	0.176	0.167	0.171	0.167
134	EF672998.1 *Lerista kalumburu*	0.169	0.169	0.159	0.164	0.087	0.077	0.082	0.075	0.082	0.082
135	EF672997.1 *Lerista ips*	0.123	0.123	0.128	0.133	0.171	0.162	0.164	0.171	0.174	0.176
136	EF672996.1 *Lerista ingrami*	0.150	0.150	0.159	0.164	0.159	0.147	0.164	0.159	0.162	0.164
137	EF672995.1 *Lerista humphriesi*	0.140	0.140	0.159	0.167	0.181	0.169	0.176	0.181	0.186	0.186
138	EF672994.1 *Lerista haroldi*	0.130	0.130	0.150	0.152	0.152	0.150	0.162	0.157	0.162	0.162
139	EF672993.1 *Lerista griffini*	0.135	0.135	0.135	0.145	0.176	0.171	0.186	0.186	0.188	0.191
140	EF672992.1 *Lerista greeri*	0.130	0.130	0.155	0.159	0.171	0.155	0.167	0.169	0.174	0.174
141	EF672991.1 *Lerista gerrardii*	0.130	0.130	0.138	0.143	0.133	0.121	0.140	0.138	0.143	0.143
142	EF672990.1 *Lerista gascoynensis*	0.126	0.126	0.118	0.126	0.152	0.157	0.169	0.162	0.167	0.167
143	EF672989.1 *Lerista frosti*	0.133	0.133	0.143	0.147	0.145	0.152	0.164	0.162	0.167	0.167
144	EF672988.1 *Lerista fragilis*	0.133	0.133	0.140	0.140	0.138	0.138	0.152	0.150	0.155	0.155

		81	82	83	84	85	86	87	88	89	90
145	EF672987.1 *Lerista flammicauda*	0.133	0.133	0.128	0.133	0.138	0.135	0.145	0.145	0.143	0.150
146	EF672986.1 *Lerista eupoda*	0.135	0.135	0.143	0.147	0.138	0.126	0.145	0.143	0.147	0.147
147	EF672985.1 *Lerista emmotti*	0.159	0.159	0.128	0.130	0.174	0.181	0.208	0.188	0.188	0.188
148	EF672984.1 *Lerista elongata*	0.130	0.130	0.123	0.130	0.147	0.133	0.155	0.147	0.152	0.152
149	EF672983.1 *Lerista elegans*	0.128	0.128	0.145	0.140	0.143	0.143	0.147	0.152	0.159	0.157
150	EF672982.1 *Lerista edwardsae*	0.123	0.123	0.126	0.123	0.150	0.145	0.157	0.155	0.162	0.159
151	EF672981.1 *Lerista dorsalis*	0.138	0.138	0.130	0.130	0.169	0.147	0.157	0.162	0.159	0.167
152	EF672980.1 *Lerista distinguenda*	0.135	0.135	0.140	0.135	0.159	0.152	0.167	0.164	0.167	0.169
153	EF672979.1 *Lerista desertorum*	0.138	0.138	0.143	0.143	0.145	0.130	0.147	0.145	0.150	0.150
154	EF672978.1 *Lerista connivens*	0.118	0.118	0.140	0.143	0.162	0.143	0.162	0.157	0.162	0.162
155	EF672977.1 *Lerista cinerea*	0.101	0.101	0.152	0.159	0.150	0.138	0.147	0.147	0.145	0.152
156	EF672976.1 *Lerista christinae*	0.140	0.140	0.133	0.133	0.155	0.152	0.155	0.157	0.159	0.162
157	EF672975.1 *Lerista carpentariae*	0.118	0.118	0.143	0.147	0.152	0.150	0.159	0.159	0.167	0.164
158	EF672974.1 *Lerista borealis*	0.126	0.126	0.128	0.135	0.143	0.143	0.150	0.147	0.147	0.152
159	EF672973.1 *Lerista bipes*	0.128	0.128	0.159	0.164	0.159	0.155	0.171	0.164	0.167	0.169
160	EF672972.1 *Lerista baynesi*	0.130	0.130	0.138	0.138	0.162	0.147	0.169	0.159	0.167	0.164
161	EF672971.1 *Lerista axillaris*	0.130	0.130	0.130	0.135	0.135	0.118	0.138	0.135	0.140	0.140
162	EF672970.1 *Lerista arenicola*	0.150	0.150	0.155	0.159	0.164	0.157	0.176	0.164	0.171	0.169
163	EF672969.1 *Lerista apoda*	0.118	0.118	0.150	0.159	0.155	0.162	0.176	0.167	0.167	0.171
164	EF672968.1 *Lerista ameles*	0.000	0.000	0.155	0.157	0.167	0.155	0.167	0.167	0.169	0.171
165	EF672967.1 *Lerista allochira*	0.121	0.121	0.133	0.140	0.135	0.138	0.150	0.143	0.147	0.150
166	EF672966.1 *Lerista aericeps*	0.128	0.128	0.145	0.147	0.145	0.145	0.159	0.155	0.159	0.159
167	DQ915332.1 *Lerista bougainvillii*	0.118	0.118	0.133	0.143	0.147	0.145	0.155	0.145	0.150	0.150
168	DQ915331.1 *Lerista bipes*	0.123	0.123	0.143	0.152	0.147	0.133	0.147	0.143	0.145	0.147
169	AY169666.1 *Lerista bipes* ND4	0.121	0.121	0.140	0.145	0.150	0.147	0.150	0.162	0.169	0.167
170	EU109216.1 *Lerista macropisthopus* ND4	0.150	0.150	0.135	0.140	0.155	0.135	0.135	0.147	0.150	0.147

		91	92	93	94	95	96	97	98	99	100
1	**PQ09** *L.separanda* WIN07P ND4	0.018	0.018	0.017	0.017	0.018	0.016	0.016	0.016	0.014	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.018	0.018	0.017	0.017	0.019	0.016	0.016	0.017	0.014	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.018	0.018	0.017	0.017	0.018	0.016	0.016	0.016	0.014	0.016
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.019	0.019	0.018	0.018	0.019	0.019	0.019	0.018	0.017	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.019	0.018	0.018	0.018	0.019	0.016	0.018	0.016	0.016	0.016
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.018	0.018	0.018	0.018	0.018	0.016	0.017	0.016	0.015	0.016
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.019	0.018	0.018	0.018	0.019	0.016	0.018	0.016	0.016	0.016
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.019	0.018	0.018	0.018	0.019	0.016	0.018	0.016	0.016	0.016
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.019	0.019	0.018	0.019	0.019	0.017	0.017	0.018	0.016	0.017
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.019	0.019	0.018	0.019	0.019	0.017	0.018	0.018	0.016	0.017
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.019	0.019	0.018	0.019	0.019	0.017	0.017	0.018	0.016	0.017
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.019	0.019	0.018	0.019	0.019	0.017	0.017	0.018	0.016	0.017
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.019	0.019	0.019	0.019	0.019	0.017	0.017	0.018	0.016	0.017
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.019	0.019	0.019	0.019	0.019	0.018	0.018	0.018	0.017	0.017
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.019	0.019	0.019	0.019	0.020	0.017	0.019	0.018	0.017	0.018
16	KU309297.1 *Lerista hobson*i isolate LehoP1	0.017	0.017	0.017	0.017	0.018	0.016	0.017	0.016	0.015	0.015
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.019	0.019	0.019	0.018	0.018	0.017	0.018	0.017	0.017	0.018
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.019	0.019	0.019	0.018	0.018	0.017	0.018	0.017	0.017	0.019
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.019	0.019	0.019	0.018	0.018	0.017	0.018	0.017	0.017	0.018
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.019	0.019	0.019	0.018	0.018	0.017	0.018	0.017	0.017	0.018
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.019	0.019	0.019	0.018	0.018	0.017	0.018	0.017	0.017	0.019
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.019	0.019	0.019	0.018	0.019	0.017	0.018	0.017	0.016	0.017
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.019	0.019	0.019	0.018	0.019	0.017	0.018	0.017	0.016	0.018
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.019	0.018	0.018	0.018	0.018	0.016	0.018	0.018	0.017	0.018
25	AY169667.1 *Lerista bougainvillii*	0.019	0.018	0.018	0.018	0.018	0.016	0.017	0.015	0.015	0.016
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.015	0.015	0.017
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.016	0.016	0.017
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.016	0.016	0.017
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.016	0.016	0.017
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.016	0.016	0.017
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.018	0.018	0.018	0.017	0.017	0.017	0.018	0.016	0.016	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.016	0.016	0.017

		91	92	93	94	95	96	97	98	99	100
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.016	0.017	0.017
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.016	0.017	0.017
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.017	0.017	0.017
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.017	0.017	0.017
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.018	0.018	0.018	0.017	0.018	0.016	0.018	0.017	0.017	0.018
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.017	0.017	0.017
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.017	0.017	0.017
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.017	0.017	0.017
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.017	0.017	0.017
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.016	0.017	0.017
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.017	0.017	0.017
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.017	0.017	0.017	0.018	0.018	0.016	0.018	0.016	0.015	0.009
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.017	0.017	0.017	0.018	0.018	0.016	0.018	0.016	0.015	0.009
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.018	0.018	0.017	0.017	0.018	0.016	0.017	0.016	0.016	0.006
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.016	0.000
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.018	0.018	0.017	0.018	0.018	0.016	0.017	0.017	0.015	0.015
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.018	0.018	0.018	0.018	0.018	0.016	0.017	0.017	0.016	0.015
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.018	0.018	0.018	0.018	0.018	0.016	0.017	0.017	0.016	0.015
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.018	0.018	0.018	0.018	0.018	0.016	0.017	0.017	0.016	0.015
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.019	0.019	0.019	0.019	0.020	0.018	0.019	0.018	0.017	0.018
57	KU309300.1 *Lerista storri* isolate LestA1	0.019	0.018	0.018	0.018	0.019	0.016	0.018	0.016	0.016	0.016
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.016	0.016	0.017
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.016	0.016	0.017
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.018	0.017	0.017	0.017	0.018	0.015	0.017	0.016	0.015	0.014
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.018	0.017	0.017	0.017	0.018	0.016	0.017	0.016	0.015	0.015
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.019	0.018	0.018	0.018	0.018	0.016	0.018	0.018	0.017	0.018
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.018	0.017	0.017	0.018	0.018	0.016	0.016	0.016	0.016	0.015
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.018	0.017	0.017	0.018	0.018	0.016	0.016	0.017	0.016	0.015
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.018	0.017	0.017	0.018	0.018	0.016	0.016	0.016	0.016	0.015
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.018	0.017	0.017	0.018	0.018	0.016	0.016	0.017	0.016	0.015
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.018	0.017	0.017	0.018	0.018	0.016	0.016	0.017	0.015	0.015
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.018	0.018	0.018	0.018	0.018	0.016	0.017	0.017	0.017	0.016
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.018	0.018	0.018	0.018	0.019	0.017	0.017	0.017	0.017	0.016
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.018	0.018	0.017	0.017	0.018	0.016	0.016	0.017	0.016	0.016
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.018	0.017	0.017	0.017	0.018	0.016	0.016	0.016	0.016	0.015
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.018	0.017	0.017	0.017	0.018	0.016	0.016	0.016	0.016	0.015

		91	92	93	94	95	96	97	98	99	100
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.018	0.018	0.018	0.018	0.019	0.017	0.017	0.017	0.017	0.016
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.018	0.018	0.018	0.018	0.018	0.016	0.017	0.017	0.017	0.016
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.018	0.018	0.018	0.018	0.018	0.016	0.017	0.017	0.017	0.016
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.018	0.018	0.018	0.018	0.019	0.017	0.017	0.017	0.017	0.016
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.018	0.018	0.018	0.018	0.019	0.017	0.017	0.017	0.017	0.016
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.018	0.018	0.018	0.018	0.018	0.016	0.017	0.017	0.017	0.016
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.019	0.018	0.018	0.018	0.018	0.016	0.018	0.015	0.016	0.016
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.019	0.018	0.018	0.018	0.018	0.016	0.018	0.015	0.016	0.016
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.019	0.018	0.018	0.018	0.018	0.016	0.018	0.015	0.016	0.016
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.019	0.018	0.018	0.018	0.018	0.016	0.018	0.015	0.016	0.016
83	KU309273.1 *Lerista allanae* isolate Leal2	0.018	0.018	0.018	0.017	0.018	0.016	0.017	0.016	0.017	0.017
84	KU309272.1 *Lerista allanae* isolate Leal1	0.018	0.018	0.018	0.017	0.018	0.017	0.018	0.017	0.017	0.018
85	KF823006.1 *Lerista kalumburu*	0.011	0.011	0.011	0.014	0.014	0.017	0.017	0.018	0.017	0.018
86	KF823005.1 *Lerista kalumburu*	0.008	0.009	0.003	0.014	0.013	0.017	0.018	0.017	0.017	0.016
87	KF823007.1 *Lerista kalumburu*	0.009	0.009	0.009	0.015	0.014	0.018	0.018	0.018	0.017	0.018
88	KF823004.1 *Lerista kalumburu*	0.004	0.005	0.008	0.014	0.013	0.018	0.018	0.018	0.017	0.017
89	KF823003.1 *Lerista kalumburu*	0.005	0.002	0.008	0.014	0.014	0.018	0.018	0.018	0.017	0.018
90	KF823002.1 *Lerista kalumburu*	0.005	0.005	0.008	0.014	0.014	0.018	0.018	0.018	0.017	0.017
91	KF823001.1 *Lerista kalumburu*		0.005	0.008	0.014	0.013	0.018	0.018	0.018	0.017	0.017
92	KF823000.1 *Lerista kalumburu*	0.012		0.009	0.015	0.014	0.018	0.018	0.018	0.017	0.017
93	KF822999.1 *Lerista kalumburu*	0.029	0.031		0.014	0.014	0.018	0.018	0.017	0.017	0.017
94	KF822998.1 *Lerista kalumburu*	0.094	0.097	0.087		0.014	0.017	0.017	0.017	0.017	0.018
95	KF822997.1 *Lerista kalumburu*	0.080	0.087	0.085	0.087		0.018	0.018	0.018	0.018	0.017
96	EF673035.1 *Lerista zietzi*	0.157	0.152	0.150	0.135	0.159		0.017	0.016	0.015	0.017
97	EF673036.1 *Lerista zonulata*	0.162	0.162	0.157	0.130	0.152	0.135		0.017	0.015	0.017
98	EF673034.1 *Lerista yuna*	0.159	0.155	0.147	0.133	0.152	0.121	0.130		0.016	0.017
99	EF673033.1 *Lerista xanthura*	0.145	0.140	0.140	0.145	0.152	0.104	0.106	0.123		0.016
100	EF673032.1 *Lerista wilkinsi*	0.145	0.147	0.133	0.152	0.147	0.133	0.147	0.135	0.116	
101	EF673031.1 *Lerista walkeri*	0.147	0.143	0.138	0.150	0.155	0.143	0.118	0.111	0.097	0.126
102	EF673030.1 *Lerista viduata*	0.164	0.159	0.152	0.140	0.152	0.145	0.135	0.106	0.135	0.143
103	EF673029.1 *Lerista vermicularis*	0.171	0.171	0.167	0.157	0.164	0.138	0.162	0.121	0.128	0.164
104	EF673028.1 *Lerista varia*	0.162	0.159	0.147	0.145	0.150	0.106	0.130	0.075	0.121	0.143
105	EF673027.1 *Lerista uniduo*	0.169	0.164	0.157	0.152	0.145	0.135	0.152	0.089	0.147	0.152
106	EF673026.1 *Lerista tridactyla*	0.155	0.150	0.138	0.147	0.152	0.126	0.140	0.109	0.121	0.114
107	EF673025.1 *Lerista terdigitata*	0.155	0.155	0.145	0.155	0.159	0.130	0.143	0.106	0.121	0.123
108	EF673024.1 *Lerista taeniata*	0.150	0.143	0.143	0.152	0.169	0.140	0.126	0.123	0.085	0.123

		91	92	93	94	95	96	97	98	99	100
109	EF673023.1 *Lerista stylis*	0.174	0.171	0.162	0.159	0.181	0.155	0.159	0.147	0.128	0.126
110	EF673022.1 *Lerista stictopleura*	0.169	0.167	0.157	0.150	0.171	0.126	0.121	0.099	0.106	0.118
111	EF673021.1 *Lerista chordae*	0.150	0.150	0.135	0.140	0.157	0.143	0.138	0.135	0.126	0.147
112	EF673020.1 *Lerista speciosa*	0.174	0.169	0.164	0.150	0.157	0.123	0.147	0.111	0.135	0.145
113	EF673019.1 *Lerista simillima*	0.162	0.162	0.159	0.150	0.155	0.128	0.162	0.116	0.118	0.155
114	EF673018.1 *Lerista robusta*	0.179	0.174	0.164	0.159	0.162	0.135	0.162	0.123	0.123	0.147
115	EF673017.1 *Lerista puncticauda*	0.145	0.143	0.130	0.150	0.162	0.130	0.109	0.114	0.092	0.126
116	EF673016.1 *Lerista punctatovittata*	0.171	0.174	0.159	0.159	0.157	0.135	0.145	0.143	0.145	0.133
117	EF673015.1 *Lerista praepedita*	0.167	0.159	0.159	0.147	0.147	0.116	0.133	0.089	0.116	0.140
118	EF673014.1 *Lerista planiventralis*	0.162	0.159	0.164	0.130	0.159	0.135	0.150	0.128	0.133	0.155
119	EF673013.1 *Lerista picturata*	0.155	0.152	0.147	0.140	0.152	0.128	0.147	0.114	0.121	0.133
120	EF673012.1 *Lerista petersoni*	0.171	0.167	0.164	0.143	0.155	0.109	0.128	0.056	0.128	0.152
121	EF673011.1 *Lerista orientalis* NADH	0.155	0.155	0.143	0.138	0.159	0.135	0.077	0.121	0.101	0.126
122	EF673010.1 *Lerista onsloviana*	0.171	0.167	0.162	0.157	0.167	0.130	0.145	0.082	0.116	0.143
123	EF673009.1 *Lerista nichollsi*	0.169	0.164	0.157	0.147	0.169	0.114	0.135	0.039	0.130	0.145
124	EF673008.1 *Lerista neander*	0.159	0.157	0.143	0.152	0.157	0.133	0.128	0.121	0.099	0.135
125	EF673007.1 *Lerista muelleri*	0.184	0.174	0.176	0.155	0.167	0.130	0.143	0.111	0.116	0.155
126	EF673006.1 *Lerista microtis*	0.167	0.159	0.152	0.140	0.169	0.133	0.147	0.114	0.140	0.138
127	EF673005.1 *Lerista macropisthopus*	0.150	0.147	0.133	0.135	0.155	0.123	0.118	0.109	0.092	0.126
128	EF673004.1 *Lerista lineopunctulata*	0.169	0.167	0.159	0.150	0.167	0.130	0.140	0.087	0.133	0.159
129	EF673003.1 *Lerista lineata*	0.162	0.155	0.145	0.145	0.167	0.128	0.138	0.116	0.121	0.143
130	EF673002.1 *Lerista labialis*	0.167	0.164	0.150	0.145	0.152	0.118	0.155	0.123	0.121	0.147
131	EF673001.1 *Lerista kennedyensis*	0.174	0.167	0.164	0.157	0.169	0.152	0.135	0.092	0.130	0.150
132	EF673000.1 Lerista *kendricki*	0.157	0.152	0.150	0.133	0.155	0.140	0.128	0.041	0.126	0.138
133	EF672999.1 *Lerista karlschmidti*	0.171	0.169	0.159	0.169	0.164	0.157	0.162	0.152	0.126	0.130
134	EF672998.1 *Lerista kalumburu*	0.077	0.085	0.082	0.085	0.002	0.162	0.155	0.155	0.155	0.150
135	EF672997.1 *Lerista ips*	0.176	0.171	0.167	0.164	0.157	0.109	0.157	0.135	0.114	0.128
136	EF672996.1 *Lerista ingrami*	0.164	0.159	0.150	0.135	0.157	0.143	0.060	0.135	0.116	0.143
137	EF672995.1 *Lerista humphriesi*	0.186	0.184	0.174	0.171	0.169	0.147	0.152	0.114	0.118	0.145
138	EF672994.1 *Lerista haroldi*	0.159	0.159	0.155	0.152	0.147	0.126	0.147	0.114	0.116	0.138
139	EF672993.1 *Lerista griffini*	0.193	0.186	0.176	0.159	0.186	0.152	0.145	0.123	0.133	0.150
140	EF672992.1 *Lerista greeri*	0.174	0.171	0.157	0.162	0.162	0.135	0.162	0.116	0.130	0.155
141	EF672991.1 *Lerista gerrardii*	0.143	0.140	0.126	0.133	0.147	0.121	0.116	0.123	0.099	0.121
142	EF672990.1 *Lerista gascoynensis*	0.167	0.164	0.162	0.135	0.152	0.109	0.114	0.036	0.126	0.145
143	EF672989.1 *Lerista frosti*	0.167	0.164	0.157	0.138	0.159	0.138	0.126	0.121	0.114	0.138
144	EF672988.1 *Lerista fragilis*	0.155	0.152	0.143	0.130	0.152	0.145	0.114	0.104	0.118	0.147

		91	92	93	94	95	96	97	98	99	100
145	EF672987.1 *Lerista flammicauda*	0.150	0.140	0.140	0.140	0.147	0.094	0.140	0.109	0.123	0.128
146	EF672986.1 *Lerista eupoda*	0.147	0.145	0.130	0.133	0.147	0.118	0.111	0.118	0.094	0.118
147	EF672985.1 *Lerista emmotti*	0.191	0.186	0.186	0.181	0.188	0.143	0.171	0.150	0.155	0.174
148	EF672984.1 *Lerista elongata*	0.150	0.150	0.138	0.138	0.143	0.121	0.128	0.104	0.114	0.106
149	EF672983.1 *Lerista elegans*	0.157	0.157	0.147	0.140	0.157	0.118	0.138	0.121	0.114	0.133
150	EF672982.1 *Lerista edwardsae*	0.162	0.159	0.145	0.140	0.147	0.147	0.145	0.116	0.126	0.126
151	EF672981.1 *Lerista dorsalis*	0.159	0.157	0.152	0.152	0.147	0.133	0.155	0.126	0.123	0.133
152	EF672980.1 *Lerista distinguenda*	0.169	0.164	0.157	0.152	0.169	0.111	0.128	0.126	0.118	0.121
153	EF672979.1 *Lerista desertorum*	0.145	0.147	0.135	0.155	0.157	0.130	0.114	0.114	0.092	0.130
154	EF672978.1 *Lerista connivens*	0.162	0.159	0.147	0.145	0.150	0.104	0.130	0.072	0.116	0.138
155	EF672977.1 *Lerista cinerea*	0.155	0.143	0.143	0.145	0.159	0.116	0.145	0.118	0.106	0.104
156	EF672976.1 *Lerista christinae*	0.164	0.157	0.157	0.138	0.159	0.123	0.157	0.116	0.123	0.128
157	EF672975.1 *Lerista carpentariae*	0.167	0.164	0.155	0.150	0.159	0.121	0.140	0.123	0.111	0.126
158	EF672974.1 *Lerista borealis*	0.152	0.145	0.147	0.135	0.145	0.128	0.130	0.094	0.106	0.143
159	EF672973.1 *Lerista bipes*	0.171	0.164	0.159	0.152	0.171	0.118	0.162	0.128	0.133	0.133
160	EF672972.1 *Lerista baynesi*	0.167	0.164	0.150	0.159	0.162	0.152	0.150	0.128	0.138	0.128
161	EF672971.1 *Lerista axillaris*	0.140	0.138	0.121	0.128	0.145	0.118	0.121	0.104	0.094	0.126
162	EF672970.1 *Lerista arenicola*	0.167	0.174	0.162	0.147	0.164	0.130	0.157	0.116	0.155	0.157
163	EF672969.1 *Lerista apoda*	0.171	0.164	0.167	0.164	0.174	0.133	0.145	0.135	0.123	0.150
164	EF672968.1 *Lerista ameles*	0.174	0.167	0.159	0.162	0.167	0.128	0.155	0.109	0.116	0.118
165	EF672967.1 *Lerista allochira*	0.150	0.145	0.143	0.133	0.145	0.114	0.143	0.087	0.116	0.130
166	EF672966.1 *Lerista aericeps*	0.159	0.157	0.150	0.145	0.159	0.133	0.111	0.114	0.097	0.128
167	DQ915332.1 *Lerista bougainvillii*	0.152	0.147	0.150	0.138	0.147	0.106	0.123	0.097	0.109	0.123
168	DQ915331.1 *Lerista bipes*	0.150	0.143	0.138	0.147	0.157	0.133	0.157	0.121	0.126	0.121
169	AY169666.1 *Lerista bipes* ND4	0.169	0.167	0.152	0.147	0.157	0.111	0.152	0.121	0.114	0.143
170	EU109216.1 *Lerista macropisthopus* ND4	0.143	0.147	0.135	0.140	0.147	0.130	0.121	0.123	0.111	0.145

		101	102	103	104	105	106	107	108	109	110
1	**PQ09** *L.separanda* WIN07P ND4	0.015	0.017	0.017	0.016	0.018	0.017	0.017	0.015	0.017	0.016
2	**PQ20** *L.separanda* 163965 ND4	0.015	0.017	0.017	0.016	0.018	0.017	0.017	0.016	0.017	0.016
3	**PQ21** *L.separanda* 163487 ND4	0.014	0.017	0.017	0.016	0.017	0.017	0.017	0.015	0.016	0.016
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.018	0.018	0.019	0.018	0.019	0.018	0.018	0.018	0.019	0.018
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.016
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.016	0.018	0.019	0.017	0.019	0.018	0.018	0.018	0.018	0.017
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.016	0.018	0.019	0.017	0.019	0.018	0.018	0.017	0.018	0.018
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.016	0.019	0.019	0.017	0.019	0.018	0.018	0.017	0.018	0.017
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.016	0.018	0.019	0.017	0.019	0.018	0.018	0.018	0.018	0.017
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.017	0.019	0.019	0.017	0.019	0.018	0.018	0.018	0.018	0.017
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.017	0.019	0.019	0.017	0.019	0.018	0.018	0.018	0.018	0.017
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.017	0.017
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.016	0.017	0.017	0.016	0.017	0.016	0.016	0.017	0.016	0.016
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.017	0.018	0.018	0.016	0.017	0.017	0.017	0.018	0.019	0.017
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.017	0.018	0.018	0.016	0.017	0.017	0.017	0.018	0.019	0.017
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.017	0.018	0.018	0.016	0.017	0.017	0.017	0.018	0.019	0.017
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.017	0.018	0.018	0.016	0.017	0.017	0.017	0.018	0.019	0.017
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.017	0.018	0.018	0.016	0.017	0.017	0.017	0.018	0.019	0.017
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.017	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.017	0.017
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.017	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.017	0.017
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.017	0.018	0.018	0.018	0.018	0.017	0.017	0.018	0.018	0.017
25	AY169667.1 *Lerista bougainvillii*	0.016	0.015	0.017	0.015	0.015	0.016	0.016	0.017	0.017	0.014
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.015	0.016	0.017	0.016	0.017	0.016	0.016	0.016	0.017	0.016
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.016	0.016	0.017	0.016	0.017	0.016	0.016	0.017	0.017	0.016
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.016	0.016	0.017	0.016	0.017	0.016	0.016	0.017	0.017	0.016
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.016	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.016	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017

		101	102	103	104	105	106	107	108	109	110
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.016	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.016
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.016	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.016
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.016	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.016
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.016	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.016
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.017	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.016
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.016	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.016
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.016	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.016
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.016	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.016
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.016	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.016
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.016	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.016
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.016	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.016
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.016	0.017	0.018	0.017	0.017	0.015	0.015	0.016	0.016	0.016
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.016	0.018	0.018	0.017	0.018	0.015	0.015	0.016	0.016	0.016
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.016	0.018	0.018	0.017	0.018	0.016	0.016	0.016	0.016	0.016
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.016	0.017	0.018	0.017	0.018	0.016	0.016	0.016	0.016	0.016
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.016	0.017	0.018	0.016	0.017	0.017	0.017	0.017	0.016	0.016
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.016	0.017	0.018	0.017	0.018	0.017	0.017	0.017	0.016	0.016
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.016	0.017	0.018	0.017	0.018	0.017	0.017	0.017	0.016	0.016
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.016	0.017	0.018	0.017	0.018	0.017	0.017	0.017	0.016	0.016
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.017
57	KU309300.1 *Lerista storri* isolate LestA1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.016	0.016	0.017	0.016	0.017	0.016	0.016	0.017	0.017	0.016
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.016	0.016	0.017	0.016	0.017	0.016	0.016	0.017	0.017	0.016
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.016	0.017	0.017	0.016	0.017	0.017	0.016	0.016	0.016	0.016
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.016	0.017	0.018	0.017	0.017	0.017	0.016	0.017	0.016	0.016
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.017	0.018	0.018	0.018	0.018	0.017	0.017	0.018	0.018	0.017
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.016	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.016
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.016	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.016
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.016	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.016
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.016	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.016
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.016	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.015
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.016
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.016	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.016
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.016	0.017	0.017	0.016	0.016	0.017	0.016	0.017	0.016	0.016
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.016	0.017	0.017	0.016	0.016	0.017	0.016	0.017	0.016	0.016

		101	102	103	104	105	106	107	108	109	110
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.017	0.017	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.016
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.017	0.017	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.016
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.017	0.017	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.016
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.017	0.017	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.016
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.017	0.017	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.016
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.016
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.017	0.016
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.017	0.016
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.017	0.016
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.017	0.016
83	KU309273.1 *Lerista allanae* isolate Leal2	0.016	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.016
84	KU309272.1 *Lerista allanae* isolate Leal1	0.017	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.016
85	KF823006.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.018	0.017	0.017	0.017	0.018	0.018
86	KF823005.1 *Lerista kalumburu*	0.017	0.017	0.018	0.017	0.018	0.017	0.017	0.017	0.018	0.018
87	KF823007.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.018	0.017	0.017	0.017	0.018	0.018
88	KF823004.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.018	0.017	0.018	0.017	0.019	0.018
89	KF823003.1 *Lerista kalumburu*	0.017	0.018	0.019	0.018	0.018	0.018	0.018	0.017	0.018	0.018
90	KF823002.1 *Lerista kalumburu*	0.017	0.018	0.019	0.018	0.018	0.018	0.018	0.018	0.019	0.018
91	KF823001.1 *Lerista kalumburu*	0.017	0.018	0.019	0.018	0.018	0.018	0.018	0.018	0.019	0.018
92	KF823000.1 *Lerista kalumburu*	0.017	0.018	0.019	0.018	0.018	0.018	0.018	0.017	0.019	0.018
93	KF822999.1 *Lerista kalumburu*	0.017	0.018	0.018	0.017	0.018	0.017	0.017	0.017	0.018	0.018
94	KF822998.1 *Lerista kalumburu*	0.018	0.017	0.018	0.017	0.018	0.017	0.018	0.018	0.018	0.018
95	KF822997.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.019	0.019
96	EF673035.1 *Lerista zietzi*	0.017	0.017	0.017	0.015	0.017	0.016	0.017	0.017	0.018	0.016
97	EF673036.1 *Lerista zonulata*	0.016	0.017	0.018	0.017	0.018	0.017	0.017	0.016	0.018	0.016
98	EF673034.1 *Lerista yuna*	0.015	0.015	0.016	0.013	0.014	0.015	0.015	0.016	0.017	0.015
99	EF673033.1 *Lerista xanthura*	0.015	0.017	0.016	0.016	0.017	0.016	0.016	0.014	0.016	0.015
100	EF673032.1 *Lerista wilkinsi*	0.016	0.017	0.018	0.017	0.018	0.016	0.016	0.016	0.016	0.016
101	EF673031.1 *Lerista walkeri*		0.016	0.017	0.016	0.017	0.016	0.016	0.016	0.016	0.016
102	EF673030.1 *Lerista viduata*	0.121		0.018	0.016	0.017	0.017	0.017	0.018	0.017	0.016
103	EF673029.1 *Lerista vermicularis*	0.140	0.155		0.016	0.016	0.017	0.017	0.017	0.019	0.017
104	EF673028.1 *Lerista varia*	0.126	0.121	0.123		0.014	0.016	0.016	0.016	0.017	0.014
105	EF673027.1 *Lerista uniduo*	0.135	0.130	0.118	0.092		0.016	0.016	0.017	0.018	0.016
106	EF673026.1 *Lerista tridactyla*	0.123	0.143	0.143	0.116	0.128		0.008	0.016	0.017	0.016
107	EF673025.1 *Lerista terdigitata*	0.121	0.140	0.140	0.121	0.121	0.029		0.016	0.017	0.016
108	EF673024.1 *Lerista taeniata*	0.116	0.152	0.145	0.128	0.138	0.118	0.123		0.018	0.017

		101	102	103	104	105	106	107	108	109	110
109	EF673023.1 *Lerista stylis*	0.114	0.145	0.171	0.143	0.164	0.140	0.138	0.152		0.016
110	EF673022.1 *Lerista stictopleura*	0.116	0.121	0.135	0.094	0.114	0.118	0.116	0.130	0.118	
111	EF673021.1 *Lerista chordae*	0.123	0.157	0.157	0.140	0.157	0.140	0.138	0.128	0.162	0.147
112	EF673020.1 *Lerista speciosa*	0.135	0.157	0.147	0.126	0.128	0.104	0.094	0.143	0.157	0.135
113	EF673019.1 *Lerista simillima*	0.130	0.150	0.010	0.114	0.116	0.133	0.130	0.135	0.162	0.126
114	EF673018.1 *Lerista robusta*	0.118	0.152	0.053	0.121	0.133	0.126	0.126	0.140	0.155	0.130
115	EF673017.1 *Lerista puncticauda*	0.097	0.123	0.135	0.116	0.140	0.116	0.111	0.116	0.138	0.114
116	EF673016.1 *Lerista punctatovittata*	0.143	0.155	0.145	0.130	0.138	0.140	0.145	0.159	0.164	0.123
117	EF673015.1 *Lerista praepedita*	0.116	0.097	0.126	0.089	0.109	0.130	0.130	0.130	0.150	0.109
118	EF673014.1 *Lerista planiventralis*	0.128	0.130	0.157	0.126	0.147	0.135	0.135	0.145	0.150	0.121
119	EF673013.1 *Lerista picturata*	0.109	0.128	0.133	0.116	0.123	0.109	0.111	0.135	0.135	0.121
120	EF673012.1 *Lerista petersoni*	0.133	0.126	0.138	0.092	0.106	0.118	0.116	0.150	0.164	0.109
121	EF673011.1 *Lerista orientalis* NADH	0.106	0.126	0.138	0.126	0.135	0.143	0.135	0.121	0.143	0.126
122	EF673010.1 *Lerista onsloviana*	0.128	0.128	0.138	0.101	0.087	0.123	0.128	0.121	0.157	0.104
123	EF673009.1 *Lerista nichollsi*	0.121	0.121	0.133	0.092	0.106	0.114	0.116	0.128	0.155	0.111
124	EF673008.1 *Lerista neander*	0.118	0.143	0.145	0.114	0.143	0.135	0.135	0.123	0.150	0.126
125	EF673007.1 *Lerista muelleri*	0.143	0.126	0.140	0.116	0.128	0.147	0.145	0.135	0.162	0.116
126	EF673006.1 *Lerista microtis*	0.123	0.143	0.143	0.130	0.128	0.140	0.133	0.147	0.140	0.135
127	EF673005.1 *Lerista macropisthopus*	0.109	0.121	0.130	0.106	0.135	0.114	0.111	0.104	0.140	0.116
128	EF673004.1 *Lerista lineopunctulata*	0.133	0.126	0.140	0.058	0.111	0.128	0.135	0.138	0.159	0.106
129	EF673003.1 *Lerista lineata*	0.118	0.128	0.150	0.135	0.143	0.133	0.128	0.138	0.157	0.138
130	EF673002.1 *Lerista labialis*	0.130	0.152	0.080	0.126	0.133	0.118	0.126	0.140	0.162	0.121
131	EF673001.1 *Lerista kennedyensis*	0.135	0.138	0.143	0.126	0.099	0.133	0.135	0.128	0.162	0.126
132	EF673000.1 *Lerista kendricki*	0.118	0.116	0.133	0.082	0.111	0.126	0.128	0.135	0.152	0.097
133	EF672999.1 *Lerista karlschmidti*	0.135	0.159	0.171	0.135	0.162	0.133	0.133	0.135	0.130	0.126
134	EF672998.1 *Lerista kalumburu*	0.157	0.155	0.167	0.152	0.147	0.155	0.162	0.171	0.184	0.174
135	EF672997.1 *Lerista ips*	0.133	0.174	0.094	0.130	0.143	0.133	0.138	0.135	0.159	0.130
136	EF672996.1 *Lerista ingrami*	0.118	0.133	0.164	0.121	0.143	0.138	0.145	0.106	0.159	0.140
137	EF672995.1 *Lerista humphriesi*	0.133	0.123	0.140	0.104	0.123	0.155	0.150	0.138	0.171	0.123
138	EF672994.1 *Lerista haroldi*	0.118	0.118	0.128	0.109	0.121	0.135	0.130	0.140	0.133	0.109
139	EF672993.1 *Lerista griffini*	0.116	0.133	0.133	0.135	0.150	0.143	0.135	0.143	0.150	0.140
140	EF672992.1 *Lerista greeri*	0.138	0.133	0.087	0.109	0.133	0.135	0.135	0.145	0.162	0.135
141	EF672991.1 *Lerista gerrardii*	0.118	0.123	0.135	0.118	0.130	0.116	0.121	0.101	0.143	0.114
142	EF672990.1 *Lerista gascoynensis*	0.121	0.114	0.126	0.085	0.092	0.114	0.116	0.133	0.152	0.104
143	EF672989.1 *Lerista frosti*	0.118	0.135	0.147	0.126	0.140	0.138	0.133	0.126	0.152	0.135
144	EF672988.1 *Lerista fragilis*	0.116	0.128	0.152	0.126	0.138	0.130	0.135	0.126	0.150	0.130

		101	102	103	104	105	106	107	108	109	110
145	EF672987.1 *Lerista flammicauda*	0.121	0.135	0.133	0.101	0.111	0.116	0.116	0.133	0.152	0.123
146	EF672986.1 *Lerista eupoda*	0.116	0.128	0.143	0.116	0.140	0.114	0.121	0.104	0.138	0.111
147	EF672985.1 *Lerista emmotti*	0.162	0.164	0.174	0.147	0.140	0.164	0.155	0.164	0.191	0.147
148	EF672984.1 *Lerista elongata*	0.118	0.140	0.145	0.111	0.109	0.046	0.046	0.111	0.130	0.106
149	EF672983.1 *Lerista elegans*	0.106	0.118	0.143	0.114	0.130	0.133	0.135	0.145	0.130	0.109
150	EF672982.1 *Lerista edwardsae*	0.116	0.143	0.138	0.126	0.126	0.118	0.111	0.126	0.138	0.116
151	EF672981.1 *Lerista dorsalis*	0.126	0.130	0.135	0.109	0.138	0.128	0.123	0.147	0.150	0.123
152	EF672980.1 *Lerista distinguenda*	0.104	0.130	0.150	0.118	0.121	0.133	0.128	0.145	0.128	0.114
153	EF672979.1 *Lerista desertorum*	0.106	0.121	0.140	0.109	0.133	0.118	0.109	0.111	0.135	0.111
154	EF672978.1 *Lerista connivens*	0.121	0.116	0.121	0.010	0.094	0.114	0.118	0.128	0.138	0.087
155	EF672977.1 *Lerista cinerea*	0.118	0.145	0.150	0.130	0.147	0.130	0.126	0.133	0.118	0.128
156	EF672976.1 *Lerista christinae*	0.138	0.138	0.143	0.126	0.133	0.126	0.128	0.150	0.145	0.106
157	EF672975.1 *Lerista carpentariae*	0.114	0.140	0.123	0.116	0.116	0.123	0.121	0.140	0.121	0.109
158	EF672974.1 *Lerista borealis*	0.087	0.123	0.123	0.114	0.128	0.133	0.130	0.123	0.130	0.118
159	EF672973.1 *Lerista bipes*	0.140	0.143	0.133	0.133	0.150	0.145	0.145	0.147	0.162	0.155
160	EF672972.1 *Lerista baynesi*	0.130	0.171	0.147	0.128	0.140	0.130	0.133	0.130	0.145	0.138
161	EF672971.1 *Lerista axillaris*	0.101	0.109	0.130	0.104	0.133	0.118	0.116	0.106	0.130	0.111
162	EF672970.1 *Lerista arenicola*	0.135	0.155	0.150	0.126	0.152	0.155	0.155	0.159	0.155	0.133
163	EF672969.1 *Lerista apoda*	0.118	0.150	0.140	0.128	0.143	0.145	0.138	0.150	0.140	0.133
164	EF672968.1 *Lerista ameles*	0.130	0.130	0.130	0.118	0.135	0.135	0.133	0.123	0.135	0.126
165	EF672967.1 *Lerista allochira*	0.114	0.109	0.135	0.097	0.109	0.133	0.130	0.135	0.140	0.104
166	EF672966.1 *Lerista aericeps*	0.104	0.130	0.147	0.116	0.140	0.123	0.118	0.080	0.128	0.116
167	DQ915332.1 *Lerista bougainvillii*	0.126	0.101	0.130	0.111	0.101	0.111	0.111	0.126	0.128	0.094
168	DQ915331.1 *Lerista bipes*	0.118	0.138	0.130	0.128	0.143	0.133	0.143	0.128	0.150	0.130
169	AY169666.1 *Lerista bipes* ND4	0.128	0.145	0.077	0.123	0.128	0.118	0.123	0.138	0.157	0.121
170	EU109216.1 *Lerista macropisthopus* ND4	0.121	0.147	0.140	0.109	0.135	0.126	0.126	0.123	0.140	0.130

		111	112	113	114	115	116	117	118	119	120
1	**PQ09** *L.separanda* WIN07P ND4	0.017	0.017	0.017	0.017	0.015	0.016	0.017	0.017	0.016	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.017	0.017	0.017	0.017	0.015	0.016	0.017	0.017	0.017	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.017	0.017	0.016	0.017	0.015	0.016	0.017	0.017	0.016	0.017
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.018	0.018	0.018	0.019	0.018	0.019	0.018	0.018	0.019	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.017	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.016	0.017
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.017	0.017	0.017	0.018	0.017	0.018	0.017	0.017	0.017	0.017
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.017	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.016	0.017
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.017	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.016	0.017
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017	0.018	0.018
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.017
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.018	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.017	0.017
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.018	0.018	0.018	0.017	0.017	0.018	0.016	0.018	0.017	0.018
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.018	0.017	0.017
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.018	0.017	0.017
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.018	0.018	0.018	0.017	0.017	0.018	0.016	0.018	0.017	0.018
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.018	0.018	0.018	0.017	0.017	0.019	0.017	0.017	0.017	0.018
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.018	0.018	0.018	0.017	0.017	0.019	0.017	0.017	0.017	0.018
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.018	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.016	0.018
25	AY169667.1 *Lerista bougainvillii*	0.017	0.016	0.017	0.016	0.016	0.017	0.014	0.017	0.016	0.015
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.017	0.016	0.017	0.017	0.016	0.016	0.015	0.018	0.015	0.016
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.017	0.016	0.017	0.017	0.016	0.016	0.015	0.018	0.015	0.017
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.017	0.016	0.017	0.017	0.016	0.016	0.015	0.018	0.015	0.017
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.018	0.015	0.017
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.018	0.016	0.017
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.018	0.016	0.017
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.018	0.016	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.018	0.016	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.018	0.016	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.018	0.016	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.018	0.017	0.017	0.017	0.016	0.016	0.016	0.018	0.016	0.017

		111	112	113	114	115	116	117	118	119	120
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.018	0.016	0.017	0.018	0.017	0.016	0.018	0.018	0.016	0.016
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.018	0.016	0.017	0.018	0.017	0.016	0.018	0.018	0.016	0.016
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.018	0.016	0.017	0.018	0.016	0.016	0.018	0.018	0.016	0.016
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.018	0.016	0.017	0.018	0.016	0.016	0.018	0.018	0.016	0.016
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.018	0.017	0.018	0.018	0.017	0.016	0.018	0.018	0.016	0.017
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.018	0.016	0.017	0.018	0.016	0.016	0.018	0.018	0.016	0.016
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.018	0.016	0.017	0.018	0.016	0.016	0.018	0.018	0.016	0.016
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.018	0.016	0.017	0.018	0.016	0.016	0.018	0.018	0.016	0.016
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.018	0.016	0.017	0.018	0.016	0.016	0.018	0.018	0.016	0.016
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.018	0.016	0.017	0.018	0.017	0.016	0.018	0.018	0.016	0.016
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.018	0.016	0.017	0.018	0.017	0.015	0.018	0.018	0.016	0.016
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.018	0.016	0.017
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.018	0.016	0.018
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.017	0.017	0.018	0.018	0.016	0.017	0.017	0.018	0.017	0.017
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.018	0.017	0.018
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.018	0.017	0.017	0.018	0.016	0.017	0.016	0.017	0.017	0.017
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.018	0.017	0.018	0.018	0.016	0.017	0.016	0.017	0.017	0.017
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.018	0.017	0.018	0.018	0.016	0.017	0.016	0.017	0.017	0.017
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.018	0.017	0.018	0.018	0.016	0.017	0.016	0.017	0.017	0.017
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
57	KU309300.1 *Lerista storri* isolate LestA1	0.017	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.016	0.017
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.017	0.016	0.017	0.017	0.016	0.016	0.015	0.018	0.015	0.017
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.017	0.016	0.017	0.017	0.016	0.016	0.015	0.018	0.015	0.017
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.016
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.016
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.018	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.016	0.018
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.016
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.016
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.016
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.016
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.016
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.018	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016

		111	112	113	114	115	116	117	118	119	120
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.018	0.017	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.018	0.017	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.018	0.017	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.017	0.017	0.016	0.017	0.017	0.018	0.015	0.016	0.016	0.017
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.017	0.017	0.016	0.017	0.017	0.018	0.015	0.016	0.016	0.017
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.017	0.017	0.016	0.017	0.017	0.018	0.015	0.016	0.016	0.017
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.017	0.017	0.016	0.017	0.017	0.018	0.015	0.016	0.016	0.017
83	KU309273.1 *Lerista allanae* isolate Leal2	0.018	0.016	0.017	0.018	0.017	0.016	0.018	0.018	0.016	0.016
84	KU309272.1 *Lerista allanae* isolate Leal1	0.018	0.016	0.018	0.018	0.017	0.016	0.018	0.018	0.016	0.017
85	KF823006.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.017	0.018
86	KF823005.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
87	KF823007.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.017	0.019	0.018	0.018	0.018	0.019
88	KF823004.1 *Lerista kalumburu*	0.017	0.018	0.018	0.019	0.017	0.018	0.018	0.018	0.017	0.018
89	KF823003.1 *Lerista kalumburu*	0.017	0.018	0.018	0.019	0.017	0.019	0.018	0.018	0.018	0.018
90	KF823002.1 *Lerista kalumburu*	0.018	0.018	0.018	0.019	0.017	0.019	0.018	0.018	0.018	0.018
91	KF823001.1 *Lerista kalumburu*	0.018	0.019	0.018	0.019	0.017	0.019	0.018	0.018	0.018	0.019
92	KF823000.1 *Lerista kalumburu*	0.018	0.018	0.018	0.019	0.017	0.019	0.018	0.018	0.018	0.018
93	KF822999.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.017	0.018
94	KF822998.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.018	0.018	0.017	0.017	0.017	0.017
95	KF822997.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
96	EF673035.1 *Lerista zietzi*	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.017	0.016	0.015
97	EF673036.1 *Lerista zonulata*	0.017	0.017	0.018	0.018	0.015	0.017	0.017	0.018	0.017	0.016
98	EF673034.1 *Lerista yuna*	0.017	0.015	0.016	0.016	0.016	0.017	0.014	0.016	0.016	0.011
99	EF673033.1 *Lerista xanthura*	0.016	0.017	0.016	0.016	0.014	0.017	0.016	0.017	0.016	0.016
100	EF673032.1 *Lerista wilkinsi*	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.018	0.017	0.018
101	EF673031.1 *Lerista walkeri*	0.016	0.017	0.017	0.016	0.015	0.017	0.016	0.016	0.015	0.017
102	EF673030.1 *Lerista viduata*	0.018	0.018	0.018	0.018	0.016	0.018	0.015	0.017	0.016	0.016
103	EF673029.1 *Lerista vermicularis*	0.018	0.017	0.005	0.011	0.017	0.017	0.016	0.018	0.017	0.017
104	EF673028.1 *Lerista varia*	0.017	0.016	0.016	0.016	0.016	0.017	0.014	0.016	0.016	0.014
105	EF673027.1 *Lerista uniduo*	0.018	0.016	0.016	0.017	0.017	0.017	0.015	0.017	0.016	0.015
106	EF673026.1 *Lerista tridactyla*	0.017	0.015	0.017	0.016	0.016	0.017	0.017	0.017	0.015	0.016
107	EF673025.1 *Lerista terdigitata*	0.017	0.014	0.017	0.016	0.015	0.017	0.017	0.017	0.015	0.016
108	EF673024.1 *Lerista taeniata*	0.016	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.017	0.018

		111	112	113	114	115	116	117	118	119	120
109	EF673023.1 *Lerista stylis*	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.017	0.018
110	EF673022.1 *Lerista stictopleura*	0.017	0.017	0.016	0.017	0.016	0.016	0.015	0.016	0.016	0.015
111	EF673021.1 *Lerista chordae*		0.017	0.018	0.018	0.017	0.018	0.016	0.018	0.018	0.017
112	EF673020.1 *Lerista speciosa*	0.145		0.017	0.017	0.016	0.017	0.017	0.017	0.015	0.016
113	EF673019.1 *Lerista simillima*	0.150	0.138		0.010	0.016	0.017	0.016	0.017	0.016	0.017
114	EF673018.1 *Lerista robusta*	0.150	0.140	0.043		0.016	0.017	0.016	0.018	0.016	0.017
115	EF673017.1 *Lerista puncticauda*	0.135	0.128	0.126	0.118		0.017	0.016	0.016	0.016	0.017
116	EF673016.1 *Lerista punctatovittata*	0.157	0.145	0.140	0.143	0.140		0.017	0.019	0.017	0.018
117	EF673015.1 *Lerista praepedita*	0.126	0.133	0.121	0.126	0.126	0.140		0.016	0.017	0.015
118	EF673014.1 *Lerista planiventralis*	0.150	0.147	0.147	0.155	0.128	0.174	0.118		0.016	0.016
119	EF673013.1 *Lerista picturata*	0.152	0.109	0.123	0.126	0.118	0.135	0.130	0.121		0.016
120	EF673012.1 *Lerista petersoni*	0.145	0.126	0.133	0.140	0.130	0.150	0.104	0.128	0.128	
121	EF673011.1 *Lerista orientalis* NADH	0.145	0.133	0.133	0.138	0.099	0.143	0.126	0.145	0.121	0.143
122	EF673010.1 *Lerista onsloviana*	0.152	0.140	0.133	0.145	0.130	0.130	0.111	0.152	0.123	0.101
123	EF673009.1 *Lerista nichollsi*	0.140	0.114	0.128	0.140	0.128	0.147	0.106	0.143	0.121	0.051
124	EF673008.1 *Lerista neander*	0.133	0.140	0.138	0.133	0.085	0.140	0.147	0.147	0.138	0.143
125	EF673007.1 *Lerista muelleri*	0.150	0.123	0.135	0.147	0.152	0.159	0.118	0.145	0.147	0.118
126	EF673006.1 *Lerista microtis*	0.138	0.135	0.133	0.140	0.133	0.138	0.130	0.138	0.133	0.130
127	EF673005.1 *Lerista macropisthopus*	0.114	0.133	0.121	0.121	0.070	0.121	0.114	0.128	0.118	0.135
128	EF673004.1 *Lerista lineopunctulata*	0.140	0.135	0.135	0.147	0.130	0.150	0.106	0.140	0.138	0.094
129	EF673003.1 *Lerista lineata*	0.130	0.121	0.143	0.133	0.121	0.143	0.126	0.135	0.126	0.135
130	EF673002.1 *Lerista labialis*	0.147	0.135	0.070	0.058	0.128	0.143	0.128	0.150	0.133	0.133
131	EF673001.1 *Lerista kennedyensis*	0.167	0.145	0.143	0.155	0.130	0.147	0.130	0.169	0.143	0.114
132	EF673000.1 *Lerista kendricki*	0.155	0.126	0.133	0.140	0.114	0.147	0.106	0.133	0.123	0.072
133	EF672999.1 *Lerista karlschmidti*	0.159	0.164	0.162	0.155	0.128	0.167	0.152	0.162	0.150	0.159
134	EF672998.1 *Lerista kalumburu*	0.159	0.159	0.157	0.164	0.164	0.159	0.150	0.162	0.155	0.157
135	EF672997.1 *Lerista ips*	0.147	0.123	0.085	0.075	0.126	0.130	0.126	0.150	0.138	0.138
136	EF672996.1 *Lerista ingrami*	0.133	0.150	0.157	0.152	0.114	0.155	0.123	0.159	0.143	0.143
137	EF672995.1 *Lerista humphriesi*	0.138	0.167	0.130	0.126	0.121	0.159	0.097	0.157	0.143	0.135
138	EF672994.1 *Lerista haroldi*	0.133	0.147	0.123	0.128	0.126	0.150	0.109	0.145	0.121	0.126
139	EF672993.1 *Lerista griffini*	0.157	0.133	0.123	0.114	0.135	0.162	0.143	0.152	0.121	0.147
140	EF672992.1 *Lerista greeri*	0.155	0.147	0.087	0.070	0.126	0.147	0.114	0.155	0.138	0.128
141	EF672991.1 *Lerista gerrardii*	0.121	0.143	0.128	0.128	0.089	0.133	0.123	0.138	0.126	0.147
142	EF672990.1 *Lerista gascoynensis*	0.140	0.114	0.121	0.138	0.118	0.140	0.094	0.143	0.123	0.053
143	EF672989.1 *Lerista frosti*	0.114	0.143	0.143	0.143	0.135	0.145	0.121	0.133	0.128	0.116
144	EF672988.1 *Lerista fragilis*	0.094	0.138	0.145	0.150	0.123	0.162	0.123	0.143	0.140	0.118

		111	112	113	114	115	116	117	118	119	120
145	EF672987.1 *Lerista flammicauda*	0.152	0.135	0.123	0.130	0.121	0.128	0.106	0.143	0.126	0.114
146	EF672986.1 *Lerista eupoda*	0.116	0.143	0.133	0.123	0.089	0.111	0.126	0.138	0.123	0.140
147	EF672985.1 *Lerista emmotti*	0.181	0.140	0.164	0.171	0.152	0.092	0.140	0.181	0.152	0.157
148	EF672984.1 *Lerista elongata*	0.121	0.109	0.135	0.123	0.114	0.126	0.130	0.128	0.116	0.106
149	EF672983.1 *Lerista elegans*	0.145	0.133	0.133	0.145	0.111	0.123	0.104	0.135	0.126	0.114
150	EF672982.1 *Lerista edwardsae*	0.130	0.126	0.130	0.133	0.123	0.138	0.133	0.123	0.063	0.128
151	EF672981.1 *Lerista dorsalis*	0.147	0.145	0.126	0.114	0.116	0.133	0.118	0.133	0.128	0.133
152	EF672980.1 *Lerista distinguenda*	0.145	0.126	0.140	0.140	0.099	0.145	0.109	0.121	0.118	0.126
153	EF672979.1 *Lerista desertorum*	0.135	0.128	0.130	0.128	0.022	0.143	0.121	0.123	0.123	0.135
154	EF672978.1 *Lerista connivens*	0.133	0.118	0.111	0.118	0.111	0.126	0.087	0.133	0.116	0.094
155	EF672977.1 *Lerista cinerea*	0.135	0.135	0.140	0.138	0.130	0.145	0.121	0.135	0.138	0.128
156	EF672976.1 *Lerista christinae*	0.135	0.140	0.133	0.128	0.135	0.150	0.123	0.143	0.133	0.123
157	EF672975.1 *Lerista carpentariae*	0.126	0.143	0.114	0.114	0.114	0.140	0.116	0.126	0.135	0.126
158	EF672974.1 *Lerista borealis*	0.130	0.114	0.114	0.128	0.111	0.143	0.116	0.130	0.133	0.116
159	EF672973.1 *Lerista bipes*	0.152	0.145	0.123	0.118	0.140	0.174	0.123	0.130	0.143	0.138
160	EF672972.1 *Lerista baynesi*	0.135	0.123	0.140	0.140	0.138	0.147	0.143	0.152	0.097	0.130
161	EF672971.1 *Lerista axillaris*	0.116	0.130	0.126	0.126	0.072	0.128	0.116	0.123	0.114	0.130
162	EF672970.1 *Lerista arenicola*	0.152	0.159	0.140	0.157	0.152	0.143	0.143	0.145	0.147	0.118
163	EF672969.1 *Lerista apoda*	0.133	0.143	0.130	0.140	0.128	0.162	0.128	0.147	0.140	0.145
164	EF672968.1 *Lerista ameles*	0.135	0.138	0.126	0.133	0.145	0.150	0.111	0.123	0.118	0.133
165	EF672967.1 *Lerista allochira*	0.140	0.135	0.126	0.138	0.130	0.145	0.109	0.130	0.128	0.104
166	EF672966.1 *Lerista aericeps*	0.128	0.140	0.138	0.133	0.094	0.150	0.121	0.135	0.133	0.123
167	DQ915332.1 *Lerista bougainvillii*	0.138	0.123	0.126	0.140	0.118	0.135	0.092	0.121	0.121	0.097
168	DQ915331.1 *Lerista bipes*	0.135	0.138	0.121	0.116	0.140	0.147	0.116	0.140	0.138	0.143
169	AY169666.1 *Lerista bipes* ND4	0.145	0.133	0.068	0.058	0.126	0.143	0.126	0.145	0.130	0.130
170	EU109216.1 *Lerista macropisthopus* ND4	0.133	0.133	0.130	0.135	0.097	0.123	0.138	0.143	0.128	0.145

		121	122	123	124	125	126	127	128	129	130
1	**PQ09** *L.separanda* WIN07P ND4	0.016	0.017	0.017	0.016	0.017	0.018	0.015	0.017	0.017	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.016	0.018	0.017	0.016	0.017	0.018	0.015	0.017	0.017	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.016	0.017	0.017	0.016	0.017	0.017	0.015	0.016	0.017	0.017
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.018	0.019	0.018	0.018	0.019	0.018	0.018	0.018	0.018	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.018
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.018
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.018
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.018
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.018	0.017	0.017
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.018	0.017	0.017
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.018	0.018	0.017
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.018	0.017	0.017
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.018	0.018	0.017
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.019	0.018	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018
16	KU309297.1 *Lerista hobson*i isolate LehoP1	0.016	0.016	0.017	0.016	0.017	0.016	0.016	0.017	0.017	0.017
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017	0.017	0.017
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017	0.018
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017	0.017
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017	0.017
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017	0.018
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.018	0.017	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.017
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.018	0.017	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.018
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.017	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
25	AY169667.1 *Lerista bougainvillii*	0.017	0.015	0.015	0.018	0.016	0.016	0.016	0.016	0.016	0.016
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.017	0.017	0.016	0.017	0.017	0.016	0.016	0.017	0.017	0.017
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.017
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.017
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017

		121	122	123	124	125	126	127	128	129	130
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.018	0.018	0.017
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.017	0.016	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.017
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.017
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.016	0.017	0.017	0.017	0.018	0.017	0.016	0.018	0.017	0.017
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.016	0.017	0.017	0.017	0.018	0.017	0.016	0.018	0.017	0.017
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.016	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.017
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.016	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018	0.018
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.016	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018	0.018
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.016	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018	0.018
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.019	0.018	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018
57	KU309300.1 *Lerista storri* isolate LestA1	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.018
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.017
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.017
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.016	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017	0.017
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.016	0.016	0.017	0.016	0.017	0.016	0.015	0.018	0.017	0.017
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.017	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.017	0.017	0.017	0.017	0.015	0.017	0.017	0.017	0.016	0.017
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.017
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.017	0.017	0.017	0.017	0.015	0.017	0.017	0.017	0.016	0.017
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.017
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.016	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.017
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.017	0.017	0.017
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.017	0.017	0.017
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.016	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.016
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.016	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.016

		121	122	123	124	125	126	127	128	129	130
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.017	0.017
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.017	0.017
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.017	0.017
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.016	0.017	0.016	0.018	0.017	0.017	0.017	0.016	0.017	0.016
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.016	0.017	0.016	0.018	0.017	0.017	0.017	0.016	0.017	0.016
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.016	0.017	0.016	0.018	0.017	0.017	0.017	0.016	0.017	0.016
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.016	0.017	0.016	0.018	0.017	0.017	0.017	0.016	0.017	0.016
83	KU309273.1 *Lerista allanae* isolate Leal2	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
84	KU309272.1 *Lerista allanae* isolate Leal1	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.018
85	KF823006.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.019	0.018	0.017	0.018	0.018	0.017
86	KF823005.1 *Lerista kalumburu*	0.017	0.018	0.018	0.017	0.019	0.017	0.016	0.018	0.017	0.017
87	KF823007.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.019	0.018	0.017	0.018	0.017	0.017
88	KF823004.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.019	0.018	0.017	0.018	0.018	0.018
89	KF823003.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.019	0.018	0.018	0.018	0.018	0.018
90	KF823002.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.019	0.018	0.018	0.018	0.018	0.018
91	KF823001.1 *Lerista kalumburu*	0.018	0.019	0.018	0.018	0.019	0.018	0.018	0.018	0.018	0.018
92	KF823000.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.019	0.018	0.017	0.018	0.018	0.018
93	KF822999.1 *Lerista kalumburu*	0.017	0.018	0.018	0.017	0.019	0.018	0.017	0.018	0.017	0.018
94	KF822998.1 *Lerista kalumburu*	0.017	0.018	0.017	0.018	0.018	0.017	0.017	0.018	0.017	0.017
95	KF822997.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
96	EF673035.1 *Lerista zietzi*	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.017	0.016	0.016
97	EF673036.1 *Lerista zonulata*	0.013	0.017	0.017	0.016	0.017	0.017	0.016	0.017	0.017	0.018
98	EF673034.1 *Lerista yuna*	0.016	0.013	0.009	0.016	0.015	0.016	0.015	0.014	0.016	0.016
99	EF673033.1 *Lerista xanthura*	0.015	0.016	0.017	0.015	0.016	0.017	0.014	0.017	0.016	0.016
100	EF673032.1 *Lerista wilkinsi*	0.016	0.017	0.017	0.017	0.018	0.017	0.016	0.018	0.017	0.017
101	EF673031.1 *Lerista walkeri*	0.015	0.016	0.016	0.016	0.017	0.016	0.015	0.017	0.016	0.017
102	EF673030.1 *Lerista viduata*	0.016	0.016	0.016	0.017	0.016	0.017	0.016	0.016	0.016	0.018
103	EF673029.1 *Lerista vermicularis*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.013
104	EF673028.1 *Lerista varia*	0.016	0.015	0.014	0.016	0.016	0.017	0.015	0.011	0.017	0.016
105	EF673027.1 *Lerista uniduo*	0.017	0.014	0.015	0.017	0.016	0.016	0.017	0.015	0.017	0.017
106	EF673026.1 *Lerista tridactyla*	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.016	0.017	0.016
107	EF673025.1 *Lerista terdigitata*	0.017	0.016	0.016	0.017	0.017	0.017	0.015	0.017	0.016	0.016
108	EF673024.1 *Lerista taeniata*	0.016	0.016	0.016	0.016	0.017	0.017	0.015	0.017	0.017	0.017

		121	122	123	124	125	126	127	128	129	130
109	EF673023.1 *Lerista stylis*	0.017	0.018	0.018	0.018	0.018	0.017	0.017	0.018	0.018	0.018
110	EF673022.1 *Lerista stictopleura*	0.016	0.015	0.015	0.016	0.016	0.017	0.016	0.015	0.017	0.016
111	EF673021.1 *Lerista chordae*	0.017	0.018	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.017
112	EF673020.1 *Lerista speciosa*	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.017	0.016	0.017
113	EF673019.1 *Lerista simillima*	0.017	0.017	0.016	0.017	0.017	0.017	0.016	0.017	0.017	0.013
114	EF673018.1 *Lerista robusta*	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.011
115	EF673017.1 *Lerista puncticauda*	0.015	0.017	0.016	0.014	0.018	0.017	0.013	0.017	0.016	0.016
116	EF673016.1 *Lerista punctatovittata*	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.018	0.017	0.017
117	EF673015.1 *Lerista praepedita*	0.016	0.015	0.015	0.017	0.016	0.017	0.016	0.015	0.016	0.016
118	EF673014.1 *Lerista planiventralis*	0.017	0.018	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.018
119	EF673013.1 *Lerista picturata*	0.016	0.016	0.016	0.017	0.017	0.017	0.016	0.017	0.016	0.017
120	EF673012.1 *Lerista petersoni*	0.017	0.015	0.011	0.017	0.016	0.017	0.017	0.014	0.017	0.017
121	EF673011.1 *Lerista orientalis* NADH		0.016	0.017	0.015	0.017	0.017	0.015	0.017	0.017	0.017
122	EF673010.1 *Lerista onsloviana*	0.128		0.014	0.016	0.017	0.017	0.016	0.016	0.017	0.017
123	EF673009.1 *Lerista nichollsi*	0.130	0.092		0.017	0.016	0.016	0.017	0.014	0.016	0.017
124	EF673008.1 *Lerista neander*	0.109	0.126	0.140		0.018	0.018	0.012	0.017	0.017	0.017
125	EF673007.1 *Lerista muelleri*	0.140	0.133	0.121	0.150		0.017	0.017	0.016	0.017	0.018
126	EF673006.1 *Lerista microtis*	0.133	0.130	0.126	0.152	0.140		0.016	0.018	0.017	0.017
127	EF673005.1 *Lerista macropisthopus*	0.104	0.116	0.133	0.068	0.133	0.121		0.017	0.017	0.016
128	EF673004.1 *Lerista lineopunctulata*	0.143	0.116	0.089	0.130	0.128	0.162	0.130		0.018	0.017
129	EF673003.1 *Lerista lineata*	0.140	0.140	0.128	0.143	0.133	0.133	0.130	0.155		0.017
130	EF673002.1 *Lerista labialis*	0.143	0.133	0.130	0.138	0.155	0.145	0.126	0.145	0.130	
131	EF673001.1 *Lerista kennedyensis*	0.135	0.072	0.099	0.138	0.143	0.138	0.123	0.121	0.143	0.147
132	EF673000.1 *Lerista kendricki*	0.114	0.101	0.060	0.121	0.114	0.135	0.114	0.087	0.135	0.140
133	EF672999.1 *Lerista karlschmidti*	0.157	0.167	0.162	0.126	0.157	0.171	0.133	0.140	0.167	0.169
134	EF672998.1 *Lerista kalumburu*	0.162	0.169	0.171	0.159	0.169	0.171	0.157	0.164	0.169	0.155
135	EF672997.1 *Lerista ips*	0.145	0.143	0.140	0.135	0.150	0.145	0.128	0.143	0.130	0.070
136	EF672996.1 *Lerista ingrami*	0.085	0.155	0.147	0.116	0.150	0.150	0.111	0.130	0.140	0.157
137	EF672995.1 *Lerista humphriesi*	0.130	0.135	0.135	0.140	0.140	0.140	0.121	0.126	0.138	0.133
138	EF672994.1 *Lerista haroldi*	0.135	0.126	0.128	0.138	0.111	0.140	0.126	0.130	0.143	0.138
139	EF672993.1 *Lerista griffini*	0.140	0.143	0.135	0.157	0.143	0.157	0.130	0.152	0.126	0.123
140	EF672992.1 *Lerista greeri*	0.147	0.138	0.128	0.128	0.155	0.152	0.121	0.126	0.133	0.080
141	EF672991.1 *Lerista gerrardii*	0.092	0.123	0.138	0.082	0.143	0.140	0.046	0.130	0.130	0.128
142	EF672990.1 *Lerista gascoynensis*	0.114	0.089	0.043	0.130	0.109	0.123	0.121	0.085	0.118	0.130
143	EF672989.1 *Lerista frosti*	0.116	0.135	0.121	0.143	0.140	0.126	0.111	0.140	0.155	0.152
144	EF672988.1 *Lerista fragilis*	0.118	0.128	0.109	0.133	0.150	0.130	0.104	0.114	0.147	0.138

		121	122	123	124	125	126	127	128	129	130
145	EF672987.1 *Lerista flammicauda*	0.138	0.123	0.121	0.140	0.135	0.126	0.123	0.128	0.143	0.135
146	EF672986.1 *Lerista eupoda*	0.097	0.111	0.138	0.080	0.133	0.128	0.036	0.138	0.128	0.130
147	EF672985.1 *Lerista emmotti*	0.169	0.145	0.150	0.176	0.150	0.145	0.133	0.159	0.171	0.169
148	EF672984.1 *Lerista elongata*	0.128	0.121	0.114	0.123	0.135	0.130	0.101	0.128	0.133	0.118
149	EF672983.1 *Lerista elegans*	0.128	0.126	0.116	0.135	0.128	0.135	0.121	0.114	0.121	0.138
150	EF672982.1 *Lerista edwardsae*	0.140	0.145	0.130	0.130	0.143	0.126	0.121	0.140	0.133	0.143
151	EF672981.1 *Lerista dorsalis*	0.143	0.145	0.140	0.135	0.143	0.140	0.128	0.126	0.143	0.118
152	EF672980.1 *Lerista distinguenda*	0.121	0.133	0.126	0.123	0.143	0.130	0.121	0.128	0.123	0.147
153	EF672979.1 *Lerista desertorum*	0.104	0.130	0.128	0.080	0.155	0.138	0.075	0.118	0.133	0.130
154	EF672978.1 *Lerista connivens*	0.121	0.099	0.089	0.109	0.111	0.133	0.106	0.053	0.133	0.123
155	EF672977.1 *Lerista cinerea*	0.123	0.116	0.133	0.114	0.133	0.126	0.111	0.150	0.138	0.138
156	EF672976.1 *Lerista christinae*	0.152	0.133	0.128	0.150	0.133	0.140	0.140	0.133	0.126	0.126
157	EF672975.1 *Lerista carpentariae*	0.135	0.130	0.130	0.126	0.133	0.138	0.106	0.135	0.140	0.126
158	EF672974.1 *Lerista borealis*	0.121	0.138	0.114	0.114	0.118	0.114	0.106	0.109	0.140	0.133
159	EF672973.1 *Lerista bipes*	0.140	0.150	0.135	0.157	0.147	0.135	0.138	0.159	0.138	0.121
160	EF672972.1 *Lerista baynesi*	0.133	0.159	0.123	0.135	0.147	0.145	0.133	0.133	0.143	0.143
161	EF672971.1 *Lerista axillaris*	0.097	0.118	0.123	0.063	0.133	0.118	0.027	0.128	0.123	0.130
162	EF672970.1 *Lerista arenicola*	0.143	0.143	0.121	0.152	0.152	0.077	0.145	0.147	0.157	0.150
163	EF672969.1 *Lerista apoda*	0.138	0.152	0.145	0.145	0.133	0.123	0.133	0.143	0.147	0.143
164	EF672968.1 *Lerista ameles*	0.128	0.133	0.128	0.150	0.130	0.133	0.138	0.123	0.145	0.128
165	EF672967.1 *Lerista allochira*	0.140	0.116	0.109	0.135	0.118	0.140	0.126	0.114	0.126	0.128
166	EF672966.1 *Lerista aericeps*	0.104	0.121	0.114	0.104	0.133	0.143	0.092	0.121	0.147	0.128
167	DQ915332.1 *Lerista bougainvillii*	0.128	0.109	0.106	0.143	0.106	0.123	0.114	0.118	0.116	0.133
168	DQ915331.1 *Lerista bipes*	0.135	0.135	0.135	0.143	0.138	0.140	0.135	0.150	0.126	0.104
169	AY169666.1 *Lerista bipes* ND4	0.140	0.130	0.128	0.130	0.150	0.138	0.123	0.140	0.123	0.010
170	EU109216.1 *Lerista macropisthopus* ND4	0.118	0.128	0.145	0.089	0.152	0.140	0.089	0.123	0.123	0.138

		131	132	133	134	135	136	137	138	139	140
1	**PQ09** *L.separanda* WIN07P ND4	0.018	0.017	0.017	0.019	0.016	0.017	0.017	0.016	0.016	0.018
2	**PQ20** *L.separanda* 163965 ND4	0.018	0.017	0.017	0.019	0.017	0.017	0.017	0.016	0.016	0.018
3	**PQ21** *L.separanda* 163487 ND4	0.018	0.016	0.017	0.018	0.016	0.016	0.017	0.016	0.016	0.017
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.018	0.018	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.018
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.017	0.017	0.017	0.019	0.017	0.018	0.017	0.016	0.017	0.017
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.017	0.017	0.017	0.019	0.017	0.018	0.017	0.016	0.018	0.017
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.017	0.017	0.017	0.019	0.017	0.018	0.017	0.016	0.017	0.017
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.017	0.017	0.017	0.019	0.017	0.018	0.017	0.016	0.017	0.017
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.018	0.018	0.018	0.019	0.017	0.018	0.018	0.018	0.018	0.018
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.019	0.018	0.018	0.019	0.017	0.018	0.018	0.018	0.018	0.018
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.018	0.018	0.018	0.019	0.017	0.018	0.019	0.018	0.018	0.018
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.018	0.018	0.018	0.019	0.017	0.018	0.018	0.018	0.018	0.018
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.018	0.018	0.018	0.019	0.017	0.018	0.019	0.018	0.018	0.018
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.018	0.018	0.018	0.019	0.017	0.018	0.018	0.018	0.017	0.018
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.019	0.018	0.019	0.019	0.018	0.019	0.018	0.017	0.018	0.018
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.017	0.016	0.017	0.018	0.016	0.017	0.018	0.017	0.017	0.017
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.017	0.018	0.019	0.018	0.016	0.018	0.018	0.018	0.018	0.017
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.018	0.018	0.019	0.018	0.017	0.018	0.018	0.018	0.017	0.017
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.018	0.018	0.019	0.018	0.016	0.018	0.018	0.018	0.018	0.017
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.018	0.018	0.019	0.018	0.016	0.018	0.018	0.018	0.018	0.017
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.018	0.018	0.019	0.018	0.017	0.018	0.018	0.018	0.017	0.017
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.018	0.018	0.018	0.019	0.017	0.018	0.018	0.017	0.017	0.018
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.018	0.018	0.018	0.019	0.017	0.018	0.018	0.017	0.017	0.018
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.018	0.018	0.018	0.018	0.016	0.018	0.019	0.018	0.018	0.018
25	AY169667.1 *Lerista bougainvillii*	0.016	0.016	0.018	0.018	0.016	0.017	0.016	0.016	0.017	0.016
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.016	0.016	0.016
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.017	0.017	0.017	0.018	0.017	0.018	0.017	0.017	0.017	0.017
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.017	0.017	0.017	0.018	0.017	0.018	0.017	0.017	0.017	0.017
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.017	0.017	0.017	0.018	0.017	0.018	0.017	0.017	0.017	0.017
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.017	0.017	0.017	0.018	0.017	0.018	0.017	0.017	0.017	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.017	0.017	0.018	0.018	0.017	0.018	0.017	0.017	0.017	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.017	0.017	0.018	0.018	0.017	0.018	0.017	0.017	0.017	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.017	0.017	0.018	0.018	0.017	0.018	0.017	0.017	0.017	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.017	0.017	0.018	0.018	0.017	0.018	0.017	0.017	0.017	0.017

		131	132	133	134	135	136	137	138	139	140
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.017	0.017	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.018
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.017	0.017	0.017	0.018	0.016	0.017	0.018	0.017	0.017	0.018
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.017	0.017	0.016	0.018	0.016	0.017	0.018	0.017	0.017	0.018
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.017	0.017	0.017	0.018	0.016	0.017	0.017	0.017	0.017	0.018
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.018	0.017	0.017	0.018	0.016	0.017	0.017	0.017	0.018	0.018
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.017	0.017	0.016	0.018	0.017	0.017	0.017	0.017	0.018	0.018
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.018	0.017	0.017	0.018	0.017	0.017	0.018	0.018	0.018	0.018
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.018	0.017	0.017	0.018	0.017	0.017	0.018	0.018	0.018	0.018
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.018	0.017	0.017	0.018	0.017	0.017	0.018	0.018	0.018	0.018
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.019	0.019	0.019	0.020	0.018	0.019	0.018	0.017	0.018	0.018
57	KU309300.1 *Lerista storri* isolate LestA1	0.017	0.017	0.017	0.019	0.017	0.018	0.017	0.016	0.017	0.017
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.017	0.016	0.017	0.018	0.016	0.017	0.017	0.016	0.017	0.017
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.017	0.016	0.017	0.018	0.016	0.017	0.018	0.017	0.017	0.017
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.018	0.018	0.018	0.018	0.016	0.018	0.019	0.018	0.018	0.018
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.017	0.016	0.017	0.018	0.016	0.017	0.017	0.016	0.017	0.018
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.017	0.016	0.017	0.018	0.017	0.017	0.018	0.016	0.017	0.018
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.017	0.016	0.017	0.018	0.016	0.017	0.017	0.016	0.017	0.018
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.017	0.016	0.017	0.018	0.017	0.017	0.018	0.016	0.017	0.018
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.017	0.016	0.017	0.018	0.017	0.017	0.017	0.016	0.017	0.018
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.017	0.017	0.017	0.018	0.017	0.017	0.018	0.017	0.018	0.018
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.017	0.017	0.018	0.019	0.017	0.017	0.018	0.017	0.018	0.018
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.017	0.017	0.017	0.018	0.017	0.017	0.018	0.016	0.018	0.018
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.017	0.016	0.017	0.018	0.016	0.017	0.018	0.016	0.017	0.018
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.017	0.016	0.017	0.018	0.016	0.017	0.018	0.016	0.017	0.018

		131	132	133	134	135	136	137	138	139	140
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.017	0.017	0.018	0.019	0.017	0.017	0.018	0.017	0.018	0.018
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.017	0.017	0.018	0.019	0.017	0.017	0.018	0.017	0.018	0.018
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.017	0.017	0.018	0.019	0.017	0.017	0.018	0.017	0.018	0.018
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.017	0.017	0.018	0.019	0.017	0.017	0.018	0.017	0.018	0.018
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.017	0.017	0.018	0.019	0.017	0.017	0.018	0.017	0.018	0.018
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.017	0.017	0.018	0.019	0.017	0.017	0.018	0.017	0.018	0.018
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.017	0.016	0.017	0.018	0.016	0.018	0.017	0.017	0.017	0.017
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.017	0.016	0.017	0.018	0.016	0.018	0.017	0.017	0.017	0.017
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.017	0.016	0.017	0.018	0.016	0.018	0.017	0.017	0.017	0.017
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.017	0.016	0.017	0.018	0.016	0.018	0.017	0.017	0.017	0.017
83	KU309273.1 *Lerista allanae* isolate Leal2	0.017	0.017	0.018	0.018	0.016	0.018	0.018	0.018	0.017	0.018
84	KU309272.1 *Lerista allanae* isolate Leal1	0.017	0.017	0.018	0.018	0.017	0.018	0.018	0.018	0.017	0.018
85	KF823006.1 *Lerista kalumburu*	0.018	0.018	0.019	0.014	0.019	0.018	0.019	0.018	0.019	0.019
86	KF823005.1 *Lerista kalumburu*	0.018	0.017	0.018	0.013	0.018	0.017	0.018	0.018	0.019	0.018
87	KF823007.1 *Lerista kalumburu*	0.018	0.018	0.019	0.013	0.018	0.018	0.019	0.018	0.019	0.018
88	KF823004.1 *Lerista kalumburu*	0.018	0.018	0.018	0.013	0.019	0.018	0.019	0.018	0.019	0.018
89	KF823003.1 *Lerista kalumburu*	0.018	0.018	0.019	0.013	0.019	0.018	0.019	0.018	0.019	0.019
90	KF823002.1 *Lerista kalumburu*	0.019	0.018	0.018	0.013	0.019	0.018	0.019	0.018	0.019	0.019
91	KF823001.1 *Lerista kalumburu*	0.019	0.018	0.019	0.013	0.019	0.018	0.019	0.018	0.019	0.019
92	KF823000.1 *Lerista kalumburu*	0.018	0.018	0.018	0.014	0.019	0.018	0.019	0.018	0.019	0.019
93	KF822999.1 *Lerista kalumburu*	0.018	0.018	0.018	0.013	0.018	0.018	0.019	0.018	0.019	0.018
94	KF822998.1 *Lerista kalumburu*	0.018	0.017	0.018	0.014	0.018	0.017	0.019	0.018	0.018	0.018
95	KF822997.1 *Lerista kalumburu*	0.018	0.018	0.018	0.002	0.018	0.018	0.018	0.017	0.019	0.018
96	EF673035.1 *Lerista zietzi*	0.018	0.017	0.018	0.018	0.015	0.017	0.017	0.016	0.018	0.017
97	EF673036.1 *Lerista zonulata*	0.017	0.016	0.018	0.018	0.018	0.012	0.018	0.017	0.017	0.018
98	EF673034.1 *Lerista yuna*	0.014	0.010	0.018	0.018	0.017	0.017	0.016	0.016	0.016	0.016
99	EF673033.1 *Lerista xanthura*	0.017	0.016	0.016	0.018	0.016	0.016	0.016	0.016	0.017	0.017
100	EF673032.1 *Lerista wilkinsi*	0.018	0.017	0.017	0.018	0.016	0.017	0.017	0.017	0.018	0.018
101	EF673031.1 *Lerista walkeri*	0.017	0.016	0.017	0.018	0.017	0.016	0.017	0.016	0.016	0.017
102	EF673030.1 *Lerista viduata*	0.017	0.016	0.018	0.018	0.019	0.017	0.016	0.016	0.017	0.017
103	EF673029.1 *Lerista vermicularis*	0.017	0.017	0.019	0.018	0.014	0.018	0.017	0.016	0.017	0.014
104	EF673028.1 *Lerista varia*	0.016	0.013	0.017	0.018	0.017	0.016	0.015	0.015	0.017	0.015
105	EF673027.1 *Lerista uniduo*	0.015	0.015	0.018	0.017	0.017	0.017	0.016	0.016	0.018	0.017
106	EF673026.1 *Lerista tridactyla*	0.017	0.016	0.017	0.018	0.017	0.017	0.018	0.017	0.017	0.017
107	EF673025.1 *Lerista terdigitata*	0.017	0.016	0.017	0.018	0.017	0.017	0.018	0.017	0.017	0.017
108	EF673024.1 *Lerista taeniata*	0.016	0.017	0.017	0.019	0.017	0.015	0.017	0.017	0.017	0.017

		131	132	133	134	135	136	137	138	139	140
109	EF673023.1 *Lerista stylis*	0.018	0.018	0.017	0.019	0.018	0.018	0.019	0.017	0.018	0.018
110	EF673022.1 *Lerista stictopleura*	0.016	0.015	0.016	0.019	0.017	0.017	0.016	0.015	0.017	0.017
111	EF673021.1 *Lerista chordae*	0.018	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.018	0.018
112	EF673020.1 *Lerista speciosa*	0.017	0.016	0.018	0.018	0.016	0.018	0.018	0.017	0.017	0.017
113	EF673019.1 *Lerista simillima*	0.017	0.017	0.018	0.018	0.014	0.018	0.017	0.016	0.016	0.014
114	EF673018.1 *Lerista robusta*	0.018	0.017	0.018	0.018	0.013	0.018	0.016	0.016	0.016	0.013
115	EF673017.1 *Lerista puncticauda*	0.017	0.016	0.016	0.018	0.016	0.016	0.016	0.016	0.017	0.016
116	EF673016.1 *Lerista punctatovittata*	0.017	0.017	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.017
117	EF673015.1 *Lerista praepedita*	0.017	0.015	0.018	0.018	0.016	0.016	0.015	0.015	0.017	0.016
118	EF673014.1 *Lerista planiventralis*	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018
119	EF673013.1 *Lerista picturata*	0.017	0.016	0.018	0.018	0.017	0.017	0.017	0.016	0.016	0.017
120	EF673012.1 *Lerista petersoni*	0.016	0.013	0.018	0.018	0.017	0.017	0.017	0.016	0.017	0.016
121	EF673011.1 *Lerista orientalis* NADH	0.017	0.016	0.018	0.018	0.017	0.014	0.017	0.017	0.017	0.017
122	EF673010.1 *Lerista onsloviana*	0.013	0.015	0.018	0.018	0.017	0.018	0.017	0.016	0.017	0.017
123	EF673009.1 *Lerista nichollsi*	0.015	0.012	0.018	0.019	0.017	0.017	0.017	0.016	0.017	0.016
124	EF673008.1 *Lerista neander*	0.017	0.016	0.016	0.018	0.017	0.016	0.017	0.017	0.018	0.016
125	EF673007.1 *Lerista muelleri*	0.017	0.016	0.018	0.018	0.018	0.018	0.017	0.015	0.017	0.018
126	EF673006.1 *Lerista microtis*	0.017	0.017	0.019	0.019	0.017	0.018	0.017	0.017	0.018	0.018
127	EF673005.1 *Lerista macropisthopus*	0.016	0.016	0.017	0.018	0.016	0.015	0.016	0.016	0.017	0.016
128	EF673004.1 *Lerista lineopunctulata*	0.016	0.014	0.017	0.018	0.017	0.017	0.016	0.017	0.018	0.016
129	EF673003.1 *Lerista lineata*	0.017	0.017	0.018	0.018	0.017	0.017	0.017	0.017	0.016	0.017
130	EF673002.1 *Lerista labialis*	0.017	0.017	0.018	0.018	0.013	0.018	0.017	0.017	0.016	0.013
131	EF673001.1 *Lerista kennedyensis*		0.015	0.018	0.019	0.018	0.017	0.018	0.017	0.018	0.017
132	EF673000.1 *Lerista kendricki*	0.111		0.017	0.018	0.018	0.017	0.016	0.016	0.017	0.016
133	EF672999.1 *Lerista karlschmidti*	0.164	0.145		0.018	0.018	0.018	0.018	0.017	0.019	0.018
134	EF672998.1 *Lerista kalumburu*	0.171	0.157	0.167		0.018	0.018	0.019	0.018	0.019	0.018
135	EF672997.1 *Lerista ips*	0.155	0.152	0.159	0.159		0.018	0.018	0.017	0.016	0.015
136	EF672996.1 *Lerista ingrami*	0.145	0.145	0.150	0.159	0.157		0.017	0.018	0.017	0.018
137	EF672995.1 *Lerista humphriesi*	0.159	0.126	0.155	0.171	0.155	0.135		0.017	0.018	0.016
138	EF672994.1 *Lerista haroldi*	0.147	0.123	0.135	0.150	0.147	0.164	0.130		0.017	0.016
139	EF672993.1 *Lerista griffini*	0.159	0.130	0.181	0.188	0.118	0.147	0.150	0.140		0.016
140	EF672992.1 *Lerista greeri*	0.145	0.128	0.159	0.164	0.099	0.159	0.118	0.128	0.118	
141	EF672991.1 *Lerista gerrardii*	0.133	0.118	0.130	0.150	0.135	0.109	0.123	0.130	0.140	0.126
142	EF672990.1 *Lerista gascoynensis*	0.099	0.046	0.155	0.155	0.135	0.138	0.126	0.118	0.138	0.123
143	EF672989.1 *Lerista frosti*	0.152	0.133	0.155	0.162	0.150	0.130	0.126	0.130	0.150	0.147
144	EF672988.1 *Lerista fragilis*	0.118	0.116	0.152	0.155	0.155	0.118	0.143	0.138	0.152	0.152

		131	132	133	134	135	136	137	138	139	140
145	EF672987.1 *Lerista flammicauda*	0.128	0.126	0.152	0.150	0.140	0.140	0.130	0.118	0.143	0.138
146	EF672986.1 *Lerista eupoda*	0.123	0.121	0.133	0.150	0.135	0.104	0.140	0.128	0.145	0.138
147	EF672985.1 *Lerista emmotti*	0.157	0.155	0.179	0.191	0.152	0.181	0.174	0.150	0.164	0.157
148	EF672984.1 *Lerista elongata*	0.128	0.116	0.118	0.145	0.135	0.130	0.140	0.121	0.140	0.126
149	EF672983.1 *Lerista elegans*	0.130	0.128	0.138	0.159	0.128	0.135	0.150	0.130	0.162	0.150
150	EF672982.1 *Lerista edwardsae*	0.143	0.126	0.138	0.150	0.150	0.140	0.143	0.118	0.140	0.145
151	EF672981.1 *Lerista dorsalis*	0.152	0.130	0.155	0.150	0.130	0.145	0.118	0.123	0.143	0.126
152	EF672980.1 *Lerista distinguenda*	0.140	0.133	0.133	0.171	0.140	0.130	0.138	0.123	0.145	0.143
153	EF672979.1 *Lerista desertorum*	0.138	0.114	0.130	0.159	0.133	0.114	0.116	0.128	0.145	0.123
154	EF672978.1 *Lerista connivens*	0.123	0.082	0.128	0.152	0.126	0.121	0.101	0.104	0.133	0.101
155	EF672977.1 *Lerista cinerea*	0.130	0.123	0.145	0.162	0.126	0.140	0.155	0.130	0.135	0.145
156	EF672976.1 *Lerista christinae*	0.143	0.128	0.150	0.162	0.140	0.150	0.126	0.128	0.152	0.138
157	EF672975.1 *Lerista carpentariae*	0.143	0.128	0.116	0.162	0.130	0.155	0.135	0.101	0.145	0.114
158	EF672974.1 *Lerista borealis*	0.138	0.111	0.123	0.147	0.133	0.126	0.133	0.106	0.145	0.123
159	EF672973.1 *Lerista bipes*	0.171	0.147	0.176	0.174	0.118	0.164	0.145	0.138	0.123	0.121
160	EF672972.1 *Lerista baynesi*	0.159	0.126	0.150	0.164	0.145	0.140	0.147	0.155	0.143	0.135
161	EF672971.1 *Lerista axillaris*	0.133	0.101	0.123	0.147	0.133	0.109	0.116	0.116	0.128	0.116
162	EF672970.1 *Lerista arenicola*	0.162	0.133	0.171	0.167	0.152	0.159	0.159	0.143	0.169	0.162
163	EF672969.1 *Lerista apoda*	0.167	0.135	0.145	0.176	0.135	0.150	0.152	0.126	0.135	0.128
164	EF672968.1 *Lerista ameles*	0.145	0.116	0.145	0.169	0.123	0.150	0.140	0.130	0.135	0.130
165	EF672967.1 *Lerista allochira*	0.121	0.101	0.147	0.147	0.138	0.143	0.133	0.109	0.133	0.116
166	EF672966.1 *Lerista aericeps*	0.135	0.116	0.123	0.162	0.130	0.109	0.143	0.121	0.133	0.130
167	DQ915332.1 *Lerista bougainvillii*	0.116	0.111	0.150	0.150	0.138	0.123	0.133	0.116	0.138	0.135
168	DQ915331.1 *Lerista bipes*	0.155	0.135	0.157	0.159	0.111	0.150	0.140	0.123	0.118	0.118
169	AY169666.1 *Lerista bipes* ND4	0.145	0.138	0.162	0.159	0.068	0.152	0.133	0.133	0.121	0.080
170	EU109216.1 *Lerista macropisthopus* ND4	0.138	0.133	0.140	0.150	0.128	0.123	0.140	0.143	0.138	0.147

		141	142	143	144	145	146	147	148	149	150
1	**PQ09** *L.separanda* WIN07P ND4	0.016	0.017	0.016	0.017	0.017	0.016	0.018	0.017	0.016	0.017
2	**PQ20** *L.separanda* 163965 ND4	0.016	0.017	0.016	0.017	0.017	0.016	0.018	0.016	0.016	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.016	0.016	0.016	0.017	0.017	0.016	0.018	0.016	0.016	0.016
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.018	0.018	0.019	0.018	0.019	0.019	0.019	0.018	0.018	0.019
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.016	0.017	0.016	0.016	0.017	0.016	0.018	0.016	0.017	0.016
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.016	0.017	0.016	0.015	0.017	0.016	0.018	0.016	0.017	0.017
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.016	0.017	0.016	0.016	0.017	0.016	0.018	0.016	0.017	0.016
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.016	0.017	0.016	0.016	0.017	0.016	0.018	0.016	0.017	0.016
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.017	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.017
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.017	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.018
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.017	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.018
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.017	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.017
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.018	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.018
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.018	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.017	0.018
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.018	0.018	0.018
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.016	0.017	0.017	0.017	0.016	0.016	0.018	0.016	0.017	0.017
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.017	0.017	0.018	0.018	0.017	0.017	0.018	0.018	0.017	0.017
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.017	0.017	0.018	0.018	0.017	0.017	0.018	0.018	0.017	0.017
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.017	0.017	0.018	0.018	0.017	0.017	0.018	0.018	0.018	0.017
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.017	0.017	0.018	0.018	0.017	0.017	0.018	0.018	0.018	0.017
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.017	0.017	0.018	0.018	0.017	0.017	0.018	0.018	0.017	0.017
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.018	0.017	0.017
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.018	0.017	0.017
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.017	0.018	0.018	0.017	0.017	0.017	0.018	0.018	0.017	0.017
25	AY169667.1 *Lerista bougainvillii*	0.016	0.015	0.017	0.016	0.015	0.016	0.017	0.015	0.016	0.017
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.016	0.016	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.016
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.016	0.016	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.016
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.016	0.016	0.017	0.017	0.016	0.017	0.016	0.016	0.017	0.016
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.016
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.016
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.016	0.017	0.016
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016

		141	142	143	144	145	146	147	148	149	150
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.017	0.016	0.017	0.017	0.016	0.017	0.016	0.016	0.017	0.016
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.017	0.016	0.017	0.017	0.016	0.017	0.016	0.016	0.017	0.016
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.016
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.016
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.016
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.016
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.016
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.016
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.017	0.016	0.017	0.017	0.017	0.017	0.016	0.016	0.017	0.016
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.017	0.016	0.017	0.017	0.016	0.017	0.016	0.016	0.017	0.016
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.016	0.017	0.017	0.017	0.016	0.016	0.018	0.016	0.017	0.016
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.016	0.017	0.017	0.017	0.017	0.016	0.018	0.015	0.017	0.016
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.016	0.017	0.017	0.017	0.016	0.016	0.019	0.015	0.017	0.016
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.016	0.017	0.017	0.017	0.016	0.016	0.019	0.015	0.017	0.016
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.016	0.017	0.017	0.017	0.016	0.016	0.018	0.016	0.016	0.017
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.018	0.018	0.018
57	KU309300.1 *Lerista storri* isolate LestA1	0.016	0.017	0.016	0.016	0.017	0.016	0.018	0.016	0.017	0.016
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.016	0.016	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.016
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.016	0.016	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.016
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.016	0.016	0.017	0.016	0.016	0.016	0.018	0.016	0.017	0.017
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.016	0.017	0.017	0.016	0.016	0.015	0.018	0.016	0.017	0.017
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.017	0.018	0.018	0.017	0.017	0.017	0.018	0.018	0.017	0.017
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.017	0.016	0.017	0.017	0.016	0.017	0.018	0.017	0.016	0.016
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.017	0.016	0.017	0.017	0.016	0.017	0.018	0.017	0.016	0.016
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.017	0.016	0.017	0.017	0.016	0.017	0.018	0.017	0.016	0.016
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.017	0.016	0.017	0.017	0.016	0.017	0.018	0.017	0.016	0.016
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.017	0.016	0.017	0.017	0.016	0.017	0.018	0.016	0.016	0.016
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.017	0.017
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.017	0.017	0.017	0.017	0.016	0.017	0.018	0.017	0.017	0.016
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.017	0.016	0.017	0.017	0.016	0.017	0.018	0.016	0.017	0.016
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.017	0.016	0.017	0.017	0.016	0.017	0.018	0.016	0.017	0.016

		141	142	143	144	145	146	147	148	149	150
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.017	0.017
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.017	0.017	0.017
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.017	0.017	0.017
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.017	0.017
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.017	0.017	0.017
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.017	0.017	0.017
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.017	0.016	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.016
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.017	0.016	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.016
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.017	0.016	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.016
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.017	0.016	0.017	0.017	0.017	0.017	0.018	0.017	0.016	0.016
83	KU309273.1 *Lerista allanae* isolate Leal2	0.017	0.016	0.017	0.017	0.016	0.017	0.016	0.016	0.017	0.016
84	KU309272.1 *Lerista allanae* isolate Leal1	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
85	KF823006.1 *Lerista kalumburu*	0.017	0.018	0.017	0.017	0.017	0.017	0.019	0.017	0.017	0.018
86	KF823005.1 *Lerista kalumburu*	0.016	0.018	0.018	0.017	0.017	0.016	0.019	0.017	0.017	0.017
87	KF823007.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.017	0.017	0.020	0.018	0.017	0.018
88	KF823004.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.017	0.017	0.019	0.017	0.018	0.018
89	KF823003.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.017	0.017	0.019	0.018	0.018	0.018
90	KF823002.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.018	0.017	0.019	0.018	0.018	0.018
91	KF823001.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.018	0.017	0.019	0.018	0.018	0.018
92	KF823000.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.017	0.017	0.019	0.018	0.018	0.018
93	KF822999.1 *Lerista kalumburu*	0.016	0.018	0.018	0.017	0.017	0.017	0.019	0.017	0.017	0.017
94	KF822998.1 *Lerista kalumburu*	0.017	0.017	0.017	0.017	0.017	0.017	0.019	0.017	0.017	0.017
95	KF822997.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.017	0.017	0.019	0.017	0.018	0.017
96	EF673035.1 *Lerista zietzi*	0.016	0.015	0.017	0.017	0.014	0.016	0.017	0.016	0.016	0.017
97	EF673036.1 *Lerista zonulata*	0.016	0.016	0.016	0.016	0.017	0.015	0.019	0.016	0.017	0.017
98	EF673034.1 *Lerista yuna*	0.016	0.009	0.016	0.015	0.015	0.016	0.018	0.015	0.016	0.016
99	EF673033.1 *Lerista xanthura*	0.015	0.016	0.016	0.016	0.016	0.014	0.018	0.016	0.016	0.016
100	EF673032.1 *Lerista wilkinsi*	0.016	0.017	0.017	0.017	0.016	0.016	0.019	0.015	0.017	0.016
101	EF673031.1 *Lerista walkeri*	0.016	0.016	0.016	0.016	0.016	0.016	0.018	0.016	0.015	0.016
102	EF673030.1 *Lerista viduata*	0.016	0.016	0.017	0.016	0.017	0.016	0.018	0.017	0.016	0.017
103	EF673029.1 *Lerista vermicularis*	0.017	0.016	0.017	0.018	0.017	0.017	0.019	0.017	0.017	0.017
104	EF673028.1 *Lerista varia*	0.016	0.014	0.016	0.016	0.015	0.016	0.017	0.015	0.016	0.016
105	EF673027.1 *Lerista uniduo*	0.017	0.014	0.017	0.017	0.015	0.017	0.017	0.015	0.017	0.016
106	EF673026.1 *Lerista tridactyla*	0.016	0.016	0.017	0.017	0.016	0.016	0.018	0.010	0.017	0.016
107	EF673025.1 *Lerista terdigitata*	0.016	0.016	0.017	0.017	0.016	0.016	0.018	0.010	0.017	0.015
108	EF673024.1 *Lerista taeniata*	0.015	0.017	0.016	0.016	0.017	0.015	0.018	0.015	0.017	0.016

		141	142	143	144	145	146	147	148	149	150
109	EF673023.1 *Lerista stylis*	0.017	0.018	0.018	0.018	0.018	0.017	0.019	0.017	0.017	0.017
110	EF673022.1 *Lerista stictopleura*	0.016	0.015	0.017	0.017	0.016	0.015	0.017	0.015	0.015	0.016
111	EF673021.1 *Lerista chordae*	0.016	0.017	0.016	0.014	0.018	0.016	0.019	0.016	0.017	0.017
112	EF673020.1 *Lerista speciosa*	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.015	0.017	0.016
113	EF673019.1 *Lerista simillima*	0.016	0.016	0.017	0.017	0.016	0.017	0.018	0.017	0.017	0.017
114	EF673018.1 *Lerista robusta*	0.016	0.017	0.017	0.018	0.017	0.016	0.019	0.016	0.017	0.017
115	EF673017.1 *Lerista puncticauda*	0.014	0.016	0.017	0.016	0.016	0.014	0.018	0.016	0.015	0.016
116	EF673016.1 *Lerista punctatovittata*	0.017	0.017	0.017	0.018	0.016	0.015	0.014	0.016	0.016	0.017
117	EF673015.1 *Lerista praepedita*	0.016	0.014	0.016	0.016	0.015	0.016	0.017	0.017	0.015	0.017
118	EF673014.1 *Lerista planiventralis*	0.017	0.017	0.017	0.017	0.017	0.017	0.019	0.016	0.017	0.016
119	EF673013.1 *Lerista picturata*	0.016	0.016	0.016	0.017	0.016	0.016	0.018	0.016	0.016	0.012
120	EF673012.1 *Lerista petersoni*	0.017	0.011	0.016	0.016	0.016	0.017	0.018	0.015	0.016	0.016
121	EF673011.1 *Lerista orientalis* NADH	0.014	0.016	0.016	0.016	0.017	0.015	0.018	0.016	0.016	0.017
122	EF673010.1 *Lerista onsloviana*	0.016	0.014	0.017	0.016	0.016	0.015	0.017	0.016	0.016	0.017
123	EF673009.1 *Lerista nichollsi*	0.017	0.010	0.016	0.015	0.016	0.017	0.018	0.016	0.016	0.017
124	EF673008.1 *Lerista neander*	0.013	0.017	0.017	0.017	0.017	0.013	0.019	0.016	0.017	0.017
125	EF673007.1 *Lerista muelleri*	0.017	0.015	0.017	0.018	0.017	0.017	0.018	0.017	0.016	0.017
126	EF673006.1 *Lerista microtis*	0.017	0.016	0.016	0.017	0.016	0.016	0.017	0.017	0.017	0.016
127	EF673005.1 *Lerista macropisthopus*	0.010	0.016	0.015	0.015	0.016	0.009	0.017	0.015	0.016	0.016
128	EF673004.1 *Lerista lineopunctulata*	0.017	0.014	0.017	0.016	0.016	0.017	0.018	0.016	0.016	0.017
129	EF673003.1 *Lerista lineata*	0.017	0.016	0.018	0.017	0.017	0.016	0.019	0.017	0.016	0.017
130	EF673002.1 *Lerista labialis*	0.016	0.017	0.018	0.017	0.017	0.017	0.018	0.016	0.017	0.017
131	EF673001.1 *Lerista kennedyensis*	0.017	0.015	0.018	0.016	0.016	0.016	0.018	0.016	0.017	0.017
132	EF673000.1 *Lerista kendricki*	0.016	0.010	0.017	0.016	0.016	0.016	0.018	0.016	0.016	0.016
133	EF672999.1 *Lerista karlschmidti*	0.017	0.018	0.018	0.018	0.018	0.017	0.019	0.016	0.017	0.017
134	EF672998.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.018	0.018	0.019	0.017	0.018	0.018
135	EF672997.1 *Lerista ips*	0.017	0.017	0.018	0.018	0.017	0.017	0.018	0.017	0.016	0.018
136	EF672996.1 *Lerista ingrami*	0.015	0.017	0.017	0.016	0.017	0.015	0.019	0.017	0.017	0.017
137	EF672995.1 *Lerista humphriesi*	0.016	0.016	0.016	0.017	0.017	0.017	0.019	0.017	0.018	0.017
138	EF672994.1 *Lerista haroldi*	0.017	0.016	0.017	0.017	0.016	0.016	0.018	0.016	0.017	0.016
139	EF672993.1 *Lerista griffini*	0.017	0.017	0.018	0.018	0.017	0.017	0.018	0.017	0.018	0.017
140	EF672992.1 *Lerista greeri*	0.016	0.016	0.017	0.018	0.017	0.017	0.018	0.016	0.018	0.017
141	EF672991.1 *Lerista gerrardii*		0.016	0.016	0.015	0.017	0.010	0.018	0.015	0.017	0.017
142	EF672990.1 *Lerista gascoynensis*	0.121		0.016	0.015	0.016	0.016	0.017	0.015	0.015	0.017
143	EF672989.1 *Lerista frosti*	0.123	0.116		0.015	0.016	0.016	0.018	0.016	0.017	0.016
144	EF672988.1 *Lerista fragilis*	0.099	0.099	0.097		0.018	0.015	0.019	0.016	0.017	0.017

		141	142	143	144	145	146	147	148	149	150
145	EF672987.1 *Lerista flammicauda*	0.130	0.116	0.123	0.150		0.016	0.017	0.016	0.016	0.015
146	EF672986.1 *Lerista eupoda*	0.041	0.121	0.116	0.099	0.128		0.017	0.015	0.016	0.016
147	EF672985.1 *Lerista emmotti*	0.150	0.143	0.167	0.174	0.147	0.145		0.018	0.017	0.018
148	EF672984.1 *Lerista elongata*	0.106	0.109	0.123	0.116	0.121	0.097	0.150		0.017	0.015
149	EF672983.1 *Lerista elegans*	0.135	0.111	0.130	0.135	0.114	0.123	0.147	0.133		0.016
150	EF672982.1 *Lerista edwardsae*	0.130	0.135	0.118	0.130	0.109	0.128	0.155	0.111	0.118	
151	EF672981.1 *Lerista dorsalis*	0.138	0.140	0.143	0.150	0.116	0.138	0.152	0.116	0.121	0.118
152	EF672980.1 *Lerista distinguenda*	0.118	0.116	0.135	0.138	0.111	0.126	0.145	0.126	0.072	0.109
153	EF672979.1 *Lerista desertorum*	0.085	0.118	0.138	0.118	0.126	0.094	0.155	0.114	0.121	0.128
154	EF672978.1 *Lerista connivens*	0.118	0.082	0.118	0.123	0.099	0.114	0.143	0.109	0.109	0.126
155	EF672977.1 *Lerista cinerea*	0.118	0.133	0.138	0.128	0.128	0.111	0.164	0.126	0.138	0.135
156	EF672976.1 *Lerista christinae*	0.143	0.118	0.147	0.130	0.128	0.140	0.181	0.116	0.145	0.135
157	EF672975.1 *Lerista carpentariae*	0.118	0.121	0.130	0.130	0.126	0.116	0.152	0.104	0.126	0.128
158	EF672974.1 *Lerista borealis*	0.123	0.109	0.109	0.109	0.118	0.118	0.152	0.118	0.116	0.114
159	EF672973.1 *Lerista bipes*	0.138	0.140	0.147	0.147	0.140	0.145	0.179	0.143	0.143	0.138
160	EF672972.1 *Lerista baynesi*	0.133	0.128	0.130	0.126	0.147	0.135	0.164	0.121	0.140	0.075
161	EF672971.1 *Lerista axillaris*	0.043	0.116	0.109	0.104	0.123	0.041	0.145	0.106	0.123	0.114
162	EF672970.1 *Lerista arenicola*	0.155	0.128	0.140	0.157	0.128	0.143	0.171	0.145	0.135	0.140
163	EF672969.1 *Lerista apoda*	0.138	0.128	0.135	0.145	0.135	0.138	0.157	0.133	0.140	0.138
164	EF672968.1 *Lerista ameles*	0.130	0.126	0.133	0.133	0.133	0.135	0.159	0.130	0.128	0.123
165	EF672967.1 *Lerista allochira*	0.126	0.099	0.126	0.130	0.109	0.128	0.155	0.123	0.123	0.135
166	EF672966.1 *Lerista aericeps*	0.109	0.116	0.121	0.118	0.128	0.104	0.164	0.111	0.130	0.138
167	DQ915332.1 *Lerista bougainvillii*	0.106	0.097	0.138	0.123	0.106	0.104	0.143	0.106	0.114	0.128
168	DQ915331.1 *Lerista bipes*	0.126	0.138	0.150	0.140	0.133	0.128	0.171	0.126	0.128	0.140
169	AY169666.1 *Lerista bipes* ND4	0.121	0.128	0.145	0.140	0.128	0.126	0.169	0.116	0.130	0.133
170	EU109216.1 *Lerista macropisthopus* ND4	0.106	0.123	0.143	0.128	0.133	0.097	0.159	0.123	0.121	0.130

		151	152	153	154	155	156	157	158	159	160
1	**PQ09** *L.separanda* WIN07P ND4	0.016	0.016	0.015	0.016	0.017	0.018	0.017	0.015	0.018	0.018
2	**PQ20** *L.separanda* 163965 ND4	0.016	0.016	0.015	0.016	0.017	0.018	0.017	0.016	0.018	0.018
3	**PQ21** *L.separanda* 163487 ND4	0.016	0.016	0.015	0.015	0.017	0.018	0.016	0.015	0.018	0.017
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.017	0.019	0.018	0.018	0.019	0.018	0.018	0.018	0.019	0.018
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.017	0.016	0.016	0.016	0.015	0.017	0.016	0.017	0.017	0.017
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.018	0.016	0.017	0.016	0.014	0.017	0.016	0.017	0.017	0.017
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.017	0.016	0.016	0.016	0.015	0.017	0.016	0.017	0.017	0.017
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.017	0.016	0.016	0.016	0.015	0.017	0.016	0.017	0.017	0.017
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.018	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.018	0.018
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.018	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.018	0.018
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.018	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.018	0.018
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.018	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.018	0.018
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.018	0.017	0.017	0.017	0.016	0.018	0.017	0.017	0.018	0.018
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.018	0.017	0.017	0.017	0.015	0.018	0.017	0.017	0.018	0.018
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.018	0.018	0.018	0.017	0.016	0.018	0.017	0.017	0.018	0.019
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.017	0.016	0.017	0.016	0.005	0.017	0.015	0.016	0.016	0.017
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.018	0.018	0.017
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.018
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.017	0.018	0.017
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.017	0.018	0.017
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.018
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.018	0.017	0.017	0.017	0.015	0.017	0.016	0.017	0.018	0.018
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.018	0.017	0.017	0.017	0.015	0.018	0.016	0.017	0.018	0.018
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.017	0.017	0.017	0.018	0.018	0.018	0.017	0.017	0.018	0.018
25	AY169667.1 *Lerista bougainvillii*	0.015	0.016	0.016	0.015	0.016	0.016	0.016	0.016	0.017	0.017
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.016	0.016	0.016	0.016	0.017	0.016	0.017	0.016	0.017	0.017
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.016	0.016	0.016	0.016	0.017	0.017	0.017	0.016	0.017	0.017
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.015	0.016	0.016	0.016	0.017	0.017	0.017	0.016	0.017	0.017
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.016	0.016	0.016	0.016	0.017	0.017	0.017	0.017	0.018	0.017
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.018	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017

		151	152	153	154	155	156	157	158	159	160
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.016	0.018	0.017
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.016	0.018	0.017
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.016	0.017	0.017	0.017	0.018	0.016	0.017	0.017	0.018	0.017
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.016	0.017	0.017	0.017	0.018	0.016	0.017	0.017	0.018	0.017
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.016	0.017	0.017	0.017	0.018	0.017	0.017	0.016	0.018	0.017
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.016	0.017	0.017	0.017	0.018	0.016	0.017	0.017	0.018	0.017
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.016	0.017	0.017	0.017	0.018	0.016	0.017	0.017	0.018	0.017
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.016	0.017	0.017	0.017	0.018	0.016	0.017	0.017	0.018	0.017
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.016	0.017	0.017	0.017	0.018	0.016	0.017	0.017	0.018	0.017
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.016	0.018	0.017
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.016	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.017	0.016	0.016	0.017	0.014	0.017	0.016	0.016	0.016	0.016
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.017	0.016	0.016	0.017	0.014	0.017	0.016	0.016	0.016	0.016
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.017	0.016	0.017	0.017	0.015	0.016	0.016	0.017	0.016	0.016
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.017	0.016	0.017	0.017	0.015	0.016	0.016	0.017	0.017	0.016
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.017	0.015	0.016	0.016	0.014	0.017	0.016	0.016	0.017	0.016
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.017	0.016	0.017	0.017	0.014	0.017	0.016	0.017	0.018	0.017
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.017	0.016	0.017	0.017	0.014	0.017	0.016	0.017	0.018	0.017
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.017	0.016	0.017	0.017	0.014	0.017	0.016	0.017	0.018	0.017
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.018	0.018	0.018	0.017	0.016	0.018	0.017	0.017	0.018	0.019
57	KU309300.1 *Lerista storri* isolate LestA1	0.017	0.016	0.016	0.016	0.015	0.017	0.016	0.017	0.017	0.017
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.016	0.016	0.016	0.016	0.017	0.017	0.017	0.016	0.017	0.017
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.016	0.016	0.016	0.016	0.017	0.017	0.017	0.016	0.017	0.017
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.017	0.016	0.016	0.016	0.005	0.017	0.015	0.016	0.016	0.017
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.017	0.016	0.017	0.017	0.000	0.017	0.015	0.016	0.016	0.017
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.017	0.017	0.017	0.018	0.018	0.018	0.017	0.017	0.018	0.018
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.017	0.016	0.017	0.016	0.014	0.016	0.016	0.017	0.017	0.016
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.017	0.016	0.017	0.016	0.015	0.016	0.016	0.017	0.017	0.016
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.017	0.016	0.017	0.016	0.014	0.016	0.016	0.017	0.017	0.016
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.017	0.016	0.017	0.016	0.015	0.016	0.016	0.017	0.017	0.016
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.016	0.016	0.017	0.016	0.015	0.016	0.015	0.017	0.017	0.016
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.017	0.016	0.017	0.017	0.015	0.017	0.016	0.017	0.018	0.017
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.017	0.017	0.018	0.017	0.015	0.017	0.016	0.017	0.018	0.017
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.017	0.016	0.017	0.017	0.015	0.017	0.016	0.016	0.018	0.017
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.017	0.016	0.017	0.016	0.014	0.017	0.016	0.016	0.017	0.017
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.017	0.016	0.017	0.016	0.014	0.017	0.016	0.016	0.017	0.017

		151	152	153	154	155	156	157	158	159	160
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.017	0.017	0.017	0.017	0.015	0.017	0.016	0.017	0.018	0.017
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.017	0.017	0.017	0.017	0.015	0.017	0.016	0.017	0.018	0.017
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.017	0.017	0.017	0.017	0.015	0.017	0.016	0.017	0.018	0.017
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.017	0.017	0.017	0.017	0.015	0.017	0.016	0.017	0.018	0.017
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.017	0.017	0.017	0.017	0.015	0.017	0.016	0.017	0.018	0.017
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.017	0.017	0.017	0.017	0.015	0.017	0.016	0.017	0.018	0.017
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.017	0.017	0.017	0.016	0.015	0.017	0.016	0.016	0.016	0.017
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.017	0.017	0.017	0.016	0.015	0.017	0.016	0.016	0.016	0.017
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.017	0.017	0.017	0.016	0.015	0.017	0.016	0.016	0.016	0.017
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.017	0.017	0.017	0.016	0.015	0.017	0.016	0.016	0.016	0.017
83	KU309273.1 *Lerista allanae* isolate Leal2	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.016	0.018	0.017
84	KU309272.1 *Lerista allanae* isolate Leal1	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.017
85	KF823006.1 *Lerista kalumburu*	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.017	0.018	0.018
86	KF823005.1 *Lerista kalumburu*	0.017	0.018	0.017	0.017	0.017	0.018	0.018	0.017	0.018	0.017
87	KF823007.1 *Lerista kalumburu*	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.018	0.019	0.018
88	KF823004.1 *Lerista kalumburu*	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.017	0.018	0.018
89	KF823003.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.018	0.018
90	KF823002.1 *Lerista kalumburu*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
91	KF823001.1 *Lerista kalumburu*	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.019	0.018
92	KF823000.1 *Lerista kalumburu*	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.017	0.018	0.018
93	KF822999.1 *Lerista kalumburu*	0.018	0.018	0.017	0.017	0.017	0.018	0.018	0.017	0.018	0.018
94	KF822998.1 *Lerista kalumburu*	0.018	0.018	0.018	0.017	0.017	0.017	0.018	0.017	0.018	0.018
95	KF822997.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.019	0.018
96	EF673035.1 *Lerista zietzi*	0.017	0.015	0.017	0.015	0.016	0.016	0.016	0.016	0.016	0.018
97	EF673036.1 *Lerista zonulata*	0.018	0.016	0.016	0.017	0.017	0.018	0.017	0.017	0.018	0.018
98	EF673034.1 *Lerista yuna*	0.016	0.016	0.016	0.013	0.016	0.016	0.016	0.014	0.016	0.016
99	EF673033.1 *Lerista xanthura*	0.016	0.016	0.014	0.016	0.015	0.016	0.015	0.015	0.017	0.017
100	EF673032.1 *Lerista wilkinsi*	0.017	0.016	0.017	0.017	0.015	0.016	0.016	0.017	0.017	0.016
101	EF673031.1 *Lerista walkeri*	0.016	0.015	0.015	0.016	0.016	0.017	0.016	0.014	0.017	0.017
102	EF673030.1 *Lerista viduata*	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.017	0.019
103	EF673029.1 *Lerista vermicularis*	0.017	0.018	0.017	0.016	0.018	0.017	0.016	0.016	0.017	0.017
104	EF673028.1 *Lerista varia*	0.015	0.016	0.015	0.005	0.017	0.016	0.016	0.016	0.017	0.016
105	EF673027.1 *Lerista uniduo*	0.017	0.016	0.017	0.014	0.017	0.017	0.016	0.016	0.018	0.017
106	EF673026.1 *Lerista tridactyla*	0.016	0.017	0.016	0.016	0.017	0.016	0.016	0.017	0.017	0.017
107	EF673025.1 *Lerista terdigitata*	0.016	0.016	0.015	0.016	0.016	0.016	0.016	0.017	0.017	0.017
108	EF673024.1 *Lerista taeniata*	0.017	0.017	0.015	0.016	0.017	0.018	0.017	0.016	0.017	0.017

		151	152	153	154	155	156	157	158	159	160
109	EF673023.1 *Lerista stylis*	0.018	0.016	0.017	0.017	0.016	0.017	0.016	0.017	0.018	0.017
110	EF673022.1 *Lerista stictopleura*	0.016	0.016	0.015	0.014	0.016	0.015	0.015	0.016	0.018	0.017
111	EF673021.1 *Lerista chordae*	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.018	0.017
112	EF673020.1 *Lerista speciosa*	0.017	0.016	0.016	0.016	0.017	0.017	0.017	0.016	0.017	0.016
113	EF673019.1 *Lerista simillima*	0.016	0.017	0.017	0.015	0.017	0.017	0.016	0.016	0.016	0.017
114	EF673018.1 *Lerista robusta*	0.016	0.017	0.016	0.016	0.017	0.016	0.016	0.016	0.016	0.017
115	EF673017.1 *Lerista puncticauda*	0.016	0.015	0.007	0.015	0.017	0.017	0.016	0.015	0.017	0.017
116	EF673016.1 *Lerista punctatovittata*	0.017	0.017	0.017	0.016	0.017	0.018	0.017	0.017	0.019	0.017
117	EF673015.1 *Lerista praepedita*	0.016	0.015	0.016	0.014	0.016	0.016	0.016	0.016	0.016	0.017
118	EF673014.1 *Lerista planiventralis*	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.017	0.017	0.018
119	EF673013.1 *Lerista picturata*	0.016	0.016	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.015
120	EF673012.1 *Lerista petersoni*	0.017	0.016	0.017	0.014	0.016	0.016	0.016	0.016	0.017	0.017
121	EF673011.1 *Lerista orientalis* NADH	0.017	0.016	0.015	0.016	0.016	0.018	0.017	0.016	0.017	0.017
122	EF673010.1 *Lerista onsloviana*	0.017	0.017	0.017	0.015	0.016	0.017	0.017	0.017	0.018	0.018
123	EF673009.1 *Lerista nichollsi*	0.017	0.016	0.016	0.014	0.017	0.016	0.017	0.016	0.017	0.016
124	EF673008.1 *Lerista neander*	0.017	0.016	0.013	0.015	0.016	0.018	0.016	0.016	0.018	0.017
125	EF673007.1 *Lerista muelleri*	0.017	0.017	0.018	0.015	0.017	0.017	0.017	0.016	0.017	0.017
126	EF673006.1 *Lerista microtis*	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.016	0.017	0.017
127	EF673005.1 *Lerista macropisthopus*	0.016	0.016	0.013	0.015	0.015	0.017	0.015	0.015	0.017	0.017
128	EF673004.1 *Lerista lineopunctulata*	0.016	0.016	0.016	0.011	0.018	0.017	0.017	0.015	0.018	0.017
129	EF673003.1 *Lerista lineata*	0.017	0.016	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.017
130	EF673002.1 *Lerista labialis*	0.016	0.017	0.017	0.016	0.017	0.016	0.016	0.017	0.016	0.017
131	EF673001.1 *Lerista kennedyensis*	0.018	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.019	0.018
132	EF673000.1 *Lerista kendricki*	0.017	0.017	0.016	0.013	0.016	0.016	0.016	0.015	0.017	0.016
133	EF672999.1 *Lerista karlschmidti*	0.018	0.017	0.017	0.016	0.017	0.018	0.016	0.016	0.019	0.018
134	EF672998.1 *Lerista kalumburu*	0.018	0.019	0.018	0.018	0.018	0.018	0.018	0.017	0.019	0.018
135	EF672997.1 *Lerista ips*	0.017	0.017	0.017	0.016	0.016	0.017	0.017	0.017	0.016	0.017
136	EF672996.1 *Lerista ingrami*	0.017	0.017	0.016	0.016	0.017	0.018	0.018	0.016	0.018	0.017
137	EF672995.1 *Lerista humphriesi*	0.016	0.017	0.016	0.015	0.018	0.016	0.017	0.017	0.017	0.017
138	EF672994.1 *Lerista haroldi*	0.016	0.016	0.016	0.015	0.017	0.016	0.015	0.015	0.017	0.018
139	EF672993.1 *Lerista griffini*	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.016	0.017
140	EF672992.1 *Lerista greeri*	0.016	0.017	0.016	0.015	0.017	0.017	0.016	0.016	0.016	0.017
141	EF672991.1 *Lerista gerrardii*	0.017	0.016	0.014	0.016	0.016	0.017	0.016	0.016	0.017	0.017
142	EF672990.1 *Lerista gascoynensis*	0.017	0.016	0.016	0.013	0.017	0.016	0.016	0.015	0.017	0.016
143	EF672989.1 *Lerista frosti*	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.015	0.017	0.017
144	EF672988.1 *Lerista fragilis*	0.018	0.017	0.016	0.016	0.016	0.017	0.017	0.015	0.017	0.016

		151	152	153	154	155	156	157	158	159	160
145	EF672987.1 *Lerista flammicauda*	0.016	0.015	0.016	0.015	0.016	0.016	0.016	0.016	0.017	0.017
146	EF672986.1 *Lerista eupoda*	0.017	0.016	0.014	0.016	0.015	0.017	0.016	0.016	0.017	0.017
147	EF672985.1 *Lerista emmotti*	0.018	0.017	0.018	0.017	0.018	0.019	0.018	0.018	0.019	0.018
148	EF672984.1 *Lerista elongata*	0.016	0.016	0.016	0.015	0.016	0.016	0.015	0.016	0.017	0.016
149	EF672983.1 *Lerista elegans*	0.016	0.013	0.016	0.015	0.017	0.017	0.016	0.016	0.017	0.017
150	EF672982.1 *Lerista edwardsae*	0.016	0.015	0.016	0.016	0.017	0.017	0.016	0.016	0.017	0.013
151	EF672981.1 *Lerista dorsalis*		0.015	0.016	0.015	0.017	0.016	0.016	0.017	0.017	0.017
152	EF672980.1 *Lerista distinguenda*	0.104		0.015	0.016	0.016	0.017	0.015	0.016	0.017	0.017
153	EF672979.1 *Lerista desertorum*	0.118	0.104		0.015	0.017	0.017	0.016	0.015	0.017	0.017
154	EF672978.1 *Lerista connivens*	0.109	0.118	0.104		0.017	0.016	0.015	0.015	0.017	0.016
155	EF672977.1 *Lerista cinerea*	0.138	0.123	0.133	0.130		0.017	0.015	0.016	0.016	0.017
156	EF672976.1 *Lerista christinae*	0.123	0.138	0.140	0.121	0.138		0.016	0.017	0.017	0.017
157	EF672975.1 *Lerista carpentariae*	0.126	0.106	0.118	0.111	0.099	0.121		0.015	0.016	0.017
158	EF672974.1 *Lerista borealis*	0.130	0.118	0.109	0.104	0.121	0.133	0.104		0.017	0.017
159	EF672973.1 *Lerista bipes*	0.145	0.140	0.140	0.130	0.128	0.145	0.128	0.140		0.017
160	EF672972.1 *Lerista baynesi*	0.130	0.130	0.135	0.123	0.140	0.147	0.130	0.130	0.133	
161	EF672971.1 *Lerista axillaris*	0.130	0.123	0.072	0.099	0.114	0.140	0.109	0.099	0.135	0.140
162	EF672970.1 *Lerista arenicola*	0.155	0.147	0.152	0.128	0.155	0.155	0.157	0.121	0.155	0.155
163	EF672969.1 *Lerista apoda*	0.147	0.121	0.133	0.128	0.116	0.135	0.116	0.104	0.138	0.162
164	EF672968.1 *Lerista ameles*	0.138	0.135	0.138	0.118	0.101	0.140	0.118	0.126	0.128	0.130
165	EF672967.1 *Lerista allochira*	0.121	0.128	0.128	0.094	0.111	0.114	0.118	0.109	0.133	0.150
166	EF672966.1 *Lerista aericeps*	0.147	0.135	0.089	0.111	0.121	0.143	0.111	0.106	0.145	0.130
167	DQ915332.1 *Lerista bougainvillii*	0.116	0.114	0.116	0.109	0.130	0.116	0.121	0.118	0.138	0.135
168	DQ915331.1 *Lerista bipes*	0.133	0.133	0.135	0.126	0.135	0.143	0.135	0.126	0.058	0.126
169	AY169666.1 *Lerista bipes* ND4	0.116	0.140	0.128	0.121	0.130	0.126	0.118	0.126	0.114	0.140
170	EU109216.1 *Lerista macropisthopus* ND4	0.130	0.128	0.097	0.106	0.135	0.135	0.126	0.121	0.152	0.150

		161	162	163	164	165	166	167	168	169	170
1	**PQ09** *L.separanda* WIN07P ND4	0.015	0.018	0.017	0.017	0.016	0.015	0.017	0.017	0.017	0.016
2	**PQ20** *L.separanda* 163965 ND4	0.015	0.018	0.017	0.017	0.016	0.015	0.017	0.017	0.017	0.017
3	**PQ21** *L.separanda* 163487 ND4	0.015	0.018	0.017	0.017	0.016	0.015	0.017	0.017	0.017	0.016
4	KJ504860.1 *Ctenotus robustus* isolate ROBUA58575 voucher SAMAR48684	0.018	0.019	0.019	0.018	0.017	0.017	0.018	0.019	0.018	0.018
5	MH643584.1 *Lerista* sp. JWW-2018b voucher QMJ95806	0.016	0.018	0.016	0.014	0.016	0.017	0.016	0.017	0.017	0.017
6	MH643583.1 *Lerista* sp. JWW-2018b voucher QMJ95792	0.016	0.018	0.015	0.015	0.016	0.017	0.016	0.017	0.017	0.017
7	MH643582.1 *Lerista* sp. JWW-2018b voucher QMJ95787	0.016	0.018	0.016	0.014	0.016	0.017	0.016	0.017	0.017	0.017
8	MH643581.1 *Lerista* sp. JWW-2018b voucher QMJ95783	0.016	0.018	0.016	0.014	0.016	0.017	0.016	0.017	0.017	0.017
9	MH643579.1 *Lerista* sp. JWW-2018a voucher QMJ94337	0.017	0.019	0.017	0.016	0.017	0.017	0.018	0.017	0.017	0.017
10	MH643578.1 *Lerista* sp. JWW-2018a voucher QMJ94312	0.017	0.019	0.017	0.016	0.017	0.017	0.018	0.017	0.017	0.017
11	MH643577.1 *Lerista* sp. JWW-2018a voucher QMJ94309	0.017	0.019	0.017	0.016	0.017	0.017	0.018	0.017	0.017	0.017
12	MH643576.1 *Lerista* sp. JWW-2018a voucher QMJ94308	0.017	0.019	0.017	0.016	0.017	0.017	0.018	0.017	0.017	0.017
13	MH643575.1 *Lerista* sp. JWW-2018a voucher QMJ94306	0.017	0.019	0.017	0.016	0.018	0.017	0.018	0.017	0.017	0.017
14	MH643574.1 *Lerista* sp. JWW-2018a voucher QMJ95798	0.017	0.020	0.017	0.016	0.018	0.018	0.018	0.018	0.017	0.018
15	KU309302.1 *Lerista vanderduysi* isolate LevaB2	0.018	0.019	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.018
16	KU309297.1 *Lerista hobsoni* isolate LehoP1	0.016	0.018	0.015	0.015	0.015	0.016	0.016	0.017	0.017	0.017
17	MK140647.1 *Lerista anyara* voucher QMJ95773	0.017	0.019	0.018	0.017	0.017	0.018	0.018	0.017	0.017	0.018
18	MK140646.1 *Lerista anyara* voucher QMJ95666	0.017	0.019	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.018
19	MK140645.1 *Lerista anyara* voucher QMJ95663	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.018
20	MK140644.1 *Lerista anyara* voucher QMJ95659	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.018
21	MK140643.1 *Lerista anyara* voucher QMJ94490	0.017	0.019	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.018
22	MH643586.1 *Lerista storri* voucher QMJ94333	0.017	0.019	0.017	0.015	0.017	0.017	0.017	0.018	0.017	0.018
23	MH643585.1 *Lerista storri* voucher QMJ94325	0.018	0.019	0.017	0.015	0.017	0.017	0.017	0.018	0.017	0.018
24	MH643580.1 *Lerista colliveri* voucher QMJ95429	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017
25	AY169667.1 *Lerista bougainvillii*	0.016	0.017	0.017	0.016	0.015	0.016	0.010	0.016	0.016	0.017
26	MF589222.1 *Lerista rochfordensis* voucher QMJ93694	0.016	0.017	0.017	0.016	0.016	0.017	0.016	0.017	0.017	0.017
27	MF589221.1 *Lerista rochfordensis* voucher QMJ93693	0.016	0.017	0.017	0.015	0.016	0.017	0.016	0.017	0.017	0.017
28	MF589220.1 *Lerista rochfordensis* voucher QMJ93692	0.016	0.017	0.017	0.016	0.016	0.017	0.016	0.017	0.017	0.017
29	MF589219.1 *Lerista rochfordensis* voucher QMJ93704	0.016	0.017	0.018	0.016	0.016	0.017	0.017	0.017	0.017	0.017
30	MF589218.1 *Lerista rochfordensis* voucher QMJ93703	0.017	0.017	0.018	0.016	0.016	0.017	0.016	0.017	0.017	0.017
31	MF589217.1 *Lerista rochfordensis* voucher QMJ93702	0.017	0.017	0.018	0.016	0.016	0.017	0.016	0.017	0.017	0.017
32	MF589216.1 *Lerista rochfordensis* voucher QMJ93701	0.017	0.017	0.017	0.016	0.016	0.017	0.016	0.017	0.017	0.017
33	MF589215.1 *Lerista rochfordensis* voucher QMJ93700	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.018	0.017	0.017
34	MF589214.1 *Lerista rochfordensis* voucher QMJ93699	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.018	0.017	0.017
35	MF589213.1 *Lerista rochfordensis* voucher QMJ93698	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.018	0.017	0.017
36	MF589212.1 *Lerista rochfordensis* voucher QMJ93697	0.017	0.017	0.018	0.017	0.016	0.017	0.017	0.018	0.017	0.017

		161	162	163	164	165	166	167	168	169	170
37	MF959818.1 *Lerista allanae* isolate Leal.19	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
38	MF959817.1 *Lerista allanae* isolate Leal.18	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
39	MF959816.1 *Lerista allanae* isolate Leal.17	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
40	MF959815.1 *Lerista allanae* isolate Leal.16	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
41	MF959814.1 *Lerista allanae* isolate Leal.15	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.018	0.017	0.017
42	MF959813.1 *Lerista allanae* isolate Leal.14	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
43	MF959812.1 *Lerista allanae* isolate Leal.12	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
44	MF959811.1 *Lerista allanae* isolate Leal.11	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
45	MF959810.1 *Lerista allanae* isolate Leal.10	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
46	MF959809.1 *Lerista allanae* isolate Leal.8	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
47	MF959808.1 *Lerista allanae* isolate Leal.7	0.017	0.018	0.018	0.018	0.017	0.018	0.017	0.018	0.017	0.017
48	KU309310.1 *Lerista wilkinsi* isolate LewiTC4	0.016	0.017	0.017	0.015	0.016	0.016	0.016	0.016	0.017	0.017
49	KU309309.1 *Lerista wilkinsi* isolate LewiTC3	0.016	0.018	0.017	0.015	0.017	0.016	0.016	0.016	0.017	0.017
50	KU309308.1 *Lerista wilkinsi* isolate LewiTC2	0.016	0.018	0.017	0.016	0.017	0.016	0.016	0.016	0.017	0.017
51	KU309307.1 *Lerista wilkinsi* isolate LewiTC1	0.016	0.018	0.018	0.016	0.017	0.016	0.016	0.016	0.017	0.017
52	KU309306.1 *Lerista vittata* isolate LeviMC4	0.016	0.017	0.017	0.015	0.016	0.016	0.016	0.017	0.017	0.017
53	KU309305.1 *Lerista vittata* isolate LeviMC3	0.017	0.017	0.017	0.015	0.016	0.016	0.017	0.018	0.017	0.017
54	KU309304.1 *Lerista vittata* isolate LeviMC2	0.017	0.017	0.017	0.015	0.016	0.016	0.017	0.018	0.017	0.017
55	KU309303.1 *Lerista vittata* isolate LeviMC1	0.017	0.017	0.017	0.015	0.016	0.016	0.017	0.018	0.017	0.017
56	KU309301.1 *Lerista vanderduysi* isolate LevaB1	0.018	0.019	0.017	0.016	0.017	0.018	0.017	0.018	0.017	0.018
57	KU309300.1 *Lerista storri* isolate LestA1	0.016	0.018	0.016	0.014	0.016	0.017	0.016	0.017	0.017	0.017
58	KU309299.1 *Lerista rochfordensis* isolate Lero2	0.016	0.017	0.017	0.015	0.016	0.017	0.016	0.017	0.017	0.017
59	KU309298.1 *Lerista rochfordensis* isolate Lero1	0.016	0.017	0.017	0.015	0.016	0.017	0.016	0.017	0.017	0.017
60	KU309296.1 *Lerista hobsoni* isolate LehoLHS3	0.016	0.018	0.016	0.015	0.015	0.016	0.017	0.016	0.016	0.017
61	KU309295.1 *Lerista hobsoni* isolate LehoLHS2	0.016	0.018	0.016	0.015	0.015	0.016	0.017	0.017	0.017	0.017
62	KU309294.1 *Lerista colliveri* isolate Leco1	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017
63	KU309293.1 *Lerista cinerea* isolate LeciSS5	0.017	0.017	0.017	0.015	0.015	0.017	0.016	0.016	0.017	0.017
64	KU309292.1 *Lerista cinerea* isolate LeciSS4	0.017	0.018	0.017	0.015	0.015	0.017	0.016	0.017	0.017	0.017
65	KU309291.1 *Lerista cinerea* isolate LeciSS3	0.017	0.017	0.017	0.015	0.015	0.017	0.016	0.016	0.017	0.017
66	KU309290.1 *Lerista cinerea* isolate LeciSS2	0.017	0.018	0.017	0.015	0.015	0.017	0.016	0.017	0.017	0.017
67	KU309289.1 *Lerista cinerea* isolate LeciSS1	0.017	0.017	0.017	0.015	0.015	0.016	0.016	0.017	0.017	0.017
68	KU309288.1 *Lerista cinerea* isolate LeciRS3	0.017	0.018	0.017	0.015	0.016	0.017	0.016	0.017	0.017	0.018
69	KU309287.1 *Lerista cinerea* isolate LeciRS2	0.017	0.018	0.017	0.016	0.016	0.017	0.017	0.017	0.017	0.018
70	KU309286.1 *Lerista cinerea* isolate LeciRS1	0.017	0.018	0.017	0.015	0.016	0.017	0.016	0.017	0.017	0.018
71	KU309285.1 *Lerista cinerea* isolate LeciGD1	0.017	0.017	0.017	0.015	0.015	0.016	0.016	0.017	0.016	0.017
72	KU309284.1 *Lerista cinerea* isolate LeciBP1	0.017	0.017	0.017	0.015	0.015	0.016	0.016	0.017	0.016	0.017

		161	162	163	164	165	166	167	168	169	170
73	KU309283.1 *Lerista cinerea* isolate LeciW6	0.017	0.018	0.017	0.016	0.016	0.017	0.016	0.017	0.017	0.018
74	KU309282.1 *Lerista cinerea* isolate LeciW5	0.017	0.018	0.017	0.015	0.016	0.017	0.016	0.017	0.017	0.018
75	KU309281.1 *Lerista cinerea* isolate LeciW4	0.017	0.018	0.017	0.015	0.016	0.017	0.016	0.017	0.017	0.018
76	KU309280.1 *Lerista cinerea* isolate LeciW3	0.017	0.018	0.017	0.016	0.016	0.017	0.016	0.017	0.017	0.018
77	KU309279.1 *Lerista cinerea* isolate LeciW2	0.017	0.018	0.017	0.016	0.016	0.017	0.016	0.017	0.017	0.018
78	KU309278.1 *Lerista cinerea* isolate LeciW1	0.017	0.018	0.017	0.015	0.016	0.017	0.016	0.017	0.017	0.018
79	KU309277.1 *Lerista ameles* isolate LeamMS4	0.017	0.018	0.016	0.000	0.016	0.016	0.016	0.016	0.016	0.018
80	KU309276.1 *Lerista ameles* isolate LeamMS3	0.017	0.018	0.016	0.000	0.016	0.016	0.016	0.016	0.016	0.018
81	KU309275.1 *Lerista ameles* isolate LeamMS2	0.017	0.018	0.016	0.000	0.016	0.016	0.016	0.016	0.016	0.018
82	KU309274.1 *Lerista ameles* isolate LeamMS1	0.017	0.018	0.016	0.000	0.016	0.016	0.016	0.016	0.016	0.018
83	KU309273.1 *Lerista allanae* isolate Leal2	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
84	KU309272.1 *Lerista allanae* isolate Leal1	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.018	0.017	0.017
85	KF823006.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.018	0.018
86	KF823005.1 *Lerista kalumburu*	0.016	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
87	KF823007.1 *Lerista kalumburu*	0.017	0.019	0.019	0.018	0.018	0.018	0.018	0.017	0.018	0.017
88	KF823004.1 *Lerista kalumburu*	0.017	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.018	0.017
89	KF823003.1 *Lerista kalumburu*	0.017	0.019	0.018	0.018	0.017	0.018	0.018	0.017	0.018	0.018
90	KF823002.1 *Lerista kalumburu*	0.017	0.018	0.019	0.019	0.018	0.018	0.018	0.017	0.018	0.017
91	KF823001.1 *Lerista kalumburu*	0.017	0.018	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.017
92	KF823000.1 *Lerista kalumburu*	0.017	0.019	0.018	0.018	0.017	0.018	0.017	0.017	0.018	0.017
93	KF822999.1 *Lerista kalumburu*	0.016	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.018	0.017
94	KF822998.1 *Lerista kalumburu*	0.016	0.017	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
95	KF822997.1 *Lerista kalumburu*	0.017	0.018	0.019	0.018	0.017	0.018	0.017	0.018	0.018	0.017
96	EF673035.1 *Lerista zietzi*	0.016	0.017	0.017	0.016	0.016	0.017	0.015	0.017	0.015	0.017
97	EF673036.1 *Lerista zonulata*	0.016	0.018	0.017	0.018	0.017	0.015	0.016	0.018	0.018	0.016
98	EF673034.1 *Lerista yuna*	0.015	0.016	0.017	0.015	0.014	0.016	0.015	0.016	0.016	0.016
99	EF673033.1 *Lerista xanthura*	0.014	0.018	0.016	0.016	0.016	0.015	0.015	0.016	0.016	0.015
100	EF673032.1 *Lerista wilkinsi*	0.016	0.018	0.018	0.016	0.017	0.016	0.016	0.016	0.017	0.017
101	EF673031.1 *Lerista walkeri*	0.015	0.017	0.016	0.017	0.016	0.015	0.016	0.016	0.016	0.016
102	EF673030.1 *Lerista viduata*	0.015	0.018	0.018	0.017	0.015	0.017	0.015	0.017	0.017	0.017
103	EF673029.1 *Lerista vermicularis*	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.013	0.017
104	EF673028.1 *Lerista varia*	0.015	0.016	0.016	0.016	0.015	0.016	0.015	0.016	0.016	0.015
105	EF673027.1 *Lerista uniduo*	0.017	0.018	0.017	0.017	0.015	0.017	0.015	0.017	0.016	0.017
106	EF673026.1 *Lerista tridactyla*	0.016	0.018	0.017	0.017	0.017	0.016	0.015	0.017	0.016	0.016
107	EF673025.1 *Lerista terdigitata*	0.016	0.018	0.017	0.017	0.017	0.016	0.015	0.017	0.016	0.016
108	EF673024.1 *Lerista taeniata*	0.015	0.018	0.018	0.016	0.017	0.013	0.016	0.016	0.017	0.016

		161	162	163	164	165	166	167	168	169	170
109	EF673023.1 *Lerista stylis*	0.017	0.018	0.017	0.017	0.017	0.016	0.016	0.018	0.018	0.017
110	EF673022.1 *Lerista stictopleura*	0.015	0.017	0.017	0.016	0.015	0.016	0.014	0.017	0.016	0.017
111	EF673021.1 *Lerista chordae*	0.016	0.018	0.017	0.017	0.017	0.016	0.017	0.017	0.017	0.017
112	EF673020.1 *Lerista speciosa*	0.017	0.018	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.017
113	EF673019.1 *Lerista simillima*	0.016	0.017	0.017	0.016	0.016	0.017	0.016	0.016	0.012	0.017
114	EF673018.1 *Lerista robusta*	0.016	0.018	0.017	0.017	0.017	0.017	0.017	0.016	0.011	0.017
115	EF673017.1 *Lerista puncticauda*	0.013	0.018	0.016	0.017	0.017	0.014	0.016	0.017	0.016	0.015
116	EF673016.1 *Lerista punctatovittata*	0.016	0.017	0.018	0.018	0.017	0.018	0.017	0.017	0.017	0.016
117	EF673015.1 *Lerista praepedita*	0.016	0.017	0.016	0.015	0.015	0.016	0.014	0.016	0.016	0.017
118	EF673014.1 *Lerista planiventralis*	0.016	0.017	0.017	0.016	0.017	0.017	0.016	0.017	0.017	0.017
119	EF673013.1 *Lerista picturata*	0.016	0.017	0.017	0.016	0.016	0.017	0.016	0.017	0.017	0.016
120	EF673012.1 *Lerista petersoni*	0.017	0.016	0.017	0.017	0.015	0.016	0.015	0.017	0.017	0.017
121	EF673011.1 *Lerista orientalis* NADH	0.015	0.017	0.017	0.016	0.017	0.015	0.016	0.017	0.017	0.016
122	EF673010.1 *Lerista onsloviana*	0.016	0.017	0.018	0.017	0.016	0.016	0.015	0.017	0.017	0.016
123	EF673009.1 *Lerista nichollsi*	0.016	0.016	0.017	0.016	0.015	0.016	0.015	0.017	0.016	0.017
124	EF673008.1 *Lerista neander*	0.012	0.018	0.017	0.018	0.017	0.015	0.017	0.017	0.017	0.014
125	EF673007.1 *Lerista muelleri*	0.017	0.018	0.017	0.017	0.016	0.017	0.015	0.017	0.018	0.018
126	EF673006.1 *Lerista microtis*	0.016	0.013	0.016	0.017	0.017	0.017	0.016	0.017	0.017	0.017
127	EF673005.1 *Lerista macropisthopus*	0.008	0.017	0.017	0.017	0.016	0.014	0.016	0.017	0.016	0.014
128	EF673004.1 *Lerista lineopunctulata*	0.016	0.017	0.017	0.016	0.016	0.016	0.016	0.018	0.017	0.016
129	EF673003.1 *Lerista lineata*	0.016	0.018	0.017	0.017	0.016	0.017	0.016	0.016	0.016	0.016
130	EF673002.1 *Lerista labialis*	0.017	0.018	0.017	0.016	0.016	0.016	0.017	0.015	0.005	0.017
131	EF673001.1 *Lerista kennedyensis*	0.017	0.018	0.018	0.017	0.016	0.017	0.016	0.018	0.017	0.017
132	EF673000.1 *Lerista kendricki*	0.015	0.017	0.017	0.016	0.015	0.016	0.015	0.017	0.017	0.017
133	EF672999.1 *Lerista karlschmidti*	0.016	0.019	0.017	0.017	0.017	0.016	0.018	0.018	0.018	0.017
134	EF672998.1 *Lerista kalumburu*	0.017	0.018	0.019	0.018	0.017	0.018	0.018	0.018	0.018	0.018
135	EF672997.1 *Lerista ips*	0.017	0.018	0.017	0.016	0.017	0.017	0.017	0.015	0.012	0.016
136	EF672996.1 *Lerista ingrami*	0.015	0.018	0.018	0.018	0.017	0.015	0.016	0.018	0.018	0.016
137	EF672995.1 *Lerista humphriesi*	0.016	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017
138	EF672994.1 *Lerista haroldi*	0.016	0.017	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.017
139	EF672993.1 *Lerista griffini*	0.016	0.018	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.017
140	EF672992.1 *Lerista greeri*	0.016	0.018	0.016	0.017	0.016	0.017	0.017	0.016	0.013	0.017
141	EF672991.1 *Lerista gerrardii*	0.010	0.018	0.017	0.017	0.016	0.015	0.015	0.016	0.016	0.015
142	EF672990.1 *Lerista gascoynensis*	0.016	0.016	0.016	0.016	0.015	0.016	0.015	0.017	0.016	0.016
143	EF672989.1 *Lerista frosti*	0.015	0.017	0.017	0.017	0.016	0.016	0.017	0.018	0.017	0.017
144	EF672988.1 *Lerista fragilis*	0.015	0.018	0.017	0.017	0.017	0.016	0.016	0.017	0.017	0.016

		161	162	163	164	165	166	167	168	169	170
145	EF672987.1 *Lerista flammicauda*	0.016	0.016	0.017	0.017	0.015	0.016	0.015	0.017	0.016	0.017
146	EF672986.1 *Lerista eupoda*	0.010	0.017	0.017	0.017	0.016	0.015	0.015	0.016	0.016	0.015
147	EF672985.1 *Lerista emmotti*	0.017	0.019	0.018	0.018	0.018	0.018	0.017	0.019	0.018	0.018
148	EF672984.1 *Lerista elongata*	0.015	0.017	0.017	0.017	0.016	0.015	0.015	0.016	0.016	0.016
149	EF672983.1 *Lerista elegans*	0.016	0.017	0.017	0.016	0.016	0.017	0.016	0.016	0.017	0.016
150	EF672982.1 *Lerista edwardsae*	0.016	0.017	0.017	0.016	0.017	0.017	0.016	0.017	0.017	0.017
151	EF672981.1 *Lerista dorsalis*	0.017	0.018	0.017	0.017	0.016	0.017	0.016	0.017	0.016	0.017
152	EF672980.1 *Lerista distinguenda*	0.016	0.017	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.016
153	EF672979.1 *Lerista desertorum*	0.013	0.018	0.017	0.017	0.016	0.014	0.016	0.017	0.016	0.015
154	EF672978.1 *Lerista connivens*	0.015	0.016	0.016	0.016	0.014	0.015	0.015	0.016	0.016	0.015
155	EF672977.1 *Lerista cinerea*	0.016	0.018	0.016	0.015	0.015	0.016	0.017	0.017	0.017	0.017
156	EF672976.1 *Lerista christinae*	0.017	0.018	0.017	0.017	0.016	0.017	0.016	0.017	0.016	0.017
157	EF672975.1 *Lerista carpentariae*	0.015	0.018	0.016	0.016	0.016	0.015	0.016	0.017	0.016	0.016
158	EF672974.1 *Lerista borealis*	0.015	0.016	0.015	0.016	0.015	0.015	0.016	0.016	0.016	0.016
159	EF672973.1 *Lerista bipes*	0.017	0.018	0.017	0.016	0.017	0.017	0.017	0.011	0.016	0.018
160	EF672972.1 *Lerista baynesi*	0.017	0.018	0.018	0.017	0.018	0.017	0.017	0.016	0.017	0.018
161	EF672971.1 *Lerista axillaris*		0.017	0.017	0.017	0.016	0.014	0.016	0.016	0.016	0.014
162	EF672970.1 *Lerista arenicola*	0.135		0.018	0.018	0.017	0.017	0.016	0.018	0.017	0.018
163	EF672969.1 *Lerista apoda*	0.130	0.152		0.016	0.016	0.017	0.017	0.017	0.017	0.018
164	EF672968.1 *Lerista ameles*	0.130	0.150	0.118		0.016	0.016	0.016	0.016	0.016	0.018
165	EF672967.1 *Lerista allochira*	0.121	0.147	0.123	0.121		0.016	0.015	0.016	0.016	0.017
166	EF672966.1 *Lerista aericeps*	0.089	0.145	0.140	0.128	0.121		0.016	0.017	0.016	0.016
167	DQ915332.1 *Lerista bougainvillii*	0.116	0.128	0.133	0.118	0.099	0.116		0.016	0.016	0.017
168	DQ915331.1 *Lerista bipes*	0.128	0.159	0.133	0.123	0.123	0.135	0.128		0.015	0.017
169	AY169666.1 *Lerista bipes* ND4	0.123	0.143	0.135	0.121	0.123	0.126	0.128	0.099		0.017
170	EU109216.1 *Lerista macropisthopus* ND4	0.085	0.152	0.150	0.150	0.138	0.118	0.133	0.138	0.130	

Appendix 7

Helix Molecular Solutions SRE Report for the Winu Project Area

Helix
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18 July 2019

Penny Brooshooft
Senior Zoologist
Biota Environmental Sciences Pty Ltd
Level 1, 228 Carr Place
Leederville WA 6007

Re. Helix Job 577 - Report on the molecular systematics of the mygalomorph and scorpion specimens from Winu.

Dear Penny,

Following is a summary of the results of the invertebrate molecular investigation we have completed for the Winu Fauna survey. We detected six species of mygalomorphae, none of which have been previously detected, as well as four species of scorpion, all of which have been previously detected based on the material available for comparison. Two spider specimens provided ambiguous results, and require further investigation. One species of scorpion detected may represent more than a single taxon and requires further investigation for taxonomic resolution. Results suggest that amongst the twenty-one successfully sequenced spider specimens, one belonged to a previously unrecorded species of *Idiommata* (family Barychelidae), fifteen specimens belong to a distinct previously unrecorded species of *Kwonkan* (family Nemesiidae), one belongs to a distinct species of Nemesiidae not previously recorded, however statistical support for the phylogenetic placement of this specimen was low so we are unable to assign it to a genus with the data available, three specimens belong to three distinct species of *Aname* (family Nemsiidae) none of which have been previously recorded. Results indicated that one specimen did not belong to the mygalomorphae, instead the family placement remains uncertain, beyond the identification that it is an Araneomorphae. We were unable to obtain a good quality sequence from one specimen, and therefore the placement of this suspected nemesiid specimen remains unresolved. Amongst the eight scorpion specimens, four are thought to belong to the widely distributed species *Lychas annulatus* (family Buthidae), although they are spread between two highly divergent clades that require further taxonomic resolution. The remaining four scorpion specimens belong to three distinct species of *Urodacus* (family Urodacidae).

Thanks once again for collaborating on this project with Helix. We hope we can continue to provide you with useful information, and feel free to contact us if you have any questions or would like to discuss the results in detail.

Sincerely,

Dr. Zoë Hamilton, Dr. Terrie Finston and Yvette Hitchen
Helix Molecular Solutions

Background and Objective

The infraorder of Arachnida, Mygalmomorphae, includes trapdoor spiders and their kin, and they are frequently identified as short-range endemics (SREs)(e.g. Harvey *et al*., 2011; Castalanelli *et al*., 2014). Identification of species has traditionally been performed using morphological techniques, however, only males can be used in identification, as both females and juveniles lack the diagnostic characters used in identification, and furthermore there is a large backlog of undescribed taxa. DNA barcoding with the use of *COI* mtDNA has become a rapid, objective method aiding mygalomorph species identifications and their distributions, and is recognised as providing important information that regulatory authorities can use to assess environmental impacts of large-scale developments (Harvey *et al*., 2008; Environmental Protection Authority, 2009; Castalanelli *et al*., 2014). Extensive molecular work has been conducted on the trap-door spider fauna of Western Australia (Helix, 2009a &b, 2010, 2011a - l, 2012a - i, 2013a & b, 2014a - d, 2015a – e, 2018, 2019). The resulting dataset provides a molecular framework that can be used to provide regional context for localised sampling.

Twenty-two specimens of invertebrate fauna belonging to two families of mygalomorph spiders (Araneae: Mygalomorphae: (Barychelidae and Nemesiidae), and eight specimens belonging to two scorpion families (Scorpionida: Buthidae & Urodacidae) from the Winu survey area in the Little Sandy Desert were sequenced for variation at the mitochondrial cytochrome oxidase subunit I gene (*COI*). The twenty-nine successful resulting molecular sequences were then assessed to determine the number of taxa present and compare these results to those sequences publically available on GenBank, as well as those already in Helix's database for context.

Executive summary

- Twenty-two specimens of mygalomorph spiders from the Winu survey area were sequenced and assessed for variation at the *COI* mtDNA gene. The molecular data were then placed within an existing molecular taxonomic framework for each family, using *COI* mtDNA sequences from GenBank, and mygalomorph *COI* sequences in the Helix database;
- Eight scorpion (Scorpionida) specimens belonging to two families (Buthidae and Urodacidae) from the Winu survey area, in the Little Sandy Desert were sequenced and assessed for variation at the *COI* mtDNA gene. The molecular data were then placed within an existing molecular taxonomic framework for each family, using *COI* mtDNA scorpions sequences from GenBank, and *COI* sequences in the Helix database;
- Three families (Barychelidae, Nemesiidae, and family uncertain) were amongst the twenty-one successfully sequenced spider specimens. Two of these families (Barychelidae & Nemesiidae) were mygalomrphae. Thirteen haplotypes were amongst the twenty successfully sequenced mygalomorphae specimens, with three haplotype shared amongst eleven individuals;
- Two divergent clades of buthid (Buthidae) scorpions were recorded amongst the four specimens. Both clades are currently recognised as *Lychas annulatus*, however we suspect more than a single taxon may exist, due to the observed patterns of phylogenetic structuring over geographical distances;
- Three species (Urodacidae) of *Urodacus* were amongst the four specimens, with one haplotype shared between two specimens.

Methods

Twenty-two spider specimens from eight sampling locations (Table 1) were sequenced for variation at the cytochrome oxidase subunit I gene (*COI*) using primers LCOI & HCO2 (Folmer *et al*., 1994). For fifteen of these specimens, these universal COI primers failed to amplify a DNA fragment, therefore specially-designed primers (NF1& NR1) from Y. Hitchen (unpublished data) were used. The resulting twenty mygalomorph sequences comprised twelve haplotypes (Table 2).

Eight scorpion specimens from six sampling locations (Table 1) from two families (Buthidae and Urodacidae) were sequenced for variation at the cytochrome oxidase subunit I gene (*COI*) using primers LCOI & HCO2 (Folmer *et al*., 1994). The eight scorpion sequences comprised six haplotypes (Table 2).

The sequences from the total twenty-nine successfully sequenced invertebrate individuals (*COI*) were edited using Geneious version 6.1.8 software (https://www.geneious.com) performed within MEGA version 5.05 (Tamura *et al*., 2011) using the built-in alignment tool using CLUSTAL W (Thompson *et al*., 1994) using default parameters. DNA nucleotide sequences were translated into protein sequences to ensure that the amplified sequences corresponded to the target mtDNA. The translated protein sequences were then checked for the presence of stop codons, to ensure that pseudogenes hadn't been amplified. Pseudogenes have a DNA sequence that is similar to the functional gene (e.g. *COI*) however, they do not code for a functioning protein despite the shared ancestry with the functional gene. The presence of pseudogenes can complicate molecular analyses, producing odd results. DNA sequences were translated into proteins with ExPASy using the invertebrate genetic code. All sequences analysed were of high quality with no evidence of heterogeneous peaks. All resulting sequences were 'BLAST'ed (Basic Local Alignment Search Tool) with the NCBI (National Centre for Biotechnology Information). This program compares DNA nucleotide sequences with a library of sequences and identifies sequences within the database that resemble the query sequences above a certain threshold. Genetic distances between unique genetic sequences (haplotypes) were measured using uncorrected p-distances (total percentage of nucleotides different between sequences). To account for polymorphism within lineages, the net genetic diversity of Nei (1987) was calculated to give a 'corrected' distance between lineages.

For phylogenetic analysis, likelihood ratio tests using the Bayesian Information Criterion were calculated in MEGA 7.0 (Kumar *et al*., 2016) to determine the best-fit model of evolution. The phylogenetic analyses were calculated in MEGA 7.0 (Kumar *et al*., 2016) using maximum likelihood (ML) with 1000 bootstrap replicates, based on the genetic distances with the best-fit model of evolution calculated for each family. The tree was rooted using two outgroups, *Centruroides vittatus* (EU404114), and *Mesobuthus martensii* (JF700146) obtained from GenBank.

For the Barychelidae, the best model of evolution was the General Time Reversible model with gamma distribution (GTR+G), with the parameter for gamma distribution of 0.24. For the Nemesiidae, the best model of evolution was the General Time Reversible model with gamma distribution and invariant sites (GTR+G+I), with the parameter for gamma distribution of 0.71.

For both scorpion families (Buthidae and Urodacidae), the best model of evolution was the General Time Reversible model with gamma distribution and invariant sites (GTR+G+I). For the Buthidae the parameter for gamma distribution was 0.93, for the Urodacidae the parameter for the gamma distribution was 0.87.

The phylogenetic analysis were performed separately for each family, and included the representative haplotypes for the eight specimens from the survey area, as well as a total of seventy-five reference specimens obtained from both Helix's and from GenBank (Appendix 1).

For the Nemesiidae a reduced dataset was secondarily analysed for simplification of the phylogenetic tree, due to the large number of samples examined. However, the full dataset was examined for relationships to reference specimens.

Results

Mygalomorphae – family Barychelidae

The single barychelid specimen from Winu was analysed along with twelve reference specimens from the Helix database (n=6) and GenBank (n=6). Based on phylogenetic analyses, the barychelid Winu specimen does not show affinity to any previously sequenced specimens available for comparison (Table 3). According to molecular data the Winu barychelid represents a previously unrecorded species *Idiommata* sp BBT_B39 (Figure 1).

Phylogenetic Analyses

A 686 base-pair (bp) fragment of *COI* was isolated for the single barychelid specimen from Winu.

Differentiation within and between lineages

The Winu specimen showed 7.7 % sequence divergence from the nearest relative, BBS_B38_OY27, an *Idiommata* from the Helix database collected 60km SW of Onslow.

Mygalomorphae – family Nemesiidae

The nineteen nemesiid specimens from Winu were analysed along with one hundred and ten reference specimens from the Helix database (n=62) and GenBank (n=48). Amongst the nineteen nemesiid Winu specimens, fifteen individuals (Table 4) belong to the newly recorded species *Kwonkan* sp NSD_N151 (Figure 2), one specimen (PC15) belongs to the newly recorded species Genus? sp NRC_N150. The remaining three specimens each represent a new distinct *Aname* species, not previously recorded. One specimen (PC18) belongs to the newly recorded species *Aname* sp NRZ_N147, another (PC16) to the new species *Aname* sp. NSA_N148, and the last specimen (PC26) to the new species *Aname* sp NSB_N149. Amongst the nineteen nemesiid specimens from Winu, eleven haplotypes existed, one haplotype (PC28) was shared amongst six individuals, another (PC29) was shared amongst three individuals, and one (PC12) was shared between two individuals.

Phylogenetic Analyses

A 686 base-pair (bp) fragment of *COI* was isolated for the three of the nemesiid specimens from Winu. For the remaining sixteen specimens, a 422 bp fragment of COI was isolated and analysed, the result of using the specially-designed primers (NF1& NR1) from Y. Hitchen (unpublished data).

Differentiation within and between lineages

The species *Kwonkan* sp NSD_N151 (n=14) (table 4) showed up to 2.5 % intraspecific variation amongst individuals. The closest relative to the species, based on genetic distance, was a specimen from GenBank (KJ45281.1) that showed 11.0 % sequence divergence from the Winu *Kwonkan* sp NSD_N151 (Table 4).

The species Genus ? sp. NRC_N150 (n= 1; PC15) was represented by a single specimen and hence showed no intraspecific sequence divergence. The closest relative, based on genetic distance, to this newly recorded species was also collected from Winu (*Kwonkan* sp NSD_N151) with 12.3 % sequence divergence (Table 4). The phylogenetic placement of this specimen (PC15), even to genus level, is unresolved due to the poor diagnostic support (bootstrap support on tree nodes, Figure 2). Despite the poor resolution, it still did not align with more than 1000 references specimens of Nemesiidae in the Helix database, nor any of the nemesiids on GenBank, and is therefore likely to represent a new taxon. Further resolution may be possible with additional genes.

The newly recorded species *Aname* sp NRZ_N147, (n=1; PC18) was also represented by a single specimen and hence showed no intraspecific sequence divergence. The closest relative, based on genetic distance, showed 13.7 % sequence divergence and was a specimen from the Helix database (NCU_N110_O211) collected 21 km E of Caiguna (Table 4).

The newly recorded species *Aname* sp NSA_N148, (n=1; PC16) was also represented by a single specimen and hence showed no intraspecific sequence divergence. The closest relative, based on genetic distance, was the Winu species *Aname* sp NSB_N149 with 8.2 % sequence divergence (Table 4). It also showed 8.5 % sequence divergence from an *Aname* specimen obtained from GenBank (KJ745288.1) also registered at the WA Museum (T82304) (Table 4).

The newly recorded species *Aname* sp NSB_N149 (n=1; PC26), was also represented by a single specimen and hence there was no intraspecific sequence divergence. The closest relatives, based on genetic distance, showed 8.2 % sequence divergence was the species *Aname* sp. NSA_N148 (Table 4). It showed 9.9 % sequence divergence from a species of *Aname* from the Helix database (NAZ_N6_AD457) collected 5.5 km W of Cossack (Table 4). The three closest GenBank specimens, based on genetic distance and phylogenetic relationships, were all species of *Aname* (KJ745494 (WAM T98900) at 10.7%, KJ745231 (WAM T74238) at 11.0 % and KJ45288 (WAM T82304) at 11.2 % divergence).

Family undetermined

A single specimen (PC11), submitted to Helix as an individual of Nemesiidae, did not align with other mygalmorphae specimens in the Helix and GenBank databse. Instead a 'megablast' search places it within the Araneomorphae. Their family assignment is unresolved as numerous identity assignments were found including the families Deinopidae, and Mesysmaucheniidae, (Appendix 2).

Scorpionida – family Buthidae

Over 40 scorpion species described in Australia are traditionally organized into four families: Buthidae, Bothriuridae, Urodacidae and Homuridae (Luna-Ramirez et al., 2017).

The Buthidae are the largest family of scorpions with 1053 species known under 92 genera (Rein, 2015). Few molecular investigations of phylogenetic relationships in the family Buthidae are available (Gantenbein *et al*., 2000; 2003; Fet *et al*., 2003; Gantenbein & Largiadèr, 2003; Mirshamsi *et al*., 2010; Sousa *et al*., 2010, 2011; Suranse *et al*., 2017). Nevertheless, all these studies agree that morpho-taxonomy has limitations in differentiating and defining species boundaries, with findings that several currently recognized species are species groups comprising undescribed taxa. Morphological variability in buthids within taxa, along with morphological similarity between taxa, has led to taxonomic confusion and underscores the value of the inclusion of molecular data for species delineation in scorpions (Yamashita & Rhoads, 2013).

Reference specimens and outgroups

Three haplotypes were among the four sequenced specimens from the Winu study area, one of which was shared amongst two individuals. These sequences were analysed along with fifty-five reference scorpion specimens from GenBank (n= 51) and the Helix database (n= 4) from the family Buthidae. Five representative specimens from five additional scorpion families were used at outgroups in the analysis.

Phylogenetic Analyses

A 686 base-pair (bp) fragment of *COI* was isolated for all of the four specimens. Because multiple specimens shared identical DNA sequences (haplotypes), the data set was reduced to include only unique haplotypes. Of the four specimens, three had unique haplotypes. Analyses revealed two distinct and strongly supported clades amongst the Winu specimens (Figure 3). These clades (A & B) had a mean divergence of 6.2 % between them. Mean divergences within each lineage were 0.0 % (0.0 % to 0.0 % - clade A) and 4.3 % (0.4 % - 8.6 % - clade B) (Table 6). The closest relative, based on molecular data, for the four buthid specimens from Winu were specimens of *Lychas annulatus* from the Helix databases collected also from the Little Sandy Desert, approximately 40 km NW of the Winu collections (Table 7). Dr. Joel Huey (WA Museum) was previously consulted for assistance with species identification for these *L. annulatus* specimens. Analyses performed by Dr Joel Huey with his more extensive collection of sequences, not yet publically available (Helix, 2018), placed the Helix specimens (NN) in two divergent clades along with specimens identified as *Lychas annulatus* by Lorenzo Prendini (American Museum of Natural History). This species is also recognised as *Hemilychas alexandrinus,* which according to the Atlas of Living Australia has a large distributional range across the arid zone of Australia.

Differentiation within and between lineages
Based on genetic distance of the specimens available for comparison, clade A shows no intraspecific divergence, whilst clade B shows up to 8.6 % intraspecific sequence divergence. The pattern of differentiation amongst specimens of *L. annulatus* does not follow an isolation by distance model. Rather, clade A shows no differentiation between specimens over 60 km (PC06 & NN03), whilst specimens less than 4 km distance apart (PC04 & PC06) show 7.6 % sequence divergence from one another. These phylogeographic patterns of differentiation suggest two distinct lineages, and these may well represent separate taxa, they will require further investigation for taxonomic resolution.

The closest relative to the Winu *Lychas annulatus* clade A specimens (PC06, PC02), based on genetic distance, were specimens from the Helix database collected 60 km NW, also from the Little Sandy Desert, one of which shared the same haplotype (Table 6). The next closest relative, were those from clade B with 7.6 % to 8.6 % divergence collected from the Winu study area and 60 km to the NW. The closest relative obtained from GenBank was' *Isometrus* sp.' (MF422313.1) that showed 13.0 % sequence divergence.

The closest relative to the Winu *Lychas annulatus* clade B specimens was a specimen from the same clade collected (NN04) that showed 2.6 % sequence divergence (Table 6). The next closest relatives were those from clade A with 7.6 % to 8.6 % sequence divergence. The closest relative obtained from GenBank specimen was a *Lychas mucronatus* (JN0181153.1) that showed 12.6 % sequence divergence.

<u>Scorpionida – family Urodacidae</u>
The Urodacidae is an Australian endemic family found across the continent, except on the south-eastern seaboard. It was first described by Koch (1977) and under the current classification includes two genera: *Urodacus* and the recently described troglobitic *Aops* (Volschenk & Prendini, 2008). The genus *Urodacus* is endemic in Australia, currently 22 valid species are recognised, although many more are known (Volschenk *et al*., 2000; Volschenk *et al*., 2010; Volschenk *et al*., 2012; Luna-Ramirez *et al*., 2017)

Reference specimens and outgroups
For analyses conducted by Helix, the four specimens from Winu were analysed along with 34 reference specimens from GenBank, representing eleven families of Scorpionida for context. Amongst the four Winu specimens, three haplotypes existed, with one haplotypes shared amongst two individuals (PC07 & PC08).

Phylogenetic Analyses
Phylogenetic analyses using available GenBank sequences as references placed the four suspected Winu urodacid specimens within the family Urodacidae. The resulting three distinct urodacid lineages show very little affinity to the *Urodcaus planimanus* species (Figure 4). As there is a paucity *COI* urodacid sequences on GenBank, and in the Helix database, Dr Erich Volschenk (Alacran), a urodacid specialist, was consulted to determine whether the three divergent lineages of *Urodacus* could be further identified using sequence data generated from a project between Dr Erich Volschenk and the WA museum. Dr Erich Volschenk confirmed that the three distinct molecular lineages represent distinct taxonomic species. His framework allowed further identification with PC03 likely to belong to the species *Urodacus varians*. The Winu *U. varians* specimen differed from other *U. varians* (n=2) sequences by 4.9 % and 4.7 % sequence divergence. These reference specimens are from the Gibson Desert which may explain the relatively large divergences. This species is a dune specialist but is rarely collected owing to the remoteness of its habitat. Dr Volschenk has previously collected the species from the Eastern side of the Gibson Desert but other known records are mostly from the eastern

Pilbara and Sandy Desert, along the Canning Stock Rout. The SRE status of some *Urodacus*, including this species, is difficult to ascertain, as there are no data on their distribution type. *Urodacus* species often have patchy distributions so whilst the overall distribution appears to be large, the area of occupancy is significantly smaller. It is thought that *U. varians* is likely present in much of central Western Australia where there are extensive dune fields, the habitat it seems to thrive in (Dr Erich Volschenk pers comm 2019).

PC05 appears to be *Urodacus* sp. 'telfer'. It differed from this species (n=1) by only 4.2 % sequence divergence. This is an undescribed species that was first collected from the vicinity of Telfer. It is only known from a handful of adult males (n=3), which are morphologically diagnostic with very enlarged telsons. This specimen is the fourth record of the species, and the first female specimen. Currently this species is only known from the area south of Telfer and is a potential SRE.

Analyses revealed that the remaining two urodacid specimens (PC07 & PC08) showed likeness to the *Urodacus* '*yaschenkoi* species complex' (Luna-Ramirez et *al*., 2017) ranging from 6.8 % to 5.9 % sequence divergence. At least three putative species exist in this complex based on concordant morphological and molecular species delineation (Luna-Ramirez *et al*., 2017). This scorpion shares a complex diversification history with other Australian arid-adapted fauna. Despite recognition of the species complex, taxonomic revision is still required. The species-complex is 'usually' associated with red dune systems and collectively has a distribution of Central Queensland to WA Goldfields, but also extends north to near Broome. They are formally describes species within this complex including *U. similis* and *U. carinatus*, as well as many more undescribed taxa. Some appear to be widespread, such as *U. similis* and the eastern goldfields type, whilst others (Broome type – which is describe but currently in synonymy) appear to be SREs. As the Winu specimens didn't show close affinity with any of the reference specimens in the data set, it should be regarded as a Potential SRE. Species in this complex are also morphologically distinctive.

Differentiation within and between lineages
The four urodacid Winu specimens were represented by three haplotypes. Amongst these specimens 0.00 to 10.3 % sequence divergence exists (Table 5; Table 8). From the Helix analysis, the closest relative was a *Urodacus planimanus* specimen (WAM T129654) from GenBank (KY295225.1) at 8.3 % sequence divergence (PC05 & KY295225.1) (Table 8).

Conclusions

The mtDNA gene cytochrome oxidase 1 (*COI*) is widely considered to show suitable variation to distinguish species (Hebert *et al*., 2003a), and the use of this gene can be extremely effective for 'DNA barcoding' in taxa where clear differentiation exists between intra and interspecific levels of divergence (e.g. Hebert *et al*., 2004a; 2004b). In a comparison of *COI* sequences for over 13,000 pairs of taxa, Hebert *et al* (2003b) found a mean of 11.1 % sequence divergence between distinct species. Nearly 80 % of these comparisons found that species pairs differed from one another by greater than 8 % sequence divergence. For mygalomorph spiders, the diversity of species in the Pilbara region of Western Australia has been assessed to test the genetic relationships between and within species, and assess molecular results against morphotype designations comparing *COI* sequences for more than 1000 sequences from seven families, (Castalanelli *et al*., 2014). The majority (92%) of the morphotypes that had been previously recognised based on adult male morphology were recovered using sequence data, showing the utility of barcoding in mygalomorph spiders (Castalanelli et al., 2014).

Despite its merits in barcoding however, a taxon by taxon approach, examining the amount of phylogenetic variation within and between taxa is the most widely accepted method of delineating species and their distributions, especially in areas where rapidly expanding mining operations outpace taxonomic treatment of unresolved taxa.

In summary, we detected a total of six species from two families among the twenty-two mygalomorph specimens and amongst the eight scorpion specimens we suspect five species of belonging to two families. All six mygale species have not been recorded previously, based on the sequences available for comparison. The five suspected species of scorpions have all been recorded previously.

References

Australian Faunal Directory. Australian Government, Department of Sustainability, Environment, Water, Population and Communities http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/index.html

Castalanelli MA, Teale RJ, Rix MC, Kennington JW, Harvey MS. 2014. Barcoding of mygalomorph spiders (Araneae : Mygalomorphae) in the Pilbara bioregion of Western Australia reveals a highly diverse biota. *Invertebrate Systematics* **28**: 375-385.

Castalanelli MA, Huey JA, Hillyer MJ, Harvey MS. 2017. Molecular and morphological evidence for a new genus of small trapdoor spiders from arid Western Australia (Araneae: Mygalomorphae: Nemesiidae: Anaminae). *Invertebrate Systematics* **31**: 492-505.

Environmental Protection Authority 2009. Sampling of short range endemic invertebrate fauna for environmental impact assessment in Western Australia. In 'Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986). Vol. No. 20'. pp. 1-31.

Fet V, Gantenbein B, Gromov AV, Lowe G, Lourenço WR. 2003. The first molecular phylogeny of Buthidae (Scorpiones). *Euscorpius*. **4**: 1–10.

Folmer O, Black M, Hoeh W, Lutz R, Vrijenhoek R. 1994. DNA primers for amplification of mitochondrial cytochrome c oxidase subunit I from diverse metazoan invertebrates. *Molecular Marine Biology and Biotechnology* **3**: 294-299.

Gantenbein B, Kropf C, Largiadèr CR, Scholl A. 2000. Molecular and mor- phological evidence for the presence of a new buthid taxon (Scorpiones: Buthidae) on the island of Cyprus. *Revue Suisse Zoologie*. **107**: 213–232.

Gantenbein B, Fet V, Gromov AV. 2003. The First DNA phylogeny of four species of *Mesobuthus* (Scorpiones, Buthidae) from Eurasia. *Journal of Arachnology*. **31**: 412–420.

Gantenbein B, Largiadèr CR. 2003. The phylogeographic importance of the Strait of Gibraltar as a gene flow barrier in terrestrial arthropods: a case study with the scorpion *Buthus occitanus* as model organism. *Molecular Phylogenetics and Evolution* **28**: 119–130.

Harvey MS, Berry O, Edward KL, Humphreys G. 2008. Molecular and morphological systematics of hypogean schizomids (Schizomida: Hubbardiidae) in semiarid Australia. *Invertebrate Systematics* **22**: 167-194.

Harvey MS, Rix MG, Framenau VW, Hamilton ZR, Johnson MS, Teale RJ, Humphreys G, Humphreys WF. 2011. Protecting the innocent: studying short-range endemic taxa enhances conservation outcomes. *Invertebrate Systematics* **25**: 1-10.

Hebert PDN, Cywinska A, Ball SL, deWaard JR. 2003a. Biological identifications through DNA barcodes. *Proceedings of the Royal Society of London B* **270**: 313-321.

Hebert PDN, Ratnasingham S, deWaard JR. 2003b. Barcoding animal life: cytochrome c oxidase subunit 1 divergences among closely related species. *Proceedings of the Royal Society of London B (supplement)* **270**, S96-S99.

Hebert, P.D.N., Penton EH, Burns JM, Janzen DH, Hallwachs W. 2004a. Ten species in one: DNA barcoding reveals cryptic species in the neotropical skipper butterfly *Astraptes fulgerator*. *PNAS* **101**: 14812-14817.

Hebert PDN, Stoeckle MY, Zemiak TS, Francis CM 2004b. Identification of birds through DNA barcodes. *PLoS Biology* **2**: 1657–1663.

Helix 2009a. Report on the molecular systematics of *Aganippe castellum*. Unpublished report for Biota Environmental Sciences.

Helix 2009b. Report on the molecular systematics of wishbone spider *Aname*. Unpublished report for BHP Billiton.

Helix 2010. Report on the molecular systematics of mygalomorph spiders from Forestania. Unpublished report for Biota Environmental Sciences.

Helix 2011a. Report on the molecular systematics of *Galeosoma* from Forestania. Unpublished report for Biota Environmental Sciences.

Helix 2011b. Report on the molecular systematics of Mygalomorphae from Forrestania. Unpublished report for Biota Environmental Sciences.

Helix 2011c. Report on the molecular systematics of Mygalomorphae from Deception. Unpublished report for Biota Environmental Sciences.

Helix 2011d. Report on the molecular systematics of Mygalomorphae from South Parmelia. Unpublished report for Biota Environmental Sciences.

Helix 2011e. Report on the molecular systematics of Mygalomorphae from Jinidi. Unpublished report for Biota Environmental Sciences.

Helix 2011f. Report on the molecular systematics of Mygalomorphae from Southern Flank. Unpublished report for Biota Environmental Sciences.
Helix 2011g. Report on the molecular systematics of Mygalomorphae from Area C to Yandi. Unpublished report for Biota Environmental Sciences.
Helix 2011h. Report on the molecular systematics of Mygalomorphae from Hammersley Irrigation. Unpublished report for Biota Environmental Sciences.
Helix 2011i. Report on the molecular systematics of Mygalomorphae from Mudlark. Unpublished report for Biota Environmental Sciences.
Helix 2011j. Report on the molecular systematics of Mygalomorphae from Marillana. Unpublished report for Biota Environmental Sciences.
Helix 2011k. Report on the molecular systematics of Mygalomorphae from Jinidi to Manline. Unpublished report for Biota Environmental Sciences.
Helix 2011l. Report on the molecular systematics of Mygalomorphae from Eastern Deviation. Unpublished report for Biota Environmental Sciences.
Helix 2012a. Report on the molecular systematics of Mygalomorphae from the Pilbara. Unpublished report for Biota Environmental Sciences, 31 January.
Helix 2012b. Report on the molecular systematics of Mygalomorphae from West Turner Syncline. Unpublished report for Biota Environmental Sciences.
Helix 2012c. Report on the molecular systematics of Mygalomorphae from Koodaideri West Corridor. Unpublished report for Biota Environmental Sciences.
Helix 2012d. Report on the molecular systematics of Mygalomorphae from Koodaideri phase IV and Koodaideri South. Unpublished report for Biota Environmental Sciences.
Helix 2012e. Report on the molecular systematics of Mygalomorphae from Cape Lambert. Unpublished report for Biota Environmental Sciences.
Helix 2012f. Report on the molecular systematics of Mygalomorphae from Marra Mamba. Unpublished report for Biota Environmental Sciences.
Helix 2012g. Report on the molecular systematics of Mygalomorphae from Mt Richardson. Unpublished report for Biota Environmental Sciences.
Helix 2012h. Report on the molecular systematics of Mygalomorphae from West Turner Extension. Unpublished report for Biota Environmental Sciences.
Helix 2012i. Report on the molecular systematics of Mygalomorphae from Southern Flank to Jinidi. Unpublished report for Biota Environmental Sciences.
Helix 2013a. Report on the molecular systematics of Mygalomorphae from Mt Richardson phase I and II. Unpublished report for Biota Environmental Sciences.
Helix 2013b. Report on the molecular systematics of mygalomorphae from Koodaideri rail corridor. Unpublished report for Biota Environmental Sciences.
Helix 2014a. Molecular systematics of mygalomorphae from Kundip. Unpublished report for Biota Environmental Sciences.
Helix 2014b. Molecular systematics of mygalomorphae from Koodaideri northern extension. Unpublished report for Biota Environmental Sciences.
Helix 2014c Molecular Systematics of mygalomorphae from Yandi Billiards. Unpublished report for Biota Environmental Sciences.
Helix 2014d. Molecular systematics of mygalomorphae from Yandi Billiards phase 2. Unpublished report for Biota Environmental Sciences.
Helix 2015a. Report on the molecular systematics of mygalomorphae from Bungaroo Valley. Unpublished report for Biota Environmental Sciences.
Helix 2015b. Report on the molecular systematics of mygalomorphae form Baby Hope Downs. Unpublished report for Biota Environmental Sciences.
Helix 2015c. Molecular systematics of mygalomorphae from Yandi Oxbow. Unpublished report for Biota Environmental Sciences.
Helix 2015d. Molecular systematics of mygalopmorphae from Red Hill. Unpublished report for Biota Environmental Sciences.
Helix 2015e. Molecular systematics of mygalomorphae from the Buckland Hills Level 2 fauna survey. Unpublished report for Biota Environmental Sciences.
Helix 2018. Report on the molecular systematics of the targeted SRE invertebrates from the Asian Hub RE Fauna Survey. Unpublished report for Biota Environmental Sciences.
Helix 2019. Molecular systematics of the K plus S Salt mygalomorph specimens from Ashburton. Unpublished report for Biota Environmental Sciences.
Kumar S, Stecher G, Tamura K. 2016. MEGA 7: Molecular Evolutionary Genetic Analysis version 7.0 for bigger datasets. *Molecular Biology and Evolution* **33**: 1870-1874.

Luna-Ramirez K, Miller AD, Rašic G. 2017. Genetic and morphological analyses indicate that the Australian endemic scorpion *Urodacus yaschenkoi* (Scorpiones: Urodacidae) is a species complex. *PeerJ* 5:e2759; DOI 10.7717/peerj.2759.

Mirshamsi O, Sari A, Elahi E, Hosseinie S. 2010. Phylogenetic relationships of *Mesobuthus eupeus* (CL Koch, 1839) inferred from COI sequences (Scorpiones: Buthidae). *Journal of Natural History* **44**: 2851–2872.

Nei M. 1987. DNA polymorphism within and between populations. In: *Molecular Evolutionary Genetics*. pp.254-286. Columbia University Press New York, NY.

Rein JO. 2015. Scorpion files. Species List. Buthidae. [Cited 2015 October 7]. Available from: http://www.ntnu.no/ub/scorpion-files/buthidae.php.

Sousa P, Froufe E, Alves PC, Harris DJ. 2010. Genetic diversity within scorpions of the genus *Buthus* from the Iberian Peninsula: mitochondrial DNA sequence data indicate additional distinct cryptic lineages. *Journal of Arachnology*. **38**: 206–211.

Suranse V, Sawant NS, Paripatyadar SV, Krutha K, Paingankar MS, Padhye AD, Bastawade DB, Dahanukar N. 2017. First molecular phylogeny of scorpions of the family Buthidae from India. *Mitochondrial DNA Part A* **28**: 606-611.

Tamura K, Stecher G, Peterson D, Filipski A, Kumar S. 2013. MEGA 6: Molecular Evolutionary Genetic Analysis using Maximum Likelihood, evolutionary distance, and Maximum Parsimony methods. *Molecular Biology and Evolution* **30**: 2725 – 2729.

Thompson J, Higgins D, Gibson T. 1994. CLUSTAL W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice. *Nucleic Acids Research* **22**, 4673–4680. doi:10.1093/nar/ 22.22.4673.

Volschenk ES, Smith GT, Harvey MS. 2000. A new species of *Urodacus* from Western Asutralia, with additional descriptive notes for *Urodacus megamastigus* (Scorpiones). *Records of yhe Western Australian Museum* **20**: 57-67.

Volschenk ES, Burbidge AH, Durrant BJ, Harvey MS. 2010. Spatial distribution of scorpions (Scorpiones) in the arid Pilbara region of Western Asutralia. *Records of the Western Australian Museum* **78**: 271-284.

Volschenk ES, Harvey MS, Prendini L. 2012. A new species of *Urodacus* (Scorpiones: Urodacidae) from Western Australia. *American Museum Novitiates* **3748**:1–18 DOI 10.1206/3748.2.

Volschenk ES, Prendini L. 2008. *Aops oncodactylus*, gen. et sp. nov., the first troglobitic urodacid (Urodacidae: Scorpiones), with a re-assessment of cavernicolous, troglo- bitic and troglomorphic scorpions. *Invertebrate Systematics* **22**: 235–257 DOI 10.1071/IS06054.

Yamashita T, Rhoads DD. 2013. Species delimitation and morphological divergence in the scorpion *Centroides vittatus* (Say, 1821): Insights from phylogeography. *PLoS One* **8**: e68282.

Table 1. Spider specimens used in the present study (n=22), and the genetic lineage to which they belong. Coloured shading refers to colour-coding used to highlight species in Figures 1 and 2. Unshaded cells represent samples that failed to sequence.

Biota Code	Helix Code	Family	Genetic Lineage/Taxonomic ID
M20190520.WIN09P-01	PC09	Barychelidae	*Idiommata* sp. BBT_B39
M20190517.WINSRE03-01	PC10	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190517.WINSRE03-02	PC11	undetermined	not mygale
M20190518.WINSRE03-01	PC12	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190516.WINSRE05-01	PC13	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190516.WINSRE05-02	PC14	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE04-01	PC15	Nemesiidae	Genus ? NRC_N150
M20190518.WINSRE07-01	PC16	Nemesiidae	*Aname* sp. NSA_N148
M20190518.WINSRE07-02	PC17	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE07-03	PC18	Nemesiidae	*Aname* sp. NRZ_N147
M20190518.WINSRE08-01	PC19	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE08-02	PC20	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE08-03	PC21	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE08-04	PC22	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE06-01	PC23	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE06-02	PC24	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE06-03	PC25	Nemesiidae	n/a
M20190513.WINSRE02-01	PC26	Nemesiidae	*Aname* sp. NSB_N149
M20190513.WINSRE02-02	PC27	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE08-05	PC28	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE08-06	PC29	Nemesiidae	*Kwonkan* sp. NSD_N151
M20190518.WINSRE08-07	PC30	Nemesiidae	*Kwonkan* sp. NSD_N151

Table 2. Genetic p-distance (below) and the associated standard error (above – blue text) between the twenty mygalomorph individuals, from two families (Barychelidae & Nemesiidae) sequenced from the Winu survey area as shown in Figures 1 and 2. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 2 attached separately as a PDF document due to the size and detail.

Table 3. Genetic p-distance (below) and the associated standard error (above – blue text) between the Winu Barychelidae specimen (in bold text), and all reference specimens, as shown in Figure 1. Colour-coding corresponds to that used in Figures 1. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 3 attached separately as a PDF document due to the size and detail.

Table 4. Genetic p-distance (below) and the associated standard error (above – blue text) between all Nemesiidae mygalomorph haplotypes from Winu (family nemesiidae) and all reference specimens as shown in Figure 2. Colour coding corresponds to Figure 2. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 4 attached separately as a PDF document due to the size and detail.

Table 5. Genetic p-distance (below) and the associated standard error (above – blue text) between the eight scorpion individuals, from two families (Buthidae & Urodacidae) sequenced from the Winu survey area as shown in Figures 3 and 4. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

	PC01	PC02	PC03	PC04	PC05	PC06	PC07	PC08
PC01		0.010	0.014	0.003	0.015	0.010	0.015	0.015
PC02	0.077		0.015	0.010	0.015	0.001	0.015	0.015
PC03	0.162	0.182		0.014	0.012	0.015	0.012	0.012
PC04	0.006	0.076	0.159		0.015	0.010	0.015	0.015
PC05	0.185	0.176	0.103	0.179		0.015	0.011	0.011
PC06	0.076	0.001	0.181	0.074	0.175		0.015	0.015
PC07	0.182	0.179	0.102	0.182	0.089	0.178		0.000
PC08	0.182	0.179	0.102	0.182	0.089	0.178	0.000	

Table 6. Mean within group genetic distances for the two lineages of *Lychas annulatus*.

	Mean genetic distance	s.e.
Clade A	0.000	0.005
Clade B	0.043	0.000

Table 7. Genetic p-distance (below) and the associated standard error (above – blue text) between all buthid scorpion specimens (n=4) (family Buthidae) from Winu, and all reference specimens as shown in Figure 3. Colour coding corresponds to Figure 3. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 7 attached separately as a PDF document due to the size and detail.

Table 8. Genetic p-distance (below) and the associated standard error (above – blue text) between the four *Urodacus* scorpion specimens (family Urodacidae) from Winu, and all reference specimens as shown in Figure 4. Colour coding corresponds to Figure 4. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 8 attached separately as a PDF document due to the size and detail.

Figure 1 attached separately as a PDF document.

Figure 1. Maximum likelihood analysis of Barychelidae *COI* mtDNA sequences, showing the placement of the Winu barychelid mygalomorphae specimen (in bold text) within the current taxonomic framework of the family Barychelidae. Coloured boxes highlight the species to which the winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. '**B'** numbers on tree refer to family species based on the 9.5 % species threshold tested in Castalanelli *et al*., (2014). 'T' numbers refer to WA Museum registration code. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

Figure 2 attached separately as a PDF document due to the size and detail.

Figure 2. Maximum likelihood analysis of the eleven Winu *COI* mtDNA haplotype sequences, showing the placement of the eleven Winu nemesiid mygalomophae haplotypes (in bold text) representing nineteen specimens, within the current taxonomic framework of the family Nemesiidae. Coloured boxes highlight the species to which the winu specimens belong. All sequences within 15 % sequence divergence are represented in the tree. '**N'** numbers on tree refer to family species based on the 9.5 % species threshold tested in Castalanelli *et al*., (2014). 'T' numbers refer to WA Museum registration code. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

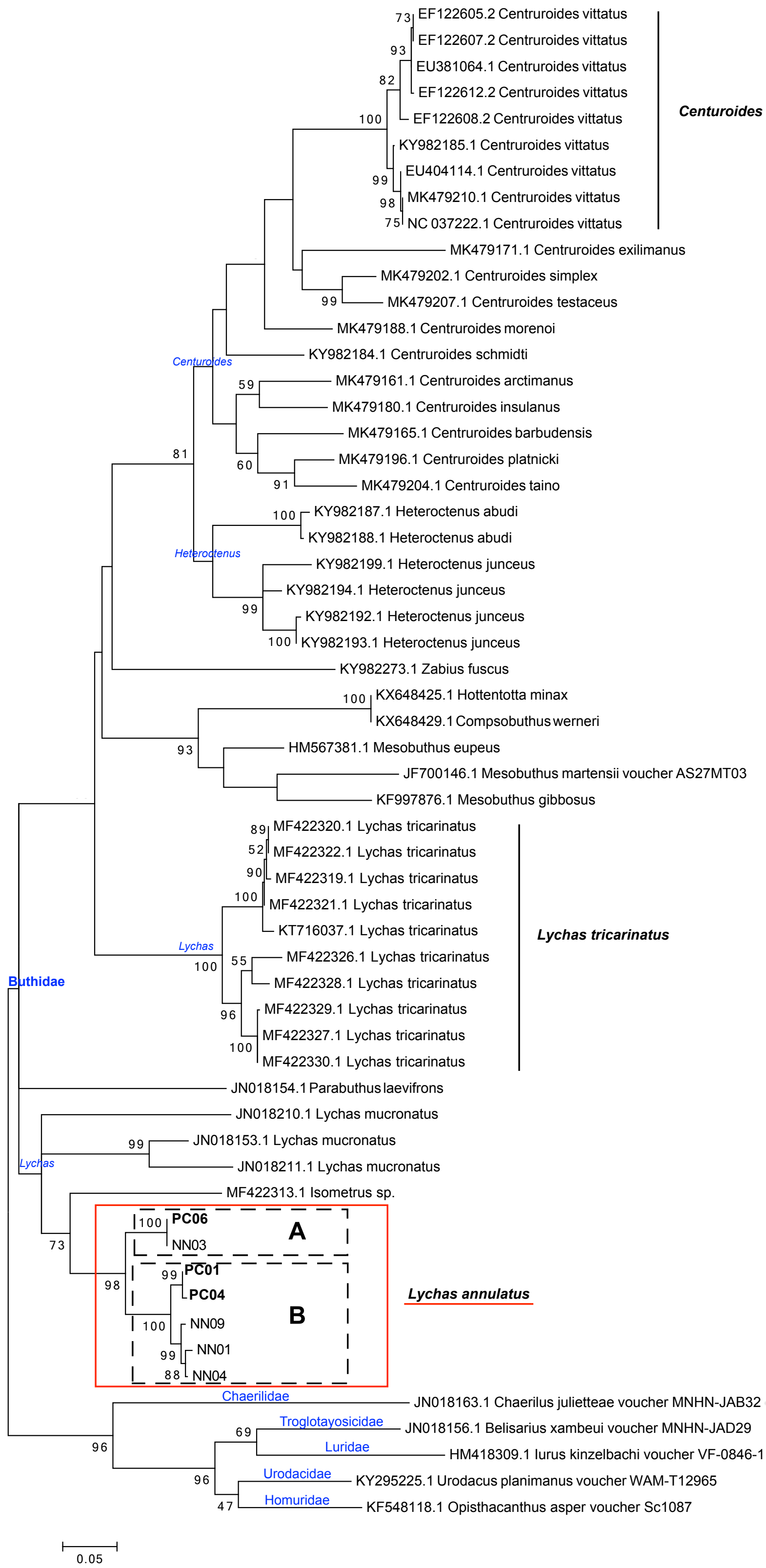

Figure 3. Maximum likelihood analysis of the three buthid *COI* mtDNA haplotype sequences, showing the placement of the Winu *Lychas* scorpion specimens (in bold text) within the current taxonomic framework of the family Buthidae. Coloured boxes highlight the species to which the Winu specimens belong. Boxes with dashed lines show distinct lineages. All available sequences within 15 % sequence divergence are represented in the tree. ' 'T' numbers refer to WA Museum registration code. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

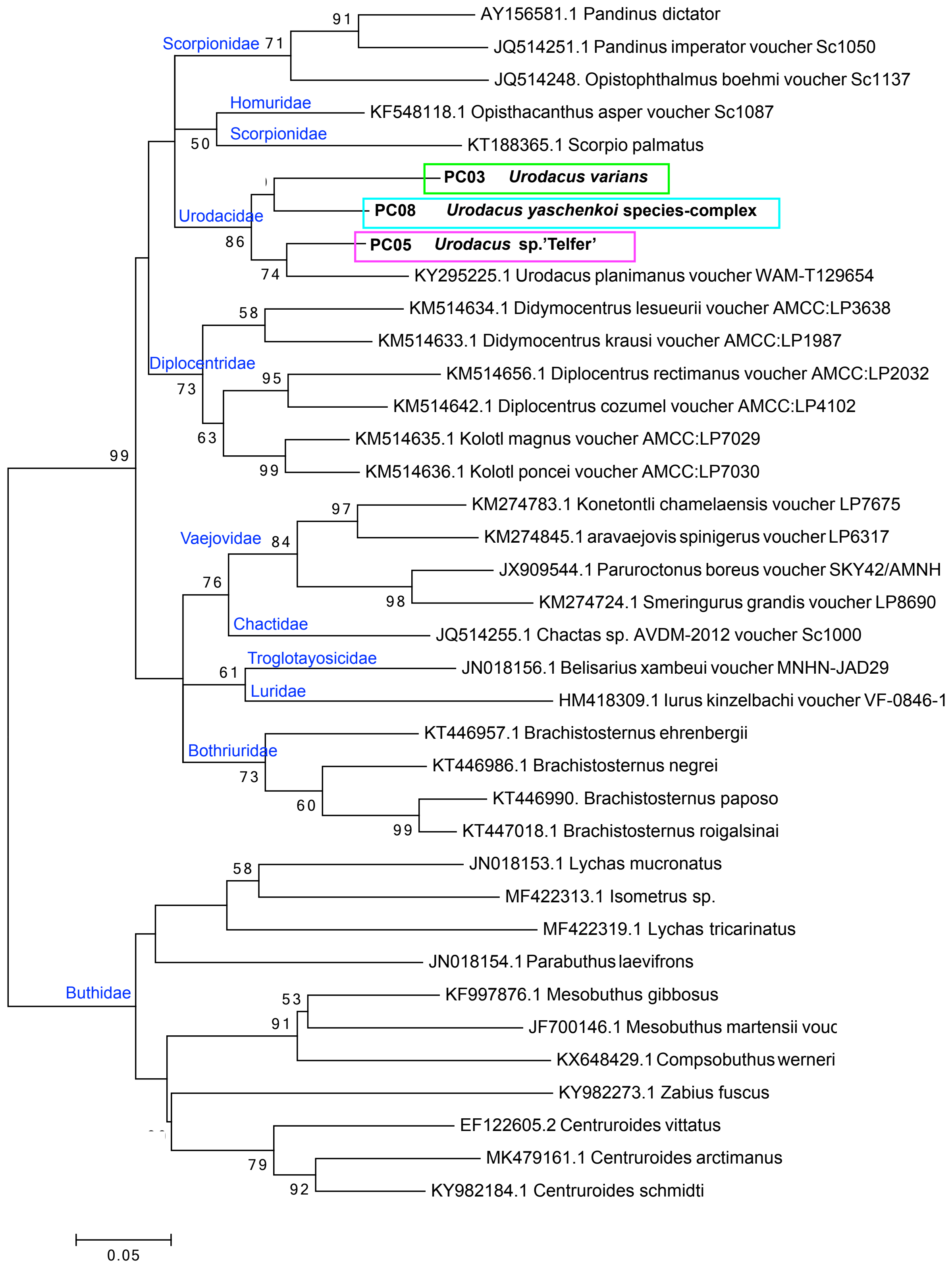

Figure 4. Maximum likelihood analysis of the three urodacid *COI* mtDNA haplotype sequences, showing the placement of the Winu scorpion specimens (in bold text) within the current taxonomic framework of the family Urodacidae and Scorpionida. Coloured boxes highlight the species to which the Winu specimens belong. All available sequences within 15 % sequence divergence are represented in the tree, as well as family representatives. 'T' numbers refer to WA Museum registration code. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

Appendix 1. Invertebrate reference specimens utilized during analysis in the present study, the source of the data, and the genetic lineage to which they belong.

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
NN01	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN03	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN04	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN09	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
n/a	EF122605.2	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EF122607.2	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EF122608.2	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EF122612.2	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EU381064.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EU404114.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	HM567381.1	*Mesobuthus*	*eupeus*	n/a	GenBank	Buthidae
n/a	JF700146.1	*Mesobuthus*	*martensii*	AS27MT03	GenBank	Buthidae
n/a	JN018153.1	*Lychas*	*mucronatus*	n/a	GenBank	Buthidae
n/a	JN018154.1	*Parabuthus*	*laevifrons*	n/a	GenBank	Buthidae
n/a	JN018210.1	*Lychas*	*mucronatus*	n/a	GenBank	Buthidae
n/a	JN018211.1	*Lychas*	*mucronatus*	n/a	GenBank	Buthidae
n/a	KF997876.1	*Mesobuthus*	*gibbosus*	n/a	GenBank	Buthidae
n/a	KT716037.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	KX648425.1	*Hottentotta*	*minax*	n/a	GenBank	Buthidae
n/a	KX648429.1	*Compsobuthus*	*werneri*	n/a	GenBank	Buthidae
n/a	KY982184.1	*Centruroides*	*schmidti*	n/a	GenBank	Buthidae
n/a	KY982185.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	KY982187.1	*Heteroctenus*	*abudi*	n/a	GenBank	Buthidae
n/a	KY982188.1	*Heteroctenus*	*abudi*	n/a	GenBank	Buthidae
n/a	KY982192.1	*Heteroctenus*	*junceus*	n/a	GenBank	Buthidae
n/a	KY982193.1	*Heteroctenus*	*junceus*	n/a	GenBank	Buthidae
n/a	KY982194.1	*Heteroctenus*	*junceus*	n/a	GenBank	Buthidae
n/a	KY982199.1	*Heteroctenus*	*junceus*	n/a	GenBank	Buthidae
n/a	KY982273.1	*Zabius*	*fuscus*	n/a	GenBank	Buthidae
n/a	MF422313.1	*Isometrus*	*sp.*	n/a	GenBank	Buthidae
n/a	MF422319.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422320.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422321.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422322.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422326.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422327.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422328.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422329.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422330.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MK479161.1	*Centruroides*	*arctimanus*	n/a	GenBank	Buthidae
n/a	MK479165.1	*Centruroides*	*barbudensis*	n/a	GenBank	Buthidae
n/a	MK479171.1	*Centruroides*	*exilimanus*	n/a	GenBank	Buthidae
n/a	MK479180.1	*Centruroides*	*insulanus*	n/a	GenBank	Buthidae
n/a	MK479188.1	*Centruroides*	*morenoi*	n/a	GenBank	Buthidae
n/a	MK479196.1	*Centruroides*	*platnicki*	n/a	GenBank	Buthidae
n/a	MK479202.1	*Centruroides*	*simplex*	n/a	GenBank	Buthidae
n/a	MK479204.1	*Centruroides*	*taino*	n/a	GenBank	Buthidae
n/a	MK479207.1	*Centruroides*	*testaceus*	n/a	GenBank	Buthidae
n/a	MK479210.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	NC37222.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	JN018156.1	*Belisarius*	*xambeui*	MNHN-JAD29	GenBank	Troglotayosicidae
n/a	KY295225.1	*Urodacus*	*planimanus*	WAM-T12965	GenBank	Urodacidae
n/a	JN018163.1	*Chaerilus*	*julietteae*	MNHN-JAB32	GenBank	Chaerilidae
n/a	HM418309.1	*Iurus*	*kinzelbachi*	VF-0846-1	GenBank	Luridae
n/a	KF548118.1	*Opisthacanthus*	*asper*	Sc1087	GenBank	Homuridae
n/a	KT446990.	*Brachistosternus*	*paposo*	n/a	GenBank	Bothriruridaae
n/a	KT447018.1	*Brachistosternus*	*roigalsinai*	n/a	GenBank	Bothriruridaae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
n/a	KT446957.1	*Brachistosternus*	*ehrenbergii*	n/a	GenBank	Bothriruridaae
n/a	KM514656.1	*Diplocentrus*	*rectimanus*	AMCC:LP2032	GenBank	Diplocentridae
n/a	KM514642.1	*Diplocentrus*	*cozumel*	AMCC:LP4102	GenBank	Diplocentridae
n/a	KT446986.1	*Brachistosternus*	*negrei*	n/a	GenBank	Bothriruridaae
n/a	KM514634.1	*Didymocentrus*	*lesueurii*	AMCC:LP3638	GenBank	Diplocentridae
n/a	KM514633.1	*Didymocentrus*	*krausi*	AMCC:LP1987	GenBank	Diplocentridae
n/a	KM514635.1	*Kolotl*	*magnus*	AMCC:LP7029	GenBank	Diplocentridae
n/a	KM514636.1	*Kolotl*	*poncei*	AMCC:LP7030	GenBank	Diplocentridae
n/a	AY156581.1	*Pandinus*	*dictator*	n/a	GenBank	Scorpionidae
n/a	KM274783.1	*Konetontli*	*chamelaensis*	LP7675	GenBank	Vaejovidae
n/a	JQ514251.1	*Pandinus*	*imperator*	Sc1050	GenBank	Scorpionidae
n/a	JX909544.1	*Paruroctonus*	*boreus*	SKY42/AMNH	GenBank	Vaejovidae
n/a	KF548118.1	*Opisthacanthus*	*asper*	Sc1087	GenBank	Homuridae
n/a	JQ514248.	*Opistophthalmus*	*boehmi*	Sc1137	GenBank	Homuridae
n/a	KT188365.1	*Scorpio*	*palmatus*	n/a	GenBank	Scorpionidae
n/a	JQ514255.1	*Chactas*	*sp.*	AVDM-2012	GenBank	Chactidae
n/a	KM274845.1	*Paravaejovis*	*spinigerus*	LP6317	GenBank	Vaejovidae
n/a	KM274724.1	*Smeringurus*	*grandis*	LP8690	GenBank	Vaejovidae
NA_N1_AG1	n/a	NA	N1	n/a	Helix database	Nemesiidae
NAA_N45_AS38	n/a	NAA	N45	n/a	Helix database	Nemesiidae
NAB_N46_AS41	n/a	NAB	N46	n/a	Helix database	Nemesiidae
NAD_N93_AC10	n/a	NAD	N93	n/a	Helix database	Nemesiidae
NAM_N49_AD14	n/a	NAM	N49	n/a	Helix database	Nemesiidae
NAO_N22_AD328	n/a	NAO	N22	n/a	Helix database	Nemesiidae
NAQ_N5_AD352	n/a	NAQ	N5	n/a	Helix database	Nemesiidae
NAW_N6_AD429	n/a	NAW	N6	n/a	Helix database	Nemesiidae
NAX_N24_AD452	n/a	NAX	N24	n/a	Helix database	Nemesiidae
NAZ_N6_AD457	n/a	NAZ	N6	n/a	Helix database	Nemesiidae
NB_N16_AH8	n/a	NB	N16	n/a	Helix database	Nemesiidae
NBC_N6_AD577	n/a	NBC	N6	n/a	Helix database	Nemesiidae
NBE_N46_AD583	n/a	NBE	N46	n/a	Helix database	Nemesiidae
NBM_N4_AD678	n/a	NBM	N4	n/a	Helix database	Nemesiidae
NBR_N14_AD746	n/a	NBR	N14	n/a	Helix database	Nemesiidae
NBT_N7_AD748	n/a	NBT	N7	n/a	Helix database	Nemesiidae
NBU_N15_AD753	n/a	NBU	N15	n/a	Helix database	Nemesiidae
NBW_N50_AD784	n/a	NBW	N50	n/a	Helix database	Nemesiidae
NCA_N20_AF78	n/a	NCA	N20	n/a	Helix database	Nemesiidae
NCG_N95_I16	n/a	NCG	N95	n/a	Helix database	Nemesiidae
NCU_N110_O211	n/a	NCU	N110	n/a	Helix database	Nemesiidae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
NCW_N66_O280	n/a	NCW	N66	n/a	Helix database	Nemesiidae
NCY_N67_O282	n/a	NCY	N67	n/a	Helix database	Nemesiidae
NCZ_N110_O285	n/a	NCZ	N110	n/a	Helix database	Nemesiidae
NDD_N101_O292	n/a	NDD	N101	n/a	Helix database	Nemesiidae
NDK_N94_O333	n/a	NDK	N94	n/a	Helix database	Nemesiidae
NDL_N96_O334	n/a	NDL	N96	n/a	Helix database	Nemesiidae
NEH_N112_BI22	n/a	NEH	N112	n/a	Helix database	Nemesiidae
NEM_N43_DW15	n/a	NEM	N43	n/a	Helix database	Nemesiidae
NEM_N43_AT53	n/a	NEM	N43	n/a	Helix database	Nemesiidae
NEW_N19_AD381	n/a	NEW	N19	n/a	Helix database	Nemesiidae
NFN_N43_CG5	n/a	NFN	N43	n/a	Helix database	Nemesiidae
NFO_N127_CB26	n/a	NFO	N127	n/a	Helix database	Nemesiidae
NFZ_N122_BV095	n/a	NFZ	N122	n/a	Helix database	Nemesiidae
NGC_N129_CW5	n/a	NGC	N129	n/a	Helix database	Nemesiidae
NGE_N130_CW14	n/a	NGE	N130	n/a	Helix database	Nemesiidae
NGN_N19_DC5	n/a	NGN	N19	n/a	Helix database	Nemesiidae
NGS_N136_DG10	n/a	NGS	N136	n/a	Helix database	Nemesiidae
NGV_N35_DW21	n/a	NGV	N35	n/a	Helix database	Nemesiidae
NIG_N22+N23_ID10	n/a	NIG	N22+N23	n/a	Helix database	Nemesiidae
NK_N36_AD110	n/a	NK	N36	n/a	Helix database	Nemesiidae
NRF_N7_NN11	n/a	NRF	N7	n/a	Helix database	Nemesiidae
NRG_N7_NN15	n/a	NRG	N7	n/a	Helix database	Nemesiidae
NRH_N7_NN16	n/a	NRH	N7	n/a	Helix database	Nemesiidae
NRI_N7_NN17	n/a	NRI	N7	n/a	Helix database	Nemesiidae
NRJ_N7_NN18	n/a	NRJ	N7	n/a	Helix database	Nemesiidae
NRK_N7_NN20	n/a	NRK	N7	n/a	Helix database	Nemesiidae
NRL_N7_NN21	n/a	NRL	N7	n/a	Helix database	Nemesiidae
NRM_N7_NN37	n/a	NRM	N7	n/a	Helix database	Nemesiidae
NRO_N7_NN38	n/a	NRO	N7	n/a	Helix database	Nemesiidae
NRP_N138_NN35	n/a	NRP	N138	n/a	Helix database	Nemesiidae
NRQ_N138_NN36	n/a	NRQ	N138	n/a	Helix database	Nemesiidae
NRW_N144_OU21	n/a	NRW	N144	n/a	Helix database	Nemesiidae
NY_N37_AR64	n/a	NY	N37	n/a	Helix database	Nemesiidae
n/a	JQ772136.1	*Aname*	sp.	T95404	GenBank	Nemesiidae
n/a	KJ744398.1	*Aname*	*mellosa*	T101163	GenBank	Nemesiidae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
n/a	KJ744414.1	*Aname*	sp.	T102047	GenBank	Nemesiidae
n/a	KJ744623.1	*Aname*	*mellosa*	T105871	GenBank	Nemesiidae
n/a	KJ744648.1	*Aname*	sp.	T107087	GenBank	Nemesiidae
n/a	KJ744649.1	*Aname*	sp.	T107089	GenBank	Nemesiidae
n/a	KJ744661.1	*Aname*	*mellosa*	T107942	GenBank	Nemesiidae
n/a	KJ744662.1	*Aname*	*mellosa*	T107945	GenBank	Nemesiidae
n/a	KJ744669.1	*Aname*	*mellosa*	T107968	GenBank	Nemesiidae
n/a	KJ744775.1	*Aname*	*mellosa*	T113629	GenBank	Nemesiidae
n/a	KJ744785.1	*Aname*	*mellosa*	T113642	GenBank	Nemesiidae
n/a	KJ744788.1	*Aname*	*mellosa*	T113648	GenBank	Nemesiidae
n/a	KJ744791.1	*Aname*	*mellosa*	T113654	GenBank	Nemesiidae
n/a	KJ744803.1	*Aname*	*mellosa*	T113666	GenBank	Nemesiidae
n/a	KJ744901.1	*Aname*	sp.	T118789	GenBank	Nemesiidae
n/a	KJ744902.1	*Aname*	sp.	T118791	GenBank	Nemesiidae
n/a	KJ744909.1	*Aname*	sp.	T118805	GenBank	Nemesiidae
n/a	KJ744910.1	*Aname*	sp.	T118811	GenBank	Nemesiidae
n/a	KJ744911.1	*Aname*	sp.	T118812	GenBank	Nemesiidae
n/a	KJ744914.1	*Aname*	sp.	T118818	GenBank	Nemesiidae
n/a	KJ744926.1	*Aname*	*mellosa*	T119710	GenBank	Nemesiidae
n/a	KJ744963.1	*Kwonkan*	sp.	T120001	GenBank	Nemesiidae
n/a	KJ744964.1	*Kwonkan*	sp.	T120003	GenBank	Nemesiidae
n/a	KJ744975.1	*Aname*	sp.	T121597	GenBank	Nemesiidae
n/a	KJ744977.1	*Aname*	*mellosa*	T122200	GenBank	Nemesiidae
n/a	KJ744982.1	*Aname*	*mellosa*	T122207	GenBank	Nemesiidae
n/a	KJ744987.1	*Aname*	*mellosa*	T122215	GenBank	Nemesiidae
n/a	KJ744990.1	*Aname*	*mellosa*	T122219	GenBank	Nemesiidae
n/a	KJ745117.1	*Aname*	sp.	T125329	GenBank	Nemesiidae
n/a	KJ745134.1	*Aname*	*mellosa*	T126250	GenBank	Nemesiidae
n/a	KJ745143.1	*Aname*	*mellosa*	T126259	GenBank	Nemesiidae
n/a	KJ745146.1	*Aname*	*mellosa*	T126262	GenBank	Nemesiidae
n/a	KJ745153.1	*Aname*	*mellosa*	T126271	GenBank	Nemesiidae
n/a	KJ745155.1	*Aname*	*mellosa*	T126273	GenBank	Nemesiidae
n/a	KJ745159.1	*Aname*	*mellosa*	T126279	GenBank	Nemesiidae
n/a	KJ745160.1	*Aname*	*mellosa*	T126280	GenBank	Nemesiidae
n/a	KJ745168.1	*Aname*	*mellosa*	T126296	GenBank	Nemesiidae
n/a	KJ745170.1	*Aname*	*mellosa*	T126301	GenBank	Nemesiidae
n/a	KJ745210.1	*Kwonkan*	sp.	T57563	GenBank	Nemesiidae
n/a	KJ745231.1	*Aname*	sp.	T74238	GenBank	Nemesiidae
n/a	KJ745232.1	*Aname*	sp.	T74241	GenBank	Nemesiidae
n/a	KJ745233.1	*Aname*	sp.	T74247	GenBank	Nemesiidae
n/a	KJ745281.1	*Kwonkan*	sp.	T78543	GenBank	Nemesiidae
n/a	KJ745287.1	*Aname*	sp.	T82303	GenBank	Nemesiidae
n/a	KJ745288.1	*Aname*	sp.	T82304	GenBank	Nemesiidae
n/a	KJ745293.1	*Aname*	sp.	T82309	GenBank	Nemesiidae
n/a	KJ745375.1	*Aname*	sp.	T93314	GenBank	Nemesiidae
n/a	KJ745494.1	*Aname*	sp.	T98900	GenBank	Nemesiidae
NHP_MYG175	n/a	*Kwonkan*	NHP	n/a	Helix database	Nemesiidae
NHD_MYG127	n/a	*Synothele*	NHD	n/a	Helix database	Nemesiidae
NHG_MYG227	n/a	*Aname*	NHG	n/a	Helix database	Nemesiidae
NHQ_MYG250	n/a	*Aname*	NHQ	n/a	Helix database	Nemesiidae
NGX_MYG182	n/a	*Aname*	NGX	n/a	Helix database	Nemesiidae
NHF_MYG067	n/a	*Aname*	NHF	n/a	Helix database	Nemesiidae
NHK_MYG185	n/a	*Aname*	NHK	n/a	Helix database	Nemesiidae
NHJ_MYG034	n/a	*Aname*	NHJ	n/a	Helix database	Nemesiidae
n/a	KJ745122.1	*Idiommata*	sp.	T125335	GenBank	Barychelidae
n/a	KJ745116.1	*Idiommata*	sp.	T125328	GenBank	Barychelidae
n/a	KJ744575.1	*Aurecocrypta*	sp.	T103910	GenBank	Barychelidae
n/a	KJ745103.1	*Idiommata*	sp.	T123636	GenBank	Barychelidae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
n/a	KJ745100.1	*Idiommata*	sp.	T123112	GenBank	Barychelidae
n/a	KJ744660.1	*Aurecocrypta*	sp.	T107502	GenBank	Barychelidae
BBS_B38_OY27	n/a	BBS	B38	n/a	Helix database	Barychelidae
BL_B17_AR106	n/a	BL	B17	n/a	Helix database	Barychelidae
BAQ_B22_O117	n/a	BAQ	B22	n/a	Helix database	Barychelidae
BBK_B19_CB32	n/a	BBK	B19	n/a	Helix database	Barychelidae
BAN_B24_O110	n/a	BAN	B24	n/a	Helix database	Barychelidae
BBM_B19_CB5	n/a	BBM	B19	n/a	Helix database	Barychelidae

Appendix 2. 'megaBLAST' search results for Araneomorph Winu specimen 'PC11'

Query Sample	GenBank ID of reference specimen	Percenty Identity (%)
PC11	KY017865.1	88.939
PC11	KP209064.1	88.602
PC11	KY017666.1	87.964
PC11	KY017668.1	87.946
PC11	MF811495.1	88.316
PC11	KX537030.1	88.316
PC11	KX536941.1	88.316
PC11	JF886125.1	88.316
PC11	JF886119.1	88.316
PC11	KY587560.1	88.415
PC11	MF467716.1	88.298
PC11	JN817103.1	87.518
PC11	JN308800.1	88.164
PC11	KY017677.1	87.743
PC11	KP646410.1	88.226
PC11	KP209084.1	88.092
PC11	KP209083.1	88.092
PC11	KP209067.1	88.048
PC11	KP209044.1	88.092
PC11	KP209040.1	88.012
PC11	KY017626.1	88.612
PC11	KM831538.1	87.994
PC11	JF884504.1	87.994
PC11	KY017931.1	87.593
PC11	KY017816.1	87.519
PC11	KY017715.1	87.994
PC11	KP646571.1	88.073
PC11	KP209042.1	87.897
PC11	JN817081.1	87.026
PC11	JF884514.1	87.842
PC11	KM825530.1	87.842
PC11	JN817199.1	87.168
PC11	JF884507.1	87.842
PC11	JF884494.1	87.842
PC11	KY017881.1	87.332
PC11	KP648977.1	87.92
PC11	KU875804.1	87.69
PC11	KX762063.1	87.709
PC11	KM244672.1	86.969
PC11	MH321612.1	87.406
PC11	MG816011.1	87.671
PC11	LC310806.1	87.221
PC11	KY018010.1	87.313
PC11	KY017899.1	87.24
PC11	KY017776.1	87.221
PC11	KY017593.1	87.313
PC11	KP253809.1	87.69
PC11	KF442792.1	87.982
PC11	JF411087.1	87.69
PC11	KY007998.1	87.768
PC11	KY017896.1	87.183
PC11	KM486439.1	87.846
PC11	FJ607577.1	87.221
PC11	MK154252.1	87.538
PC11	KY778930.1	88.144
PC11	KP209090.1	87.595
PC11	KP209089.1	87.634

Query Sample	GenBank ID of reference specimen	Percenty Identity (%)
PC11	MF808720.1	87.538
PC11	LC310805.1	87.073
PC11	KY017787.1	87.164
PC11	KM839430.1	87.538
PC11	JN817216.1	86.715
PC11	JN817198.1	86.873
PC11	JF411100.1	87.519
PC11	JN299238.1	87.538
PC11	HQ979347.1	87.557
PC11	FJ525318.1	87.538
PC11	KP271816.1	87.054
PC11	KT174686.1	87.443
PC11	KT174685.1	87.538
PC11	KT174684.1	87.443
PC11	MK154166.1	87.386
PC11	MK154152.1	87.386
PC11	MH321625.1	87.292
PC11	KX537443.1	87.386
PC11	KX536876.1	87.386
PC11	KP209038.1	87.405
PC11	LN887156.1	86.944
PC11	LN887155.1	87.034
PC11	KP656865.1	87.367
PC11	KP645878.1	87.405
PC11	JF411088.1	88.691
PC11	JN309667.1	87.386
PC11	JN309666.1	87.386
PC11	JF884979.1	87.386
PC11	JF884567.1	87.386
PC11	JF884498.1	87.386
PC11	KY778983.1	87.752
PC11	KY018062.1	86.905
PC11	KY017920.1	86.905
PC11	KY017672.1	86.976
PC11	KY017671.1	86.976
PC11	KT174769.1	87.386
PC11	KT174768.1	87.386
PC11	KT174753.1	87.386
PC11	KT174751.1	87.386
PC11	KT174750.1	87.386
PC11	KT174747.1	87.386
PC11	KT174725.1	87.386
PC11	KM825253.1	87.234

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
NN01	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN03	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN04	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN09	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
n/a	EF122605.2	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EF122607.2	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EF122608.2	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EF122612.2	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EU381064.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	EU404114.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	HM567381.1	*Mesobuthus*	*eupeus*	n/a	GenBank	Buthidae
n/a	JF700146.1	*Mesobuthus*	*martensii*	AS27MT03	GenBank	Buthidae
n/a	JN018153.1	*Lychas*	*mucronatus*	n/a	GenBank	Buthidae
n/a	JN018154.1	*Parabuthus*	*laevifrons*	n/a	GenBank	Buthidae
n/a	JN018210.1	*Lychas*	*mucronatus*	n/a	GenBank	Buthidae
n/a	JN018211.1	*Lychas*	*mucronatus*	n/a	GenBank	Buthidae
n/a	KF997876.1	*Mesobuthus*	*gibbosus*	n/a	GenBank	Buthidae
n/a	KT716037.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	KX648425.1	*Hottentotta*	*minax*	n/a	GenBank	Buthidae
n/a	KX648429.1	*Compsobuthus*	*werneri*	n/a	GenBank	Buthidae
n/a	KY982184.1	*Centruroides*	*schmidti*	n/a	GenBank	Buthidae
n/a	KY982185.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	KY982187.1	*Heteroctenus*	*abudi*	n/a	GenBank	Buthidae
n/a	KY982188.1	*Heteroctenus*	*abudi*	n/a	GenBank	Buthidae
n/a	KY982192.1	*Heteroctenus*	*junceus*	n/a	GenBank	Buthidae
n/a	KY982193.1	*Heteroctenus*	*junceus*	n/a	GenBank	Buthidae
n/a	KY982194.1	*Heteroctenus*	*junceus*	n/a	GenBank	Buthidae
n/a	KY982199.1	*Heteroctenus*	*junceus*	n/a	GenBank	Buthidae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
n/a	KY982273.1	*Zabius*	*fuscus*	n/a	GenBank	Buthidae
n/a	MF422313.1	*Isometrus*	*sp.*	n/a	GenBank	Buthidae
n/a	MF422319.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422320.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422321.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422322.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422326.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422327.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422328.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422329.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MF422330.1	*Lychas*	*tricarinatus*	n/a	GenBank	Buthidae
n/a	MK479161.1	*Centruroides*	*arctimanus*	n/a	GenBank	Buthidae
n/a	MK479165.1	*Centruroides*	*barbudensis*	n/a	GenBank	Buthidae
n/a	MK479171.1	*Centruroides*	*exilimanus*	n/a	GenBank	Buthidae
n/a	MK479180.1	*Centruroides*	*insulanus*	n/a	GenBank	Buthidae
n/a	MK479188.1	*Centruroides*	*morenoi*	n/a	GenBank	Buthidae
n/a	MK479196.1	*Centruroides*	*platnicki*	n/a	GenBank	Buthidae
n/a	MK479202.1	*Centruroides*	*simplex*	n/a	GenBank	Buthidae
n/a	MK479204.1	*Centruroides*	*taino*	n/a	GenBank	Buthidae
n/a	MK479207.1	*Centruroides*	*testaceus*	n/a	GenBank	Buthidae
n/a	MK479210.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	NC37222.1	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	JN018156.1	*Belisarius*	*xambeui*	MNHN-JAD29	GenBank	Troglotayosicidae
n/a	KY295225.1	*Urodacus*	*planimanus*	WAM-T12965	GenBank	Urodacidae
n/a	JN018163.1	*Chaerilus*	*julietteae*	MNHN-JAB32	GenBank	Chaerilidae
n/a	HM418309.1	*Iurus*	*kinzelbachi*	VF-0846-1	GenBank	Luridae
n/a	KF548118.1	*Opisthacanthus*	*asper*	Sc1087	GenBank	Homuridae
n/a	KT446990.	*Brachistosternus*	*paposo*	n/a	GenBank	Bothriruridaae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
n/a	KT447018.1	*Brachistosternus*	*roigalsinai*	n/a	GenBank	Bothriruridaae
n/a	KT446957.1	*Brachistosternus*	*ehrenbergii*	n/a	GenBank	Bothriruridaae
n/a	KM514656.1	*Diplocentrus*	*rectimanus*	AMCC:LP2032	GenBank	Diplocentridae
n/a	KM514642.1	*Diplocentrus*	*cozumel*	AMCC:LP4102	GenBank	Diplocentridae
n/a	KT446986.1	*Brachistosternus*	*negrei*	n/a	GenBank	Bothriruridaae
n/a	KM514634.1	*Didymocentrus*	*lesueurii*	AMCC:LP3638	GenBank	Diplocentridae
n/a	KM514633.1	*Didymocentrus*	*krausi*	AMCC:LP1987	GenBank	Diplocentridae
n/a	KM514635.1	*Kolotl*	*magnus*	AMCC:LP7029	GenBank	Diplocentridae
n/a	KM514636.1	*Kolotl*	*poncei*	AMCC:LP7030	GenBank	Diplocentridae
n/a	AY156581.1	*Pandinus*	*dictator*	n/a	GenBank	Scorpionidae
n/a	KM274783.1	*Konetontli*	*chamelaensis*	LP7675	GenBank	Vaejovidae
n/a	JQ514251.1	*Pandinus*	*imperator*	Sc1050	GenBank	Scorpionidae
n/a	JX909544.1	*Paruroctonus*	*boreus*	SKY42/AMNH	GenBank	Vaejovidae
n/a	KF548118.1	*Opisthacanthus*	*asper*	Sc1087	GenBank	Homuridae
n/a	JQ514248.	*Opistophthalmus*	*boehmi*	Sc1137	GenBank	Homuridae
n/a	KT188365.1	*Scorpio*	*palmatus*	n/a	GenBank	Scorpionidae
n/a	JQ514255.1	*Chactas*	sp.	AVDM-2012	GenBank	Chactidae
n/a	KM274845.1	*Paravaejovis*	*spinigerus*	LP6317	GenBank	Vaejovidae
n/a	KM274724.1	*Smeringurus*	*grandis*	LP8690	GenBank	Vaejovidae
NA_N1_AG1	n/a	NA	N1	n/a	Helix database	Nemesiidae
NAA_N45_AS38	n/a	NAA	N45	n/a	Helix database	Nemesiidae
NAB_N46_AS41	n/a	NAB	N46	n/a	Helix database	Nemesiidae
NAD_N93_AC10	n/a	NAD	N93	n/a	Helix database	Nemesiidae
NAM_N49_AD14	n/a	NAM	N49	n/a	Helix database	Nemesiidae
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NAQ_N5_AD352	n/a	NAQ	N5	n/a	Helix database	Nemesiidae
NAW_N6_AD429	n/a	NAW	N6	n/a	Helix database	Nemesiidae
NAX_N24_AD452	n/a	NAX	N24	n/a	Helix database	Nemesiidae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
NAZ_N6_AD457	n/a	NAZ	N6	n/a	Helix database	Nemesiidae
NB_N16_AH8	n/a	NB	N16	n/a	Helix database	Nemesiidae
NBC_N6_AD577	n/a	NBC	N6	n/a	Helix database	Nemesiidae
NBE_N46_AD583	n/a	NBE	N46	n/a	Helix database	Nemesiidae
NBM_N4_AD678	n/a	NBM	N4	n/a	Helix database	Nemesiidae
NBR_N14_AD746	n/a	NBR	N14	n/a	Helix database	Nemesiidae
NBT_N7_AD748	n/a	NBT	N7	n/a	Helix database	Nemesiidae
NBU_N15_AD753	n/a	NBU	N15	n/a	Helix database	Nemesiidae
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NCA_N20_AF78	n/a	NCA	N20	n/a	Helix database	Nemesiidae
NCG_N95_I16	n/a	NCG	N95	n/a	Helix database	Nemesiidae
NCU_N110_O211	n/a	NCU	N110	n/a	Helix database	Nemesiidae
NCW_N66_O280	n/a	NCW	N66	n/a	Helix database	Nemesiidae
NCY_N67_O282	n/a	NCY	N67	n/a	Helix database	Nemesiidae
NCZ_N110_O285	n/a	NCZ	N110	n/a	Helix database	Nemesiidae
NDD_N101_O292	n/a	NDD	N101	n/a	Helix database	Nemesiidae
NDK_N94_O333	n/a	NDK	N94	n/a	Helix database	Nemesiidae
NDL_N96_O334	n/a	NDL	N96	n/a	Helix database	Nemesiidae
NEH_N112_BI22	n/a	NEH	N112	n/a	Helix database	Nemesiidae
NEM_N43_DW15	n/a	NEM	N43	n/a	Helix database	Nemesiidae
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NEW_N19_AD381	n/a	NEW	N19	n/a	Helix database	Nemesiidae
NFN_N43_CG5	n/a	NFN	N43	n/a	Helix database	Nemesiidae
NFO_N127_CB26	n/a	NFO	N127	n/a	Helix database	Nemesiidae
NFZ_N122_BV095	n/a	NFZ	N122	n/a	Helix database	Nemesiidae
NGC_N129_CW5	n/a	NGC	N129	n/a	Helix database	Nemesiidae
NGE_N130_CW14	n/a	NGE	N130	n/a	Helix database	Nemesiidae
NGN_N19_DC5	n/a	NGN	N19	n/a	Helix database	Nemesiidae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
NGS_N136_DG10	n/a	NGS	N136	n/a	Helix database	Nemesiidae
NGV_N35_DW21	n/a	NGV	N35	n/a	Helix database	Nemesiidae
NIG_N22+N23_ID10	n/a	NIG	N22+N23	n/a	Helix database	Nemesiidae
NK_N36_AD110	n/a	NK	N36	n/a	Helix database	Nemesiidae
NRF_N7_NN11	n/a	NRF	N7	n/a	Helix database	Nemesiidae
NRG_N7_NN15	n/a	NRG	N7	n/a	Helix database	Nemesiidae
NRH_N7_NN16	n/a	NRH	N7	n/a	Helix database	Nemesiidae
NRI_N7_NN17	n/a	NRI	N7	n/a	Helix database	Nemesiidae
NRJ_N7_NN18	n/a	NRJ	N7	n/a	Helix database	Nemesiidae
NRK_N7_NN20	n/a	NRK	N7	n/a	Helix database	Nemesiidae
NRL_N7_NN21	n/a	NRL	N7	n/a	Helix database	Nemesiidae
NRM_N7_NN37	n/a	NRM	N7	n/a	Helix database	Nemesiidae
NRO_N7_NN38	n/a	NRO	N7	n/a	Helix database	Nemesiidae
NRP_N138_NN35	n/a	NRP	N138	n/a	Helix database	Nemesiidae
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NRW_N144_OU21	n/a	NRW	N144	n/a	Helix database	Nemesiidae
NY_N37_AR64	n/a	NY	N37	n/a	Helix database	Nemesiidae
n/a	JQ772136.1	*Aname*	sp.	T95404	GenBank	Nemesiidae
n/a	KJ744398.1	*Aname*	*mellosa*	T101163	GenBank	Nemesiidae
n/a	KJ744414.1	*Aname*	sp.	T102047	GenBank	Nemesiidae
n/a	KJ744623.1	*Aname*	*mellosa*	T105871	GenBank	Nemesiidae
n/a	KJ744648.1	*Aname*	sp.	T107087	GenBank	Nemesiidae
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n/a	KJ744661.1	*Aname*	*mellosa*	T107942	GenBank	Nemesiidae
n/a	KJ744662.1	*Aname*	*mellosa*	T107945	GenBank	Nemesiidae
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n/a	KJ744775.1	*Aname*	*mellosa*	T113629	GenBank	Nemesiidae
n/a	KJ744785.1	*Aname*	*mellosa*	T113642	GenBank	Nemesiidae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
n/a	KJ744788.1	*Aname*	*mellosa*	T113648	GenBank	Nemesiidae
n/a	KJ744791.1	*Aname*	*mellosa*	T113654	GenBank	Nemesiidae
n/a	KJ744803.1	*Aname*	*mellosa*	T113666	GenBank	Nemesiidae
n/a	KJ744901.1	*Aname*	sp.	T118789	GenBank	Nemesiidae
n/a	KJ744902.1	*Aname*	sp.	T118791	GenBank	Nemesiidae
n/a	KJ744909.1	*Aname*	sp.	T118805	GenBank	Nemesiidae
n/a	KJ744910.1	*Aname*	sp.	T118811	GenBank	Nemesiidae
n/a	KJ744911.1	*Aname*	sp.	T118812	GenBank	Nemesiidae
n/a	KJ744914.1	*Aname*	sp.	T118818	GenBank	Nemesiidae
n/a	KJ744926.1	*Aname*	*mellosa*	T119710	GenBank	Nemesiidae
n/a	KJ744963.1	*Kwonkan*	sp.	T120001	GenBank	Nemesiidae
n/a	KJ744964.1	*Kwonkan*	sp.	T120003	GenBank	Nemesiidae
n/a	KJ744975.1	*Aname*	sp.	T121597	GenBank	Nemesiidae
n/a	KJ744977.1	*Aname*	*mellosa*	T122200	GenBank	Nemesiidae
n/a	KJ744982.1	*Aname*	*mellosa*	T122207	GenBank	Nemesiidae
n/a	KJ744987.1	*Aname*	*mellosa*	T122215	GenBank	Nemesiidae
n/a	KJ744990.1	*Aname*	*mellosa*	T122219	GenBank	Nemesiidae
n/a	KJ745117.1	*Aname*	sp.	T125329	GenBank	Nemesiidae
n/a	KJ745134.1	*Aname*	*mellosa*	T126250	GenBank	Nemesiidae
n/a	KJ745143.1	*Aname*	*mellosa*	T126259	GenBank	Nemesiidae
n/a	KJ745146.1	*Aname*	*mellosa*	T126262	GenBank	Nemesiidae
n/a	KJ745153.1	*Aname*	*mellosa*	T126271	GenBank	Nemesiidae
n/a	KJ745155.1	*Aname*	*mellosa*	T126273	GenBank	Nemesiidae
n/a	KJ745159.1	*Aname*	*mellosa*	T126279	GenBank	Nemesiidae
n/a	KJ745160.1	*Aname*	*mellosa*	T126280	GenBank	Nemesiidae
n/a	KJ745168.1	*Aname*	*mellosa*	T126296	GenBank	Nemesiidae
n/a	KJ745170.1	*Aname*	*mellosa*	T126301	GenBank	Nemesiidae
n/a	KJ745210.1	*Kwonkan*	sp.	T57563	GenBank	Nemesiidae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
n/a	KJ745231.1	*Aname*	sp.	T74238	GenBank	Nemesiidae
n/a	KJ745232.1	*Aname*	sp.	T74241	GenBank	Nemesiidae
n/a	KJ745233.1	*Aname*	sp.	T74247	GenBank	Nemesiidae
n/a	KJ745281.1	*Kwonkan*	sp.	T78543	GenBank	Nemesiidae
n/a	KJ745287.1	*Aname*	sp.	T82303	GenBank	Nemesiidae
n/a	KJ745288.1	*Aname*	sp.	T82304	GenBank	Nemesiidae
n/a	KJ745293.1	*Aname*	sp.	T82309	GenBank	Nemesiidae
n/a	KJ745375.1	*Aname*	sp.	T93314	GenBank	Nemesiidae
n/a	KJ745494.1	*Aname*	sp.	T98900	GenBank	Nemesiidae
NHP_MYG175	n/a	*Kwonkan*	NHP	n/a	Helix database	Nemesiidae
NHD_MYG127	n/a	*Synothele*	NHD	n/a	Helix database	Nemesiidae
NHG_MYG227	n/a	*Aname*	NHG	n/a	Helix database	Nemesiidae
NHQ_MYG250	n/a	*Aname*	NHQ	n/a	Helix database	Nemesiidae
NGX_MYG182	n/a	*Aname*	NGX	n/a	Helix database	Nemesiidae
NHF_MYG067	n/a	*Aname*	NHF	n/a	Helix database	Nemesiidae
NHK_MYG185	n/a	*Aname*	NHK	n/a	Helix database	Nemesiidae
NHJ_MYG034	n/a	*Aname*	NHJ	n/a	Helix database	Nemesiidae
n/a	KJ745122.1	*Idiommata*	sp.	T125335	GenBank	Bareychelidae
n/a	KJ745116.1	*Idiommata*	sp.	T125328	GenBank	Bareychelidae
n/a	KJ744575.1	*Aurecocrypta*	sp.	T103910	GenBank	Bareychelidae
n/a	KJ745103.1	*Idiommata*	sp.	T123636	GenBank	Bareychelidae
n/a	KJ745100.1	*Idiommata*	sp.	T123112	GenBank	Bareychelidae
n/a	KJ744660.1	*Aurecocrypta*	sp.	T107502	GenBank	Bareychelidae
BBS_B38_OY27	n/a	BBS	B38	n/a	Helix database	Bareychelidae
BL_B17_AR106	n/a	BL	B17	n/a	Helix database	Bareychelidae
BAQ_B22_O117	n/a	BAQ	B22	n/a	Helix database	Bareychelidae
BBK_B19_CB32	n/a	BBK	B19	n/a	Helix database	Bareychelidae
BAN_B24_O110	n/a	BAN	B24	n/a	Helix database	Bareychelidae

Helix ID	GenBank accession Number	Genus	Species	Voucher	Source	Family
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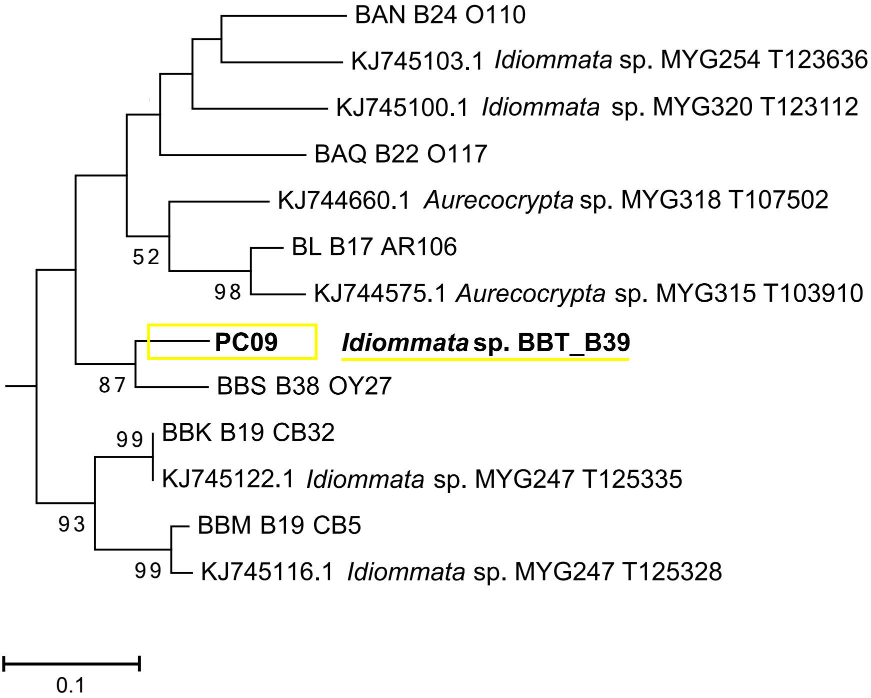
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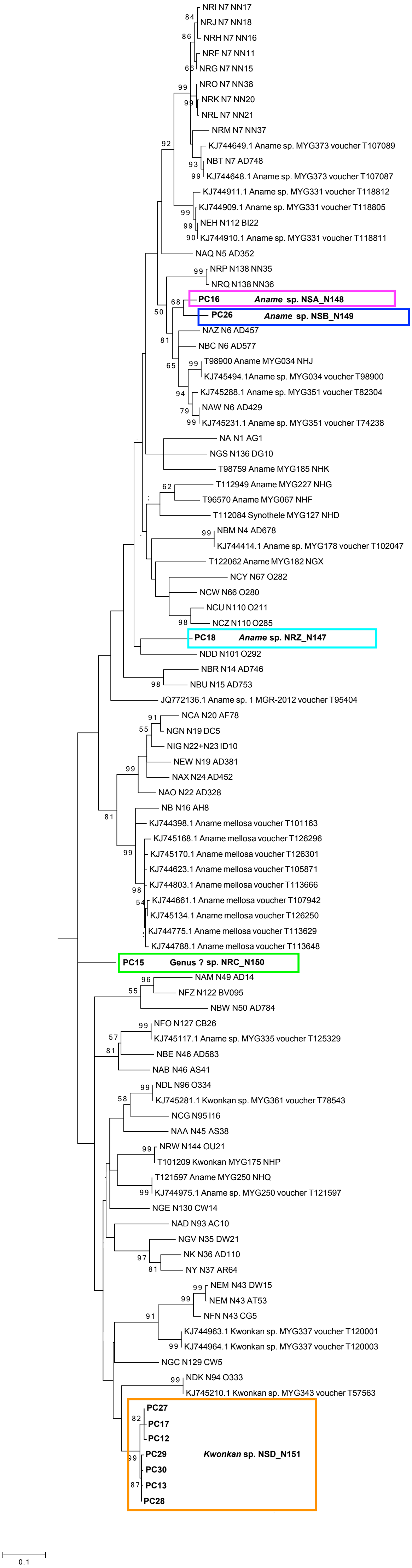
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NBT N7 AD748
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KJ744911.1 Aname sp. MYG331 voucher T118812
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PC16 Aname sp. NSA_N148
PC26 Aname sp. NSB_N149
NAZ N6 AD457
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KJ745288.1 Aname sp. MYG351 voucher T82304
NAW N6 AD429
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NA N1 AG1
NGS N136 DG10
T98759 Aname MYG185 NHK
T112949 Aname MYG227 NHG
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T112084 Synothele MYG127 NHD
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KJ744414.1 Aname sp. MYG178 voucher T102047
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NCY N67 O282
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NBR N14 AD746
NBU N15 AD753
JQ772136.1 Aname sp. 1 MGR-2012 voucher T95404
NCA N20 AF78
NGN N19 DC5
NIG N22+N23 ID10
NEW N19 AD381
NAX N24 AD452
NAO N22 AD328
NB N16 AH8
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NAM N49 AD14
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NBW N50 AD784
NFO N127 CB26
KJ745117.1 Aname sp. MYG335 voucher T125329
NBE N46 AD583
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NDL N96 O334
KJ745281.1 Kwonkan sp. MYG361 voucher T78543
NCG N95 I16
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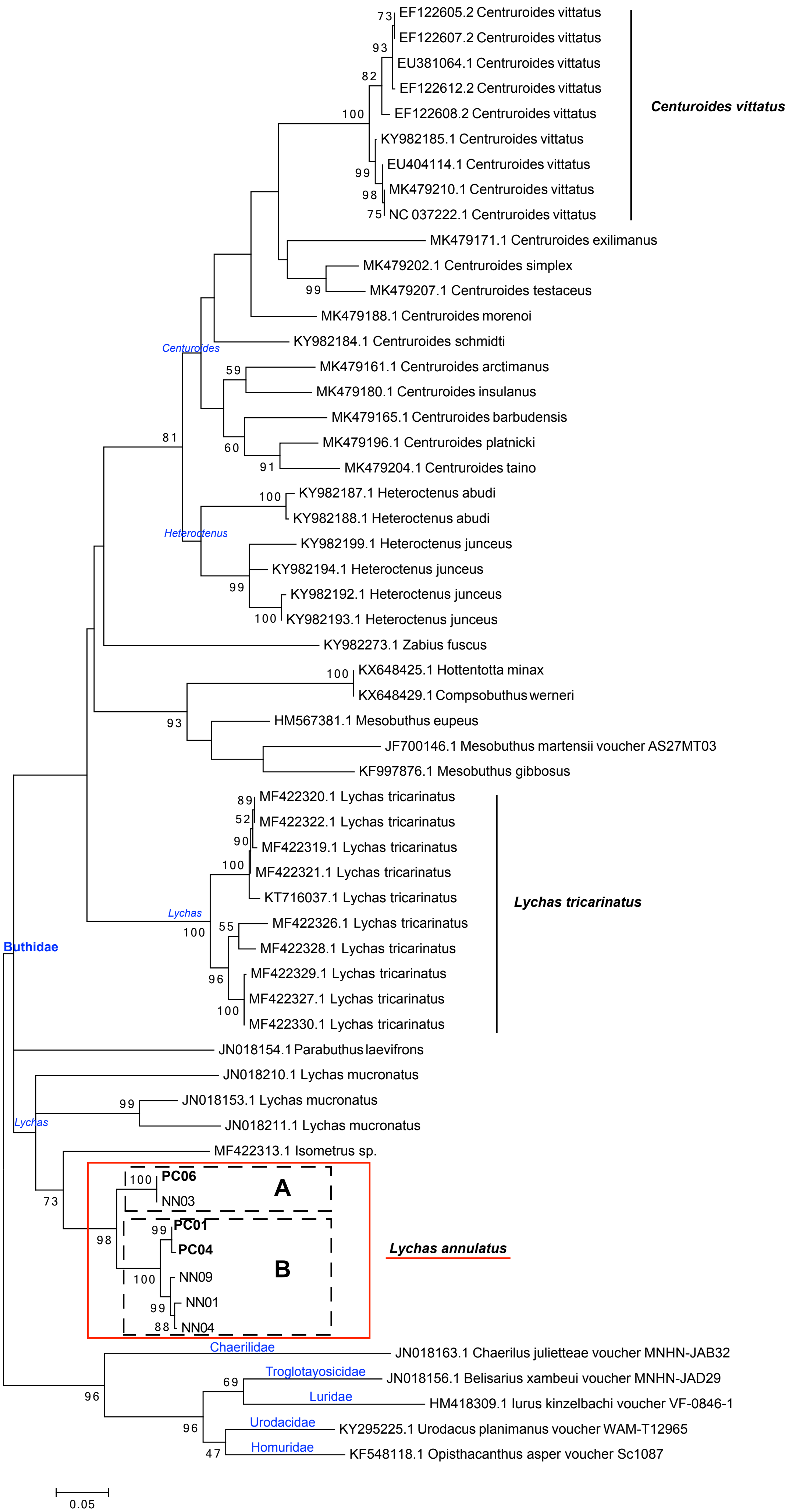
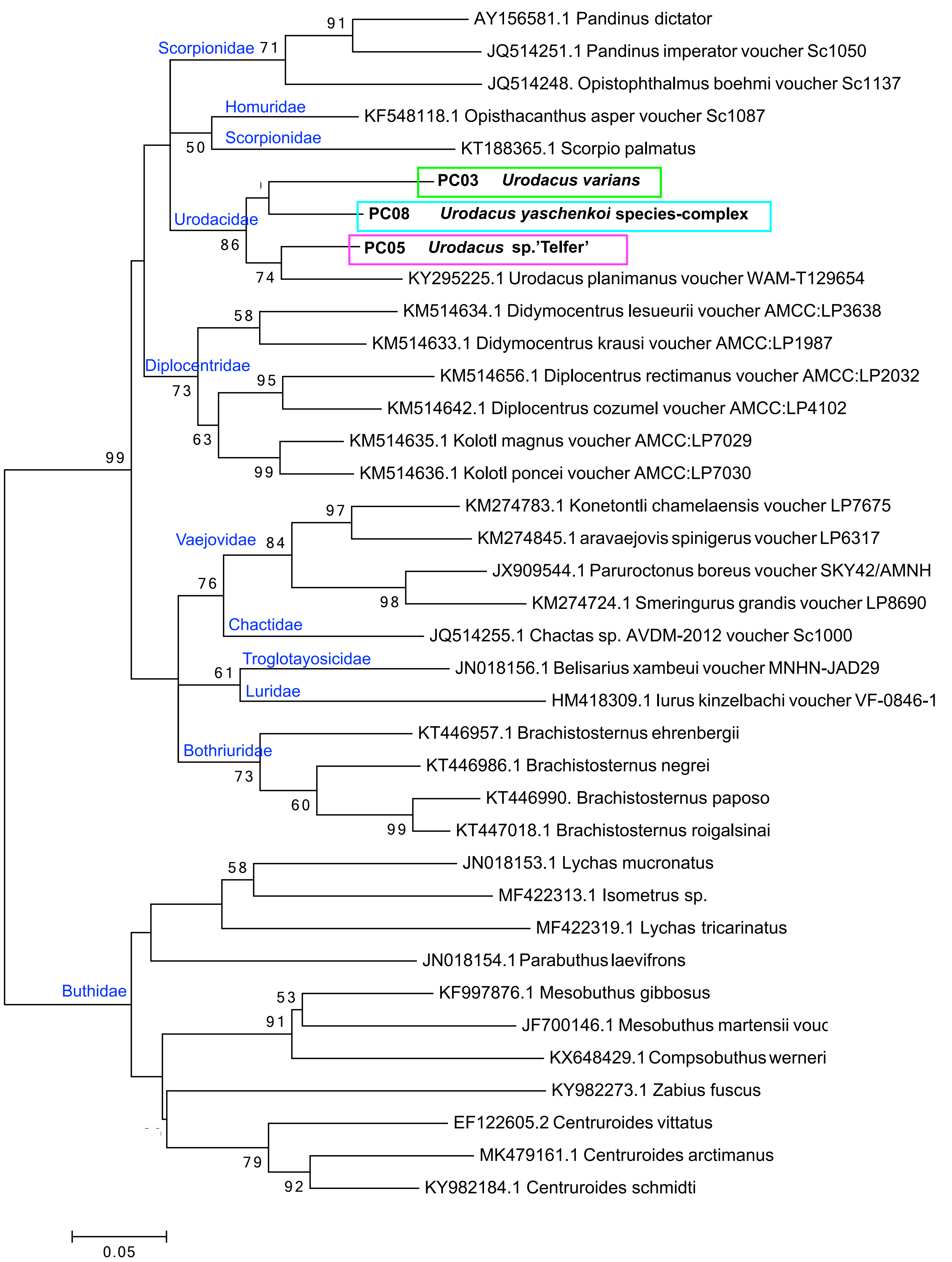
NRW N144 OU21
T101209 Kwonkan MYG175 NHP
T121597 Aname MYG250 NHQ
KJ744975.1 Aname sp. MYG250 voucher T121597
NGE N130 CW14
NAD N93 AC10
NGV N35 DW21
NK N36 AD110
NY N37 AR64
NEM N43 DW15
NEM N43 AT53
NFN N43 CG5
KJ744963.1 Kwonkan sp. MYG337 voucher T120001
KJ744964.1 Kwonkan sp. MYG337 voucher T120003
NGC N129 CW5
NDK N94 O333
KJ745210.1 Kwonkan sp. MYG343 voucher T57563
PC27
PC17
PC12
PC29
PC30
PC13
PC28
Kwonkan sp. NSD_N151
0.1



EF122605.2 Centruroides vittatus
EF122607.2 Centruroides vittatus
EU381064.1 Centruroides vittatus
EF122612.2 Centruroides vittatus
EF122608.2 Centruroides vittatus
KY982185.1 Centruroides vittatus
EU404114.1 Centruroides vittatus
MK479210.1 Centruroides vittatus
NC 037222.1 Centruroides vittatus
Centuroides vittatus
MK479171.1 Centruroides exilimanus
MK479202.1 Centruroides simplex
MK479207.1 Centruroides testaceus
MK479188.1 Centruroides morenoi
KY982184.1 Centruroides schmidti
Centuroides
MK479161.1 Centruroides arctimanus
MK479180.1 Centruroides insulanus
MK479165.1 Centruroides barbudensis
MK479196.1 Centruroides platnicki
MK479204.1 Centruroides taino
KY982187.1 Heteroctenus abudi
KY982188.1 Heteroctenus abudi
Heteroctenus
KY982199.1 Heteroctenus junceus
KY982194.1 Heteroctenus junceus
KY982192.1 Heteroctenus junceus
KY982193.1 Heteroctenus junceus
KY982273.1 Zabius fuscus
KX648425.1 Hottentotta minax
KX648429.1 Compsobuthus werneri
HM567381.1 Mesobuthus eupeus
JF700146.1 Mesobuthus martensii voucher AS27MT03
KF997876.1 Mesobuthus gibbosus
MF422320.1 Lychas tricarinatus
MF422322.1 Lychas tricarinatus
MF422319.1 Lychas tricarinatus
MF422321.1 Lychas tricarinatus
KT716037.1 Lychas tricarinatus
Lychas
Lychas tricarinatus
MF422326.1 Lychas tricarinatus
MF422328.1 Lychas tricarinatus
Buthidae
MF422329.1 Lychas tricarinatus
MF422327.1 Lychas tricarinatus
MF422330.1 Lychas tricarinatus
JN018154.1 Parabuthus laevifrons
JN018210.1 Lychas mucronatus
JN018153.1 Lychas mucronatus
Lychas
JN018211.1 Lychas mucronatus
MF422313.1 Isometrus sp.
PC06
A
NN03
PC01
PC04
Lychas annulatus
NN09
B
NN01
NN04
Chaerilidae
JN018163.1 Chaerilus julietteae voucher MNHN-JAB32
Troglotayosicidae
JN018156.1 Belisarius xambeui voucher MNHN-JAD29
Luridae
HM418309.1 Iurus kinzelbachi voucher VF-0846-1
Urodacidae
KY295225.1 Urodacus planimanus voucher WAM-T12965
Homuridae
KF548118.1 Opisthacanthus asper voucher Sc1087
0.05



AY156581.1 Pandinus dictator
JQ514251.1 Pandinus imperator voucher Sc1050
JQ514248. Opistophthalmus boehmi voucher Sc1137
KF548118.1 Opisthacanthus asper voucher Sc1087
KT188365.1 Scorpio palmatus
PC03 Urodacus varians
PC08 Urodacus yaschenkoi species-complex
PC05 Urodacus sp.'Telfer'
KY295225.1 Urodacus planimanus voucher WAM-T129654
KM514634.1 Didymocentrus lesueurii voucher AMCC:LP3638
KM514633.1 Didymocentrus krausi voucher AMCC:LP1987
KM514656.1 Diplocentrus rectimanus voucher AMCC:LP2032
KM514642.1 Diplocentrus cozumel voucher AMCC:LP4102
KM514635.1 Kolotl magnus voucher AMCC:LP7029
KM514636.1 Kolotl poncei voucher AMCC:LP7030
KM274783.1 Konetontli chamelaensis voucher LP7675
KM274845.1 aravaejovis spinigerus voucher LP6317
JX909544.1 Paruroctonus boreus voucher SKY42/AMNH
KM274724.1 Smeringurus grandis voucher LP8690
JQ514255.1 Chactas sp. AVDM-2012 voucher Sc1000
JN018156.1 Belisarius xambeui voucher MNHN-JAD29
HM418309.1 Iurus kinzelbachi voucher VF-0846-1
KT446957.1 Brachistosternus ehrenbergii
KT446986.1 Brachistosternus negrei
KT446990. Brachistosternus paposo
KT447018.1 Brachistosternus roigalsinai
JN018153.1 Lychas mucronatus
MF422313.1 Isometrus sp.
MF422319.1 Lychas tricarinatus
JN018154.1 Parabuthus laevifrons
KF997876.1 Mesobuthus gibbosus
JF700146.1 Mesobuthus martensii vouc
KX648429.1 Compsobuthus werneri
KY982273.1 Zabius fuscus
EF122605.2 Centruroides vittatus
MK479161.1 Centruroides arctimanus
KY982184.1 Centruroides schmidti
Scorpionidae
Homuridae
Scorpionidae
Urodacidae
Diplocentridae
Vaejovidae
Chactidae
Troglotayosicidae
Luridae
Bothriuridae
Buthidae
91
71
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0.05

	PC16	PC26	PC23	PC24	PC28	PC19	PC20	PC14	PC21	PC29	PC22	PC13	PC10	PC30	PC12	PC17	PC27	PC15	PC18	PC09
PC16		0.013	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.018	0.018	0.020
PC26	0.081		0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.020
PC23	0.178	0.164		0.000	0.000	0.000	0.000	0.000	0.003	0.003	0.003	0.003	0.007	0.002	0.007	0.007	0.006	0.016	0.017	0.019
PC24	0.178	0.164	0.000		0.000	0.000	0.000	0.000	0.003	0.003	0.003	0.003	0.007	0.002	0.007	0.007	0.006	0.016	0.017	0.019
PC28	0.178	0.164	0.000	0.000		0.000	0.000	0.000	0.003	0.003	0.003	0.003	0.007	0.002	0.007	0.007	0.006	0.016	0.017	0.019
PC19	0.178	0.164	0.000	0.000	0.000		0.000	0.000	0.003	0.003	0.003	0.003	0.007	0.002	0.007	0.007	0.006	0.016	0.017	0.019
PC20	0.178	0.164	0.000	0.000	0.000	0.000		0.000	0.003	0.003	0.003	0.003	0.007	0.002	0.007	0.007	0.006	0.016	0.017	0.019
PC14	0.178	0.164	0.000	0.000	0.000	0.000	0.000		0.003	0.003	0.003	0.003	0.007	0.002	0.007	0.007	0.006	0.016	0.017	0.019
PC21	0.178	0.169	0.005	0.005	0.005	0.005	0.005	0.005		0.000	0.000	0.005	0.007	0.004	0.007	0.007	0.007	0.016	0.017	0.019
PC29	0.178	0.169	0.005	0.005	0.005	0.005	0.005	0.005	0.000		0.000	0.005	0.007	0.004	0.007	0.007	0.007	0.016	0.017	0.019
PC22	0.178	0.169	0.005	0.005	0.005	0.005	0.005	0.005	0.000	0.000		0.005	0.007	0.004	0.007	0.007	0.007	0.016	0.017	0.019
PC13	0.181	0.162	0.005	0.005	0.005	0.005	0.005	0.005	0.010	0.010	0.010		0.007	0.004	0.007	0.007	0.007	0.016	0.017	0.019
PC10	0.178	0.162	0.019	0.019	0.019	0.019	0.019	0.019	0.024	0.024	0.024	0.024		0.006	0.000	0.005	0.003	0.016	0.017	0.020
PC30	0.181	0.162	0.002	0.002	0.002	0.002	0.002	0.002	0.007	0.007	0.007	0.007	0.017		0.006	0.007	0.006	0.016	0.017	0.019
PC12	0.178	0.162	0.019	0.019	0.019	0.019	0.019	0.019	0.024	0.024	0.024	0.024	0.000	0.017		0.005	0.003	0.016	0.017	0.020
PC17	0.176	0.169	0.019	0.019	0.019	0.019	0.019	0.019	0.024	0.024	0.024	0.019	0.010	0.021	0.010		0.003	0.016	0.017	0.019
PC27	0.178	0.166	0.014	0.014	0.014	0.014	0.014	0.014	0.019	0.019	0.019	0.019	0.005	0.017	0.005	0.005		0.016	0.017	0.019
PC15	0.162	0.159	0.126	0.126	0.126	0.126	0.126	0.126	0.131	0.131	0.131	0.131	0.126	0.126	0.126	0.128	0.128		0.019	0.020
PC18	0.164	0.154	0.138	0.138	0.138	0.138	0.138	0.138	0.143	0.143	0.143	0.133	0.145	0.135	0.145	0.145	0.145	0.176		0.020
PC09	0.202	0.209	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.188	0.190	0.202	0.190	0.202	0.195	0.197	0.209	0.221	

		1	2	3	4	5	6	7	8	9
1	**PC09**		0.013	0.016	0.017	0.016	0.017	0.017	0.016	0.017
2	BBS_B38_OY27	0.077		0.017	0.017	0.017	0.018	0.017	0.017	0.017
3	BL_B17_AR106	0.120	0.123		0.016	0.016	0.017	0.017	0.016	0.017
4	BAQ_B22_O117	0.128	0.128	0.120		0.017	0.017	0.017	0.017	0.017
5	BBK_B19_CB32	0.120	0.123	0.110	0.130		0.017	0.013	0.000	0.013
6	BAN_B24_O110	0.136	0.141	0.136	0.123	0.133		0.017	0.017	0.017
7	BBM_B19_CB5	0.128	0.133	0.125	0.138	0.074	0.128		0.013	0.008
8	KJ745122.1:2-658 *Idiommata* sp. MYG247 voucher T125335	0.120	0.123	0.110	0.130	0.000	0.133	0.074		0.013
9	KJ745116.1:2-658 *Idiommata* sp. MYG247 voucher T125328	0.130	0.130	0.128	0.133	0.077	0.123	0.023	0.077	
10	KJ744575.1:1-658 *Aurecocrypta* sp. MYG315 voucher T103910	0.120	0.125	0.049	0.123	0.128	0.146	0.141	0.128	0.143
11	KJ745103.1:2-658 *Idiommata* sp. MYG254 voucher T123636	0.133	0.136	0.123	0.130	0.110	0.107	0.130	0.110	0.128
12	KJ745100.1:1-658 *Idiommata* sp. MYG320 voucher T123112	0.133	0.115	0.123	0.125	0.143	0.128	0.141	0.143	0.133
13	KJ744660.1:2-658 *Aurecocrypta* sp. MYG318 voucher T107502	0.148	0.133	0.097	0.113	0.123	0.125	0.148	0.123	0.141

		10	11	12	13
1	**PC09**	0.016	0.017	0.017	0.018
2	BBS_B38_OY27	0.017	0.017	0.016	0.017
3	BL_B17_AR106	0.011	0.017	0.017	0.015
4	BAQ_B22_O117	0.017	0.017	0.017	0.016
5	BBK_B19_CB32	0.017	0.016	0.018	0.017
6	BAN_B24_O110	0.018	0.016	0.017	0.017
7	BBM_B19_CB5	0.018	0.017	0.018	0.018
8	KJ745122.1:2-658 *Idiommata* sp. MYG247 voucher T125335	0.017	0.016	0.018	0.017
9	KJ745116.1:2-658 *Idiommata* sp. MYG247 voucher T125328	0.018	0.017	0.017	0.018
10	KJ744575.1:1-658 *Aurecocrypta* sp. MYG315 voucher T103910		0.017	0.017	0.015
11	KJ745103.1:2-658 *Idiommata* sp. MYG254 voucher T123636	0.130		0.017	0.016
12	KJ745100.1:1-658 *Idiommata* sp. MYG320 voucher T123112	0.128	0.123		0.017
13	KJ744660.1:2-658 *Aurecocrypta* sp. MYG318 voucher T107502	0.102	0.110	0.130	

		1	2	3	4	5	6	7	8	9
1	**PC12**		0.004	0.008	0.008	0.007	0.019	0.017	0.020	0.019
2	**PC27**	0.005		0.007	0.007	0.006	0.019	0.018	0.020	0.020
3	**PC29**	0.025	0.019		0.005	0.004	0.019	0.018	0.020	0.020
4	**PC13**	0.022	0.016	0.008		0.003	0.018	0.017	0.020	0.020
5	**PC28**	0.019	0.014	0.005	0.003		0.018	0.017	0.020	0.020
6	**PC18**	0.148	0.148	0.148	0.140	0.142		0.020	0.019	0.019
7	**PC15**	0.126	0.129	0.129	0.126	0.123	0.175		0.019	0.019
8	**PC16**	0.181	0.181	0.184	0.184	0.184	0.164	0.159		0.014
9	**PC26**	0.164	0.170	0.175	0.170	0.170	0.164	0.153	0.082	
10	NA_N1_AG1	0.192	0.197	0.192	0.192	0.195	0.162	0.181	0.156	0.170
11	NAA_N45_AS38	0.137	0.137	0.132	0.137	0.134	0.173	0.145	0.186	0.203
12	NAB_N46_AS41	0.140	0.137	0.137	0.140	0.137	0.148	0.153	0.186	0.181
13	NAD_N93_AC10	0.129	0.129	0.142	0.140	0.137	0.189	0.175	0.211	0.197
14	NAM_N49_AD14	0.159	0.162	0.162	0.162	0.162	0.200	0.181	0.192	0.197
15	NAO_N22_AD328	0.167	0.173	0.170	0.164	0.167	0.167	0.140	0.170	0.162
16	NAQ_N5_AD352	0.178	0.184	0.170	0.173	0.175	0.167	0.173	0.126	0.129
17	NAW_N6_AD429	0.181	0.181	0.175	0.175	0.175	0.151	0.167	0.088	0.110
18	NAX_N24_AD452	0.170	0.170	0.178	0.170	0.173	0.170	0.153	0.162	0.134
19	NAZ_N6_AD457	0.156	0.162	0.162	0.159	0.159	0.145	0.164	0.093	0.099
20	NB_N16_AH8	0.156	0.159	0.164	0.156	0.159	0.153	0.162	0.184	0.192
21	NBC_N6_AD577	0.192	0.195	0.186	0.192	0.192	0.170	0.170	0.099	0.110
22	NBE_N46_AD583	0.145	0.140	0.137	0.140	0.142	0.181	0.151	0.192	0.178
23	NBM_N4_AD678	0.192	0.197	0.184	0.186	0.186	0.164	0.175	0.164	0.167
24	NBR_N14_AD746	0.181	0.181	0.181	0.181	0.181	0.189	0.178	0.167	0.170
25	NBT_N7_AD748	0.167	0.173	0.178	0.173	0.173	0.162	0.167	0.110	0.115
26	NBU_N15_AD753	0.167	0.162	0.162	0.164	0.164	0.153	0.192	0.167	0.159
27	NBW_N50_AD784	0.167	0.164	0.156	0.159	0.159	0.173	0.178	0.167	0.173
28	NCA_N20_AF78	0.186	0.192	0.186	0.184	0.186	0.181	0.151	0.181	0.178

		1	2	3	4	5	6	7	8	9
29	NCG_N95_I16	0.118	0.121	0.121	0.126	0.123	0.184	0.151	0.178	0.184
30	NCU_N110_O211	0.156	0.162	0.156	0.153	0.153	0.137	0.167	0.175	0.151
31	NCW_N66_O280	0.167	0.167	0.178	0.175	0.175	0.164	0.162	0.145	0.145
32	NCY_N67_O282	0.211	0.211	0.205	0.200	0.200	0.164	0.186	0.159	0.156
33	NCZ_N110_O285	0.162	0.167	0.167	0.164	0.164	0.156	0.159	0.181	0.142
34	NDD_N101_O292	0.184	0.181	0.181	0.175	0.178	0.151	0.181	0.153	0.178
35	NDK_N94_O333	0.118	0.118	0.118	0.118	0.115	0.175	0.159	0.186	0.159
36	NDL_N96_O334	0.121	0.118	0.110	0.118	0.115	0.186	0.142	0.192	0.192
37	NEH_N112_BI22	0.167	0.173	0.167	0.164	0.164	0.151	0.178	0.121	0.142
38	NEM_N43_DW15	0.134	0.134	0.140	0.134	0.137	0.167	0.159	0.200	0.195
39	NEM_N43_AT53	0.132	0.132	0.137	0.132	0.134	0.170	0.162	0.203	0.197
40	NEW_N19_AD381	0.181	0.186	0.195	0.186	0.189	0.200	0.156	0.173	0.167
41	NFN_N43_CG5	0.134	0.134	0.140	0.140	0.137	0.178	0.167	0.195	0.208
42	NFO_N127_CB26	0.140	0.142	0.140	0.142	0.140	0.178	0.142	0.197	0.178
43	NFZ_N122_BV095	0.156	0.159	0.162	0.159	0.159	0.184	0.173	0.200	0.192
44	NGC_N129_CW5	0.123	0.118	0.121	0.121	0.118	0.164	0.148	0.184	0.175
45	NGE_N130_CW14	0.121	0.118	0.112	0.115	0.112	0.153	0.132	0.186	0.170
46	NGN_N19_DC5	0.189	0.195	0.195	0.186	0.189	0.184	0.151	0.162	0.151
47	NGS_N136_DG10	0.186	0.184	0.175	0.175	0.178	0.151	0.203	0.151	0.164
48	NGV_N35_DW21	0.134	0.134	0.129	0.134	0.134	0.167	0.170	0.164	0.186
49	NIG_N22+N23_ID10	0.184	0.184	0.178	0.175	0.178	0.192	0.156	0.173	0.175
50	NK_N36_AD110	0.132	0.137	0.132	0.137	0.137	0.178	0.170	0.175	0.178
51	NRF_N7_NN11	0.164	0.170	0.170	0.164	0.164	0.156	0.173	0.112	0.123
52	NRG_N7_NN15	0.164	0.170	0.170	0.164	0.164	0.156	0.164	0.115	0.121
53	NRH_N7_NN16	0.173	0.178	0.178	0.173	0.173	0.170	0.170	0.126	0.132
54	NRI_N7_NN17	0.170	0.175	0.175	0.170	0.170	0.164	0.164	0.121	0.126
55	NRJ_N7_NN18	0.167	0.173	0.173	0.167	0.167	0.167	0.167	0.123	0.129
56	NRK_N7_NN20	0.175	0.181	0.175	0.175	0.175	0.167	0.167	0.107	0.123

		1	2	3	4	5	6	7	8	9
57	NRL_N7_NN21	0.170	0.175	0.170	0.170	0.170	0.162	0.167	0.112	0.118
58	NRM_N7_NN37	0.189	0.195	0.197	0.192	0.192	0.173	0.189	0.126	0.140
59	NRO_N7_NN38	0.173	0.178	0.173	0.173	0.173	0.162	0.173	0.107	0.118
60	NRP_N138_NN35	0.175	0.181	0.178	0.175	0.175	0.173	0.159	0.110	0.121
61	NRQ_N138_NN36	0.175	0.181	0.178	0.175	0.175	0.181	0.167	0.115	0.126
62	NRW_N144_OU21	0.134	0.140	0.142	0.145	0.142	0.186	0.159	0.178	0.173
63	NY_N37_AR64	0.142	0.148	0.145	0.151	0.151	0.186	0.173	0.189	0.181
64	T101209 Kwonkan MYG175 NHP	0.129	0.134	0.140	0.140	0.137	0.181	0.159	0.173	0.173
65	T112084 Synothele MYG127 NHD	0.186	0.189	0.186	0.184	0.184	0.173	0.197	0.142	0.167
66	T112949 Aname MYG227 NHG	0.167	0.173	0.167	0.167	0.170	0.173	0.175	0.142	0.156
67	T121597 Aname MYG250 NHQ	0.121	0.126	0.129	0.134	0.132	0.167	0.151	0.173	0.178
68	T122062 Aname MYG182 NGX	0.175	0.175	0.175	0.170	0.170	0.170	0.173	0.164	0.142
69	T96570 Aname MYG067 NHF	0.186	0.192	0.181	0.181	0.178	0.151	0.189	0.159	0.156
70	T98759 Aname MYG185 NHK	0.197	0.197	0.195	0.189	0.192	0.178	0.208	0.173	0.162
71	T98900 Aname MYG034 NHJ	0.184	0.186	0.181	0.181	0.181	0.167	0.167	0.093	0.107
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.173	0.178	0.170	0.178	0.175	0.173	0.145	0.156	0.173
73	KJ744398.1 *Aname mellosa* voucher T101163	0.145	0.148	0.153	0.145	0.148	0.142	0.145	0.175	0.175
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.192	0.197	0.184	0.186	0.186	0.164	0.175	0.164	0.167
75	KJ744623.1 *Aname mellosa* voucher T105871	0.123	0.126	0.134	0.126	0.129	0.140	0.151	0.170	0.167
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.167	0.173	0.178	0.173	0.173	0.162	0.167	0.110	0.115
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.175	0.181	0.186	0.181	0.181	0.173	0.170	0.112	0.123
78	KJ744661.1 *Aname mellosa* voucher T107942	0.129	0.129	0.134	0.126	0.129	0.145	0.151	0.173	0.167
79	KJ744662.1 *Aname mellosa* voucher T107945	0.132	0.134	0.142	0.134	0.137	0.142	0.151	0.164	0.170
80	KJ744669.1 *Aname mellosa* voucher T107968	0.132	0.134	0.140	0.132	0.134	0.145	0.151	0.173	0.173
81	KJ744775.1 *Aname mellosa* voucher T113629	0.126	0.129	0.137	0.129	0.132	0.142	0.151	0.173	0.173
82	KJ744785.1 *Aname mellosa* voucher T113642	0.126	0.129	0.134	0.126	0.129	0.142	0.148	0.170	0.170
83	KJ744788.1 *Aname mellosa* voucher T113648	0.126	0.129	0.137	0.129	0.132	0.145	0.153	0.175	0.175
84	KJ744791.1 *Aname mellosa* voucher T113654	0.129	0.132	0.140	0.132	0.134	0.140	0.156	0.170	0.167

		1	2	3	4	5	6	7	8	9
85	KJ744803.1 *Aname mellosa* voucher T113666	0.129	0.132	0.137	0.129	0.132	0.142	0.148	0.170	0.170
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.164	0.170	0.164	0.162	0.162	0.148	0.175	0.118	0.140
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.164	0.170	0.164	0.162	0.162	0.148	0.175	0.118	0.140
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.167	0.173	0.167	0.164	0.164	0.151	0.173	0.115	0.142
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.167	0.173	0.167	0.164	0.164	0.151	0.178	0.121	0.142
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.164	0.170	0.170	0.167	0.167	0.153	0.170	0.118	0.134
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.167	0.173	0.167	0.164	0.164	0.153	0.173	0.118	0.134
92	KJ744926.1 *Aname mellosa* voucher T119710	0.129	0.132	0.137	0.129	0.132	0.142	0.156	0.178	0.173
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.134	0.137	0.132	0.132	0.129	0.181	0.153	0.173	0.170
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.134	0.137	0.132	0.132	0.129	0.181	0.153	0.173	0.170
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.121	0.126	0.129	0.134	0.132	0.167	0.151	0.173	0.178
96	KJ744977.1 *Aname mellosa* voucher T122200	0.134	0.137	0.142	0.134	0.137	0.142	0.151	0.170	0.164
97	KJ744982.1 *Aname mellosa* voucher T122207	0.112	0.118	0.129	0.121	0.123	0.142	0.156	0.173	0.164
98	KJ744987.1 *Aname mellosa* voucher T122215	0.129	0.132	0.134	0.132	0.134	0.142	0.156	0.175	0.175
99	KJ744990.1 *Aname mellosa* voucher T122219	0.129	0.129	0.137	0.129	0.132	0.145	0.167	0.189	0.167
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.140	0.142	0.140	0.142	0.140	0.178	0.142	0.197	0.178
101	KJ745134.1 *Aname mellosa* voucher T126250	0.132	0.134	0.140	0.132	0.134	0.148	0.148	0.175	0.170
102	KJ745143.1 *Aname mellosa* voucher T126259	0.132	0.134	0.140	0.132	0.134	0.148	0.148	0.175	0.170
103	KJ745146.1 *Aname mellosa* voucher T126262	0.129	0.132	0.134	0.126	0.129	0.145	0.145	0.173	0.164
104	KJ745153.1 *Aname mellosa* voucher T126271	0.134	0.137	0.142	0.134	0.137	0.151	0.151	0.178	0.173
105	KJ745155.1 *Aname mellosa* voucher T126273	0.129	0.132	0.137	0.129	0.132	0.142	0.151	0.170	0.170
106	KJ745159.1 *Aname mellosa* voucher T126279	0.134	0.137	0.145	0.137	0.140	0.140	0.153	0.167	0.167
107	KJ745160.1 *Aname mellosa* voucher T126280	0.134	0.137	0.142	0.134	0.137	0.151	0.151	0.178	0.173
108	KJ745168.1 *Aname mellosa* voucher T126296	0.140	0.142	0.148	0.140	0.142	0.142	0.156	0.173	0.167
109	KJ745170.1 *Aname mellosa* voucher T126301	0.129	0.129	0.137	0.129	0.132	0.140	0.148	0.164	0.167
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.118	0.118	0.118	0.118	0.115	0.175	0.159	0.186	0.159
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.181	0.181	0.175	0.175	0.175	0.151	0.167	0.088	0.110
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.181	0.181	0.175	0.175	0.175	0.151	0.167	0.088	0.110

		1	2	3	4	5	6	7	8	9
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.181	0.181	0.175	0.175	0.175	0.151	0.167	0.088	0.110
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.121	0.118	0.110	0.118	0.115	0.186	0.142	0.192	0.192
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.181	0.181	0.175	0.175	0.175	0.151	0.167	0.088	0.110
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.195	0.189	0.184	0.184	0.184	0.162	0.170	0.085	0.112
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.181	0.181	0.175	0.175	0.175	0.151	0.167	0.088	0.110
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.192	0.195	0.186	0.192	0.192	0.170	0.170	0.099	0.110
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.184	0.186	0.181	0.181	0.181	0.167	0.167	0.093	0.107

		10	11	12	13	14	15	16	17	18
1	**PC12**	0.021	0.018	0.018	0.018	0.019	0.020	0.020	0.020	0.020
2	**PC27**	0.021	0.018	0.018	0.018	0.019	0.020	0.020	0.020	0.020
3	**PC29**	0.021	0.018	0.018	0.018	0.019	0.020	0.020	0.020	0.020
4	**PC13**	0.021	0.018	0.018	0.018	0.019	0.019	0.020	0.020	0.020
5	**PC28**	0.021	0.018	0.018	0.018	0.019	0.020	0.020	0.020	0.020
6	**PC18**	0.019	0.020	0.019	0.020	0.021	0.020	0.020	0.019	0.020
7	**PC15**	0.020	0.018	0.019	0.020	0.020	0.018	0.020	0.020	0.019
8	**PC16**	0.019	0.020	0.020	0.021	0.021	0.020	0.017	0.015	0.019
9	**PC26**	0.020	0.021	0.020	0.021	0.021	0.019	0.018	0.016	0.018
10	NA_N1_AG1		0.020	0.021	0.021	0.021	0.020	0.019	0.019	0.020
11	NAA_N45_AS38	0.178		0.018	0.019	0.020	0.020	0.020	0.020	0.020
12	NAB_N46_AS41	0.192	0.129		0.018	0.019	0.020	0.020	0.020	0.019
13	NAD_N93_AC10	0.205	0.164	0.140		0.021	0.021	0.021	0.021	0.020
14	NAM_N49_AD14	0.211	0.175	0.153	0.197		0.021	0.020	0.021	0.021
15	NAO_N22_AD328	0.170	0.167	0.186	0.200	0.192		0.020	0.019	0.016
16	NAQ_N5_AD352	0.151	0.184	0.178	0.205	0.189	0.181		0.017	0.020
17	NAW_N6_AD429	0.148	0.178	0.167	0.203	0.197	0.162	0.123		0.020
18	NAX_N24_AD452	0.184	0.167	0.164	0.189	0.192	0.101	0.167	0.170	
19	NAZ_N6_AD457	0.151	0.186	0.175	0.203	0.189	0.164	0.121	0.082	0.164
20	NB_N16_AH8	0.192	0.175	0.195	0.203	0.197	0.142	0.167	0.186	0.145
21	NBC_N6_AD577	0.170	0.175	0.175	0.211	0.186	0.162	0.115	0.063	0.167
22	NBE_N46_AD583	0.195	0.156	0.110	0.153	0.175	0.173	0.186	0.195	0.159
23	NBM_N4_AD678	0.197	0.184	0.195	0.214	0.211	0.197	0.151	0.164	0.214
24	NBR_N14_AD746	0.175	0.186	0.184	0.205	0.200	0.197	0.151	0.173	0.173
25	NBT_N7_AD748	0.162	0.189	0.197	0.216	0.195	0.170	0.118	0.107	0.189
26	NBU_N15_AD753	0.184	0.162	0.164	0.208	0.200	0.186	0.159	0.170	0.156
27	NBW_N50_AD784	0.189	0.186	0.173	0.197	0.159	0.186	0.184	0.181	0.200
28	NCA_N20_AF78	0.195	0.184	0.181	0.208	0.203	0.096	0.173	0.189	0.096

		10	11	12	13	14	15	16	17	18
29	NCG_N95_I16	0.197	0.137	0.156	0.134	0.178	0.186	0.178	0.186	0.184
30	NCU_N110_O211	0.162	0.175	0.208	0.203	0.216	0.167	0.156	0.164	0.173
31	NCW_N66_O280	0.162	0.184	0.195	0.192	0.189	0.178	0.148	0.142	0.159
32	NCY_N67_O282	0.195	0.214	0.219	0.230	0.219	0.170	0.175	0.137	0.181
33	NCZ_N110_O285	0.162	0.189	0.197	0.186	0.205	0.186	0.137	0.145	0.178
34	NDD_N101_O292	0.192	0.181	0.184	0.197	0.208	0.181	0.159	0.151	0.175
35	NDK_N94_O333	0.211	0.153	0.142	0.164	0.173	0.162	0.175	0.178	0.173
36	NDL_N96_O334	0.189	0.112	0.145	0.159	0.173	0.181	0.175	0.178	0.192
37	NEH_N112_BI22	0.170	0.181	0.195	0.219	0.192	0.186	0.126	0.126	0.203
38	NEM_N43_DW15	0.211	0.197	0.181	0.167	0.186	0.197	0.178	0.189	0.192
39	NEM_N43_AT53	0.214	0.195	0.178	0.170	0.189	0.200	0.181	0.186	0.195
40	NEW_N19_AD381	0.216	0.184	0.197	0.219	0.197	0.101	0.186	0.178	0.085
41	NFN_N43_CG5	0.227	0.181	0.170	0.151	0.181	0.203	0.181	0.200	0.192
42	NFO_N127_CB26	0.189	0.159	0.107	0.145	0.156	0.170	0.184	0.178	0.170
43	NFZ_N122_BV095	0.219	0.162	0.137	0.153	0.112	0.197	0.200	0.189	0.184
44	NGC_N129_CW5	0.197	0.156	0.148	0.153	0.186	0.192	0.162	0.164	0.192
45	NGE_N130_CW14	0.184	0.145	0.129	0.134	0.167	0.156	0.162	0.159	0.167
46	NGN_N19_DC5	0.197	0.181	0.186	0.197	0.197	0.085	0.162	0.173	0.077
47	NGS_N136_DG10	0.156	0.203	0.184	0.219	0.200	0.200	0.151	0.159	0.200
48	NGV_N35_DW21	0.186	0.159	0.162	0.151	0.167	0.189	0.164	0.162	0.186
49	NIG_N22+N23_ID10	0.178	0.175	0.192	0.211	0.184	0.074	0.173	0.186	0.090
50	NK_N36_AD110	0.192	0.153	0.148	0.145	0.164	0.205	0.167	0.159	0.200
51	NRF_N7_NN11	0.167	0.195	0.189	0.214	0.186	0.167	0.110	0.110	0.197
52	NRG_N7_NN15	0.159	0.192	0.189	0.214	0.186	0.164	0.112	0.101	0.195
53	NRH_N7_NN16	0.175	0.197	0.186	0.214	0.184	0.173	0.126	0.104	0.203
54	NRI_N7_NN17	0.167	0.195	0.192	0.216	0.192	0.170	0.118	0.104	0.200
55	NRJ_N7_NN18	0.173	0.195	0.195	0.216	0.189	0.170	0.123	0.101	0.200
56	NRK_N7_NN20	0.159	0.195	0.189	0.219	0.192	0.173	0.118	0.096	0.192

		10	11	12	13	14	15	16	17	18
57	NRL_N7_NN21	0.159	0.189	0.184	0.214	0.192	0.173	0.118	0.096	0.197
58	NRM_N7_NN37	0.173	0.208	0.208	0.227	0.208	0.189	0.126	0.118	0.214
59	NRO_N7_NN38	0.159	0.189	0.184	0.216	0.195	0.173	0.118	0.096	0.192
60	NRP_N138_NN35	0.167	0.192	0.175	0.192	0.205	0.159	0.132	0.112	0.164
61	NRQ_N138_NN36	0.173	0.195	0.173	0.195	0.205	0.164	0.140	0.115	0.170
62	NRW_N144_OU21	0.197	0.134	0.132	0.151	0.167	0.189	0.167	0.186	0.175
63	NY_N37_AR64	0.189	0.148	0.162	0.148	0.153	0.192	0.170	0.175	0.186
64	T101209 Kwonkan MYG175 NHP	0.197	0.134	0.126	0.145	0.164	0.189	0.170	0.181	0.175
65	T112084 Synothele MYG127 NHD	0.173	0.192	0.186	0.208	0.186	0.173	0.148	0.153	0.184
66	T112949 Aname MYG227 NHG	0.189	0.205	0.189	0.205	0.216	0.184	0.129	0.156	0.173
67	T121597 Aname MYG250 NHQ	0.189	0.123	0.132	0.140	0.156	0.162	0.164	0.173	0.164
68	T122062 Aname MYG182 NGX	0.184	0.189	0.192	0.203	0.200	0.186	0.159	0.162	0.178
69	T96570 Aname MYG067 NHF	0.178	0.197	0.189	0.225	0.211	0.181	0.145	0.159	0.164
70	T98759 Aname MYG185 NHK	0.170	0.216	0.225	0.249	0.211	0.205	0.140	0.153	0.200
71	T98900 Aname MYG034 NHJ	0.159	0.184	0.162	0.208	0.186	0.175	0.126	0.055	0.178
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.162	0.164	0.184	0.197	0.197	0.170	0.140	0.175	0.164
73	KJ744398.1 *Aname mellosa* voucher T101163	0.186	0.162	0.164	0.203	0.192	0.107	0.178	0.175	0.140
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.197	0.184	0.195	0.214	0.211	0.197	0.151	0.164	0.214
75	KJ744623.1 *Aname mellosa* voucher T105871	0.184	0.156	0.162	0.181	0.175	0.118	0.148	0.175	0.121
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.162	0.189	0.197	0.216	0.195	0.170	0.118	0.107	0.189
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.167	0.200	0.208	0.216	0.200	0.181	0.118	0.118	0.197
78	KJ744661.1 *Aname mellosa* voucher T107942	0.186	0.159	0.170	0.186	0.178	0.115	0.153	0.181	0.121
79	KJ744662.1 *Aname mellosa* voucher T107945	0.178	0.156	0.159	0.175	0.175	0.121	0.148	0.170	0.118
80	KJ744669.1 *Aname mellosa* voucher T107968	0.184	0.156	0.167	0.186	0.175	0.121	0.153	0.178	0.123
81	KJ744775.1 *Aname mellosa* voucher T113629	0.184	0.156	0.164	0.181	0.173	0.118	0.153	0.178	0.121
82	KJ744785.1 *Aname mellosa* voucher T113642	0.181	0.153	0.164	0.181	0.173	0.115	0.151	0.175	0.121
83	KJ744788.1 *Aname mellosa* voucher T113648	0.184	0.153	0.170	0.178	0.178	0.126	0.153	0.175	0.126
84	KJ744791.1 *Aname mellosa* voucher T113654	0.184	0.162	0.162	0.184	0.178	0.121	0.151	0.175	0.118

		10	11	12	13	14	15	16	17	18
85	KJ744803.1 *Aname mellosa* voucher T113666	0.181	0.153	0.164	0.184	0.175	0.118	0.151	0.175	0.121
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.167	0.178	0.192	0.216	0.189	0.184	0.123	0.123	0.200
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.167	0.178	0.192	0.216	0.189	0.184	0.123	0.123	0.200
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.164	0.181	0.195	0.219	0.186	0.181	0.121	0.121	0.197
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.170	0.181	0.195	0.219	0.192	0.186	0.126	0.126	0.203
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.162	0.175	0.186	0.203	0.200	0.178	0.121	0.121	0.192
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.164	0.178	0.184	0.205	0.197	0.181	0.118	0.118	0.195
92	KJ744926.1 *Aname mellosa* voucher T119710	0.184	0.153	0.167	0.184	0.173	0.118	0.159	0.175	0.123
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.203	0.173	0.156	0.153	0.162	0.175	0.162	0.181	0.162
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.203	0.173	0.156	0.153	0.162	0.175	0.162	0.181	0.162
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.189	0.123	0.132	0.140	0.156	0.162	0.164	0.173	0.164
96	KJ744977.1 *Aname mellosa* voucher T122200	0.181	0.164	0.173	0.184	0.175	0.123	0.151	0.178	0.118
97	KJ744982.1 *Aname mellosa* voucher T122207	0.170	0.151	0.159	0.170	0.178	0.110	0.151	0.170	0.115
98	KJ744987.1 *Aname mellosa* voucher T122215	0.184	0.156	0.153	0.181	0.175	0.129	0.148	0.178	0.132
99	KJ744990.1 *Aname mellosa* voucher T122219	0.192	0.170	0.181	0.192	0.186	0.129	0.164	0.189	0.121
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.189	0.159	0.107	0.145	0.156	0.170	0.184	0.178	0.170
101	KJ745134.1 *Aname mellosa* voucher T126250	0.186	0.159	0.170	0.186	0.175	0.115	0.156	0.181	0.121
102	KJ745143.1 *Aname mellosa* voucher T126259	0.186	0.159	0.170	0.186	0.175	0.115	0.156	0.181	0.121
103	KJ745146.1 *Aname mellosa* voucher T126262	0.184	0.156	0.167	0.189	0.175	0.112	0.151	0.178	0.121
104	KJ745153.1 *Aname mellosa* voucher T126271	0.189	0.162	0.170	0.184	0.178	0.118	0.159	0.184	0.123
105	KJ745155.1 *Aname mellosa* voucher T126273	0.181	0.159	0.164	0.178	0.175	0.123	0.151	0.175	0.121
106	KJ745159.1 *Aname mellosa* voucher T126279	0.181	0.164	0.167	0.184	0.175	0.118	0.151	0.173	0.115
107	KJ745160.1 *Aname mellosa* voucher T126280	0.189	0.162	0.170	0.184	0.178	0.118	0.159	0.184	0.123
108	KJ745168.1 *Aname mellosa* voucher T126296	0.178	0.167	0.167	0.178	0.175	0.123	0.142	0.167	0.123
109	KJ745170.1 *Aname mellosa* voucher T126301	0.178	0.159	0.170	0.181	0.175	0.115	0.148	0.170	0.118
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.211	0.153	0.142	0.164	0.173	0.162	0.175	0.178	0.173
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.148	0.178	0.167	0.203	0.197	0.162	0.123	0.000	0.170
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.148	0.178	0.167	0.203	0.197	0.162	0.123	0.000	0.170

		10	11	12	13	14	15	16	17	18
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.148	0.178	0.167	0.203	0.197	0.162	0.123	0.000	0.170
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.189	0.112	0.145	0.159	0.173	0.181	0.175	0.178	0.192
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.148	0.178	0.167	0.203	0.197	0.162	0.123	0.000	0.170
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.162	0.181	0.170	0.214	0.200	0.175	0.132	0.030	0.170
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.148	0.178	0.167	0.203	0.197	0.162	0.123	0.000	0.170
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.170	0.175	0.175	0.211	0.186	0.162	0.115	0.063	0.167
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.159	0.184	0.162	0.208	0.186	0.175	0.126	0.055	0.178

		19	20	21	22	23	24	25	26	27
1	**PC12**	0.019	0.019	0.021	0.018	0.021	0.020	0.020	0.020	0.020
2	**PC27**	0.019	0.019	0.021	0.018	0.021	0.020	0.020	0.019	0.019
3	**PC29**	0.019	0.019	0.020	0.018	0.020	0.020	0.020	0.019	0.019
4	**PC13**	0.019	0.019	0.021	0.018	0.020	0.020	0.020	0.019	0.019
5	**PC28**	0.019	0.019	0.021	0.018	0.020	0.020	0.020	0.019	0.019
6	**PC18**	0.018	0.019	0.020	0.020	0.019	0.020	0.019	0.019	0.020
7	**PC15**	0.019	0.019	0.020	0.019	0.020	0.020	0.020	0.021	0.020
8	**PC16**	0.015	0.020	0.016	0.021	0.019	0.020	0.016	0.020	0.020
9	**PC26**	0.016	0.021	0.016	0.020	0.020	0.020	0.017	0.019	0.020
10	NA_N1_AG1	0.019	0.021	0.020	0.021	0.021	0.020	0.019	0.020	0.020
11	NAA_N45_AS38	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.019	0.020
12	NAB_N46_AS41	0.020	0.021	0.020	0.016	0.021	0.020	0.021	0.019	0.020
13	NAD_N93_AC10	0.021	0.021	0.021	0.019	0.021	0.021	0.022	0.021	0.021
14	NAM_N49_AD14	0.020	0.021	0.020	0.020	0.021	0.021	0.021	0.021	0.019
15	NAO_N22_AD328	0.019	0.018	0.019	0.020	0.021	0.021	0.020	0.020	0.020
16	NAQ_N5_AD352	0.017	0.020	0.017	0.020	0.019	0.019	0.017	0.019	0.020
17	NAW_N6_AD429	0.014	0.020	0.013	0.021	0.019	0.020	0.016	0.020	0.020
18	NAX_N24_AD452	0.019	0.018	0.020	0.019	0.021	0.020	0.020	0.019	0.021
19	NAZ_N6_AD457		0.020	0.014	0.021	0.019	0.020	0.017	0.018	0.020
20	NB_N16_AH8	0.173		0.020	0.021	0.021	0.021	0.020	0.020	0.022
21	NBC_N6_AD577	0.077	0.189		0.021	0.019	0.020	0.017	0.019	0.020
22	NBE_N46_AD583	0.200	0.192	0.192		0.021	0.020	0.021	0.019	0.021
23	NBM_N4_AD678	0.162	0.214	0.156	0.208		0.021	0.018	0.020	0.020
24	NBR_N14_AD746	0.175	0.195	0.178	0.184	0.197		0.019	0.017	0.020
25	NBT_N7_AD748	0.112	0.181	0.123	0.205	0.134	0.164		0.019	0.020
26	NBU_N15_AD753	0.142	0.173	0.156	0.159	0.186	0.112	0.164		0.019
27	NBW_N50_AD784	0.178	0.216	0.178	0.192	0.175	0.175	0.181	0.162	
28	NCA_N20_AF78	0.184	0.167	0.178	0.186	0.208	0.189	0.205	0.189	0.203

		19	20	21	22	23	24	25	26	27
29	NCG_N95_I16	0.197	0.184	0.184	0.148	0.186	0.178	0.192	0.200	0.200
30	NCU_N110_O211	0.145	0.159	0.164	0.184	0.164	0.184	0.167	0.167	0.181
31	NCW_N66_O280	0.151	0.159	0.153	0.200	0.142	0.159	0.126	0.162	0.184
32	NCY_N67_O282	0.167	0.203	0.153	0.211	0.175	0.197	0.156	0.178	0.216
33	NCZ_N110_O285	0.137	0.170	0.153	0.181	0.162	0.178	0.162	0.151	0.195
34	NDD_N101_O292	0.159	0.159	0.156	0.189	0.186	0.192	0.178	0.181	0.173
35	NDK_N94_O333	0.173	0.189	0.195	0.159	0.195	0.203	0.189	0.189	0.184
36	NDL_N96_O334	0.189	0.192	0.181	0.162	0.178	0.208	0.200	0.203	0.178
37	NEH_N112_BI22	0.123	0.178	0.126	0.192	0.142	0.178	0.101	0.164	0.178
38	NEM_N43_DW15	0.186	0.164	0.203	0.186	0.200	0.189	0.203	0.205	0.197
39	NEM_N43_AT53	0.189	0.162	0.200	0.184	0.203	0.186	0.197	0.203	0.200
40	NEW_N19_AD381	0.175	0.164	0.156	0.186	0.208	0.192	0.192	0.178	0.219
41	NFN_N43_CG5	0.200	0.167	0.208	0.189	0.203	0.186	0.208	0.203	0.192
42	NFO_N127_CB26	0.192	0.184	0.178	0.104	0.195	0.192	0.203	0.175	0.178
43	NFZ_N122_BV095	0.186	0.203	0.189	0.162	0.178	0.197	0.197	0.181	0.148
44	NGC_N129_CW5	0.186	0.186	0.178	0.153	0.186	0.189	0.197	0.170	0.175
45	NGE_N130_CW14	0.170	0.170	0.159	0.148	0.205	0.192	0.195	0.170	0.192
46	NGN_N19_DC5	0.178	0.140	0.164	0.192	0.205	0.173	0.192	0.184	0.195
47	NGS_N136_DG10	0.145	0.192	0.156	0.184	0.148	0.178	0.134	0.181	0.203
48	NGV_N35_DW21	0.170	0.178	0.173	0.167	0.189	0.178	0.189	0.164	0.173
49	NIG_N22+N23_ID10	0.186	0.148	0.167	0.184	0.208	0.192	0.197	0.192	0.200
50	NK_N36_AD110	0.162	0.208	0.173	0.173	0.192	0.164	0.205	0.186	0.181
51	NRF_N7_NN11	0.115	0.192	0.118	0.214	0.137	0.181	0.047	0.173	0.156
52	NRG_N7_NN15	0.118	0.189	0.121	0.214	0.137	0.178	0.038	0.175	0.159
53	NRH_N7_NN16	0.129	0.189	0.129	0.216	0.145	0.192	0.049	0.189	0.175
54	NRI_N7_NN17	0.126	0.186	0.129	0.219	0.145	0.186	0.047	0.184	0.167
55	NRJ_N7_NN18	0.126	0.186	0.126	0.219	0.142	0.189	0.047	0.186	0.170
56	NRK_N7_NN20	0.126	0.197	0.115	0.216	0.140	0.170	0.047	0.175	0.167

		19	20	21	22	23	24	25	26	27
57	NRL_N7_NN21	0.126	0.197	0.115	0.211	0.134	0.170	0.047	0.170	0.167
58	NRM_N7_NN37	0.142	0.181	0.140	0.230	0.148	0.186	0.063	0.195	0.189
59	NRO_N7_NN38	0.126	0.197	0.115	0.216	0.137	0.167	0.047	0.170	0.162
60	NRP_N138_NN35	0.126	0.184	0.121	0.170	0.167	0.186	0.137	0.175	0.192
61	NRQ_N138_NN36	0.132	0.186	0.126	0.173	0.173	0.189	0.137	0.178	0.197
62	NRW_N144_OU21	0.167	0.197	0.175	0.153	0.186	0.195	0.195	0.164	0.186
63	NY_N37_AR64	0.178	0.181	0.189	0.159	0.197	0.178	0.192	0.175	0.186
64	T101209 Kwonkan MYG175 NHP	0.167	0.192	0.173	0.151	0.189	0.195	0.195	0.170	0.186
65	T112084 Synothele MYG127 NHD	0.153	0.162	0.151	0.195	0.162	0.178	0.156	0.178	0.192
66	T112949 Aname MYG227 NHG	0.156	0.178	0.156	0.170	0.178	0.178	0.151	0.178	0.184
67	T121597 Aname MYG250 NHQ	0.173	0.181	0.170	0.153	0.184	0.189	0.186	0.156	0.167
68	T122062 Aname MYG182 NGX	0.170	0.203	0.178	0.186	0.153	0.186	0.159	0.178	0.195
69	T96570 Aname MYG067 NHF	0.156	0.192	0.159	0.205	0.153	0.178	0.164	0.175	0.192
70	T98759 Aname MYG185 NHK	0.145	0.178	0.151	0.203	0.184	0.189	0.170	0.178	0.205
71	T98900 Aname MYG034 NHJ	0.093	0.184	0.079	0.192	0.156	0.173	0.126	0.173	0.184
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.167	0.164	0.162	0.164	0.189	0.173	0.175	0.178	0.200
73	KJ744398.1 *Aname mellosa* voucher T101163	0.162	0.079	0.178	0.178	0.208	0.181	0.178	0.167	0.200
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.162	0.214	0.156	0.208	0.000	0.197	0.134	0.186	0.175
75	KJ744623.1 *Aname mellosa* voucher T105871	0.148	0.079	0.162	0.151	0.189	0.178	0.164	0.145	0.181
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.112	0.181	0.123	0.205	0.134	0.164	0.000	0.164	0.181
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.129	0.186	0.137	0.216	0.137	0.167	0.019	0.181	0.178
78	KJ744661.1 *Aname mellosa* voucher T107942	0.153	0.077	0.170	0.153	0.189	0.178	0.167	0.148	0.178
79	KJ744662.1 *Aname mellosa* voucher T107945	0.153	0.077	0.159	0.159	0.189	0.175	0.164	0.145	0.178
80	KJ744669.1 *Aname mellosa* voucher T107968	0.153	0.079	0.167	0.159	0.186	0.184	0.164	0.151	0.178
81	KJ744775.1 *Aname mellosa* voucher T113629	0.153	0.077	0.167	0.153	0.186	0.184	0.164	0.148	0.178
82	KJ744785.1 *Aname mellosa* voucher T113642	0.151	0.074	0.164	0.153	0.186	0.181	0.164	0.148	0.178
83	KJ744788.1 *Aname mellosa* voucher T113648	0.148	0.077	0.162	0.159	0.195	0.181	0.167	0.151	0.184
84	KJ744791.1 *Aname mellosa* voucher T113654	0.151	0.079	0.162	0.156	0.186	0.181	0.162	0.142	0.181

		19	20	21	22	23	24	25	26	27
85	KJ744803.1 *Aname mellosa* voucher T113666	0.151	0.077	0.164	0.156	0.186	0.181	0.164	0.148	0.178
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.121	0.175	0.123	0.195	0.140	0.175	0.099	0.167	0.175
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.121	0.175	0.123	0.195	0.140	0.175	0.099	0.167	0.175
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.118	0.173	0.121	0.197	0.142	0.178	0.096	0.170	0.178
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.123	0.178	0.126	0.192	0.142	0.178	0.101	0.164	0.178
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.118	0.181	0.115	0.192	0.132	0.173	0.090	0.159	0.175
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.121	0.184	0.118	0.189	0.129	0.175	0.090	0.162	0.178
92	KJ744926.1 *Aname mellosa* voucher T119710	0.151	0.079	0.164	0.156	0.192	0.184	0.164	0.151	0.181
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.184	0.175	0.181	0.167	0.197	0.192	0.197	0.211	0.192
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.184	0.175	0.181	0.167	0.197	0.192	0.197	0.211	0.192
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.173	0.181	0.170	0.153	0.184	0.189	0.186	0.156	0.167
96	KJ744977.1 *Aname mellosa* voucher T122200	0.153	0.066	0.167	0.159	0.192	0.175	0.167	0.153	0.186
97	KJ744982.1 *Aname mellosa* voucher T122207	0.151	0.082	0.170	0.151	0.189	0.186	0.167	0.151	0.175
98	KJ744987.1 *Aname mellosa* voucher T122215	0.156	0.088	0.167	0.153	0.184	0.184	0.173	0.148	0.173
99	KJ744990.1 *Aname mellosa* voucher T122219	0.156	0.088	0.178	0.164	0.211	0.167	0.184	0.145	0.186
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.192	0.184	0.178	0.104	0.195	0.192	0.203	0.175	0.178
101	KJ745134.1 *Aname mellosa* voucher T126250	0.156	0.074	0.170	0.159	0.189	0.181	0.167	0.153	0.181
102	KJ745143.1 *Aname mellosa* voucher T126259	0.156	0.074	0.170	0.159	0.189	0.181	0.167	0.153	0.181
103	KJ745146.1 *Aname mellosa* voucher T126262	0.151	0.074	0.164	0.156	0.186	0.178	0.164	0.151	0.178
104	KJ745153.1 *Aname mellosa* voucher T126271	0.159	0.077	0.173	0.162	0.192	0.184	0.170	0.156	0.184
105	KJ745155.1 *Aname mellosa* voucher T126273	0.151	0.077	0.164	0.159	0.181	0.175	0.164	0.148	0.184
106	KJ745159.1 *Aname mellosa* voucher T126279	0.151	0.079	0.162	0.162	0.184	0.184	0.164	0.148	0.178
107	KJ745160.1 *Aname mellosa* voucher T126280	0.159	0.077	0.173	0.162	0.192	0.184	0.170	0.156	0.184
108	KJ745168.1 *Aname mellosa* voucher T126296	0.148	0.082	0.156	0.162	0.175	0.189	0.167	0.156	0.186
109	KJ745170.1 *Aname mellosa* voucher T126301	0.145	0.079	0.162	0.151	0.181	0.184	0.167	0.148	0.175
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.173	0.189	0.195	0.159	0.195	0.203	0.189	0.189	0.184
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.082	0.186	0.063	0.195	0.164	0.173	0.107	0.170	0.181
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.082	0.186	0.063	0.195	0.164	0.173	0.107	0.170	0.181

		19	20	21	22	23	24	25	26	27
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.082	0.186	0.063	0.195	0.164	0.173	0.107	0.170	0.181
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.189	0.192	0.181	0.162	0.178	0.208	0.200	0.203	0.178
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.082	0.186	0.063	0.195	0.164	0.173	0.107	0.170	0.181
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.093	0.195	0.077	0.195	0.162	0.175	0.129	0.173	0.178
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.082	0.186	0.063	0.195	0.164	0.173	0.107	0.170	0.181
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.077	0.189	0.000	0.192	0.156	0.178	0.123	0.156	0.178
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.093	0.184	0.079	0.192	0.156	0.173	0.126	0.173	0.184

		28	29	30	31	32	33	34	35	36
1	**PC12**	0.020	0.017	0.019	0.020	0.021	0.019	0.020	0.017	0.017
2	**PC27**	0.021	0.017	0.019	0.020	0.021	0.020	0.020	0.017	0.017
3	**PC29**	0.020	0.017	0.019	0.020	0.021	0.020	0.020	0.017	0.016
4	**PC13**	0.020	0.017	0.019	0.020	0.021	0.019	0.020	0.017	0.017
5	**PC28**	0.020	0.017	0.019	0.020	0.021	0.019	0.020	0.017	0.017
6	**PC18**	0.020	0.020	0.018	0.019	0.019	0.019	0.019	0.020	0.020
7	**PC15**	0.019	0.019	0.020	0.019	0.020	0.019	0.020	0.019	0.018
8	**PC16**	0.020	0.020	0.020	0.018	0.019	0.020	0.019	0.020	0.021
9	**PC26**	0.020	0.020	0.019	0.018	0.019	0.018	0.020	0.019	0.021
10	NA_N1_AG1	0.021	0.021	0.019	0.019	0.021	0.019	0.021	0.021	0.020
11	NAA_N45_AS38	0.020	0.018	0.020	0.020	0.021	0.020	0.020	0.019	0.017
12	NAB_N46_AS41	0.020	0.019	0.021	0.021	0.022	0.021	0.020	0.018	0.018
13	NAD_N93_AC10	0.021	0.018	0.021	0.021	0.022	0.020	0.021	0.019	0.019
14	NAM_N49_AD14	0.021	0.020	0.022	0.020	0.022	0.021	0.021	0.020	0.020
15	NAO_N22_AD328	0.015	0.020	0.020	0.020	0.020	0.020	0.020	0.019	0.020
16	NAQ_N5_AD352	0.020	0.020	0.019	0.019	0.020	0.018	0.019	0.020	0.020
17	NAW_N6_AD429	0.020	0.020	0.019	0.018	0.018	0.018	0.019	0.020	0.020
18	NAX_N24_AD452	0.015	0.020	0.020	0.019	0.020	0.020	0.020	0.020	0.021
19	NAZ_N6_AD457	0.020	0.021	0.018	0.019	0.020	0.018	0.019	0.020	0.020
20	NB_N16_AH8	0.020	0.020	0.019	0.019	0.021	0.020	0.019	0.020	0.021
21	NBC_N6_AD577	0.020	0.020	0.019	0.019	0.019	0.019	0.019	0.021	0.020
22	NBE_N46_AD583	0.020	0.019	0.020	0.021	0.021	0.020	0.020	0.019	0.019
23	NBM_N4_AD678	0.021	0.020	0.019	0.018	0.020	0.019	0.020	0.021	0.020
24	NBR_N14_AD746	0.020	0.020	0.020	0.019	0.021	0.020	0.021	0.021	0.021
25	NBT_N7_AD748	0.021	0.021	0.020	0.017	0.019	0.019	0.020	0.020	0.021
26	NBU_N15_AD753	0.020	0.021	0.020	0.019	0.020	0.019	0.020	0.020	0.021
27	NBW_N50_AD784	0.021	0.021	0.020	0.020	0.022	0.021	0.020	0.020	0.020
28	NCA_N20_AF78		0.020	0.020	0.021	0.020	0.021	0.020	0.020	0.020

		28	29	30	31	32	33	34	35	36
29	NCG_N95_I16	0.189		0.020	0.020	0.021	0.020	0.020	0.018	0.016
30	NCU_N110_O211	0.189	0.184		0.016	0.018	0.013	0.019	0.020	0.020
31	NCW_N66_O280	0.200	0.173	0.104		0.018	0.016	0.019	0.020	0.020
32	NCY_N67_O282	0.189	0.208	0.137	0.137		0.018	0.019	0.021	0.022
33	NCZ_N110_O285	0.195	0.184	0.068	0.110	0.134		0.019	0.019	0.021
34	NDD_N101_O292	0.175	0.184	0.156	0.159	0.164	0.162		0.021	0.021
35	NDK_N94_O333	0.184	0.134	0.186	0.181	0.205	0.153	0.197		0.018
36	NDL_N96_O334	0.189	0.104	0.181	0.186	0.222	0.195	0.197	0.145	
37	NEH_N112_BI22	0.216	0.195	0.153	0.137	0.148	0.142	0.142	0.175	0.189
38	NEM_N43_DW15	0.197	0.162	0.200	0.192	0.211	0.181	0.178	0.170	0.178
39	NEM_N43_AT53	0.200	0.164	0.203	0.195	0.208	0.184	0.181	0.173	0.181
40	NEW_N19_AD381	0.110	0.197	0.195	0.173	0.173	0.192	0.192	0.181	0.205
41	NFN_N43_CG5	0.192	0.162	0.197	0.189	0.216	0.200	0.175	0.186	0.178
42	NFO_N127_CB26	0.195	0.156	0.197	0.197	0.195	0.170	0.186	0.148	0.153
43	NFZ_N122_BV095	0.197	0.175	0.189	0.175	0.216	0.167	0.197	0.162	0.170
44	NGC_N129_CW5	0.203	0.148	0.178	0.175	0.197	0.170	0.167	0.151	0.145
45	NGE_N130_CW14	0.164	0.132	0.181	0.181	0.197	0.167	0.184	0.140	0.126
46	NGN_N19_DC5	0.052	0.192	0.181	0.181	0.173	0.181	0.173	0.175	0.192
47	NGS_N136_DG10	0.222	0.203	0.186	0.164	0.175	0.184	0.170	0.214	0.214
48	NGV_N35_DW21	0.197	0.156	0.189	0.173	0.208	0.178	0.159	0.164	0.162
49	NIG_N22+N23_ID10	0.085	0.186	0.184	0.175	0.184	0.184	0.181	0.170	0.189
50	NK_N36_AD110	0.211	0.162	0.186	0.175	0.200	0.167	0.162	0.162	0.156
51	NRF_N7_NN11	0.195	0.192	0.156	0.123	0.153	0.156	0.184	0.173	0.189
52	NRG_N7_NN15	0.192	0.192	0.153	0.121	0.148	0.148	0.186	0.170	0.189
53	NRH_N7_NN16	0.205	0.197	0.164	0.123	0.162	0.151	0.192	0.175	0.184
54	NRI_N7_NN17	0.195	0.197	0.162	0.123	0.162	0.156	0.189	0.175	0.184
55	NRJ_N7_NN18	0.197	0.195	0.162	0.121	0.159	0.153	0.189	0.175	0.181
56	NRK_N7_NN20	0.197	0.181	0.162	0.121	0.148	0.159	0.181	0.175	0.186

		28	29	30	31	32	33	34	35	36
57	NRL_N7_NN21	0.203	0.181	0.162	0.115	0.148	0.153	0.181	0.170	0.181
58	NRM_N7_NN37	0.225	0.200	0.162	0.129	0.164	0.159	0.186	0.197	0.214
59	NRO_N7_NN38	0.203	0.178	0.156	0.115	0.142	0.153	0.175	0.173	0.184
60	NRP_N138_NN35	0.173	0.184	0.164	0.148	0.153	0.140	0.162	0.178	0.200
61	NRQ_N138_NN36	0.181	0.192	0.170	0.153	0.159	0.148	0.170	0.186	0.203
62	NRW_N144_OU21	0.178	0.156	0.192	0.192	0.227	0.181	0.184	0.137	0.134
63	NY_N37_AR64	0.197	0.167	0.173	0.170	0.203	0.156	0.173	0.181	0.156
64	T101209 Kwonkan MYG175 NHP	0.181	0.153	0.186	0.186	0.222	0.181	0.184	0.132	0.132
65	T112084 Synothele MYG127 NHD	0.195	0.184	0.162	0.132	0.173	0.167	0.164	0.203	0.200
66	T112949 Aname MYG227 NHG	0.170	0.173	0.153	0.140	0.181	0.153	0.148	0.189	0.197
67	T121597 Aname MYG250 NHQ	0.186	0.123	0.170	0.173	0.214	0.170	0.175	0.140	0.123
68	T122062 Aname MYG182 NGX	0.195	0.181	0.140	0.134	0.156	0.129	0.156	0.175	0.181
69	T96570 Aname MYG067 NHF	0.192	0.184	0.156	0.156	0.162	0.153	0.162	0.181	0.203
70	T98759 Aname MYG185 NHK	0.211	0.219	0.181	0.170	0.184	0.164	0.189	0.195	0.208
71	T98900 Aname MYG034 NHJ	0.184	0.181	0.167	0.142	0.162	0.156	0.170	0.189	0.170
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.184	0.181	0.170	0.159	0.184	0.173	0.181	0.208	0.189
73	KJ744398.1 *Aname mellosa* voucher T101163	0.142	0.173	0.156	0.175	0.175	0.173	0.156	0.178	0.175
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.208	0.186	0.164	0.142	0.175	0.162	0.186	0.195	0.178
75	KJ744623.1 *Aname mellosa* voucher T105871	0.153	0.164	0.145	0.148	0.173	0.153	0.140	0.170	0.170
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.205	0.192	0.167	0.126	0.156	0.162	0.178	0.189	0.200
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.211	0.195	0.164	0.129	0.159	0.164	0.181	0.197	0.203
78	KJ744661.1 *Aname mellosa* voucher T107942	0.156	0.170	0.142	0.142	0.170	0.156	0.145	0.173	0.175
79	KJ744662.1 *Aname mellosa* voucher T107945	0.151	0.153	0.153	0.140	0.170	0.151	0.134	0.173	0.170
80	KJ744669.1 *Aname mellosa* voucher T107968	0.153	0.167	0.151	0.148	0.170	0.153	0.142	0.175	0.173
81	KJ744775.1 *Aname mellosa* voucher T113629	0.153	0.164	0.148	0.145	0.170	0.151	0.140	0.170	0.170
82	KJ744785.1 *Aname mellosa* voucher T113642	0.151	0.162	0.145	0.148	0.167	0.148	0.140	0.173	0.167
83	KJ744788.1 *Aname mellosa* voucher T113648	0.159	0.170	0.145	0.148	0.175	0.148	0.140	0.170	0.173
84	KJ744791.1 *Aname mellosa* voucher T113654	0.156	0.159	0.151	0.142	0.178	0.159	0.142	0.173	0.175

		28	29	30	31	32	33	34	35	36
85	KJ744803.1 *Aname mellosa* voucher T113666	0.151	0.164	0.148	0.148	0.167	0.151	0.140	0.175	0.170
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.214	0.192	0.151	0.134	0.145	0.140	0.140	0.173	0.186
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.214	0.192	0.151	0.134	0.145	0.140	0.140	0.173	0.186
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.211	0.195	0.153	0.137	0.148	0.142	0.142	0.175	0.189
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.216	0.195	0.153	0.137	0.148	0.142	0.142	0.175	0.189
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.211	0.181	0.145	0.123	0.148	0.134	0.140	0.175	0.184
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.214	0.184	0.148	0.126	0.145	0.137	0.137	0.173	0.186
92	KJ744926.1 *Aname mellosa* voucher T119710	0.153	0.170	0.148	0.153	0.167	0.151	0.142	0.175	0.170
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.173	0.132	0.173	0.192	0.208	0.186	0.186	0.159	0.140
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.173	0.132	0.173	0.192	0.208	0.186	0.186	0.159	0.140
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.186	0.123	0.170	0.173	0.214	0.170	0.175	0.140	0.123
96	KJ744977.1 *Aname mellosa* voucher T122200	0.159	0.162	0.148	0.142	0.173	0.156	0.145	0.173	0.175
97	KJ744982.1 *Aname mellosa* voucher T122207	0.145	0.167	0.137	0.145	0.167	0.140	0.134	0.162	0.162
98	KJ744987.1 *Aname mellosa* voucher T122215	0.159	0.164	0.148	0.153	0.181	0.153	0.145	0.173	0.173
99	KJ744990.1 *Aname mellosa* voucher T122219	0.159	0.186	0.142	0.156	0.181	0.159	0.153	0.181	0.175
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.195	0.156	0.197	0.197	0.195	0.170	0.186	0.148	0.153
101	KJ745134.1 *Aname mellosa* voucher T126250	0.156	0.167	0.145	0.145	0.167	0.153	0.145	0.175	0.173
102	KJ745143.1 *Aname mellosa* voucher T126259	0.156	0.167	0.145	0.145	0.167	0.153	0.145	0.175	0.173
103	KJ745146.1 *Aname mellosa* voucher T126262	0.153	0.164	0.140	0.145	0.167	0.156	0.148	0.173	0.170
104	KJ745153.1 *Aname mellosa* voucher T126271	0.159	0.170	0.148	0.148	0.170	0.156	0.148	0.178	0.175
105	KJ745155.1 *Aname mellosa* voucher T126273	0.153	0.159	0.153	0.148	0.173	0.156	0.140	0.175	0.170
106	KJ745159.1 *Aname mellosa* voucher T126279	0.153	0.156	0.151	0.140	0.173	0.153	0.137	0.173	0.173
107	KJ745160.1 *Aname mellosa* voucher T126280	0.159	0.170	0.148	0.148	0.170	0.156	0.148	0.178	0.175
108	KJ745168.1 *Aname mellosa* voucher T126296	0.159	0.153	0.153	0.151	0.170	0.145	0.137	0.175	0.175
109	KJ745170.1 *Aname mellosa* voucher T126301	0.151	0.164	0.140	0.137	0.162	0.142	0.134	0.170	0.170
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.184	0.134	0.186	0.181	0.205	0.153	0.197	0.000	0.145
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.189	0.186	0.164	0.142	0.137	0.145	0.151	0.178	0.178
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.189	0.186	0.164	0.142	0.137	0.145	0.151	0.178	0.178

		28	29	30	31	32	33	34	35	36
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.189	0.186	0.164	0.142	0.137	0.145	0.151	0.178	0.178
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.189	0.104	0.181	0.186	0.222	0.195	0.197	0.145	0.000
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.189	0.186	0.164	0.142	0.137	0.145	0.151	0.178	0.178
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.192	0.186	0.164	0.148	0.153	0.151	0.153	0.186	0.178
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.189	0.186	0.164	0.142	0.137	0.145	0.151	0.178	0.178
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.178	0.184	0.164	0.153	0.153	0.153	0.156	0.195	0.181
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.184	0.181	0.167	0.142	0.162	0.156	0.170	0.189	0.170

		37	38	39	40	41	42	43	44	45
1	**PC12**	0.020	0.018	0.018	0.020	0.018	0.018	0.019	0.017	0.017
2	**PC27**	0.020	0.018	0.018	0.020	0.018	0.018	0.019	0.017	0.017
3	**PC29**	0.020	0.018	0.018	0.021	0.018	0.018	0.019	0.017	0.017
4	**PC13**	0.019	0.018	0.018	0.020	0.018	0.018	0.019	0.017	0.017
5	**PC28**	0.019	0.018	0.018	0.020	0.018	0.018	0.019	0.017	0.017
6	**PC18**	0.019	0.020	0.020	0.021	0.020	0.020	0.020	0.019	0.019
7	**PC15**	0.020	0.019	0.019	0.019	0.020	0.018	0.020	0.019	0.018
8	**PC16**	0.017	0.021	0.021	0.020	0.021	0.021	0.021	0.020	0.020
9	**PC26**	0.018	0.021	0.021	0.020	0.021	0.020	0.021	0.020	0.020
10	NA_N1_AG1	0.020	0.021	0.021	0.022	0.022	0.020	0.022	0.021	0.020
11	NAA_N45_AS38	0.020	0.021	0.021	0.020	0.020	0.019	0.019	0.019	0.018
12	NAB_N46_AS41	0.021	0.020	0.020	0.021	0.020	0.016	0.018	0.019	0.018
13	NAD_N93_AC10	0.022	0.020	0.020	0.022	0.019	0.018	0.019	0.019	0.018
14	NAM_N49_AD14	0.021	0.020	0.020	0.021	0.020	0.019	0.017	0.020	0.020
15	NAO_N22_AD328	0.020	0.021	0.021	0.016	0.021	0.020	0.021	0.021	0.019
16	NAQ_N5_AD352	0.017	0.020	0.020	0.020	0.020	0.020	0.021	0.019	0.019
17	NAW_N6_AD429	0.017	0.020	0.020	0.020	0.021	0.020	0.020	0.019	0.019
18	NAX_N24_AD452	0.021	0.021	0.021	0.015	0.021	0.020	0.020	0.021	0.020
19	NAZ_N6_AD457	0.017	0.020	0.020	0.020	0.021	0.021	0.020	0.020	0.020
20	NB_N16_AH8	0.020	0.019	0.019	0.019	0.020	0.020	0.021	0.020	0.020
21	NBC_N6_AD577	0.017	0.021	0.021	0.019	0.021	0.020	0.020	0.020	0.019
22	NBE_N46_AD583	0.021	0.020	0.020	0.020	0.020	0.016	0.019	0.019	0.019
23	NBM_N4_AD678	0.018	0.021	0.021	0.021	0.021	0.021	0.020	0.020	0.021
24	NBR_N14_AD746	0.020	0.020	0.020	0.021	0.020	0.021	0.021	0.020	0.021
25	NBT_N7_AD748	0.016	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
26	NBU_N15_AD753	0.019	0.021	0.021	0.020	0.021	0.020	0.020	0.020	0.020
27	NBW_N50_AD784	0.020	0.021	0.021	0.022	0.021	0.020	0.019	0.020	0.021
28	NCA_N20_AF78	0.022	0.021	0.021	0.016	0.021	0.021	0.021	0.021	0.019

		37	38	39	40	41	42	43	44	45
29	NCG_N95_I16	0.021	0.019	0.019	0.021	0.019	0.019	0.020	0.019	0.018
30	NCU_N110_O211	0.019	0.021	0.021	0.021	0.021	0.021	0.020	0.020	0.020
31	NCW_N66_O280	0.018	0.021	0.021	0.020	0.020	0.021	0.020	0.020	0.020
32	NCY_N67_O282	0.019	0.021	0.021	0.020	0.022	0.021	0.022	0.021	0.021
33	NCZ_N110_O285	0.018	0.020	0.020	0.021	0.021	0.020	0.020	0.020	0.020
34	NDD_N101_O292	0.018	0.020	0.020	0.021	0.020	0.020	0.021	0.020	0.020
35	NDK_N94_O333	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.018
36	NDL_N96_O334	0.020	0.020	0.020	0.021	0.020	0.019	0.020	0.018	0.017
37	NEH_N112_BI22		0.021	0.021	0.021	0.021	0.020	0.021	0.020	0.021
38	NEM_N43_DW15	0.208		0.005	0.021	0.011	0.020	0.020	0.019	0.019
39	NEM_N43_AT53	0.203	0.008		0.021	0.011	0.019	0.020	0.019	0.020
40	NEW_N19_AD381	0.195	0.205	0.203		0.021	0.020	0.021	0.021	0.020
41	NFN_N43_CG5	0.214	0.049	0.047	0.211		0.020	0.020	0.019	0.019
42	NFO_N127_CB26	0.184	0.173	0.164	0.181	0.184		0.018	0.018	0.018
43	NFZ_N122_BV095	0.197	0.178	0.175	0.192	0.170	0.137		0.020	0.020
44	NGC_N129_CW5	0.181	0.159	0.162	0.208	0.162	0.145	0.170		0.018
45	NGE_N130_CW14	0.192	0.164	0.167	0.167	0.164	0.134	0.170	0.140	
46	NGN_N19_DC5	0.203	0.195	0.197	0.090	0.189	0.189	0.189	0.203	0.167
47	NGS_N136_DG10	0.132	0.208	0.203	0.214	0.208	0.186	0.205	0.205	0.195
48	NGV_N35_DW21	0.197	0.140	0.142	0.186	0.148	0.156	0.159	0.151	0.140
49	NIG_N22+N23_ID10	0.200	0.200	0.203	0.085	0.203	0.192	0.200	0.211	0.145
50	NK_N36_AD110	0.162	0.170	0.173	0.197	0.170	0.151	0.175	0.159	0.153
51	NRF_N7_NN11	0.085	0.208	0.208	0.178	0.214	0.195	0.197	0.189	0.192
52	NRG_N7_NN15	0.088	0.203	0.203	0.186	0.214	0.195	0.197	0.189	0.186
53	NRH_N7_NN16	0.096	0.214	0.214	0.195	0.222	0.197	0.203	0.203	0.184
54	NRI_N7_NN17	0.096	0.208	0.208	0.192	0.216	0.200	0.203	0.197	0.189
55	NRJ_N7_NN18	0.093	0.208	0.208	0.192	0.216	0.200	0.203	0.197	0.186
56	NRK_N7_NN20	0.090	0.208	0.205	0.186	0.214	0.195	0.205	0.189	0.184

		37	38	39	40	41	42	43	44	45
57	NRL_N7_NN21	0.085	0.203	0.200	0.186	0.214	0.189	0.200	0.184	0.184
58	NRM_N7_NN37	0.107	0.211	0.211	0.211	0.214	0.219	0.214	0.203	0.197
59	NRO_N7_NN38	0.085	0.205	0.203	0.186	0.211	0.195	0.205	0.186	0.186
60	NRP_N138_NN35	0.129	0.200	0.203	0.167	0.197	0.164	0.175	0.170	0.170
61	NRQ_N138_NN36	0.129	0.208	0.205	0.173	0.200	0.167	0.175	0.178	0.178
62	NRW_N144_OU21	0.186	0.170	0.173	0.178	0.170	0.145	0.140	0.142	0.132
63	NY_N37_AR64	0.175	0.170	0.167	0.197	0.170	0.151	0.156	0.173	0.145
64	T101209 Kwonkan MYG175 NHP	0.181	0.170	0.173	0.178	0.170	0.142	0.140	0.137	0.129
65	T112084 Synothele MYG127 NHD	0.162	0.192	0.195	0.203	0.173	0.197	0.203	0.186	0.200
66	T112949 Aname MYG227 NHG	0.153	0.203	0.200	0.197	0.197	0.184	0.200	0.170	0.189
67	T121597 Aname MYG250 NHQ	0.175	0.173	0.175	0.197	0.164	0.132	0.142	0.148	0.126
68	T122062 Aname MYG182 NGX	0.145	0.214	0.216	0.186	0.219	0.175	0.181	0.189	0.184
69	T96570 Aname MYG067 NHF	0.156	0.216	0.219	0.189	0.222	0.178	0.200	0.175	0.181
70	T98759 Aname MYG185 NHK	0.148	0.222	0.225	0.214	0.238	0.211	0.241	0.203	0.200
71	T98900 Aname MYG034 NHJ	0.132	0.195	0.192	0.195	0.197	0.175	0.173	0.175	0.170
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.164	0.214	0.216	0.181	0.214	0.162	0.192	0.178	0.175
73	KJ744398.1 *Aname mellosa* voucher T101163	0.175	0.167	0.164	0.148	0.175	0.175	0.192	0.184	0.162
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.142	0.200	0.203	0.208	0.203	0.195	0.178	0.186	0.205
75	KJ744623.1 *Aname mellosa* voucher T105871	0.159	0.162	0.159	0.137	0.162	0.156	0.170	0.170	0.151
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.101	0.203	0.197	0.192	0.208	0.203	0.197	0.197	0.195
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.110	0.208	0.203	0.205	0.205	0.208	0.205	0.203	0.203
78	KJ744661.1 *Aname mellosa* voucher T107942	0.162	0.159	0.156	0.137	0.164	0.156	0.175	0.164	0.151
79	KJ744662.1 *Aname mellosa* voucher T107945	0.156	0.153	0.151	0.134	0.153	0.159	0.170	0.167	0.145
80	KJ744669.1 *Aname mellosa* voucher T107968	0.156	0.164	0.162	0.140	0.164	0.164	0.173	0.170	0.156
81	KJ744775.1 *Aname mellosa* voucher T113629	0.156	0.159	0.156	0.137	0.159	0.159	0.167	0.167	0.153
82	KJ744785.1 *Aname mellosa* voucher T113642	0.156	0.159	0.156	0.137	0.159	0.159	0.170	0.170	0.151
83	KJ744788.1 *Aname mellosa* voucher T113648	0.159	0.164	0.162	0.142	0.164	0.164	0.164	0.170	0.153
84	KJ744791.1 *Aname mellosa* voucher T113654	0.162	0.162	0.159	0.140	0.162	0.162	0.173	0.164	0.148

		37	38	39	40	41	42	43	44	45
85	KJ744803.1 *Aname mellosa* voucher T113666	0.156	0.162	0.159	0.137	0.162	0.162	0.173	0.173	0.153
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.003	0.205	0.200	0.192	0.211	0.181	0.195	0.178	0.189
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.003	0.205	0.200	0.192	0.211	0.181	0.195	0.178	0.189
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.005	0.208	0.203	0.189	0.214	0.184	0.197	0.181	0.186
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.000	0.208	0.203	0.195	0.214	0.184	0.197	0.181	0.192
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.025	0.205	0.200	0.189	0.205	0.184	0.195	0.173	0.175
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.022	0.205	0.200	0.192	0.205	0.181	0.192	0.173	0.178
92	KJ744926.1 *Aname mellosa* voucher T119710	0.156	0.164	0.162	0.140	0.164	0.162	0.170	0.164	0.153
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.203	0.121	0.123	0.197	0.107	0.159	0.151	0.142	0.148
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.203	0.121	0.123	0.197	0.107	0.159	0.151	0.142	0.148
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.175	0.173	0.175	0.197	0.164	0.132	0.142	0.148	0.126
96	KJ744977.1 *Aname mellosa* voucher T122200	0.159	0.159	0.156	0.140	0.164	0.159	0.175	0.167	0.153
97	KJ744982.1 *Aname mellosa* voucher T122207	0.148	0.159	0.156	0.132	0.159	0.156	0.167	0.156	0.145
98	KJ744987.1 *Aname mellosa* voucher T122215	0.159	0.162	0.159	0.148	0.162	0.159	0.164	0.164	0.156
99	KJ744990.1 *Aname mellosa* voucher T122219	0.175	0.164	0.156	0.142	0.170	0.162	0.189	0.181	0.164
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.184	0.173	0.164	0.181	0.184	0.000	0.137	0.145	0.134
101	KJ745134.1 *Aname mellosa* voucher T126250	0.159	0.159	0.156	0.137	0.164	0.159	0.173	0.170	0.156
102	KJ745143.1 *Aname mellosa* voucher T126259	0.159	0.159	0.156	0.137	0.164	0.159	0.173	0.170	0.156
103	KJ745146.1 *Aname mellosa* voucher T126262	0.159	0.162	0.159	0.137	0.167	0.156	0.173	0.164	0.151
104	KJ745153.1 *Aname mellosa* voucher T126271	0.162	0.162	0.159	0.140	0.162	0.159	0.175	0.173	0.159
105	KJ745155.1 *Aname mellosa* voucher T126273	0.162	0.156	0.153	0.142	0.156	0.164	0.175	0.167	0.151
106	KJ745159.1 *Aname mellosa* voucher T126279	0.162	0.156	0.159	0.137	0.162	0.167	0.175	0.164	0.148
107	KJ745160.1 *Aname mellosa* voucher T126280	0.162	0.162	0.159	0.140	0.162	0.159	0.175	0.173	0.159
108	KJ745168.1 *Aname mellosa* voucher T126296	0.164	0.156	0.159	0.145	0.167	0.162	0.175	0.167	0.145
109	KJ745170.1 *Aname mellosa* voucher T126301	0.156	0.153	0.156	0.134	0.159	0.162	0.175	0.167	0.148
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.175	0.170	0.173	0.181	0.186	0.148	0.162	0.151	0.140
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.126	0.189	0.186	0.178	0.200	0.178	0.189	0.164	0.159
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.126	0.189	0.186	0.178	0.200	0.178	0.189	0.164	0.159

		37	38	39	40	41	42	43	44	45
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.126	0.189	0.186	0.178	0.200	0.178	0.189	0.164	0.159
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.189	0.178	0.181	0.205	0.178	0.153	0.170	0.145	0.126
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.126	0.189	0.186	0.178	0.200	0.178	0.189	0.164	0.159
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.140	0.195	0.197	0.189	0.200	0.186	0.189	0.167	0.167
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.126	0.189	0.186	0.178	0.200	0.178	0.189	0.164	0.159
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.126	0.203	0.200	0.156	0.208	0.178	0.189	0.178	0.159
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.132	0.195	0.192	0.195	0.197	0.175	0.173	0.175	0.170

		46	47	48	49	50	51	52	53	54
1	**PC12**	0.020	0.020	0.018	0.020	0.018	0.019	0.019	0.020	0.020
2	**PC27**	0.021	0.020	0.018	0.020	0.018	0.020	0.020	0.020	0.020
3	**PC29**	0.021	0.020	0.018	0.020	0.018	0.020	0.020	0.020	0.020
4	**PC13**	0.020	0.020	0.018	0.020	0.018	0.019	0.019	0.020	0.020
5	**PC28**	0.020	0.020	0.018	0.020	0.018	0.019	0.019	0.020	0.020
6	**PC18**	0.020	0.019	0.020	0.021	0.020	0.019	0.019	0.020	0.019
7	**PC15**	0.019	0.021	0.020	0.019	0.020	0.020	0.019	0.020	0.019
8	**PC16**	0.019	0.019	0.019	0.020	0.020	0.017	0.017	0.017	0.017
9	**PC26**	0.019	0.019	0.020	0.020	0.020	0.017	0.017	0.018	0.017
10	NA_N1_AG1	0.021	0.019	0.020	0.020	0.021	0.020	0.019	0.020	0.020
11	NAA_N45_AS38	0.020	0.021	0.019	0.020	0.019	0.021	0.021	0.021	0.021
12	NAB_N46_AS41	0.020	0.020	0.019	0.021	0.019	0.020	0.020	0.020	0.021
13	NAD_N93_AC10	0.021	0.022	0.019	0.021	0.018	0.021	0.021	0.021	0.022
14	NAM_N49_AD14	0.021	0.021	0.020	0.020	0.019	0.020	0.020	0.020	0.021
15	NAO_N22_AD328	0.015	0.021	0.020	0.014	0.021	0.020	0.019	0.020	0.020
16	NAQ_N5_AD352	0.019	0.019	0.019	0.020	0.020	0.016	0.017	0.017	0.017
17	NAW_N6_AD429	0.020	0.019	0.019	0.020	0.019	0.016	0.016	0.016	0.016
18	NAX_N24_AD452	0.014	0.021	0.020	0.015	0.021	0.021	0.021	0.021	0.021
19	NAZ_N6_AD457	0.020	0.018	0.020	0.020	0.019	0.017	0.017	0.018	0.017
20	NB_N16_AH8	0.018	0.021	0.020	0.019	0.021	0.021	0.020	0.020	0.020
21	NBC_N6_AD577	0.019	0.019	0.020	0.020	0.020	0.017	0.017	0.018	0.018
22	NBE_N46_AD583	0.021	0.020	0.020	0.020	0.020	0.021	0.021	0.022	0.022
23	NBM_N4_AD678	0.021	0.019	0.020	0.021	0.021	0.018	0.018	0.018	0.018
24	NBR_N14_AD746	0.020	0.020	0.020	0.021	0.019	0.020	0.020	0.021	0.020
25	NBT_N7_AD748	0.021	0.018	0.020	0.021	0.021	0.011	0.010	0.011	0.011
26	NBU_N15_AD753	0.020	0.020	0.019	0.021	0.020	0.020	0.020	0.020	0.020
27	NBW_N50_AD784	0.021	0.021	0.020	0.021	0.020	0.019	0.019	0.020	0.020
28	NCA_N20_AF78	0.012	0.022	0.021	0.015	0.021	0.021	0.021	0.021	0.021

		46	47	48	49	50	51	52	53	54
29	NCG_N95_I16	0.021	0.021	0.019	0.020	0.019	0.021	0.021	0.021	0.021
30	NCU_N110_O211	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.019
31	NCW_N66_O280	0.020	0.019	0.020	0.020	0.020	0.017	0.017	0.017	0.017
32	NCY_N67_O282	0.020	0.020	0.021	0.020	0.021	0.019	0.019	0.019	0.019
33	NCZ_N110_O285	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.019
34	NDD_N101_O292	0.020	0.020	0.019	0.020	0.019	0.020	0.020	0.021	0.020
35	NDK_N94_O333	0.020	0.021	0.019	0.020	0.019	0.020	0.020	0.020	0.020
36	NDL_N96_O334	0.021	0.021	0.019	0.020	0.019	0.020	0.020	0.020	0.020
37	NEH_N112_BI22	0.021	0.018	0.021	0.021	0.019	0.015	0.015	0.015	0.015
38	NEM_N43_DW15	0.021	0.021	0.018	0.021	0.020	0.021	0.021	0.021	0.021
39	NEM_N43_AT53	0.021	0.021	0.018	0.021	0.020	0.021	0.021	0.021	0.021
40	NEW_N19_AD381	0.015	0.021	0.020	0.015	0.021	0.020	0.020	0.021	0.021
41	NFN_N43_CG5	0.020	0.021	0.019	0.021	0.020	0.021	0.021	0.022	0.022
42	NFO_N127_CB26	0.020	0.020	0.019	0.021	0.019	0.021	0.021	0.021	0.021
43	NFZ_N122_BV095	0.020	0.021	0.019	0.021	0.020	0.021	0.021	0.021	0.021
44	NGC_N129_CW5	0.021	0.021	0.019	0.021	0.019	0.020	0.020	0.021	0.021
45	NGE_N130_CW14	0.020	0.021	0.018	0.018	0.019	0.021	0.020	0.020	0.020
46	NGN_N19_DC5		0.021	0.020	0.013	0.021	0.020	0.020	0.021	0.020
47	NGS_N136_DG10	0.214		0.021	0.022	0.020	0.019	0.019	0.020	0.020
48	NGV_N35_DW21	0.186	0.195		0.020	0.016	0.021	0.020	0.021	0.020
49	NIG_N22+N23_ID10	0.063	0.216	0.186		0.021	0.020	0.020	0.021	0.020
50	NK_N36_AD110	0.195	0.184	0.101	0.197		0.021	0.020	0.020	0.020
51	NRF_N7_NN11	0.189	0.162	0.192	0.186	0.192		0.005	0.009	0.008
52	NRG_N7_NN15	0.186	0.162	0.189	0.184	0.189	0.008		0.008	0.006
53	NRH_N7_NN16	0.192	0.170	0.192	0.192	0.189	0.030	0.022		0.006
54	NRI_N7_NN17	0.189	0.175	0.189	0.189	0.186	0.022	0.014	0.014	
55	NRJ_N7_NN18	0.189	0.173	0.189	0.189	0.186	0.022	0.014	0.008	0.005
56	NRK_N7_NN20	0.189	0.162	0.184	0.186	0.178	0.033	0.030	0.036	0.038

		46	47	48	49	50	51	52	53	54
57	NRL_N7_NN21	0.195	0.162	0.184	0.192	0.178	0.033	0.030	0.036	0.038
58	NRM_N7_NN37	0.211	0.167	0.197	0.200	0.200	0.060	0.058	0.063	0.066
59	NRO_N7_NN38	0.189	0.156	0.186	0.186	0.175	0.033	0.030	0.036	0.038
60	NRP_N138_NN35	0.156	0.173	0.170	0.164	0.170	0.132	0.126	0.132	0.129
61	NRQ_N138_NN36	0.164	0.173	0.178	0.170	0.178	0.137	0.132	0.129	0.132
62	NRW_N144_OU21	0.162	0.219	0.145	0.189	0.132	0.192	0.192	0.192	0.192
63	NY_N37_AR64	0.189	0.205	0.093	0.186	0.079	0.184	0.181	0.178	0.178
64	T101209 Kwonkan MYG175 NHP	0.162	0.225	0.145	0.186	0.132	0.186	0.186	0.186	0.186
65	T112084 Synothele MYG127 NHD	0.181	0.175	0.167	0.186	0.178	0.151	0.153	0.153	0.153
66	T112949 Aname MYG227 NHG	0.173	0.167	0.178	0.184	0.197	0.153	0.156	0.162	0.156
67	T121597 Aname MYG250 NHQ	0.184	0.195	0.134	0.186	0.142	0.178	0.178	0.181	0.181
68	T122062 Aname MYG182 NGX	0.184	0.173	0.186	0.195	0.170	0.148	0.145	0.153	0.153
69	T96570 Aname MYG067 NHF	0.178	0.189	0.184	0.186	0.192	0.156	0.159	0.167	0.167
70	T98759 Aname MYG185 NHK	0.197	0.145	0.205	0.208	0.186	0.162	0.159	0.164	0.162
71	T98900 Aname MYG034 NHJ	0.178	0.170	0.162	0.192	0.162	0.126	0.121	0.126	0.123
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.164	0.170	0.181	0.167	0.181	0.164	0.164	0.175	0.170
73	KJ744398.1 *Aname mellosa* voucher T101163	0.132	0.205	0.186	0.129	0.203	0.181	0.178	0.184	0.184
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.205	0.148	0.189	0.208	0.192	0.137	0.137	0.145	0.145
75	KJ744623.1 *Aname mellosa* voucher T105871	0.137	0.178	0.156	0.132	0.184	0.162	0.164	0.173	0.170
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.192	0.134	0.189	0.197	0.205	0.047	0.038	0.049	0.047
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.197	0.142	0.192	0.200	0.203	0.055	0.047	0.058	0.055
78	KJ744661.1 *Aname mellosa* voucher T107942	0.140	0.181	0.159	0.132	0.195	0.164	0.167	0.175	0.173
79	KJ744662.1 *Aname mellosa* voucher T107945	0.140	0.178	0.153	0.129	0.192	0.162	0.164	0.173	0.170
80	KJ744669.1 *Aname mellosa* voucher T107968	0.142	0.181	0.164	0.132	0.195	0.162	0.164	0.173	0.170
81	KJ744775.1 *Aname mellosa* voucher T113629	0.142	0.181	0.159	0.132	0.192	0.162	0.164	0.173	0.170
82	KJ744785.1 *Aname mellosa* voucher T113642	0.140	0.178	0.159	0.129	0.192	0.162	0.164	0.173	0.170
83	KJ744788.1 *Aname mellosa* voucher T113648	0.142	0.186	0.159	0.132	0.186	0.164	0.167	0.175	0.173
84	KJ744791.1 *Aname mellosa* voucher T113654	0.145	0.175	0.156	0.134	0.195	0.164	0.167	0.175	0.173

		46	47	48	49	50	51	52	53	54
85	KJ744803.1 *Aname mellosa* voucher T113666	0.140	0.178	0.162	0.129	0.192	0.162	0.164	0.173	0.170
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.200	0.129	0.195	0.197	0.159	0.082	0.085	0.093	0.093
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.200	0.129	0.195	0.197	0.159	0.082	0.085	0.093	0.093
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.197	0.132	0.192	0.195	0.162	0.079	0.082	0.090	0.090
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.203	0.132	0.197	0.200	0.162	0.085	0.088	0.096	0.096
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.197	0.140	0.203	0.189	0.175	0.079	0.082	0.096	0.096
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.200	0.137	0.203	0.192	0.173	0.079	0.082	0.096	0.096
92	KJ744926.1 *Aname mellosa* voucher T119710	0.142	0.175	0.164	0.134	0.195	0.167	0.170	0.178	0.175
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.167	0.214	0.159	0.181	0.186	0.186	0.186	0.192	0.189
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.167	0.214	0.159	0.181	0.186	0.186	0.186	0.192	0.189
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.184	0.195	0.134	0.186	0.142	0.178	0.178	0.181	0.181
96	KJ744977.1 *Aname mellosa* voucher T122200	0.137	0.178	0.162	0.137	0.200	0.170	0.173	0.181	0.178
97	KJ744982.1 *Aname mellosa* voucher T122207	0.134	0.181	0.156	0.126	0.178	0.164	0.167	0.175	0.173
98	KJ744987.1 *Aname mellosa* voucher T122215	0.153	0.181	0.164	0.142	0.192	0.173	0.175	0.186	0.181
99	KJ744990.1 *Aname mellosa* voucher T122219	0.148	0.192	0.170	0.140	0.195	0.178	0.181	0.192	0.186
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.189	0.186	0.156	0.192	0.151	0.195	0.195	0.197	0.200
101	KJ745134.1 *Aname mellosa* voucher T126250	0.140	0.184	0.164	0.134	0.197	0.164	0.167	0.175	0.173
102	KJ745143.1 *Aname mellosa* voucher T126259	0.140	0.184	0.164	0.134	0.197	0.164	0.167	0.175	0.173
103	KJ745146.1 *Aname mellosa* voucher T126262	0.137	0.178	0.162	0.132	0.195	0.162	0.164	0.173	0.170
104	KJ745153.1 *Aname mellosa* voucher T126271	0.142	0.186	0.167	0.137	0.200	0.167	0.170	0.178	0.175
105	KJ745155.1 *Aname mellosa* voucher T126273	0.145	0.178	0.156	0.134	0.192	0.167	0.170	0.178	0.175
106	KJ745159.1 *Aname mellosa* voucher T126279	0.142	0.181	0.156	0.132	0.195	0.162	0.164	0.173	0.170
107	KJ745160.1 *Aname mellosa* voucher T126280	0.142	0.186	0.167	0.137	0.200	0.167	0.170	0.178	0.175
108	KJ745168.1 *Aname mellosa* voucher T126296	0.148	0.178	0.162	0.132	0.195	0.164	0.167	0.175	0.173
109	KJ745170.1 *Aname mellosa* voucher T126301	0.140	0.178	0.153	0.126	0.189	0.156	0.159	0.167	0.167
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.175	0.214	0.164	0.170	0.162	0.173	0.170	0.175	0.175
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.173	0.159	0.162	0.186	0.159	0.110	0.101	0.104	0.104
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.173	0.159	0.162	0.186	0.159	0.110	0.101	0.104	0.104

		46	47	48	49	50	51	52	53	54
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.173	0.159	0.162	0.186	0.159	0.110	0.101	0.104	0.104
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.192	0.214	0.162	0.189	0.156	0.189	0.189	0.184	0.184
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.173	0.159	0.162	0.186	0.159	0.110	0.101	0.104	0.104
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.175	0.167	0.167	0.189	0.164	0.129	0.121	0.123	0.123
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.173	0.159	0.162	0.186	0.159	0.110	0.101	0.104	0.104
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.164	0.156	0.173	0.167	0.173	0.118	0.121	0.129	0.129
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.178	0.170	0.162	0.192	0.162	0.126	0.121	0.126	0.123

		55	56	57	58	59	60	61	62	63
1	**PC12**	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.018	0.018
2	**PC27**	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.019
3	**PC29**	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.018
4	**PC13**	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.019
5	**PC28**	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.019
6	**PC18**	0.020	0.020	0.019	0.020	0.019	0.020	0.020	0.020	0.020
7	**PC15**	0.020	0.020	0.020	0.020	0.020	0.019	0.020	0.019	0.020
8	**PC16**	0.017	0.016	0.017	0.017	0.016	0.016	0.017	0.020	0.020
9	**PC26**	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.020	0.020
10	NA_N1_AG1	0.020	0.019	0.019	0.020	0.019	0.020	0.020	0.021	0.020
11	NAA_N45_AS38	0.021	0.021	0.020	0.021	0.020	0.021	0.021	0.018	0.019
12	NAB_N46_AS41	0.021	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.019
13	NAD_N93_AC10	0.022	0.022	0.021	0.022	0.022	0.021	0.021	0.019	0.019
14	NAM_N49_AD14	0.020	0.021	0.021	0.021	0.021	0.021	0.021	0.020	0.019
15	NAO_N22_AD328	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.020	0.021
16	NAQ_N5_AD352	0.017	0.017	0.017	0.017	0.017	0.018	0.018	0.020	0.020
17	NAW_N6_AD429	0.016	0.015	0.015	0.017	0.015	0.017	0.017	0.020	0.020
18	NAX_N24_AD452	0.021	0.021	0.021	0.021	0.021	0.019	0.020	0.020	0.020
19	NAZ_N6_AD457	0.017	0.017	0.017	0.018	0.017	0.017	0.018	0.020	0.020
20	NB_N16_AH8	0.020	0.021	0.021	0.020	0.021	0.020	0.020	0.021	0.020
21	NBC_N6_AD577	0.017	0.017	0.017	0.018	0.017	0.017	0.017	0.020	0.020
22	NBE_N46_AD583	0.022	0.022	0.021	0.022	0.022	0.020	0.020	0.019	0.019
23	NBM_N4_AD678	0.018	0.018	0.018	0.019	0.018	0.020	0.020	0.020	0.021
24	NBR_N14_AD746	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020
25	NBT_N7_AD748	0.011	0.011	0.011	0.013	0.011	0.018	0.018	0.021	0.021
26	NBU_N15_AD753	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.019	0.020
27	NBW_N50_AD784	0.020	0.020	0.020	0.020	0.019	0.021	0.021	0.020	0.020
28	NCA_N20_AF78	0.021	0.021	0.021	0.022	0.021	0.020	0.020	0.020	0.021

		55	56	57	58	59	60	61	62	63
29	NCG_N95_I16	0.021	0.020	0.020	0.021	0.020	0.020	0.021	0.019	0.020
30	NCU_N110_O211	0.019	0.019	0.019	0.019	0.019	0.019	0.020	0.021	0.020
31	NCW_N66_O280	0.017	0.017	0.017	0.018	0.017	0.019	0.019	0.021	0.020
32	NCY_N67_O282	0.019	0.019	0.019	0.019	0.018	0.019	0.019	0.022	0.021
33	NCZ_N110_O285	0.019	0.019	0.019	0.019	0.019	0.018	0.019	0.020	0.019
34	NDD_N101_O292	0.020	0.020	0.020	0.020	0.020	0.019	0.020	0.020	0.020
35	NDK_N94_O333	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.020
36	NDL_N96_O334	0.020	0.020	0.020	0.021	0.020	0.021	0.021	0.018	0.019
37	NEH_N112_BI22	0.015	0.015	0.015	0.016	0.015	0.018	0.018	0.020	0.020
38	NEM_N43_DW15	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.020	0.020
39	NEM_N43_AT53	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.020	0.020
40	NEW_N19_AD381	0.021	0.020	0.020	0.021	0.020	0.020	0.020	0.020	0.021
41	NFN_N43_CG5	0.022	0.021	0.021	0.021	0.021	0.021	0.021	0.020	0.020
42	NFO_N127_CB26	0.021	0.021	0.020	0.022	0.021	0.019	0.020	0.018	0.019
43	NFZ_N122_BV095	0.021	0.021	0.021	0.021	0.021	0.020	0.020	0.018	0.019
44	NGC_N129_CW5	0.021	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.020
45	NGE_N130_CW14	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.018
46	NGN_N19_DC5	0.020	0.020	0.021	0.021	0.020	0.019	0.019	0.019	0.020
47	NGS_N136_DG10	0.020	0.019	0.019	0.020	0.019	0.020	0.020	0.022	0.021
48	NGV_N35_DW21	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.015
49	NIG_N22+N23_ID10	0.020	0.020	0.021	0.021	0.020	0.019	0.020	0.020	0.020
50	NK_N36_AD110	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.014
51	NRF_N7_NN11	0.008	0.009	0.009	0.012	0.009	0.018	0.018	0.021	0.020
52	NRG_N7_NN15	0.006	0.009	0.009	0.012	0.009	0.017	0.018	0.021	0.020
53	NRH_N7_NN16	0.005	0.010	0.010	0.013	0.010	0.018	0.018	0.021	0.020
54	NRI_N7_NN17	0.004	0.010	0.010	0.013	0.010	0.018	0.018	0.021	0.020
55	NRJ_N7_NN18		0.009	0.009	0.012	0.009	0.018	0.018	0.020	0.020
56	NRK_N7_NN20	0.033		0.004	0.011	0.004	0.018	0.018	0.020	0.020

		55	56	57	58	59	60	61	62	63
57	NRL_N7_NN21	0.033	0.005		0.012	0.004	0.018	0.018	0.020	0.020
58	NRM_N7_NN37	0.060	0.049	0.055		0.011	0.019	0.019	0.021	0.021
59	NRO_N7_NN38	0.033	0.005	0.005	0.049		0.018	0.018	0.021	0.020
60	NRP_N138_NN35	0.129	0.137	0.137	0.151	0.137		0.005	0.020	0.019
61	NRQ_N138_NN36	0.132	0.142	0.142	0.156	0.142	0.008		0.020	0.019
62	NRW_N144_OU21	0.189	0.189	0.189	0.208	0.192	0.173	0.181		0.019
63	NY_N37_AR64	0.175	0.178	0.178	0.197	0.181	0.162	0.164	0.148	
64	T101209 Kwonkan MYG175 NHP	0.184	0.184	0.184	0.203	0.186	0.167	0.175	0.005	0.148
65	T112084 Synothele MYG127 NHD	0.151	0.148	0.153	0.148	0.148	0.145	0.153	0.195	0.184
66	T112949 Aname MYG227 NHG	0.159	0.151	0.156	0.151	0.156	0.137	0.134	0.195	0.186
67	T121597 Aname MYG250 NHQ	0.178	0.170	0.175	0.170	0.173	0.162	0.170	0.110	0.137
68	T122062 Aname MYG182 NGX	0.151	0.148	0.142	0.162	0.148	0.156	0.162	0.192	0.159
69	T96570 Aname MYG067 NHF	0.164	0.148	0.153	0.164	0.153	0.151	0.156	0.184	0.192
70	T98759 Aname MYG185 NHK	0.159	0.170	0.170	0.164	0.170	0.175	0.184	0.203	0.197
71	T98900 Aname MYG034 NHJ	0.123	0.110	0.110	0.129	0.115	0.115	0.115	0.181	0.156
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.173	0.178	0.178	0.175	0.178	0.153	0.162	0.181	0.178
73	KJ744398.1 *Aname mellosa* voucher T101163	0.186	0.195	0.189	0.200	0.189	0.175	0.170	0.192	0.181
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.142	0.140	0.134	0.148	0.137	0.167	0.173	0.186	0.197
75	KJ744623.1 *Aname mellosa* voucher T105871	0.170	0.184	0.178	0.186	0.178	0.162	0.162	0.181	0.164
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.047	0.047	0.047	0.063	0.047	0.137	0.137	0.195	0.192
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.055	0.049	0.055	0.049	0.049	0.151	0.151	0.211	0.189
78	KJ744661.1 *Aname mellosa* voucher T107942	0.173	0.186	0.181	0.189	0.181	0.167	0.167	0.189	0.170
79	KJ744662.1 *Aname mellosa* voucher T107945	0.170	0.178	0.173	0.184	0.173	0.162	0.162	0.189	0.164
80	KJ744669.1 *Aname mellosa* voucher T107968	0.170	0.184	0.178	0.184	0.178	0.164	0.164	0.192	0.170
81	KJ744775.1 *Aname mellosa* voucher T113629	0.170	0.184	0.178	0.184	0.178	0.164	0.164	0.186	0.164
82	KJ744785.1 *Aname mellosa* voucher T113642	0.170	0.184	0.178	0.184	0.178	0.162	0.162	0.189	0.164
83	KJ744788.1 *Aname mellosa* voucher T113648	0.173	0.186	0.181	0.186	0.181	0.164	0.164	0.181	0.164
84	KJ744791.1 *Aname mellosa* voucher T113654	0.173	0.181	0.175	0.184	0.175	0.167	0.167	0.189	0.170

		55	56	57	58	59	60	61	62	63
85	KJ744803.1 *Aname mellosa* voucher T113666	0.170	0.184	0.178	0.184	0.178	0.162	0.162	0.192	0.167
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.090	0.088	0.082	0.104	0.082	0.126	0.126	0.184	0.173
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.090	0.088	0.082	0.104	0.082	0.126	0.126	0.184	0.173
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.088	0.085	0.085	0.101	0.085	0.123	0.123	0.181	0.170
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.093	0.090	0.085	0.107	0.085	0.129	0.129	0.186	0.175
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.093	0.085	0.079	0.101	0.079	0.123	0.123	0.181	0.184
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.093	0.085	0.079	0.101	0.079	0.121	0.121	0.181	0.184
92	KJ744926.1 *Aname mellosa* voucher T119710	0.175	0.189	0.184	0.189	0.184	0.170	0.170	0.186	0.173
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.192	0.189	0.195	0.192	0.192	0.178	0.184	0.159	0.170
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.192	0.189	0.195	0.192	0.192	0.178	0.184	0.159	0.170
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.178	0.170	0.175	0.170	0.173	0.162	0.170	0.110	0.137
96	KJ744977.1 *Aname mellosa* voucher T122200	0.178	0.186	0.181	0.186	0.181	0.170	0.170	0.195	0.173
97	KJ744982.1 *Aname mellosa* voucher T122207	0.173	0.181	0.175	0.181	0.175	0.156	0.156	0.173	0.156
98	KJ744987.1 *Aname mellosa* voucher T122215	0.184	0.186	0.181	0.181	0.181	0.162	0.162	0.186	0.167
99	KJ744990.1 *Aname mellosa* voucher T122219	0.189	0.200	0.195	0.195	0.195	0.186	0.186	0.197	0.175
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.200	0.195	0.189	0.219	0.195	0.164	0.167	0.145	0.151
101	KJ745134.1 *Aname mellosa* voucher T126250	0.173	0.186	0.181	0.186	0.181	0.167	0.167	0.192	0.170
102	KJ745143.1 *Aname mellosa* voucher T126259	0.173	0.186	0.181	0.186	0.181	0.167	0.167	0.192	0.170
103	KJ745146.1 *Aname mellosa* voucher T126262	0.170	0.184	0.178	0.186	0.178	0.164	0.164	0.189	0.170
104	KJ745153.1 *Aname mellosa* voucher T126271	0.175	0.189	0.184	0.189	0.184	0.167	0.167	0.195	0.173
105	KJ745155.1 *Aname mellosa* voucher T126273	0.175	0.181	0.175	0.184	0.178	0.167	0.167	0.192	0.167
106	KJ745159.1 *Aname mellosa* voucher T126279	0.170	0.178	0.173	0.178	0.173	0.164	0.170	0.189	0.173
107	KJ745160.1 *Aname mellosa* voucher T126280	0.175	0.189	0.184	0.189	0.184	0.167	0.167	0.195	0.173
108	KJ745168.1 *Aname mellosa* voucher T126296	0.173	0.181	0.175	0.175	0.175	0.164	0.170	0.192	0.173
109	KJ745170.1 *Aname mellosa* voucher T126301	0.164	0.178	0.173	0.178	0.173	0.162	0.167	0.186	0.167
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.175	0.175	0.170	0.197	0.173	0.178	0.186	0.137	0.181
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.101	0.096	0.096	0.118	0.096	0.112	0.115	0.186	0.175
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.101	0.096	0.096	0.118	0.096	0.112	0.115	0.186	0.175

		55	56	57	58	59	60	61	62	63
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.101	0.096	0.096	0.118	0.096	0.112	0.115	0.186	0.175
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.181	0.186	0.181	0.214	0.184	0.200	0.203	0.134	0.156
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.101	0.096	0.096	0.118	0.096	0.112	0.115	0.186	0.175
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.121	0.112	0.118	0.126	0.112	0.115	0.118	0.189	0.178
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.101	0.096	0.096	0.118	0.096	0.112	0.115	0.186	0.175
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.126	0.115	0.115	0.140	0.115	0.121	0.126	0.175	0.189
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.123	0.110	0.110	0.129	0.115	0.115	0.115	0.181	0.156

		64	65	66	67	68	69	70	71	72
1	**PC12**	0.018	0.020	0.020	0.017	0.020	0.020	0.021	0.020	0.020
2	**PC27**	0.018	0.020	0.020	0.017	0.020	0.021	0.021	0.020	0.020
3	**PC29**	0.018	0.020	0.020	0.018	0.020	0.020	0.021	0.020	0.020
4	**PC13**	0.018	0.020	0.020	0.018	0.020	0.020	0.020	0.020	0.020
5	**PC28**	0.018	0.020	0.020	0.018	0.020	0.020	0.021	0.020	0.020
6	**PC18**	0.020	0.020	0.020	0.020	0.020	0.019	0.020	0.020	0.020
7	**PC15**	0.019	0.021	0.020	0.019	0.020	0.020	0.021	0.020	0.018
8	**PC16**	0.020	0.018	0.018	0.020	0.019	0.019	0.020	0.015	0.019
9	**PC26**	0.020	0.020	0.019	0.020	0.018	0.019	0.019	0.016	0.020
10	NA_N1_AG1	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.019	0.019
11	NAA_N45_AS38	0.018	0.021	0.021	0.017	0.020	0.021	0.022	0.020	0.019
12	NAB_N46_AS41	0.017	0.020	0.020	0.018	0.021	0.020	0.022	0.019	0.020
13	NAD_N93_AC10	0.018	0.021	0.021	0.018	0.021	0.022	0.023	0.021	0.021
14	NAM_N49_AD14	0.019	0.020	0.022	0.019	0.021	0.021	0.021	0.020	0.021
15	NAO_N22_AD328	0.020	0.020	0.020	0.019	0.020	0.020	0.021	0.020	0.020
16	NAQ_N5_AD352	0.020	0.019	0.018	0.019	0.019	0.018	0.018	0.017	0.018
17	NAW_N6_AD429	0.020	0.019	0.019	0.020	0.019	0.019	0.019	0.012	0.020
18	NAX_N24_AD452	0.020	0.020	0.020	0.019	0.020	0.019	0.021	0.020	0.019
19	NAZ_N6_AD457	0.020	0.019	0.019	0.020	0.020	0.019	0.018	0.015	0.020
20	NB_N16_AH8	0.021	0.019	0.020	0.020	0.021	0.021	0.020	0.020	0.019
21	NBC_N6_AD577	0.020	0.019	0.019	0.020	0.020	0.019	0.019	0.014	0.019
22	NBE_N46_AD583	0.019	0.021	0.020	0.019	0.020	0.021	0.021	0.021	0.019
23	NBM_N4_AD678	0.020	0.019	0.020	0.020	0.019	0.019	0.020	0.019	0.020
24	NBR_N14_AD746	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
25	NBT_N7_AD748	0.021	0.019	0.019	0.020	0.019	0.019	0.020	0.017	0.020
26	NBU_N15_AD753	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.020	0.020
27	NBW_N50_AD784	0.020	0.021	0.020	0.020	0.021	0.021	0.021	0.020	0.021
28	NCA_N20_AF78	0.020	0.021	0.020	0.020	0.021	0.021	0.021	0.020	0.020

		64	65	66	67	68	69	70	71	72
29	NCG_N95_I16	0.019	0.020	0.020	0.017	0.020	0.020	0.022	0.020	0.020
30	NCU_N110_O211	0.020	0.019	0.019	0.020	0.018	0.019	0.020	0.020	0.020
31	NCW_N66_O280	0.020	0.018	0.018	0.020	0.018	0.019	0.020	0.018	0.019
32	NCY_N67_O282	0.022	0.020	0.020	0.021	0.019	0.019	0.020	0.019	0.020
33	NCZ_N110_O285	0.020	0.020	0.019	0.020	0.018	0.019	0.019	0.019	0.020
34	NDD_N101_O292	0.020	0.019	0.019	0.020	0.019	0.019	0.020	0.020	0.020
35	NDK_N94_O333	0.018	0.021	0.020	0.018	0.020	0.020	0.021	0.020	0.021
36	NDL_N96_O334	0.018	0.021	0.021	0.017	0.020	0.021	0.021	0.020	0.020
37	NEH_N112_BI22	0.020	0.019	0.019	0.020	0.018	0.019	0.019	0.018	0.019
38	NEM_N43_DW15	0.020	0.021	0.021	0.020	0.021	0.022	0.022	0.021	0.021
39	NEM_N43_AT53	0.020	0.021	0.021	0.020	0.022	0.022	0.022	0.021	0.022
40	NEW_N19_AD381	0.020	0.021	0.021	0.021	0.020	0.020	0.021	0.021	0.020
41	NFN_N43_CG5	0.020	0.020	0.021	0.019	0.022	0.022	0.022	0.021	0.021
42	NFO_N127_CB26	0.018	0.021	0.020	0.018	0.020	0.020	0.021	0.020	0.019
43	NFZ_N122_BV095	0.018	0.021	0.021	0.018	0.020	0.021	0.022	0.020	0.021
44	NGC_N129_CW5	0.018	0.020	0.020	0.019	0.020	0.020	0.021	0.020	0.020
45	NGE_N130_CW14	0.018	0.021	0.020	0.017	0.020	0.020	0.021	0.020	0.020
46	NGN_N19_DC5	0.019	0.020	0.020	0.020	0.020	0.020	0.021	0.020	0.019
47	NGS_N136_DG10	0.022	0.020	0.020	0.021	0.020	0.020	0.018	0.020	0.020
48	NGV_N35_DW21	0.018	0.020	0.020	0.018	0.020	0.020	0.021	0.019	0.020
49	NIG_N22+N23_ID10	0.020	0.020	0.020	0.020	0.021	0.020	0.021	0.021	0.020
50	NK_N36_AD110	0.018	0.020	0.021	0.018	0.020	0.021	0.020	0.019	0.020
51	NRF_N7_NN11	0.020	0.019	0.019	0.020	0.019	0.019	0.019	0.017	0.019
52	NRG_N7_NN15	0.020	0.019	0.019	0.020	0.018	0.019	0.019	0.017	0.019
53	NRH_N7_NN16	0.020	0.019	0.019	0.020	0.019	0.020	0.019	0.017	0.020
54	NRI_N7_NN17	0.020	0.019	0.019	0.020	0.019	0.020	0.019	0.017	0.020
55	NRJ_N7_NN18	0.020	0.019	0.019	0.020	0.019	0.019	0.019	0.017	0.020
56	NRK_N7_NN20	0.020	0.019	0.019	0.020	0.019	0.019	0.020	0.016	0.020

		64	65	66	67	68	69	70	71	72
57	NRL_N7_NN21	0.020	0.019	0.019	0.020	0.018	0.019	0.020	0.016	0.020
58	NRM_N7_NN37	0.021	0.019	0.019	0.020	0.019	0.019	0.019	0.018	0.020
59	NRO_N7_NN38	0.020	0.019	0.019	0.020	0.019	0.019	0.020	0.017	0.020
60	NRP_N138_NN35	0.020	0.018	0.018	0.019	0.019	0.019	0.020	0.017	0.019
61	NRQ_N138_NN36	0.020	0.019	0.018	0.020	0.019	0.019	0.020	0.017	0.019
62	NRW_N144_OU21	0.004	0.021	0.021	0.016	0.021	0.020	0.021	0.020	0.020
63	NY_N37_AR64	0.019	0.020	0.020	0.018	0.019	0.021	0.021	0.019	0.020
64	T101209 Kwonkan MYG175 NHP		0.020	0.021	0.016	0.021	0.020	0.021	0.020	0.020
65	T112084 Synothele MYG127 NHD	0.189		0.018	0.020	0.020	0.018	0.019	0.019	0.020
66	T112949 Aname MYG227 NHG	0.192	0.145		0.020	0.019	0.017	0.020	0.019	0.019
67	T121597 Aname MYG250 NHQ	0.110	0.189	0.173		0.020	0.020	0.021	0.019	0.019
68	T122062 Aname MYG182 NGX	0.192	0.181	0.156	0.181		0.018	0.020	0.019	0.020
69	T96570 Aname MYG067 NHF	0.178	0.134	0.118	0.184	0.137		0.020	0.019	0.020
70	T98759 Aname MYG185 NHK	0.205	0.164	0.173	0.205	0.189	0.186		0.019	0.020
71	T98900 Aname MYG034 NHJ	0.175	0.148	0.151	0.164	0.162	0.153	0.164		0.020
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.178	0.184	0.148	0.156	0.173	0.173	0.189	0.175	
73	KJ744398.1 *Aname mellosa* voucher T101163	0.186	0.173	0.178	0.167	0.181	0.178	0.214	0.173	0.164
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.189	0.162	0.178	0.184	0.153	0.153	0.184	0.156	0.189
75	KJ744623.1 *Aname mellosa* voucher T105871	0.175	0.159	0.156	0.142	0.159	0.175	0.181	0.178	0.145
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.195	0.156	0.151	0.186	0.159	0.164	0.170	0.126	0.175
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.211	0.162	0.148	0.178	0.156	0.170	0.173	0.137	0.178
78	KJ744661.1 *Aname mellosa* voucher T107942	0.184	0.159	0.159	0.148	0.164	0.167	0.189	0.186	0.148
79	KJ744662.1 *Aname mellosa* voucher T107945	0.184	0.156	0.156	0.145	0.156	0.175	0.195	0.173	0.153
80	KJ744669.1 *Aname mellosa* voucher T107968	0.186	0.151	0.153	0.151	0.164	0.170	0.189	0.181	0.153
81	KJ744775.1 *Aname mellosa* voucher T113629	0.181	0.151	0.153	0.145	0.159	0.170	0.189	0.181	0.153
82	KJ744785.1 *Aname mellosa* voucher T113642	0.184	0.153	0.156	0.145	0.159	0.173	0.186	0.178	0.151
83	KJ744788.1 *Aname mellosa* voucher T113648	0.175	0.159	0.151	0.148	0.162	0.175	0.189	0.181	0.153
84	KJ744791.1 *Aname mellosa* voucher T113654	0.184	0.153	0.153	0.142	0.162	0.170	0.192	0.178	0.156

		64	65	66	67	68	69	70	71	72
85	KJ744803.1 *Aname mellosa* voucher T113666	0.186	0.153	0.156	0.148	0.162	0.173	0.186	0.178	0.151
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.178	0.159	0.151	0.173	0.142	0.153	0.145	0.129	0.162
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.178	0.159	0.151	0.173	0.142	0.153	0.145	0.129	0.162
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.175	0.156	0.148	0.170	0.145	0.151	0.142	0.126	0.159
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.181	0.162	0.153	0.175	0.145	0.156	0.148	0.132	0.164
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.175	0.162	0.142	0.170	0.142	0.156	0.162	0.132	0.164
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.175	0.159	0.140	0.173	0.140	0.153	0.159	0.129	0.167
92	KJ744926.1 *Aname mellosa* voucher T119710	0.181	0.153	0.159	0.148	0.167	0.173	0.189	0.178	0.156
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.153	0.167	0.186	0.134	0.211	0.178	0.227	0.164	0.184
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.153	0.167	0.186	0.134	0.211	0.178	0.227	0.164	0.184
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.110	0.189	0.173	0.000	0.181	0.184	0.205	0.164	0.156
96	KJ744977.1 *Aname mellosa* voucher T122200	0.189	0.153	0.153	0.153	0.167	0.162	0.192	0.181	0.151
97	KJ744982.1 *Aname mellosa* voucher T122207	0.167	0.148	0.145	0.137	0.156	0.164	0.181	0.178	0.153
98	KJ744987.1 *Aname mellosa* voucher T122215	0.181	0.159	0.162	0.142	0.167	0.173	0.197	0.175	0.159
99	KJ744990.1 *Aname mellosa* voucher T122219	0.192	0.175	0.175	0.159	0.178	0.184	0.195	0.189	0.167
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.142	0.197	0.184	0.132	0.175	0.178	0.211	0.175	0.162
101	KJ745134.1 *Aname mellosa* voucher T126250	0.186	0.153	0.156	0.151	0.164	0.167	0.192	0.184	0.151
102	KJ745143.1 *Aname mellosa* voucher T126259	0.186	0.153	0.156	0.151	0.164	0.167	0.192	0.184	0.151
103	KJ745146.1 *Aname mellosa* voucher T126262	0.184	0.153	0.156	0.148	0.164	0.164	0.186	0.181	0.145
104	KJ745153.1 *Aname mellosa* voucher T126271	0.189	0.156	0.159	0.148	0.167	0.170	0.195	0.186	0.153
105	KJ745155.1 *Aname mellosa* voucher T126273	0.186	0.153	0.153	0.148	0.164	0.170	0.192	0.175	0.156
106	KJ745159.1 *Aname mellosa* voucher T126279	0.184	0.148	0.153	0.142	0.159	0.167	0.192	0.181	0.156
107	KJ745160.1 *Aname mellosa* voucher T126280	0.189	0.156	0.159	0.148	0.167	0.170	0.195	0.186	0.153
108	KJ745168.1 *Aname mellosa* voucher T126296	0.186	0.156	0.164	0.148	0.156	0.164	0.186	0.175	0.148
109	KJ745170.1 *Aname mellosa* voucher T126301	0.181	0.151	0.159	0.142	0.151	0.167	0.181	0.181	0.148
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.132	0.203	0.189	0.140	0.175	0.181	0.195	0.189	0.208
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.181	0.153	0.156	0.173	0.162	0.159	0.153	0.055	0.175
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.181	0.153	0.156	0.173	0.162	0.159	0.153	0.055	0.175

		64	65	66	67	68	69	70	71	72
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.181	0.153	0.156	0.173	0.162	0.159	0.153	0.055	0.175
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.132	0.200	0.197	0.123	0.181	0.203	0.208	0.170	0.189
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.181	0.153	0.156	0.173	0.162	0.159	0.153	0.055	0.175
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.184	0.153	0.153	0.164	0.153	0.151	0.164	0.044	0.175
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.181	0.153	0.156	0.173	0.162	0.159	0.153	0.055	0.175
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.173	0.151	0.156	0.170	0.178	0.159	0.151	0.079	0.162
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.175	0.148	0.151	0.164	0.162	0.153	0.164	0.000	0.175

		73	74	75	76	77	78	79	80	81
1	**PC12**	0.018	0.021	0.017	0.020	0.020	0.018	0.018	0.018	0.017
2	**PC27**	0.019	0.021	0.017	0.020	0.020	0.018	0.018	0.018	0.018
3	**PC29**	0.019	0.020	0.018	0.020	0.020	0.018	0.018	0.018	0.018
4	**PC13**	0.018	0.020	0.017	0.020	0.020	0.017	0.018	0.018	0.018
5	**PC28**	0.019	0.020	0.018	0.020	0.020	0.018	0.018	0.018	0.018
6	**PC18**	0.018	0.019	0.018	0.019	0.020	0.018	0.018	0.018	0.018
7	**PC15**	0.018	0.020	0.019	0.020	0.020	0.019	0.019	0.019	0.019
8	**PC16**	0.020	0.019	0.020	0.016	0.017	0.020	0.019	0.020	0.020
9	**PC26**	0.020	0.020	0.020	0.017	0.017	0.020	0.020	0.020	0.020
10	NA_N1_AG1	0.020	0.021	0.020	0.019	0.020	0.020	0.020	0.020	0.020
11	NAA_N45_AS38	0.019	0.020	0.019	0.020	0.021	0.019	0.019	0.019	0.019
12	NAB_N46_AS41	0.019	0.021	0.019	0.021	0.021	0.020	0.019	0.020	0.019
13	NAD_N93_AC10	0.021	0.021	0.020	0.022	0.022	0.020	0.020	0.020	0.020
14	NAM_N49_AD14	0.021	0.021	0.020	0.021	0.021	0.020	0.020	0.020	0.020
15	NAO_N22_AD328	0.016	0.021	0.017	0.020	0.020	0.017	0.017	0.017	0.017
16	NAQ_N5_AD352	0.020	0.019	0.019	0.017	0.017	0.019	0.019	0.019	0.019
17	NAW_N6_AD429	0.020	0.019	0.020	0.016	0.017	0.020	0.020	0.020	0.020
18	NAX_N24_AD452	0.018	0.021	0.017	0.020	0.021	0.017	0.017	0.017	0.017
19	NAZ_N6_AD457	0.019	0.019	0.019	0.017	0.018	0.019	0.019	0.019	0.019
20	NB_N16_AH8	0.014	0.021	0.014	0.020	0.020	0.014	0.014	0.014	0.014
21	NBC_N6_AD577	0.020	0.019	0.019	0.017	0.018	0.020	0.019	0.020	0.020
22	NBE_N46_AD583	0.020	0.021	0.019	0.021	0.022	0.019	0.019	0.019	0.019
23	NBM_N4_AD678	0.021	0.000	0.020	0.018	0.018	0.020	0.020	0.020	0.020
24	NBR_N14_AD746	0.020	0.021	0.020	0.019	0.020	0.020	0.020	0.020	0.020
25	NBT_N7_AD748	0.020	0.018	0.019	0.000	0.007	0.020	0.019	0.019	0.019
26	NBU_N15_AD753	0.020	0.020	0.018	0.019	0.020	0.019	0.018	0.019	0.019
27	NBW_N50_AD784	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
28	NCA_N20_AF78	0.018	0.021	0.019	0.021	0.021	0.019	0.019	0.019	0.019

		73	74	75	76	77	78	79	80	81
29	NCG_N95_I16	0.020	0.020	0.019	0.021	0.021	0.020	0.019	0.020	0.019
30	NCU_N110_O211	0.019	0.019	0.018	0.020	0.019	0.018	0.019	0.019	0.019
31	NCW_N66_O280	0.020	0.018	0.019	0.017	0.018	0.018	0.018	0.019	0.018
32	NCY_N67_O282	0.020	0.020	0.020	0.019	0.019	0.020	0.020	0.020	0.020
33	NCZ_N110_O285	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
34	NDD_N101_O292	0.019	0.020	0.018	0.020	0.020	0.018	0.018	0.018	0.018
35	NDK_N94_O333	0.020	0.021	0.020	0.020	0.021	0.020	0.020	0.020	0.020
36	NDL_N96_O334	0.020	0.020	0.020	0.021	0.021	0.020	0.020	0.020	0.020
37	NEH_N112_BI22	0.020	0.018	0.019	0.016	0.016	0.019	0.019	0.019	0.019
38	NEM_N43_DW15	0.020	0.021	0.019	0.021	0.021	0.019	0.019	0.019	0.019
39	NEM_N43_AT53	0.019	0.021	0.019	0.021	0.021	0.019	0.019	0.019	0.019
40	NEW_N19_AD381	0.019	0.021	0.018	0.021	0.021	0.018	0.018	0.018	0.018
41	NFN_N43_CG5	0.020	0.021	0.019	0.021	0.021	0.019	0.019	0.019	0.019
42	NFO_N127_CB26	0.020	0.021	0.019	0.021	0.021	0.019	0.019	0.019	0.019
43	NFZ_N122_BV095	0.021	0.020	0.020	0.021	0.021	0.020	0.020	0.020	0.020
44	NGC_N129_CW5	0.020	0.020	0.020	0.021	0.021	0.019	0.020	0.020	0.020
45	NGE_N130_CW14	0.019	0.021	0.019	0.021	0.021	0.019	0.018	0.019	0.019
46	NGN_N19_DC5	0.018	0.021	0.018	0.021	0.021	0.018	0.018	0.018	0.018
47	NGS_N136_DG10	0.021	0.019	0.020	0.018	0.018	0.020	0.020	0.020	0.020
48	NGV_N35_DW21	0.020	0.020	0.019	0.020	0.021	0.019	0.019	0.019	0.019
49	NIG_N22+N23_ID10	0.018	0.021	0.018	0.021	0.021	0.018	0.018	0.018	0.018
50	NK_N36_AD110	0.021	0.021	0.020	0.021	0.021	0.021	0.021	0.021	0.021
51	NRF_N7_NN11	0.020	0.018	0.019	0.011	0.012	0.019	0.019	0.019	0.019
52	NRG_N7_NN15	0.020	0.018	0.019	0.010	0.011	0.020	0.019	0.019	0.019
53	NRH_N7_NN16	0.020	0.018	0.020	0.011	0.012	0.020	0.020	0.020	0.020
54	NRI_N7_NN17	0.020	0.018	0.020	0.011	0.012	0.020	0.020	0.020	0.020
55	NRJ_N7_NN18	0.020	0.018	0.020	0.011	0.012	0.020	0.020	0.020	0.020
56	NRK_N7_NN20	0.021	0.018	0.020	0.011	0.011	0.020	0.020	0.020	0.020

		73	74	75	76	77	78	79	80	81
57	NRL_N7_NN21	0.020	0.018	0.020	0.011	0.012	0.020	0.020	0.020	0.020
58	NRM_N7_NN37	0.021	0.019	0.020	0.013	0.011	0.020	0.020	0.020	0.020
59	NRO_N7_NN38	0.020	0.018	0.020	0.011	0.011	0.020	0.020	0.020	0.020
60	NRP_N138_NN35	0.020	0.020	0.019	0.018	0.019	0.020	0.019	0.019	0.019
61	NRQ_N138_NN36	0.020	0.020	0.019	0.018	0.019	0.020	0.019	0.019	0.019
62	NRW_N144_OU21	0.021	0.020	0.020	0.021	0.021	0.020	0.020	0.021	0.020
63	NY_N37_AR64	0.020	0.021	0.019	0.021	0.020	0.020	0.019	0.020	0.019
64	T101209 Kwonkan MYG175 NHP	0.020	0.020	0.020	0.021	0.021	0.020	0.020	0.020	0.020
65	T112084 Synothele MYG127 NHD	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
66	T112949 Aname MYG227 NHG	0.020	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019
67	T121597 Aname MYG250 NHQ	0.020	0.020	0.018	0.020	0.020	0.019	0.018	0.019	0.018
68	T122062 Aname MYG182 NGX	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
69	T96570 Aname MYG067 NHF	0.020	0.019	0.020	0.019	0.020	0.020	0.020	0.020	0.020
70	T98759 Aname MYG185 NHK	0.021	0.020	0.020	0.020	0.020	0.020	0.021	0.020	0.020
71	T98900 Aname MYG034 NHJ	0.020	0.019	0.020	0.017	0.018	0.020	0.020	0.020	0.020
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.019	0.020	0.018	0.020	0.020	0.019	0.019	0.019	0.019
73	KJ744398.1 *Aname mellosa* voucher T101163		0.021	0.012	0.020	0.021	0.012	0.012	0.012	0.012
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.208		0.020	0.018	0.018	0.020	0.020	0.020	0.020
75	KJ744623.1 *Aname mellosa* voucher T105871	0.055	0.189		0.019	0.020	0.006	0.006	0.006	0.005
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.178	0.134	0.164		0.007	0.020	0.019	0.019	0.019
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.195	0.137	0.173	0.019		0.020	0.020	0.020	0.020
78	KJ744661.1 *Aname mellosa* voucher T107942	0.055	0.189	0.014	0.167	0.175		0.008	0.005	0.005
79	KJ744662.1 *Aname mellosa* voucher T107945	0.058	0.189	0.014	0.164	0.173	0.022		0.007	0.005
80	KJ744669.1 *Aname mellosa* voucher T107968	0.055	0.186	0.014	0.164	0.173	0.011	0.016		0.004
81	KJ744775.1 *Aname mellosa* voucher T113629	0.052	0.186	0.008	0.164	0.173	0.011	0.011	0.005	
82	KJ744785.1 *Aname mellosa* voucher T113642	0.049	0.186	0.008	0.164	0.173	0.011	0.011	0.005	0.005
83	KJ744788.1 *Aname mellosa* voucher T113648	0.060	0.195	0.011	0.167	0.175	0.019	0.019	0.014	0.008
84	KJ744791.1 *Aname mellosa* voucher T113654	0.060	0.186	0.011	0.162	0.170	0.014	0.008	0.014	0.008

		73	74	75	76	77	78	79	80	81
85	KJ744803.1 *Aname mellosa* voucher T113666	0.052	0.186	0.011	0.164	0.173	0.014	0.014	0.003	0.008
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.173	0.140	0.156	0.099	0.107	0.159	0.153	0.153	0.153
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.173	0.140	0.156	0.099	0.107	0.159	0.153	0.153	0.153
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.175	0.142	0.159	0.096	0.104	0.162	0.156	0.156	0.156
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.175	0.142	0.159	0.101	0.110	0.162	0.156	0.156	0.156
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.175	0.132	0.159	0.090	0.099	0.162	0.151	0.156	0.156
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.178	0.129	0.162	0.090	0.099	0.164	0.153	0.159	0.159
92	KJ744926.1 *Aname mellosa* voucher T119710	0.055	0.192	0.016	0.164	0.178	0.014	0.019	0.008	0.008
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.167	0.197	0.164	0.197	0.197	0.164	0.156	0.164	0.162
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.167	0.197	0.164	0.197	0.197	0.164	0.156	0.164	0.162
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.167	0.184	0.142	0.186	0.178	0.148	0.145	0.151	0.145
96	KJ744977.1 *Aname mellosa* voucher T122200	0.058	0.192	0.022	0.167	0.175	0.014	0.019	0.014	0.014
97	KJ744982.1 *Aname mellosa* voucher T122207	0.060	0.189	0.022	0.167	0.175	0.022	0.025	0.019	0.014
98	KJ744987.1 *Aname mellosa* voucher T122215	0.063	0.184	0.025	0.173	0.181	0.027	0.027	0.022	0.016
99	KJ744990.1 *Aname mellosa* voucher T122219	0.071	0.211	0.033	0.184	0.192	0.030	0.041	0.041	0.036
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.175	0.195	0.156	0.203	0.208	0.156	0.159	0.164	0.159
101	KJ745134.1 *Aname mellosa* voucher T126250	0.049	0.189	0.014	0.167	0.175	0.005	0.016	0.005	0.005
102	KJ745143.1 *Aname mellosa* voucher T126259	0.049	0.189	0.014	0.167	0.175	0.005	0.016	0.005	0.005
103	KJ745146.1 *Aname mellosa* voucher T126262	0.049	0.186	0.011	0.164	0.173	0.005	0.019	0.011	0.008
104	KJ745153.1 *Aname mellosa* voucher T126271	0.052	0.192	0.016	0.170	0.178	0.008	0.019	0.008	0.008
105	KJ745155.1 *Aname mellosa* voucher T126273	0.058	0.181	0.016	0.164	0.173	0.019	0.014	0.008	0.014
106	KJ745159.1 *Aname mellosa* voucher T126279	0.060	0.184	0.016	0.164	0.173	0.019	0.008	0.014	0.008
107	KJ745160.1 *Aname mellosa* voucher T126280	0.052	0.192	0.016	0.170	0.178	0.008	0.019	0.008	0.008
108	KJ745168.1 *Aname mellosa* voucher T126296	0.063	0.175	0.022	0.167	0.175	0.025	0.019	0.019	0.019
109	KJ745170.1 *Aname mellosa* voucher T126301	0.058	0.181	0.014	0.167	0.175	0.016	0.016	0.016	0.011
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.178	0.195	0.170	0.189	0.197	0.173	0.173	0.175	0.170
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.175	0.164	0.175	0.107	0.118	0.181	0.170	0.178	0.178
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.175	0.164	0.175	0.107	0.118	0.181	0.170	0.178	0.178

		73	74	75	76	77	78	79	80	81
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.175	0.164	0.175	0.107	0.118	0.181	0.170	0.178	0.178
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.175	0.178	0.170	0.200	0.203	0.175	0.170	0.173	0.170
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.175	0.164	0.175	0.107	0.118	0.181	0.170	0.178	0.178
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.181	0.162	0.181	0.129	0.134	0.184	0.175	0.184	0.184
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.175	0.164	0.175	0.107	0.118	0.181	0.170	0.178	0.178
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.178	0.156	0.162	0.123	0.137	0.170	0.159	0.167	0.167
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.173	0.156	0.178	0.126	0.137	0.186	0.173	0.181	0.181

		82	83	84	85	86	87	88	89	90
1	**PC12**	0.017	0.017	0.018	0.018	0.019	0.019	0.020	0.020	0.019
2	**PC27**	0.018	0.018	0.018	0.018	0.020	0.020	0.020	0.020	0.020
3	**PC29**	0.018	0.018	0.018	0.018	0.019	0.019	0.020	0.020	0.020
4	**PC13**	0.017	0.018	0.018	0.018	0.019	0.019	0.019	0.019	0.020
5	**PC28**	0.018	0.018	0.018	0.018	0.019	0.019	0.019	0.019	0.020
6	**PC18**	0.018	0.018	0.018	0.018	0.019	0.019	0.019	0.019	0.019
7	**PC15**	0.019	0.019	0.019	0.019	0.020	0.020	0.020	0.020	0.020
8	**PC16**	0.020	0.020	0.020	0.020	0.017	0.017	0.017	0.017	0.017
9	**PC26**	0.020	0.020	0.020	0.020	0.018	0.018	0.018	0.018	0.018
10	NA_N1_AG1	0.020	0.020	0.020	0.020	0.020	0.020	0.019	0.020	0.019
11	NAA_N45_AS38	0.019	0.019	0.019	0.019	0.020	0.020	0.020	0.020	0.020
12	NAB_N46_AS41	0.019	0.020	0.019	0.019	0.021	0.021	0.021	0.021	0.020
13	NAD_N93_AC10	0.020	0.020	0.020	0.020	0.022	0.022	0.022	0.022	0.021
14	NAM_N49_AD14	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.021
15	NAO_N22_AD328	0.017	0.017	0.017	0.017	0.020	0.020	0.020	0.020	0.020
16	NAQ_N5_AD352	0.019	0.019	0.019	0.019	0.017	0.017	0.017	0.017	0.017
17	NAW_N6_AD429	0.020	0.020	0.020	0.020	0.017	0.017	0.017	0.017	0.017
18	NAX_N24_AD452	0.017	0.017	0.017	0.017	0.021	0.021	0.021	0.021	0.021
19	NAZ_N6_AD457	0.019	0.019	0.019	0.019	0.017	0.017	0.017	0.017	0.017
20	NB_N16_AH8	0.014	0.014	0.014	0.014	0.020	0.020	0.020	0.020	0.020
21	NBC_N6_AD577	0.019	0.019	0.019	0.019	0.017	0.017	0.017	0.017	0.017
22	NBE_N46_AD583	0.019	0.019	0.019	0.019	0.021	0.021	0.021	0.021	0.021
23	NBM_N4_AD678	0.020	0.021	0.020	0.020	0.018	0.018	0.018	0.018	0.018
24	NBR_N14_AD746	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
25	NBT_N7_AD748	0.019	0.020	0.019	0.019	0.016	0.016	0.015	0.016	0.015
26	NBU_N15_AD753	0.019	0.019	0.018	0.019	0.020	0.020	0.020	0.019	0.019
27	NBW_N50_AD784	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
28	NCA_N20_AF78	0.019	0.019	0.019	0.019	0.021	0.021	0.021	0.022	0.021

		82	83	84	85	86	87	88	89	90
29	NCG_N95_I16	0.019	0.020	0.019	0.019	0.021	0.021	0.021	0.021	0.020
30	NCU_N110_O211	0.018	0.018	0.019	0.019	0.019	0.019	0.019	0.019	0.018
31	NCW_N66_O280	0.019	0.019	0.018	0.019	0.018	0.018	0.018	0.018	0.017
32	NCY_N67_O282	0.020	0.020	0.020	0.020	0.018	0.018	0.019	0.019	0.019
33	NCZ_N110_O285	0.019	0.019	0.019	0.019	0.018	0.018	0.018	0.018	0.018
34	NDD_N101_O292	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
35	NDK_N94_O333	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
36	NDL_N96_O334	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
37	NEH_N112_BI22	0.019	0.019	0.019	0.019	0.003	0.003	0.004	0.000	0.008
38	NEM_N43_DW15	0.019	0.019	0.019	0.019	0.021	0.021	0.021	0.021	0.021
39	NEM_N43_AT53	0.019	0.019	0.019	0.019	0.021	0.021	0.021	0.021	0.021
40	NEW_N19_AD381	0.018	0.018	0.018	0.018	0.021	0.021	0.020	0.021	0.020
41	NFN_N43_CG5	0.019	0.019	0.019	0.019	0.021	0.021	0.021	0.021	0.021
42	NFO_N127_CB26	0.019	0.019	0.019	0.019	0.020	0.020	0.020	0.020	0.020
43	NFZ_N122_BV095	0.020	0.019	0.020	0.020	0.021	0.021	0.021	0.021	0.021
44	NGC_N129_CW5	0.020	0.020	0.019	0.020	0.020	0.020	0.020	0.020	0.020
45	NGE_N130_CW14	0.019	0.019	0.019	0.019	0.020	0.020	0.020	0.021	0.020
46	NGN_N19_DC5	0.018	0.018	0.018	0.018	0.021	0.021	0.021	0.021	0.021
47	NGS_N136_DG10	0.020	0.020	0.020	0.020	0.018	0.018	0.018	0.018	0.018
48	NGV_N35_DW21	0.019	0.019	0.019	0.019	0.021	0.021	0.021	0.021	0.021
49	NIG_N22+N23_ID10	0.018	0.018	0.018	0.018	0.021	0.021	0.021	0.021	0.020
50	NK_N36_AD110	0.021	0.020	0.021	0.021	0.019	0.019	0.019	0.019	0.020
51	NRF_N7_NN11	0.019	0.019	0.019	0.019	0.014	0.014	0.014	0.015	0.014
52	NRG_N7_NN15	0.019	0.020	0.020	0.019	0.015	0.015	0.014	0.015	0.014
53	NRH_N7_NN16	0.020	0.020	0.020	0.020	0.015	0.015	0.015	0.015	0.015
54	NRI_N7_NN17	0.020	0.020	0.020	0.020	0.015	0.015	0.015	0.015	0.015
55	NRJ_N7_NN18	0.020	0.020	0.020	0.020	0.015	0.015	0.015	0.015	0.015
56	NRK_N7_NN20	0.020	0.020	0.020	0.020	0.015	0.015	0.015	0.015	0.015

		82	83	84	85	86	87	88	89	90
57	NRL_N7_NN21	0.020	0.020	0.020	0.020	0.014	0.014	0.015	0.015	0.014
58	NRM_N7_NN37	0.020	0.020	0.020	0.020	0.016	0.016	0.016	0.016	0.016
59	NRO_N7_NN38	0.020	0.020	0.020	0.020	0.014	0.014	0.015	0.015	0.014
60	NRP_N138_NN35	0.019	0.019	0.020	0.019	0.017	0.017	0.017	0.018	0.017
61	NRQ_N138_NN36	0.019	0.019	0.020	0.019	0.017	0.017	0.017	0.018	0.017
62	NRW_N144_OU21	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.020	0.020
63	NY_N37_AR64	0.019	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020
64	T101209 Kwonkan MYG175 NHP	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
65	T112084 Synothele MYG127 NHD	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
66	T112949 Aname MYG227 NHG	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.018
67	T121597 Aname MYG250 NHQ	0.018	0.019	0.018	0.019	0.020	0.020	0.020	0.020	0.020
68	T122062 Aname MYG182 NGX	0.019	0.019	0.019	0.019	0.018	0.018	0.018	0.018	0.018
69	T96570 Aname MYG067 NHF	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.019	0.019
70	T98759 Aname MYG185 NHK	0.020	0.020	0.021	0.020	0.018	0.018	0.018	0.019	0.019
71	T98900 Aname MYG034 NHJ	0.020	0.020	0.020	0.020	0.018	0.018	0.017	0.018	0.018
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
73	KJ744398.1 *Aname mellosa* voucher T101163	0.011	0.012	0.012	0.012	0.020	0.020	0.020	0.020	0.020
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.020	0.021	0.020	0.020	0.018	0.018	0.018	0.018	0.018
75	KJ744623.1 *Aname mellosa* voucher T105871	0.005	0.005	0.005	0.005	0.019	0.019	0.019	0.019	0.019
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.019	0.020	0.019	0.019	0.016	0.016	0.015	0.016	0.015
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.020	0.020	0.020	0.020	0.016	0.016	0.016	0.016	0.016
78	KJ744661.1 *Aname mellosa* voucher T107942	0.005	0.007	0.006	0.006	0.019	0.019	0.019	0.019	0.019
79	KJ744662.1 *Aname mellosa* voucher T107945	0.005	0.007	0.005	0.006	0.019	0.019	0.019	0.019	0.019
80	KJ744669.1 *Aname mellosa* voucher T107968	0.004	0.006	0.006	0.003	0.019	0.019	0.019	0.019	0.019
81	KJ744775.1 *Aname mellosa* voucher T113629	0.004	0.005	0.005	0.005	0.019	0.019	0.019	0.019	0.019
82	KJ744785.1 *Aname mellosa* voucher T113642		0.006	0.006	0.003	0.019	0.019	0.019	0.019	0.019
83	KJ744788.1 *Aname mellosa* voucher T113648	0.014		0.007	0.007	0.019	0.019	0.019	0.019	0.019
84	KJ744791.1 *Aname mellosa* voucher T113654	0.014	0.016		0.007	0.019	0.019	0.019	0.019	0.019

		82	83	84	85	86	87	88	89	90
85	KJ744803.1 *Aname mellosa* voucher T113666	0.003	0.016	0.016		0.019	0.019	0.019	0.019	0.019
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.153	0.156	0.159	0.153		0.000	0.003	0.003	0.008
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.153	0.156	0.159	0.153	0.000		0.003	0.003	0.008
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.156	0.159	0.162	0.156	0.003	0.003		0.004	0.008
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.156	0.159	0.162	0.156	0.003	0.003	0.005		0.008
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.156	0.156	0.156	0.156	0.022	0.022	0.025	0.025	
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.159	0.159	0.159	0.159	0.019	0.019	0.022	0.022	0.003
92	KJ744926.1 *Aname mellosa* voucher T119710	0.008	0.016	0.016	0.011	0.153	0.153	0.156	0.156	0.156
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.159	0.167	0.164	0.162	0.200	0.200	0.197	0.203	0.200
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.159	0.167	0.164	0.162	0.200	0.200	0.197	0.203	0.200
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.145	0.148	0.142	0.148	0.173	0.173	0.170	0.175	0.170
96	KJ744977.1 *Aname mellosa* voucher T122200	0.014	0.019	0.016	0.016	0.156	0.156	0.159	0.159	0.156
97	KJ744982.1 *Aname mellosa* voucher T122207	0.019	0.022	0.022	0.022	0.145	0.145	0.148	0.148	0.148
98	KJ744987.1 *Aname mellosa* voucher T122215	0.022	0.025	0.025	0.025	0.156	0.156	0.159	0.159	0.159
99	KJ744990.1 *Aname mellosa* voucher T122219	0.036	0.044	0.038	0.038	0.173	0.173	0.175	0.175	0.175
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.159	0.164	0.162	0.162	0.181	0.181	0.184	0.184	0.184
101	KJ745134.1 *Aname mellosa* voucher T126250	0.005	0.014	0.014	0.008	0.156	0.156	0.159	0.159	0.159
102	KJ745143.1 *Aname mellosa* voucher T126259	0.005	0.014	0.014	0.008	0.156	0.156	0.159	0.159	0.159
103	KJ745146.1 *Aname mellosa* voucher T126262	0.011	0.016	0.011	0.014	0.156	0.156	0.159	0.159	0.159
104	KJ745153.1 *Aname mellosa* voucher T126271	0.008	0.016	0.016	0.011	0.159	0.159	0.162	0.162	0.162
105	KJ745155.1 *Aname mellosa* voucher T126273	0.008	0.022	0.016	0.005	0.159	0.159	0.162	0.162	0.156
106	KJ745159.1 *Aname mellosa* voucher T126279	0.014	0.016	0.005	0.016	0.159	0.159	0.162	0.162	0.156
107	KJ745160.1 *Aname mellosa* voucher T126280	0.008	0.016	0.016	0.011	0.159	0.159	0.162	0.162	0.162
108	KJ745168.1 *Aname mellosa* voucher T126296	0.014	0.027	0.022	0.016	0.162	0.162	0.164	0.164	0.159
109	KJ745170.1 *Aname mellosa* voucher T126301	0.011	0.019	0.019	0.014	0.153	0.153	0.156	0.156	0.156
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.173	0.170	0.173	0.175	0.173	0.173	0.175	0.175	0.175
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.175	0.175	0.175	0.175	0.123	0.123	0.121	0.126	0.121
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.175	0.175	0.175	0.175	0.123	0.123	0.121	0.126	0.121

		82	83	84	85	86	87	88	89	90
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.175	0.175	0.175	0.175	0.123	0.123	0.121	0.126	0.121
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.167	0.173	0.175	0.170	0.186	0.186	0.189	0.189	0.184
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.175	0.175	0.175	0.175	0.123	0.123	0.121	0.126	0.121
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.181	0.184	0.181	0.181	0.137	0.137	0.134	0.140	0.134
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.175	0.175	0.175	0.175	0.123	0.123	0.121	0.126	0.121
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.164	0.162	0.162	0.164	0.123	0.123	0.121	0.126	0.115
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.178	0.181	0.178	0.178	0.129	0.129	0.126	0.132	0.132

		91	92	93	94	95	96	97	98	99
1	**PC12**	0.020	0.018	0.018	0.018	0.017	0.018	0.017	0.018	0.018
2	**PC27**	0.020	0.018	0.018	0.018	0.017	0.018	0.017	0.018	0.018
3	**PC29**	0.020	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
4	**PC13**	0.019	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018
5	**PC28**	0.019	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018
6	**PC18**	0.019	0.018	0.020	0.020	0.020	0.018	0.018	0.018	0.018
7	**PC15**	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.020
8	**PC16**	0.017	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
9	**PC26**	0.018	0.020	0.020	0.020	0.020	0.019	0.019	0.020	0.020
10	NA_N1_AG1	0.019	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.021
11	NAA_N45_AS38	0.020	0.019	0.020	0.020	0.017	0.019	0.019	0.019	0.020
12	NAB_N46_AS41	0.020	0.020	0.019	0.019	0.018	0.020	0.019	0.019	0.020
13	NAD_N93_AC10	0.021	0.020	0.019	0.019	0.018	0.020	0.020	0.020	0.021
14	NAM_N49_AD14	0.021	0.020	0.019	0.019	0.019	0.020	0.020	0.020	0.020
15	NAO_N22_AD328	0.020	0.017	0.020	0.020	0.019	0.017	0.016	0.018	0.018
16	NAQ_N5_AD352	0.017	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
17	NAW_N6_AD429	0.017	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
18	NAX_N24_AD452	0.021	0.017	0.019	0.019	0.019	0.017	0.017	0.018	0.017
19	NAZ_N6_AD457	0.017	0.019	0.020	0.020	0.020	0.019	0.019	0.019	0.019
20	NB_N16_AH8	0.020	0.014	0.020	0.020	0.020	0.013	0.014	0.015	0.015
21	NBC_N6_AD577	0.017	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020
22	NBE_N46_AD583	0.020	0.019	0.020	0.020	0.019	0.019	0.019	0.019	0.019
23	NBM_N4_AD678	0.018	0.021	0.021	0.021	0.020	0.021	0.020	0.020	0.021
24	NBR_N14_AD746	0.020	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.020
25	NBT_N7_AD748	0.015	0.019	0.021	0.021	0.020	0.020	0.020	0.020	0.020
26	NBU_N15_AD753	0.019	0.019	0.021	0.021	0.019	0.019	0.019	0.019	0.018
27	NBW_N50_AD784	0.020	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.020
28	NCA_N20_AF78	0.021	0.019	0.020	0.020	0.020	0.019	0.018	0.019	0.019

		91	92	93	94	95	96	97	98	99
29	NCG_N95_I16	0.020	0.020	0.018	0.018	0.017	0.019	0.020	0.019	0.020
30	NCU_N110_O211	0.019	0.019	0.020	0.020	0.020	0.019	0.018	0.019	0.018
31	NCW_N66_O280	0.017	0.019	0.021	0.021	0.020	0.018	0.018	0.019	0.019
32	NCY_N67_O282	0.018	0.020	0.021	0.021	0.021	0.020	0.020	0.020	0.020
33	NCZ_N110_O285	0.018	0.019	0.020	0.020	0.020	0.019	0.018	0.019	0.019
34	NDD_N101_O292	0.018	0.018	0.020	0.020	0.020	0.018	0.018	0.018	0.019
35	NDK_N94_O333	0.020	0.020	0.019	0.019	0.018	0.020	0.019	0.020	0.020
36	NDL_N96_O334	0.020	0.020	0.018	0.018	0.017	0.020	0.019	0.020	0.020
37	NEH_N112_BI22	0.008	0.019	0.021	0.021	0.020	0.019	0.019	0.019	0.020
38	NEM_N43_DW15	0.021	0.019	0.017	0.017	0.020	0.019	0.019	0.019	0.019
39	NEM_N43_AT53	0.021	0.019	0.017	0.017	0.020	0.019	0.019	0.019	0.019
40	NEW_N19_AD381	0.021	0.018	0.021	0.021	0.021	0.018	0.018	0.019	0.018
41	NFN_N43_CG5	0.021	0.019	0.016	0.016	0.019	0.019	0.019	0.019	0.020
42	NFO_N127_CB26	0.020	0.019	0.019	0.019	0.018	0.019	0.019	0.019	0.019
43	NFZ_N122_BV095	0.021	0.020	0.019	0.019	0.018	0.020	0.020	0.019	0.020
44	NGC_N129_CW5	0.020	0.019	0.018	0.018	0.019	0.020	0.019	0.019	0.020
45	NGE_N130_CW14	0.020	0.019	0.019	0.019	0.017	0.019	0.018	0.019	0.019
46	NGN_N19_DC5	0.021	0.018	0.020	0.020	0.020	0.018	0.018	0.019	0.019
47	NGS_N136_DG10	0.018	0.020	0.021	0.021	0.021	0.020	0.020	0.020	0.021
48	NGV_N35_DW21	0.021	0.019	0.019	0.019	0.018	0.019	0.019	0.019	0.020
49	NIG_N22+N23_ID10	0.021	0.018	0.020	0.020	0.020	0.018	0.017	0.018	0.018
50	NK_N36_AD110	0.020	0.021	0.020	0.020	0.018	0.021	0.020	0.021	0.021
51	NRF_N7_NN11	0.014	0.020	0.020	0.020	0.020	0.020	0.019	0.020	0.020
52	NRG_N7_NN15	0.014	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
53	NRH_N7_NN16	0.015	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.021
54	NRI_N7_NN17	0.015	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
55	NRJ_N7_NN18	0.015	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.020
56	NRK_N7_NN20	0.015	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021

		91	92	93	94	95	96	97	98	99
57	NRL_N7_NN21	0.014	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.021
58	NRM_N7_NN37	0.016	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.021
59	NRO_N7_NN38	0.014	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.021
60	NRP_N138_NN35	0.017	0.020	0.020	0.020	0.019	0.020	0.019	0.019	0.020
61	NRQ_N138_NN36	0.017	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.020
62	NRW_N144_OU21	0.020	0.020	0.019	0.019	0.016	0.021	0.020	0.020	0.021
63	NY_N37_AR64	0.020	0.020	0.020	0.020	0.018	0.020	0.019	0.020	0.020
64	T101209 Kwonkan MYG175 NHP	0.020	0.020	0.019	0.019	0.016	0.020	0.020	0.020	0.021
65	T112084 Synothele MYG127 NHD	0.019	0.019	0.020	0.020	0.020	0.019	0.019	0.019	0.020
66	T112949 Aname MYG227 NHG	0.018	0.019	0.020	0.020	0.020	0.019	0.018	0.019	0.020
67	T121597 Aname MYG250 NHQ	0.020	0.019	0.018	0.018	0.000	0.019	0.018	0.018	0.019
68	T122062 Aname MYG182 NGX	0.018	0.020	0.021	0.021	0.020	0.020	0.019	0.020	0.020
69	T96570 Aname MYG067 NHF	0.019	0.020	0.020	0.020	0.020	0.019	0.019	0.020	0.020
70	T98759 Aname MYG185 NHK	0.019	0.020	0.022	0.022	0.021	0.021	0.020	0.021	0.021
71	T98900 Aname MYG034 NHJ	0.018	0.020	0.019	0.019	0.019	0.020	0.020	0.020	0.020
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.020	0.019	0.020	0.020	0.019	0.019	0.019	0.019	0.020
73	KJ744398.1 *Aname mellosa* voucher T101163	0.020	0.012	0.020	0.020	0.020	0.012	0.012	0.013	0.013
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.018	0.021	0.021	0.021	0.020	0.021	0.020	0.020	0.021
75	KJ744623.1 *Aname mellosa* voucher T105871	0.019	0.007	0.019	0.019	0.018	0.008	0.008	0.008	0.009
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.015	0.019	0.021	0.021	0.020	0.020	0.020	0.020	0.020
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.016	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.021
78	KJ744661.1 *Aname mellosa* voucher T107942	0.019	0.006	0.019	0.019	0.019	0.006	0.008	0.009	0.009
79	KJ744662.1 *Aname mellosa* voucher T107945	0.019	0.007	0.019	0.019	0.018	0.007	0.008	0.009	0.010
80	KJ744669.1 *Aname mellosa* voucher T107968	0.019	0.005	0.019	0.019	0.019	0.006	0.007	0.008	0.010
81	KJ744775.1 *Aname mellosa* voucher T113629	0.019	0.005	0.019	0.019	0.018	0.006	0.006	0.007	0.010
82	KJ744785.1 *Aname mellosa* voucher T113642	0.019	0.005	0.019	0.019	0.018	0.006	0.007	0.008	0.010
83	KJ744788.1 *Aname mellosa* voucher T113648	0.019	0.007	0.020	0.020	0.019	0.007	0.008	0.008	0.011
84	KJ744791.1 *Aname mellosa* voucher T113654	0.019	0.007	0.019	0.019	0.018	0.007	0.008	0.008	0.010

		91	92	93	94	95	96	97	98	99
85	KJ744803.1 *Aname mellosa* voucher T113666	0.019	0.005	0.019	0.019	0.019	0.007	0.008	0.008	0.010
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.007	0.019	0.021	0.021	0.020	0.019	0.018	0.019	0.020
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.007	0.019	0.021	0.021	0.020	0.019	0.018	0.019	0.020
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.008	0.019	0.021	0.021	0.020	0.019	0.019	0.019	0.020
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.008	0.019	0.021	0.021	0.020	0.019	0.019	0.019	0.020
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.003	0.019	0.021	0.021	0.020	0.019	0.019	0.019	0.020
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818		0.019	0.021	0.021	0.020	0.019	0.019	0.019	0.020
92	KJ744926.1 *Aname mellosa* voucher T119710	0.159		0.019	0.019	0.019	0.007	0.007	0.008	0.010
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.200	0.162		0.000	0.018	0.019	0.019	0.019	0.019
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.200	0.162	0.000		0.018	0.019	0.019	0.019	0.019
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.173	0.148	0.134	0.134		0.019	0.018	0.018	0.019
96	KJ744977.1 *Aname mellosa* voucher T122200	0.159	0.016	0.153	0.153	0.153		0.009	0.009	0.011
97	KJ744982.1 *Aname mellosa* voucher T122207	0.151	0.016	0.162	0.162	0.137	0.027		0.008	0.010
98	KJ744987.1 *Aname mellosa* voucher T122215	0.162	0.025	0.159	0.159	0.142	0.030	0.025		0.010
99	KJ744990.1 *Aname mellosa* voucher T122219	0.178	0.038	0.164	0.164	0.159	0.044	0.041	0.041	
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.181	0.162	0.159	0.159	0.132	0.159	0.156	0.159	0.162
101	KJ745134.1 *Aname mellosa* voucher T126250	0.162	0.008	0.159	0.159	0.151	0.008	0.019	0.022	0.036
102	KJ745143.1 *Aname mellosa* voucher T126259	0.162	0.008	0.159	0.159	0.151	0.008	0.019	0.022	0.036
103	KJ745146.1 *Aname mellosa* voucher T126262	0.162	0.014	0.159	0.159	0.148	0.014	0.022	0.025	0.033
104	KJ745153.1 *Aname mellosa* voucher T126271	0.164	0.011	0.156	0.156	0.148	0.011	0.022	0.025	0.038
105	KJ745155.1 *Aname mellosa* voucher T126273	0.159	0.016	0.156	0.156	0.148	0.016	0.027	0.030	0.044
106	KJ745159.1 *Aname mellosa* voucher T126279	0.159	0.016	0.159	0.159	0.142	0.016	0.022	0.025	0.044
107	KJ745160.1 *Aname mellosa* voucher T126280	0.164	0.011	0.156	0.156	0.148	0.011	0.022	0.025	0.038
108	KJ745168.1 *Aname mellosa* voucher T126296	0.162	0.022	0.156	0.156	0.148	0.022	0.033	0.030	0.049
109	KJ745170.1 *Aname mellosa* voucher T126301	0.159	0.019	0.162	0.162	0.142	0.025	0.022	0.027	0.036
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.173	0.175	0.159	0.159	0.140	0.173	0.162	0.173	0.181
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.118	0.175	0.181	0.181	0.173	0.178	0.170	0.178	0.189
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.118	0.175	0.181	0.181	0.173	0.178	0.170	0.178	0.189

		91	92	93	94	95	96	97	98	99
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.118	0.175	0.181	0.181	0.173	0.178	0.170	0.178	0.189
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.186	0.170	0.140	0.140	0.123	0.175	0.162	0.173	0.175
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.118	0.175	0.181	0.181	0.173	0.178	0.170	0.178	0.189
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.132	0.181	0.175	0.175	0.164	0.184	0.178	0.184	0.197
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.118	0.175	0.181	0.181	0.173	0.178	0.170	0.178	0.189
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.118	0.164	0.181	0.181	0.170	0.167	0.170	0.167	0.178
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.129	0.178	0.164	0.164	0.164	0.181	0.178	0.175	0.189

		100	101	102	103	104	105	106	107	108
1	**PC12**	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
2	**PC27**	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
3	**PC29**	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.019
4	**PC13**	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
5	**PC28**	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
6	**PC18**	0.020	0.019	0.019	0.018	0.019	0.018	0.018	0.019	0.018
7	**PC15**	0.018	0.019	0.019	0.018	0.019	0.019	0.019	0.019	0.019
8	**PC16**	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
9	**PC26**	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.020	0.020
10	NA_N1_AG1	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
11	NAA_N45_AS38	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.020
12	NAB_N46_AS41	0.016	0.020	0.020	0.020	0.020	0.019	0.020	0.020	0.020
13	NAD_N93_AC10	0.018	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
14	NAM_N49_AD14	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
15	NAO_N22_AD328	0.020	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
16	NAQ_N5_AD352	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.018
17	NAW_N6_AD429	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
18	NAX_N24_AD452	0.020	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
19	NAZ_N6_AD457	0.021	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
20	NB_N16_AH8	0.020	0.014	0.014	0.014	0.014	0.014	0.014	0.014	0.014
21	NBC_N6_AD577	0.020	0.020	0.020	0.019	0.020	0.019	0.019	0.020	0.019
22	NBE_N46_AD583	0.016	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
23	NBM_N4_AD678	0.021	0.020	0.020	0.020	0.021	0.020	0.020	0.021	0.020
24	NBR_N14_AD746	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
25	NBT_N7_AD748	0.021	0.020	0.020	0.019	0.020	0.019	0.019	0.020	0.020
26	NBU_N15_AD753	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
27	NBW_N50_AD784	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
28	NCA_N20_AF78	0.021	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019

		100	101	102	103	104	105	106	107	108
29	NCG_N95_I16	0.019	0.020	0.020	0.019	0.020	0.019	0.019	0.020	0.019
30	NCU_N110_O211	0.021	0.018	0.018	0.018	0.019	0.019	0.019	0.019	0.019
31	NCW_N66_O280	0.021	0.018	0.018	0.018	0.019	0.019	0.018	0.019	0.019
32	NCY_N67_O282	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
33	NCZ_N110_O285	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.018
34	NDD_N101_O292	0.020	0.018	0.018	0.019	0.019	0.018	0.018	0.019	0.018
35	NDK_N94_O333	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
36	NDL_N96_O334	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
37	NEH_N112_BI22	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
38	NEM_N43_DW15	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
39	NEM_N43_AT53	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
40	NEW_N19_AD381	0.020	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
41	NFN_N43_CG5	0.020	0.019	0.019	0.020	0.019	0.019	0.019	0.019	0.020
42	NFO_N127_CB26	0.000	0.019	0.019	0.019	0.019	0.019	0.020	0.019	0.019
43	NFZ_N122_BV095	0.018	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
44	NGC_N129_CW5	0.018	0.020	0.020	0.019	0.020	0.020	0.019	0.020	0.020
45	NGE_N130_CW14	0.018	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.018
46	NGN_N19_DC5	0.020	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.019
47	NGS_N136_DG10	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
48	NGV_N35_DW21	0.019	0.019	0.019	0.019	0.020	0.019	0.019	0.020	0.019
49	NIG_N22+N23_ID10	0.021	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
50	NK_N36_AD110	0.019	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021
51	NRF_N7_NN11	0.021	0.019	0.019	0.019	0.020	0.020	0.019	0.020	0.019
52	NRG_N7_NN15	0.021	0.020	0.020	0.019	0.020	0.020	0.019	0.020	0.020
53	NRH_N7_NN16	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
54	NRI_N7_NN17	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
55	NRJ_N7_NN18	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
56	NRK_N7_NN20	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020

		100	101	102	103	104	105	106	107	108
57	NRL_N7_NN21	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
58	NRM_N7_NN37	0.022	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
59	NRO_N7_NN38	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
60	NRP_N138_NN35	0.019	0.020	0.020	0.019	0.020	0.020	0.019	0.020	0.019
61	NRQ_N138_NN36	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.020	0.020
62	NRW_N144_OU21	0.018	0.021	0.021	0.020	0.021	0.021	0.020	0.021	0.021
63	NY_N37_AR64	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
64	T101209 Kwonkan MYG175 NHP	0.018	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
65	T112084 Synothele MYG127 NHD	0.021	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
66	T112949 Aname MYG227 NHG	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
67	T121597 Aname MYG250 NHQ	0.018	0.019	0.019	0.019	0.019	0.019	0.018	0.019	0.019
68	T122062 Aname MYG182 NGX	0.020	0.019	0.019	0.019	0.020	0.019	0.019	0.020	0.019
69	T96570 Aname MYG067 NHF	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.020	0.019
70	T98759 Aname MYG185 NHK	0.021	0.021	0.021	0.020	0.021	0.021	0.021	0.021	0.020
71	T98900 Aname MYG034 NHJ	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.019	0.019	0.019	0.018	0.019	0.019	0.019	0.019	0.019
73	KJ744398.1 *Aname mellosa* voucher T101163	0.020	0.011	0.011	0.011	0.012	0.012	0.012	0.012	0.013
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.021	0.020	0.020	0.020	0.021	0.020	0.020	0.021	0.020
75	KJ744623.1 *Aname mellosa* voucher T105871	0.019	0.006	0.006	0.005	0.007	0.007	0.007	0.007	0.008
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.021	0.020	0.020	0.019	0.020	0.019	0.019	0.020	0.020
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
78	KJ744661.1 *Aname mellosa* voucher T107942	0.019	0.004	0.004	0.004	0.005	0.007	0.007	0.005	0.008
79	KJ744662.1 *Aname mellosa* voucher T107945	0.019	0.007	0.007	0.007	0.007	0.006	0.005	0.007	0.007
80	KJ744669.1 *Aname mellosa* voucher T107968	0.019	0.004	0.004	0.005	0.005	0.005	0.006	0.005	0.007
81	KJ744775.1 *Aname mellosa* voucher T113629	0.019	0.004	0.004	0.005	0.005	0.006	0.005	0.005	0.007
82	KJ744785.1 *Aname mellosa* voucher T113642	0.019	0.004	0.004	0.005	0.005	0.005	0.006	0.005	0.006
83	KJ744788.1 *Aname mellosa* voucher T113648	0.019	0.006	0.006	0.007	0.007	0.008	0.007	0.007	0.009
84	KJ744791.1 *Aname mellosa* voucher T113654	0.019	0.006	0.006	0.005	0.007	0.007	0.004	0.007	0.008

		100	101	102	103	104	105	106	107	108
85	KJ744803.1 *Aname mellosa* voucher T113666	0.019	0.005	0.005	0.006	0.005	0.004	0.007	0.005	0.007
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
92	KJ744926.1 *Aname mellosa* voucher T119710	0.019	0.005	0.005	0.006	0.005	0.007	0.007	0.005	0.008
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.018	0.019	0.019	0.019	0.019	0.019	0.018	0.019	0.019
96	KJ744977.1 *Aname mellosa* voucher T122200	0.019	0.005	0.005	0.006	0.005	0.007	0.007	0.005	0.008
97	KJ744982.1 *Aname mellosa* voucher T122207	0.019	0.007	0.007	0.008	0.008	0.009	0.008	0.008	0.009
98	KJ744987.1 *Aname mellosa* voucher T122215	0.019	0.008	0.008	0.008	0.008	0.009	0.008	0.008	0.009
99	KJ744990.1 *Aname mellosa* voucher T122219	0.019	0.010	0.010	0.009	0.010	0.011	0.011	0.010	0.011
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329		0.019	0.019	0.019	0.019	0.019	0.020	0.019	0.019
101	KJ745134.1 *Aname mellosa* voucher T126250	0.159		0.000	0.004	0.003	0.006	0.006	0.003	0.007
102	KJ745143.1 *Aname mellosa* voucher T126259	0.159	0.000		0.004	0.003	0.006	0.006	0.003	0.007
103	KJ745146.1 *Aname mellosa* voucher T126262	0.156	0.005	0.005		0.005	0.007	0.007	0.005	0.008
104	KJ745153.1 *Aname mellosa* voucher T126271	0.159	0.003	0.003	0.008		0.007	0.007	0.000	0.008
105	KJ745155.1 *Aname mellosa* voucher T126273	0.164	0.014	0.014	0.019	0.016		0.007	0.007	0.007
106	KJ745159.1 *Aname mellosa* voucher T126279	0.167	0.014	0.014	0.016	0.016	0.016		0.007	0.007
107	KJ745160.1 *Aname mellosa* voucher T126280	0.159	0.003	0.003	0.008	0.000	0.016	0.016		0.008
108	KJ745168.1 *Aname mellosa* voucher T126296	0.162	0.019	0.019	0.025	0.022	0.016	0.016	0.022	
109	KJ745170.1 *Aname mellosa* voucher T126301	0.162	0.016	0.016	0.019	0.019	0.019	0.014	0.019	0.019
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.148	0.175	0.175	0.173	0.178	0.175	0.173	0.178	0.175
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.178	0.181	0.181	0.178	0.184	0.175	0.173	0.184	0.167
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.178	0.181	0.181	0.178	0.184	0.175	0.173	0.184	0.167

		100	101	102	103	104	105	106	107	108
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.178	0.181	0.181	0.178	0.184	0.175	0.173	0.184	0.167
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.153	0.173	0.173	0.170	0.175	0.170	0.173	0.175	0.175
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.178	0.181	0.181	0.178	0.184	0.175	0.173	0.184	0.167
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.186	0.186	0.186	0.184	0.189	0.181	0.178	0.189	0.173
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.178	0.181	0.181	0.178	0.184	0.175	0.173	0.184	0.167
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.178	0.170	0.170	0.164	0.173	0.164	0.162	0.173	0.156
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.175	0.184	0.184	0.181	0.186	0.175	0.181	0.186	0.175

		109	110	111	112	113	114	115	116	117
1	**PC12**	0.018	0.017	0.020	0.020	0.020	0.017	0.020	0.021	0.020
2	**PC27**	0.018	0.017	0.020	0.020	0.020	0.017	0.020	0.020	0.020
3	**PC29**	0.018	0.017	0.020	0.020	0.020	0.016	0.020	0.020	0.020
4	**PC13**	0.018	0.017	0.020	0.020	0.020	0.017	0.020	0.020	0.020
5	**PC28**	0.018	0.017	0.020	0.020	0.020	0.017	0.020	0.020	0.020
6	**PC18**	0.018	0.020	0.019	0.019	0.019	0.020	0.019	0.019	0.019
7	**PC15**	0.019	0.019	0.020	0.020	0.020	0.018	0.020	0.020	0.020
8	**PC16**	0.019	0.020	0.015	0.015	0.015	0.021	0.015	0.015	0.015
9	**PC26**	0.020	0.019	0.016	0.016	0.016	0.021	0.016	0.017	0.016
10	NA_N1_AG1	0.020	0.021	0.019	0.019	0.019	0.020	0.019	0.019	0.019
11	NAA_N45_AS38	0.019	0.019	0.020	0.020	0.020	0.017	0.020	0.020	0.020
12	NAB_N46_AS41	0.020	0.018	0.020	0.020	0.020	0.018	0.020	0.020	0.020
13	NAD_N93_AC10	0.020	0.019	0.021	0.021	0.021	0.019	0.021	0.021	0.021
14	NAM_N49_AD14	0.020	0.020	0.021	0.021	0.021	0.020	0.021	0.021	0.021
15	NAO_N22_AD328	0.017	0.019	0.019	0.019	0.019	0.020	0.019	0.020	0.019
16	NAQ_N5_AD352	0.019	0.020	0.017	0.017	0.017	0.020	0.017	0.018	0.017
17	NAW_N6_AD429	0.020	0.020	0.000	0.000	0.000	0.020	0.000	0.009	0.000
18	NAX_N24_AD452	0.017	0.020	0.020	0.020	0.020	0.021	0.020	0.020	0.020
19	NAZ_N6_AD457	0.018	0.020	0.014	0.014	0.014	0.020	0.014	0.015	0.014
20	NB_N16_AH8	0.014	0.020	0.020	0.020	0.020	0.021	0.020	0.021	0.020
21	NBC_N6_AD577	0.019	0.021	0.013	0.013	0.013	0.020	0.013	0.014	0.013
22	NBE_N46_AD583	0.019	0.019	0.021	0.021	0.021	0.019	0.021	0.021	0.021
23	NBM_N4_AD678	0.020	0.021	0.019	0.019	0.019	0.020	0.019	0.019	0.019
24	NBR_N14_AD746	0.020	0.021	0.020	0.020	0.020	0.021	0.020	0.020	0.020
25	NBT_N7_AD748	0.020	0.020	0.016	0.016	0.016	0.021	0.016	0.018	0.016
26	NBU_N15_AD753	0.019	0.020	0.020	0.020	0.020	0.021	0.020	0.020	0.020
27	NBW_N50_AD784	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
28	NCA_N20_AF78	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020

		109	110	111	112	113	114	115	116	117
29	NCG_N95_I16	0.019	0.018	0.020	0.020	0.020	0.016	0.020	0.020	0.020
30	NCU_N110_O211	0.018	0.020	0.019	0.019	0.019	0.020	0.019	0.019	0.019
31	NCW_N66_O280	0.018	0.020	0.018	0.018	0.018	0.020	0.018	0.019	0.018
32	NCY_N67_O282	0.019	0.021	0.018	0.018	0.018	0.022	0.018	0.019	0.018
33	NCZ_N110_O285	0.018	0.019	0.018	0.018	0.018	0.021	0.018	0.019	0.018
34	NDD_N101_O292	0.018	0.021	0.019	0.019	0.019	0.021	0.019	0.019	0.019
35	NDK_N94_O333	0.020	0.000	0.020	0.020	0.020	0.018	0.020	0.020	0.020
36	NDL_N96_O334	0.020	0.018	0.020	0.020	0.020	0.000	0.020	0.020	0.020
37	NEH_N112_BI22	0.019	0.020	0.017	0.017	0.017	0.020	0.017	0.018	0.017
38	NEM_N43_DW15	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020
39	NEM_N43_AT53	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020
40	NEW_N19_AD381	0.018	0.020	0.020	0.020	0.020	0.021	0.020	0.020	0.020
41	NFN_N43_CG5	0.019	0.020	0.021	0.021	0.021	0.020	0.021	0.021	0.021
42	NFO_N127_CB26	0.019	0.019	0.020	0.020	0.020	0.019	0.020	0.020	0.020
43	NFZ_N122_BV095	0.020	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020
44	NGC_N129_CW5	0.020	0.019	0.019	0.019	0.019	0.018	0.019	0.020	0.019
45	NGE_N130_CW14	0.019	0.018	0.019	0.019	0.019	0.017	0.019	0.020	0.019
46	NGN_N19_DC5	0.018	0.020	0.020	0.020	0.020	0.021	0.020	0.020	0.020
47	NGS_N136_DG10	0.020	0.021	0.019	0.019	0.019	0.021	0.019	0.020	0.019
48	NGV_N35_DW21	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.020	0.019
49	NIG_N22+N23_ID10	0.017	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
50	NK_N36_AD110	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
51	NRF_N7_NN11	0.019	0.020	0.016	0.016	0.016	0.020	0.016	0.018	0.016
52	NRG_N7_NN15	0.019	0.020	0.016	0.016	0.016	0.020	0.016	0.017	0.016
53	NRH_N7_NN16	0.020	0.020	0.016	0.016	0.016	0.020	0.016	0.017	0.016
54	NRI_N7_NN17	0.020	0.020	0.016	0.016	0.016	0.020	0.016	0.017	0.016
55	NRJ_N7_NN18	0.019	0.020	0.016	0.016	0.016	0.020	0.016	0.017	0.016
56	NRK_N7_NN20	0.020	0.020	0.015	0.015	0.015	0.020	0.015	0.017	0.015

		109	110	111	112	113	114	115	116	117
57	NRL_N7_NN21	0.020	0.020	0.015	0.015	0.015	0.020	0.015	0.017	0.015
58	NRM_N7_NN37	0.020	0.021	0.017	0.017	0.017	0.021	0.017	0.017	0.017
59	NRO_N7_NN38	0.020	0.020	0.015	0.015	0.015	0.020	0.015	0.017	0.015
60	NRP_N138_NN35	0.019	0.020	0.017	0.017	0.017	0.021	0.017	0.017	0.017
61	NRQ_N138_NN36	0.020	0.020	0.017	0.017	0.017	0.021	0.017	0.017	0.017
62	NRW_N144_OU21	0.020	0.018	0.020	0.020	0.020	0.018	0.020	0.020	0.020
63	NY_N37_AR64	0.020	0.020	0.020	0.020	0.020	0.019	0.020	0.020	0.020
64	T101209 Kwonkan MYG175 NHP	0.020	0.018	0.020	0.020	0.020	0.018	0.020	0.020	0.020
65	T112084 Synothele MYG127 NHD	0.019	0.021	0.019	0.019	0.019	0.021	0.019	0.019	0.019
66	T112949 Aname MYG227 NHG	0.019	0.020	0.019	0.019	0.019	0.021	0.019	0.019	0.019
67	T121597 Aname MYG250 NHQ	0.018	0.018	0.020	0.020	0.020	0.017	0.020	0.019	0.020
68	T122062 Aname MYG182 NGX	0.019	0.020	0.019	0.019	0.019	0.020	0.019	0.019	0.019
69	T96570 Aname MYG067 NHF	0.020	0.020	0.019	0.019	0.019	0.021	0.019	0.019	0.019
70	T98759 Aname MYG185 NHK	0.020	0.021	0.019	0.019	0.019	0.021	0.019	0.019	0.019
71	T98900 Aname MYG034 NHJ	0.020	0.020	0.012	0.012	0.012	0.020	0.012	0.011	0.012
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.019	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020
73	KJ744398.1 *Aname mellosa* voucher T101163	0.012	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.020	0.021	0.019	0.019	0.019	0.020	0.019	0.019	0.019
75	KJ744623.1 *Aname mellosa* voucher T105871	0.006	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.020	0.020	0.016	0.016	0.016	0.021	0.016	0.018	0.016
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.020	0.021	0.017	0.017	0.017	0.021	0.017	0.018	0.017
78	KJ744661.1 *Aname mellosa* voucher T107942	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
79	KJ744662.1 *Aname mellosa* voucher T107945	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
80	KJ744669.1 *Aname mellosa* voucher T107968	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
81	KJ744775.1 *Aname mellosa* voucher T113629	0.005	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
82	KJ744785.1 *Aname mellosa* voucher T113642	0.005	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
83	KJ744788.1 *Aname mellosa* voucher T113648	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
84	KJ744791.1 *Aname mellosa* voucher T113654	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020

		109	110	111	112	113	114	115	116	117
85	KJ744803.1 *Aname mellosa* voucher T113666	0.006	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.019	0.020	0.017	0.017	0.017	0.020	0.017	0.018	0.017
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.019	0.020	0.017	0.017	0.017	0.020	0.017	0.018	0.017
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.019	0.020	0.017	0.017	0.017	0.020	0.017	0.018	0.017
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.019	0.020	0.017	0.017	0.017	0.020	0.017	0.018	0.017
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.019	0.020	0.017	0.017	0.017	0.020	0.017	0.018	0.017
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.019	0.020	0.017	0.017	0.017	0.020	0.017	0.018	0.017
92	KJ744926.1 *Aname mellosa* voucher T119710	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.019	0.019	0.020	0.020	0.020	0.018	0.020	0.020	0.020
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.019	0.019	0.020	0.020	0.020	0.018	0.020	0.020	0.020
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.018	0.018	0.020	0.020	0.020	0.017	0.020	0.019	0.020
96	KJ744977.1 *Aname mellosa* voucher T122200	0.008	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
97	KJ744982.1 *Aname mellosa* voucher T122207	0.008	0.019	0.020	0.020	0.020	0.019	0.020	0.020	0.020
98	KJ744987.1 *Aname mellosa* voucher T122215	0.009	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
99	KJ744990.1 *Aname mellosa* voucher T122219	0.010	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.019	0.019	0.020	0.020	0.020	0.019	0.020	0.020	0.020
101	KJ745134.1 *Aname mellosa* voucher T126250	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
102	KJ745143.1 *Aname mellosa* voucher T126259	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
103	KJ745146.1 *Aname mellosa* voucher T126262	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
104	KJ745153.1 *Aname mellosa* voucher T126271	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
105	KJ745155.1 *Aname mellosa* voucher T126273	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
106	KJ745159.1 *Aname mellosa* voucher T126279	0.006	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
107	KJ745160.1 *Aname mellosa* voucher T126280	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
108	KJ745168.1 *Aname mellosa* voucher T126296	0.007	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
109	KJ745170.1 *Aname mellosa* voucher T126301		0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.170		0.020	0.020	0.020	0.018	0.020	0.020	0.020
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.170	0.178		0.000	0.000	0.020	0.000	0.009	0.000
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.170	0.178	0.000		0.000	0.020	0.000	0.009	0.000

		109	110	111	112	113	114	115	116	117
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.170	0.178	0.000	0.000		0.020	0.000	0.009	0.000
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.170	0.145	0.178	0.178	0.178		0.020	0.020	0.020
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.170	0.178	0.000	0.000	0.000	0.178		0.009	0.000
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.173	0.186	0.030	0.030	0.030	0.178	0.030		0.009
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.170	0.178	0.000	0.000	0.000	0.178	0.000	0.030	
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314	0.162	0.195	0.063	0.063	0.063	0.181	0.063	0.077	0.063
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.181	0.189	0.055	0.055	0.055	0.170	0.055	0.044	0.055

		118	119
1	**PC12**	0.021	0.020
2	**PC27**	0.021	0.020
3	**PC29**	0.020	0.020
4	**PC13**	0.021	0.020
5	**PC28**	0.021	0.020
6	**PC18**	0.020	0.020
7	**PC15**	0.020	0.020
8	**PC16**	0.016	0.015
9	**PC26**	0.016	0.016
10	NA_N1_AG1	0.020	0.019
11	NAA_N45_AS38	0.020	0.020
12	NAB_N46_AS41	0.020	0.019
13	NAD_N93_AC10	0.021	0.021
14	NAM_N49_AD14	0.020	0.020
15	NAO_N22_AD328	0.019	0.020
16	NAQ_N5_AD352	0.017	0.017
17	NAW_N6_AD429	0.013	0.012
18	NAX_N24_AD452	0.020	0.020
19	NAZ_N6_AD457	0.014	0.015
20	NB_N16_AH8	0.020	0.020
21	NBC_N6_AD577	0.000	0.014
22	NBE_N46_AD583	0.021	0.021
23	NBM_N4_AD678	0.019	0.019
24	NBR_N14_AD746	0.020	0.020
25	NBT_N7_AD748	0.017	0.017
26	NBU_N15_AD753	0.019	0.020
27	NBW_N50_AD784	0.020	0.020
28	NCA_N20_AF78	0.020	0.020

		118	119
29	NCG_N95_I16	0.020	0.020
30	NCU_N110_O211	0.019	0.020
31	NCW_N66_O280	0.019	0.018
32	NCY_N67_O282	0.019	0.019
33	NCZ_N110_O285	0.019	0.019
34	NDD_N101_O292	0.019	0.020
35	NDK_N94_O333	0.021	0.020
36	NDL_N96_O334	0.020	0.020
37	NEH_N112_BI22	0.017	0.018
38	NEM_N43_DW15	0.021	0.021
39	NEM_N43_AT53	0.021	0.021
40	NEW_N19_AD381	0.019	0.021
41	NFN_N43_CG5	0.021	0.021
42	NFO_N127_CB26	0.020	0.020
43	NFZ_N122_BV095	0.020	0.020
44	NGC_N129_CW5	0.020	0.020
45	NGE_N130_CW14	0.019	0.020
46	NGN_N19_DC5	0.019	0.020
47	NGS_N136_DG10	0.019	0.020
48	NGV_N35_DW21	0.020	0.019
49	NIG_N22+N23_ID10	0.020	0.021
50	NK_N36_AD110	0.020	0.019
51	NRF_N7_NN11	0.017	0.017
52	NRG_N7_NN15	0.017	0.017
53	NRH_N7_NN16	0.018	0.017
54	NRI_N7_NN17	0.018	0.017
55	NRJ_N7_NN18	0.017	0.017
56	NRK_N7_NN20	0.017	0.016

		118	119
57	NRL_N7_NN21	0.017	0.016
58	NRM_N7_NN37	0.018	0.018
59	NRO_N7_NN38	0.017	0.017
60	NRP_N138_NN35	0.017	0.017
61	NRQ_N138_NN36	0.017	0.017
62	NRW_N144_OU21	0.020	0.020
63	NY_N37_AR64	0.020	0.019
64	T101209 Kwonkan MYG175 NHP	0.020	0.020
65	T112084 Synothele MYG127 NHD	0.019	0.019
66	T112949 Aname MYG227 NHG	0.019	0.019
67	T121597 Aname MYG250 NHQ	0.020	0.019
68	T122062 Aname MYG182 NGX	0.020	0.019
69	T96570 Aname MYG067 NHF	0.019	0.019
70	T98759 Aname MYG185 NHK	0.019	0.019
71	T98900 Aname MYG034 NHJ	0.014	0.000
72	JQ772136.1 *Aname* sp. 1 MGR-2012 voucher WAM:T95404	0.019	0.020
73	KJ744398.1 *Aname mellosa* voucher T101163	0.020	0.020
74	KJ744414.1 *Aname* sp. MYG178 voucher T102047	0.019	0.019
75	KJ744623.1 *Aname mellosa* voucher T105871	0.019	0.020
76	KJ744648.1 *Aname* sp. MYG373 voucher T107087	0.017	0.017
77	KJ744649.1 *Aname* sp. MYG373 voucher T107089	0.018	0.018
78	KJ744661.1 *Aname mellosa* voucher T107942	0.020	0.020
79	KJ744662.1 *Aname mellosa* voucher T107945	0.019	0.020
80	KJ744669.1 *Aname mellosa* voucher T107968	0.020	0.020
81	KJ744775.1 *Aname mellosa* voucher T113629	0.020	0.020
82	KJ744785.1 *Aname mellosa* voucher T113642	0.019	0.020
83	KJ744788.1 *Aname mellosa* voucher T113648	0.019	0.020
84	KJ744791.1 *Aname mellosa* voucher T113654	0.019	0.020

		118	119
85	KJ744803.1 *Aname mellosa* voucher T113666	0.019	0.020
86	KJ744901.1 *Aname* sp. MYG331 voucher T118789	0.017	0.018
87	KJ744902.1 *Aname* sp. MYG331 voucher T118791	0.017	0.018
88	KJ744909.1 *Aname* sp. MYG331 voucher T118805	0.017	0.017
89	KJ744910.1 *Aname* sp. MYG331 voucher T118811	0.017	0.018
90	KJ744911.1 *Aname* sp. MYG331 voucher T118812	0.017	0.018
91	KJ744914.1 *Aname* sp. MYG331 voucher T118818	0.017	0.018
92	KJ744926.1 *Aname mellosa* voucher T119710	0.019	0.020
93	KJ744963.1 *Kwonkan* sp. MYG337 voucher T120001	0.020	0.019
94	KJ744964.1 *Kwonkan* sp. MYG337 voucher T120003	0.020	0.019
95	KJ744975.1 *Aname* sp. MYG250 voucher T121597	0.020	0.019
96	KJ744977.1 *Aname mellosa* voucher T122200	0.020	0.020
97	KJ744982.1 *Aname mellosa* voucher T122207	0.020	0.020
98	KJ744987.1 *Aname mellosa* voucher T122215	0.020	0.020
99	KJ744990.1 *Aname mellosa* voucher T122219	0.020	0.020
100	KJ745117.1 *Aname* sp. MYG335 voucher T125329	0.020	0.020
101	KJ745134.1 *Aname mellosa* voucher T126250	0.020	0.020
102	KJ745143.1 *Aname mellosa* voucher T126259	0.020	0.020
103	KJ745146.1 *Aname mellosa* voucher T126262	0.019	0.020
104	KJ745153.1 *Aname mellosa* voucher T126271	0.020	0.020
105	KJ745155.1 *Aname mellosa* voucher T126273	0.019	0.020
106	KJ745159.1 *Aname mellosa* voucher T126279	0.019	0.020
107	KJ745160.1 *Aname mellosa* voucher T126280	0.020	0.020
108	KJ745168.1 *Aname mellosa* voucher T126296	0.019	0.020
109	KJ745170.1 *Aname mellosa* voucher T126301	0.019	0.020
110	KJ745210.1 *Kwonkan* sp. MYG343 voucher T57563	0.021	0.020
111	KJ745231.1 *Aname* sp. MYG351 voucher T74238	0.013	0.012
112	KJ745232.1 *Aname* sp. MYG351 voucher T74241	0.013	0.012

		118	119
113	KJ745233.1 *Aname* sp. MYG351 voucher T74247	0.013	0.012
114	KJ745281.1 *Kwonkan* sp. MYG361 voucher T78543	0.020	0.020
115	KJ745287.1 *Aname* sp. MYG351 voucher T82303	0.013	0.012
116	KJ745288.1 *Aname* sp. MYG351 voucher T82304	0.014	0.011
117	KJ745293.1 *Aname* sp. MYG351 voucher T82309	0.013	0.012
118	KJ745375.1 *Aname* sp. MYG034 voucher T93314		0.014
119	KJ745494.1 *Aname* sp. MYG034 voucher T98900	0.079	

		1	2	3	4	5	6	7	8	9
1	**PC01**		0.012	0.003	0.012	0.008	0.012	0.007	0.007	0.016
2	**PC02**	0.076		0.012	0.000	0.013	0.000	0.012	0.012	0.017
3	**PC04**	0.004	0.076		0.012	0.008	0.012	0.007	0.007	0.016
4	**PC06**	0.076	0.000	0.076		0.013	0.000	0.012	0.012	0.017
5	NN01	0.030	0.086	0.030	0.086		0.013	0.004	0.005	0.017
6	NN03	0.076	0.000	0.076	0.000	0.086		0.012	0.012	0.017
7	NN04	0.026	0.078	0.026	0.078	0.008	0.078		0.004	0.017
8	NN09	0.024	0.080	0.028	0.080	0.014	0.080	0.010		0.017
9	EF122605.2	0.160	0.184	0.160	0.184	0.166	0.184	0.166	0.168	
10	EF122607.2	0.160	0.184	0.160	0.184	0.166	0.184	0.166	0.168	0.000
11	EF122608.2	0.160	0.190	0.160	0.190	0.166	0.190	0.166	0.168	0.016
12	EF122612.2	0.158	0.186	0.158	0.186	0.164	0.186	0.164	0.166	0.004
13	EU381064.1	0.158	0.186	0.158	0.186	0.164	0.186	0.164	0.166	0.002
14	EU404114.1	0.160	0.182	0.160	0.182	0.164	0.182	0.164	0.168	0.030
15	HM567381.1	0.156	0.162	0.156	0.162	0.172	0.162	0.168	0.162	0.170
16	JF700146.1	0.168	0.184	0.164	0.184	0.182	0.184	0.182	0.184	0.160
17	JN018153.1	0.142	0.126	0.142	0.126	0.150	0.126	0.144	0.146	0.172
18	JN018154.1	0.156	0.154	0.160	0.154	0.162	0.154	0.154	0.152	0.172
19	JN018210.1	0.148	0.150	0.148	0.150	0.156	0.150	0.156	0.154	0.164
20	JN018211.1	0.156	0.160	0.160	0.160	0.154	0.160	0.158	0.152	0.194
21	KF997876.1	0.160	0.168	0.164	0.168	0.164	0.168	0.160	0.162	0.158
22	KT716037.1	0.158	0.140	0.158	0.140	0.162	0.140	0.154	0.152	0.168
23	KX648425.1	0.166	0.160	0.164	0.160	0.166	0.160	0.166	0.168	0.188
24	KX648429.1	0.166	0.160	0.164	0.160	0.166	0.160	0.166	0.168	0.188
25	KY982184.1	0.162	0.156	0.162	0.156	0.162	0.156	0.162	0.160	0.118
26	KY982185.1	0.160	0.178	0.160	0.178	0.166	0.178	0.166	0.168	0.026
27	KY982187.1	0.158	0.140	0.162	0.140	0.170	0.140	0.164	0.168	0.148

		1	2	3	4	5	6	7	8	9
28	KY982188.1	0.160	0.142	0.164	0.142	0.168	0.142	0.162	0.166	0.138
29	KY982192.1	0.172	0.182	0.172	0.182	0.182	0.182	0.180	0.178	0.126
30	KY982193.1	0.170	0.180	0.170	0.180	0.180	0.180	0.178	0.176	0.126
31	KY982194.1 A	0.162	0.170	0.162	0.170	0.168	0.170	0.166	0.164	0.122
32	KY982199.1	0.164	0.172	0.164	0.172	0.166	0.172	0.160	0.166	0.114
33	KY982273.1	0.162	0.152	0.162	0.152	0.174	0.152	0.170	0.168	0.166
34	MF422313.1	0.130	0.136	0.126	0.136	0.132	0.136	0.130	0.124	0.178
35	MF422319.1	0.156	0.138	0.156	0.138	0.160	0.138	0.152	0.146	0.166
36	MF422320.1	0.156	0.138	0.156	0.138	0.160	0.138	0.152	0.146	0.168
37	MF422321.1	0.152	0.134	0.152	0.134	0.156	0.134	0.148	0.146	0.164
38	MF422322.1	0.156	0.138	0.156	0.138	0.160	0.138	0.152	0.146	0.168
39	MF422326.1	0.144	0.150	0.144	0.150	0.160	0.150	0.156	0.146	0.152
40	MF422327.1	0.146	0.154	0.142	0.154	0.154	0.154	0.150	0.148	0.138
41	MF422328.1	0.146	0.156	0.146	0.156	0.166	0.156	0.162	0.156	0.144
42	MF422329.1	0.146	0.154	0.142	0.154	0.154	0.154	0.150	0.148	0.140
43	MF422330.1	0.146	0.154	0.142	0.154	0.154	0.154	0.150	0.148	0.138
44	MK479161.1	0.174	0.168	0.170	0.168	0.176	0.168	0.174	0.172	0.140
45	MK479165.1	0.172	0.180	0.172	0.180	0.168	0.180	0.170	0.166	0.128
46	MK479171.1	0.166	0.178	0.166	0.178	0.172	0.178	0.172	0.166	0.118
47	MK479180.1	0.166	0.162	0.170	0.162	0.172	0.162	0.166	0.168	0.122
48	MK479188.1	0.174	0.168	0.174	0.168	0.176	0.168	0.178	0.176	0.102
49	MK479196.1	0.162	0.156	0.158	0.156	0.166	0.156	0.164	0.166	0.120
50	MK479202.1	0.156	0.160	0.156	0.160	0.156	0.160	0.152	0.158	0.100
51	MK479204.1	0.152	0.160	0.156	0.160	0.162	0.160	0.156	0.154	0.130
52	MK479207.1	0.152	0.156	0.152	0.156	0.152	0.156	0.148	0.150	0.108
53	MK479210.1	0.162	0.184	0.162	0.184	0.166	0.184	0.166	0.170	0.032
54	NC 037222.1	0.162	0.184	0.162	0.184	0.166	0.184	0.166	0.170	0.032
55	JN018156.1	0.200	0.186	0.204	0.186	0.208	0.186	0.204	0.198	0.208

		1	2	3	4	5	6	7	8	9
56	KY295225.1	0.186	0.170	0.186	0.170	0.200	0.170	0.192	0.194	0.218
57	JN018163.1	0.196	0.196	0.196	0.196	0.206	0.196	0.198	0.198	0.198
58	HM418309.1	0.212	0.190	0.216	0.190	0.218	0.190	0.214	0.206	0.228
59	KF548118.1	0.186	0.182	0.186	0.182	0.200	0.182	0.196	0.192	0.186

		10	11	12	13	14	15	16	17	18
1	**PC01**	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.016	0.016
2	**PC02**	0.017	0.018	0.017	0.017	0.017	0.016	0.017	0.015	0.016
3	**PC04**	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.016	0.016
4	**PC06**	0.017	0.018	0.017	0.017	0.017	0.016	0.017	0.015	0.016
5	NN01	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
6	NN03	0.017	0.018	0.017	0.017	0.017	0.016	0.017	0.015	0.016
7	NN04	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
8	NN09	0.017	0.017	0.017	0.017	0.017	0.016	0.017	0.016	0.016
9	EF122605.2 (	0.000	0.006	0.003	0.002	0.008	0.017	0.016	0.017	0.017
10	EF122607.2 (		0.006	0.003	0.002	0.008	0.017	0.016	0.017	0.017
11	EF122608.2 (	0.016		0.006	0.006	0.008	0.017	0.017	0.017	0.017
12	EF122612.2 (	0.004	0.020		0.002	0.008	0.017	0.016	0.017	0.017
13	EU381064.1	0.002	0.018	0.002		0.008	0.017	0.016	0.017	0.017
14	EU404114.1	0.030	0.030	0.034	0.032		0.017	0.017	0.017	0.017
15	HM567381.1	0.170	0.172	0.166	0.168	0.172		0.015	0.016	0.018
16	JF700146.1 M	0.160	0.164	0.156	0.158	0.166	0.128		0.017	0.017
17	JN018153.1 /	0.172	0.176	0.172	0.174	0.180	0.158	0.174		0.016
18	JN018154.1 /	0.172	0.174	0.170	0.170	0.174	0.194	0.188	0.154	
19	JN018210.1 /	0.164	0.160	0.164	0.164	0.168	0.178	0.184	0.156	0.194
20	JN018211.1 /	0.194	0.198	0.196	0.196	0.202	0.186	0.202	0.088	0.162
21	KF997876.1 /	0.158	0.168	0.154	0.156	0.160	0.116	0.122	0.152	0.176
22	KT716037.1 /	0.168	0.172	0.166	0.166	0.168	0.142	0.182	0.168	0.174
23	KX648425.1 /	0.188	0.192	0.186	0.186	0.190	0.138	0.152	0.176	0.176
24	KX648429.1 (	0.188	0.192	0.186	0.186	0.190	0.138	0.152	0.176	0.176
25	KY982184.1 (	0.118	0.118	0.114	0.116	0.116	0.170	0.172	0.160	0.162
26	KY982185.1 (	0.026	0.026	0.030	0.028	0.008	0.170	0.166	0.176	0.168
27	KY982187.1 /	0.148	0.154	0.148	0.150	0.146	0.148	0.176	0.158	0.164

		10	11	12	13	14	15	16	17	18
28	KY982188.1	0.138	0.144	0.138	0.140	0.136	0.144	0.172	0.154	0.162
29	KY982192.1	0.126	0.132	0.126	0.124	0.138	0.154	0.168	0.176	0.154
30	KY982193.1	0.126	0.132	0.126	0.124	0.138	0.152	0.168	0.172	0.158
31	KY982194.1	0.122	0.128	0.118	0.120	0.134	0.138	0.162	0.166	0.156
32	KY982199.1	0.114	0.118	0.114	0.112	0.120	0.162	0.170	0.180	0.152
33	KY982273.1	0.166	0.168	0.170	0.168	0.162	0.160	0.176	0.164	0.196
34	MF422313.1	0.178	0.182	0.182	0.180	0.182	0.174	0.194	0.144	0.178
35	MF422319.1	0.166	0.170	0.164	0.164	0.170	0.136	0.186	0.162	0.168
36	MF422320.1	0.168	0.172	0.166	0.166	0.172	0.138	0.184	0.162	0.168
37	MF422321.1	0.164	0.168	0.162	0.162	0.168	0.134	0.182	0.158	0.168
38	MF422322.1	0.168	0.172	0.166	0.166	0.172	0.138	0.184	0.162	0.168
39	MF422326.1	0.152	0.160	0.150	0.150	0.152	0.146	0.186	0.156	0.182
40	MF422327.1	0.138	0.146	0.136	0.136	0.142	0.136	0.182	0.160	0.174
41	MF422328.1	0.144	0.152	0.142	0.142	0.146	0.128	0.182	0.154	0.178
42	MF422329.1	0.140	0.148	0.138	0.138	0.144	0.138	0.182	0.158	0.176
43	MF422330.1	0.138	0.146	0.136	0.136	0.142	0.136	0.182	0.160	0.174
44	MK479161.1	0.140	0.138	0.136	0.138	0.134	0.156	0.170	0.168	0.170
45	MK479165.1	0.128	0.128	0.128	0.126	0.130	0.160	0.178	0.178	0.164
46	MK479171.1	0.118	0.116	0.116	0.116	0.120	0.172	0.176	0.168	0.176
47	MK479180.1	0.122	0.124	0.120	0.120	0.118	0.148	0.156	0.158	0.146
48	MK479188.1	0.102	0.110	0.100	0.100	0.112	0.152	0.174	0.170	0.162
49	MK479196.1	0.120	0.122	0.120	0.122	0.126	0.170	0.176	0.158	0.166
50	MK479202.1	0.100	0.102	0.098	0.098	0.106	0.168	0.164	0.158	0.156
51	MK479204.1	0.130	0.128	0.126	0.128	0.138	0.160	0.166	0.160	0.150
52	MK479207.1	0.108	0.110	0.106	0.106	0.108	0.178	0.178	0.164	0.142
53	MK479210.1	0.032	0.032	0.036	0.034	0.002	0.170	0.168	0.178	0.176
54	NC 037222.1	0.032	0.032	0.036	0.034	0.002	0.170	0.168	0.178	0.176
55	JN018156.1	0.208	0.210	0.206	0.206	0.214	0.208	0.224	0.198	0.202

		10	11	12	13	14	15	16	17	18
56	KY295225.1 (	0.218	0.224	0.216	0.216	0.210	0.218	0.212	0.208	0.204
57	JN018163.1 (	0.198	0.208	0.196	0.196	0.198	0.218	0.228	0.214	0.204
58	HM418309.1	0.228	0.232	0.230	0.228	0.228	0.242	0.246	0.192	0.208
59	KF548118.1 (	0.186	0.186	0.188	0.188	0.192	0.206	0.216	0.204	0.208

		19	20	21	22	23	24	25	26	27
1	**PC01**	0.016	0.016	0.016	0.016	0.017	0.017	0.016	0.016	0.016
2	**PC02**	0.016	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.016
3	**PC04**	0.016	0.016	0.017	0.016	0.017	0.017	0.016	0.016	0.016
4	**PC06**	0.016	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.016
5	NN01	0.016	0.016	0.017	0.016	0.017	0.017	0.016	0.017	0.017
6	NN03	0.016	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.016
7	NN04	0.016	0.016	0.016	0.016	0.017	0.017	0.016	0.017	0.017
8	NN09	0.016	0.016	0.016	0.016	0.017	0.017	0.016	0.017	0.017
9	EF122605.2 (	0.017	0.018	0.016	0.017	0.017	0.017	0.014	0.007	0.016
10	EF122607.2 (	0.017	0.018	0.016	0.017	0.017	0.017	0.014	0.007	0.016
11	EF122608.2 (	0.016	0.018	0.017	0.017	0.018	0.018	0.014	0.007	0.016
12	EF122612.2 (	0.017	0.018	0.016	0.017	0.017	0.017	0.014	0.008	0.016
13	EU381064.1	0.017	0.018	0.016	0.017	0.017	0.017	0.014	0.007	0.016
14	EU404114.1	0.017	0.018	0.016	0.017	0.018	0.018	0.014	0.004	0.016
15	HM567381.1	0.017	0.017	0.014	0.016	0.015	0.015	0.017	0.017	0.016
16	JF700146.1 M	0.017	0.018	0.015	0.017	0.016	0.016	0.017	0.017	0.017
17	JN018153.1 /	0.016	0.013	0.016	0.017	0.017	0.017	0.016	0.017	0.016
18	JN018154.1 /	0.018	0.016	0.017	0.017	0.017	0.017	0.016	0.017	0.017
19	JN018210.1 /		0.017	0.017	0.016	0.018	0.018	0.017	0.017	0.017
20	JN018211.1 /	0.172		0.017	0.016	0.017	0.017	0.018	0.018	0.017
21	KF997876.1 /	0.182	0.166		0.017	0.015	0.015	0.016	0.016	0.016
22	KT716037.1 /	0.158	0.160	0.186		0.017	0.017	0.016	0.017	0.016
23	KX648425.1 /	0.202	0.174	0.136	0.182		0.000	0.017	0.017	0.017
24	KX648429.1 (	0.202	0.174	0.136	0.182	0.000		0.017	0.017	0.017
25	KY982184.1 (	0.166	0.192	0.156	0.160	0.178	0.178		0.014	0.014
26	KY982185.1 (	0.166	0.202	0.160	0.164	0.188	0.188	0.110		0.016
27	KY982187.1 /	0.180	0.186	0.152	0.152	0.180	0.180	0.116	0.146	

		19	20	21	22	23	24	25	26	27
28	KY982188.1	0.176	0.178	0.144	0.142	0.174	0.174	0.116	0.136	0.010
29	KY982192.1	0.178	0.186	0.160	0.162	0.180	0.180	0.118	0.134	0.118
30	KY982193.1	0.174	0.182	0.160	0.160	0.176	0.176	0.114	0.134	0.114
31	KY982194.1	0.164	0.192	0.154	0.152	0.174	0.174	0.112	0.132	0.098
32	KY982199.1	0.166	0.198	0.154	0.150	0.176	0.176	0.122	0.114	0.120
33	KY982273.1	0.194	0.182	0.170	0.178	0.182	0.182	0.160	0.160	0.150
34	MF422313.1	0.160	0.170	0.186	0.172	0.172	0.172	0.180	0.178	0.174
35	MF422319.1	0.164	0.150	0.186	0.018	0.180	0.180	0.166	0.166	0.154
36	MF422320.1	0.166	0.150	0.184	0.016	0.180	0.180	0.164	0.168	0.152
37	MF422321.1	0.162	0.154	0.182	0.012	0.178	0.178	0.160	0.164	0.148
38	MF422322.1	0.166	0.150	0.184	0.016	0.180	0.180	0.164	0.168	0.152
39	MF422326.1	0.160	0.166	0.174	0.076	0.180	0.180	0.160	0.148	0.162
40	MF422327.1	0.156	0.174	0.172	0.066	0.170	0.170	0.148	0.138	0.156
41	MF422328.1	0.158	0.178	0.172	0.074	0.178	0.178	0.158	0.142	0.162
42	MF422329.1	0.158	0.176	0.174	0.068	0.170	0.170	0.146	0.140	0.156
43	MF422330.1	0.156	0.174	0.172	0.066	0.170	0.170	0.148	0.138	0.156
44	MK479161.1	0.182	0.190	0.170	0.158	0.174	0.174	0.108	0.128	0.130
45	MK479165.1	0.178	0.182	0.182	0.154	0.174	0.174	0.126	0.130	0.126
46	MK479171.1	0.174	0.186	0.162	0.176	0.188	0.188	0.134	0.114	0.140
47	MK479180.1	0.172	0.178	0.144	0.136	0.164	0.164	0.098	0.116	0.116
48	MK479188.1	0.160	0.180	0.152	0.146	0.184	0.184	0.110	0.110	0.124
49	MK479196.1	0.164	0.184	0.166	0.160	0.182	0.182	0.104	0.122	0.122
50	MK479202.1	0.160	0.190	0.138	0.148	0.170	0.170	0.102	0.100	0.134
51	MK479204.1	0.168	0.172	0.156	0.146	0.180	0.180	0.122	0.136	0.124
52	MK479207.1	0.170	0.186	0.150	0.154	0.172	0.172	0.100	0.102	0.136
53	MK479210.1	0.170	0.200	0.162	0.166	0.188	0.188	0.118	0.010	0.148
54	NC 037222.1	0.170	0.200	0.162	0.166	0.188	0.188	0.118	0.010	0.148
55	JN018156.1	0.194	0.206	0.230	0.192	0.222	0.222	0.194	0.212	0.198

		19	20	21	22	23	24	25	26	27
56	KY295225.1 (	0.214	0.216	0.206	0.202	0.208	0.208	0.192	0.212	0.192
57	JN018163.1 (	0.220	0.218	0.226	0.208	0.206	0.206	0.202	0.194	0.214
58	HM418309.1	0.206	0.206	0.234	0.222	0.238	0.238	0.220	0.228	0.226
59	KF548118.1 (	0.174	0.206	0.212	0.188	0.226	0.226	0.202	0.190	0.204

		28	29	30	31	32	33	34	35	36
1	**PC01**	0.016	0.017	0.017	0.016	0.017	0.016	0.015	0.016	0.016
2	**PC02**	0.016	0.017	0.017	0.017	0.017	0.016	0.015	0.015	0.015
3	**PC04**	0.017	0.017	0.017	0.016	0.017	0.016	0.015	0.016	0.016
4	**PC06**	0.016	0.017	0.017	0.017	0.017	0.016	0.015	0.015	0.015
5	NN01	0.017	0.017	0.017	0.017	0.017	0.017	0.015	0.016	0.016
6	NN03	0.016	0.017	0.017	0.017	0.017	0.016	0.015	0.015	0.015
7	NN04	0.016	0.017	0.017	0.017	0.016	0.017	0.015	0.016	0.016
8	NN09	0.017	0.017	0.017	0.017	0.017	0.017	0.015	0.016	0.016
9	EF122605.2	0.015	0.015	0.015	0.015	0.014	0.017	0.017	0.017	0.017
10	EF122607.2	0.015	0.015	0.015	0.015	0.014	0.017	0.017	0.017	0.017
11	EF122608.2	0.016	0.015	0.015	0.015	0.014	0.017	0.017	0.017	0.017
12	EF122612.2	0.015	0.015	0.015	0.014	0.014	0.017	0.017	0.017	0.017
13	EU381064.1	0.016	0.015	0.015	0.015	0.014	0.017	0.017	0.017	0.017
14	EU404114.1	0.015	0.015	0.015	0.015	0.015	0.016	0.017	0.017	0.017
15	HM567381.1	0.016	0.016	0.016	0.015	0.016	0.016	0.017	0.015	0.015
16	JF700146.1	0.017	0.017	0.017	0.016	0.017	0.017	0.018	0.017	0.017
17	JN018153.1	0.016	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016
18	JN018154.1	0.016	0.016	0.016	0.016	0.016	0.018	0.017	0.017	0.017
19	JN018210.1	0.017	0.017	0.017	0.017	0.017	0.018	0.016	0.017	0.017
20	JN018211.1	0.017	0.017	0.017	0.018	0.018	0.017	0.017	0.016	0.016
21	KF997876.1	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017	0.017
22	KT716037.1	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.006	0.006
23	KX648425.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
24	KX648429.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
25	KY982184.1	0.014	0.014	0.014	0.014	0.015	0.016	0.017	0.017	0.017
26	KY982185.1	0.015	0.015	0.015	0.015	0.014	0.016	0.017	0.017	0.017
27	KY982187.1	0.004	0.014	0.014	0.013	0.015	0.016	0.017	0.016	0.016

		28	29	30	31	32	33	34	35	36
28	KY982188.1 /		0.014	0.014	0.013	0.014	0.016	0.017	0.016	0.016
29	KY982192.1 /	0.116		0.003	0.009	0.010	0.016	0.017	0.017	0.017
30	KY982193.1 /	0.112	0.004		0.009	0.010	0.016	0.017	0.017	0.017
31	KY982194.1 H	0.098	0.046	0.042		0.010	0.016	0.017	0.016	0.016
32	KY982199.1 /	0.118	0.058	0.058	0.054		0.016	0.017	0.016	0.016
33	KY982273.1	0.152	0.150	0.148	0.156	0.160		0.018	0.017	0.017
34	MF422313.1	0.180	0.176	0.176	0.176	0.180	0.190		0.016	0.016
35	MF422319.1	0.144	0.166	0.164	0.152	0.158	0.182	0.162		0.003
36	MF422320.1	0.142	0.166	0.164	0.156	0.158	0.180	0.162	0.006	
37	MF422321.1	0.138	0.162	0.160	0.152	0.154	0.176	0.164	0.006	0.004
38	MF422322.1	0.142	0.166	0.164	0.156	0.158	0.180	0.162	0.006	0.000
39	MF422326.1	0.156	0.172	0.170	0.162	0.172	0.174	0.162	0.074	0.068
40	MF422327.1	0.146	0.166	0.164	0.158	0.162	0.176	0.160	0.064	0.062
41	MF422328.1	0.152	0.164	0.162	0.156	0.174	0.166	0.168	0.072	0.074
42	MF422329.1	0.146	0.168	0.166	0.160	0.164	0.176	0.160	0.066	0.064
43	MF422330.1	0.146	0.166	0.164	0.158	0.162	0.176	0.160	0.064	0.062
44	MK479161.1	0.126	0.114	0.114	0.114	0.114	0.158	0.164	0.162	0.160
45	MK479165.1	0.120	0.120	0.120	0.122	0.118	0.152	0.178	0.152	0.148
46	MK479171.1	0.136	0.130	0.130	0.130	0.124	0.154	0.166	0.176	0.174
47	MK479180.1	0.108	0.122	0.118	0.108	0.112	0.160	0.176	0.144	0.142
48	MK479188.1	0.118	0.108	0.108	0.100	0.114	0.176	0.182	0.144	0.144
49	MK479196.1	0.116	0.116	0.116	0.112	0.110	0.148	0.172	0.162	0.164
50	MK479202.1	0.128	0.120	0.120	0.110	0.104	0.180	0.170	0.150	0.152
51	MK479204.1	0.118	0.116	0.116	0.102	0.114	0.162	0.178	0.140	0.140
52	MK479207.1	0.134	0.124	0.124	0.122	0.106	0.164	0.184	0.152	0.150
53	MK479210.1	0.138	0.140	0.140	0.136	0.122	0.164	0.180	0.168	0.170
54	NC 037222.1	0.138	0.140	0.140	0.136	0.122	0.164	0.180	0.168	0.170
55	JN018156.1 /	0.202	0.220	0.216	0.202	0.220	0.232	0.206	0.188	0.190

		28	29	30	31	32	33	34	35	36
56	KY295225.1 (	0.198	0.198	0.198	0.198	0.194	0.216	0.212	0.210	0.210
57	JN018163.1 (	0.212	0.202	0.200	0.202	0.190	0.198	0.214	0.206	0.204
58	HM418309.1	0.224	0.228	0.224	0.222	0.230	0.220	0.204	0.218	0.220
59	KF548118.1 (	0.204	0.198	0.194	0.196	0.188	0.200	0.210	0.198	0.198

		37	38	39	40	41	42	43	44	45
1	**PC01**	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017
2	**PC02**	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.017	0.017
3	**PC04**	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017
4	**PC06**	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.017	0.017
5	NN01	0.016	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
6	NN03	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.017	0.017
7	NN04	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017
8	NN09	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017
9	EF122605.2	0.017	0.017	0.016	0.015	0.016	0.016	0.015	0.016	0.015
10	EF122607.2	0.017	0.017	0.016	0.015	0.016	0.016	0.015	0.016	0.015
11	EF122608.2	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.015	0.015
12	EF122612.2	0.016	0.017	0.016	0.015	0.016	0.015	0.015	0.015	0.015
13	EU381064.1	0.016	0.017	0.016	0.015	0.016	0.015	0.015	0.015	0.015
14	EU404114.1	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.015	0.015
15	HM567381.1	0.015	0.015	0.016	0.015	0.015	0.015	0.015	0.016	0.016
16	JF700146.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
17	JN018153.1	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017
18	JN018154.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
19	JN018210.1	0.016	0.017	0.016	0.016	0.016	0.016	0.016	0.017	0.017
20	JN018211.1	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.018	0.017
21	KF997876.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
22	KT716037.1	0.005	0.006	0.012	0.011	0.012	0.011	0.011	0.016	0.016
23	KX648425.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
24	KX648429.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
25	KY982184.1	0.016	0.017	0.016	0.016	0.016	0.016	0.016	0.014	0.015
26	KY982185.1	0.017	0.017	0.016	0.015	0.016	0.016	0.015	0.015	0.015
27	KY982187.1	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.015

		37	38	39	40	41	42	43	44	45
28	KY982188.1	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.015
29	KY982192.1	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.014	0.015
30	KY982193.1	0.016	0.017	0.017	0.017	0.016	0.017	0.017	0.014	0.015
31	KY982194.1	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.014	0.015
32	KY982199.1	0.016	0.016	0.017	0.016	0.017	0.017	0.016	0.014	0.014
33	KY982273.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016	0.016
34	MF422313.1	0.017	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
35	MF422319.1	0.003	0.003	0.012	0.011	0.012	0.011	0.011	0.016	0.016
36	MF422320.1	0.003	0.000	0.011	0.011	0.012	0.011	0.011	0.016	0.016
37	MF422321.1		0.003	0.012	0.010	0.011	0.011	0.010	0.016	0.016
38	MF422322.1	0.004		0.011	0.011	0.012	0.011	0.011	0.016	0.016
39	MF422326.1	0.072	0.068		0.010	0.009	0.010	0.010	0.016	0.016
40	MF422327.1	0.058	0.062	0.048		0.009	0.002	0.000	0.016	0.016
41	MF422328.1	0.070	0.074	0.042	0.038		0.009	0.009	0.016	0.016
42	MF422329.1	0.060	0.064	0.050	0.002	0.040		0.002	0.016	0.016
43	MF422330.1	0.058	0.062	0.048	0.000	0.038	0.002		0.016	0.016
44	MK479161.1	0.158	0.160	0.158	0.156	0.150	0.156	0.156		0.014
45	MK479165.1	0.150	0.148	0.158	0.150	0.152	0.152	0.150	0.112	
46	MK479171.1	0.172	0.174	0.174	0.170	0.178	0.172	0.170	0.122	0.140
47	MK479180.1	0.140	0.142	0.142	0.136	0.134	0.138	0.136	0.090	0.110
48	MK479188.1	0.142	0.144	0.146	0.138	0.142	0.140	0.138	0.116	0.102
49	MK479196.1	0.160	0.164	0.162	0.156	0.154	0.158	0.156	0.102	0.100
50	MK479202.1	0.148	0.152	0.146	0.150	0.152	0.152	0.150	0.124	0.134
51	MK479204.1	0.138	0.140	0.162	0.154	0.158	0.156	0.154	0.116	0.100
52	MK479207.1	0.146	0.150	0.142	0.148	0.150	0.150	0.148	0.126	0.124
53	MK479210.1	0.166	0.170	0.150	0.140	0.144	0.142	0.140	0.132	0.132
54	NC 037222.1	0.166	0.170	0.150	0.140	0.144	0.142	0.140	0.132	0.132
55	JN018156.1	0.186	0.190	0.218	0.204	0.206	0.206	0.204	0.206	0.220

		37	38	39	40	41	42	43	44	45
56	KY295225.1 (	0.206	0.210	0.218	0.214	0.212	0.214	0.214	0.194	0.216
57	JN018163.1 (	0.206	0.204	0.208	0.212	0.218	0.212	0.212	0.208	0.210
58	HM418309.1	0.220	0.220	0.224	0.232	0.228	0.230	0.232	0.228	0.236
59	KF548118.1 (	0.194	0.198	0.206	0.208	0.206	0.210	0.208	0.206	0.216

		46	47	48	49	50	51	52	53	54
1	**PC01**	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.016
2	**PC02**	0.017	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
3	**PC04**	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.016
4	**PC06**	0.017	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
5	NN01	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.017	0.017
6	NN03	0.017	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
7	NN04	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.017	0.017
8	NN09	0.017	0.017	0.017	0.017	0.016	0.016	0.016	0.017	0.017
9	EF122605.2	0.014	0.015	0.014	0.015	0.013	0.015	0.014	0.008	0.008
10	EF122607.2	0.014	0.015	0.014	0.015	0.013	0.015	0.014	0.008	0.008
11	EF122608.2	0.014	0.015	0.014	0.015	0.014	0.015	0.014	0.008	0.008
12	EF122612.2	0.014	0.015	0.013	0.015	0.013	0.015	0.014	0.008	0.008
13	EU381064.1	0.014	0.015	0.013	0.015	0.013	0.015	0.014	0.008	0.008
14	EU404114.1	0.015	0.014	0.014	0.015	0.014	0.015	0.014	0.002	0.002
15	HM567381.1	0.017	0.016	0.016	0.017	0.017	0.016	0.017	0.017	0.017
16	JF700146.1	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017
17	JN018153.1	0.017	0.016	0.017	0.016	0.016	0.016	0.017	0.017	0.017
18	JN018154.1	0.017	0.016	0.016	0.017	0.016	0.016	0.016	0.017	0.017
19	JN018210.1	0.017	0.017	0.016	0.017	0.016	0.017	0.017	0.017	0.017
20	JN018211.1	0.017	0.017	0.017	0.017	0.018	0.017	0.017	0.018	0.018
21	KF997876.1	0.016	0.016	0.016	0.017	0.015	0.016	0.016	0.016	0.016
22	KT716037.1	0.017	0.015	0.016	0.016	0.016	0.016	0.016	0.017	0.017
23	KX648425.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
24	KX648429.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
25	KY982184.1	0.015	0.013	0.014	0.014	0.014	0.015	0.013	0.014	0.014
26	KY982185.1	0.014	0.014	0.014	0.015	0.013	0.015	0.014	0.004	0.004
27	KY982187.1	0.016	0.014	0.015	0.015	0.015	0.015	0.015	0.016	0.016

		46	47	48	49	50	51	52	53	54
28	KY982188.1	0.015	0.014	0.014	0.014	0.015	0.014	0.015	0.015	0.015
29	KY982192.1	0.015	0.015	0.014	0.014	0.015	0.014	0.015	0.016	0.016
30	KY982193.1	0.015	0.014	0.014	0.014	0.015	0.014	0.015	0.016	0.016
31	KY982194.1	0.015	0.014	0.013	0.014	0.014	0.014	0.015	0.015	0.015
32	KY982199.1	0.015	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.015
33	KY982273.1	0.016	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.017
34	MF422313.1	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
35	MF422319.1	0.017	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017
36	MF422320.1	0.017	0.016	0.016	0.017	0.016	0.016	0.016	0.017	0.017
37	MF422321.1	0.017	0.016	0.016	0.016	0.016	0.015	0.016	0.017	0.017
38	MF422322.1	0.017	0.016	0.016	0.017	0.016	0.016	0.016	0.017	0.017
39	MF422326.1	0.017	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
40	MF422327.1	0.017	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016
41	MF422328.1	0.017	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016
42	MF422329.1	0.017	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016
43	MF422330.1	0.017	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016
44	MK479161.1	0.015	0.013	0.014	0.014	0.015	0.014	0.015	0.015	0.015
45	MK479165.1	0.016	0.014	0.014	0.013	0.015	0.013	0.015	0.015	0.015
46	MK479171.1		0.014	0.014	0.015	0.014	0.016	0.014	0.014	0.014
47	MK479180.1	0.116		0.014	0.014	0.014	0.013	0.015	0.014	0.014
48	MK479188.1	0.118	0.104		0.015	0.013	0.014	0.013	0.014	0.014
49	MK479196.1	0.136	0.110	0.124		0.014	0.012	0.015	0.015	0.015
50	MK479202.1	0.106	0.104	0.098	0.116		0.015	0.010	0.014	0.014
51	MK479204.1	0.142	0.094	0.108	0.074	0.134		0.015	0.016	0.016
52	MK479207.1	0.108	0.122	0.092	0.132	0.056	0.128		0.014	0.014
53	MK479210.1	0.118	0.116	0.114	0.128	0.108	0.140	0.110		0.000
54	NC 037222.1	0.118	0.116	0.114	0.128	0.108	0.140	0.110	0.000	
55	JN018156.1	0.216	0.196	0.204	0.216	0.186	0.206	0.194	0.216	0.216

		46	47	48	49	50	51	52	53	54
56	KY295225.1 (	0.210	0.182	0.196	0.204	0.184	0.200	0.186	0.212	0.212
57	JN018163.1 (	0.206	0.204	0.212	0.208	0.182	0.220	0.188	0.200	0.200
58	HM418309.1	0.228	0.232	0.228	0.220	0.226	0.230	0.236	0.230	0.230
59	KF548118.1 (	0.188	0.190	0.200	0.190	0.192	0.204	0.190	0.194	0.194

		1	2	3	4	5	6	7	8	9
1	**PC03**		0.012	0.012	0.014	0.015	0.015	0.014	0.014	0.015
2	**PC05**	0.104		0.012	0.011	0.014	0.015	0.015	0.014	0.014
3	**PC08**	0.101	0.093		0.012	0.014	0.014	0.014	0.014	0.014
4	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.128	0.085	0.103		0.014	0.014	0.014	0.014	0.014
5	KT446990. *Brachistosternus paposo*	0.158	0.148	0.131	0.134		0.009	0.013	0.014	0.014
6	KT447018.1 *Brachistosternus roigalsinai*	0.151	0.149	0.126	0.133	0.053		0.012	0.015	0.014
7	KT446957.1 *Brachistosternus ehrenbergii*	0.136	0.154	0.126	0.138	0.108	0.104		0.014	0.015
8	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.143	0.138	0.129	0.148	0.146	0.154	0.143		0.012
9	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.159	0.128	0.139	0.136	0.143	0.146	0.156	0.098	
10	KT446986.1 *Brachistosternus negrei*	0.153	0.153	0.146	0.138	0.111	0.096	0.121	0.161	0.139
11	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.138	0.124	0.143	0.138	0.164	0.158	0.139	0.131	0.131
12	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.131	0.121	0.126	0.139	0.134	0.138	0.128	0.114	0.109
13	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.148	0.131	0.133	0.123	0.141	0.146	0.123	0.118	0.106
14	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.146	0.123	0.134	0.121	0.141	0.151	0.136	0.119	0.116
15	AY156581.1 *Pandinus dictator*	0.139	0.144	0.133	0.136	0.154	0.153	0.149	0.139	0.134
16	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.169	0.154	0.149	0.158	0.159	0.153	0.159	0.163	0.164
17	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.154	0.141	0.138	0.143	0.151	0.153	0.167	0.144	0.153
18	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.153	0.159	0.151	0.158	0.151	0.149	0.151	0.163	0.163
19	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.136	0.134	0.134	0.128	0.148	0.161	0.139	0.153	0.138
20	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.144	0.153	0.144	0.151	0.154	0.156	0.166	0.167	0.154
21	KT188365.1 *Scorpio palmatus*	0.143	0.151	0.143	0.153	0.164	0.176	0.163	0.156	0.164
22	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.143	0.154	0.136	0.148	0.141	0.154	0.141	0.164	0.166
23	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.171	0.159	0.161	0.159	0.144	0.163	0.149	0.167	0.167
24	KM274724.1 *Smeringurus grandis* voucher LP8690	0.154	0.163	0.149	0.163	0.156	0.158	0.154	0.169	0.161
25	KF997876.1 *Mesobuthus gibbosus*	0.201	0.199	0.191	0.192	0.194	0.194	0.191	0.189	0.187
26	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.189	0.179	0.191	0.194	0.199	0.197	0.197	0.184	0.186
27	JN018154.1 *Parabuthus laevifrons*	0.186	0.186	0.189	0.189	0.174	0.171	0.169	0.184	0.182
28	JN018153.1 *Lychas mucronatus*	0.192	0.186	0.194	0.197	0.189	0.184	0.176	0.201	0.189
29	MF422319.1 *Lychas tricarinatus*	0.182	0.186	0.192	0.201	0.194	0.186	0.194	0.211	0.189
30	MF422313.1 *Isometrus* sp.	0.174	0.191	0.189	0.196	0.202	0.202	0.187	0.202	0.209
31	KX648429.1 *Compsobuthus werneri*	0.192	0.187	0.191	0.192	0.197	0.187	0.189	0.211	0.197
32	EF122605.2 *Centruroides vittatus*	0.177	0.187	0.192	0.197	0.174	0.179	0.174	0.177	0.179
33	MK479161.1 *Centruroides arctimanus*	0.184	0.186	0.194	0.181	0.184	0.172	0.189	0.189	0.177
34	KY982184.1 *Centruroides schmidti*	0.181	0.179	0.181	0.181	0.174	0.166	0.177	0.167	0.164
35	KY982273.1 *Zabius fuscus*	0.209	0.222	0.221	0.201	0.187	0.186	0.181	0.211	0.196

		1	2	3	4	5	6	7	8	9
36	JN018156.1 *Belisarius xambeu*i voucher MNHN-JAD29	0.146	0.143	0.153	0.141	0.159	0.153	0.153	0.186	0.164
37	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.164	0.161	0.176	0.151	0.172	0.149	0.153	0.191	0.172

		10	11	12	13	14	15	16	17	18
1	**PC03**	0.015	0.014	0.014	0.014	0.014	0.014	0.015	0.015	0.015
2	**PC05**	0.015	0.013	0.013	0.014	0.013	0.014	0.015	0.014	0.015
3	**PC08**	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.014	0.015
4	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.014	0.014	0.014	0.013	0.013	0.014	0.015	0.014	0.015
5	KT446990. *Brachistosternus paposo*	0.013	0.015	0.014	0.014	0.014	0.015	0.015	0.015	0.015
6	KT447018.1 *Brachistosternus roigalsinai*	0.012	0.015	0.014	0.014	0.015	0.015	0.015	0.015	0.015
7	KT446957.1 *Brachistosternus ehrenbergii*	0.013	0.014	0.014	0.013	0.014	0.015	0.015	0.015	0.015
8	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.015	0.014	0.013	0.013	0.013	0.014	0.015	0.014	0.015
9	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.014	0.014	0.013	0.013	0.013	0.014	0.015	0.015	0.015
10	KT446986.1 *Brachistosternus negrei*		0.014	0.014	0.014	0.015	0.015	0.015	0.015	0.014
11	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.144		0.012	0.013	0.013	0.014	0.015	0.014	0.015
12	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.128	0.103		0.013	0.013	0.013	0.015	0.014	0.014
13	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.141	0.118	0.111		0.010	0.015	0.015	0.015	0.014
14	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.151	0.114	0.118	0.070		0.015	0.015	0.014	0.015
15	AY156581.1 *Pandinus dictator*	0.163	0.146	0.121	0.151	0.154		0.015	0.012	0.015
16	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.149	0.156	0.154	0.161	0.159	0.174		0.016	0.013
17	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.161	0.148	0.126	0.159	0.143	0.103	0.177		0.015
18	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.141	0.154	0.133	0.143	0.158	0.171	0.119	0.164	
19	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.131	0.143	0.141	0.126	0.131	0.148	0.156	0.153	0.163
20	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.159	0.163	0.139	0.151	0.159	0.126	0.167	0.128	0.169
21	KT188365.1 *Scorpio palmatus*	0.166	0.151	0.151	0.146	0.144	0.149	0.154	0.153	0.166
22	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.149	0.149	0.133	0.148	0.151	0.153	0.139	0.158	0.148
23	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.149	0.144	0.144	0.161	0.151	0.159	0.100	0.149	0.124
24	KM274724.1 *Smeringurus grandis* voucher LP8690	0.158	0.153	0.144	0.158	0.151	0.176	0.133	0.166	0.093
25	KF997876.1 *Mesobuthus gibbosus*	0.194	0.177	0.169	0.186	0.181	0.171	0.199	0.199	0.201
26	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.207	0.186	0.164	0.177	0.196	0.174	0.196	0.196	0.199
27	JN018154.1 *Parabuthus laevifrons*	0.187	0.176	0.164	0.187	0.197	0.189	0.184	0.194	0.177
28	JN018153.1 *Lychas mucronatus*	0.197	0.186	0.189	0.177	0.184	0.196	0.189	0.194	0.187
29	MF422319.1 *Lychas tricarinatus*	0.184	0.184	0.181	0.179	0.182	0.199	0.211	0.197	0.189
30	MF422313.1 *Isometrus* sp.	0.211	0.196	0.189	0.196	0.187	0.199	0.216	0.199	0.202
31	KX648429.1 *Compsobuthus werneri*	0.207	0.191	0.182	0.211	0.209	0.194	0.224	0.194	0.199
32	EF122605.2 *Centruroides vittatus*	0.187	0.176	0.153	0.179	0.182	0.167	0.179	0.176	0.182
33	MK479161.1 *Centruroides arctimanus*	0.201	0.182	0.169	0.191	0.184	0.177	0.201	0.176	0.186
34	KY982184.1 *Centruroides schmidti*	0.181	0.164	0.172	0.176	0.174	0.167	0.181	0.158	0.174
35	KY982273.1 *Zabius fuscus*	0.199	0.196	0.182	0.191	0.204	0.194	0.202	0.196	0.184

		10	11	12	13	14	15	16	17	18
36	JN018156.1 *Belisarius xambeu*i voucher MNHN-JAD29	0.146	0.156	0.154	0.143	0.139	0.179	0.154	0.187	0.154
37	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.138	0.161	0.166	0.171	0.164	0.164	0.163	0.191	0.181

		19	20	21	22	23	24	25	26	27
1	**PC03**	0.014	0.014	0.014	0.014	0.015	0.015	0.016	0.016	0.016
2	**PC05**	0.014	0.015	0.015	0.015	0.015	0.015	0.016	0.016	0.016
3	**PC08**	0.014	0.014	0.014	0.014	0.015	0.015	0.016	0.016	0.016
4	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.014	0.015	0.015	0.014	0.015	0.015	0.016	0.016	0.016
5	KT446990. *Brachistosternus paposo*	0.014	0.015	0.015	0.014	0.014	0.015	0.016	0.016	0.015
6	KT447018.1 *Brachistosternus roigalsinai*	0.015	0.015	0.016	0.015	0.015	0.015	0.016	0.016	0.015
7	KT446957.1 *Brachistosternus ehrenbergii*	0.014	0.015	0.015	0.014	0.015	0.015	0.016	0.016	0.015
8	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.016	0.016
9	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.014	0.015	0.015	0.015	0.015	0.015	0.016	0.016	0.016
10	KT446986.1 *Brachistosternus negrei*	0.014	0.015	0.015	0.015	0.015	0.015	0.016	0.017	0.016
11	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.014	0.015	0.015	0.015	0.014	0.015	0.016	0.016	0.016
12	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.014	0.014	0.015	0.014	0.014	0.014	0.015	0.015	0.015
13	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.014	0.015	0.014	0.014	0.015	0.015	0.016	0.016	0.016
14	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.014	0.015	0.014	0.015	0.015	0.015	0.016	0.016	0.016
15	AY156581.1 *Pandinus dictator*	0.014	0.014	0.015	0.015	0.015	0.016	0.015	0.015	0.016
16	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.015	0.015	0.015	0.014	0.012	0.014	0.016	0.016	0.016
17	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.015	0.014	0.015	0.015	0.015	0.015	0.016	0.016	0.016
18	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.015	0.015	0.015	0.014	0.013	0.012	0.016	0.016	0.016
19	KF548118.1 *Opisthacanthus asper* voucher Sc1087		0.014	0.014	0.015	0.015	0.015	0.016	0.016	0.016
20	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.148		0.014	0.014	0.015	0.015	0.016	0.015	0.016
21	KT188365.1 *Scorpio palmatus*	0.133	0.138		0.015	0.015	0.015	0.016	0.016	0.016
22	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.153	0.148	0.163		0.014	0.015	0.016	0.016	0.016
23	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.167	0.164	0.161	0.129		0.014	0.017	0.017	0.016
24	KM274724.1 *Smeringurus grandis* voucher LP8690	0.158	0.171	0.166	0.149	0.139		0.016	0.016	0.016
25	KF997876.1 *Mesobuthus gibbosus*	0.194	0.187	0.204	0.184	0.207	0.194		0.013	0.015
26	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.192	0.172	0.197	0.191	0.207	0.201	0.124		0.015
27	JN018154.1 *Parabuthus laevifrons*	0.191	0.184	0.206	0.176	0.199	0.191	0.163	0.174	
28	JN018153.1 *Lychas mucronatus*	0.194	0.194	0.191	0.177	0.201	0.192	0.144	0.167	0.149
29	MF422319.1 *Lychas tricarinatus*	0.191	0.184	0.192	0.201	0.197	0.197	0.174	0.177	0.163
30	MF422313.1 *Isometrus* sp.	0.199	0.189	0.201	0.199	0.231	0.209	0.177	0.186	0.171
31	KX648429.1 *Compsobuthus werneri*	0.201	0.201	0.214	0.206	0.219	0.192	0.134	0.143	0.164
32	EF122605.2 *Centruroides vittatus*	0.171	0.164	0.172	0.174	0.181	0.176	0.151	0.151	0.156
33	MK479161.1 *Centruroides arctimanus*	0.186	0.191	0.194	0.186	0.212	0.174	0.154	0.153	0.158
34	KY982184.1 *Centruroides schmidti*	0.187	0.186	0.194	0.177	0.199	0.186	0.141	0.163	0.149
35	KY982273.1 *Zabius fuscus*	0.194	0.214	0.202	0.199	0.207	0.214	0.166	0.177	0.184

		19	20	21	22	23	24	25	26	27
36	JN018156.1 *Belisarius xambeu*i voucher MNHN-JAD29	0.163	0.181	0.179	0.164	0.167	0.159	0.212	0.219	0.192
37	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.167	0.186	0.176	0.181	0.182	0.174	0.219	0.222	0.192

		28	29	30	31	32	33	34	35	36	37
1	**PC03**	0.016	0.016	0.015	0.016	0.016	0.016	0.016	0.017	0.014	0.015
2	**PC05**	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.014	0.015
3	**PC08**	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.015	0.016
4	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.014	0.015
5	KT446990. *Brachistosternus paposo*	0.016	0.016	0.016	0.016	0.015	0.016	0.015	0.016	0.015	0.015
6	KT447018.1 *Brachistosternus roigalsinai*	0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.016	0.015	0.015
7	KT446957.1 *Brachistosternus ehrenbergii*	0.016	0.016	0.016	0.016	0.015	0.016	0.016	0.016	0.015	0.015
8	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.016	0.017	0.016	0.017	0.016	0.016	0.015	0.017	0.016	0.016
9	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.016	0.016	0.017	0.016	0.016	0.016	0.015	0.016	0.015	0.015
10	KT446986.1 *Brachistosternus negrei*	0.016	0.016	0.017	0.017	0.016	0.016	0.016	0.016	0.014	0.014
11	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.016	0.015	0.015
12	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.016	0.016	0.016	0.016	0.015	0.015	0.015	0.016	0.015	0.015
13	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.016	0.016	0.016	0.017	0.016	0.016	0.016	0.016	0.014	0.015
14	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.016	0.016	0.016	0.017	0.016	0.016	0.015	0.016	0.014	0.015
15	AY156581.1 *Pandinus dictator*	0.016	0.016	0.016	0.016	0.015	0.016	0.015	0.016	0.016	0.015
16	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.016	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.015	0.015
17	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.016	0.016	0.016
18	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.016	0.016	0.016	0.016	0.016	0.016	0.015	0.016	0.015	0.016
19	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.016	0.016	0.016	0.016	0.015	0.016	0.016	0.016	0.015	0.015
20	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.016	0.016	0.016	0.016	0.015	0.016	0.016	0.017	0.016	0.016
21	KT188365.1 *Scorpio palmatus*	0.016	0.016	0.016	0.017	0.015	0.016	0.016	0.016	0.016	0.016
22	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.016	0.016	0.016	0.016	0.015	0.016	0.016	0.016	0.015	0.016
23	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.016	0.016	0.017	0.017	0.016	0.017	0.016	0.017	0.015	0.016
24	KM274724.1 *Smeringurus grandis* voucher LP8690	0.016	0.016	0.017	0.016	0.016	0.015	0.016	0.017	0.015	0.015
25	KF997876.1 *Mesobuthus gibbosus*	0.014	0.015	0.016	0.014	0.015	0.015	0.014	0.015	0.017	0.017
26	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.015	0.016	0.016	0.014	0.015	0.015	0.015	0.016	0.017	0.017
27	JN018154.1 *Parabuthus laevifrons*	0.015	0.015	0.015	0.015	0.015	0.015	0.015	0.016	0.016	0.016
28	JN018153.1 *Lychas mucronatus*		0.015	0.014	0.015	0.015	0.015	0.015	0.015	0.016	0.016
29	MF422319.1 *Lychas tricarinatus*	0.161		0.015	0.016	0.015	0.015	0.015	0.016	0.016	0.016
30	MF422313.1 *Isometrus* sp.	0.144	0.158		0.015	0.015	0.015	0.016	0.016	0.016	0.016
31	KX648429.1 *Compsobuthus werneri*	0.164	0.177	0.169		0.015	0.015	0.015	0.015	0.017	0.017
32	EF122605.2 *Centruroides vittatus*	0.163	0.161	0.163	0.174		0.014	0.013	0.015	0.016	0.016
33	MK479161.1 *Centruroides arctimanus*	0.158	0.156	0.156	0.159	0.133		0.012	0.015	0.016	0.017
34	KY982184.1 *Centruroides schmidti*	0.158	0.161	0.177	0.166	0.116	0.101		0.015	0.016	0.016
35	KY982273.1 *Zabius fuscus*	0.161	0.181	0.186	0.172	0.159	0.161	0.154		0.017	0.017

		28	29	30	31	32	33	34	35	36	37
36	JN018156.1 *Belisarius xambeu*i voucher MNHN-JAD29	0.192	0.189	0.199	0.212	0.196	0.196	0.182	0.217		0.015
37	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.187	0.206	0.189	0.222	0.204	0.209	0.204	0.212	0.154	

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5th December 2019

Penny Brooshooft
Senior Zoologist
Biota Environmental Sciences Pty Ltd
Level 1, 228 Carr Place
Leederville WA 6007

Via email

Re. Helix Job 601 - Report on the molecular systematics of the mygalomorph, and scorpion specimens from Winu.

Dear Penny,

Following is a summary of the results of the invertebrate molecular investigation we have completed for the Winu Fauna phase 2 survey. There were six species amongst the nine successfully sequenced invertebrate specimens, based on the current available molecular data. We detected four species amongst the six mygalomorph spider specimens, two of which have been recorded previously during phase one sampling. Amongst the three successfully sequenced scorpion specimens, two were placed in a single clade of the widely distributed species *Lychas annulatus* (family Buthidae). The remaining scorpion belonged to a separate widespread *Lychas* species, *Lychas adonis*. We were unable to obtain a good quality sequence from three specimens, and therefore the placement of these suspected buthid and urodacid scorpion specimens remain unresolved.

Thanks once again for collaborating on this project with Helix. We hope we can continue to provide you with useful information, and feel free to contact us if you have any questions or would like to discuss the results in detail.

Sincerely,

Dr. Zoë Hamilton, Dr. Terrie Finston and Yvette Hitchen
Helix Molecular Solutions

Background and Objective

The infraorder of Arachnida, Mygalmomorphae, includes trapdoor spiders and their kin, and they are frequently identified as short-range endemics (SREs)(e.g. Harvey *et al*., 2011; Castalanelli *et al*., 2014). Identification of species has traditionally been performed using morphological techniques, however, only males can be used in identification, as both females and juveniles lack the diagnostic characters used in identification, and furthermore there is a large backlog of undescribed taxa. DNA barcoding with the use of *COI* mtDNA has become a rapid, objective method aiding mygalomorph species identifications and their distributions, and is recognised as providing important information that regulatory authorities can use to assess environmental impacts of large-scale developments (Harvey *et al*., 2008; Environmental Protection Authority, 2009; Castalanelli *et al*., 2014). Extensive molecular work has been conducted on the trap-door spider fauna of Western Australia (Helix, 2009a &b, 2010, 2011a - l, 2012a - i, 2013a & b, 2014a - d, 2015a – e, 2019a). The resulting dataset provides a molecular framework that can be used to provide regional context for localised sampling.

Six specimens of invertebrate fauna belonging to a single family of mygalomorph spiders (Araneae: Mygalomorphae: (Nemesiidae), and five scorpion specimens belonging to two families (Scorpionida: Buthidae & Urodacidae from the Winu survey area in the Little Sandy Desert were sequenced for variation at the mitochondrial cytochrome oxidase subunit I gene (*COI*). The nine successful resulting molecular sequences were then assessed to determine the number of taxa present and compare these results to those specimens from Phase 1 sampling, as well as sequences publically available on GenBank, and those already in Helix's database for context.

Executive summary

- Six specimens of mygalomorph spiders from the Winu survey area were sequenced and assessed for variation at the *COI* mtDNA gene. The molecular data were then placed within an existing molecular taxonomic framework for each family, using *COI* mtDNA sequences from phase 1 sampling, GenBank, and mygalomorph *COI* sequences in the Helix database;
- Five scorpion (Scorpionida) specimens belonging to two families (Buthidae and Urodacidae) from the Winu survey area, in the Little Sandy Desert were sequenced and assessed for variation at the *COI* mtDNA gene. The resulting molecular data were then placed within an existing molecular taxonomic framework for each family, using *COI* mtDNA scorpions sequences from GenBank, and *COI* sequences in the Helix database;
- A single family (Nemesiidae) was amongst the six successfully sequenced spider specimens. Six haplotypes were amongst the six successfully sequenced mygalomorphae specimens;
- Two species of buthid (Buthidae) scorpions were recorded amongst the three specimens. These species were *Lychas annulatus* and *Lychas adonis*;
- One specimen of buthid scorpion was not successfully sequenced and therefore the placement of this suspected *Lychas* could not be ascertained;
- The single urodcaid specimen was not successfully sequenced and therefore the placement of this suspected *Urodacus* could not be ascertained.

Methods

Six mygalomorph spider specimens from four sampling locations (Table 1) were sequenced for variation at the cytochrome oxidase subunit I gene (*COI*) using primers LCOI & HCO2 (Folmer *et al*., 1994). The resulting six mygalomorph sequences comprised six haplotypes (Table 2).

Five scorpion specimens from four sampling locations (Table 1) from two families (Buthidae and Urodacidae) were sequenced for variation at the cytochrome oxidase subunit I gene (*COI*) using primers LCOI & HCO2 (Folmer *et al*., 1994). The three resulting successful scorpion sequences comprised three haplotypes (Table 2).

The two Winu specimens (mygalomorphs n=0, scorpions n=2) that were not successfully sequenced could not be assigned to known or unknown species. Sequence failure could be due to degradation of the DNA, primer mis-matches, or contamination by other DNA in the sample.

The sequences from the total nine successfully sequenced invertebrate individuals (*COI*) were edited using Geneious version 6.1.8 software (https://www.geneious.com) performed within MEGA version 5.05 (Tamura *et al*., 2011) using the built-in alignment tool using CLUSTAL W (Thompson *et al*., 1994) using default parameters. DNA nucleotide sequences were translated into protein sequences to ensure that the amplified sequences corresponded to the target mtDNA. The translated protein sequences were then checked for the presence of stop codons, to ensure that pseudogenes hadn't been amplified. Pseudogenes have a DNA sequence that is similar to the functional gene (e.g. *COI*) however, they do not code for a functioning protein despite the shared ancestry with the functional gene. The presence of pseudogenes can complicate molecular analyses, producing odd results. DNA sequences were translated into proteins with ExPASy using the invertebrate genetic code. All sequences analysed were of high quality with no evidence of heterogeneous peaks. All resulting sequences were 'BLAST'ed (Basic Local Alignment Search Tool) with the NCBI (National Centre for Biotechnology Information). This program compares DNA nucleotide sequences with a library of sequences and identifies sequences within the database that resemble the query sequences above a certain threshold. Genetic distances between unique genetic sequences (haplotypes) were measured using uncorrected p-distances (total percentage of nucleotides different between sequences). To account for polymorphism within lineages, the net genetic diversity of Nei (1987) was calculated to give a 'corrected' distance between lineages.

For phylogenetic analysis, likelihood ratio tests using the Bayesian Information Criterion were calculated in MEGA 7.0 (Kumar *et al*., 2016) to determine the best-fit model of evolution. The phylogenetic analyses were calculated in MEGA 7.0 (Kumar *et al*., 2016) using maximum likelihood (ML) with 1000 bootstrap replicates, based on the genetic distances with the best-fit model of evolution calculated for each family. The tree was rooted using three outgroups, *Centruroides vittatus* (EU404114), *Mesobuthus martensii* (JF700146), and *Selenotholus* sp MYG381 (KJ744742) obtained from GenBank.

For the both the mygalomorph specimens (family Nemesiidae), and the scorpion specimens (family Buthidae) the best model of evolution was the General Time Reversible model with gamma distribution and invariant sites (GTR+G+I with the parameter for gamma distribution of 0.65 (Nemesiidae) and 0.76 (Buthidae).

Phylogenetic analysis were performed separately for each family, and included the representative haplotypes for the nine successfully sequenced specimens from the survey area, as well as a total of one-hundred and ninety seven reference specimens including all nemesiid mygalomoph specimens and all buthid specimens from phase 1 sampling, in addition to reference specimens obtained from both Helix and GenBank databases (Appendix 1).

Results

Mygalomorphae – family Nemesiidae

Phylogenetic Analyses
A 683 base-pair (bp) fragment of *COI* was isolated for all six nemesiid specimens from Winu.

Reference specimens and outgroups
The six mygalomorph specimens from the second phase of Winu fauna sampling (PP01 – PP06) were analysed along with a total of eighty-nine reference specimens from both the Helix database (n=54) and GenBank (n=35). These reference specimens also included representative lineages from the five species of nemesiid mygalmorph spiders recorded during phase 1 sampling (Helix 2019c). In addition to the thirty-five genbank sequences used for context, three specimens were also used during analyses as outgroups; these were *Centruroides vittatus* (EU404114), *Mesobuthus martensii* (JF700146), and *Selenotholus* sp MYG381 (KJ744742) all obtained from GenBank.

Based on phylogenetic analyses, the six nemesiid specimens from the second phase of sampling belong to four separate clades (Table 1, Figure 1). One specimen (PP01) shows affinity to the previously recorded species *Aname* sp. N148 (Figure 1, Table 1), recorded during phase one sampling. Three specimens (PP03, PP05, PP06) do not show affinity to any specimens available on GenBank, or in the Helix database. Another specimen (PP02) did not show affinity to any specimens available on GenBank or in the Helix database, and the placement of this specimen in relation to all other nemesiid specimens currently available for comparison is ambiguous, reflected by the low bootstrap support on the nodes (Figure 1). The remaining nemesiid specimen (PP04) showed affinity to the previously recorded species *Kwonkan* sp N15, recorded during phase one sampling.

Differentiation within and between lineages
Aname sp. N148 (PP01)
The PP01 specimen shows just 0.5 % sequence divergence from the nearest relative (NSA_N148_PC16, Table 3). There is 8.8 % divergence between PP01 and both NSB_N149_PC26 from the Helix database from the first phase of sampling for Winu and *Aname* sp. MYG351 (Genbank # KJ745288.1, WAM voucher # T82304) (Table 3, Figure 1). This species, *Aname* sp. N148 is represented by one other specimen in the Helix database, recorded during phase one sampling at Winu. Based on the limited molecular data of the specimens available for comparison, the species shows up to 1.0 % intraspecific sequence divergence.

Kwonkan sp. N151 (PP04)
The PP04 specimen from Winu shows 2.2 % sequence divergence from the nearest relative NSD_N151_PC13 (Figure 1, Table 3). The species, *Kwonkan* sp. N151 is represented by seven specimens in the Helix database recorded during phase one sampling. Based on the molecular data of the specimens available for comparison, the species shows up to 2.6 % intraspecific sequence divergence. The next closest relative, based on the molecular data available for comparison were NGE_N130_CW14 (Helix) and *Aname mellosa* (GenBank #KJ744982.1, WAM voucher T122207) both at 11.8 % sequence divergence (Table 3).

New species, *Aname* sp. N152 (PP03, PP05, PP06)
The three specimens from Winu show just 0.1 % sequence divergence from one another (Table 2). These specimens show 9.3 % sequence divergence from the nearest relatives (Table 3), *Aname* sp MYG331 (Genbank #'s KJ744911.1 & KJ744914.1, WAM voucher #'s T118812 & T118818). This suspected new species *Aname* sp. N152 is represented by just the three specimens collected during the second phase of sampling for Winu.

New species, *Aname* sp. N153 (PP02)
The final nemesiid specimen from Winu phase 2 sampling (PP02) shows 13.4 % sequence divergence from the nearest relative, *A. mellosa* (Genbank # KJ744982.1, WAM voucher T122207) (Figure 1, Table 3). This suspected new species, *Aname* sp. N153 is represented by just the single specimen collected during phase 2 sampling at Winu.

Scorpionida – family Buthidae
Over 40 scorpion species described in Australia are traditionally organized into four families: Buthidae, Bothriuridae, Urodacidae and Homuridae (Luna-Ramirez *et al.,* 2017). The Buthidae are the largest family of scorpions with 1053 species known under 92 genera (Rein, 2015). Few molecular investigations of phylogenetic relationships in the family Buthidae are available (Gantenbein *et al*., 2000; 2003; Fet *et al*., 2003; Gantenbein & Largiadèr, 2003; Mirshamsi *et al*., 2010; Sousa *et al*., 2010, 2011; Suranse *et al*., 2017). Nevertheless, all these studies agree that morpho-taxonomy has limitations in differentiating and defining species boundaries, with findings that several currently recognized species are species groups comprising undescribed taxa. Morphological variability in buthids within taxa, along with morphological similarity between taxa, has led to taxonomic confusion and underscores the value of the inclusion of molecular data for species delineation in scorpions (Yamashita & Rhoads, 2013).

Previous sequencing by Helix of buthids from the Great Sandy Desert, approximately 40 km NW of the Winu collections (Helix, 2018, 2019a) and phase 1 at Winu (Helix, 2019b) revealed two closely related clades of Buthidae, which showed approximately 6 % sequence divergence (Helix, 2018; Helix, 2019b). Analyses of the Helix specimens performed by Dr Joel Huey (WA Museum) with his more extensive collection of sequences, not yet publically available, confirmed the placement of the Helix specimens in two distinct clades, which also contained specimens identified as *Lychas annulatus* by Lorenzo Prendini (American Museum of Natural History). This species is also recognised as *Hemilychas alexandrinus,* which according to the Atlas of Living Australia has a large distributional range across the arid zone of Australia. We refer to the two clades as *L. annulatus* clade A and *L. annulatus* clade B (Helix, 2018, Helix 2019b).

Reference specimens and outgroups
Three of the four specimens of buthid scorpions collected during the second phase of sampling at Winu were successfully sequenced (Table 1).

The three successfully sequenced specimens from the Winu study area comprised three haplotypes each of which was unique. These sequences were analysed along with one hundred reference scorpion specimens from GenBank (n= 83) and the Helix database (n= 17) from the family Buthidae. Five representative specimens from five additional scorpion families were used at outgroups in the analysis.

Phylogenetic Analyses
A 683 base-pair (bp) fragment of *COI* was isolated for the three successfully sequenced specimens. Amongst the three specimens, all had unique haplotypes. Phylogenetic analyses placed two of the haplotypes (PP07, PP11) in the previously detected *L. annulatus* clade B, along with specimens of *Lychas annulatus* from the first phase of sampling (Helix code PC) as well as specimens from the Helix databases collected from the Great Sandy Desert, (Helix code NN; Table 4).

While the two haplotypes from Winu phase 2 were both placed in *L. annulatus* clade B, haplotypes from phase 1 were placed in both clades A and B (Figure 2). *Lychas annulatus* clades A and B had a mean divergence of 6.8 % between them (Table 6).

The remaining Winu scorpion haplotype (PP08) belonged to another clade of *Lychas* scorpions (Figure 2). This specimen showed 9.4 % sequence divergence from the two *L. annulatus* specimens (PP07 & PP11), one of which (PP11) was collected at the same locality. This level of sequence divergence, along with the strongly supported phylogenetic differentiation clearly indicated a separate species of *Lychas* (Figure 2). For further resolution of this specimen, Dr. Erich Volschenk (Alacran Environmental Science) was consulted. This specimen has been included along with those buthid specimens in his collection, not yet publically available. Molecular analyses conducted by Dr Erich Volschenk indicate this specimen belongs to the species *Lychas adonis.* The species has a widespread distribution across arid parts of Australia from Kalgoorlie to northern Victoria (Dr Erich Volschenck pers. comm., 2019).

Differentiation within and between lineages
Based on genetic distance of the specimens available for comparison, the *Lychas annulatus* clade B shows up to 2.3 % intraspecific sequence divergence (Table 4), with a mean divergence of 1.3 % (Table 5). The two clades (A & B) show up to 7.8 % sequence between them (Table 4). The pattern of differentiation amongst all specimens of *L. annulatus* does not follow an isolation by distance model. Rather, clade A shows no differentiation between specimens over 60 km (PC06 & NN03), whilst specimens less than 2.5 km distance apart (PP11 & PC02) show 7.2 % sequence divergence from one another. These phylogeographic patterns of differentiation suggest two distinct lineages, and these may well represent separate taxa, they will require further investigation for taxonomic resolution.

The closest relative to the phase 2 Winu *Lychas annulatus* clade B specimens (PP07 & PP11) was a specimen from the same clade collected (NN09) that showed 0.3 % sequence divergence (Table 4), followed by another specimen also collected from the Great Sandy Desert (NN04) with 1.0 % sequence divergence (Table 4). The closest relative obtained from GenBank specimen was an *Isometrus* sp. (MF422313.1) that showed 12.6 % sequence divergence (Table 4).

The closest relative to the *Lychas adonis* specimen (PP08), based on the publically available molecular data (GenBank) and those in the Helix database, was the *L. annulatus* specimen also collected from Winu (PP08) with 9.4% sequence divergence (Table 4).

Scorpionida – family Urodacidae
The Urodacidae is an Australian endemic family found across the continent, except on the south-eastern seaboard. It was first described by Koch (1977) and under the current classification includes two genera: *Urodacus* and the recently described troglobitic *Aops* (Volschenk & Prendini, 2008). The genus *Urodacus* is endemic in Australia; currently 22 valid species are recognised, although many more are known (Volschenk *et al*., 2000; Volschenk *et al*., 2010; Volschenk *et al*., 2012; Luna-Ramirez *et al*., 2017)

The single urodacid specimen collected during the second phase of sampling at Winu was not successfully sequenced and therefore taxonomic placement of this specimen could not be ascertained. Sequence failure could be due to degradation of the DNA, primer mis-matches, or contamination by other DNA in the sample.

Conclusions

The mtDNA gene cytochrome oxidase 1 (*COI*) is widely considered to show suitable variation to distinguish species (Hebert *et al*., 2003a), and the use of this gene can be extremely effective for 'DNA barcoding' in taxa where clear differentiation exists between intra and interspecific levels of divergence (e.g. Hebert *et al*., 2004a; 2004b). In a comparison of *COI* sequences for over 13,000 pairs of taxa, Hebert *et al* (2003b) found a mean of 11.1 % sequence divergence between distinct species. Nearly 80 % of these comparisons found that species pairs differed from one another by greater than 8 % sequence divergence. For mygalomorph spiders, the diversity of species in the Pilbara region of Western Australia was assessed to test the genetic relationships between and within species, and assess molecular results against morphotype designations comparing *COI* sequences for more than 1000 sequences from seven families, (Castalanelli *et al*., 2014). The majority (92 %) of the morphotypes that had been previously recognised based on adult male morphology were recovered using sequence data, showing the utility of barcoding in mygalomorph spiders (Castalanelli *et al*., 2014).

Despite its merits in barcoding however, a taxon by taxon approach, examining the amount of phylogenetic variation within and between taxa is the most widely accepted method of delineating species and their distributions, especially in areas where rapidly expanding mining operations outpace taxonomic treatment of unresolved taxa.

In summary, we detected a total of four species from a single family (Nemesiidae) among the six mygalomorph specimens and amongst the three successfully sequenced scorpion specimens we detected two species belonging to the Buthidae family. Two of the nemesiid mygalomorph species have been recorded previously, during phase one sampling, based on the sequences available for comparison, whilst four phase 2 nemesiid specimens appear to belong to two new species, neither of which have been detected previously, based on the molecular data available for comparison. The buthid scorpion species *Lychas annulatus* has been recorded previously, including during phase one sampling. The second buthid scorpion *Lychas adonis*, was not detected during phase one sampling but belongs to a widespread arid species.

References

Australian Faunal Directory. Australian Government, Department of Sustainability, Environment, Water, Population and Communities http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/index.html

Castalanelli MA, Teale RJ, Rix MC, Kennington JW, Harvey MS. 2014. Barcoding of mygalomorph spiders (Araneae : Mygalomorphae) in the Pilbara bioregion of Western Australia reveals a highly diverse biota. *Invertebrate Systematics* **28**: 375-385.

Castalanelli MA, Huey JA, Hillyer MJ, Harvey MS. 2017. Molecular and morphological evidence for a new genus of small trapdoor spiders from arid Western Australia (Araneae: Mygalomorphae: Nemesiidae: Anaminae). *Invertebrate Systematics* **31**: 492-505.

Environmental Protection Authority 2009. Sampling of short range endemic invertebrate fauna for environmental impact assessment in Western Australia. In 'Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986). Vol. No. 20'. pp. 1-31.

Fet V, Gantenbein B, Gromov AV, Lowe G, Lourenço WR. 2003. The first molecular phylogeny of Buthidae (Scorpiones). *Euscorpius*. **4**: 1–10.

Folmer O, Black M, Hoeh W, Lutz R, Vrijenhoek R. 1994. DNA primers for amplification of mitochondrial cytochrome c oxidase subunit I from diverse metazoan invertebrates. *Molecular Marine Biology and Biotechnology* **3**: 294-299.

Gantenbein B, Kropf C, Largiadèr CR, Scholl A. 2000. Molecular and mor- phological evidence for the presence of a new buthid taxon (Scorpiones: Buthidae) on the island of Cyprus. *Revue Suisse Zoologie*. **107**: 213–232.

Gantenbein B, Fet V, Gromov AV. 2003. The First DNA phylogeny of four species of *Mesobuthus* (Scorpiones, Buthidae) from Eurasia. *Journal of Arachnology*. **31**: 412–420.

Gantenbein B, Largiadèr CR. 2003. The phylogeographic importance of the Strait of Gibraltar as a gene flow barrier in terrestrial arthropods: a case study with the scorpion *Buthus occitanus* as model organism. *Molecular Phylogenetics and Evolution* **28**: 119–130.

Harvey MS, Berry O, Edward KL, Humphreys G. 2008. Molecular and morphological systematics of hypogean schizomids (Schizomida: Hubbardiidae) in semiarid Australia. *Invertebrate Systematics* **22**: 167-194.

Harvey MS, Rix MG, Framenau VW, Hamilton ZR, Johnson MS, Teale RJ, Humphreys G, Humphreys WF. 2011. Protecting the innocent: studying short-range endemic taxa enhances conservation outcomes. *Invertebrate Systematics* **25**: 1-10.

Hebert PDN, Cywinska A, Ball SL, deWaard JR. 2003a. Biological identifications through DNA barcodes. *Proceedings of the Royal Society of London B* **270**: 313-321.

Hebert PDN, Ratnasingham S, deWaard JR. 2003b. Barcoding animal life: cytochrome c oxidase subunit 1 divergences among closely related species. *Proceedings of the Royal Society of London B (supplement)* **270**, S96-S99.

Hebert, P.D.N., Penton EH, Burns JM, Janzen DH, Hallwachs W. 2004a. Ten species in one: DNA barcoding reveals cryptic species in the neotropical skipper butterfly *Astraptes fulgerator*. *PNAS* **101**: 14812-14817.

Hebert PDN, Stoeckle MY, Zemiak TS, Francis CM 2004b. Identification of birds through DNA barcodes. *PLoS Biology* **2**: 1657–1663.

Helix 2009a. Report on the molecular systematics of *Aganippe castellum*. Unpublished report for Biota Environmental Sciences.

Helix 2009b. Report on the molecular systematics of wishbone spider *Aname*. Unpublished report for BHP Billiton.

Helix 2010. Report on the molecular systematics of mygalomorph spiders from Forestania. Unpublished report for Biota Environmental Sciences.

Helix 2011a. Report on the molecular systematics of *Galeosoma* from Forestania. Unpublished report for Biota Environmental Sciences.

Helix 2011b. Report on the molecular systematics of Mygalomorphae from Forrestania. Unpublished report for Biota Environmental Sciences.

Helix 2011c. Report on the molecular systematics of Mygalomorphae from Deception. Unpublished report for Biota Environmental Sciences.

Helix 2011d. Report on the molecular systematics of Mygalomorphae from South Parmelia. Unpublished report for Biota Environmental Sciences.

Helix 2011e. Report on the molecular systematics of Mygalomorphae from Jinidi. Unpublished report for Biota Environmental Sciences.

Helix 2011f. Report on the molecular systematics of Mygalomorphae from Southern Flank. Unpublished report for Biota Environmental Sciences.

Helix 2011g. Report on the molecular systematics of Mygalomorphae from Area C to Yandi. Unpublished report for Biota Environmental Sciences.

Helix 2011h. Report on the molecular systematics of Mygalomorphae from Hammersley Irrigation. Unpublished report for Biota Environmental Sciences.

Helix 2011i. Report on the molecular systematics of Mygalomorphae from Mudlark. Unpublished report for Biota Environmental Sciences.

Helix 2011j. Report on the molecular systematics of Mygalomorphae from Marillana. Unpublished report for Biota Environmental Sciences.

Helix 2011k. Report on the molecular systematics of Mygalomorphae from Jinidi to Manline. Unpublished report for Biota Environmental Sciences.

Helix 2011l. Report on the molecular systematics of Mygalomorphae from Eastern Deviation. Unpublished report for Biota Environmental Sciences.

Helix 2012a. Report on the molecular systematics of Mygalomorphae from the Pilbara. Unpublished report for Biota Environmental Sciences, 31 January.

Helix 2012b. Report on the molecular systematics of Mygalomorphae from West Turner Syncline. Unpublished report for Biota Environmental Sciences.

Helix 2012c. Report on the molecular systematics of Mygalomorphae from Koodaideri West Corridor. Unpublished report for Biota Environmental Sciences.

Helix 2012d. Report on the molecular systematics of Mygalomorphae from Koodaideri phase IV and Koodaideri South. Unpublished report for Biota Environmental Sciences.

Helix 2012e. Report on the molecular systematics of Mygalomorphae from Cape Lambert. Unpublished report for Biota Environmental Sciences.

Helix 2012f. Report on the molecular systematics of Mygalomorphae from Marra Mamba. Unpublished report for Biota Environmental Sciences.

Helix 2012g. Report on the molecular systematics of Mygalomorphae from Mt Richardson. Unpublished report for Biota Environmental Sciences.

Helix 2012h. Report on the molecular systematics of Mygalomorphae from West Turner Extension. Unpublished report for Biota Environmental Sciences.

Helix 2012i. Report on the molecular systematics of Mygalomorphae from Southern Flank to Jinidi. Unpublished report for Biota Environmental Sciences.

Helix 2013a. Report on the molecular systematics of Mygalomorphae from Mt Richardson phase I and II. Unpublished report for Biota Environmental Sciences.

Helix 2013b. Report on the molecular systematics of mygalomorphae from Koodaideri rail corridor. Unpublished report for Biota Environmental Sciences.

Helix 2014a. Molecular systematics of mygalomorphae from Kundip. Unpublished report for Biota Environmental Sciences.

Helix 2014b. Molecular systematics of mygalomorphae from Koodaideri northern extension. Unpublished report for Biota Environmental Sciences.

Helix 2014c Molecular Systematics of mygalomorphae from Yandi Billiards. Unpublished report for Biota Environmental Sciences.

Helix 2014d. Molecular systematics of mygalomorphae from Yandi Billiards phase 2. Unpublished report for Biota Environmental Sciences.

Helix 2015a. Report on the molecular systematics of mygalomorphae from Bungaroo Valley. Unpublished report for Biota Environmental Sciences.

Helix 2015b. Report on the molecular systematics of mygalomorphae form Baby Hope Downs. Unpublished report for Biota Environmental Sciences.

Helix 2015c. Molecular systematics of mygalomorphae from Yandi Oxbow. Unpublished report for Biota Environmental Sciences.

Helix 2015d. Molecular systematics of mygalopmorphae from Red Hill. Unpublished report for Biota Environmental Sciences.

Helix 2015e. Molecular systematics of mygalomorphae from the Buckland Hills Level 2 fauna survey. Unpublished report for Biota Environmental Sciences.

Helix 2018. Report on the molecular systematics of the targeted SRE invertebrates from the Asian Hub RE Fauna Survey. Unpublished report for Biota Environmental Sciences.

Helix 2019a. Molecular systematics of the K plus S Salt mygalomorph specimens from Ashburton. Unpublished report for Biota Environmental Sciences.

Helix 2019b. Report on the molecular systematics of the mygalomorph and scorpion specimens from Winu. Unpublished report for Biota Environmental Sciences.

Helix 2019c. Molecular systematics of the molecular systematics of the mygalomorph and scorpion specimens from Winu. . Unpublished report for Biota Environmental Sciences

Kumar S, Stecher G, Tamura K. 2016. MEGA 7: Molecular Evolutionary Genetic Analysis version 7.0 for bigger datasets. *Molecular Biology and Evolution* **33**: 1870-1874.

Luna-Ramirez K, Miller AD, Rašic G. 2017. Genetic and morphological analyses indicate that the Australian endemic scorpion *Urodacus yaschenkoi* (Scorpiones: Urodacidae) is a species complex. *PeerJ* 5:e2759; DOI 10.7717/peerj.2759.

Mirshamsi O, Sari A, Elahi E, Hosseinie S. 2010. Phylogenetic relationships of *Mesobuthus eupeus* (CL Koch, 1839) inferred from COI sequences (Scorpiones: Buthidae). *Journal of Natural History* **44**: 2851–2872.

Nei M. 1987. DNA polymorphism within and between populations. In: *Molecular Evolutionary Genetics*. pp.254-286. Columbia University Press New York, NY.

Rein JO. 2015. Scorpion files. Species List. Buthidae. [Cited 2015 October 7]. Available from: http://www.ntnu.no/ub/scorpion-files/buthidae.php.

Sousa P, Froufe E, Alves PC, Harris DJ. 2010. Genetic diversity within scorpions of the genus *Buthus* from the Iberian Peninsula: mitochondrial DNA sequence data indicate additional distinct cryptic lineages. *Journal of Arachnology*. **38**: 206–211.

Suranse V, Sawant NS, Paripatyadar SV, Krutha K, Paingankar MS, Padhye AD, Bastawade DB, Dahanukar N. 2017. First molecular phylogeny of scorpions of the family Buthidae from India. *Mitochondrial DNA Part A* **28**: 606-611.

Tamura K, Stecher G, Peterson D, Filipski A, Kumar S. 2013. MEGA 6: Molecular Evolutionary Genetic Analysis using Maximum Likelihood, evolutionary distance, and Maximum Parsimony methods. *Molecular Biology and Evolution* **30**: 2725 – 2729.

Thompson J, Higgins D, Gibson T. 1994. CLUSTAL W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice. *Nucleic Acids Research* **22**, 4673–4680. doi:10.1093/nar/ 22.22.4673.

Volschenk ES, Smith GT, Harvey MS. 2000. A new species of *Urodacus* from Western Asutralia, with additional descriptive notes for *Urodacus megamastigus* (Scorpiones). *Records of yhe Western Australian Museum* **20**: 57-67.

Volschenk ES, Burbidge AH, Durrant BJ, Harvey MS. 2010. Spatial distribution of scorpions (Scorpiones) in the arid Pilbara region of Western Asutralia. *Records of the Western Australian Museum* **78**: 271-284.

Volschenk ES, Harvey MS, Prendini L. 2012. A new species of *Urodacus* (Scorpiones: Urodacidae) from Western Australia. *American Museum Novitiates* **3748**:1–18 DOI 10.1206/3748.2.

Volschenk ES, Prendini L. 2008. *Aops oncodactylus*, gen. et sp. nov., the first troglobitic urodacid (Urodacidae: Scorpiones), with a re-assessment of cavernicolous, troglo- bitic and troglomorphic scorpions. *Invertebrate Systematics* **22**: 235–257 DOI 10.1071/IS06054.

Yamashita T, Rhoads DD. 2013. Species delimitation and morphological divergence in the scorpion *Centroides vittatus* (Say, 1821): Insights from phylogeography. *PLoS One* **8**: e68282.

Table 1. . Invertebrate specimens used in the present study (Spiders n=6; Scorpions n=5), and the genetic lineage to which they belong. Coloured shading refers to colour-coding used to highlight species in Figures 1 & 2. Unshaded cells represent samples that failed to sequence.

Biota Sample ID	Helix ID	Order	Family	Genetic Lineage	Taxonomic ID
M20190924.WIN01P-01	**PP01**	Araneae	Nemesiidae	NSA	*Aname* sp. N148
M20190923.WIN02P-01	**PP02**	Araneae	Nemesiidae	NBF	*Aname* sp. N153
M20190923.WIN09P-02	**PP03**	Araneae	Nemesiidae	New species Lineage NSE	*Aname* sp. N152
M20190921.WINSRE12-01	**PP04**	Araneae	Nemesiidae	NSD	*Kwonkan* sp. N151
M20190923.WIN09P-01	**PP05**	Araneae	Nemesiidae	New species Lineage NSE	*Aname* sp. N152
M20190924.WIN09P-01	**PP06**	Araneae	Nemesiidae	New species Lineage NSE	*Aname* sp. N152
S20190919.WIN01P-01	**PP07**	Scorpionida	Buthidae	*Lychas annulatus* clade B	*Lychas annulatus* clade B
S20190919.WIN04P-02	**PP08**	Scorpionida	Buthidae	n/a	n/a
S20190922.WIN10P-01	**PP09**	Scorpionida	Urodacidae	n/a	n/a
S20190919.WIN05P-01	**PP10**	Scorpionida	Buthidae	*Lychas adonis*	*Lychas adonis*
S20190919.WIN04P-01	**PP11**	Scorpionida	Buthidae	*Lychas annulatus* clade B	*Lychas annulatus* clade B

Table 2. Genetic p-distance (below diagonal) and the associated standard error (above diagonal – blue text) between the six mygalomorph individuals, from the family Nemesiidae sequenced from the Winu survey area as shown in Figure 1. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

	PP01	PP02	PP03	PP04	PP05	PP06
PP01		0.013	0.012	0.014	0.012	0.012
PP02	0.142		0.013	0.014	0.013	0.013
PP03	0.111	0.142		0.014	0.001	0.001
PP04	0.164	0.157	0.151		0.014	0.014
PP05	0.113	0.142	0.001	0.152		0.000
PP06	0.113	0.142	0.001	0.152	0.000	

Table 3. Genetic p-distance (below diagonal) and the associated standard error (above diagonal – blue text) between the six Winu mygalomorph specimens, from the family Nemesiidae sequenced from the Winu survey area as shown in Figure 1. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 3 attached separately as a PDF document due to the size and detail.

Table 4. Genetic p-distance (below diagonal) and the associated standard error (above diagonal – blue text) between the three Winu scorpion specimens, from the family Buthidae sequenced from the Winu survey area as shown in Figure 2. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

Table 4 attached separately as a PDF document due to the size and detail.

Table 5. Mean within group genetic distances for the two clades of *Lychas annulatus.*

	Mean genetic distance	s.e.
Clade A	0.017	0.002
Clade B	0.013	0.003

Table 6. Mean between group genetic distance between the two clades of *Lychas annulatus.*

	Mean genetic distance	s.e.
Clade A & Clade B	0.068	0.009

Figure 1 attached separately as a PDF document due to the size and detail.

Figure 1. Maximum likelihood analysis of mygalomorph *COI* mtDNA sequences, showing the placement of the Winu mygalomorphae specimens (sample prefix '**PP**' for phase 2, 'PC' for phase 1) within the current taxonomic framework of the family Nemesiidae. Coloured boxes highlight the species to which the Winu specimen belongs. All sequences within 15 % sequence divergence are represented in the tree. '**N'** numbers on tree refer to family species based on the 9.5 % species threshold tested in Castalanelli *et al*., (2014). 'T' numbers refer to WA Museum registration code. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

Figure 2 attached separately as a PDF document due to the size and detail.

Figure 2. Maximum likelihood analysis of the three scorpion *COI* mtDNA haplotype sequences, showing the placement of the Winu buthids (sample prefix '**PP**' for phase 2, 'PC' for phase 1) within the current taxonomic framework of the family Buthidae. Coloured box highlight the species to which the Winu specimens belong. All sequences within 15 % sequence divergence are represented in the tree. 'T' numbers refer to WA Museum registration code. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site

Appendix 1. Invertebrate reference specimens utilized during analysis in the present study, the source of the data, and the genetic lineage to which they belong.

Appendix 1 attached separately as a PDF document due to the size and detail.

Helix ID	Bank accession Nu	Genus	Species	Voucher	Source	Family
NA_N1_AG1	n/a	NA	N1	n/a	Helix database	Nemesiidae
NAI_N8_AD1	n/a	NAI	N8	n/a	Helix database	Nemesiidae
NAW_N6_AD429	n/a	NAW	N6	n/a	Helix database	Nemesiidae
NAZ_N6_AD457	n/a	NAZ	N6	n/a	Helix database	Nemesiidae
NBC_N6_AD577	n/a	NBC	N6	n/a	Helix database	Nemesiidae
NBE_N46_AD583	n/a	NBE	N46	n/a	Helix database	Nemesiidae
NBF_N11_AD592	n/a	NBF	N11	n/a	Helix database	Nemesiidae
NBR_N14_AD746	n/a	NBR	N14	n/a	Helix database	Nemesiidae
NBT_N7_AD748	n/a	NBT	N7	n/a	Helix database	Nemesiidae
NBU_N15_AD753	n/a	NBU	N15	n/a	Helix database	Nemesiidae
NBW_N50_AD784	n/a	NBW	N50	n/a	Helix database	Nemesiidae
NBY_N13_AF26b	n/a	NBY	N13	n/a	Helix database	Nemesiidae
NCU_N110_O211	n/a	NCU	N110	n/a	Helix database	Nemesiidae
NCW_N66_O280	n/a	NCW	N66	n/a	Helix database	Nemesiidae
NCY_N67_O282	n/a	NCY	N67	n/a	Helix database	Nemesiidae
NCZ_N110_O285	n/a	NCZ	N110	n/a	Helix database	Nemesiidae
NDC_N84_O288	n/a	NDC	N84	n/a	Helix database	Nemesiidae
NDD_N101_O292	n/a	NDD	N101	n/a	Helix database	Nemesiidae
NDG_N78_O304	n/a	NDG	N78	n/a	Helix database	Nemesiidae
NDK_N94_O333	n/a	NDK	N94	n/a	Helix database	Nemesiidae
NDL_N96_O334	n/a	NDL	N96	n/a	Helix database	Nemesiidae
NEH_N112_BI22	n/a	NEH	N112	n/a	Helix database	Nemesiidae
NEM_N43_DW15	n/a	NEM	N43	n/a	Helix database	Nemesiidae
NEM_N43_AT53	n/a	NEM	N43	n/a	Helix database	Nemesiidae
NEN_N115_AD594	n/a	NEN	N115	n/a	Helix database	Nemesiidae
NFN_N43_CG5	n/a	NFN	N43	n/a	Helix database	Nemesiidae
NFZ_N122_BV095	n/a	NFZ	N122	n/a	Helix database	Nemesiidae
NGE_N130_CW14	n/a	NGE	N130	n/a	Helix database	Nemesiidae

Helix ID	Bank accession Nu	Genus	Species	Voucher	Source	Family
NGS_N136_DG10	n/a	NGS	N136	n/a	Helix database	Nemesiidae
NGQ_N134_DG3	n/a	NGQ	N134	n/a	Helix database	Nemesiidae
NRC_N150_PC15	n/a	NRC	N150	n/a	Helix database	Nemesiidae
NRF_N7_NN11	n/a	NRF	N7	n/a	Helix database	Nemesiidae
NRG_N7_NN15	n/a	NRG	N7	n/a	Helix database	Nemesiidae
NRH_N7_NN16	n/a	NRH	N7	n/a	Helix database	Nemesiidae
NRI_N7_NN17	n/a	NRI	N7	n/a	Helix database	Nemesiidae
NRJ_N7_NN18	n/a	NRJ	N7	n/a	Helix database	Nemesiidae
NRK_N7_NN20	n/a	NRK	N7	n/a	Helix database	Nemesiidae
NRL_N7_NN21	n/a	NRL	N7	n/a	Helix database	Nemesiidae
NRM_N7_NN37	n/a	NRM	N7	n/a	Helix database	Nemesiidae
NRO_N7_NN38	n/a	NRO	N7	n/a	Helix database	Nemesiidae
NRP_N138_NN35	n/a	NRP	N138	n/a	Helix database	Nemesiidae
NRQ_N138_NN36	n/a	NRQ	N138	n/a	Helix database	Nemesiidae
NRZ_N147_PC18	n/a	NRZ	N147	n/a	Helix database	Nemesiidae
NSA_N148_PC16	n/a	NSA	N148	n/a	Helix database	Nemesiidae
NSB_N149_PC26	n/a	NSB	N149	n/a	Helix database	Nemesiidae
NSD_N151_PC13	n/a	NSD	N151	n/a	Helix database	Nemesiidae
NY_N37_AR64	n/a	NY	N37	n/a	Helix database	Nemesiidae
T101209	n/a	*Kwonkan*	MYG175	T101209	Helix database	Nemesiidae
T108978	n/a	*Aname*	MYG214	T108978	Helix database	Nemesiidae
T112084	n/a	*Synothele*	MYG127	T112084	Helix database	Nemesiidae
T112949	n/a	*Aname*	MYG227	T112949	Helix database	Nemesiidae
T96570	n/a	*Aname*	MYG067	T96570	Helix database	Nemesiidae
T98767	n/a	*Aname*	MYG102	T98767	Helix database	Nemesiidae
T98900	n/a	*Aname*	MYG034	T98900	Helix database	Nemesiidae
n/a	JQ772139	*Aname*	sp	T98892	GenBank	Nemesiidae
n/a	KJ744505	*Aname*	*mellosa*	T103199	GenBank	Nemesiidae

Helix ID	Bank accession Nu	Genus	Species	Voucher	Source	Family
n/a	KJ744623	*Aname*	*mellosa*	T105871	GenBank	Nemesiidae
n/a	KJ744648	*Aname*	sp	T107087	GenBank	Nemesiidae
n/a	KJ744649	*Aname*	sp	T107089	GenBank	Nemesiidae
n/a	KJ744677	*Aname*	*mellosa*	T107987	GenBank	Nemesiidae
n/a	KJ744775	*Aname*	*mellosa*	T113629	GenBank	Nemesiidae
n/a	KJ744785	*Aname*	*mellosa*	T113642	GenBank	Nemesiidae
n/a	KJ744788	*Aname*	*mellosa*	T113648	GenBank	Nemesiidae
n/a	KJ744791	*Aname*	*mellosa*	T113654	GenBank	Nemesiidae
n/a	KJ744833	*Kwonkan*	sp	T114812	GenBank	Nemesiidae
n/a	KJ744901	*Aname*	sp	T118789	GenBank	Nemesiidae
n/a	KJ744902	*Aname*	sp	T118791	GenBank	Nemesiidae
n/a	KJ744909	*Aname*	sp	T118805	GenBank	Nemesiidae
n/a	KJ744910	*Aname*	sp	T118811	GenBank	Nemesiidae
n/a	KJ744911	*Aname*	sp	T118812	GenBank	Nemesiidae
n/a	KJ744914	*Aname*	sp	T118818	GenBank	Nemesiidae
n/a	KJ744982	*Aname*	mellosa	T122207	GenBank	Nemesiidae
n/a	KJ744987	*Aname*	mellosa	T122215	GenBank	Nemesiidae
n/a	KJ744989	*Aname*	mellosa	T122218	GenBank	Nemesiidae
n/a	KJ744990	*Aname*	mellosa	T122219	GenBank	Nemesiidae
n/a	KJ744992	*Aname*	mellosa	T122222	GenBank	Nemesiidae
n/a	KJ745155	*Aname*	mellosa	T126273	GenBank	Nemesiidae
n/a	KJ745231	*Aname*	sp	T74238	GenBank	Nemesiidae
n/a	KJ745232	*Aname*	sp	T74241	GenBank	Nemesiidae
n/a	KJ745233	*Aname*	sp	T74247	GenBank	Nemesiidae
n/a	KJ745281	*Kwonkan*	sp	T78543	GenBank	Nemesiidae
n/a	KJ745287	*Aname*	sp	T82303	GenBank	Nemesiidae
n/a	KJ745288	*Aname*	sp	T82304	GenBank	Nemesiidae
n/a	KJ745293	*Aname*	sp	T82309	GenBank	Nemesiidae

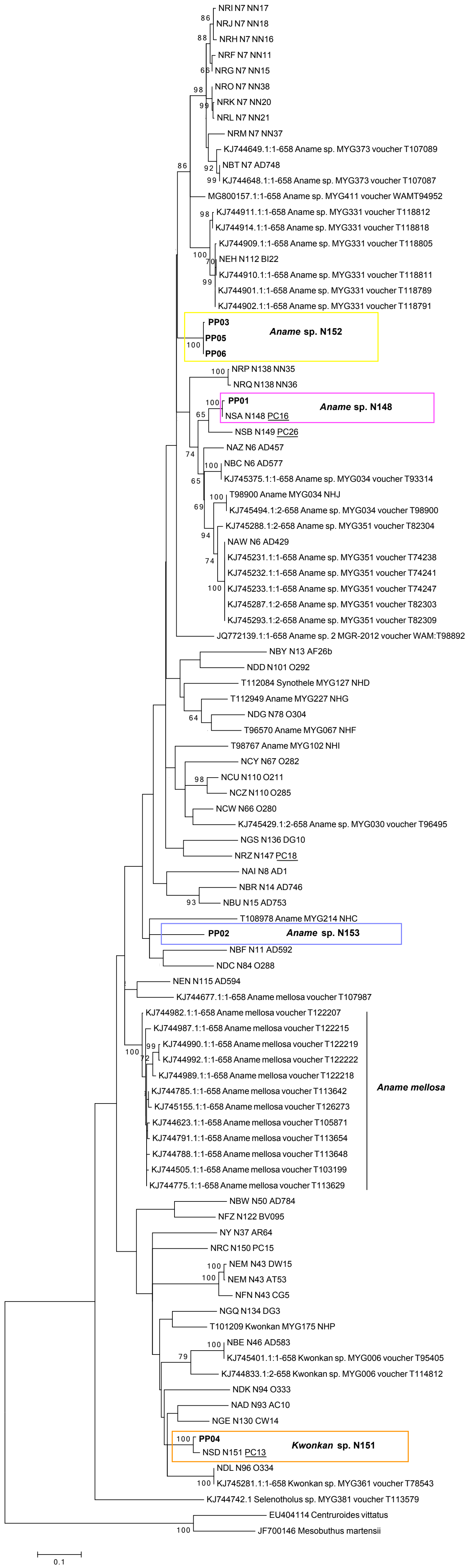
Helix ID	3ank accession Nui	Genus	Species	Voucher	Source	Family
n/a	KJ745375	*Aname*	sp	T93314	GenBank	Nemesiidae
n/a	KJ745401	*Kwonkan*	sp	T95405	GenBank	Nemesiidae
n/a	KJ745429	*Aname*	sp	T96495	GenBank	Nemesiidae
n/a	KJ745494	*Aname*	sp	T98900	GenBank	Nemesiidae
n/a	MG800157	*Aname*	sp	T94952	GenBank	Nemesiidae
n/a	EU404114	*Centruroides*	*vittatus*	n/a	GenBank	Buthidae
n/a	JF700146	*Mesobuthus*	*martensii*	n/a	GenBank	Buthidae
n/a	KJ7447421	*Selenotholus*	sp	T113579	GenBank	Theraphosidae
PC01	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
PC02	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
PC03	n/a	*Urodacus*	*varians*	n/a	Helix database	Urodacidae
PC04	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
PC05	n/a	*Urodacus*	sp. Telfer	n/a	Helix database	Urodacidae
PC06	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
PC07	n/a	*Urodacus*	*yaschenkoki*	n/a	Helix database	Urodacidae
PC08	n/a	*Urodacus*	*yaschenkoki*	n/a	Helix database	Urodacidae
NN01	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN03	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN04	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN05	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN06	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN07	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN08	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN09	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
NN10	n/a	*Lychas*	*annulatus*	n/a	Helix database	Buthidae
EF122605.2	n/a	*Centruroides*	*vittatus*		GenBank	Buthidae
KY295225.1	n/a	*Urodacus*	*planimanus*	WAM T129654	GenBank	Urodacidae
KT446990.	n/a	*Brachistosternus*	*paposo*		GenBank	Bothriruridae

Helix ID	Bank accession Nu	Genus	Species	Voucher	Source	Family
KT447018.1	n/a	*Brachistosternus*	*roigalsinai*		GenBank	Bothriruridae
KT446957.1	n/a	*Brachistosternus*	*ehrenbergii*		GenBank	Bothriruridae
KM514656.1	n/a	*Diplocentrus*	*rectimanus*	AMCC LP2032	GenBank	Diplocentridae
KM514633.1	n/a	*Didymocentrus*	*krausi*	AMCC LP1987	GenBank	Diplocentridae
KM514635.1	n/a	*Kolotl*	*magnus*	AMCC LP7029	GenBank	Diplocentridae
KX517230.1	n/a	*Brachistosternus*	*paposo*		GenBank	Bothriruridae
KX517229.1	n/a	*Brachistosternus*	*paposo*		GenBank	Bothriruridae
KT446947.1	n/a	*Brachistosternus*	*chilensis*		GenBank	Bothriruridae
KT446928.1	n/a	*Brachistosternus*	*aconcagua*		GenBank	Bothriruridae
KM514636.1	n/a	*Kolotl*	*poncei*	AMCC LP7030	GenBank	Diplocentridae
AY156581.1	n/a	*Pandinus*	*dictator*		GenBank	Scorpionidae
KM514642.1	n/a	*Diplocentrus*	*cozumel*	AMCC LP4102	GenBank	Diplocentridae
KT447015.1	n/a	*Brachistosternus*	*roigalsinai*		GenBank	Bothriruridae
KT446955.1	n/a	*Brachistosternus*	*ehrenbergii*		GenBank	Bothriruridae
KT446946.1	n/a	*Brachistosternus*	*chango*		GenBank	Bothriruridae
KM274783.1	n/a	*Konetontli*	*chamelaensis*	LP7675	GenBank	Vaejovidae
KU755656.1	n/a	*Brachistosternus*	sp.	AMCC LP8355	GenBank	Bothriruridae
JQ514251.1	n/a	*Pandinus*	*imperator*	Sc1050	GenBank	Scorpionidae
KM514641.1	n/a	*Diplocentrus*	*coylei*	AMCC LP7031	GenBank	Diplocentridae
KX517244.1	n/a	*Brachistosternus*	*paposo*		GenBank	Bothriruridae
KU755642.1	n/a	*Brachistosternus*	*turpuq*	AMCC LP8346	GenBank	Bothriruridae
KT447016.1	n/a	*Brachistosternus*	*roigalsinai*		GenBank	Bothriruridae
KT446986.1	n/a	*Brachistosternus*	*negrei*		GenBank	Bothriruridae
KT446952.1	n/a	*Brachistosternus*	*ehrenbergii*		GenBank	Bothriruridae
JX909544.1	n/a	*Paruroctonus*	*boreus*	SKY42/AMNH	GenBank	Vaejovidae
KT446960.1	n/a	*Brachistosternus*	*ferrugineus*		GenBank	Bothriruridae
KM514634.1	n/a	*Didymocentrus*	*lesueurii*	AMCC LP3638	GenBank	Diplocentridae
KF548118.1	n/a	*Opisthacanthus*	*asper*	Sc1087	GenBank	Homuridae

Helix ID	Bank accession Nu	Genus	Species	Voucher	Source	Family
KT447025.1	n/a	*Brachistosternus*	*titicaca*		GenBank	Bothriruridae
KT447014.1	n/a	*Brachistosternus*	*roigalsinai*		GenBank	Bothriruridae
KT188365.1	n/a	*Scorpio*	*palmatus*		GenBank	Scorpionidae
JQ514255.1	n/a	*Chactas*	sp.	voucher	GenBank	Chactidae
JQ514248.	n/a	*Opistophthalmus*	*boehmi*	Sc1137	GenBank	Homuridae
KM274845.1	n/a	*Paravaejovis*	*spinigerus*	LP6317	GenBank	Vaejovidae
KM274724.1	n/a	*Smeringurus*	*grandis*	LP8690	GenBank	Vaejovidae
KT188368.1	n/a	*Scorpio*	*palmatus*	12286D	GenBank	Scorpionidae
EF122607.2	n/a	*Centruroides*	*vittatus*		GenBank	Buthidae
EF122608.2	n/a	*Centruroides*	*vittatus*		GenBank	Buthidae
EF122612.2	n/a	*Centruroides*	*vittatus*		GenBank	Buthidae
EU381064.1	n/a	*Centruroides*	*vittatus*		GenBank	Buthidae
EU404114.1	n/a	*Centruroides*	*vittatus*		GenBank	Buthidae
HM567381.1	n/a	*Mesobuthus*	*eupeus*		GenBank	Buthidae
JF700146.1	n/a	*Mesobuthus*	*martensii*	AS27MT03	GenBank	Buthidae
JN018153.1	n/a	*Lychas*	*mucronatus*		GenBank	Buthidae
JN018154.1	n/a	*Parabuthus*	*laevifrons*		GenBank	Buthidae
JN018210.1	n/a	*Lychas*	*mucronatus*		GenBank	Buthidae
JN018211.1	n/a	*Lychas*	*mucronatus*		GenBank	Buthidae
KF997876.1	n/a	*Mesobuthus*	*gibbosus*		GenBank	Buthidae
KT716037.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
KX648425.1	n/a	*Hottentotta*	*minax*		GenBank	Buthidae
KX648429.1	n/a	*Compsobuthus*	*werneri*		GenBank	Buthidae
KY982184.1	n/a	*Centruroides*	*schmidti*		GenBank	Buthidae
KY982185.1	n/a	*Centruroides*	*vittatus*		GenBank	Buthidae
KY982187.1	n/a	*Heteroctenus*	*abudi*		GenBank	Buthidae
KY982188.1	n/a	*Heteroctenus*	*abudi*		GenBank	Buthidae
KY982192.1	n/a	*Heteroctenus*	*junceus*		GenBank	Buthidae

Helix ID	Bank accession Nu	Genus	Species	Voucher	Source	Family
KY982193.1	n/a	*Heteroctenus*	*junceus*		GenBank	Buthidae
KY982194.1	n/a	*Heteroctenus*	*junceus*		GenBank	Buthidae
KY982199.1	n/a	*Heteroctenus*	*junceus*		GenBank	Buthidae
KY982273.1	n/a	*Zabius*	*fuscus*		GenBank	Buthidae
MF422313.1	n/a	*Isometrus*	sp.		GenBank	Buthidae
MF422319.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
MF422320.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
MF422321.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
MF422322.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
MF422326.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
MF422327.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
MF422328.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
MF422329.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
MF422330.1	n/a	*Lychas*	*tricarinatus*		GenBank	Buthidae
MK479161.1	n/a	*Centruroides*	*arctimanus*		GenBank	Buthidae
MK479165.1	n/a	*Centruroides*	*barbudensis*		GenBank	Buthidae
MK479171.1	n/a	*Centruroides*	*exilimanus*		GenBank	Buthidae
MK479180.1	n/a	*Centruroides*	*insulanus*		GenBank	Buthidae
MK479188.1	n/a	*Centruroides*	*morenoi*		GenBank	Buthidae
MK479196.1	n/a	*Centruroides*	*platnicki*		GenBank	Buthidae
MK479202.1	n/a	*Centruroides*	*simplex*		GenBank	Buthidae
MK479204.1	n/a	*Centruroides*	*taino*		GenBank	Buthidae
MK479207.1	n/a	*Centruroides*	*testaceus*		GenBank	Buthidae
MK479210.1	n/a	*Centruroides*	*vittatus*		GenBank	Buthidae
NC3722.1	n/a	*Centruroides*	*vittatus*		GenBank	Buthidae
JN018156.1	n/a	*Belisarius*	*xambeui*	MNHN JAD29	GenBank	Troglotayosicidae
JN018163.1	n/a	*Chaerilus*	*julietteae*	MNHN JAB32	GenBank	Chaerilidae
HM418309.1	n/a	*Iurus*	*kinzelbachi*	VF 0846 1	GenBank	Luridae

Helix ID	Bank accession Nu	Genus	Species	Voucher	Source	Family
KF548118.1	n/a	*Opisthacanthus*	*asper*	Sc1087	GenBank	Homuridae



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KJ744902.1:1-658 Aname sp. MYG331 voucher T118791
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PP05
PP06
Aname sp. N152
NRP N138 NN35
NRQ N138 NN36
PP01
NSA N148 PC16
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NSB N149 PC26
NAZ N6 AD457
NBC N6 AD577
KJ745375.1:1-658 Aname sp. MYG034 voucher T93314
T98900 Aname MYG034 NHJ
KJ745494.1:2-658 Aname sp. MYG034 voucher T98900
KJ745288.1:2-658 Aname sp. MYG351 voucher T82304
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JQ772139.1:1-658 Aname sp. 2 MGR-2012 voucher WAM:T98892
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NDD N101 O292
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NCW N66 O280
KJ745429.1:2-658 Aname sp. MYG030 voucher T96495
NGS N136 DG10
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T108978 Aname MYG214 NHC
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Aname sp. N153
NBF N11 AD592
NDC N84 O288
NEN N115 AD594
KJ744677.1:1-658 Aname mellosa voucher T107987
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KJ745401.1:1-658 Kwonkan sp. MYG006 voucher T95405
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Kwonkan sp. N151
NDL N96 O334
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EU404114 Centruroides vittatus
JF700146 Mesobuthus martensii
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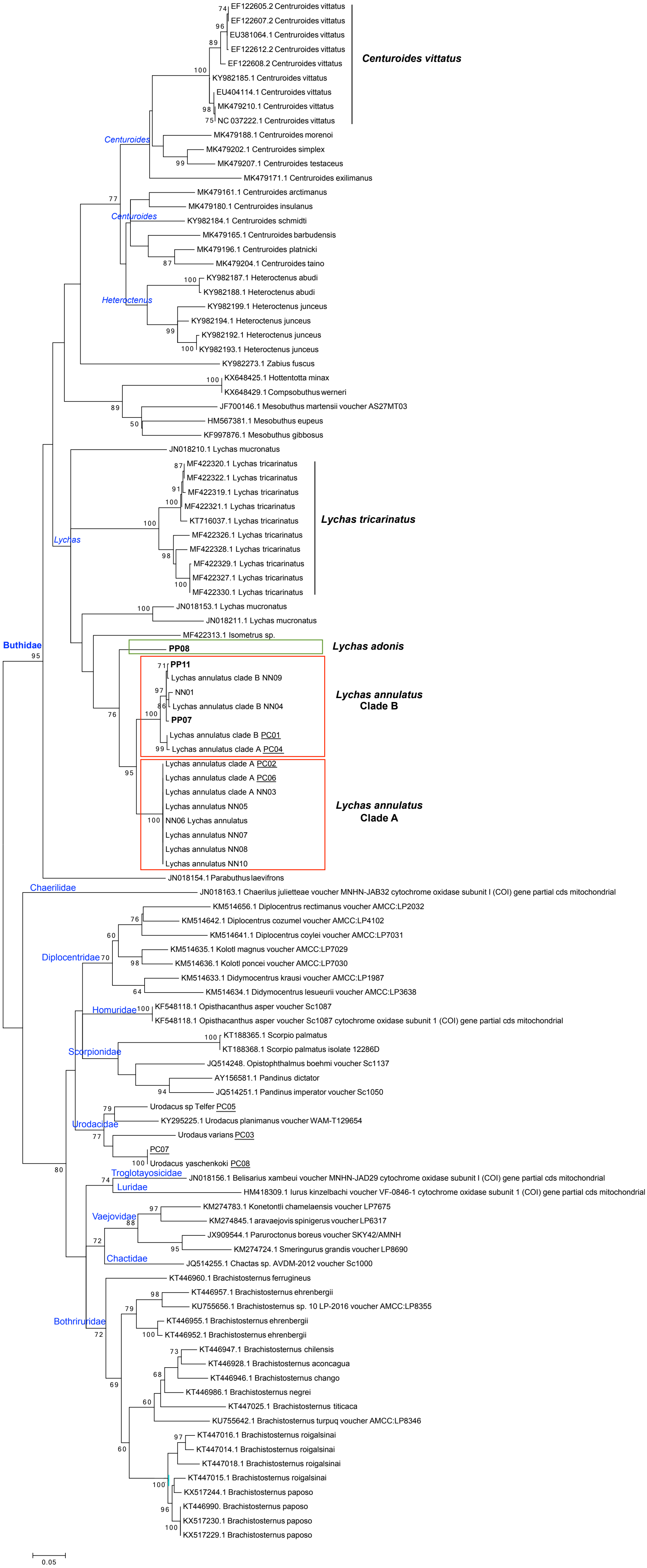
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MK479180.1 Centruroides insulanus
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MK479196.1 Centruroides platnicki
MK479204.1 Centruroides taino
KY982187.1 Heteroctenus abudi
KY982188.1 Heteroctenus abudi
Heteroctenus
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KX648425.1 Hottentotta minax
KX648429.1 Compsobuthus werneri
JF700146.1 Mesobuthus martensii voucher AS27MT03
HM567381.1 Mesobuthus eupeus
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Lychas
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JN018153.1 Lychas mucronatus
JN018211.1 Lychas mucronatus
MF422313.1 Isometrus sp.
Buthidae
PP08
Lychas adonis
PP11
Lychas annulatus clade B NN09
NN01
Lychas annulatus clade B NN04
PP07
Lychas annulatus Clade B
Lychas annulatus clade B PC01
Lychas annulatus clade A PC04
Lychas annulatus clade A PC02
Lychas annulatus clade A PC06
Lychas annulatus clade A NN03
Lychas annulatus NN05
NN06 Lychas annulatus
Lychas annulatus NN07
Lychas annulatus NN08
Lychas annulatus NN10
Lychas annulatus Clade A
JN018154.1 Parabuthus laevifrons
Chaerilidae
JN018163.1 Chaerilus julietteae voucher MNHN-JAB32 cytochrome oxidase subunit I (COI) gene partial cds mitochondrial
KM514656.1 Diplocentrus rectimanus voucher AMCC:LP2032
KM514642.1 Diplocentrus cozumel voucher AMCC:LP4102
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Diplocentridae
KM514635.1 Kolotl magnus voucher AMCC:LP7029
KM514636.1 Kolotl poncei voucher AMCC:LP7030
KM514633.1 Didymocentrus krausi voucher AMCC:LP1987
KM514634.1 Didymocentrus lesueurii voucher AMCC:LP3638
Homuridae
KF548118.1 Opisthacanthus asper voucher Sc1087
KF548118.1 Opisthacanthus asper voucher Sc1087 cytochrome oxidase subunit 1 (COI) gene partial cds mitochondrial
KT188365.1 Scorpio palmatus
Scorpionidae
KT188368.1 Scorpio palmatus isolate 12286D
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AY156581.1 Pandinus dictator
JQ514251.1 Pandinus imperator voucher Sc1050
Urodacus sp Telfer PC05
Urodacidae
KY295225.1 Urodacus planimanus voucher WAM-T129654
Urodaus varians PC03
PC07
Urodacus yaschenkoki PC08
Troglotayosicidae
JN018156.1 Belisarius xambeui voucher MNHN-JAD29 cytochrome oxidase subunit I (COI) gene partial cds mitochondrial
Luridae
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KM274783.1 Konetontli chamelaensis voucher LP7675
Vaejovidae
KM274845.1 aravaejovis spinigerus voucher LP6317
JX909544.1 Paruroctonus boreus voucher SKY42/AMNH
KM274724.1 Smeringurus grandis voucher LP8690
Chactidae
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Bothriuridae
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KT446947.1 Brachistosternus chilensis
KT446928.1 Brachistosternus aconcagua
KT446946.1 Brachistosternus chango
KT446986.1 Brachistosternus negrei
KT447025.1 Brachistosternus titicaca
KU755642.1 Brachistosternus turpuq voucher AMCC:LP8346
KT447016.1 Brachistosternus roigalsinai
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2	**PP02**	0.167		0.019	0.019	0.019	0.019	0.020	0.020	0.019	0.019	0.020
3	**PP03**	0.101	0.156		0.019	0.003	0.003	0.020	0.020	0.017	0.016	0.018
4	**PP04**	0.178	0.162	0.148		0.019	0.019	0.018	0.021	0.020	0.020	0.021
5	**PP05**	0.104	0.156	0.003	0.151		0.000	0.021	0.020	0.017	0.016	0.017
6	**PP06**	0.104	0.156	0.003	0.151	0.000		0.021	0.020	0.017	0.016	0.017
7	NAD_N93_AC10	0.208	0.178	0.189	0.132	0.192	0.192		0.022	0.021	0.021	0.021
8	NAI_N8_AD1	0.203	0.186	0.170	0.192	0.173	0.173	0.216		0.021	0.021	0.021
9	NAW_N6_AD429	0.090	0.148	0.126	0.181	0.123	0.123	0.203	0.200		0.014	0.013
10	NAZ_N6_AD457	0.096	0.164	0.110	0.167	0.107	0.107	0.203	0.205	0.082		0.014
11	NBC_N6_AD577	0.101	0.173	0.129	0.195	0.126	0.126	0.211	0.208	0.063	0.077	
12	NBE_N46_AD583	0.189	0.192	0.178	0.140	0.181	0.181	0.153	0.192	0.195	0.200	0.192
13	NBF_N11_AD592	0.184	0.162	0.164	0.173	0.167	0.167	0.205	0.159	0.178	0.167	0.184
14	NBR_N14_AD746	0.164	0.173	0.181	0.186	0.184	0.184	0.205	0.189	0.173	0.175	0.178
15	NBT_N7_AD748	0.107	0.164	0.115	0.173	0.112	0.112	0.216	0.173	0.107	0.112	0.123
16	NBU_N15_AD753	0.164	0.178	0.153	0.167	0.156	0.156	0.208	0.178	0.170	0.142	0.156
17	NBW_N50_AD784	0.170	0.178	0.167	0.159	0.170	0.170	0.197	0.211	0.181	0.178	0.178
18	NBY_N13_AF26b	0.181	0.203	0.167	0.225	0.164	0.164	0.230	0.200	0.200	0.189	0.195
19	NCU_N110_O211	0.181	0.167	0.126	0.159	0.129	0.129	0.203	0.186	0.164	0.145	0.164
20	NCW_N66_O280	0.148	0.153	0.137	0.167	0.140	0.140	0.192	0.159	0.142	0.151	0.153
21	NCY_N67_O282	0.162	0.164	0.148	0.205	0.145	0.145	0.230	0.186	0.137	0.167	0.153
22	NCZ_N110_O285	0.184	0.159	0.140	0.170	0.137	0.137	0.186	0.181	0.145	0.137	0.153
23	NDC_N84_O288	0.197	0.153	0.192	0.189	0.189	0.189	0.225	0.208	0.189	0.181	0.200
24	NDD_N101_O292	0.159	0.164	0.167	0.181	0.164	0.164	0.197	0.184	0.151	0.159	0.156
25	NDG_N78_O304	0.164	0.195	0.142	0.186	0.140	0.140	0.233	0.208	0.145	0.140	0.151
26	NDK_N94_O333	0.189	0.175	0.184	0.123	0.186	0.186	0.164	0.197	0.178	0.173	0.195
27	NDL_N96_O334	0.195	0.181	0.192	0.121	0.195	0.195	0.159	0.208	0.178	0.189	0.181
28	NEH_N112_BI22	0.118	0.153	0.104	0.173	0.101	0.101	0.219	0.173	0.126	0.123	0.126
29	NEM_N43_DW15	0.203	0.181	0.181	0.134	0.178	0.178	0.167	0.219	0.189	0.186	0.203
30	NEM_N43_AT53	0.200	0.184	0.178	0.132	0.175	0.175	0.170	0.216	0.186	0.189	0.200
31	NEN_N115_AD594	0.184	0.178	0.173	0.184	0.170	0.170	0.211	0.173	0.184	0.173	0.167
32	NFN_N43_CG5	0.192	0.200	0.181	0.134	0.184	0.184	0.151	0.216	0.200	0.200	0.208
33	NFZ_N122_BV095	0.197	0.184	0.197	0.159	0.200	0.200	0.153	0.203	0.189	0.186	0.189
34	NGE_N130_CW14	0.189	0.175	0.175	0.118	0.178	0.178	0.134	0.211	0.159	0.170	0.159
35	NGQ_N134_DG3	0.178	0.164	0.162	0.134	0.164	0.164	0.164	0.211	0.186	0.162	0.167
36	NGS_N136_DG10	0.148	0.167	0.151	0.184	0.148	0.148	0.219	0.184	0.159	0.145	0.156

		1	2	3	4	5	6	7	8	9	10	11
37	NRC_N150_PC15	0.162	0.170	0.167	0.129	0.170	0.170	0.175	0.186	0.167	0.164	0.170
38	NRF_N7_NN11	0.115	0.162	0.110	0.170	0.107	0.107	0.214	0.181	0.110	0.115	0.118
39	NRG_N7_NN15	0.118	0.156	0.110	0.170	0.107	0.107	0.214	0.186	0.101	0.118	0.121
40	NRH_N7_NN16	0.129	0.162	0.123	0.178	0.121	0.121	0.214	0.195	0.104	0.129	0.129
41	NRI_N7_NN17	0.123	0.159	0.121	0.175	0.118	0.118	0.216	0.189	0.104	0.126	0.129
42	NRJ_N7_NN18	0.126	0.159	0.121	0.173	0.118	0.118	0.216	0.192	0.101	0.126	0.126
43	NRK_N7_NN20	0.110	0.164	0.118	0.181	0.115	0.115	0.219	0.184	0.096	0.126	0.115
44	NRL_N7_NN21	0.115	0.159	0.112	0.175	0.110	0.110	0.214	0.181	0.096	0.126	0.115
45	NRM_N7_NN37	0.129	0.184	0.132	0.195	0.129	0.129	0.227	0.197	0.118	0.142	0.140
46	NRO_N7_NN38	0.110	0.159	0.112	0.178	0.110	0.110	0.216	0.181	0.096	0.126	0.115
47	NRP_N138_NN35	0.112	0.142	0.112	0.181	0.115	0.115	0.192	0.175	0.112	0.126	0.121
48	NRQ_N138_NN36	0.112	0.145	0.112	0.181	0.115	0.115	0.195	0.178	0.115	0.132	0.126
49	NRZ_N147_PC18	0.167	0.148	0.140	0.148	0.142	0.142	0.189	0.184	0.151	0.145	0.170
50	NSA_N148_PC16	0.005	0.164	0.104	0.181	0.107	0.107	0.211	0.205	0.088	0.093	0.099
51	NSB_N149_PC26	0.088	0.159	0.104	0.175	0.107	0.107	0.197	0.200	0.110	0.099	0.110
52	NSD_N151_PC13	0.181	0.162	0.142	0.022	0.145	0.145	0.140	0.195	0.175	0.159	0.192
53	NY_N37_AR64	0.186	0.173	0.175	0.148	0.173	0.173	0.148	0.184	0.175	0.178	0.189
54	T101209 *Kwonkan* MYG175 NHP	0.175	0.189	0.189	0.134	0.192	0.192	0.145	0.208	0.181	0.167	0.173
55	T108978 *Aname* MYG214 NHC	0.167	0.159	0.153	0.164	0.153	0.153	0.192	0.192	0.148	0.159	0.162
56	T112084 *Synothele* MYG127 NHD	0.145	0.178	0.140	0.189	0.142	0.142	0.208	0.178	0.153	0.153	0.151
57	T112949 *Aname* MYG227 NHG	0.140	0.186	0.129	0.173	0.132	0.132	0.205	0.184	0.156	0.156	0.156
58	T96570 *Aname* MYG067 NHF	0.162	0.186	0.164	0.197	0.162	0.162	0.225	0.195	0.159	0.156	0.159
59	T98767 *Aname* MYG102 NHI	0.167	0.167	0.142	0.181	0.145	0.145	0.195	0.167	0.167	0.175	0.173
60	T98900 *Aname* MYG034 NHJ	0.090	0.167	0.129	0.186	0.126	0.126	0.208	0.200	0.055	0.093	0.079
61	JQ772139 *Aname* sp 2 MGR-2012 voucher WAMT98892	0.132	0.164	0.126	0.184	0.123	0.123	0.211	0.195	0.126	0.118	0.118
62	KJ744505 *Aname mellosa* voucher T103199	0.167	0.148	0.142	0.129	0.145	0.145	0.181	0.186	0.175	0.151	0.167
63	KJ744623 *Aname mellosa* voucher T105871	0.167	0.142	0.137	0.126	0.140	0.140	0.181	0.189	0.175	0.148	0.162
64	KJ744648 *Aname* sp MYG373 voucher T107087	0.107	0.164	0.115	0.173	0.112	0.112	0.216	0.173	0.107	0.112	0.123
65	KJ744649 *Aname* sp MYG373 voucher T107089	0.110	0.173	0.118	0.181	0.115	0.115	0.216	0.184	0.118	0.129	0.137
66	KJ744677 *Aname mellosa* voucher T107987	0.173	0.148	0.175	0.173	0.178	0.178	0.200	0.178	0.162	0.164	0.162
67	KJ744775 *Aname mellosa* voucher T113629	0.170	0.145	0.142	0.129	0.145	0.145	0.181	0.186	0.178	0.153	0.167
68	KJ744785 *Aname mellosa* voucher T113642	0.167	0.145	0.140	0.129	0.142	0.142	0.181	0.189	0.175	0.151	0.164
69	KJ744788 *Aname mellosa* voucher T113648	0.173	0.145	0.148	0.129	0.151	0.151	0.178	0.189	0.175	0.148	0.162
70	KJ744791 *Aname mellosa* voucher T113654	0.167	0.145	0.137	0.132	0.140	0.140	0.184	0.186	0.175	0.151	0.162
71	KJ744833 *Kwonkan* sp MYG006 voucher T114812	0.184	0.170	0.184	0.137	0.186	0.186	0.140	0.200	0.167	0.175	0.175
72	KJ744901 *Aname* sp MYG331 voucher T118789	0.115	0.151	0.101	0.170	0.099	0.099	0.216	0.170	0.123	0.121	0.123

		1	2	3	4	5	6	7	8	9	10	11
73	KJ744902 *Aname* sp MYG331 voucher T118791	0.115	0.151	0.101	0.170	0.099	0.099	0.216	0.170	0.123	0.121	0.123
74	KJ744909 *Aname* sp MYG331 voucher T118805	0.112	0.153	0.104	0.173	0.101	0.101	0.219	0.170	0.121	0.118	0.121
75	KJ744910 *Aname* sp MYG331 voucher T118811	0.118	0.153	0.104	0.173	0.101	0.101	0.219	0.173	0.126	0.123	0.126
76	KJ744911 Aname sp MYG331 voucher T118812	0.115	0.148	0.096	0.170	0.093	0.093	0.203	0.167	0.121	0.118	0.115
77	KJ744914 *Aname* sp MYG331 voucher T118818	0.115	0.151	0.096	0.173	0.093	0.093	0.205	0.164	0.118	0.121	0.118
78	KJ744982 *Aname mellosa* voucher T122207	0.170	0.134	0.134	0.118	0.137	0.137	0.170	0.175	0.170	0.151	0.170
79	KJ744987 *Aname mellosa* voucher T122215	0.173	0.151	0.148	0.132	0.151	0.151	0.181	0.192	0.178	0.156	0.167
80	KJ744989 *Aname mellosa* voucher T122218	0.184	0.159	0.148	0.134	0.151	0.151	0.195	0.200	0.186	0.153	0.167
81	KJ744990 *Aname mellosa* voucher T122219	0.186	0.162	0.151	0.134	0.153	0.153	0.192	0.203	0.189	0.156	0.178
82	KJ744992 *Aname mellosa* voucher T122222	0.189	0.162	0.153	0.140	0.156	0.156	0.197	0.205	0.192	0.159	0.181
83	KJ745155 *Aname mellosa* voucher T126273	0.167	0.151	0.140	0.132	0.142	0.142	0.178	0.189	0.175	0.151	0.164
84	KJ745231 *Aname* sp MYG351 voucher T74238	0.090	0.148	0.126	0.181	0.123	0.123	0.203	0.200	0.000	0.082	0.063
85	KJ745232 *Aname* sp MYG351 voucher T74241	0.090	0.148	0.126	0.181	0.123	0.123	0.203	0.200	0.000	0.082	0.063
86	KJ745233 *Aname* sp MYG351 voucher T74247	0.090	0.148	0.126	0.181	0.123	0.123	0.203	0.200	0.000	0.082	0.063
87	KJ745281 *Kwonkan* sp MYG361 voucher T78543	0.195	0.181	0.192	0.121	0.195	0.195	0.159	0.208	0.178	0.189	0.181
88	KJ745287 *Aname* sp MYG351 voucher T82303	0.090	0.148	0.126	0.181	0.123	0.123	0.203	0.200	0.000	0.082	0.063
89	KJ745288 *Aname* sp MYG351 voucher T82304	0.088	0.159	0.137	0.189	0.134	0.134	0.214	0.205	0.030	0.093	0.077
90	KJ745293 *Aname* sp MYG351 voucher T82309	0.090	0.148	0.126	0.181	0.123	0.123	0.203	0.200	0.000	0.082	0.063
91	KJ745375 *Aname* sp MYG034 voucher T93314	0.101	0.173	0.129	0.195	0.126	0.126	0.211	0.208	0.063	0.077	0.000
92	KJ745401 *Kwonkan* sp MYG006 voucher T95405	0.189	0.192	0.178	0.140	0.181	0.181	0.153	0.192	0.195	0.200	0.192
93	KJ745429 *Aname* sp MYG030 voucher T96495	0.178	0.156	0.153	0.181	0.151	0.151	0.211	0.170	0.148	0.170	0.148
94	KJ745494 *Aname* sp MYG034 voucher T98900	0.090	0.167	0.129	0.186	0.126	0.126	0.208	0.200	0.055	0.093	0.079
95	MG800157 *Aname* sp MYG411 voucher WAMT94952	0.115	0.167	0.110	0.175	0.107	0.107	0.216	0.170	0.107	0.107	0.118
96	EU404114 *Centruroides vittatus*	0.274	0.238	0.260	0.255	0.263	0.263	0.274	0.285	0.263	0.252	0.258
97	JF700146 *Mesobuthus martensii*	0.277	0.252	0.271	0.247	0.268	0.268	0.249	0.293	0.258	0.271	0.277
98	KJ7447421 Selenotholus sp MYG381 voucher T113579	0.227	0.200	0.205	0.189	0.208	0.208	0.219	0.241	0.236	0.222	0.222

		12	13	14	15	16	17	18	19	20	21	22
1	**PP01**	0.020	0.020	0.019	0.016	0.019	0.020	0.020	0.020	0.019	0.019	0.020
2	**PP02**	0.021	0.019	0.020	0.019	0.020	0.020	0.021	0.020	0.019	0.019	0.019
3	**PP03**	0.020	0.019	0.020	0.017	0.019	0.020	0.020	0.017	0.018	0.019	0.018
4	**PP04**	0.018	0.020	0.020	0.020	0.020	0.019	0.022	0.019	0.020	0.021	0.020
5	**PP05**	0.020	0.020	0.020	0.017	0.019	0.020	0.019	0.018	0.018	0.018	0.018
6	**PP06**	0.020	0.020	0.020	0.017	0.019	0.020	0.019	0.018	0.018	0.018	0.018
7	NAD_N93_AC10	0.019	0.021	0.021	0.022	0.021	0.021	0.022	0.021	0.021	0.022	0.020
8	NAI_N8_AD1	0.021	0.019	0.020	0.020	0.020	0.021	0.021	0.020	0.019	0.020	0.020
9	NAW_N6_AD429	0.021	0.020	0.020	0.016	0.020	0.020	0.021	0.019	0.018	0.018	0.018
10	NAZ_N6_AD457	0.021	0.020	0.020	0.017	0.018	0.020	0.020	0.018	0.019	0.020	0.018
11	NBC_N6_AD577	0.021	0.020	0.020	0.017	0.019	0.020	0.021	0.019	0.019	0.019	0.019
12	NBE_N46_AD583		0.021	0.020	0.021	0.019	0.021	0.022	0.020	0.021	0.021	0.020
13	NBF_N11_AD592	0.205		0.020	0.019	0.021	0.021	0.021	0.020	0.019	0.021	0.020
14	NBR_N14_AD746	0.184	0.167		0.019	0.017	0.020	0.021	0.020	0.019	0.021	0.020
15	NBT_N7_AD748	0.205	0.159	0.164		0.019	0.020	0.020	0.020	0.017	0.019	0.019
16	NBU_N15_AD753	0.159	0.200	0.112	0.164		0.019	0.020	0.020	0.019	0.020	0.019
17	NBW_N50_AD784	0.192	0.192	0.175	0.181	0.162		0.021	0.020	0.020	0.022	0.021
18	NBY_N13_AF26b	0.219	0.195	0.211	0.175	0.175	0.211		0.020	0.020	0.020	0.019
19	NCU_N110_O211	0.184	0.178	0.184	0.167	0.167	0.181	0.181		0.016	0.018	0.013
20	NCW_N66_O280	0.200	0.159	0.159	0.126	0.162	0.184	0.181	0.104		0.018	0.016
21	NCY_N67_O282	0.211	0.208	0.197	0.156	0.178	0.216	0.181	0.137	0.137		0.018
22	NCZ_N110_O285	0.181	0.173	0.178	0.162	0.151	0.195	0.159	0.068	0.110	0.134	
23	NDC_N84_O288	0.197	0.151	0.175	0.186	0.186	0.197	0.225	0.178	0.173	0.205	0.156
24	NDD_N101_O292	0.189	0.175	0.192	0.178	0.181	0.173	0.164	0.156	0.159	0.164	0.162
25	NDG_N78_O304	0.203	0.205	0.197	0.167	0.170	0.184	0.186	0.145	0.153	0.159	0.164
26	NDK_N94_O333	0.159	0.181	0.203	0.189	0.189	0.184	0.216	0.186	0.181	0.205	0.153
27	NDL_N96_O334	0.162	0.197	0.208	0.200	0.203	0.178	0.247	0.181	0.186	0.222	0.195
28	NEH_N112_BI22	0.192	0.156	0.178	0.101	0.164	0.178	0.181	0.153	0.137	0.148	0.142
29	NEM_N43_DW15	0.186	0.211	0.189	0.203	0.205	0.197	0.222	0.200	0.192	0.211	0.181
30	NEM_N43_AT53	0.184	0.214	0.186	0.197	0.203	0.200	0.219	0.203	0.195	0.208	0.184
31	NEN_N115_AD594	0.184	0.181	0.192	0.184	0.170	0.197	0.186	0.156	0.167	0.195	0.167
32	NFN_N43_CG5	0.189	0.203	0.186	0.208	0.203	0.192	0.216	0.197	0.189	0.216	0.200
33	NFZ_N122_BV095	0.162	0.203	0.197	0.197	0.181	0.148	0.227	0.189	0.175	0.216	0.167
34	NGE_N130_CW14	0.148	0.195	0.192	0.195	0.170	0.192	0.211	0.181	0.181	0.197	0.167
35	NGQ_N134_DG3	0.156	0.205	0.173	0.189	0.181	0.186	0.214	0.167	0.167	0.195	0.178
36	NGS_N136_DG10	0.184	0.186	0.178	0.134	0.181	0.203	0.214	0.186	0.164	0.175	0.184

		12	13	14	15	16	17	18	19	20	21	22
37	NRC_N150_PC15	0.151	0.200	0.178	0.167	0.192	0.178	0.214	0.167	0.162	0.186	0.159
38	NRF_N7_NN11	0.214	0.156	0.181	0.047	0.173	0.156	0.184	0.156	0.123	0.153	0.156
39	NRG_N7_NN15	0.214	0.156	0.178	0.038	0.175	0.159	0.175	0.153	0.121	0.148	0.148
40	NRH_N7_NN16	0.216	0.167	0.192	0.049	0.189	0.175	0.184	0.164	0.123	0.162	0.151
41	NRI_N7_NN17	0.219	0.167	0.186	0.047	0.184	0.167	0.178	0.162	0.123	0.162	0.156
42	NRJ_N7_NN18	0.219	0.162	0.189	0.047	0.186	0.170	0.181	0.162	0.121	0.159	0.153
43	NRK_N7_NN20	0.216	0.164	0.170	0.047	0.175	0.167	0.192	0.162	0.121	0.148	0.159
44	NRL_N7_NN21	0.211	0.159	0.170	0.047	0.170	0.167	0.192	0.162	0.115	0.148	0.153
45	NRM_N7_NN37	0.230	0.164	0.186	0.063	0.195	0.189	0.195	0.162	0.129	0.164	0.159
46	NRO_N7_NN38	0.216	0.159	0.167	0.047	0.170	0.162	0.192	0.156	0.115	0.142	0.153
47	NRP_N138_NN35	0.170	0.181	0.186	0.137	0.175	0.192	0.175	0.164	0.148	0.153	0.140
48	NRQ_N138_NN36	0.173	0.186	0.189	0.137	0.178	0.197	0.178	0.170	0.153	0.159	0.148
49	NRZ_N147_PC18	0.181	0.186	0.189	0.162	0.153	0.173	0.200	0.137	0.164	0.164	0.156
50	NSA_N148_PC16	0.192	0.181	0.167	0.110	0.167	0.167	0.184	0.175	0.145	0.159	0.181
51	NSB_N149_PC26	0.178	0.178	0.170	0.115	0.159	0.173	0.197	0.151	0.145	0.156	0.142
52	NSD_N151_PC13	0.140	0.170	0.181	0.173	0.164	0.159	0.214	0.153	0.175	0.200	0.164
53	NY_N37_AR64	0.159	0.197	0.178	0.192	0.175	0.186	0.205	0.173	0.170	0.203	0.156
54	T101209 *Kwonkan* MYG175 NHP	0.151	0.203	0.195	0.195	0.170	0.186	0.216	0.186	0.186	0.222	0.181
55	T108978 *Aname* MYG214 NHC	0.200	0.170	0.181	0.153	0.192	0.173	0.219	0.164	0.153	0.175	0.153
56	T112084 *Synothele* MYG127 NHD	0.195	0.192	0.178	0.156	0.178	0.192	0.184	0.162	0.132	0.173	0.167
57	T112949 *Aname* MYG227 NHG	0.170	0.186	0.178	0.151	0.178	0.184	0.164	0.153	0.140	0.181	0.153
58	T96570 *Aname* MYG067 NHF	0.205	0.195	0.178	0.164	0.175	0.192	0.181	0.156	0.156	0.162	0.153
59	T98767 *Aname* MYG102 NHI	0.200	0.162	0.145	0.140	0.173	0.195	0.170	0.140	0.126	0.170	0.148
60	T98900 *Aname* MYG034 NHJ	0.192	0.186	0.173	0.126	0.173	0.184	0.205	0.167	0.142	0.162	0.156
61	JQ772139 *Aname* sp 2 MGR-2012 voucher WAMT98892	0.184	0.159	0.153	0.115	0.153	0.186	0.189	0.156	0.148	0.175	0.142
62	KJ744505 *Aname mellosa* voucher T103199	0.151	0.178	0.184	0.164	0.148	0.178	0.186	0.145	0.140	0.167	0.148
63	KJ744623 *Aname mellosa* voucher T105871	0.151	0.178	0.178	0.164	0.145	0.181	0.186	0.145	0.148	0.173	0.153
64	KJ744648 *Aname* sp MYG373 voucher T107087	0.205	0.159	0.164	0.000	0.164	0.181	0.175	0.167	0.126	0.156	0.162
65	KJ744649 *Aname* sp MYG373 voucher T107089	0.216	0.164	0.167	0.019	0.181	0.178	0.181	0.164	0.129	0.159	0.164
66	KJ744677 *Aname mellosa* voucher T107987	0.173	0.192	0.197	0.170	0.186	0.186	0.208	0.167	0.178	0.170	0.186
67	KJ744775 *Aname mellosa* voucher T113629	0.153	0.181	0.184	0.164	0.148	0.178	0.189	0.148	0.145	0.170	0.151
68	KJ744785 *Aname mellosa* voucher T113642	0.153	0.181	0.181	0.164	0.148	0.178	0.186	0.145	0.148	0.167	0.148
69	KJ744788 *Aname mellosa* voucher T113648	0.159	0.173	0.181	0.167	0.151	0.184	0.186	0.145	0.148	0.175	0.148
70	KJ744791 *Aname mellosa* voucher T113654	0.156	0.181	0.181	0.162	0.142	0.181	0.195	0.151	0.142	0.178	0.159
71	KJ744833 *Kwonkan* sp MYG006 voucher T114812	0.110	0.195	0.184	0.197	0.164	0.173	0.222	0.208	0.195	0.219	0.197
72	KJ744901 *Aname* sp MYG331 voucher T118789	0.195	0.153	0.175	0.099	0.167	0.175	0.178	0.151	0.134	0.145	0.140

		12	13	14	15	16	17	18	19	20	21	22
73	KJ744902 *Aname* sp MYG331 voucher T118791	0.195	0.153	0.175	0.099	0.167	0.175	0.178	0.151	0.134	0.145	0.140
74	KJ744909 *Aname* sp MYG331 voucher T118805	0.197	0.156	0.178	0.096	0.170	0.178	0.175	0.153	0.137	0.148	0.142
75	KJ744910 *Aname* sp MYG331 voucher T118811	0.192	0.156	0.178	0.101	0.164	0.178	0.181	0.153	0.137	0.148	0.142
76	KJ744911 Aname sp MYG331 voucher T118812	0.192	0.140	0.173	0.090	0.159	0.175	0.173	0.145	0.123	0.148	0.134
77	KJ744914 *Aname* sp MYG331 voucher T118818	0.189	0.142	0.175	0.090	0.162	0.178	0.173	0.148	0.126	0.145	0.137
78	KJ744982 *Aname mellosa* voucher T122207	0.151	0.170	0.186	0.167	0.151	0.175	0.186	0.137	0.145	0.167	0.140
79	KJ744987 *Aname mellosa* voucher T122215	0.153	0.178	0.184	0.173	0.148	0.173	0.197	0.148	0.153	0.181	0.153
80	KJ744989 *Aname mellosa* voucher T122218	0.164	0.192	0.181	0.175	0.151	0.184	0.200	0.148	0.162	0.184	0.162
81	KJ744990 *Aname mellosa* voucher T122219	0.164	0.192	0.167	0.184	0.145	0.186	0.203	0.142	0.156	0.181	0.159
82	KJ744992 *Aname mellosa* voucher T122222	0.170	0.192	0.173	0.186	0.151	0.192	0.205	0.145	0.159	0.184	0.162
83	KJ745155 *Aname mellosa* voucher T126273	0.159	0.181	0.175	0.164	0.148	0.184	0.192	0.153	0.148	0.173	0.156
84	KJ745231 *Aname* sp MYG351 voucher T74238	0.195	0.178	0.173	0.107	0.170	0.181	0.200	0.164	0.142	0.137	0.145
85	KJ745232 *Aname* sp MYG351 voucher T74241	0.195	0.178	0.173	0.107	0.170	0.181	0.200	0.164	0.142	0.137	0.145
86	KJ745233 *Aname* sp MYG351 voucher T74247	0.195	0.178	0.173	0.107	0.170	0.181	0.200	0.164	0.142	0.137	0.145
87	KJ745281 *Kwonkan* sp MYG361 voucher T78543	0.162	0.197	0.208	0.200	0.203	0.178	0.247	0.181	0.186	0.222	0.195
88	KJ745287 *Aname* sp MYG351 voucher T82303	0.195	0.178	0.173	0.107	0.170	0.181	0.200	0.164	0.142	0.137	0.145
89	KJ745288 *Aname* sp MYG351 voucher T82304	0.195	0.189	0.175	0.129	0.173	0.178	0.203	0.164	0.148	0.153	0.151
90	KJ745293 *Aname* sp MYG351 voucher T82309	0.195	0.178	0.173	0.107	0.170	0.181	0.200	0.164	0.142	0.137	0.145
91	KJ745375 *Aname* sp MYG034 voucher T93314	0.192	0.184	0.178	0.123	0.156	0.178	0.195	0.164	0.153	0.153	0.153
92	KJ745401 *Kwonkan* sp MYG006 voucher T95405	0.000	0.205	0.184	0.205	0.159	0.192	0.219	0.184	0.200	0.211	0.181
93	KJ745429 *Aname* sp MYG030 voucher T96495	0.197	0.159	0.167	0.167	0.186	0.197	0.197	0.134	0.112	0.164	0.121
94	KJ745494 *Aname* sp MYG034 voucher T98900	0.192	0.186	0.173	0.126	0.173	0.184	0.205	0.167	0.142	0.162	0.156
95	MG800157 *Aname* sp MYG411 voucher WAMT94952	0.205	0.153	0.173	0.082	0.162	0.175	0.189	0.134	0.115	0.145	0.142
96	EU404114 *Centruroides vittatus*	0.252	0.255	0.274	0.268	0.277	0.258	0.266	0.252	0.260	0.288	0.260
97	JF700146 *Mesobuthus martensii*	0.241	0.277	0.268	0.268	0.266	0.249	0.268	0.274	0.271	0.271	0.258
98	KJ7447421 Selenotholus sp MYG381 voucher T113579	0.225	0.208	0.222	0.222	0.222	0.225	0.225	0.227	0.222	0.219	0.214

		23	24	25	26	27	28	29	30	31	32	33
1	**PP01**	0.021	0.019	0.019	0.020	0.021	0.017	0.021	0.021	0.020	0.021	0.021
2	**PP02**	0.019	0.019	0.021	0.020	0.020	0.019	0.020	0.020	0.020	0.021	0.020
3	**PP03**	0.021	0.020	0.018	0.020	0.021	0.016	0.020	0.020	0.020	0.020	0.021
4	**PP04**	0.020	0.020	0.020	0.017	0.017	0.020	0.018	0.018	0.020	0.018	0.019
5	**PP05**	0.020	0.019	0.018	0.020	0.021	0.016	0.020	0.020	0.020	0.020	0.021
6	**PP06**	0.020	0.019	0.018	0.020	0.021	0.016	0.020	0.020	0.020	0.020	0.021
7	NAD_N93_AC10	0.022	0.021	0.022	0.019	0.019	0.022	0.020	0.020	0.021	0.019	0.019
8	NAI_N8_AD1	0.021	0.020	0.021	0.021	0.021	0.020	0.022	0.022	0.020	0.022	0.021
9	NAW_N6_AD429	0.020	0.019	0.018	0.020	0.020	0.017	0.020	0.020	0.020	0.021	0.020
10	NAZ_N6_AD457	0.020	0.019	0.018	0.020	0.020	0.017	0.020	0.020	0.020	0.021	0.020
11	NBC_N6_AD577	0.021	0.019	0.019	0.021	0.020	0.017	0.021	0.021	0.020	0.021	0.020
12	NBE_N46_AD583	0.021	0.020	0.021	0.019	0.019	0.021	0.020	0.020	0.020	0.020	0.019
13	NBF_N11_AD592	0.019	0.020	0.021	0.020	0.021	0.019	0.021	0.021	0.020	0.021	0.021
14	NBR_N14_AD746	0.020	0.021	0.021	0.021	0.021	0.020	0.020	0.020	0.021	0.020	0.021
15	NBT_N7_AD748	0.020	0.020	0.020	0.020	0.021	0.016	0.021	0.021	0.020	0.021	0.021
16	NBU_N15_AD753	0.020	0.020	0.020	0.020	0.021	0.019	0.021	0.021	0.020	0.021	0.020
17	NBW_N50_AD784	0.021	0.020	0.020	0.020	0.020	0.020	0.021	0.021	0.021	0.021	0.019
18	NBY_N13_AF26b	0.022	0.019	0.020	0.022	0.023	0.020	0.022	0.022	0.020	0.022	0.022
19	NCU_N110_O211	0.020	0.019	0.018	0.020	0.020	0.019	0.021	0.021	0.019	0.021	0.020
20	NCW_N66_O280	0.020	0.019	0.019	0.020	0.020	0.018	0.021	0.021	0.020	0.020	0.020
21	NCY_N67_O282	0.021	0.019	0.019	0.021	0.022	0.019	0.021	0.021	0.021	0.022	0.022
22	NCZ_N110_O285	0.019	0.019	0.019	0.019	0.021	0.018	0.020	0.020	0.020	0.021	0.020
23	NDC_N84_O288		0.021	0.021	0.020	0.021	0.020	0.021	0.021	0.020	0.022	0.021
24	NDD_N101_O292	0.192		0.019	0.021	0.021	0.018	0.020	0.020	0.019	0.020	0.021
25	NDG_N78_O304	0.197	0.148		0.021	0.021	0.019	0.021	0.022	0.020	0.022	0.021
26	NDK_N94_O333	0.178	0.197	0.203		0.018	0.020	0.020	0.020	0.020	0.020	0.019
27	NDL_N96_O334	0.192	0.197	0.214	0.145		0.020	0.020	0.020	0.020	0.020	0.020
28	NEH_N112_BI22	0.175	0.142	0.156	0.175	0.189		0.021	0.021	0.020	0.021	0.021
29	NEM_N43_DW15	0.197	0.178	0.214	0.170	0.178	0.208		0.005	0.021	0.011	0.020
30	NEM_N43_AT53	0.200	0.181	0.216	0.173	0.181	0.203	0.008		0.021	0.011	0.020
31	NEN_N115_AD594	0.181	0.164	0.181	0.186	0.189	0.175	0.195	0.192		0.020	0.021
32	NFN_N43_CG5	0.216	0.175	0.216	0.186	0.178	0.214	0.049	0.047	0.189		0.020
33	NFZ_N122_BV095	0.200	0.197	0.214	0.162	0.170	0.197	0.178	0.175	0.200	0.170	
34	NGE_N130_CW14	0.184	0.184	0.208	0.140	0.126	0.192	0.164	0.167	0.173	0.164	0.170
35	NGQ_N134_DG3	0.211	0.173	0.186	0.153	0.137	0.153	0.148	0.151	0.192	0.137	0.173
36	NGS_N136_DG10	0.189	0.170	0.173	0.214	0.214	0.132	0.208	0.203	0.195	0.208	0.205

		23	24	25	26	27	28	29	30	31	32	33
37	NRC_N150_PC15	0.200	0.181	0.200	0.159	0.142	0.178	0.159	0.162	0.184	0.167	0.173
38	NRF_N7_NN11	0.184	0.184	0.159	0.173	0.189	0.085	0.208	0.208	0.184	0.214	0.197
39	NRG_N7_NN15	0.181	0.186	0.162	0.170	0.189	0.088	0.203	0.203	0.186	0.214	0.197
40	NRH_N7_NN16	0.181	0.192	0.170	0.175	0.184	0.096	0.214	0.214	0.195	0.222	0.203
41	NRI_N7_NN17	0.181	0.189	0.170	0.175	0.184	0.096	0.208	0.208	0.192	0.216	0.203
42	NRJ_N7_NN18	0.184	0.189	0.167	0.175	0.181	0.093	0.208	0.208	0.192	0.216	0.203
43	NRK_N7_NN20	0.181	0.181	0.167	0.175	0.186	0.090	0.208	0.205	0.184	0.214	0.205
44	NRL_N7_NN21	0.175	0.181	0.167	0.170	0.181	0.085	0.203	0.200	0.184	0.214	0.200
45	NRM_N7_NN37	0.186	0.186	0.175	0.197	0.214	0.107	0.211	0.211	0.197	0.214	0.214
46	NRO_N7_NN38	0.175	0.175	0.162	0.173	0.184	0.085	0.205	0.203	0.189	0.211	0.205
47	NRP_N138_NN35	0.203	0.162	0.170	0.178	0.200	0.129	0.200	0.203	0.178	0.197	0.175
48	NRQ_N138_NN36	0.205	0.170	0.175	0.186	0.203	0.129	0.208	0.205	0.178	0.200	0.175
49	NRZ_N147_PC18	0.175	0.151	0.159	0.175	0.186	0.151	0.167	0.170	0.178	0.178	0.184
50	NSA_N148_PC16	0.195	0.153	0.162	0.186	0.192	0.121	0.200	0.203	0.186	0.195	0.200
51	NSB_N149_PC26	0.175	0.178	0.164	0.159	0.192	0.142	0.195	0.197	0.189	0.208	0.192
52	NSD_N151_PC13	0.195	0.175	0.195	0.118	0.118	0.164	0.134	0.132	0.173	0.140	0.159
53	NY_N37_AR64	0.189	0.173	0.205	0.181	0.156	0.175	0.170	0.167	0.184	0.170	0.156
54	T101209 *Kwonkan* MYG175 NHP	0.208	0.184	0.205	0.132	0.132	0.181	0.170	0.173	0.200	0.170	0.140
55	T108978 *Aname* MYG214 NHC	0.181	0.173	0.164	0.173	0.178	0.156	0.197	0.200	0.189	0.211	0.175
56	T112084 *Synothele* MYG127 NHD	0.195	0.164	0.170	0.203	0.200	0.162	0.192	0.195	0.186	0.173	0.203
57	T112949 *Aname* MYG227 NHG	0.189	0.148	0.121	0.189	0.197	0.153	0.203	0.200	0.164	0.197	0.200
58	T96570 *Aname* MYG067 NHF	0.186	0.162	0.126	0.181	0.203	0.156	0.216	0.219	0.173	0.222	0.200
59	T98767 *Aname* MYG102 NHI	0.175	0.153	0.162	0.184	0.184	0.137	0.200	0.197	0.164	0.200	0.208
60	T98900 *Aname* MYG034 NHJ	0.192	0.170	0.159	0.189	0.170	0.132	0.195	0.192	0.189	0.197	0.173
61	JQ772139 *Aname* sp 2 MGR-2012 voucher WAMT98892	0.148	0.162	0.153	0.181	0.181	0.129	0.184	0.186	0.159	0.186	0.200
62	KJ744505 *Aname mellosa* voucher T103199	0.164	0.140	0.164	0.173	0.175	0.153	0.159	0.156	0.126	0.159	0.173
63	KJ744623 *Aname mellosa* voucher T105871	0.156	0.140	0.162	0.170	0.170	0.159	0.162	0.159	0.123	0.162	0.170
64	KJ744648 *Aname* sp MYG373 voucher T107087	0.186	0.178	0.167	0.189	0.200	0.101	0.203	0.197	0.184	0.208	0.197
65	KJ744649 *Aname* sp MYG373 voucher T107089	0.189	0.181	0.167	0.197	0.203	0.110	0.208	0.203	0.186	0.205	0.205
66	KJ744677 *Aname mellosa* voucher T107987	0.175	0.181	0.195	0.162	0.181	0.186	0.197	0.200	0.129	0.203	0.197
67	KJ744775 *Aname mellosa* voucher T113629	0.162	0.140	0.167	0.170	0.170	0.156	0.159	0.156	0.123	0.159	0.167
68	KJ744785 *Aname mellosa* voucher T113642	0.162	0.140	0.167	0.173	0.167	0.156	0.159	0.156	0.121	0.159	0.170
69	KJ744788 *Aname mellosa* voucher T113648	0.162	0.140	0.159	0.170	0.173	0.159	0.164	0.162	0.126	0.164	0.164
70	KJ744791 *Aname mellosa* voucher T113654	0.162	0.142	0.170	0.173	0.175	0.162	0.162	0.159	0.118	0.162	0.173
71	KJ744833 *Kwonkan* sp MYG006 voucher T114812	0.200	0.184	0.205	0.142	0.145	0.195	0.181	0.178	0.208	0.170	0.137
72	KJ744901 *Aname* sp MYG331 voucher T118789	0.173	0.140	0.159	0.173	0.186	0.003	0.205	0.200	0.178	0.211	0.195

		23	24	25	26	27	28	29	30	31	32	33
73	KJ744902 *Aname* sp MYG331 voucher T118791	0.173	0.140	0.159	0.173	0.186	0.003	0.205	0.200	0.178	0.211	0.195
74	KJ744909 *Aname* sp MYG331 voucher T118805	0.175	0.142	0.162	0.175	0.189	0.005	0.208	0.203	0.175	0.214	0.197
75	KJ744910 *Aname* sp MYG331 voucher T118811	0.175	0.142	0.156	0.175	0.189	0.000	0.208	0.203	0.175	0.214	0.197
76	KJ744911 Aname sp MYG331 voucher T118812	0.175	0.140	0.162	0.175	0.184	0.025	0.205	0.200	0.170	0.205	0.195
77	KJ744914 *Aname* sp MYG331 voucher T118818	0.178	0.137	0.159	0.173	0.186	0.022	0.205	0.200	0.173	0.205	0.192
78	KJ744982 *Aname mellosa* voucher T122207	0.151	0.134	0.164	0.162	0.162	0.148	0.159	0.156	0.118	0.159	0.167
79	KJ744987 *Aname mellosa* voucher T122215	0.156	0.145	0.175	0.173	0.173	0.159	0.162	0.159	0.123	0.162	0.164
80	KJ744989 *Aname mellosa* voucher T122218	0.170	0.153	0.173	0.181	0.175	0.170	0.175	0.173	0.137	0.175	0.181
81	KJ744990 *Aname mellosa* voucher T122219	0.173	0.153	0.170	0.181	0.175	0.175	0.164	0.156	0.132	0.170	0.189
82	KJ744992 *Aname mellosa* voucher T122222	0.173	0.156	0.173	0.181	0.181	0.178	0.170	0.162	0.132	0.175	0.195
83	KJ745155 *Aname mellosa* voucher T126273	0.164	0.140	0.173	0.175	0.170	0.162	0.156	0.153	0.118	0.156	0.175
84	KJ745231 *Aname* sp MYG351 voucher T74238	0.189	0.151	0.145	0.178	0.178	0.126	0.189	0.186	0.184	0.200	0.189
85	KJ745232 *Aname* sp MYG351 voucher T74241	0.189	0.151	0.145	0.178	0.178	0.126	0.189	0.186	0.184	0.200	0.189
86	KJ745233 *Aname* sp MYG351 voucher T74247	0.189	0.151	0.145	0.178	0.178	0.126	0.189	0.186	0.184	0.200	0.189
87	KJ745281 *Kwonkan* sp MYG361 voucher T78543	0.192	0.197	0.214	0.145	0.000	0.189	0.178	0.181	0.189	0.178	0.170
88	KJ745287 *Aname* sp MYG351 voucher T82303	0.189	0.151	0.145	0.178	0.178	0.126	0.189	0.186	0.184	0.200	0.189
89	KJ745288 *Aname* sp MYG351 voucher T82304	0.192	0.153	0.151	0.186	0.178	0.140	0.195	0.197	0.195	0.200	0.189
90	KJ745293 *Aname* sp MYG351 voucher T82309	0.189	0.151	0.145	0.178	0.178	0.126	0.189	0.186	0.184	0.200	0.189
91	KJ745375 *Aname* sp MYG034 voucher T93314	0.200	0.156	0.151	0.195	0.181	0.126	0.203	0.200	0.167	0.208	0.189
92	KJ745401 *Kwonkan* sp MYG006 voucher T95405	0.197	0.189	0.203	0.159	0.162	0.192	0.186	0.184	0.184	0.189	0.162
93	KJ745429 *Aname* sp MYG030 voucher T96495	0.186	0.162	0.167	0.184	0.197	0.148	0.200	0.203	0.181	0.203	0.200
94	KJ745494 *Aname* sp MYG034 voucher T98900	0.192	0.170	0.159	0.189	0.170	0.132	0.195	0.192	0.189	0.197	0.173
95	MG800157 *Aname* sp MYG411 voucher WAMT94952	0.186	0.159	0.151	0.175	0.181	0.088	0.195	0.195	0.173	0.200	0.195
96	EU404114 *Centruroides vittatus*	0.293	0.252	0.255	0.249	0.260	0.260	0.260	0.260	0.277	0.266	0.271
97	JF700146 *Mesobuthus martensii*	0.277	0.258	0.255	0.249	0.244	0.268	0.258	0.255	0.274	0.249	0.238
98	KJ7447421 Selenotholus sp MYG381 voucher T113579	0.236	0.197	0.227	0.200	0.216	0.197	0.205	0.203	0.216	0.205	0.233

		34	35	36	37	38	39	40	41	42	43	44
1	**PP01**	0.020	0.020	0.019	0.019	0.017	0.017	0.018	0.017	0.017	0.016	0.017
2	**PP02**	0.020	0.019	0.020	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019
3	**PP03**	0.020	0.019	0.019	0.020	0.016	0.016	0.017	0.017	0.017	0.017	0.017
4	**PP04**	0.017	0.018	0.020	0.018	0.020	0.020	0.020	0.020	0.020	0.020	0.020
5	**PP05**	0.020	0.019	0.019	0.020	0.016	0.016	0.017	0.017	0.017	0.017	0.016
6	**PP06**	0.020	0.019	0.019	0.020	0.016	0.016	0.017	0.017	0.017	0.017	0.016
7	NAD_N93_AC10	0.018	0.019	0.022	0.020	0.021	0.021	0.021	0.022	0.022	0.022	0.021
8	NAI_N8_AD1	0.021	0.021	0.020	0.020	0.020	0.020	0.021	0.020	0.021	0.020	0.020
9	NAW_N6_AD429	0.019	0.020	0.019	0.020	0.016	0.016	0.016	0.016	0.016	0.015	0.015
10	NAZ_N6_AD457	0.020	0.019	0.018	0.019	0.017	0.017	0.018	0.017	0.017	0.017	0.017
11	NBC_N6_AD577	0.019	0.020	0.019	0.020	0.017	0.017	0.018	0.018	0.017	0.017	0.017
12	NBE_N46_AD583	0.019	0.019	0.020	0.019	0.021	0.021	0.022	0.022	0.022	0.022	0.021
13	NBF_N11_AD592	0.021	0.021	0.020	0.021	0.019	0.019	0.020	0.020	0.019	0.019	0.019
14	NBR_N14_AD746	0.021	0.020	0.020	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.020
15	NBT_N7_AD748	0.021	0.020	0.018	0.020	0.011	0.010	0.011	0.011	0.011	0.011	0.011
16	NBU_N15_AD753	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020
17	NBW_N50_AD784	0.021	0.020	0.021	0.020	0.019	0.019	0.020	0.020	0.020	0.020	0.020
18	NBY_N13_AF26b	0.021	0.021	0.021	0.021	0.020	0.020	0.020	0.020	0.020	0.021	0.021
19	NCU_N110_O211	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019
20	NCW_N66_O280	0.020	0.020	0.019	0.019	0.017	0.017	0.017	0.017	0.017	0.017	0.017
21	NCY_N67_O282	0.021	0.021	0.020	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019
22	NCZ_N110_O285	0.020	0.020	0.020	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
23	NDC_N84_O288	0.020	0.021	0.020	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020
24	NDD_N101_O292	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.020
25	NDG_N78_O304	0.021	0.020	0.020	0.021	0.019	0.019	0.020	0.020	0.020	0.020	0.020
26	NDK_N94_O333	0.018	0.019	0.021	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020
27	NDL_N96_O334	0.017	0.018	0.021	0.018	0.020	0.020	0.020	0.020	0.020	0.020	0.020
28	NEH_N112_BI22	0.021	0.019	0.018	0.020	0.015	0.015	0.015	0.015	0.015	0.015	0.015
29	NEM_N43_DW15	0.019	0.019	0.021	0.019	0.021	0.021	0.021	0.021	0.021	0.021	0.021
30	NEM_N43_AT53	0.020	0.019	0.021	0.019	0.021	0.021	0.021	0.021	0.021	0.021	0.021
31	NEN_N115_AD594	0.020	0.021	0.021	0.020	0.020	0.020	0.021	0.021	0.021	0.020	0.020
32	NFN_N43_CG5	0.019	0.018	0.021	0.020	0.021	0.021	0.022	0.022	0.022	0.021	0.021
33	NFZ_N122_BV095	0.020	0.020	0.021	0.020	0.021	0.021	0.021	0.021	0.021	0.021	0.021
34	NGE_N130_CW14		0.018	0.021	0.018	0.021	0.020	0.020	0.020	0.020	0.020	0.020
35	NGQ_N134_DG3	0.140		0.020	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020
36	NGS_N136_DG10	0.195	0.178		0.021	0.019	0.019	0.020	0.020	0.020	0.019	0.019

		34	35	36	37	38	39	40	41	42	43	44
37	NRC_N150_PC15	0.132	0.156	0.203		0.020	0.019	0.020	0.019	0.020	0.020	0.020
38	NRF_N7_NN11	0.192	0.181	0.162	0.173		0.005	0.009	0.008	0.008	0.009	0.009
39	NRG_N7_NN15	0.186	0.181	0.162	0.164	0.008		0.008	0.006	0.006	0.009	0.009
40	NRH_N7_NN16	0.184	0.186	0.170	0.170	0.030	0.022		0.006	0.005	0.010	0.010
41	NRI_N7_NN17	0.189	0.184	0.175	0.164	0.022	0.014	0.014		0.004	0.010	0.010
42	NRJ_N7_NN18	0.186	0.184	0.173	0.167	0.022	0.014	0.008	0.005		0.009	0.009
43	NRK_N7_NN20	0.184	0.178	0.162	0.167	0.033	0.030	0.036	0.038	0.033		0.004
44	NRL_N7_NN21	0.184	0.184	0.162	0.167	0.033	0.030	0.036	0.038	0.033	0.005	
45	NRM_N7_NN37	0.197	0.197	0.167	0.189	0.060	0.058	0.063	0.066	0.060	0.049	0.055
46	NRO_N7_NN38	0.186	0.181	0.156	0.173	0.033	0.030	0.036	0.038	0.033	0.005	0.005
47	NRP_N138_NN35	0.170	0.178	0.173	0.159	0.132	0.126	0.132	0.129	0.129	0.137	0.137
48	NRQ_N138_NN36	0.178	0.186	0.173	0.167	0.137	0.132	0.129	0.132	0.132	0.142	0.142
49	NRZ_N147_PC18	0.153	0.175	0.151	0.175	0.156	0.156	0.170	0.164	0.167	0.167	0.162
50	NSA_N148_PC16	0.186	0.175	0.151	0.159	0.112	0.115	0.126	0.121	0.123	0.107	0.112
51	NSB_N149_PC26	0.170	0.170	0.164	0.153	0.123	0.121	0.132	0.126	0.129	0.123	0.118
52	NSD_N151_PC13	0.115	0.140	0.175	0.126	0.164	0.164	0.173	0.170	0.167	0.175	0.170
53	NY_N37_AR64	0.145	0.140	0.205	0.173	0.184	0.181	0.178	0.178	0.175	0.178	0.178
54	T101209 *Kwonkan* MYG175 NHP	0.129	0.115	0.225	0.159	0.186	0.186	0.186	0.186	0.184	0.184	0.184
55	T108978 *Aname* MYG214 NHC	0.197	0.186	0.192	0.162	0.151	0.145	0.156	0.151	0.153	0.148	0.142
56	T112084 *Synothele* MYG127 NHD	0.200	0.164	0.175	0.197	0.151	0.153	0.153	0.153	0.151	0.148	0.153
57	T112949 *Aname* MYG227 NHG	0.189	0.181	0.167	0.175	0.153	0.156	0.162	0.156	0.159	0.151	0.156
58	T96570 *Aname* MYG067 NHF	0.181	0.186	0.189	0.189	0.156	0.159	0.167	0.167	0.164	0.148	0.153
59	T98767 *Aname* MYG102 NHI	0.178	0.167	0.181	0.170	0.140	0.137	0.142	0.142	0.140	0.142	0.137
60	T98900 *Aname* MYG034 NHJ	0.170	0.175	0.170	0.167	0.126	0.121	0.126	0.123	0.123	0.110	0.110
61	JQ772139 *Aname* sp 2 MGR-2012 voucher WAMT98892	0.162	0.175	0.145	0.178	0.112	0.115	0.129	0.121	0.126	0.121	0.121
62	KJ744505 *Aname mellosa* voucher T103199	0.153	0.151	0.178	0.153	0.159	0.162	0.170	0.170	0.167	0.181	0.175
63	KJ744623 *Aname mellosa* voucher T105871	0.151	0.151	0.178	0.151	0.162	0.164	0.173	0.170	0.170	0.184	0.178
64	KJ744648 *Aname* sp MYG373 voucher T107087	0.195	0.189	0.134	0.167	0.047	0.038	0.049	0.047	0.047	0.047	0.047
65	KJ744649 *Aname* sp MYG373 voucher T107089	0.203	0.189	0.142	0.170	0.055	0.047	0.058	0.055	0.055	0.049	0.055
66	KJ744677 *Aname mellosa* voucher T107987	0.156	0.162	0.200	0.140	0.167	0.164	0.173	0.170	0.170	0.173	0.173
67	KJ744775 *Aname mellosa* voucher T113629	0.153	0.145	0.181	0.151	0.162	0.164	0.173	0.170	0.170	0.184	0.178
68	KJ744785 *Aname mellosa* voucher T113642	0.151	0.148	0.178	0.148	0.162	0.164	0.173	0.170	0.170	0.184	0.178
69	KJ744788 *Aname mellosa* voucher T113648	0.153	0.151	0.186	0.153	0.164	0.167	0.175	0.173	0.173	0.186	0.181
70	KJ744791 *Aname mellosa* voucher T113654	0.148	0.151	0.175	0.156	0.164	0.167	0.175	0.173	0.173	0.181	0.175
71	KJ744833 *Kwonkan* sp MYG006 voucher T114812	0.129	0.148	0.184	0.153	0.189	0.189	0.186	0.192	0.195	0.189	0.184
72	KJ744901 *Aname* sp MYG331 voucher T118789	0.189	0.151	0.129	0.175	0.082	0.085	0.093	0.093	0.090	0.088	0.082

		34	35	36	37	38	39	40	41	42	43	44
73	KJ744902 *Aname* sp MYG331 voucher T118791	0.189	0.151	0.129	0.175	0.082	0.085	0.093	0.093	0.090	0.088	0.082
74	KJ744909 *Aname* sp MYG331 voucher T118805	0.186	0.148	0.132	0.173	0.079	0.082	0.090	0.090	0.088	0.085	0.085
75	KJ744910 *Aname* sp MYG331 voucher T118811	0.192	0.153	0.132	0.178	0.085	0.088	0.096	0.096	0.093	0.090	0.085
76	KJ744911 Aname sp MYG331 voucher T118812	0.175	0.153	0.140	0.170	0.079	0.082	0.096	0.096	0.093	0.085	0.079
77	KJ744914 *Aname* sp MYG331 voucher T118818	0.178	0.156	0.137	0.173	0.079	0.082	0.096	0.096	0.093	0.085	0.079
78	KJ744982 *Aname mellosa* voucher T122207	0.145	0.142	0.181	0.156	0.164	0.167	0.175	0.173	0.173	0.181	0.175
79	KJ744987 *Aname mellosa* voucher T122215	0.156	0.153	0.181	0.156	0.173	0.175	0.186	0.181	0.184	0.186	0.181
80	KJ744989 *Aname mellosa* voucher T122218	0.156	0.162	0.184	0.159	0.170	0.173	0.184	0.178	0.181	0.195	0.189
81	KJ744990 *Aname mellosa* voucher T122219	0.164	0.156	0.192	0.167	0.178	0.181	0.192	0.186	0.189	0.200	0.195
82	KJ744992 *Aname mellosa* voucher T122222	0.159	0.162	0.195	0.173	0.181	0.184	0.195	0.189	0.192	0.203	0.197
83	KJ745155 *Aname mellosa* voucher T126273	0.151	0.151	0.178	0.151	0.167	0.170	0.178	0.175	0.175	0.181	0.175
84	KJ745231 *Aname* sp MYG351 voucher T74238	0.159	0.186	0.159	0.167	0.110	0.101	0.104	0.104	0.101	0.096	0.096
85	KJ745232 *Aname* sp MYG351 voucher T74241	0.159	0.186	0.159	0.167	0.110	0.101	0.104	0.104	0.101	0.096	0.096
86	KJ745233 *Aname* sp MYG351 voucher T74247	0.159	0.186	0.159	0.167	0.110	0.101	0.104	0.104	0.101	0.096	0.096
87	KJ745281 *Kwonkan* sp MYG361 voucher T78543	0.126	0.137	0.214	0.142	0.189	0.189	0.184	0.184	0.181	0.186	0.181
88	KJ745287 *Aname* sp MYG351 voucher T82303	0.159	0.186	0.159	0.167	0.110	0.101	0.104	0.104	0.101	0.096	0.096
89	KJ745288 *Aname* sp MYG351 voucher T82304	0.167	0.181	0.167	0.170	0.129	0.121	0.123	0.123	0.121	0.112	0.118
90	KJ745293 *Aname* sp MYG351 voucher T82309	0.159	0.186	0.159	0.167	0.110	0.101	0.104	0.104	0.101	0.096	0.096
91	KJ745375 *Aname* sp MYG034 voucher T93314	0.159	0.167	0.156	0.170	0.118	0.121	0.129	0.129	0.126	0.115	0.115
92	KJ745401 *Kwonkan* sp MYG006 voucher T95405	0.148	0.156	0.184	0.151	0.214	0.214	0.216	0.219	0.219	0.216	0.211
93	KJ745429 *Aname* sp MYG030 voucher T96495	0.197	0.178	0.159	0.189	0.142	0.145	0.153	0.153	0.151	0.153	0.148
94	KJ745494 *Aname* sp MYG034 voucher T98900	0.170	0.175	0.170	0.167	0.126	0.121	0.126	0.123	0.123	0.110	0.110
95	MG800157 *Aname* sp MYG411 voucher WAMT94952	0.186	0.162	0.159	0.167	0.066	0.066	0.082	0.079	0.079	0.060	0.066
96	EU404114 *Centruroides vittatus*	0.268	0.227	0.268	0.249	0.249	0.249	0.266	0.260	0.258	0.258	0.258
97	JF700146 *Mesobuthus martensii*	0.266	0.244	0.277	0.258	0.279	0.274	0.279	0.282	0.282	0.274	0.274
98	KJ7447421 Selenotholus sp MYG381 voucher T113579	0.195	0.203	0.230	0.208	0.203	0.205	0.216	0.214	0.211	0.214	0.208

		45	46	47	48	49	50	51	52	53	54	55
1	**PP01**	0.018	0.016	0.017	0.017	0.020	0.004	0.015	0.020	0.020	0.020	0.020
2	**PP02**	0.020	0.019	0.018	0.018	0.019	0.019	0.019	0.019	0.020	0.020	0.019
3	**PP03**	0.018	0.017	0.017	0.017	0.018	0.016	0.016	0.018	0.020	0.020	0.019
4	**PP04**	0.021	0.020	0.020	0.020	0.019	0.020	0.020	0.008	0.019	0.018	0.019
5	**PP05**	0.018	0.016	0.017	0.017	0.018	0.016	0.016	0.018	0.020	0.021	0.019
6	**PP06**	0.018	0.016	0.017	0.017	0.018	0.016	0.016	0.018	0.020	0.021	0.019
7	NAD_N93_AC10	0.022	0.022	0.021	0.021	0.020	0.021	0.021	0.018	0.019	0.018	0.021
8	NAI_N8_AD1	0.021	0.020	0.020	0.020	0.020	0.021	0.021	0.021	0.020	0.021	0.021
9	NAW_N6_AD429	0.017	0.015	0.017	0.017	0.019	0.015	0.016	0.020	0.020	0.020	0.019
10	NAZ_N6_AD457	0.018	0.017	0.017	0.018	0.018	0.015	0.016	0.019	0.020	0.020	0.019
11	NBC_N6_AD577	0.018	0.017	0.017	0.017	0.020	0.016	0.016	0.021	0.020	0.020	0.019
12	NBE_N46_AD583	0.022	0.022	0.020	0.020	0.020	0.021	0.020	0.018	0.019	0.019	0.021
13	NBF_N11_AD592	0.019	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.021	0.020
14	NBR_N14_AD746	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020
15	NBT_N7_AD748	0.013	0.011	0.018	0.018	0.019	0.016	0.017	0.020	0.021	0.021	0.019
16	NBU_N15_AD753	0.021	0.020	0.020	0.020	0.019	0.020	0.019	0.019	0.020	0.020	0.021
17	NBW_N50_AD784	0.020	0.019	0.021	0.021	0.020	0.020	0.020	0.019	0.020	0.020	0.020
18	NBY_N13_AF26b	0.021	0.021	0.020	0.020	0.021	0.020	0.021	0.021	0.021	0.022	0.022
19	NCU_N110_O211	0.019	0.019	0.019	0.020	0.018	0.020	0.019	0.019	0.020	0.020	0.019
20	NCW_N66_O280	0.018	0.017	0.019	0.019	0.019	0.018	0.018	0.020	0.020	0.020	0.019
21	NCY_N67_O282	0.019	0.018	0.019	0.019	0.019	0.019	0.019	0.021	0.021	0.022	0.020
22	NCZ_N110_O285	0.019	0.019	0.018	0.019	0.019	0.020	0.018	0.019	0.019	0.020	0.019
23	NDC_N84_O288	0.020	0.020	0.021	0.021	0.020	0.021	0.020	0.021	0.020	0.021	0.020
24	NDD_N101_O292	0.020	0.020	0.019	0.020	0.019	0.019	0.020	0.020	0.020	0.020	0.020
25	NDG_N78_O304	0.020	0.019	0.020	0.020	0.019	0.019	0.019	0.021	0.021	0.021	0.019
26	NDK_N94_O333	0.021	0.020	0.020	0.020	0.020	0.020	0.019	0.017	0.020	0.018	0.020
27	NDL_N96_O334	0.021	0.020	0.021	0.021	0.020	0.021	0.021	0.017	0.019	0.018	0.020
28	NEH_N112_BI22	0.016	0.015	0.018	0.018	0.019	0.017	0.018	0.019	0.020	0.020	0.019
29	NEM_N43_DW15	0.021	0.021	0.021	0.021	0.020	0.021	0.021	0.018	0.020	0.020	0.021
30	NEM_N43_AT53	0.021	0.021	0.021	0.021	0.020	0.021	0.021	0.018	0.020	0.020	0.021
31	NEN_N115_AD594	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020
32	NFN_N43_CG5	0.021	0.021	0.021	0.021	0.020	0.021	0.021	0.018	0.020	0.020	0.021
33	NFZ_N122_BV095	0.021	0.021	0.020	0.020	0.020	0.021	0.021	0.019	0.019	0.018	0.020
34	NGE_N130_CW14	0.021	0.020	0.020	0.020	0.019	0.020	0.020	0.017	0.018	0.018	0.021
35	NGQ_N134_DG3	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.018	0.018	0.017	0.020
36	NGS_N136_DG10	0.020	0.019	0.020	0.020	0.019	0.019	0.019	0.020	0.021	0.022	0.021

		45	46	47	48	49	50	51	52	53	54	55
37	NRC_N150_PC15	0.020	0.020	0.019	0.020	0.020	0.019	0.019	0.017	0.020	0.019	0.019
38	NRF_N7_NN11	0.012	0.009	0.018	0.018	0.019	0.017	0.017	0.019	0.020	0.020	0.019
39	NRG_N7_NN15	0.012	0.009	0.017	0.018	0.019	0.017	0.017	0.019	0.020	0.020	0.018
40	NRH_N7_NN16	0.013	0.010	0.018	0.018	0.020	0.017	0.018	0.020	0.020	0.020	0.019
41	NRI_N7_NN17	0.013	0.010	0.018	0.018	0.019	0.017	0.017	0.020	0.020	0.020	0.019
42	NRJ_N7_NN18	0.012	0.009	0.018	0.018	0.020	0.017	0.018	0.020	0.020	0.020	0.019
43	NRK_N7_NN20	0.011	0.004	0.018	0.018	0.020	0.016	0.017	0.020	0.020	0.020	0.019
44	NRL_N7_NN21	0.012	0.004	0.018	0.018	0.019	0.017	0.017	0.020	0.020	0.020	0.018
45	NRM_N7_NN37		0.011	0.019	0.019	0.020	0.017	0.018	0.021	0.021	0.021	0.019
46	NRO_N7_NN38	0.049		0.018	0.018	0.019	0.016	0.017	0.020	0.020	0.020	0.018
47	NRP_N138_NN35	0.151	0.137		0.005	0.020	0.016	0.017	0.020	0.019	0.020	0.019
48	NRQ_N138_NN36	0.156	0.142	0.008		0.020	0.017	0.017	0.020	0.019	0.020	0.020
49	NRZ_N147_PC18	0.173	0.162	0.173	0.181		0.019	0.019	0.018	0.020	0.020	0.019
50	NSA_N148_PC16	0.126	0.107	0.110	0.115	0.164		0.014	0.020	0.020	0.020	0.020
51	NSB_N149_PC26	0.140	0.118	0.121	0.126	0.164	0.082		0.020	0.020	0.020	0.020
52	NSD_N151_PC13	0.192	0.173	0.175	0.175	0.140	0.184	0.170		0.019	0.018	0.020
53	NY_N37_AR64	0.197	0.181	0.162	0.164	0.186	0.189	0.181	0.151		0.019	0.021
54	T101209 *Kwonkan* MYG175 NHP	0.203	0.186	0.167	0.175	0.181	0.173	0.173	0.140	0.148		0.020
55	T108978 *Aname* MYG214 NHC	0.156	0.145	0.162	0.170	0.162	0.167	0.178	0.173	0.192	0.175	
56	T112084 *Synothele* MYG127 NHD	0.148	0.148	0.145	0.153	0.173	0.142	0.167	0.184	0.184	0.189	0.200
57	T112949 *Aname* MYG227 NHG	0.151	0.156	0.137	0.134	0.173	0.142	0.156	0.167	0.186	0.192	0.173
58	T96570 *Aname* MYG067 NHF	0.164	0.153	0.151	0.156	0.151	0.159	0.156	0.181	0.192	0.178	0.195
59	T98767 *Aname* MYG102 NHI	0.151	0.140	0.164	0.167	0.170	0.170	0.156	0.184	0.170	0.192	0.170
60	T98900 *Aname* MYG034 NHJ	0.129	0.115	0.115	0.115	0.167	0.093	0.107	0.181	0.156	0.175	0.159
61	JQ772139 *Aname* sp 2 MGR-2012 voucher WAMT98892	0.123	0.121	0.134	0.142	0.164	0.129	0.123	0.173	0.170	0.175	0.159
62	KJ744505 *Aname mellosa* voucher T103199	0.181	0.175	0.167	0.167	0.145	0.170	0.173	0.129	0.167	0.184	0.184
63	KJ744623 *Aname mellosa* voucher T105871	0.186	0.178	0.162	0.162	0.140	0.170	0.167	0.126	0.164	0.175	0.181
64	KJ744648 *Aname* sp MYG373 voucher T107087	0.063	0.047	0.137	0.137	0.162	0.110	0.115	0.173	0.192	0.195	0.153
65	KJ744649 *Aname* sp MYG373 voucher T107089	0.049	0.049	0.151	0.151	0.173	0.112	0.123	0.181	0.189	0.211	0.159
66	KJ744677 *Aname mellosa* voucher T107987	0.189	0.173	0.159	0.164	0.167	0.170	0.162	0.164	0.192	0.189	0.189
67	KJ744775 *Aname mellosa* voucher T113629	0.184	0.178	0.164	0.164	0.142	0.173	0.173	0.129	0.164	0.181	0.184
68	KJ744785 *Aname mellosa* voucher T113642	0.184	0.178	0.162	0.162	0.142	0.170	0.170	0.126	0.164	0.184	0.181
69	KJ744788 *Aname mellosa* voucher T113648	0.186	0.181	0.164	0.164	0.145	0.175	0.175	0.129	0.164	0.175	0.178
70	KJ744791 *Aname mellosa* voucher T113654	0.184	0.175	0.167	0.167	0.140	0.170	0.167	0.132	0.170	0.184	0.189
71	KJ744833 *Kwonkan* sp MYG006 voucher T114812	0.208	0.184	0.175	0.173	0.148	0.186	0.181	0.140	0.162	0.126	0.184
72	KJ744901 *Aname* sp MYG331 voucher T118789	0.104	0.082	0.126	0.126	0.148	0.118	0.140	0.162	0.173	0.178	0.153

		45	46	47	48	49	50	51	52	53	54	55
73	KJ744902 *Aname* sp MYG331 voucher T118791	0.104	0.082	0.126	0.126	0.148	0.118	0.140	0.162	0.173	0.178	0.153
74	KJ744909 *Aname* sp MYG331 voucher T118805	0.101	0.085	0.123	0.123	0.151	0.115	0.142	0.164	0.170	0.175	0.156
75	KJ744910 *Aname* sp MYG331 voucher T118811	0.107	0.085	0.129	0.129	0.151	0.121	0.142	0.164	0.175	0.181	0.156
76	KJ744911 Aname sp MYG331 voucher T118812	0.101	0.079	0.123	0.123	0.153	0.118	0.134	0.167	0.184	0.175	0.151
77	KJ744914 *Aname* sp MYG331 voucher T118818	0.101	0.079	0.121	0.121	0.153	0.118	0.134	0.164	0.184	0.175	0.153
78	KJ744982 *Aname mellosa* voucher T122207	0.181	0.175	0.156	0.156	0.142	0.173	0.164	0.121	0.156	0.167	0.175
79	KJ744987 *Aname mellosa* voucher T122215	0.181	0.181	0.162	0.162	0.142	0.175	0.175	0.132	0.167	0.181	0.181
80	KJ744989 *Aname mellosa* voucher T122218	0.192	0.189	0.175	0.175	0.145	0.186	0.178	0.132	0.178	0.189	0.186
81	KJ744990 *Aname mellosa* voucher T122219	0.195	0.195	0.186	0.186	0.145	0.189	0.167	0.129	0.175	0.192	0.192
82	KJ744992 *Aname mellosa* voucher T122222	0.192	0.197	0.189	0.189	0.148	0.192	0.170	0.134	0.181	0.197	0.197
83	KJ745155 *Aname mellosa* voucher T126273	0.184	0.178	0.167	0.167	0.142	0.170	0.170	0.129	0.167	0.186	0.181
84	KJ745231 *Aname* sp MYG351 voucher T74238	0.118	0.096	0.112	0.115	0.151	0.088	0.110	0.175	0.175	0.181	0.148
85	KJ745232 *Aname* sp MYG351 voucher T74241	0.118	0.096	0.112	0.115	0.151	0.088	0.110	0.175	0.175	0.181	0.148
86	KJ745233 *Aname* sp MYG351 voucher T74247	0.118	0.096	0.112	0.115	0.151	0.088	0.110	0.175	0.175	0.181	0.148
87	KJ745281 *Kwonkan* sp MYG361 voucher T78543	0.214	0.184	0.200	0.203	0.186	0.192	0.192	0.118	0.156	0.132	0.178
88	KJ745287 *Aname* sp MYG351 voucher T82303	0.118	0.096	0.112	0.115	0.151	0.088	0.110	0.175	0.175	0.181	0.148
89	KJ745288 *Aname* sp MYG351 voucher T82304	0.126	0.112	0.115	0.118	0.162	0.085	0.112	0.184	0.178	0.184	0.162
90	KJ745293 *Aname* sp MYG351 voucher T82309	0.118	0.096	0.112	0.115	0.151	0.088	0.110	0.175	0.175	0.181	0.148
91	KJ745375 *Aname* sp MYG034 voucher T93314	0.140	0.115	0.121	0.126	0.170	0.099	0.110	0.192	0.189	0.173	0.162
92	KJ745401 *Kwonkan* sp MYG006 voucher T95405	0.230	0.216	0.170	0.173	0.181	0.192	0.178	0.140	0.159	0.151	0.200
93	KJ745429 *Aname* sp MYG030 voucher T96495	0.159	0.153	0.162	0.170	0.175	0.175	0.159	0.181	0.184	0.197	0.164
94	KJ745494 *Aname* sp MYG034 voucher T98900	0.129	0.115	0.115	0.115	0.167	0.093	0.107	0.181	0.156	0.175	0.159
95	MG800157 *Aname* sp MYG411 voucher WAMT94952	0.085	0.066	0.132	0.137	0.153	0.112	0.126	0.170	0.175	0.184	0.148
96	EU404114 *Centruroides vittatus*	0.274	0.255	0.266	0.274	0.244	0.271	0.271	0.249	0.263	0.252	0.266
97	JF700146 *Mesobuthus martensii*	0.279	0.271	0.252	0.255	0.255	0.279	0.266	0.247	0.258	0.233	0.266
98	KJ7447421 Selenotholus sp MYG381 voucher T113579	0.233	0.211	0.208	0.211	0.203	0.230	0.219	0.181	0.214	0.216	0.216

		56	57	58	59	60	61	62	63	64	65	66
1	**PP01**	0.018	0.018	0.019	0.020	0.015	0.018	0.020	0.020	0.016	0.016	0.020
2	**PP02**	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.018	0.019	0.020	0.019
3	**PP03**	0.018	0.018	0.019	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.020
4	**PP04**	0.020	0.020	0.021	0.020	0.020	0.020	0.018	0.017	0.020	0.020	0.020
5	**PP05**	0.018	0.018	0.019	0.018	0.017	0.017	0.018	0.018	0.017	0.017	0.020
6	**PP06**	0.018	0.018	0.019	0.018	0.017	0.017	0.018	0.018	0.017	0.017	0.020
7	NAD_N93_AC10	0.021	0.021	0.022	0.021	0.021	0.021	0.020	0.020	0.022	0.022	0.021
8	NAI_N8_AD1	0.020	0.020	0.021	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.020
9	NAW_N6_AD429	0.019	0.019	0.019	0.020	0.012	0.017	0.020	0.020	0.016	0.017	0.019
10	NAZ_N6_AD457	0.019	0.019	0.019	0.020	0.015	0.017	0.019	0.019	0.017	0.018	0.019
11	NBC_N6_AD577	0.019	0.019	0.019	0.020	0.014	0.017	0.020	0.019	0.017	0.018	0.019
12	NBE_N46_AD583	0.021	0.020	0.021	0.021	0.021	0.020	0.019	0.019	0.021	0.022	0.020
13	NBF_N11_AD592	0.021	0.020	0.021	0.019	0.020	0.019	0.020	0.020	0.019	0.019	0.021
14	NBR_N14_AD746	0.020	0.020	0.020	0.018	0.020	0.019	0.020	0.020	0.019	0.020	0.021
15	NBT_N7_AD748	0.019	0.019	0.019	0.018	0.017	0.017	0.019	0.019	0.000	0.007	0.020
16	NBU_N15_AD753	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.018	0.019	0.020	0.020
17	NBW_N50_AD784	0.021	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020
18	NBY_N13_AF26b	0.020	0.019	0.020	0.020	0.021	0.020	0.020	0.020	0.020	0.020	0.021
19	NCU_N110_O211	0.019	0.019	0.019	0.018	0.020	0.019	0.018	0.018	0.020	0.019	0.020
20	NCW_N66_O280	0.018	0.018	0.019	0.017	0.018	0.019	0.018	0.019	0.017	0.018	0.020
21	NCY_N67_O282	0.020	0.020	0.019	0.020	0.019	0.020	0.020	0.020	0.019	0.019	0.020
22	NCZ_N110_O285	0.020	0.019	0.019	0.019	0.019	0.018	0.019	0.019	0.019	0.019	0.020
23	NDC_N84_O288	0.021	0.020	0.020	0.020	0.021	0.019	0.019	0.019	0.020	0.020	0.020
24	NDD_N101_O292	0.019	0.019	0.019	0.019	0.020	0.019	0.018	0.018	0.020	0.020	0.020
25	NDG_N78_O304	0.020	0.017	0.017	0.019	0.019	0.019	0.019	0.019	0.020	0.020	0.021
26	NDK_N94_O333	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.019
27	NDL_N96_O334	0.021	0.021	0.021	0.020	0.020	0.020	0.020	0.020	0.021	0.021	0.020
28	NEH_N112_BI22	0.019	0.019	0.019	0.018	0.018	0.018	0.019	0.019	0.016	0.016	0.020
29	NEM_N43_DW15	0.021	0.021	0.022	0.021	0.021	0.020	0.019	0.019	0.021	0.021	0.021
30	NEM_N43_AT53	0.021	0.021	0.022	0.021	0.021	0.020	0.019	0.019	0.021	0.021	0.021
31	NEN_N115_AD594	0.020	0.019	0.020	0.019	0.020	0.019	0.017	0.017	0.020	0.020	0.018
32	NFN_N43_CG5	0.020	0.021	0.022	0.021	0.021	0.020	0.019	0.019	0.021	0.021	0.021
33	NFZ_N122_BV095	0.021	0.021	0.021	0.021	0.020	0.021	0.020	0.020	0.021	0.021	0.021
34	NGE_N130_CW14	0.021	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.021	0.021	0.019
35	NGQ_N134_DG3	0.019	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.020	0.020	0.019
36	NGS_N136_DG10	0.020	0.020	0.020	0.020	0.020	0.018	0.020	0.020	0.018	0.018	0.021

		56	57	58	59	60	61	62	63	64	65	66
37	NRC_N150_PC15	0.021	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.020	0.020	0.018
38	NRF_N7_NN11	0.019	0.019	0.019	0.018	0.017	0.017	0.019	0.019	0.011	0.012	0.020
39	NRG_N7_NN15	0.019	0.019	0.019	0.018	0.017	0.017	0.019	0.019	0.010	0.011	0.019
40	NRH_N7_NN16	0.019	0.019	0.020	0.018	0.017	0.018	0.020	0.020	0.011	0.012	0.020
41	NRI_N7_NN17	0.019	0.019	0.020	0.018	0.017	0.017	0.020	0.020	0.011	0.012	0.020
42	NRJ_N7_NN18	0.019	0.019	0.019	0.018	0.017	0.017	0.020	0.020	0.011	0.012	0.020
43	NRK_N7_NN20	0.019	0.019	0.019	0.018	0.016	0.017	0.020	0.020	0.011	0.011	0.020
44	NRL_N7_NN21	0.019	0.019	0.019	0.018	0.016	0.017	0.020	0.020	0.011	0.012	0.020
45	NRM_N7_NN37	0.019	0.019	0.019	0.019	0.018	0.017	0.020	0.020	0.013	0.011	0.020
46	NRO_N7_NN38	0.019	0.019	0.019	0.018	0.017	0.017	0.020	0.020	0.011	0.011	0.020
47	NRP_N138_NN35	0.018	0.018	0.019	0.019	0.017	0.018	0.020	0.019	0.018	0.019	0.019
48	NRQ_N138_NN36	0.019	0.018	0.019	0.020	0.017	0.018	0.020	0.019	0.018	0.019	0.019
49	NRZ_N147_PC18	0.020	0.020	0.019	0.020	0.020	0.019	0.018	0.018	0.019	0.020	0.020
50	NSA_N148_PC16	0.018	0.018	0.019	0.020	0.015	0.018	0.020	0.020	0.016	0.017	0.020
51	NSB_N149_PC26	0.020	0.019	0.019	0.019	0.016	0.017	0.020	0.020	0.017	0.017	0.019
52	NSD_N151_PC13	0.020	0.020	0.020	0.020	0.020	0.020	0.018	0.017	0.020	0.020	0.019
53	NY_N37_AR64	0.020	0.020	0.021	0.020	0.019	0.020	0.020	0.019	0.021	0.020	0.021
54	T101209 *Kwonkan* MYG175 NHP	0.020	0.021	0.020	0.021	0.020	0.020	0.020	0.020	0.021	0.021	0.020
55	T108978 *Aname* MYG214 NHC	0.021	0.020	0.021	0.020	0.019	0.019	0.020	0.020	0.019	0.019	0.020
56	T112084 *Synothele* MYG127 NHD		0.018	0.018	0.020	0.019	0.018	0.019	0.019	0.019	0.019	0.020
57	T112949 *Aname* MYG227 NHG	0.145		0.017	0.019	0.019	0.017	0.019	0.019	0.019	0.019	0.020
58	T96570 *Aname* MYG067 NHF	0.134	0.118		0.019	0.019	0.018	0.020	0.020	0.019	0.020	0.020
59	T98767 *Aname* MYG102 NHI	0.170	0.153	0.153		0.020	0.019	0.019	0.019	0.018	0.018	0.020
60	T98900 *Aname* MYG034 NHJ	0.148	0.151	0.153	0.167		0.018	0.020	0.020	0.017	0.018	0.020
61	JQ772139 *Aname* sp 2 MGR-2012 voucher WAMT98892	0.145	0.126	0.142	0.148	0.129		0.019	0.018	0.017	0.017	0.020
62	KJ744505 *Aname mellosa* voucher T103199	0.151	0.153	0.167	0.151	0.181	0.148		0.006	0.019	0.020	0.017
63	KJ744623 *Aname mellosa* voucher T105871	0.159	0.156	0.175	0.151	0.178	0.142	0.014		0.019	0.020	0.017
64	KJ744648 *Aname* sp MYG373 voucher T107087	0.156	0.151	0.164	0.140	0.126	0.115	0.164	0.164		0.007	0.020
65	KJ744649 *Aname* sp MYG373 voucher T107089	0.162	0.148	0.170	0.140	0.137	0.115	0.173	0.173	0.019		0.020
66	KJ744677 *Aname mellosa* voucher T107987	0.173	0.184	0.181	0.167	0.175	0.181	0.121	0.118	0.170	0.181	
67	KJ744775 *Aname mellosa* voucher T113629	0.151	0.153	0.170	0.153	0.181	0.148	0.005	0.008	0.164	0.173	0.118
68	KJ744785 *Aname mellosa* voucher T113642	0.153	0.156	0.173	0.153	0.178	0.145	0.011	0.008	0.164	0.173	0.115
69	KJ744788 *Aname mellosa* voucher T113648	0.159	0.151	0.175	0.156	0.181	0.148	0.014	0.011	0.167	0.175	0.126
70	KJ744791 *Aname mellosa* voucher T113654	0.153	0.153	0.170	0.151	0.178	0.145	0.014	0.011	0.162	0.170	0.121
71	KJ744833 *Kwonkan* sp MYG006 voucher T114812	0.186	0.189	0.189	0.186	0.162	0.181	0.170	0.162	0.197	0.208	0.186
72	KJ744901 *Aname* sp MYG331 voucher T118789	0.159	0.151	0.153	0.134	0.129	0.126	0.151	0.156	0.099	0.107	0.184

		56	57	58	59	60	61	62	63	64	65	66
73	KJ744902 *Aname* sp MYG331 voucher T118791	0.159	0.151	0.153	0.134	0.129	0.126	0.151	0.156	0.099	0.107	0.184
74	KJ744909 *Aname* sp MYG331 voucher T118805	0.156	0.148	0.151	0.137	0.126	0.123	0.153	0.159	0.096	0.104	0.181
75	KJ744910 *Aname* sp MYG331 voucher T118811	0.162	0.153	0.156	0.137	0.132	0.129	0.153	0.159	0.101	0.110	0.186
76	KJ744911 Aname sp MYG331 voucher T118812	0.162	0.142	0.156	0.129	0.132	0.123	0.153	0.159	0.090	0.099	0.178
77	KJ744914 *Aname* sp MYG331 voucher T118818	0.159	0.140	0.153	0.132	0.129	0.121	0.156	0.162	0.090	0.099	0.181
78	KJ744982 *Aname mellosa* voucher T122207	0.148	0.145	0.164	0.148	0.178	0.145	0.016	0.022	0.167	0.175	0.110
79	KJ744987 *Aname mellosa* voucher T122215	0.159	0.162	0.173	0.164	0.175	0.142	0.022	0.025	0.173	0.181	0.129
80	KJ744989 *Aname mellosa* voucher T122218	0.167	0.170	0.184	0.167	0.184	0.153	0.030	0.022	0.175	0.184	0.126
81	KJ744990 *Aname mellosa* voucher T122219	0.175	0.175	0.184	0.162	0.189	0.159	0.036	0.033	0.184	0.192	0.129
82	KJ744992 *Aname mellosa* voucher T122222	0.178	0.178	0.186	0.164	0.192	0.159	0.036	0.033	0.186	0.195	0.134
83	KJ745155 *Aname mellosa* voucher T126273	0.153	0.153	0.170	0.148	0.175	0.145	0.019	0.016	0.164	0.173	0.123
84	KJ745231 *Aname* sp MYG351 voucher T74238	0.153	0.156	0.159	0.167	0.055	0.126	0.175	0.175	0.107	0.118	0.162
85	KJ745232 *Aname* sp MYG351 voucher T74241	0.153	0.156	0.159	0.167	0.055	0.126	0.175	0.175	0.107	0.118	0.162
86	KJ745233 *Aname* sp MYG351 voucher T74247	0.153	0.156	0.159	0.167	0.055	0.126	0.175	0.175	0.107	0.118	0.162
87	KJ745281 *Kwonkan* sp MYG361 voucher T78543	0.200	0.197	0.203	0.184	0.170	0.181	0.175	0.170	0.200	0.203	0.181
88	KJ745287 *Aname* sp MYG351 voucher T82303	0.153	0.156	0.159	0.167	0.055	0.126	0.175	0.175	0.107	0.118	0.162
89	KJ745288 *Aname* sp MYG351 voucher T82304	0.153	0.153	0.151	0.175	0.044	0.134	0.178	0.181	0.129	0.134	0.175
90	KJ745293 *Aname* sp MYG351 voucher T82309	0.153	0.156	0.159	0.167	0.055	0.126	0.175	0.175	0.107	0.118	0.162
91	KJ745375 *Aname* sp MYG034 voucher T93314	0.151	0.156	0.159	0.173	0.079	0.118	0.167	0.162	0.123	0.137	0.162
92	KJ745401 *Kwonkan* sp MYG006 voucher T95405	0.195	0.170	0.205	0.200	0.192	0.184	0.151	0.151	0.205	0.216	0.173
93	KJ745429 *Aname* sp MYG030 voucher T96495	0.145	0.159	0.159	0.151	0.148	0.142	0.178	0.178	0.167	0.170	0.197
94	KJ745494 *Aname* sp MYG034 voucher T98900	0.148	0.151	0.153	0.167	0.000	0.129	0.181	0.178	0.126	0.137	0.175
95	MG800157 *Aname* sp MYG411 voucher WAMT94952	0.151	0.132	0.148	0.142	0.101	0.121	0.164	0.170	0.082	0.085	0.189
96	EU404114 *Centruroides vittatus*	0.271	0.255	0.268	0.247	0.271	0.268	0.241	0.244	0.268	0.268	0.249
97	JF700146 *Mesobuthus martensii*	0.266	0.268	0.252	0.255	0.263	0.263	0.266	0.266	0.268	0.266	0.266
98	KJ7447421 Selenotholus sp MYG381 voucher T113579	0.230	0.214	0.230	0.208	0.233	0.208	0.181	0.175	0.222	0.230	0.211

		67	68	69	70	71	72	73	74	75	76	77
1	**PP01**	0.020	0.020	0.020	0.020	0.020	0.017	0.017	0.017	0.017	0.017	0.017
2	**PP02**	0.018	0.018	0.018	0.018	0.020	0.019	0.019	0.019	0.019	0.019	0.019
3	**PP03**	0.018	0.018	0.019	0.018	0.020	0.016	0.016	0.016	0.016	0.015	0.015
4	**PP04**	0.018	0.018	0.018	0.018	0.018	0.020	0.020	0.020	0.020	0.020	0.020
5	**PP05**	0.018	0.018	0.019	0.018	0.020	0.016	0.016	0.016	0.016	0.015	0.015
6	**PP06**	0.018	0.018	0.019	0.018	0.020	0.016	0.016	0.016	0.016	0.015	0.015
7	NAD_N93_AC10	0.020	0.020	0.020	0.020	0.018	0.022	0.022	0.022	0.022	0.021	0.021
8	NAI_N8_AD1	0.020	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.020	0.020	0.019
9	NAW_N6_AD429	0.020	0.020	0.020	0.020	0.020	0.017	0.017	0.017	0.017	0.017	0.017
10	NAZ_N6_AD457	0.019	0.019	0.019	0.019	0.020	0.017	0.017	0.017	0.017	0.017	0.017
11	NBC_N6_AD577	0.020	0.019	0.019	0.019	0.020	0.017	0.017	0.017	0.017	0.017	0.017
12	NBE_N46_AD583	0.019	0.019	0.019	0.019	0.016	0.021	0.021	0.021	0.021	0.021	0.020
13	NBF_N11_AD592	0.020	0.020	0.020	0.020	0.021	0.019	0.019	0.019	0.019	0.018	0.018
14	NBR_N14_AD746	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
15	NBT_N7_AD748	0.019	0.019	0.020	0.019	0.021	0.016	0.016	0.015	0.016	0.015	0.015
16	NBU_N15_AD753	0.019	0.019	0.019	0.018	0.019	0.020	0.020	0.020	0.019	0.019	0.019
17	NBW_N50_AD784	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020
18	NBY_N13_AF26b	0.020	0.020	0.020	0.021	0.022	0.020	0.020	0.020	0.020	0.020	0.020
19	NCU_N110_O211	0.019	0.018	0.018	0.019	0.021	0.019	0.019	0.019	0.019	0.018	0.019
20	NCW_N66_O280	0.018	0.019	0.019	0.018	0.021	0.018	0.018	0.018	0.018	0.017	0.017
21	NCY_N67_O282	0.020	0.020	0.020	0.020	0.022	0.018	0.018	0.019	0.019	0.019	0.018
22	NCZ_N110_O285	0.019	0.019	0.019	0.019	0.021	0.018	0.018	0.018	0.018	0.018	0.018
23	NDC_N84_O288	0.019	0.019	0.019	0.019	0.021	0.020	0.020	0.020	0.020	0.020	0.020
24	NDD_N101_O292	0.018	0.018	0.018	0.018	0.020	0.018	0.018	0.018	0.018	0.018	0.018
25	NDG_N78_O304	0.020	0.020	0.019	0.020	0.021	0.019	0.019	0.019	0.019	0.019	0.019
26	NDK_N94_O333	0.020	0.020	0.020	0.020	0.018	0.020	0.020	0.020	0.020	0.020	0.020
27	NDL_N96_O334	0.020	0.020	0.020	0.020	0.018	0.020	0.020	0.020	0.020	0.020	0.020
28	NEH_N112_BI22	0.019	0.019	0.019	0.019	0.021	0.003	0.003	0.004	0.000	0.008	0.008
29	NEM_N43_DW15	0.019	0.019	0.019	0.019	0.020	0.021	0.021	0.021	0.021	0.021	0.021
30	NEM_N43_AT53	0.019	0.019	0.019	0.019	0.020	0.021	0.021	0.021	0.021	0.021	0.021
31	NEN_N115_AD594	0.017	0.017	0.017	0.017	0.021	0.020	0.020	0.020	0.020	0.020	0.020
32	NFN_N43_CG5	0.019	0.019	0.019	0.019	0.020	0.021	0.021	0.021	0.021	0.021	0.021
33	NFZ_N122_BV095	0.020	0.020	0.019	0.020	0.018	0.021	0.021	0.021	0.021	0.021	0.021
34	NGE_N130_CW14	0.019	0.019	0.019	0.019	0.018	0.020	0.020	0.020	0.021	0.020	0.020
35	NGQ_N134_DG3	0.018	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019
36	NGS_N136_DG10	0.020	0.020	0.020	0.020	0.020	0.018	0.018	0.018	0.018	0.018	0.018

		67	68	69	70	71	72	73	74	75	76	77
37	NRC_N150_PC15	0.019	0.019	0.019	0.019	0.019	0.020	0.020	0.020	0.020	0.020	0.020
38	NRF_N7_NN11	0.019	0.019	0.019	0.019	0.020	0.014	0.014	0.014	0.015	0.014	0.014
39	NRG_N7_NN15	0.019	0.019	0.020	0.020	0.020	0.015	0.015	0.014	0.015	0.014	0.014
40	NRH_N7_NN16	0.020	0.020	0.020	0.020	0.020	0.015	0.015	0.015	0.015	0.015	0.015
41	NRI_N7_NN17	0.020	0.020	0.020	0.020	0.021	0.015	0.015	0.015	0.015	0.015	0.015
42	NRJ_N7_NN18	0.020	0.020	0.020	0.020	0.021	0.015	0.015	0.015	0.015	0.015	0.015
43	NRK_N7_NN20	0.020	0.020	0.020	0.020	0.020	0.015	0.015	0.015	0.015	0.015	0.015
44	NRL_N7_NN21	0.020	0.020	0.020	0.020	0.020	0.014	0.014	0.015	0.015	0.014	0.014
45	NRM_N7_NN37	0.020	0.020	0.020	0.020	0.021	0.016	0.016	0.016	0.016	0.016	0.016
46	NRO_N7_NN38	0.020	0.020	0.020	0.020	0.020	0.014	0.014	0.015	0.015	0.014	0.014
47	NRP_N138_NN35	0.019	0.019	0.019	0.020	0.020	0.017	0.017	0.017	0.018	0.017	0.017
48	NRQ_N138_NN36	0.019	0.019	0.019	0.020	0.020	0.017	0.017	0.017	0.018	0.017	0.017
49	NRZ_N147_PC18	0.018	0.018	0.018	0.018	0.019	0.019	0.019	0.019	0.019	0.019	0.019
50	NSA_N148_PC16	0.020	0.020	0.020	0.020	0.020	0.017	0.017	0.017	0.017	0.017	0.017
51	NSB_N149_PC26	0.020	0.020	0.020	0.020	0.020	0.018	0.018	0.018	0.018	0.018	0.018
52	NSD_N151_PC13	0.018	0.017	0.018	0.018	0.018	0.019	0.019	0.019	0.019	0.020	0.019
53	NY_N37_AR64	0.019	0.019	0.019	0.020	0.019	0.020	0.020	0.020	0.020	0.020	0.020
54	T101209 *Kwonkan* MYG175 NHP	0.020	0.020	0.020	0.020	0.017	0.020	0.020	0.020	0.020	0.020	0.020
55	T108978 *Aname* MYG214 NHC	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.019	0.019	0.019
56	T112084 *Synothele* MYG127 NHD	0.019	0.019	0.019	0.019	0.020	0.019	0.019	0.019	0.019	0.019	0.019
57	T112949 *Aname* MYG227 NHG	0.019	0.019	0.019	0.019	0.020	0.019	0.019	0.019	0.019	0.018	0.018
58	T96570 *Aname* MYG067 NHF	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.019	0.019	0.019
59	T98767 *Aname* MYG102 NHI	0.019	0.019	0.019	0.019	0.020	0.018	0.018	0.018	0.018	0.018	0.018
60	T98900 *Aname* MYG034 NHJ	0.020	0.020	0.020	0.020	0.019	0.018	0.018	0.017	0.018	0.018	0.018
61	JQ772139 *Aname* sp 2 MGR-2012 voucher WAMT98892	0.019	0.018	0.019	0.018	0.020	0.017	0.017	0.017	0.018	0.017	0.017
62	KJ744505 *Aname mellosa* voucher T103199	0.004	0.005	0.006	0.006	0.020	0.019	0.019	0.019	0.019	0.019	0.019
63	KJ744623 *Aname mellosa* voucher T105871	0.005	0.005	0.005	0.005	0.019	0.019	0.019	0.019	0.019	0.019	0.019
64	KJ744648 *Aname* sp MYG373 voucher T107087	0.019	0.019	0.020	0.019	0.021	0.016	0.016	0.015	0.016	0.015	0.015
65	KJ744649 *Aname* sp MYG373 voucher T107089	0.020	0.020	0.020	0.020	0.021	0.016	0.016	0.016	0.016	0.016	0.016
66	KJ744677 *Aname mellosa* voucher T107987	0.017	0.017	0.017	0.017	0.020	0.020	0.020	0.020	0.020	0.020	0.020
67	KJ744775 *Aname mellosa* voucher T113629		0.004	0.005	0.005	0.019	0.019	0.019	0.019	0.019	0.019	0.019
68	KJ744785 *Aname mellosa* voucher T113642	0.005		0.006	0.006	0.019	0.019	0.019	0.019	0.019	0.019	0.019
69	KJ744788 *Aname mellosa* voucher T113648	0.008	0.014		0.007	0.020	0.019	0.019	0.019	0.019	0.019	0.019
70	KJ744791 *Aname mellosa* voucher T113654	0.008	0.014	0.016		0.019	0.019	0.019	0.019	0.019	0.019	0.019
71	KJ744833 *Kwonkan* sp MYG006 voucher T114812	0.164	0.164	0.170	0.162		0.021	0.021	0.021	0.021	0.020	0.020
72	KJ744901 *Aname* sp MYG331 voucher T118789	0.153	0.153	0.156	0.159	0.192		0.000	0.003	0.003	0.008	0.007

		67	68	69	70	71	72	73	74	75	76	77
73	KJ744902 *Aname* sp MYG331 voucher T118791	0.153	0.153	0.156	0.159	0.192	0.000		0.003	0.003	0.008	0.007
74	KJ744909 *Aname* sp MYG331 voucher T118805	0.156	0.156	0.159	0.162	0.195	0.003	0.003		0.004	0.008	0.008
75	KJ744910 *Aname* sp MYG331 voucher T118811	0.156	0.156	0.159	0.162	0.195	0.003	0.003	0.005		0.008	0.008
76	KJ744911 Aname sp MYG331 voucher T118812	0.156	0.156	0.156	0.156	0.186	0.022	0.022	0.025	0.025		0.003
77	KJ744914 *Aname* sp MYG331 voucher T118818	0.159	0.159	0.159	0.159	0.184	0.019	0.019	0.022	0.022	0.003	
78	KJ744982 *Aname mellosa* voucher T122207	0.014	0.019	0.022	0.022	0.159	0.145	0.145	0.148	0.148	0.148	0.151
79	KJ744987 *Aname mellosa* voucher T122215	0.016	0.022	0.025	0.025	0.153	0.156	0.156	0.159	0.159	0.159	0.162
80	KJ744989 *Aname mellosa* voucher T122218	0.025	0.019	0.033	0.027	0.170	0.167	0.167	0.170	0.170	0.170	0.173
81	KJ744990 *Aname mellosa* voucher T122219	0.036	0.036	0.044	0.038	0.181	0.173	0.173	0.175	0.175	0.175	0.178
82	KJ744992 *Aname mellosa* voucher T122222	0.036	0.036	0.044	0.038	0.181	0.175	0.175	0.178	0.178	0.178	0.181
83	KJ745155 *Aname mellosa* voucher T126273	0.014	0.008	0.022	0.016	0.164	0.159	0.159	0.162	0.162	0.156	0.159
84	KJ745231 *Aname* sp MYG351 voucher T74238	0.178	0.175	0.175	0.175	0.167	0.123	0.123	0.121	0.126	0.121	0.118
85	KJ745232 *Aname* sp MYG351 voucher T74241	0.178	0.175	0.175	0.175	0.167	0.123	0.123	0.121	0.126	0.121	0.118
86	KJ745233 *Aname* sp MYG351 voucher T74247	0.178	0.175	0.175	0.175	0.167	0.123	0.123	0.121	0.126	0.121	0.118
87	KJ745281 *Kwonkan* sp MYG361 voucher T78543	0.170	0.167	0.173	0.175	0.145	0.186	0.186	0.189	0.189	0.184	0.186
88	KJ745287 *Aname* sp MYG351 voucher T82303	0.178	0.175	0.175	0.175	0.167	0.123	0.123	0.121	0.126	0.121	0.118
89	KJ745288 *Aname* sp MYG351 voucher T82304	0.184	0.181	0.184	0.181	0.170	0.137	0.137	0.134	0.140	0.134	0.132
90	KJ745293 *Aname* sp MYG351 voucher T82309	0.178	0.175	0.175	0.175	0.167	0.123	0.123	0.121	0.126	0.121	0.118
91	KJ745375 *Aname* sp MYG034 voucher T93314	0.167	0.164	0.162	0.162	0.175	0.123	0.123	0.121	0.126	0.115	0.118
92	KJ745401 *Kwonkan* sp MYG006 voucher T95405	0.153	0.153	0.159	0.156	0.110	0.195	0.195	0.197	0.192	0.192	0.189
93	KJ745429 *Aname* sp MYG030 voucher T96495	0.178	0.181	0.181	0.178	0.205	0.145	0.145	0.148	0.148	0.142	0.142
94	KJ745494 *Aname* sp MYG034 voucher T98900	0.181	0.178	0.181	0.178	0.162	0.129	0.129	0.126	0.132	0.132	0.129
95	MG800157 *Aname* sp MYG411 voucher WAMT94952	0.167	0.167	0.167	0.167	0.184	0.085	0.085	0.082	0.088	0.079	0.077
96	EU404114 *Centruroides vittatus*	0.244	0.247	0.238	0.247	0.241	0.258	0.258	0.260	0.260	0.258	0.255
97	JF700146 *Mesobuthus martensii*	0.263	0.266	0.266	0.266	0.230	0.266	0.266	0.268	0.268	0.263	0.260
98	KJ7447421 Selenotholus sp MYG381 voucher T113579	0.181	0.178	0.178	0.186	0.214	0.195	0.195	0.197	0.197	0.195	0.197

		78	79	80	81	82	83	84	85	86	87	88
1	**PP01**	0.020	0.020	0.020	0.020	0.020	0.020	0.015	0.015	0.015	0.021	0.015
2	**PP02**	0.018	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.020	0.019
3	**PP03**	0.018	0.019	0.019	0.019	0.019	0.018	0.017	0.017	0.017	0.021	0.017
4	**PP04**	0.017	0.018	0.018	0.018	0.018	0.018	0.020	0.020	0.020	0.017	0.020
5	**PP05**	0.018	0.019	0.019	0.019	0.019	0.018	0.017	0.017	0.017	0.021	0.017
6	**PP06**	0.018	0.019	0.019	0.019	0.019	0.018	0.017	0.017	0.017	0.021	0.017
7	NAD_N93_AC10	0.020	0.020	0.021	0.021	0.021	0.020	0.021	0.021	0.021	0.019	0.021
8	NAI_N8_AD1	0.020	0.021	0.021	0.021	0.021	0.020	0.021	0.021	0.021	0.021	0.021
9	NAW_N6_AD429	0.020	0.020	0.020	0.020	0.021	0.020	0.000	0.000	0.000	0.020	0.000
10	NAZ_N6_AD457	0.019	0.019	0.019	0.019	0.019	0.019	0.014	0.014	0.014	0.020	0.014
11	NBC_N6_AD577	0.020	0.020	0.020	0.020	0.020	0.019	0.013	0.013	0.013	0.020	0.013
12	NBE_N46_AD583	0.019	0.019	0.019	0.019	0.020	0.019	0.021	0.021	0.021	0.019	0.021
13	NBF_N11_AD592	0.020	0.020	0.021	0.021	0.021	0.020	0.020	0.020	0.020	0.021	0.020
14	NBR_N14_AD746	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.021	0.020
15	NBT_N7_AD748	0.020	0.020	0.020	0.020	0.020	0.019	0.016	0.016	0.016	0.021	0.016
16	NBU_N15_AD753	0.019	0.019	0.019	0.018	0.019	0.019	0.020	0.020	0.020	0.021	0.020
17	NBW_N50_AD784	0.020	0.020	0.020	0.020	0.021	0.020	0.020	0.020	0.020	0.020	0.020
18	NBY_N13_AF26b	0.020	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.021	0.023	0.021
19	NCU_N110_O211	0.018	0.019	0.019	0.018	0.018	0.019	0.019	0.019	0.019	0.020	0.019
20	NCW_N66_O280	0.018	0.019	0.019	0.019	0.019	0.019	0.018	0.018	0.018	0.020	0.018
21	NCY_N67_O282	0.020	0.020	0.020	0.020	0.020	0.020	0.018	0.018	0.018	0.022	0.018
22	NCZ_N110_O285	0.018	0.019	0.019	0.019	0.019	0.019	0.018	0.018	0.018	0.021	0.018
23	NDC_N84_O288	0.019	0.019	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.021	0.020
24	NDD_N101_O292	0.018	0.018	0.019	0.019	0.019	0.018	0.019	0.019	0.019	0.021	0.019
25	NDG_N78_O304	0.019	0.020	0.020	0.020	0.020	0.020	0.018	0.018	0.018	0.021	0.018
26	NDK_N94_O333	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.018	0.020
27	NDL_N96_O334	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.000	0.020
28	NEH_N112_BI22	0.019	0.019	0.020	0.020	0.020	0.019	0.017	0.017	0.017	0.020	0.017
29	NEM_N43_DW15	0.019	0.019	0.020	0.019	0.020	0.019	0.020	0.020	0.020	0.020	0.020
30	NEM_N43_AT53	0.019	0.019	0.020	0.019	0.019	0.019	0.020	0.020	0.020	0.020	0.020
31	NEN_N115_AD594	0.017	0.017	0.018	0.018	0.018	0.017	0.020	0.020	0.020	0.020	0.020
32	NFN_N43_CG5	0.019	0.019	0.020	0.020	0.020	0.019	0.021	0.021	0.021	0.020	0.021
33	NFZ_N122_BV095	0.020	0.019	0.020	0.020	0.021	0.020	0.020	0.020	0.020	0.020	0.020
34	NGE_N130_CW14	0.018	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.019	0.017	0.019
35	NGQ_N134_DG3	0.018	0.019	0.019	0.019	0.019	0.019	0.020	0.020	0.020	0.018	0.020
36	NGS_N136_DG10	0.020	0.020	0.020	0.021	0.021	0.020	0.019	0.019	0.019	0.021	0.019

		78	79	80	81	82	83	84	85	86	87	88
37	NRC_N150_PC15	0.019	0.019	0.019	0.020	0.020	0.019	0.020	0.020	0.020	0.018	0.020
38	NRF_N7_NN11	0.019	0.020	0.020	0.020	0.020	0.020	0.016	0.016	0.016	0.020	0.016
39	NRG_N7_NN15	0.020	0.020	0.020	0.020	0.020	0.020	0.016	0.016	0.016	0.020	0.016
40	NRH_N7_NN16	0.020	0.020	0.020	0.021	0.021	0.020	0.016	0.016	0.016	0.020	0.016
41	NRI_N7_NN17	0.020	0.020	0.020	0.020	0.020	0.020	0.016	0.016	0.016	0.020	0.016
42	NRJ_N7_NN18	0.020	0.020	0.020	0.020	0.021	0.020	0.016	0.016	0.016	0.020	0.016
43	NRK_N7_NN20	0.020	0.020	0.021	0.021	0.021	0.020	0.015	0.015	0.015	0.020	0.015
44	NRL_N7_NN21	0.020	0.020	0.020	0.021	0.021	0.020	0.015	0.015	0.015	0.020	0.015
45	NRM_N7_NN37	0.020	0.020	0.021	0.021	0.021	0.020	0.017	0.017	0.017	0.021	0.017
46	NRO_N7_NN38	0.020	0.020	0.020	0.021	0.021	0.020	0.015	0.015	0.015	0.020	0.015
47	NRP_N138_NN35	0.019	0.019	0.020	0.020	0.020	0.020	0.017	0.017	0.017	0.021	0.017
48	NRQ_N138_NN36	0.019	0.019	0.020	0.020	0.020	0.020	0.017	0.017	0.017	0.021	0.017
49	NRZ_N147_PC18	0.018	0.018	0.018	0.018	0.019	0.018	0.019	0.019	0.019	0.020	0.019
50	NSA_N148_PC16	0.020	0.020	0.020	0.020	0.021	0.020	0.015	0.015	0.015	0.021	0.015
51	NSB_N149_PC26	0.019	0.020	0.020	0.020	0.020	0.020	0.016	0.016	0.016	0.021	0.016
52	NSD_N151_PC13	0.017	0.018	0.018	0.018	0.018	0.018	0.020	0.020	0.020	0.017	0.020
53	NY_N37_AR64	0.019	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.019	0.020
54	T101209 *Kwonkan* MYG175 NHP	0.020	0.020	0.020	0.021	0.021	0.020	0.020	0.020	0.020	0.018	0.020
55	T108978 *Aname* MYG214 NHC	0.020	0.020	0.020	0.021	0.021	0.020	0.019	0.019	0.019	0.020	0.019
56	T112084 *Synothele* MYG127 NHD	0.019	0.019	0.020	0.020	0.020	0.019	0.019	0.019	0.019	0.021	0.019
57	T112949 *Aname* MYG227 NHG	0.018	0.019	0.020	0.020	0.020	0.019	0.019	0.019	0.019	0.021	0.019
58	T96570 *Aname* MYG067 NHF	0.019	0.020	0.020	0.020	0.020	0.020	0.019	0.019	0.019	0.021	0.019
59	T98767 *Aname* MYG102 NHI	0.019	0.019	0.020	0.019	0.019	0.019	0.020	0.020	0.020	0.020	0.020
60	T98900 *Aname* MYG034 NHJ	0.020	0.020	0.020	0.020	0.021	0.020	0.012	0.012	0.012	0.020	0.012
61	JQ772139 *Aname* sp 2 MGR-2012 voucher WAMT98892	0.018	0.018	0.019	0.019	0.019	0.018	0.017	0.017	0.017	0.020	0.017
62	KJ744505 *Aname mellosa* voucher T103199	0.007	0.008	0.009	0.010	0.010	0.007	0.020	0.020	0.020	0.020	0.020
63	KJ744623 *Aname mellosa* voucher T105871	0.008	0.008	0.008	0.009	0.009	0.007	0.020	0.020	0.020	0.020	0.020
64	KJ744648 *Aname* sp MYG373 voucher T107087	0.020	0.020	0.020	0.020	0.020	0.019	0.016	0.016	0.016	0.021	0.016
65	KJ744649 *Aname* sp MYG373 voucher T107089	0.020	0.020	0.020	0.021	0.021	0.020	0.017	0.017	0.017	0.021	0.017
66	KJ744677 *Aname mellosa* voucher T107987	0.016	0.018	0.017	0.018	0.018	0.017	0.019	0.019	0.019	0.020	0.019
67	KJ744775 *Aname mellosa* voucher T113629	0.006	0.007	0.008	0.010	0.010	0.006	0.020	0.020	0.020	0.020	0.020
68	KJ744785 *Aname mellosa* voucher T113642	0.007	0.008	0.007	0.010	0.010	0.005	0.020	0.020	0.020	0.020	0.020
69	KJ744788 *Aname mellosa* voucher T113648	0.008	0.008	0.009	0.011	0.011	0.008	0.020	0.020	0.020	0.020	0.020
70	KJ744791 *Aname mellosa* voucher T113654	0.008	0.008	0.009	0.010	0.010	0.007	0.020	0.020	0.020	0.020	0.020
71	KJ744833 *Kwonkan* sp MYG006 voucher T114812	0.019	0.019	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.018	0.020
72	KJ744901 *Aname* sp MYG331 voucher T118789	0.018	0.019	0.020	0.020	0.020	0.019	0.017	0.017	0.017	0.020	0.017

		78	79	80	81	82	83	84	85	86	87	88
73	KJ744902 *Aname* sp MYG331 voucher T118791	0.018	0.019	0.020	0.020	0.020	0.019	0.017	0.017	0.017	0.020	0.017
74	KJ744909 *Aname* sp MYG331 voucher T118805	0.019	0.019	0.020	0.020	0.020	0.019	0.017	0.017	0.017	0.020	0.017
75	KJ744910 *Aname* sp MYG331 voucher T118811	0.019	0.019	0.020	0.020	0.020	0.019	0.017	0.017	0.017	0.020	0.017
76	KJ744911 Aname sp MYG331 voucher T118812	0.019	0.019	0.020	0.020	0.020	0.019	0.017	0.017	0.017	0.020	0.017
77	KJ744914 *Aname* sp MYG331 voucher T118818	0.019	0.019	0.020	0.020	0.020	0.019	0.017	0.017	0.017	0.020	0.017
78	KJ744982 *Aname mellosa* voucher T122207		0.008	0.009	0.010	0.010	0.009	0.020	0.020	0.020	0.019	0.020
79	KJ744987 *Aname mellosa* voucher T122215	0.025		0.010	0.010	0.010	0.009	0.020	0.020	0.020	0.020	0.020
80	KJ744989 *Aname mellosa* voucher T122218	0.033	0.036		0.009	0.009	0.009	0.020	0.020	0.020	0.020	0.020
81	KJ744990 *Aname mellosa* voucher T122219	0.041	0.041	0.027		0.004	0.011	0.020	0.020	0.020	0.020	0.020
82	KJ744992 *Aname mellosa* voucher T122222	0.041	0.041	0.027	0.005		0.011	0.021	0.021	0.021	0.020	0.021
83	KJ745155 *Aname mellosa* voucher T126273	0.027	0.030	0.027	0.044	0.044		0.020	0.020	0.020	0.020	0.020
84	KJ745231 *Aname* sp MYG351 voucher T74238	0.170	0.178	0.186	0.189	0.192	0.175		0.000	0.000	0.020	0.000
85	KJ745232 *Aname* sp MYG351 voucher T74241	0.170	0.178	0.186	0.189	0.192	0.175	0.000		0.000	0.020	0.000
86	KJ745233 *Aname* sp MYG351 voucher T74247	0.170	0.178	0.186	0.189	0.192	0.175	0.000	0.000		0.020	0.000
87	KJ745281 *Kwonkan* sp MYG361 voucher T78543	0.162	0.173	0.175	0.175	0.181	0.170	0.178	0.178	0.178		0.020
88	KJ745287 *Aname* sp MYG351 voucher T82303	0.170	0.178	0.186	0.189	0.192	0.175	0.000	0.000	0.000	0.178	
89	KJ745288 *Aname* sp MYG351 voucher T82304	0.178	0.184	0.192	0.197	0.200	0.181	0.030	0.030	0.030	0.178	0.030
90	KJ745293 *Aname* sp MYG351 voucher T82309	0.170	0.178	0.186	0.189	0.192	0.175	0.000	0.000	0.000	0.178	0.000
91	KJ745375 *Aname* sp MYG034 voucher T93314	0.170	0.167	0.167	0.178	0.181	0.164	0.063	0.063	0.063	0.181	0.063
92	KJ745401 *Kwonkan* sp MYG006 voucher T95405	0.151	0.153	0.164	0.164	0.170	0.159	0.195	0.195	0.195	0.162	0.195
93	KJ745429 *Aname* sp MYG030 voucher T96495	0.175	0.184	0.186	0.181	0.184	0.184	0.148	0.148	0.148	0.197	0.148
94	KJ745494 *Aname* sp MYG034 voucher T98900	0.178	0.175	0.184	0.189	0.192	0.175	0.055	0.055	0.055	0.170	0.055
95	MG800157 *Aname* sp MYG411 voucher WAMT94952	0.164	0.170	0.181	0.181	0.184	0.164	0.107	0.107	0.107	0.181	0.107
96	EU404114 *Centruroides vittatus*	0.244	0.258	0.258	0.252	0.255	0.247	0.263	0.263	0.263	0.260	0.263
97	JF700146 *Mesobuthus martensii*	0.255	0.268	0.274	0.277	0.282	0.266	0.258	0.258	0.258	0.244	0.258
98	KJ7447421 Selenotholus sp MYG381 voucher T113579	0.178	0.184	0.186	0.184	0.178	0.181	0.236	0.236	0.236	0.216	0.236

		89	90	91	92	93	94	95	96	97	98
1	**PP01**	0.015	0.015	0.016	0.020	0.020	0.015	0.017	0.023	0.023	0.022
2	**PP02**	0.019	0.019	0.020	0.021	0.019	0.020	0.020	0.022	0.023	0.021
3	**PP03**	0.018	0.017	0.018	0.020	0.019	0.018	0.016	0.023	0.023	0.021
4	**PP04**	0.020	0.020	0.021	0.018	0.020	0.020	0.020	0.023	0.023	0.020
5	**PP05**	0.018	0.017	0.017	0.020	0.019	0.017	0.016	0.023	0.023	0.021
6	**PP06**	0.018	0.017	0.017	0.020	0.019	0.017	0.016	0.023	0.023	0.021
7	NAD_N93_AC10	0.021	0.021	0.021	0.019	0.021	0.021	0.022	0.023	0.023	0.022
8	NAI_N8_AD1	0.021	0.021	0.021	0.021	0.020	0.021	0.020	0.024	0.024	0.022
9	NAW_N6_AD429	0.009	0.000	0.013	0.021	0.019	0.012	0.016	0.023	0.023	0.022
10	NAZ_N6_AD457	0.015	0.014	0.014	0.021	0.020	0.015	0.016	0.023	0.023	0.022
11	NBC_N6_AD577	0.014	0.013	0.000	0.021	0.019	0.014	0.017	0.023	0.023	0.022
12	NBE_N46_AD583	0.021	0.021	0.021	0.000	0.021	0.021	0.021	0.023	0.022	0.022
13	NBF_N11_AD592	0.020	0.020	0.020	0.021	0.019	0.020	0.019	0.023	0.023	0.021
14	NBR_N14_AD746	0.020	0.020	0.020	0.020	0.020	0.020	0.020	0.023	0.023	0.022
15	NBT_N7_AD748	0.018	0.016	0.017	0.021	0.020	0.017	0.014	0.023	0.023	0.022
16	NBU_N15_AD753	0.020	0.020	0.019	0.019	0.020	0.020	0.019	0.023	0.023	0.022
17	NBW_N50_AD784	0.020	0.020	0.020	0.021	0.021	0.020	0.020	0.023	0.023	0.022
18	NBY_N13_AF26b	0.021	0.021	0.021	0.022	0.021	0.021	0.020	0.023	0.023	0.022
19	NCU_N110_O211	0.019	0.019	0.019	0.020	0.018	0.020	0.018	0.023	0.023	0.022
20	NCW_N66_O280	0.019	0.018	0.019	0.021	0.017	0.018	0.017	0.023	0.023	0.022
21	NCY_N67_O282	0.019	0.018	0.019	0.021	0.019	0.019	0.018	0.024	0.023	0.022
22	NCZ_N110_O285	0.019	0.018	0.019	0.020	0.017	0.019	0.018	0.023	0.023	0.021
23	NDC_N84_O288	0.021	0.020	0.021	0.021	0.020	0.021	0.020	0.024	0.023	0.022
24	NDD_N101_O292	0.019	0.019	0.019	0.020	0.019	0.020	0.019	0.023	0.023	0.021
25	NDG_N78_O304	0.019	0.018	0.019	0.021	0.020	0.019	0.019	0.023	0.023	0.022
26	NDK_N94_O333	0.020	0.020	0.021	0.019	0.020	0.020	0.020	0.023	0.023	0.021
27	NDL_N96_O334	0.020	0.020	0.020	0.019	0.021	0.020	0.020	0.023	0.022	0.022
28	NEH_N112_BI22	0.018	0.017	0.017	0.021	0.019	0.018	0.015	0.023	0.023	0.021
29	NEM_N43_DW15	0.021	0.020	0.021	0.020	0.021	0.021	0.021	0.023	0.023	0.021
30	NEM_N43_AT53	0.021	0.020	0.021	0.020	0.021	0.021	0.021	0.023	0.023	0.021
31	NEN_N115_AD594	0.021	0.020	0.020	0.020	0.020	0.020	0.020	0.023	0.023	0.022
32	NFN_N43_CG5	0.021	0.021	0.021	0.020	0.021	0.021	0.021	0.023	0.023	0.021
33	NFZ_N122_BV095	0.020	0.020	0.020	0.019	0.021	0.020	0.021	0.023	0.022	0.022
34	NGE_N130_CW14	0.020	0.019	0.019	0.019	0.021	0.020	0.020	0.023	0.023	0.021
35	NGQ_N134_DG3	0.020	0.020	0.020	0.019	0.020	0.020	0.019	0.022	0.022	0.021
36	NGS_N136_DG10	0.020	0.019	0.019	0.020	0.019	0.020	0.019	0.023	0.023	0.022

		89	90	91	92	93	94	95	96	97	98
37	NRC_N150_PC15	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.023	0.023	0.021
38	NRF_N7_NN11	0.018	0.016	0.017	0.021	0.018	0.017	0.013	0.023	0.023	0.021
39	NRG_N7_NN15	0.017	0.016	0.017	0.021	0.018	0.017	0.013	0.023	0.023	0.021
40	NRH_N7_NN16	0.017	0.016	0.018	0.022	0.019	0.017	0.014	0.023	0.023	0.022
41	NRI_N7_NN17	0.017	0.016	0.018	0.022	0.019	0.017	0.014	0.023	0.024	0.021
42	NRJ_N7_NN18	0.017	0.016	0.017	0.022	0.019	0.017	0.014	0.023	0.024	0.021
43	NRK_N7_NN20	0.017	0.015	0.017	0.022	0.019	0.016	0.012	0.023	0.023	0.021
44	NRL_N7_NN21	0.017	0.015	0.017	0.021	0.019	0.016	0.013	0.023	0.023	0.021
45	NRM_N7_NN37	0.017	0.017	0.018	0.022	0.019	0.018	0.015	0.023	0.023	0.022
46	NRO_N7_NN38	0.017	0.015	0.017	0.022	0.019	0.017	0.013	0.023	0.023	0.021
47	NRP_N138_NN35	0.017	0.017	0.017	0.020	0.019	0.017	0.018	0.023	0.023	0.021
48	NRQ_N138_NN36	0.017	0.017	0.017	0.020	0.020	0.017	0.018	0.023	0.023	0.021
49	NRZ_N147_PC18	0.019	0.019	0.020	0.020	0.020	0.020	0.019	0.022	0.023	0.021
50	NSA_N148_PC16	0.015	0.015	0.016	0.021	0.020	0.015	0.017	0.023	0.023	0.022
51	NSB_N149_PC26	0.017	0.016	0.016	0.020	0.019	0.016	0.017	0.023	0.023	0.022
52	NSD_N151_PC13	0.020	0.020	0.021	0.018	0.020	0.020	0.020	0.023	0.023	0.020
53	NY_N37_AR64	0.020	0.020	0.020	0.019	0.020	0.019	0.020	0.023	0.023	0.021
54	T101209 *Kwonkan* MYG175 NHP	0.020	0.020	0.020	0.019	0.021	0.020	0.020	0.023	0.022	0.022
55	T108978 *Aname* MYG214 NHC	0.019	0.019	0.019	0.021	0.019	0.019	0.019	0.023	0.023	0.022
56	T112084 *Synothele* MYG127 NHD	0.019	0.019	0.019	0.021	0.018	0.019	0.019	0.023	0.023	0.022
57	T112949 *Aname* MYG227 NHG	0.019	0.019	0.019	0.020	0.019	0.019	0.018	0.023	0.023	0.021
58	T96570 *Aname* MYG067 NHF	0.019	0.019	0.019	0.021	0.019	0.019	0.019	0.023	0.023	0.022
59	T98767 *Aname* MYG102 NHI	0.020	0.020	0.020	0.021	0.019	0.020	0.018	0.023	0.023	0.021
60	T98900 *Aname* MYG034 NHJ	0.011	0.012	0.014	0.021	0.019	0.000	0.016	0.023	0.023	0.022
61	JQ772139 *Aname* sp 2 MGR-2012 voucher WAMT98892	0.018	0.017	0.017	0.020	0.018	0.018	0.017	0.023	0.023	0.021
62	KJ744505 *Aname mellosa* voucher T103199	0.020	0.020	0.020	0.019	0.020	0.020	0.019	0.022	0.023	0.020
63	KJ744623 *Aname mellosa* voucher T105871	0.020	0.020	0.019	0.019	0.020	0.020	0.020	0.022	0.023	0.020
64	KJ744648 *Aname* sp MYG373 voucher T107087	0.018	0.016	0.017	0.021	0.020	0.017	0.014	0.023	0.023	0.022
65	KJ744649 *Aname* sp MYG373 voucher T107089	0.018	0.017	0.018	0.022	0.020	0.018	0.015	0.023	0.023	0.022
66	KJ744677 *Aname mellosa* voucher T107987	0.020	0.019	0.019	0.020	0.021	0.020	0.020	0.023	0.023	0.021
67	KJ744775 *Aname mellosa* voucher T113629	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.022	0.023	0.020
68	KJ744785 *Aname mellosa* voucher T113642	0.020	0.020	0.019	0.019	0.020	0.020	0.020	0.023	0.023	0.020
69	KJ744788 *Aname mellosa* voucher T113648	0.020	0.020	0.019	0.019	0.020	0.020	0.020	0.022	0.023	0.020
70	KJ744791 *Aname mellosa* voucher T113654	0.020	0.020	0.019	0.019	0.020	0.020	0.020	0.023	0.023	0.020
71	KJ744833 *Kwonkan* sp MYG006 voucher T114812	0.020	0.020	0.020	0.016	0.021	0.019	0.020	0.022	0.022	0.021
72	KJ744901 *Aname* sp MYG331 voucher T118789	0.018	0.017	0.017	0.021	0.018	0.018	0.015	0.023	0.023	0.021

		89	90	91	92	93	94	95	96	97	98
73	KJ744902 *Aname* sp MYG331 voucher T118791	0.018	0.017	0.017	0.021	0.018	0.018	0.015	0.023	0.023	0.021
74	KJ744909 *Aname* sp MYG331 voucher T118805	0.018	0.017	0.017	0.021	0.019	0.017	0.014	0.023	0.023	0.021
75	KJ744910 *Aname* sp MYG331 voucher T118811	0.018	0.017	0.017	0.021	0.019	0.018	0.015	0.023	0.023	0.021
76	KJ744911 Aname sp MYG331 voucher T118812	0.018	0.017	0.017	0.021	0.018	0.018	0.014	0.023	0.023	0.021
77	KJ744914 *Aname* sp MYG331 voucher T118818	0.018	0.017	0.017	0.020	0.018	0.018	0.014	0.023	0.023	0.021
78	KJ744982 *Aname mellosa* voucher T122207	0.020	0.020	0.020	0.019	0.020	0.020	0.019	0.022	0.023	0.020
79	KJ744987 *Aname mellosa* voucher T122215	0.020	0.020	0.020	0.019	0.020	0.020	0.020	0.023	0.023	0.020
80	KJ744989 *Aname mellosa* voucher T122218	0.021	0.020	0.020	0.019	0.020	0.020	0.020	0.023	0.023	0.020
81	KJ744990 *Aname mellosa* voucher T122219	0.021	0.020	0.020	0.019	0.020	0.020	0.020	0.023	0.023	0.020
82	KJ744992 *Aname mellosa* voucher T122222	0.021	0.021	0.020	0.020	0.020	0.021	0.020	0.023	0.024	0.020
83	KJ745155 *Aname mellosa* voucher T126273	0.020	0.020	0.019	0.019	0.020	0.020	0.019	0.023	0.023	0.020
84	KJ745231 *Aname* sp MYG351 voucher T74238	0.009	0.000	0.013	0.021	0.019	0.012	0.016	0.023	0.023	0.022
85	KJ745232 *Aname* sp MYG351 voucher T74241	0.009	0.000	0.013	0.021	0.019	0.012	0.016	0.023	0.023	0.022
86	KJ745233 *Aname* sp MYG351 voucher T74247	0.009	0.000	0.013	0.021	0.019	0.012	0.016	0.023	0.023	0.022
87	KJ745281 *Kwonkan* sp MYG361 voucher T78543	0.020	0.020	0.020	0.019	0.021	0.020	0.020	0.023	0.022	0.022
88	KJ745287 *Aname* sp MYG351 voucher T82303	0.009	0.000	0.013	0.021	0.019	0.012	0.016	0.023	0.023	0.022
89	KJ745288 *Aname* sp MYG351 voucher T82304		0.009	0.014	0.021	0.019	0.011	0.017	0.023	0.023	0.022
90	KJ745293 *Aname* sp MYG351 voucher T82309	0.030		0.013	0.021	0.019	0.012	0.016	0.023	0.023	0.022
91	KJ745375 *Aname* sp MYG034 voucher T93314	0.077	0.063		0.021	0.019	0.014	0.017	0.023	0.023	0.022
92	KJ745401 *Kwonkan* sp MYG006 voucher T95405	0.195	0.195	0.192		0.021	0.021	0.021	0.023	0.022	0.022
93	KJ745429 *Aname* sp MYG030 voucher T96495	0.159	0.148	0.148	0.197		0.019	0.019	0.023	0.023	0.022
94	KJ745494 *Aname* sp MYG034 voucher T98900	0.044	0.055	0.079	0.192	0.148		0.016	0.023	0.023	0.022
95	MG800157 *Aname* sp MYG411 voucher WAMT94952	0.112	0.107	0.118	0.205	0.153	0.101		0.022	0.023	0.022
96	EU404114 *Centruroides vittatus*	0.268	0.263	0.258	0.252	0.258	0.271	0.244		0.020	0.023
97	JF700146 *Mesobuthus martensii*	0.255	0.258	0.277	0.241	0.274	0.263	0.268	0.167		0.024
98	KJ7447421 Selenotholus sp MYG381 voucher T113579	0.236	0.236	0.222	0.225	0.233	0.233	0.216	0.252	0.285	

		1	2	3	4	5	6	7	8
1	**PP07**		0.013	0.004	0.007	0.012	0.017	0.007	0.018
2	**PP08**	0.094		0.013	0.014	0.014	0.017	0.014	0.017
3	**PP11**	0.008	0.094		0.007	0.012	0.017	0.007	0.018
4	*Lychas annulatus* clade B PC01	0.024	0.102	0.024		0.012	0.017	0.003	0.018
5	*Lychas annulatus* clade A PC02	0.072	0.104	0.076	0.076		0.017	0.012	0.017
6	*Urodacus varians* PC03	0.182	0.172	0.178	0.180	0.186		0.017	0.014
7	*Lychas annulatus* clade B PC04	0.028	0.102	0.028	0.004	0.076	0.176		0.018
8	*Urodacus* sp Telfer PC05	0.198	0.172	0.198	0.196	0.184	0.110	0.192	
9	*Lychas annulatus* clade A PC06	0.072	0.104	0.076	0.076	0.000	0.186	0.076	0.184
10	*Urodacus yaschenkoki* PC07	0.190	0.182	0.186	0.194	0.188	0.100	0.194	0.094
11	*Urodacus yaschenkoki* PC08	0.190	0.182	0.186	0.194	0.188	0.100	0.194	0.094
12	*Lychas annulatus clade* B NN01	0.014	0.108	0.014	0.030	0.086	0.188	0.030	0.208
13	*Lychas annulatus* clade A NN03	0.072	0.104	0.076	0.076	0.000	0.186	0.076	0.184
14	*Lychas annulatus* clade B NN04	0.010	0.104	0.010	0.026	0.078	0.184	0.026	0.200
15	*Lychas annulatus* NN05 clade A	0.072	0.104	0.076	0.076	0.000	0.186	0.076	0.184
16	*Lychas annulatus* clade A NN06	0.072	0.104	0.076	0.076	0.000	0.186	0.076	0.184
17	*Lychas annulatus* clade A NN07	0.072	0.104	0.076	0.076	0.000	0.186	0.076	0.184
18	*Lychas annulatus* clade A NN08	0.072	0.104	0.076	0.076	0.000	0.186	0.076	0.184
19	*Lychas annulatus* clade B NN09	0.008	0.094	0.004	0.024	0.080	0.178	0.028	0.198
20	*Lychas annulatus* clade ANN10	0.072	0.104	0.076	0.076	0.000	0.186	0.076	0.184
21	EF122605.2 *Centruroides vittatus*	0.162	0.176	0.166	0.160	0.184	0.192	0.160	0.206
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.186	0.176	0.190	0.186	0.170	0.128	0.186	0.086
23	KT446990. *Brachistosternus paposo*	0.184	0.174	0.186	0.178	0.182	0.158	0.182	0.148
24	KT447018.1 *Brachistosternus roigalsinai*	0.190	0.184	0.190	0.188	0.174	0.156	0.192	0.156
25	KT446957.1 *Brachistosternus ehrenbergii*	0.170	0.166	0.166	0.172	0.182	0.140	0.176	0.162
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.194	0.192	0.196	0.190	0.202	0.150	0.190	0.154
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.180	0.170	0.176	0.172	0.182	0.140	0.172	0.130
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.174	0.160	0.178	0.174	0.178	0.154	0.178	0.142
29	KX517230.1 *Brachistosternus paposo*	0.184	0.174	0.186	0.178	0.182	0.158	0.182	0.148
30	KX517229.1 *Brachistosternus paposo*	0.184	0.174	0.186	0.178	0.182	0.158	0.182	0.148
31	KT446947.1 *Brachistosternus chilensis*	0.192	0.174	0.188	0.194	0.188	0.158	0.194	0.162
32	KT446928.1 *Brachistosternus aconcagua*	0.196	0.186	0.192	0.198	0.186	0.158	0.198	0.154
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.186	0.172	0.192	0.186	0.178	0.152	0.186	0.132
34	AY156581.1 *Pandinus dictator*	0.204	0.200	0.202	0.200	0.198	0.138	0.204	0.148
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.200	0.192	0.200	0.198	0.188	0.162	0.198	0.132
36	KT447015.1 *Brachistosternus roigalsinai*	0.192	0.176	0.198	0.186	0.192	0.164	0.182	0.144

		1	2	3	4	5	6	7	8
37	KT446955.1 *Brachistosternus ehrenbergii*	0.168	0.178	0.168	0.174	0.176	0.154	0.174	0.158
38	KT446946.1 *Brachistosternus chango*	0.196	0.174	0.198	0.192	0.186	0.148	0.192	0.152
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.198	0.190	0.200	0.194	0.198	0.180	0.198	0.168
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.190	0.184	0.188	0.188	0.196	0.160	0.188	0.168
41	JQ514251.1 *Pandinus imperato*r voucher Sc1050	0.214	0.192	0.216	0.212	0.190	0.158	0.208	0.144
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.196	0.202	0.204	0.202	0.190	0.168	0.202	0.148
43	KX517244.1 *Brachistosternus paposo*	0.186	0.178	0.192	0.180	0.180	0.158	0.180	0.152
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.200	0.184	0.202	0.206	0.198	0.166	0.206	0.160
45	KT447016.1 *Brachistosternus roigalsinai*	0.178	0.184	0.182	0.176	0.192	0.166	0.176	0.162
46	KT446986.1 *Brachistosternus negrei*	0.194	0.180	0.198	0.196	0.184	0.160	0.196	0.158
47	KT446952.1 *Brachistosternus ehrenbergii*	0.162	0.172	0.162	0.168	0.168	0.152	0.168	0.154
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.178	0.180	0.178	0.178	0.180	0.158	0.182	0.160
49	KT446960.1 *Brachistosternus ferrugineus*	0.194	0.190	0.202	0.190	0.194	0.144	0.190	0.152
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.184	0.178	0.184	0.194	0.182	0.142	0.190	0.136
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.190	0.182	0.190	0.186	0.182	0.146	0.186	0.150
52	KT447025.1 *Brachistosternus titicaca*	0.218	0.198	0.214	0.216	0.214	0.168	0.220	0.172
53	KT447014.1 *Brachistosternus roigalsinai*	0.180	0.184	0.186	0.182	0.186	0.174	0.182	0.164
54	KT188365.1 *Scorpio palmatus*	0.198	0.180	0.196	0.200	0.202	0.154	0.200	0.168
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.196	0.186	0.192	0.186	0.206	0.152	0.190	0.162
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.192	0.182	0.194	0.186	0.182	0.142	0.190	0.156
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.220	0.196	0.222	0.222	0.208	0.180	0.226	0.166
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.214	0.192	0.212	0.212	0.212	0.166	0.208	0.176
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.196	0.178	0.194	0.198	0.200	0.154	0.198	0.170
60	EF122607.2 *Centruroides vittatus*	0.162	0.176	0.166	0.160	0.184	0.192	0.160	0.206
61	EF122608.2 *Centruroides vittatus*	0.162	0.172	0.166	0.160	0.190	0.196	0.160	0.210
62	EF122612.2 *Centruroides vittatus*	0.160	0.174	0.164	0.158	0.186	0.194	0.158	0.204
63	EU381064.1 *Centruroides vittatus*	0.160	0.174	0.164	0.158	0.186	0.194	0.158	0.204
64	EU404114.1 *Centruroides vittatus*	0.164	0.176	0.166	0.160	0.182	0.198	0.160	0.212
65	HM567381.1 *Mesobuthus eupeus*	0.158	0.152	0.158	0.156	0.162	0.202	0.156	0.206
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.180	0.172	0.184	0.168	0.184	0.202	0.164	0.198
67	JN018153.1 *Lychas mucronatus*	0.138	0.138	0.142	0.142	0.126	0.202	0.142	0.194
68	JN018154.1 *Parabuthus laevifrons*	0.152	0.160	0.152	0.156	0.154	0.200	0.160	0.200
69	JN018210.1 *Lychas mucronatus*	0.150	0.142	0.150	0.148	0.150	0.196	0.148	0.202
70	JN018211.1 *Lychas mucronatus*	0.160	0.150	0.152	0.156	0.160	0.206	0.160	0.210
71	KF997876.1 *Mesobuthus gibbosus*	0.154	0.178	0.162	0.160	0.168	0.212	0.164	0.218
72	KT716037.1 *Lychas tricarinatus*	0.152	0.140	0.148	0.158	0.140	0.198	0.158	0.198

		1	2	3	4	5	6	7	8
73	KX648425.1 *Hottentotta minax*	0.166	0.176	0.164	0.166	0.160	0.210	0.164	0.202
74	KX648429.1 *Compsobuthus werneri*	0.166	0.176	0.164	0.166	0.160	0.210	0.164	0.202
75	KY982184.1 *Centruroides schmidti*	0.156	0.162	0.156	0.162	0.156	0.190	0.162	0.192
76	KY982185.1 *Centruroides vittatus*	0.164	0.170	0.166	0.160	0.178	0.194	0.160	0.210
77	KY982187.1 *Heteroctenus abudi*	0.160	0.176	0.164	0.158	0.140	0.192	0.162	0.194
78	KY982188.1 *Heteroctenus abudi*	0.158	0.178	0.162	0.160	0.142	0.198	0.164	0.200
79	KY982192.1 *Heteroctenus junceus*	0.176	0.188	0.178	0.172	0.182	0.188	0.172	0.204
80	KY982193.1 *Heteroctenus junceus*	0.174	0.186	0.176	0.170	0.180	0.188	0.170	0.204
81	*KY982194.1* Heteroctenus junceus	0.160	0.182	0.164	0.162	0.170	0.184	0.162	0.200
82	KY982199.1 *Heteroctenus junceus*	0.162	0.180	0.166	0.164	0.172	0.182	0.164	0.200
83	KY982273.1 *Zabius fuscus*	0.162	0.178	0.168	0.162	0.152	0.218	0.162	0.234
84	MF422313.1 *Isometrus* sp.	0.126	0.142	0.128	0.130	0.136	0.174	0.126	0.196
85	MF422319.1 *Lychas tricarinatus*	0.150	0.134	0.146	0.156	0.138	0.190	0.156	0.194
86	MF422320.1 *Lychas tricarinatus*	0.150	0.132	0.146	0.156	0.138	0.188	0.156	0.194
87	MF422321.1 *Lychas tricarinatus*	0.146	0.134	0.142	0.152	0.134	0.190	0.152	0.194
88	MF422322.1 *Lychas tricarinatus*	0.150	0.132	0.146	0.156	0.138	0.188	0.156	0.194
89	MF422326.1 *Lychas tricarinatus*	0.150	0.138	0.146	0.144	0.150	0.198	0.144	0.208
90	MF422327.1 *Lychas tricarinatus*	0.148	0.144	0.144	0.146	0.154	0.186	0.142	0.196
91	MF422328.1 *Lychas tricarinatus*	0.154	0.140	0.152	0.146	0.156	0.198	0.146	0.210
92	MF422329.1 *Lychas tricarinatus*	0.148	0.146	0.144	0.146	0.154	0.188	0.142	0.198
93	MF422330.1 *Lychas tricarinatus*	0.148	0.144	0.144	0.146	0.154	0.186	0.142	0.196
94	*MK479161.1* Centruroides arctimanus	0.172	0.176	0.172	0.174	0.168	0.194	0.170	0.204
95	MK479165.1 *Centruroides barbudensis*	0.166	0.164	0.166	0.172	0.180	0.198	0.172	0.198
96	MK479171.1 *Centruroides exilimanus*	0.166	0.172	0.164	0.166	0.178	0.188	0.166	0.212
97	MK479180.1 *Centruroides insulanus*	0.160	0.160	0.164	0.166	0.162	0.184	0.170	0.190
98	MK479188.1 *Centruroides morenoi*	0.172	0.174	0.174	0.174	0.168	0.200	0.174	0.188
99	MK479196.1 *Centruroides platnicki*	0.160	0.156	0.162	0.162	0.156	0.182	0.158	0.202
100	MK479202.1 *Centruroides simplex*	0.150	0.154	0.156	0.156	0.160	0.190	0.156	0.178
101	MK479204.1 *Centruroides taino*	0.150	0.156	0.150	0.152	0.160	0.180	0.156	0.190
102	MK479207.1 *Centruroides testaceus*	0.150	0.168	0.148	0.152	0.156	0.180	0.152	0.186
103	MK479210.1 *Centruroides vittatus*	0.166	0.178	0.168	0.162	0.184	0.200	0.162	0.214
104	NC 037222.1 *Centruroides vittatus*	0.166	0.178	0.168	0.162	0.184	0.200	0.162	0.214
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.196	0.176	0.194	0.200	0.186	0.142	0.204	0.142
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.200	0.218	0.200	0.196	0.196	0.174	0.196	0.176
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.208	0.192	0.206	0.212	0.190	0.170	0.216	0.170
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.190	0.182	0.190	0.186	0.182	0.146	0.186	0.150

		9	10	11	12	13	14	15	16
1	**PP07**	0.012	0.018	0.018	0.005	0.012	0.004	0.012	0.012
2	**PP08**	0.014	0.017	0.017	0.014	0.014	0.014	0.014	0.014
3	**PP11**	0.012	0.017	0.017	0.005	0.012	0.004	0.012	0.012
4	*Lychas annulatus* clade B PC01	0.012	0.018	0.018	0.008	0.012	0.007	0.012	0.012
5	*Lychas annulatus* clade A PC02	0.000	0.017	0.017	0.013	0.000	0.012	0.000	0.000
6	*Urodacus varians* PC03	0.017	0.013	0.013	0.017	0.017	0.017	0.017	0.017
7	*Lychas annulatus* clade B PC04	0.012	0.018	0.018	0.008	0.012	0.007	0.012	0.012
8	*Urodacus* sp Telfer PC05	0.017	0.013	0.013	0.018	0.017	0.018	0.017	0.017
9	*Lychas annulatus* clade A PC06		0.017	0.017	0.013	0.000	0.012	0.000	0.000
10	*Urodacus yaschenkoki* PC07	0.188		0.000	0.018	0.017	0.017	0.017	0.017
11	*Urodacus yaschenkoki* PC08	0.188	0.000		0.018	0.017	0.017	0.017	0.017
12	*Lychas annulatus clade* B NN01	0.086	0.196	0.196		0.013	0.004	0.013	0.013
13	*Lychas annulatus* clade A NN03	0.000	0.188	0.188	0.086		0.012	0.000	0.000
14	*Lychas annulatus* clade B NN04	0.078	0.188	0.188	0.008	0.078		0.012	0.012
15	*Lychas annulatus* NN05 clade A	0.000	0.188	0.188	0.086	0.000	0.078		0.000
16	*Lychas annulatus* clade A NN06	0.000	0.188	0.188	0.086	0.000	0.078	0.000	
17	*Lychas annulatus* clade A NN07	0.000	0.188	0.188	0.086	0.000	0.078	0.000	0.000
18	*Lychas annulatus* clade A NN08	0.000	0.188	0.188	0.086	0.000	0.078	0.000	0.000
19	*Lychas annulatus* clade B NN09	0.080	0.190	0.190	0.014	0.080	0.010	0.080	0.080
20	*Lychas annulatus* clade ANN10	0.000	0.188	0.188	0.086	0.000	0.078	0.000	0.000
21	EF122605.2 *Centruroides vittatus*	0.184	0.208	0.208	0.166	0.184	0.166	0.184	0.184
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.170	0.108	0.108	0.200	0.170	0.192	0.170	0.170
23	KT446990. *Brachistosternus paposo*	0.182	0.138	0.138	0.192	0.182	0.184	0.182	0.182
24	KT447018.1 *Brachistosternus roigalsinai*	0.174	0.136	0.136	0.198	0.174	0.190	0.174	0.174
25	KT446957.1 *Brachistosternus ehrenbergii*	0.182	0.130	0.130	0.180	0.182	0.176	0.182	0.182
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.202	0.140	0.140	0.200	0.202	0.192	0.202	0.202
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.182	0.132	0.132	0.184	0.182	0.176	0.182	0.182
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.178	0.144	0.144	0.180	0.178	0.180	0.178	0.178
29	KX517230.1 *Brachistosternus paposo*	0.182	0.138	0.138	0.192	0.182	0.184	0.182	0.182
30	KX517229.1 *Brachistosternus paposo*	0.182	0.138	0.138	0.192	0.182	0.184	0.182	0.182
31	KT446947.1 *Brachistosternus chilensis*	0.188	0.146	0.146	0.196	0.188	0.192	0.188	0.188
32	KT446928.1 *Brachistosternus aconcagua*	0.186	0.144	0.144	0.204	0.186	0.200	0.186	0.186
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.178	0.142	0.142	0.196	0.178	0.188	0.178	0.178
34	AY156581.1 *Pandinus dictator*	0.198	0.126	0.126	0.214	0.198	0.206	0.198	0.198
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.188	0.138	0.138	0.202	0.188	0.198	0.188	0.188
36	KT447015.1 *Brachistosternus roigalsinai*	0.192	0.146	0.146	0.196	0.192	0.196	0.192	0.192

		9	10	11	12	13	14	15	16
37	KT446955.1 *Brachistosternus ehrenbergii*	0.176	0.136	0.136	0.176	0.176	0.172	0.176	0.176
38	KT446946.1 *Brachistosternus chango*	0.186	0.150	0.150	0.206	0.186	0.202	0.186	0.186
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.198	0.162	0.162	0.212	0.198	0.204	0.198	0.198
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.196	0.148	0.148	0.194	0.196	0.190	0.196	0.196
41	JQ514251.1 *Pandinus imperato*r voucher Sc1050	0.190	0.138	0.138	0.222	0.190	0.216	0.190	0.190
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.190	0.154	0.154	0.206	0.190	0.198	0.190	0.190
43	KX517244.1 *Brachistosternus paposo*	0.180	0.144	0.144	0.190	0.180	0.186	0.180	0.180
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.198	0.156	0.156	0.208	0.198	0.200	0.198	0.198
45	KT447016.1 *Brachistosternus roigalsinai*	0.192	0.150	0.150	0.182	0.192	0.174	0.192	0.192
46	KT446986.1 *Brachistosternus negrei*	0.184	0.154	0.154	0.206	0.184	0.202	0.184	0.184
47	KT446952.1 *Brachistosternus ehrenbergii*	0.168	0.144	0.144	0.170	0.168	0.166	0.168	0.168
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.180	0.154	0.154	0.190	0.180	0.184	0.180	0.180
49	KT446960.1 *Brachistosternus ferrugineus*	0.194	0.156	0.156	0.208	0.194	0.204	0.194	0.194
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.182	0.150	0.150	0.194	0.182	0.186	0.182	0.182
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.182	0.142	0.142	0.200	0.182	0.196	0.182	0.182
52	KT447025.1 *Brachistosternus titicaca*	0.214	0.152	0.152	0.226	0.214	0.218	0.214	0.214
53	KT447014.1 *Brachistosternus roigalsinai*	0.186	0.152	0.152	0.188	0.186	0.180	0.186	0.186
54	KT188365.1 *Scorpio palmatus*	0.202	0.154	0.154	0.202	0.202	0.194	0.202	0.202
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.206	0.140	0.140	0.206	0.206	0.202	0.206	0.206
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.182	0.144	0.144	0.198	0.182	0.198	0.182	0.182
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.208	0.170	0.170	0.230	0.208	0.226	0.208	0.208
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.212	0.160	0.160	0.214	0.212	0.212	0.212	0.212
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.200	0.152	0.152	0.200	0.200	0.192	0.200	0.200
60	EF122607.2 *Centruroides vittatus*	0.184	0.208	0.208	0.166	0.184	0.166	0.184	0.184
61	EF122608.2 *Centruroides vittatus*	0.190	0.210	0.210	0.166	0.190	0.166	0.190	0.190
62	EF122612.2 *Centruroides vittatus*	0.186	0.206	0.206	0.164	0.186	0.164	0.186	0.186
63	EU381064.1 *Centruroides vittatus*	0.186	0.206	0.206	0.164	0.186	0.164	0.186	0.186
64	EU404114.1 *Centruroides vittatus*	0.182	0.200	0.200	0.164	0.182	0.164	0.182	0.182
65	HM567381.1 *Mesobuthus eupeus*	0.162	0.208	0.208	0.172	0.162	0.168	0.162	0.162
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.184	0.202	0.202	0.182	0.184	0.182	0.184	0.184
67	JN018153.1 *Lychas mucronatus*	0.126	0.208	0.208	0.150	0.126	0.144	0.126	0.126
68	JN018154.1 *Parabuthus laevifrons*	0.154	0.196	0.196	0.162	0.154	0.154	0.154	0.154
69	JN018210.1 *Lychas mucronatus*	0.150	0.200	0.200	0.156	0.150	0.156	0.150	0.150
70	JN018211.1 *Lychas mucronatus*	0.160	0.212	0.212	0.154	0.160	0.158	0.160	0.160
71	KF997876.1 *Mesobuthus gibbosus*	0.168	0.202	0.202	0.164	0.168	0.160	0.168	0.168
72	KT716037.1 *Lychas tricarinatus*	0.140	0.196	0.196	0.162	0.140	0.154	0.140	0.140

		9	10	11	12	13	14	15	16
73	KX648425.1 *Hottentotta minax*	0.160	0.208	0.208	0.166	0.160	0.166	0.160	0.160
74	KX648429.1 *Compsobuthus werneri*	0.160	0.208	0.208	0.166	0.160	0.166	0.160	0.160
75	KY982184.1 *Centruroides schmidti*	0.156	0.190	0.190	0.162	0.156	0.162	0.156	0.156
76	KY982185.1 *Centruroides vittatus*	0.178	0.196	0.196	0.166	0.178	0.166	0.178	0.178
77	KY982187.1 *Heteroctenus abudi*	0.140	0.202	0.202	0.170	0.140	0.164	0.140	0.140
78	KY982188.1 *Heteroctenus abudi*	0.142	0.204	0.204	0.168	0.142	0.162	0.142	0.142
79	KY982192.1 *Heteroctenus junceus*	0.182	0.196	0.196	0.182	0.182	0.180	0.182	0.182
80	KY982193.1 *Heteroctenus junceus*	0.180	0.196	0.196	0.180	0.180	0.178	0.180	0.180
81	*KY982194.1* Heteroctenus junceus	0.170	0.194	0.194	0.168	0.170	0.166	0.170	0.170
82	KY982199.1 *Heteroctenus junceus*	0.172	0.184	0.184	0.166	0.172	0.160	0.172	0.172
83	KY982273.1 *Zabius fuscus*	0.152	0.234	0.234	0.174	0.152	0.170	0.152	0.152
84	MF422313.1 *Isometrus* sp.	0.136	0.196	0.196	0.132	0.136	0.130	0.136	0.136
85	MF422319.1 *Lychas tricarinatus*	0.138	0.200	0.200	0.160	0.138	0.152	0.138	0.138
86	MF422320.1 *Lychas tricarinatus*	0.138	0.198	0.198	0.160	0.138	0.152	0.138	0.138
87	MF422321.1 *Lychas tricarinatus*	0.134	0.196	0.196	0.156	0.134	0.148	0.134	0.134
88	MF422322.1 *Lychas tricarinatus*	0.138	0.198	0.198	0.160	0.138	0.152	0.138	0.138
89	MF422326.1 *Lychas tricarinatus*	0.150	0.210	0.210	0.160	0.150	0.156	0.150	0.150
90	MF422327.1 *Lychas tricarinatus*	0.154	0.202	0.202	0.154	0.154	0.150	0.154	0.154
91	MF422328.1 *Lychas tricarinatus*	0.156	0.212	0.212	0.166	0.156	0.162	0.156	0.156
92	MF422329.1 *Lychas tricarinatus*	0.154	0.200	0.200	0.154	0.154	0.150	0.154	0.154
93	MF422330.1 *Lychas tricarinatus*	0.154	0.202	0.202	0.154	0.154	0.150	0.154	0.154
94	*MK479161.1* Centruroides arctimanus	0.168	0.204	0.204	0.176	0.168	0.174	0.168	0.168
95	MK479165.1 *Centruroides barbudensis*	0.180	0.202	0.202	0.168	0.180	0.170	0.180	0.180
96	MK479171.1 *Centruroides exilimanus*	0.178	0.206	0.206	0.172	0.178	0.172	0.178	0.178
97	MK479180.1 *Centruroides insulanus*	0.162	0.178	0.178	0.172	0.162	0.166	0.162	0.162
98	MK479188.1 *Centruroides morenoi*	0.168	0.196	0.196	0.176	0.168	0.178	0.168	0.168
99	MK479196.1 *Centruroides platnicki*	0.156	0.200	0.200	0.166	0.156	0.164	0.156	0.156
100	MK479202.1 *Centruroides simplex*	0.160	0.184	0.184	0.156	0.160	0.152	0.160	0.160
101	MK479204.1 *Centruroides taino*	0.160	0.188	0.188	0.162	0.160	0.156	0.160	0.160
102	MK479207.1 *Centruroides testaceus*	0.156	0.182	0.182	0.152	0.156	0.148	0.156	0.156
103	MK479210.1 *Centruroides vittatus*	0.184	0.202	0.202	0.166	0.184	0.166	0.184	0.184
104	NC 037222.1 *Centruroides vittatus*	0.184	0.202	0.202	0.166	0.184	0.166	0.184	0.184
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.186	0.154	0.154	0.208	0.186	0.204	0.186	0.186
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.196	0.172	0.172	0.206	0.196	0.198	0.196	0.196
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.190	0.186	0.186	0.218	0.190	0.214	0.190	0.190
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.182	0.142	0.142	0.200	0.182	0.196	0.182	0.182

		17	18	19	20	21	22	23	24
1	**PP07**	0.012	0.012	0.004	0.012	0.016	0.017	0.017	0.018
2	**PP08**	0.014	0.014	0.013	0.014	0.017	0.017	0.017	0.017
3	**PP11**	0.012	0.012	0.003	0.012	0.017	0.018	0.017	0.018
4	*Lychas annulatus* clade B PC01	0.012	0.012	0.007	0.012	0.016	0.017	0.017	0.017
5	*Lychas annulatus* clade A PC02	0.000	0.000	0.012	0.000	0.017	0.017	0.017	0.017
6	*Urodacus varians* PC03	0.017	0.017	0.017	0.017	0.018	0.015	0.016	0.016
7	*Lychas annulatus* clade B PC04	0.012	0.012	0.007	0.012	0.016	0.017	0.017	0.018
8	*Urodacus* sp Telfer PC05	0.017	0.017	0.018	0.017	0.018	0.013	0.016	0.016
9	*Lychas annulatus* clade A PC06	0.000	0.000	0.012	0.000	0.017	0.017	0.017	0.017
10	*Urodacus yaschenkoki* PC07	0.017	0.017	0.018	0.017	0.018	0.014	0.015	0.015
11	*Urodacus yaschenkoki* PC08	0.017	0.017	0.018	0.017	0.018	0.014	0.015	0.015
12	*Lychas annulatus clade* B NN01	0.013	0.013	0.005	0.013	0.017	0.018	0.018	0.018
13	*Lychas annulatus* clade A NN03	0.000	0.000	0.012	0.000	0.017	0.017	0.017	0.017
14	*Lychas annulatus* clade B NN04	0.012	0.012	0.004	0.012	0.017	0.018	0.017	0.018
15	*Lychas annulatus* NN05 clade A	0.000	0.000	0.012	0.000	0.017	0.017	0.017	0.017
16	*Lychas annulatus* clade A NN06	0.000	0.000	0.012	0.000	0.017	0.017	0.017	0.017
17	*Lychas annulatus* clade A NN07		0.000	0.012	0.000	0.017	0.017	0.017	0.017
18	*Lychas annulatus* clade A NN08	0.000		0.012	0.000	0.017	0.017	0.017	0.017
19	*Lychas annulatus* clade B NN09	0.080	0.080		0.012	0.017	0.018	0.017	0.018
20	*Lychas annulatus* clade ANN10	0.000	0.000	0.080		0.017	0.017	0.017	0.017
21	EF122605.2 *Centruroides vittatus*	0.184	0.184	0.168	0.184		0.018	0.017	0.018
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.170	0.170	0.194	0.170	0.218		0.016	0.016
23	KT446990. *Brachistosternus paposo*	0.182	0.182	0.186	0.182	0.178	0.144		0.010
24	KT447018.1 *Brachistosternus roigalsinai*	0.174	0.174	0.194	0.174	0.192	0.146	0.056	
25	KT446957.1 *Brachistosternus ehrenbergii*	0.182	0.182	0.170	0.182	0.188	0.150	0.100	0.100
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.202	0.202	0.196	0.202	0.194	0.154	0.144	0.158
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.182	0.182	0.176	0.182	0.164	0.152	0.138	0.148
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.178	0.178	0.178	0.178	0.196	0.132	0.140	0.152
29	KX517230.1 *Brachistosternus paposo*	0.182	0.182	0.186	0.182	0.178	0.144	0.000	0.056
30	KX517229.1 *Brachistosternus paposo*	0.182	0.182	0.186	0.182	0.178	0.144	0.000	0.056
31	KT446947.1 *Brachistosternus chilensis*	0.188	0.188	0.192	0.188	0.208	0.146	0.100	0.114
32	KT446928.1 *Brachistosternus aconcagua*	0.186	0.186	0.196	0.186	0.214	0.148	0.108	0.116
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.178	0.178	0.192	0.178	0.200	0.128	0.144	0.158
34	AY156581.1 *Pandinus dictator*	0.198	0.198	0.204	0.198	0.180	0.140	0.154	0.156
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.188	0.188	0.204	0.188	0.198	0.138	0.138	0.146
36	KT447015.1 *Brachistosternus roigalsinai*	0.192	0.192	0.198	0.192	0.186	0.142	0.030	0.062

		17	18	19	20	21	22	23	24
37	KT446955.1 *Brachistosternus ehrenbergii*	0.176	0.176	0.172	0.176	0.184	0.158	0.098	0.116
38	KT446946.1 *Brachistosternus chango*	0.186	0.186	0.202	0.186	0.192	0.148	0.098	0.108
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.198	0.198	0.202	0.198	0.198	0.166	0.160	0.160
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.196	0.196	0.192	0.196	0.194	0.162	0.114	0.106
41	JQ514251.1 *Pandinus imperato*r voucher Sc1050	0.190	0.190	0.218	0.190	0.186	0.144	0.154	0.156
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.190	0.190	0.204	0.190	0.186	0.144	0.128	0.146
43	KX517244.1 *Brachistosternus paposo*	0.180	0.180	0.192	0.180	0.178	0.150	0.026	0.052
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.198	0.198	0.202	0.198	0.198	0.154	0.102	0.108
45	KT447016.1 *Brachistosternus roigalsinai*	0.192	0.192	0.182	0.192	0.178	0.150	0.052	0.052
46	KT446986.1 *Brachistosternus negrei*	0.184	0.184	0.202	0.184	0.198	0.144	0.114	0.102
47	KT446952.1 *Brachistosternus ehrenbergii*	0.168	0.168	0.166	0.168	0.190	0.154	0.100	0.122
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.180	0.180	0.182	0.180	0.196	0.162	0.154	0.160
49	KT446960.1 *Brachistosternus ferrugineus*	0.194	0.194	0.202	0.194	0.192	0.128	0.116	0.128
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.182	0.182	0.184	0.182	0.194	0.144	0.168	0.168
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.182	0.182	0.192	0.182	0.186	0.132	0.154	0.170
52	KT447025.1 *Brachistosternus titicaca*	0.214	0.214	0.218	0.214	0.222	0.154	0.110	0.108
53	KT447014.1 *Brachistosternus roigalsinai*	0.186	0.186	0.186	0.186	0.190	0.154	0.050	0.050
54	KT188365.1 *Scorpio palmatus*	0.202	0.202	0.200	0.202	0.188	0.164	0.172	0.188
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.206	0.206	0.196	0.206	0.188	0.154	0.142	0.162
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.182	0.182	0.196	0.182	0.172	0.156	0.156	0.162
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.208	0.208	0.224	0.208	0.194	0.170	0.148	0.172
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.212	0.212	0.216	0.212	0.194	0.172	0.160	0.166
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.200	0.200	0.198	0.200	0.188	0.162	0.170	0.186
60	EF122607.2 *Centruroides vittatus*	0.184	0.184	0.168	0.184	0.000	0.218	0.178	0.192
61	EF122608.2 *Centruroides vittatus*	0.190	0.190	0.168	0.190	0.016	0.224	0.176	0.190
62	EF122612.2 *Centruroides vittatus*	0.186	0.186	0.166	0.186	0.004	0.216	0.178	0.192
63	EU381064.1 *Centruroides vittatus*	0.186	0.186	0.166	0.186	0.002	0.216	0.178	0.192
64	EU404114.1 *Centruroides vittatus*	0.182	0.182	0.168	0.182	0.030	0.210	0.178	0.182
65	HM567381.1 *Mesobuthus eupeus*	0.162	0.162	0.162	0.162	0.170	0.218	0.210	0.208
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.184	0.184	0.184	0.184	0.160	0.212	0.212	0.214
67	JN018153.1 *Lychas mucronatus*	0.126	0.126	0.146	0.126	0.172	0.208	0.196	0.190
68	JN018154.1 *Parabuthus laevifrons*	0.154	0.154	0.152	0.154	0.172	0.204	0.182	0.182
69	JN018210.1 *Lychas mucronatus*	0.150	0.150	0.154	0.150	0.164	0.214	0.180	0.188
70	JN018211.1 *Lychas mucronatus*	0.160	0.160	0.152	0.160	0.194	0.216	0.198	0.202
71	KF997876.1 *Mesobuthus gibbosus*	0.168	0.168	0.162	0.168	0.158	0.206	0.202	0.206
72	KT716037.1 *Lychas tricarinatus*	0.140	0.140	0.152	0.140	0.168	0.202	0.200	0.196

		17	18	19	20	21	22	23	24
73	KX648425.1 *Hottentotta minax*	0.160	0.160	0.168	0.160	0.188	0.208	0.214	0.206
74	KX648429.1 *Compsobuthus werneri*	0.160	0.160	0.168	0.160	0.188	0.208	0.214	0.206
75	KY982184.1 *Centruroides schmidti*	0.156	0.156	0.160	0.156	0.118	0.192	0.180	0.174
76	KY982185.1 *Centruroides vittatus*	0.178	0.178	0.168	0.178	0.026	0.212	0.178	0.182
77	KY982187.1 *Heteroctenus abudi*	0.140	0.140	0.168	0.140	0.148	0.192	0.184	0.186
78	KY982188.1 *Heteroctenus abudi*	0.142	0.142	0.166	0.142	0.138	0.198	0.186	0.192
79	KY982192.1 *Heteroctenus junceus*	0.182	0.182	0.178	0.182	0.126	0.198	0.198	0.196
80	KY982193.1 *Heteroctenus junceus*	0.180	0.180	0.176	0.180	0.126	0.198	0.198	0.196
81	*KY982194.1* Heteroctenus junceus	0.170	0.170	0.164	0.170	0.122	0.198	0.200	0.192
82	KY982199.1 *Heteroctenus junceus*	0.172	0.172	0.166	0.172	0.114	0.194	0.184	0.188
83	KY982273.1 *Zabius fuscus*	0.152	0.152	0.168	0.152	0.166	0.216	0.200	0.200
84	MF422313.1 *Isometrus* sp.	0.136	0.136	0.124	0.136	0.178	0.212	0.210	0.214
85	MF422319.1 *Lychas tricarinatus*	0.138	0.138	0.146	0.138	0.166	0.210	0.200	0.192
86	MF422320.1 *Lychas tricarinatus*	0.138	0.138	0.146	0.138	0.168	0.210	0.198	0.194
87	MF422321.1 *Lychas tricarinatus*	0.134	0.134	0.146	0.134	0.164	0.206	0.194	0.190
88	MF422322.1 *Lychas tricarinatus*	0.138	0.138	0.146	0.138	0.168	0.210	0.198	0.194
89	MF422326.1 *Lychas tricarinatus*	0.150	0.150	0.146	0.150	0.152	0.218	0.202	0.202
90	MF422327.1 *Lychas tricarinatus*	0.154	0.154	0.148	0.154	0.138	0.214	0.200	0.208
91	MF422328.1 *Lychas tricarinatus*	0.156	0.156	0.156	0.156	0.144	0.212	0.204	0.206
92	MF422329.1 *Lychas tricarinatus*	0.154	0.154	0.148	0.154	0.140	0.214	0.202	0.210
93	MF422330.1 *Lychas tricarinatus*	0.154	0.154	0.148	0.154	0.138	0.214	0.200	0.208
94	*MK479161.1* Centruroides arctimanus	0.168	0.168	0.172	0.168	0.140	0.194	0.192	0.182
95	MK479165.1 *Centruroides barbudensis*	0.180	0.180	0.166	0.180	0.128	0.216	0.190	0.192
96	MK479171.1 *Centruroides exilimanus*	0.178	0.178	0.166	0.178	0.118	0.210	0.190	0.188
97	MK479180.1 *Centruroides insulanus*	0.162	0.162	0.168	0.162	0.122	0.182	0.190	0.174
98	MK479188.1 *Centruroides morenoi*	0.168	0.168	0.176	0.168	0.102	0.196	0.186	0.186
99	MK479196.1 *Centruroides platnicki*	0.156	0.156	0.166	0.156	0.120	0.204	0.170	0.182
100	MK479202.1 *Centruroides simplex*	0.160	0.160	0.158	0.160	0.100	0.184	0.172	0.170
101	MK479204.1 *Centruroides taino*	0.160	0.160	0.154	0.160	0.130	0.200	0.184	0.184
102	MK479207.1 *Centruroides testaceus*	0.156	0.156	0.150	0.156	0.108	0.186	0.168	0.170
103	MK479210.1 *Centruroides vittatus*	0.184	0.184	0.170	0.184	0.032	0.212	0.180	0.184
104	NC 037222.1 *Centruroides vittatus*	0.184	0.184	0.170	0.184	0.032	0.212	0.180	0.184
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.186	0.186	0.198	0.186	0.208	0.148	0.156	0.152
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.196	0.196	0.198	0.196	0.198	0.188	0.180	0.182
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.190	0.190	0.206	0.190	0.228	0.158	0.172	0.152
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.182	0.182	0.192	0.182	0.186	0.132	0.154	0.170

		25	26	27	28	29	30	31	32
1	**PP07**	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.018
2	**PP08**	0.017	0.018	0.017	0.016	0.017	0.017	0.017	0.017
3	**PP11**	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.018
4	*Lychas annulatus* clade B PC01	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.018
5	*Lychas annulatus* clade A PC02	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
6	*Urodacus varians* PC03	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
7	*Lychas annulatus* clade B PC04	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.018
8	*Urodacus* sp Telfer PC05	0.016	0.016	0.015	0.016	0.016	0.016	0.016	0.016
9	*Lychas annulatus* clade A PC06	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
10	*Urodacus yaschenkoki* PC07	0.015	0.016	0.015	0.016	0.015	0.015	0.016	0.016
11	*Urodacus yaschenkoki* PC08	0.015	0.016	0.015	0.016	0.015	0.015	0.016	0.016
12	*Lychas annulatus clade* B NN01	0.017	0.018	0.017	0.017	0.018	0.018	0.018	0.018
13	*Lychas annulatus* clade A NN03	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
14	*Lychas annulatus* clade B NN04	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.018
15	*Lychas annulatus* NN05 clade A	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
16	*Lychas annulatus* clade A NN06	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
17	*Lychas annulatus* clade A NN07	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
18	*Lychas annulatus* clade A NN08	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
19	*Lychas annulatus* clade B NN09	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.018
20	*Lychas annulatus* clade ANN10	0.017	0.018	0.017	0.017	0.017	0.017	0.017	0.017
21	EF122605.2 *Centruroides vittatus*	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.016	0.016	0.016	0.015	0.016	0.016	0.016	0.016
23	KT446990. *Brachistosternus paposo*	0.013	0.016	0.015	0.016	0.000	0.000	0.013	0.014
24	KT447018.1 *Brachistosternus roigalsinai*	0.013	0.016	0.016	0.016	0.010	0.010	0.014	0.014
25	KT446957.1 *Brachistosternus ehrenbergii*		0.016	0.015	0.015	0.013	0.013	0.014	0.013
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.148		0.014	0.015	0.016	0.016	0.017	0.017
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.128	0.116		0.014	0.015	0.015	0.015	0.016
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.124	0.122	0.118		0.016	0.016	0.016	0.016
29	KX517230.1 *Brachistosternus paposo*	0.100	0.144	0.138	0.140		0.000	0.013	0.014
30	KX517229.1 *Brachistosternus paposo*	0.100	0.144	0.138	0.140	0.000		0.013	0.014
31	KT446947.1 *Brachistosternus chilensis*	0.110	0.168	0.132	0.146	0.100	0.100		0.010
32	KT446928.1 *Brachistosternus aconcagua*	0.100	0.172	0.144	0.160	0.108	0.108	0.056	
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.140	0.122	0.122	0.076	0.144	0.144	0.144	0.154
34	AY156581.1 *Pandinus dictator*	0.156	0.140	0.120	0.148	0.154	0.154	0.162	0.156
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.154	0.102	0.110	0.106	0.138	0.138	0.138	0.150
36	KT447015.1 *Brachistosternus roigalsinai*	0.110	0.148	0.150	0.152	0.030	0.030	0.108	0.118

		25	26	27	28	29	30	31	32
37	KT446955.1 *Brachistosternus ehrenbergii*	0.092	0.144	0.132	0.132	0.098	0.098	0.096	0.106
38	KT446946.1 *Brachistosternus chango*	0.110	0.168	0.128	0.132	0.098	0.098	0.064	0.074
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.168	0.176	0.164	0.174	0.160	0.160	0.160	0.168
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.066	0.150	0.130	0.146	0.114	0.114	0.106	0.104
41	JQ514251.1 *Pandinus imperato*r voucher Sc1050	0.170	0.148	0.134	0.160	0.154	0.154	0.174	0.182
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.152	0.124	0.128	0.140	0.128	0.128	0.160	0.172
43	KX517244.1 *Brachistosternus paposo*	0.108	0.144	0.144	0.146	0.026	0.026	0.112	0.126
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.120	0.166	0.146	0.168	0.102	0.102	0.098	0.094
45	KT447016.1 *Brachistosternus roigalsinai*	0.104	0.146	0.142	0.144	0.052	0.052	0.106	0.122
46	KT446986.1 *Brachistosternus negrei*	0.120	0.168	0.140	0.150	0.114	0.114	0.066	0.076
47	KT446952.1 *Brachistosternus ehrenbergii*	0.086	0.148	0.136	0.124	0.100	0.100	0.094	0.102
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.148	0.164	0.142	0.146	0.154	0.154	0.148	0.152
49	KT446960.1 *Brachistosternus ferrugineus*	0.122	0.156	0.146	0.150	0.116	0.116	0.134	0.134
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.144	0.140	0.104	0.124	0.168	0.168	0.150	0.144
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.144	0.168	0.150	0.132	0.154	0.154	0.142	0.156
52	KT447025.1 *Brachistosternus titicaca*	0.124	0.160	0.160	0.152	0.110	0.110	0.108	0.106
53	KT447014.1 *Brachistosternus roigalsinai*	0.102	0.150	0.150	0.154	0.050	0.050	0.116	0.124
54	KT188365.1 *Scorpio palmatus*	0.176	0.174	0.166	0.160	0.172	0.172	0.172	0.186
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.140	0.172	0.140	0.160	0.142	0.142	0.132	0.144
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.170	0.172	0.146	0.154	0.156	0.156	0.170	0.176
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.164	0.176	0.152	0.170	0.148	0.148	0.166	0.152
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.158	0.180	0.158	0.170	0.160	0.160	0.144	0.152
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.174	0.172	0.164	0.158	0.170	0.170	0.170	0.184
60	EF122607.2 *Centruroides vittatus*	0.188	0.194	0.164	0.196	0.178	0.178	0.208	0.214
61	EF122608.2 *Centruroides vittatus*	0.188	0.196	0.166	0.198	0.176	0.176	0.202	0.216
62	EF122612.2 *Centruroides vittatus*	0.188	0.196	0.162	0.194	0.178	0.178	0.208	0.214
63	EU381064.1 *Centruroides vittatus*	0.188	0.196	0.162	0.194	0.178	0.178	0.208	0.214
64	EU404114.1 *Centruroides vittatus*	0.190	0.192	0.162	0.200	0.178	0.178	0.200	0.204
65	HM567381.1 *Mesobuthus eupeus*	0.184	0.202	0.194	0.194	0.210	0.210	0.210	0.202
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.212	0.200	0.176	0.184	0.212	0.212	0.222	0.210
67	JN018153.1 *Lychas mucronatus*	0.184	0.212	0.192	0.186	0.196	0.196	0.200	0.198
68	JN018154.1 *Parabuthus laevifrons*	0.182	0.196	0.178	0.198	0.182	0.182	0.194	0.204
69	JN018210.1 *Lychas mucronatus*	0.180	0.218	0.194	0.184	0.180	0.180	0.182	0.192
70	JN018211.1 *Lychas mucronatus*	0.188	0.226	0.200	0.194	0.198	0.198	0.196	0.204
71	KF997876.1 *Mesobuthus gibbosus*	0.196	0.200	0.180	0.206	0.202	0.202	0.206	0.202
72	KT716037.1 *Lychas tricarinatus*	0.198	0.220	0.206	0.186	0.200	0.200	0.200	0.200

		25	26	27	28	29	30	31	32
73	KX648425.1 *Hottentotta minax*	0.198	0.226	0.200	0.228	0.214	0.214	0.202	0.208
74	KX648429.1 *Compsobuthus werneri*	0.198	0.226	0.200	0.228	0.214	0.214	0.202	0.208
75	KY982184.1 *Centruroides schmidti*	0.176	0.176	0.188	0.190	0.180	0.180	0.194	0.196
76	KY982185.1 *Centruroides vittatus*	0.184	0.188	0.160	0.196	0.178	0.178	0.200	0.206
77	KY982187.1 *Heteroctenus abudi*	0.196	0.198	0.176	0.190	0.184	0.184	0.188	0.182
78	KY982188.1 *Heteroctenus abudi*	0.198	0.198	0.174	0.190	0.186	0.186	0.188	0.188
79	KY982192.1 *Heteroctenus junceus*	0.182	0.190	0.176	0.200	0.198	0.198	0.200	0.202
80	KY982193.1 *Heteroctenus junceus*	0.182	0.190	0.176	0.196	0.198	0.198	0.196	0.198
81	*KY982194.1* Heteroctenus junceus	0.182	0.188	0.174	0.188	0.200	0.200	0.194	0.190
82	KY982199.1 *Heteroctenus junceus*	0.178	0.184	0.176	0.192	0.184	0.184	0.200	0.196
83	KY982273.1 *Zabius fuscus*	0.186	0.218	0.190	0.202	0.200	0.200	0.210	0.202
84	MF422313.1 *Isometrus* sp.	0.196	0.212	0.202	0.208	0.210	0.210	0.210	0.214
85	MF422319.1 *Lychas tricarinatus*	0.194	0.222	0.196	0.188	0.200	0.200	0.196	0.200
86	MF422320.1 *Lychas tricarinatus*	0.190	0.218	0.196	0.188	0.198	0.198	0.196	0.196
87	MF422321.1 *Lychas tricarinatus*	0.188	0.216	0.198	0.186	0.194	0.194	0.194	0.194
88	MF422322.1 *Lychas tricarinatus*	0.190	0.218	0.196	0.188	0.198	0.198	0.196	0.196
89	MF422326.1 *Lychas tricarinatus*	0.200	0.222	0.198	0.196	0.202	0.202	0.210	0.196
90	MF422327.1 *Lychas tricarinatus*	0.190	0.214	0.192	0.194	0.200	0.200	0.206	0.202
91	MF422328.1 *Lychas tricarinatus*	0.192	0.222	0.194	0.186	0.204	0.204	0.210	0.204
92	MF422329.1 *Lychas tricarinatus*	0.188	0.216	0.192	0.196	0.202	0.202	0.208	0.204
93	MF422330.1 *Lychas tricarinatus*	0.190	0.214	0.192	0.194	0.200	0.200	0.206	0.202
94	*MK479161.1* Centruroides arctimanus	0.192	0.204	0.184	0.202	0.192	0.192	0.204	0.200
95	MK479165.1 *Centruroides barbudensis*	0.188	0.194	0.168	0.196	0.190	0.190	0.216	0.212
96	MK479171.1 *Centruroides exilimanus*	0.176	0.206	0.178	0.196	0.190	0.190	0.190	0.194
97	MK479180.1 *Centruroides insulanus*	0.178	0.170	0.166	0.180	0.190	0.190	0.186	0.196
98	MK479188.1 *Centruroides morenoi*	0.186	0.188	0.164	0.170	0.186	0.186	0.208	0.202
99	MK479196.1 *Centruroides platnicki*	0.186	0.182	0.170	0.192	0.170	0.170	0.194	0.204
100	MK479202.1 *Centruroides simplex*	0.176	0.176	0.168	0.184	0.172	0.172	0.190	0.204
101	MK479204.1 *Centruroides taino*	0.184	0.192	0.156	0.182	0.184	0.184	0.194	0.208
102	MK479207.1 *Centruroides testaceus*	0.166	0.186	0.170	0.180	0.168	0.168	0.194	0.196
103	MK479210.1 *Centruroides vittatus*	0.192	0.194	0.164	0.202	0.180	0.180	0.202	0.206
104	NC 037222.1 *Centruroides vittatus*	0.192	0.194	0.164	0.202	0.180	0.180	0.202	0.206
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.156	0.190	0.160	0.148	0.156	0.156	0.150	0.148
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.182	0.212	0.198	0.206	0.180	0.180	0.196	0.204
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.156	0.210	0.178	0.186	0.172	0.172	0.156	0.150
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.144	0.168	0.150	0.132	0.154	0.154	0.142	0.156

		33	34	35	36	37	38	39	40
1	**PP07**	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.018
2	**PP08**	0.017	0.018	0.018	0.017	0.017	0.017	0.018	0.017
3	**PP11**	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.017
4	*Lychas annulatus* clade B PC01	0.017	0.018	0.018	0.017	0.017	0.018	0.018	0.017
5	*Lychas annulatus* clade A PC02	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
6	*Urodacus varians* PC03	0.016	0.015	0.016	0.017	0.016	0.016	0.017	0.016
7	*Lychas annulatus* clade B PC04	0.017	0.018	0.018	0.017	0.017	0.018	0.018	0.017
8	*Urodacus* sp Telfer PC05	0.015	0.016	0.015	0.016	0.016	0.016	0.017	0.017
9	*Lychas annulatus* clade A PC06	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
10	*Urodacus yaschenkoki* PC07	0.016	0.015	0.015	0.016	0.015	0.016	0.016	0.016
11	*Urodacus yaschenkoki* PC08	0.016	0.015	0.015	0.016	0.015	0.016	0.016	0.016
12	*Lychas annulatus clade* B NN01	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
13	*Lychas annulatus* clade A NN03	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
14	*Lychas annulatus* clade B NN04	0.017	0.018	0.018	0.018	0.017	0.018	0.018	0.018
15	*Lychas annulatus* NN05 clade A	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
16	*Lychas annulatus* clade A NN06	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
17	*Lychas annulatus* clade A NN07	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
18	*Lychas annulatus* clade A NN08	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
19	*Lychas annulatus* clade B NN09	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
20	*Lychas annulatus* clade ANN10	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
21	EF122605.2 *Centruroides vittatus*	0.018	0.017	0.018	0.017	0.017	0.018	0.018	0.018
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.015	0.016	0.015	0.016	0.016	0.016	0.017	0.016
23	KT446990. *Brachistosternus paposo*	0.016	0.016	0.015	0.008	0.013	0.013	0.016	0.014
24	KT447018.1 *Brachistosternus roigalsinai*	0.016	0.016	0.016	0.011	0.014	0.014	0.016	0.014
25	KT446957.1 *Brachistosternus ehrenbergii*	0.016	0.016	0.016	0.014	0.013	0.014	0.017	0.011
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.015	0.016	0.014	0.016	0.016	0.017	0.017	0.016
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.015	0.015	0.014	0.016	0.015	0.015	0.017	0.015
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.012	0.016	0.014	0.016	0.015	0.015	0.017	0.016
29	KX517230.1 *Brachistosternus paposo*	0.016	0.016	0.015	0.008	0.013	0.013	0.016	0.014
30	KX517229.1 *Brachistosternus paposo*	0.016	0.016	0.015	0.008	0.013	0.013	0.016	0.014
31	KT446947.1 *Brachistosternus chilensis*	0.016	0.016	0.015	0.014	0.013	0.011	0.016	0.014
32	KT446928.1 *Brachistosternus aconcagua*	0.016	0.016	0.016	0.014	0.014	0.012	0.017	0.014
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030		0.016	0.015	0.016	0.015	0.016	0.017	0.016
34	AY156581.1 *Pandinus dictator*	0.158		0.015	0.017	0.017	0.016	0.017	0.016
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.120	0.132		0.016	0.016	0.016	0.017	0.016
36	KT447015.1 *Brachistosternus roigalsinai*	0.144	0.174	0.140		0.013	0.014	0.016	0.014

		33	34	35	36	37	38	39	40
37	KT446955.1 *Brachistosternus ehrenbergii*	0.132	0.164	0.146	0.100		0.014	0.016	0.013
38	KT446946.1 *Brachistosternus chango*	0.146	0.160	0.154	0.106	0.118		0.016	0.015
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.174	0.178	0.176	0.160	0.142	0.150		0.017
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.148	0.150	0.146	0.116	0.094	0.122	0.178	
41	JQ514251.1 *Pandinus imperato*r voucher Sc1050	0.140	0.098	0.158	0.158	0.178	0.166	0.182	0.180
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.124	0.152	0.106	0.142	0.148	0.162	0.180	0.154
43	KX517244.1 *Brachistosternus paposo*	0.146	0.164	0.140	0.028	0.100	0.102	0.152	0.116
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.148	0.164	0.142	0.104	0.120	0.104	0.166	0.112
45	KT447016.1 *Brachistosternus roigalsinai*	0.152	0.164	0.144	0.056	0.102	0.104	0.164	0.110
46	KT446986.1 *Brachistosternus negrei*	0.156	0.164	0.138	0.120	0.102	0.080	0.154	0.118
47	KT446952.1 *Brachistosternus ehrenbergii*	0.130	0.158	0.142	0.106	0.018	0.112	0.146	0.094
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.158	0.174	0.166	0.168	0.132	0.150	0.118	0.166
49	KT446960.1 *Brachistosternus ferrugineus*	0.158	0.154	0.148	0.114	0.124	0.130	0.142	0.122
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.122	0.148	0.136	0.168	0.142	0.164	0.174	0.148
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.142	0.154	0.140	0.160	0.140	0.158	0.164	0.150
52	KT447025.1 *Brachistosternus titicaca*	0.152	0.172	0.160	0.116	0.124	0.096	0.148	0.138
53	KT447014.1 *Brachistosternus roigalsinai*	0.154	0.172	0.152	0.050	0.106	0.114	0.162	0.110
54	KT188365.1 *Scorpio palmatus*	0.160	0.160	0.174	0.188	0.164	0.168	0.166	0.172
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.164	0.154	0.178	0.162	0.134	0.132	0.144	0.158
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.168	0.126	0.164	0.166	0.166	0.168	0.176	0.180
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.162	0.168	0.174	0.162	0.168	0.160	0.102	0.172
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.158	0.180	0.162	0.160	0.148	0.160	0.138	0.150
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.162	0.160	0.172	0.186	0.162	0.166	0.164	0.170
60	EF122607.2 *Centruroides vittatus*	0.200	0.180	0.198	0.186	0.184	0.192	0.198	0.194
61	EF122608.2 *Centruroides vittatus*	0.204	0.186	0.202	0.186	0.182	0.192	0.192	0.198
62	EF122612.2 *Centruroides vittatus*	0.198	0.178	0.194	0.186	0.184	0.192	0.200	0.194
63	EU381064.1 *Centruroides vittatus*	0.198	0.178	0.196	0.186	0.184	0.192	0.200	0.194
64	EU404114.1 *Centruroides vittatus*	0.204	0.184	0.202	0.182	0.182	0.204	0.200	0.192
65	HM567381.1 *Mesobuthus eupeus*	0.200	0.208	0.210	0.208	0.202	0.202	0.226	0.200
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.208	0.188	0.202	0.212	0.220	0.200	0.210	0.204
67	JN018153.1 *Lychas mucronatus*	0.196	0.198	0.202	0.206	0.202	0.186	0.206	0.204
68	JN018154.1 *Parabuthus laevifrons*	0.212	0.206	0.200	0.192	0.194	0.204	0.204	0.188
69	JN018210.1 *Lychas mucronatus*	0.184	0.198	0.204	0.196	0.164	0.182	0.216	0.180
70	JN018211.1 *Lychas mucronatus*	0.200	0.216	0.208	0.212	0.204	0.196	0.218	0.208
71	KF997876.1 *Mesobuthus gibbosus*	0.196	0.176	0.198	0.212	0.202	0.202	0.216	0.202
72	KT716037.1 *Lychas tricarinatus*	0.190	0.210	0.200	0.206	0.194	0.206	0.218	0.212

		33	34	35	36	37	38	39	40
73	KX648425.1 *Hottentotta minax*	0.226	0.204	0.212	0.210	0.218	0.212	0.244	0.196
74	KX648429.1 *Compsobuthus werneri*	0.226	0.204	0.212	0.210	0.218	0.212	0.244	0.196
75	KY982184.1 *Centruroides schmidti*	0.186	0.172	0.176	0.174	0.180	0.200	0.198	0.198
76	KY982185.1 *Centruroides vittatus*	0.200	0.180	0.198	0.182	0.182	0.198	0.200	0.190
77	KY982187.1 *Heteroctenus abudi*	0.184	0.172	0.174	0.192	0.194	0.182	0.206	0.190
78	KY982188.1 *Heteroctenus abudi*	0.188	0.170	0.172	0.198	0.196	0.190	0.212	0.188
79	KY982192.1 *Heteroctenus junceus*	0.184	0.184	0.184	0.190	0.200	0.202	0.216	0.178
80	KY982193.1 *Heteroctenus junceus*	0.180	0.180	0.180	0.190	0.200	0.202	0.218	0.174
81	*KY982194.1* Heteroctenus junceus	0.182	0.168	0.174	0.194	0.194	0.202	0.214	0.176
82	KY982199.1 *Heteroctenus junceus*	0.174	0.174	0.180	0.190	0.196	0.206	0.226	0.170
83	KY982273.1 *Zabius fuscus*	0.224	0.202	0.210	0.200	0.204	0.198	0.216	0.186
84	MF422313.1 *Isometrus* sp.	0.198	0.214	0.224	0.208	0.192	0.200	0.226	0.210
85	MF422319.1 *Lychas tricarinatus*	0.190	0.208	0.200	0.210	0.198	0.202	0.222	0.216
86	MF422320.1 *Lychas tricarinatus*	0.192	0.208	0.202	0.208	0.198	0.202	0.224	0.212
87	MF422321.1 *Lychas tricarinatus*	0.190	0.206	0.198	0.204	0.196	0.200	0.220	0.210
88	MF422322.1 *Lychas tricarinatus*	0.192	0.208	0.202	0.208	0.198	0.202	0.224	0.212
89	MF422326.1 *Lychas tricarinatus*	0.212	0.196	0.210	0.212	0.210	0.198	0.220	0.214
90	MF422327.1 *Lychas tricarinatus*	0.196	0.202	0.204	0.206	0.210	0.198	0.226	0.214
91	MF422328.1 *Lychas tricarinatus*	0.202	0.204	0.208	0.216	0.212	0.200	0.220	0.210
92	MF422329.1 *Lychas tricarinatus*	0.198	0.202	0.206	0.208	0.208	0.200	0.224	0.216
93	MF422330.1 *Lychas tricarinatus*	0.196	0.202	0.204	0.206	0.210	0.198	0.226	0.214
94	*MK479161.1* Centruroides arctimanus	0.192	0.186	0.194	0.184	0.200	0.204	0.216	0.194
95	MK479165.1 *Centruroides barbudensis*	0.204	0.196	0.200	0.196	0.204	0.206	0.226	0.188
96	MK479171.1 *Centruroides exilimanus*	0.206	0.172	0.204	0.192	0.192	0.196	0.218	0.180
97	MK479180.1 *Centruroides insulanus*	0.176	0.160	0.180	0.190	0.196	0.188	0.194	0.174
98	MK479188.1 *Centruroides morenoi*	0.174	0.170	0.192	0.188	0.198	0.186	0.212	0.190
99	MK479196.1 *Centruroides platnicki*	0.196	0.182	0.178	0.174	0.186	0.186	0.214	0.178
100	MK479202.1 *Centruroides simplex*	0.184	0.160	0.172	0.170	0.174	0.190	0.190	0.174
101	MK479204.1 *Centruroides taino*	0.192	0.174	0.184	0.196	0.188	0.188	0.198	0.190
102	MK479207.1 *Centruroides testaceus*	0.190	0.162	0.186	0.180	0.178	0.202	0.202	0.178
103	MK479210.1 *Centruroides vittatus*	0.206	0.186	0.204	0.184	0.184	0.206	0.202	0.194
104	NC 037222.1 *Centruroides vittatus*	0.206	0.186	0.204	0.184	0.184	0.206	0.202	0.194
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.144	0.182	0.164	0.162	0.146	0.148	0.158	0.166
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.198	0.202	0.216	0.180	0.184	0.206	0.214	0.188
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.176	0.172	0.188	0.174	0.150	0.156	0.174	0.160
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.142	0.154	0.140	0.160	0.140	0.158	0.164	0.150

		41	42	43	44	45	46	47	48
1	**PP07**	0.018	0.018	0.017	0.018	0.017	0.018	0.016	0.017
2	**PP08**	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
3	**PP11**	0.018	0.018	0.018	0.018	0.017	0.018	0.016	0.017
4	*Lychas annulatus* clade B PC01	0.018	0.018	0.017	0.018	0.017	0.018	0.017	0.017
5	*Lychas annulatus* clade A PC02	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017
6	*Urodacus varians* PC03	0.016	0.017	0.016	0.017	0.017	0.016	0.016	0.016
7	*Lychas annulatus* clade B PC04	0.018	0.018	0.017	0.018	0.017	0.018	0.017	0.017
8	*Urodacus* sp Telfer PC05	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
9	*Lychas annulatus* clade A PC06	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017
10	*Urodacus yaschenkoki* PC07	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016
11	*Urodacus yaschenkoki* PC08	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016
12	*Lychas annulatus clade* B NN01	0.019	0.018	0.018	0.018	0.017	0.018	0.017	0.018
13	*Lychas annulatus* clade A NN03	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017
14	*Lychas annulatus* clade B NN04	0.018	0.018	0.017	0.018	0.017	0.018	0.017	0.017
15	*Lychas annulatus* NN05 clade A	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017
16	*Lychas annulatus* clade A NN06	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017
17	*Lychas annulatus* clade A NN07	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017
18	*Lychas annulatus* clade A NN08	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017
19	*Lychas annulatus* clade B NN09	0.018	0.018	0.018	0.018	0.017	0.018	0.017	0.017
20	*Lychas annulatus* clade ANN10	0.018	0.018	0.017	0.018	0.018	0.017	0.017	0.017
21	EF122605.2 *Centruroides vittatus*	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.018
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
23	KT446990. *Brachistosternus paposo*	0.016	0.015	0.007	0.014	0.010	0.014	0.013	0.016
24	KT447018.1 *Brachistosternus roigalsinai*	0.016	0.016	0.010	0.014	0.010	0.014	0.015	0.016
25	KT446957.1 *Brachistosternus ehrenbergii*	0.017	0.016	0.014	0.015	0.014	0.015	0.013	0.016
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.016	0.015	0.016	0.017	0.016	0.017	0.016	0.017
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.015	0.015	0.016	0.016	0.016	0.016	0.015	0.016
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.016	0.016	0.016	0.017	0.016	0.016	0.015	0.016
29	KX517230.1 *Brachistosternus paposo*	0.016	0.015	0.007	0.014	0.010	0.014	0.013	0.016
30	KX517229.1 *Brachistosternus paposo*	0.016	0.015	0.007	0.014	0.010	0.014	0.013	0.016
31	KT446947.1 *Brachistosternus chilensis*	0.017	0.016	0.014	0.013	0.014	0.011	0.013	0.016
32	KT446928.1 *Brachistosternus aconcagua*	0.017	0.017	0.015	0.013	0.015	0.012	0.014	0.016
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.016	0.015	0.016	0.016	0.016	0.016	0.015	0.016
34	AY156581.1 *Pandinus dictator*	0.013	0.016	0.017	0.017	0.017	0.017	0.016	0.017
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.016	0.014	0.016	0.016	0.016	0.015	0.016	0.017
36	KT447015.1 *Brachistosternus roigalsinai*	0.016	0.016	0.007	0.014	0.010	0.015	0.014	0.017

		41	42	43	44	45	46	47	48
37	KT446955.1 *Brachistosternus ehrenbergii*	0.017	0.016	0.013	0.015	0.014	0.014	0.006	0.015
38	KT446946.1 *Brachistosternus chango*	0.017	0.016	0.014	0.014	0.014	0.012	0.014	0.016
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.017	0.017	0.016	0.017	0.017	0.016	0.016	0.014
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.017	0.016	0.014	0.014	0.014	0.014	0.013	0.017
41	JQ514251.1 *Pandinus imperator* voucher Sc1050		0.016	0.016	0.017	0.016	0.017	0.017	0.017
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.154		0.015	0.016	0.016	0.016	0.016	0.017
43	KX517244.1 *Brachistosternus paposo*	0.144	0.136		0.013	0.010	0.014	0.014	0.016
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.182	0.154	0.100		0.014	0.013	0.014	0.016
45	KT447016.1 *Brachistosternus roigalsinai*	0.162	0.148	0.052	0.108		0.014	0.014	0.016
46	KT446986.1 *Brachistosternus negrei*	0.168	0.162	0.118	0.100	0.108		0.013	0.016
47	KT446952.1 *Brachistosternus ehrenbergii*	0.178	0.146	0.106	0.116	0.106	0.100		0.015
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.168	0.178	0.154	0.162	0.156	0.152	0.136	
49	KT446960.1 *Brachistosternus ferrugineus*	0.162	0.156	0.112	0.120	0.118	0.108	0.120	0.156
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.150	0.158	0.164	0.146	0.160	0.154	0.140	0.160
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.160	0.152	0.160	0.170	0.168	0.128	0.138	0.166
52	KT447025.1 *Brachistosternus titicaca*	0.180	0.176	0.118	0.108	0.116	0.098	0.128	0.162
53	KT447014.1 *Brachistosternus roigalsinai*	0.160	0.148	0.042	0.102	0.026	0.118	0.112	0.154
54	KT188365.1 *Scorpio palmatus*	0.164	0.186	0.178	0.190	0.180	0.178	0.162	0.172
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.158	0.172	0.162	0.152	0.156	0.152	0.138	0.148
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.132	0.158	0.158	0.194	0.164	0.164	0.162	0.172
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.150	0.172	0.152	0.158	0.178	0.156	0.172	0.120
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.176	0.160	0.156	0.148	0.178	0.162	0.146	0.092
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.164	0.184	0.176	0.188	0.178	0.176	0.160	0.170
60	EF122607.2 *Centruroides vittatus*	0.186	0.186	0.178	0.198	0.178	0.198	0.190	0.196
61	EF122608.2 *Centruroides vittatus*	0.184	0.186	0.178	0.202	0.186	0.196	0.190	0.196
62	EF122612.2 *Centruroides vittatus*	0.184	0.190	0.178	0.198	0.178	0.198	0.190	0.198
63	EU381064.1 *Centruroides vittatus*	0.184	0.188	0.178	0.198	0.178	0.198	0.190	0.198
64	EU404114.1 *Centruroides vittatus*	0.182	0.192	0.178	0.198	0.180	0.192	0.190	0.210
65	HM567381.1 *Mesobuthus eupeus*	0.222	0.222	0.212	0.214	0.208	0.202	0.200	0.214
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.212	0.214	0.212	0.232	0.216	0.218	0.216	0.206
67	JN018153.1 *Lychas mucronatus*	0.198	0.202	0.202	0.212	0.194	0.196	0.200	0.188
68	JN018154.1 *Parabuthus laevifrons*	0.208	0.210	0.190	0.192	0.182	0.200	0.190	0.190
69	JN018210.1 *Lychas mucronatus*	0.204	0.208	0.184	0.204	0.196	0.172	0.166	0.196
70	JN018211.1 *Lychas mucronatus*	0.210	0.212	0.204	0.210	0.198	0.194	0.200	0.212
71	KF997876.1 *Mesobuthus gibbosus*	0.206	0.200	0.204	0.210	0.194	0.202	0.206	0.214
72	KT716037.1 *Lychas tricarinatus*	0.208	0.224	0.208	0.206	0.206	0.194	0.192	0.204

		41	42	43	44	45	46	47	48
73	KX648425.1 *Hottentotta minax*	0.210	0.232	0.208	0.216	0.208	0.220	0.214	0.216
74	KX648429.1 *Compsobuthus werneri*	0.210	0.232	0.208	0.216	0.208	0.220	0.214	0.216
75	KY982184.1 *Centruroides schmidti*	0.164	0.188	0.176	0.190	0.188	0.194	0.172	0.186
76	KY982185.1 *Centruroides vittatus*	0.178	0.186	0.178	0.196	0.176	0.196	0.188	0.204
77	KY982187.1 *Heteroctenus abudi*	0.190	0.196	0.188	0.196	0.188	0.180	0.188	0.196
78	KY982188.1 *Heteroctenus abudi*	0.192	0.194	0.194	0.194	0.190	0.180	0.190	0.196
79	KY982192.1 *Heteroctenus junceus*	0.188	0.190	0.192	0.196	0.192	0.206	0.202	0.206
80	KY982193.1 *Heteroctenus junceus*	0.188	0.186	0.192	0.196	0.192	0.202	0.198	0.208
81	*KY982194.1* Heteroctenus junceus	0.188	0.198	0.194	0.204	0.190	0.194	0.186	0.200
82	KY982199.1 *Heteroctenus junceus*	0.182	0.178	0.188	0.184	0.184	0.208	0.194	0.202
83	KY982273.1 *Zabius fuscus*	0.202	0.204	0.194	0.218	0.200	0.210	0.198	0.198
84	MF422313.1 *Isometrus* sp.	0.204	0.222	0.208	0.228	0.206	0.220	0.196	0.212
85	MF422319.1 *Lychas tricarinatus*	0.210	0.226	0.208	0.208	0.202	0.190	0.196	0.198
86	MF422320.1 *Lychas tricarinatus*	0.206	0.224	0.206	0.208	0.204	0.192	0.196	0.196
87	MF422321.1 *Lychas tricarinatus*	0.204	0.220	0.202	0.208	0.200	0.188	0.194	0.194
88	MF422322.1 *Lychas tricarinatus*	0.206	0.224	0.206	0.208	0.204	0.192	0.196	0.196
89	MF422326.1 *Lychas tricarinatus*	0.216	0.226	0.210	0.212	0.206	0.200	0.206	0.200
90	MF422327.1 *Lychas tricarinatus*	0.204	0.220	0.204	0.210	0.202	0.200	0.202	0.202
91	MF422328.1 *Lychas tricarinatus*	0.216	0.226	0.210	0.214	0.206	0.200	0.208	0.198
92	MF422329.1 *Lychas tricarinatus*	0.204	0.222	0.206	0.212	0.204	0.202	0.200	0.202
93	MF422330.1 *Lychas tricarinatus*	0.204	0.220	0.204	0.210	0.202	0.200	0.202	0.202
94	*MK479161.1* Centruroides arctimanus	0.184	0.202	0.194	0.214	0.192	0.210	0.202	0.198
95	MK479165.1 *Centruroides barbudensis*	0.182	0.194	0.194	0.208	0.190	0.212	0.204	0.198
96	MK479171.1 *Centruroides exilimanus*	0.180	0.210	0.186	0.210	0.190	0.212	0.196	0.196
97	MK479180.1 *Centruroides insulanus*	0.176	0.188	0.192	0.192	0.186	0.186	0.188	0.200
98	MK479188.1 *Centruroides morenoi*	0.156	0.190	0.182	0.202	0.180	0.198	0.198	0.198
99	MK479196.1 *Centruroides platnicki*	0.184	0.194	0.174	0.194	0.178	0.188	0.182	0.190
100	MK479202.1 *Centruroides simplex*	0.170	0.176	0.168	0.184	0.176	0.204	0.176	0.202
101	MK479204.1 *Centruroides taino*	0.190	0.196	0.190	0.206	0.184	0.194	0.188	0.182
102	MK479207.1 *Centruroides testaceus*	0.168	0.188	0.172	0.190	0.170	0.212	0.178	0.186
103	MK479210.1 *Centruroides vittatus*	0.184	0.194	0.180	0.200	0.182	0.194	0.192	0.212
104	NC 037222.1 *Centruroides vittatus*	0.184	0.194	0.180	0.200	0.182	0.194	0.192	0.212
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.186	0.172	0.160	0.156	0.174	0.144	0.148	0.162
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.208	0.214	0.176	0.188	0.180	0.206	0.190	0.194
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.198	0.182	0.172	0.166	0.176	0.140	0.144	0.190
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.160	0.152	0.160	0.170	0.168	0.128	0.138	0.166

		49	50	51	52	53	54	55	56
1	**PP07**	0.018	0.017	0.018	0.018	0.017	0.018	0.018	0.018
2	**PP08**	0.018	0.017	0.017	0.018	0.017	0.017	0.017	0.017
3	**PP11**	0.018	0.017	0.018	0.018	0.017	0.018	0.018	0.018
4	*Lychas annulatus* clade B PC01	0.018	0.018	0.017	0.018	0.017	0.018	0.017	0.017
5	*Lychas annulatus* clade A PC02	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017
6	*Urodacus varians* PC03	0.016	0.016	0.016	0.017	0.017	0.016	0.016	0.016
7	*Lychas annulatus* clade B PC04	0.018	0.018	0.017	0.019	0.017	0.018	0.018	0.018
8	*Urodacus* sp Telfer PC05	0.016	0.015	0.016	0.017	0.017	0.017	0.016	0.016
9	*Lychas annulatus* clade A PC06	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017
10	*Urodacus yaschenkoki* PC07	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
11	*Urodacus yaschenkoki* PC08	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
12	*Lychas annulatus clade* B NN01	0.018	0.018	0.018	0.019	0.017	0.018	0.018	0.018
13	*Lychas annulatus* clade A NN03	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017
14	*Lychas annulatus* clade B NN04	0.018	0.017	0.018	0.018	0.017	0.018	0.018	0.018
15	*Lychas annulatus* NN05 clade A	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017
16	*Lychas annulatus* clade A NN06	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017
17	*Lychas annulatus* clade A NN07	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017
18	*Lychas annulatus* clade A NN08	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017
19	*Lychas annulatus* clade B NN09	0.018	0.017	0.018	0.018	0.017	0.018	0.018	0.018
20	*Lychas annulatus* clade ANN10	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017
21	EF122605.2 *Centruroides vittatus*	0.018	0.018	0.017	0.019	0.018	0.017	0.017	0.017
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.015	0.016	0.015	0.016	0.016	0.017	0.016	0.016
23	KT446990. *Brachistosternus paposo*	0.014	0.017	0.016	0.014	0.010	0.017	0.016	0.016
24	KT447018.1 *Brachistosternus roigalsinai*	0.015	0.017	0.017	0.014	0.010	0.017	0.016	0.016
25	KT446957.1 *Brachistosternus ehrenbergii*	0.015	0.016	0.016	0.015	0.014	0.017	0.016	0.017
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.016	0.016	0.017	0.016	0.016	0.017	0.017	0.017
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.016	0.014	0.016	0.016	0.016	0.017	0.016	0.016
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.016	0.015	0.015	0.016	0.016	0.016	0.016	0.016
29	KX517230.1 *Brachistosternus paposo*	0.014	0.017	0.016	0.014	0.010	0.017	0.016	0.016
30	KX517229.1 *Brachistosternus paposo*	0.014	0.017	0.016	0.014	0.010	0.017	0.016	0.016
31	KT446947.1 *Brachistosternus chilensis*	0.015	0.016	0.016	0.014	0.014	0.017	0.015	0.017
32	KT446928.1 *Brachistosternus aconcagua*	0.015	0.016	0.016	0.014	0.015	0.017	0.016	0.017
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.016	0.015	0.016	0.016	0.016	0.016	0.017	0.017
34	AY156581.1 *Pandinus dictator*	0.016	0.016	0.016	0.017	0.017	0.016	0.016	0.015
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.016	0.015	0.016	0.016	0.016	0.017	0.017	0.017
36	KT447015.1 *Brachistosternus roigalsinai*	0.014	0.017	0.016	0.014	0.010	0.017	0.016	0.017

		49	50	51	52	53	54	55	56
37	KT446955.1 *Brachistosternus ehrenbergii*	0.015	0.016	0.016	0.015	0.014	0.017	0.015	0.017
38	KT446946.1 *Brachistosternus chango*	0.015	0.017	0.016	0.013	0.014	0.017	0.015	0.017
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.016	0.017	0.017	0.016	0.016	0.017	0.016	0.017
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.015	0.016	0.016	0.015	0.014	0.017	0.016	0.017
41	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.016	0.016	0.016	0.017	0.016	0.017	0.016	0.015
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.016	0.016	0.016	0.017	0.016	0.017	0.017	0.016
43	KX517244.1 *Brachistosternus paposo*	0.014	0.017	0.016	0.014	0.009	0.017	0.016	0.016
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.015	0.016	0.017	0.014	0.014	0.018	0.016	0.018
45	KT447016.1 *Brachistosternus roigalsinai*	0.014	0.016	0.017	0.014	0.007	0.017	0.016	0.017
46	KT446986.1 *Brachistosternus negrei*	0.014	0.016	0.015	0.013	0.014	0.017	0.016	0.017
47	KT446952.1 *Brachistosternus ehrenbergii*	0.015	0.016	0.015	0.015	0.014	0.016	0.015	0.016
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.016	0.016	0.017	0.016	0.016	0.017	0.016	0.017
49	KT446960.1 *Brachistosternus ferrugineus*		0.016	0.016	0.015	0.015	0.018	0.016	0.017
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.154		0.016	0.017	0.016	0.016	0.016	0.017
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.146	0.154		0.016	0.017	0.016	0.016	0.016
52	KT447025.1 *Brachistosternus titicaca*	0.136	0.168	0.160		0.014	0.018	0.017	0.017
53	KT447014.1 *Brachistosternus roigalsinai*	0.122	0.158	0.170	0.116		0.017	0.017	0.017
54	KT188365.1 *Scorpio palmatus*	0.190	0.162	0.148	0.190	0.184		0.017	0.016
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.148	0.154	0.158	0.164	0.164	0.170		0.016
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.168	0.172	0.152	0.186	0.178	0.146	0.152	
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.132	0.156	0.174	0.172	0.176	0.172	0.134	0.174
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.160	0.164	0.174	0.168	0.172	0.180	0.152	0.176
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.190	0.162	0.146	0.188	0.182	0.002	0.168	0.144
60	EF122607.2 *Centruroides vittatus*	0.192	0.194	0.186	0.222	0.190	0.188	0.188	0.172
61	EF122608.2 *Centruroides vittatus*	0.194	0.200	0.186	0.216	0.190	0.188	0.184	0.180
62	EF122612.2 *Centruroides vittatus*	0.192	0.192	0.188	0.222	0.190	0.188	0.188	0.176
63	EU381064.1 *Centruroides vittatus*	0.192	0.192	0.188	0.222	0.190	0.186	0.188	0.174
64	EU404114.1 *Centruroides vittatus*	0.188	0.192	0.192	0.216	0.190	0.190	0.188	0.178
65	HM567381.1 *Mesobuthus eupeus*	0.198	0.190	0.206	0.226	0.208	0.194	0.212	0.204
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.198	0.202	0.216	0.226	0.228	0.214	0.200	0.180
67	JN018153.1 *Lychas mucronatus*	0.210	0.192	0.204	0.226	0.196	0.200	0.186	0.196
68	JN018154.1 *Parabuthus laevifrons*	0.192	0.192	0.208	0.214	0.192	0.222	0.192	0.200
69	JN018210.1 *Lychas mucronatus*	0.210	0.198	0.174	0.198	0.190	0.192	0.198	0.188
70	JN018211.1 *Lychas mucronatus*	0.208	0.220	0.206	0.206	0.208	0.220	0.200	0.188
71	KF997876.1 *Mesobuthus gibbosus*	0.202	0.190	0.212	0.228	0.202	0.220	0.202	0.196
72	KT716037.1 *Lychas tricarinatus*	0.200	0.192	0.188	0.198	0.204	0.198	0.224	0.196

		49	50	51	52	53	54	55	56
73	KX648425.1 *Hottentotta minax*	0.212	0.200	0.226	0.238	0.214	0.234	0.218	0.214
74	KX648429.1 *Compsobuthus werneri*	0.212	0.200	0.226	0.238	0.214	0.234	0.218	0.214
75	KY982184.1 *Centruroides schmidti*	0.190	0.178	0.202	0.202	0.182	0.208	0.192	0.198
76	KY982185.1 *Centruroides vittatus*	0.186	0.188	0.190	0.214	0.186	0.192	0.184	0.170
77	KY982187.1 *Heteroctenus abudi*	0.176	0.180	0.204	0.202	0.192	0.198	0.194	0.184
78	KY982188.1 *Heteroctenus abudi*	0.174	0.178	0.204	0.202	0.194	0.200	0.198	0.186
79	KY982192.1 *Heteroctenus junceus*	0.172	0.184	0.198	0.212	0.198	0.210	0.184	0.194
80	KY982193.1 *Heteroctenus junceus*	0.176	0.180	0.194	0.212	0.198	0.208	0.188	0.190
81	*KY982194.1* Heteroctenus junceus	0.174	0.182	0.196	0.214	0.190	0.200	0.188	0.186
82	KY982199.1 *Heteroctenus junceus*	0.174	0.172	0.188	0.210	0.190	0.194	0.186	0.188
83	KY982273.1 *Zabius fuscus*	0.188	0.202	0.200	0.222	0.196	0.210	0.216	0.226
84	MF422313.1 *Isometrus* sp.	0.216	0.204	0.210	0.228	0.212	0.212	0.208	0.192
85	MF422319.1 *Lychas tricarinatus*	0.198	0.194	0.198	0.204	0.204	0.204	0.222	0.196
86	MF422320.1 *Lychas tricarinatus*	0.198	0.192	0.198	0.202	0.202	0.204	0.224	0.196
87	MF422321.1 *Lychas tricarinatus*	0.194	0.192	0.194	0.200	0.198	0.200	0.220	0.192
88	MF422322.1 *Lychas tricarinatus*	0.198	0.192	0.198	0.202	0.202	0.204	0.224	0.196
89	MF422326.1 *Lychas tricarinatus*	0.204	0.190	0.206	0.228	0.204	0.204	0.218	0.202
90	MF422327.1 *Lychas tricarinatus*	0.206	0.188	0.208	0.218	0.204	0.198	0.224	0.208
91	MF422328.1 *Lychas tricarinatus*	0.204	0.188	0.206	0.228	0.210	0.200	0.214	0.208
92	MF422329.1 *Lychas tricarinatus*	0.206	0.188	0.210	0.220	0.206	0.200	0.224	0.210
93	MF422330.1 *Lychas tricarinatus*	0.206	0.188	0.208	0.218	0.204	0.198	0.224	0.208
94	*MK479161.1* Centruroides arctimanus	0.178	0.196	0.206	0.210	0.194	0.208	0.196	0.200
95	MK479165.1 *Centruroides barbudensis*	0.202	0.196	0.216	0.214	0.190	0.196	0.190	0.192
96	MK479171.1 *Centruroides exilimanus*	0.190	0.190	0.188	0.226	0.192	0.206	0.190	0.208
97	MK479180.1 *Centruroides insulanus*	0.180	0.170	0.190	0.200	0.190	0.190	0.194	0.178
98	MK479188.1 *Centruroides morenoi*	0.202	0.186	0.200	0.212	0.186	0.206	0.202	0.176
99	MK479196.1 *Centruroides platnicki*	0.182	0.184	0.190	0.210	0.182	0.202	0.182	0.196
100	MK479202.1 *Centruroides simplex*	0.184	0.186	0.192	0.220	0.180	0.202	0.192	0.184
101	MK479204.1 *Centruroides taino*	0.188	0.182	0.204	0.204	0.186	0.206	0.176	0.184
102	MK479207.1 *Centruroides testaceus*	0.194	0.176	0.190	0.216	0.172	0.208	0.182	0.186
103	MK479210.1 *Centruroides vittatus*	0.186	0.194	0.194	0.218	0.192	0.192	0.190	0.180
104	NC 037222.1 *Centruroides vittatus*	0.186	0.194	0.194	0.218	0.192	0.192	0.190	0.180
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.162	0.158	0.162	0.162	0.166	0.188	0.166	0.182
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.192	0.178	0.188	0.216	0.184	0.204	0.206	0.220
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.166	0.176	0.180	0.162	0.176	0.190	0.190	0.196
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.146	0.154	0.000	0.160	0.170	0.148	0.158	0.152

		57	58	59	60	61	62	63	64
1	**PP07**	0.019	0.018	0.018	0.016	0.016	0.016	0.016	0.017
2	**PP08**	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
3	**PP11**	0.019	0.018	0.018	0.017	0.017	0.017	0.017	0.017
4	*Lychas annulatus* clade B PC01	0.019	0.018	0.018	0.016	0.016	0.016	0.016	0.016
5	*Lychas annulatus* clade A PC02	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.017
6	*Urodacus varians* PC03	0.017	0.017	0.016	0.018	0.018	0.018	0.018	0.018
7	*Lychas annulatus* clade B PC04	0.019	0.018	0.018	0.016	0.016	0.016	0.016	0.016
8	*Urodacus* sp Telfer PC05	0.017	0.017	0.017	0.018	0.018	0.018	0.018	0.018
9	*Lychas annulatus* clade A PC06	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.017
10	*Urodacus yaschenkoki* PC07	0.017	0.016	0.016	0.018	0.018	0.018	0.018	0.018
11	*Urodacus yaschenkoki* PC08	0.017	0.016	0.016	0.018	0.018	0.018	0.018	0.018
12	*Lychas annulatus clade* B NN01	0.019	0.018	0.018	0.017	0.017	0.017	0.017	0.017
13	*Lychas annulatus* clade A NN03	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.017
14	*Lychas annulatus* clade B NN04	0.019	0.018	0.018	0.017	0.017	0.017	0.017	0.017
15	*Lychas annulatus* NN05 clade A	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.017
16	*Lychas annulatus* clade A NN06	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.017
17	*Lychas annulatus* clade A NN07	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.017
18	*Lychas annulatus* clade A NN08	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.017
19	*Lychas annulatus* clade B NN09	0.019	0.018	0.018	0.017	0.017	0.017	0.017	0.017
20	*Lychas annulatus* clade ANN10	0.018	0.018	0.018	0.017	0.018	0.017	0.017	0.017
21	EF122605.2 *Centruroides vittatus*	0.018	0.018	0.017	0.000	0.006	0.003	0.002	0.008
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.017	0.017	0.016	0.018	0.019	0.018	0.018	0.018
23	KT446990. *Brachistosternus paposo*	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017
24	KT447018.1 *Brachistosternus roigalsinai*	0.017	0.017	0.017	0.018	0.018	0.018	0.018	0.017
25	KT446957.1 *Brachistosternus ehrenbergii*	0.017	0.016	0.017	0.017	0.017	0.017	0.017	0.018
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.017	0.017	0.017	0.018	0.018	0.018	0.018	0.018
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.016	0.016	0.017	0.017	0.017	0.016	0.016	0.016
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.017	0.017	0.016	0.018	0.018	0.018	0.018	0.018
29	KX517230.1 *Brachistosternus paposo*	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017
30	KX517229.1 *Brachistosternus paposo*	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017
31	KT446947.1 *Brachistosternus chilensis*	0.017	0.016	0.017	0.018	0.018	0.018	0.018	0.018
32	KT446928.1 *Brachistosternus aconcagua*	0.016	0.016	0.017	0.018	0.018	0.018	0.018	0.018
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.016	0.016	0.016	0.018	0.018	0.018	0.018	0.018
34	AY156581.1 *Pandinus dictator*	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.017	0.016	0.017	0.018	0.018	0.018	0.018	0.018
36	KT447015.1 *Brachistosternus roigalsinai*	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017

		57	58	59	60	61	62	63	64
37	KT446955.1 *Brachistosternus ehrenbergii*	0.017	0.016	0.016	0.017	0.017	0.017	0.017	0.017
38	KT446946.1 *Brachistosternus chango*	0.016	0.016	0.017	0.018	0.018	0.018	0.018	0.018
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.014	0.015	0.017	0.018	0.018	0.018	0.018	0.018
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.017	0.016	0.017	0.018	0.018	0.018	0.018	0.018
41	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.017	0.016	0.017	0.017	0.017	0.018	0.017	0.018
43	KX517244.1 *Brachistosternus paposo*	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.016	0.016	0.017	0.018	0.018	0.018	0.018	0.018
45	KT447016.1 *Brachistosternus roigalsinai*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
46	KT446986.1 *Brachistosternus negrei*	0.016	0.016	0.017	0.018	0.018	0.018	0.018	0.018
47	KT446952.1 *Brachistosternus ehrenbergii*	0.017	0.016	0.016	0.018	0.018	0.018	0.018	0.018
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.015	0.013	0.017	0.018	0.018	0.018	0.018	0.018
49	KT446960.1 *Brachistosternus ferrugineus*	0.015	0.016	0.018	0.018	0.018	0.018	0.018	0.017
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.016	0.017	0.016	0.018	0.018	0.018	0.018	0.018
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.018
52	KT447025.1 *Brachistosternus titicaca*	0.017	0.017	0.017	0.019	0.018	0.019	0.019	0.018
53	KT447014.1 *Brachistosternus roigalsinai*	0.017	0.017	0.017	0.018	0.018	0.018	0.018	0.018
54	KT188365.1 *Scorpio palmatus*	0.017	0.017	0.002	0.017	0.017	0.017	0.017	0.018
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.015	0.016	0.017	0.017	0.017	0.017	0.017	0.017
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317		0.016	0.017	0.018	0.018	0.018	0.018	0.018
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.142		0.017	0.018	0.018	0.018	0.018	0.018
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.172	0.180		0.017	0.017	0.017	0.017	0.018
60	EF122607.2 *Centruroides vittatus*	0.194	0.194	0.188		0.006	0.003	0.002	0.008
61	EF122608.2 *Centruroides vittatus*	0.196	0.192	0.188	0.016		0.006	0.006	0.008
62	EF122612.2 *Centruroides vittatus*	0.194	0.196	0.188	0.004	0.020		0.002	0.008
63	EU381064.1 *Centruroides vittatus*	0.194	0.196	0.186	0.002	0.018	0.002		0.008
64	EU404114.1 *Centruroides vittatus*	0.198	0.194	0.190	0.030	0.030	0.034	0.032	
65	HM567381.1 *Mesobuthus eupeus*	0.238	0.204	0.196	0.170	0.172	0.166	0.168	0.172
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.218	0.220	0.212	0.160	0.164	0.156	0.158	0.166
67	JN018153.1 *Lychas mucronatus*	0.216	0.204	0.200	0.172	0.176	0.172	0.174	0.180
68	JN018154.1 *Parabuthus laevifrons*	0.222	0.204	0.222	0.172	0.174	0.170	0.170	0.174
69	JN018210.1 *Lychas mucronatus*	0.234	0.208	0.190	0.164	0.160	0.164	0.164	0.168
70	JN018211.1 *Lychas mucronatus*	0.218	0.214	0.220	0.194	0.198	0.196	0.196	0.202
71	KF997876.1 *Mesobuthus gibbosus*	0.222	0.212	0.220	0.158	0.168	0.154	0.156	0.160
72	KT716037.1 *Lychas tricarinatus*	0.210	0.210	0.198	0.168	0.172	0.166	0.166	0.168

		57	58	59	60	61	62	63	64
73	KX648425.1 *Hottentotta minax*	0.230	0.208	0.236	0.188	0.192	0.186	0.186	0.190
74	KX648429.1 *Compsobuthus werneri*	0.230	0.208	0.236	0.188	0.192	0.186	0.186	0.190
75	KY982184.1 *Centruroides schmidti*	0.208	0.200	0.208	0.118	0.118	0.114	0.116	0.116
76	KY982185.1 *Centruroides vittatus*	0.196	0.192	0.192	0.026	0.026	0.030	0.028	0.008
77	KY982187.1 *Heteroctenus abudi*	0.204	0.210	0.198	0.148	0.154	0.148	0.150	0.146
78	KY982188.1 *Heteroctenus abudi*	0.198	0.202	0.200	0.138	0.144	0.138	0.140	0.136
79	KY982192.1 *Heteroctenus junceus*	0.214	0.202	0.210	0.126	0.132	0.126	0.124	0.138
80	KY982193.1 *Heteroctenus junceus*	0.216	0.202	0.208	0.126	0.132	0.126	0.124	0.138
81	*KY982194.1* Heteroctenus junceus	0.220	0.204	0.200	0.122	0.128	0.118	0.120	0.134
82	KY982199.1 *Heteroctenus junceus*	0.210	0.192	0.194	0.114	0.118	0.114	0.112	0.120
83	KY982273.1 *Zabius fuscus*	0.224	0.218	0.210	0.166	0.168	0.170	0.168	0.162
84	MF422313.1 *Isometrus* sp.	0.248	0.224	0.214	0.178	0.182	0.182	0.180	0.182
85	MF422319.1 *Lychas tricarinatus*	0.210	0.210	0.204	0.166	0.170	0.164	0.164	0.170
86	MF422320.1 *Lychas tricarinatus*	0.208	0.206	0.204	0.168	0.172	0.166	0.166	0.172
87	MF422321.1 *Lychas tricarinatus*	0.204	0.204	0.200	0.164	0.168	0.162	0.162	0.168
88	MF422322.1 *Lychas tricarinatus*	0.208	0.206	0.204	0.168	0.172	0.166	0.166	0.172
89	MF422326.1 *Lychas tricarinatus*	0.218	0.208	0.204	0.152	0.160	0.150	0.150	0.152
90	MF422327.1 *Lychas tricarinatus*	0.220	0.206	0.198	0.138	0.146	0.136	0.136	0.142
91	MF422328.1 *Lychas tricarinatus*	0.220	0.200	0.200	0.144	0.152	0.142	0.142	0.146
92	MF422329.1 *Lychas tricarinatus*	0.220	0.208	0.200	0.140	0.148	0.138	0.138	0.144
93	MF422330.1 *Lychas tricarinatus*	0.220	0.206	0.198	0.138	0.146	0.136	0.136	0.142
94	*MK479161.1* Centruroides arctimanus	0.220	0.190	0.208	0.140	0.138	0.136	0.138	0.134
95	MK479165.1 *Centruroides barbudensis*	0.208	0.188	0.196	0.128	0.128	0.128	0.126	0.130
96	MK479171.1 *Centruroides exilimanus*	0.214	0.204	0.206	0.118	0.116	0.116	0.116	0.120
97	MK479180.1 *Centruroides insulanus*	0.200	0.182	0.190	0.122	0.124	0.120	0.120	0.118
98	MK479188.1 *Centruroides morenoi*	0.196	0.204	0.206	0.102	0.110	0.100	0.100	0.112
99	MK479196.1 *Centruroides platnicki*	0.206	0.196	0.202	0.120	0.122	0.120	0.122	0.126
100	MK479202.1 *Centruroides simplex*	0.200	0.200	0.202	0.100	0.102	0.098	0.098	0.106
101	MK479204.1 *Centruroides taino*	0.200	0.196	0.206	0.130	0.128	0.126	0.128	0.138
102	MK479207.1 *Centruroides testaceus*	0.196	0.194	0.208	0.108	0.110	0.106	0.106	0.108
103	MK479210.1 *Centruroides vittatus*	0.200	0.196	0.192	0.032	0.032	0.036	0.034	0.002
104	NC 037222.1 *Centruroides vittatus*	0.200	0.196	0.192	0.032	0.032	0.036	0.034	0.002
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.176	0.168	0.188	0.208	0.210	0.206	0.206	0.214
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.214	0.214	0.204	0.198	0.208	0.196	0.196	0.198
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.192	0.184	0.190	0.228	0.232	0.230	0.228	0.228
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.174	0.174	0.146	0.186	0.186	0.188	0.188	0.192

		65	66	67	68	69	70	71	72
1	**PP07**	0.016	0.017	0.015	0.016	0.016	0.016	0.016	0.016
2	**PP08**	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.016
3	**PP11**	0.016	0.017	0.016	0.016	0.016	0.016	0.016	0.016
4	*Lychas annulatus* clade B PC01	0.016	0.017	0.016	0.016	0.016	0.016	0.016	0.016
5	*Lychas annulatus* clade A PC02	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.016
6	*Urodacus varians* PC03	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
7	*Lychas annulatus* clade B PC04	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.016
8	*Urodacus* sp Telfer PC05	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
9	*Lychas annulatus* clade A PC06	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.016
10	*Urodacus yaschenkoki* PC07	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
11	*Urodacus yaschenkoki* PC08	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
12	*Lychas annulatus clade* B NN01	0.017	0.017	0.016	0.016	0.016	0.016	0.017	0.016
13	*Lychas annulatus* clade A NN03	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.016
14	*Lychas annulatus* clade B NN04	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.016
15	*Lychas annulatus* NN05 clade A	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.016
16	*Lychas annulatus* clade A NN06	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.016
17	*Lychas annulatus* clade A NN07	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.016
18	*Lychas annulatus* clade A NN08	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.016
19	*Lychas annulatus* clade B NN09	0.016	0.017	0.016	0.016	0.016	0.016	0.016	0.016
20	*Lychas annulatus* clade ANN10	0.016	0.017	0.015	0.016	0.016	0.016	0.017	0.016
21	EF122605.2 *Centruroides vittatus*	0.017	0.016	0.017	0.017	0.017	0.018	0.016	0.017
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
23	KT446990. *Brachistosternus paposo*	0.018	0.018	0.018	0.017	0.017	0.018	0.018	0.018
24	KT447018.1 *Brachistosternus roigalsinai*	0.018	0.018	0.018	0.017	0.017	0.018	0.018	0.018
25	KT446957.1 *Brachistosternus ehrenbergii*	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.018
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.018	0.018	0.018	0.018	0.018	0.019	0.018	0.019
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.018	0.017	0.018	0.017	0.018	0.018	0.017	0.018
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.018	0.017	0.017	0.018	0.017	0.018	0.018	0.017
29	KX517230.1 *Brachistosternus paposo*	0.018	0.018	0.018	0.017	0.017	0.018	0.018	0.018
30	KX517229.1 *Brachistosternus paposo*	0.018	0.018	0.018	0.017	0.017	0.018	0.018	0.018
31	KT446947.1 *Brachistosternus chilensis*	0.018	0.019	0.018	0.018	0.017	0.018	0.018	0.018
32	KT446928.1 *Brachistosternus aconcagua*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
34	AY156581.1 *Pandinus dictator*	0.018	0.017	0.018	0.018	0.018	0.018	0.017	0.018
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
36	KT447015.1 *Brachistosternus roigalsinai*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018

		65	66	67	68	69	70	71	72
37	KT446955.1 *Brachistosternus ehrenbergii*	0.018	0.019	0.018	0.018	0.017	0.018	0.018	0.018
38	KT446946.1 *Brachistosternus chango*	0.018	0.018	0.017	0.018	0.017	0.018	0.018	0.018
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.019	0.018	0.018	0.018	0.018	0.018	0.018	0.018
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.018	0.018	0.018	0.017	0.017	0.018	0.018	0.018
41	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.019	0.018	0.018	0.018	0.018	0.018	0.018	0.018
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.019	0.018	0.018	0.018	0.018	0.018	0.018	0.019
43	KX517244.1 *Brachistosternus paposo*	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.018	0.019	0.018	0.018	0.018	0.018	0.018	0.018
45	KT447016.1 *Brachistosternus roigalsinai*	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018
46	KT446986.1 *Brachistosternus negrei*	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
47	KT446952.1 *Brachistosternus ehrenbergii*	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
49	KT446960.1 *Brachistosternus ferrugineus*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.018	0.018	0.018	0.018	0.018	0.019	0.018	0.018
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.017
52	KT447025.1 *Brachistosternus titicaca*	0.019	0.019	0.019	0.018	0.018	0.018	0.019	0.018
53	KT447014.1 *Brachistosternus roigalsinai*	0.018	0.019	0.018	0.018	0.018	0.018	0.018	0.018
54	KT188365.1 *Scorpio palmatus*	0.018	0.018	0.018	0.019	0.018	0.019	0.019	0.018
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.019
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.018	0.017	0.018	0.018	0.017	0.017	0.018	0.018
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.019	0.018	0.018	0.019	0.019	0.018	0.019	0.018
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.018	0.019	0.018	0.018	0.018	0.018	0.018	0.018
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.018	0.018	0.018	0.019	0.018	0.019	0.019	0.018
60	EF122607.2 *Centruroides vittatus*	0.017	0.016	0.017	0.017	0.017	0.018	0.016	0.017
61	EF122608.2 *Centruroides vittatus*	0.017	0.017	0.017	0.017	0.016	0.018	0.017	0.017
62	EF122612.2 *Centruroides vittatus*	0.017	0.016	0.017	0.017	0.017	0.018	0.016	0.017
63	EU381064.1 *Centruroides vittatus*	0.017	0.016	0.017	0.017	0.017	0.018	0.016	0.017
64	EU404114.1 *Centruroides vittatus*	0.017	0.017	0.017	0.017	0.017	0.018	0.016	0.017
65	HM567381.1 *Mesobuthus eupeus*		0.015	0.016	0.018	0.017	0.017	0.014	0.016
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.128		0.017	0.017	0.017	0.018	0.015	0.017
67	JN018153.1 *Lychas mucronatus*	0.158	0.174		0.016	0.016	0.013	0.016	0.017
68	JN018154.1 *Parabuthus laevifrons*	0.194	0.188	0.154		0.018	0.016	0.017	0.017
69	JN018210.1 *Lychas mucronatus*	0.178	0.184	0.156	0.194		0.017	0.017	0.016
70	JN018211.1 *Lychas mucronatus*	0.186	0.202	0.088	0.162	0.172		0.017	0.016
71	KF997876.1 *Mesobuthus gibbosus*	0.116	0.122	0.152	0.176	0.182	0.166		0.017
72	KT716037.1 *Lychas tricarinatus*	0.142	0.182	0.168	0.174	0.158	0.160	0.186	

		65	66	67	68	69	70	71	72
73	KX648425.1 *Hottentotta minax*	0.138	0.152	0.176	0.176	0.202	0.174	0.136	0.182
74	KX648429.1 *Compsobuthus werneri*	0.138	0.152	0.176	0.176	0.202	0.174	0.136	0.182
75	KY982184.1 *Centruroides schmidti*	0.170	0.172	0.160	0.162	0.166	0.192	0.156	0.160
76	KY982185.1 *Centruroides vittatus*	0.170	0.166	0.176	0.168	0.166	0.202	0.160	0.164
77	KY982187.1 *Heteroctenus abudi*	0.148	0.176	0.158	0.164	0.180	0.186	0.152	0.152
78	KY982188.1 *Heteroctenus abudi*	0.144	0.172	0.154	0.162	0.176	0.178	0.144	0.142
79	KY982192.1 *Heteroctenus junceus*	0.154	0.168	0.176	0.154	0.178	0.186	0.160	0.162
80	KY982193.1 *Heteroctenus junceus*	0.152	0.168	0.172	0.158	0.174	0.182	0.160	0.160
81	*KY982194.1* Heteroctenus junceus	0.138	0.162	0.166	0.156	0.164	0.192	0.154	0.152
82	KY982199.1 *Heteroctenus junceus*	0.162	0.170	0.180	0.152	0.166	0.198	0.154	0.150
83	KY982273.1 *Zabius fuscus*	0.160	0.176	0.164	0.196	0.194	0.182	0.170	0.178
84	MF422313.1 *Isometrus* sp.	0.174	0.194	0.144	0.178	0.160	0.170	0.186	0.172
85	MF422319.1 *Lychas tricarinatus*	0.136	0.186	0.162	0.168	0.164	0.150	0.186	0.018
86	MF422320.1 *Lychas tricarinatus*	0.138	0.184	0.162	0.168	0.166	0.150	0.184	0.016
87	MF422321.1 *Lychas tricarinatus*	0.134	0.182	0.158	0.168	0.162	0.154	0.182	0.012
88	MF422322.1 *Lychas tricarinatus*	0.138	0.184	0.162	0.168	0.166	0.150	0.184	0.016
89	MF422326.1 *Lychas tricarinatus*	0.146	0.186	0.156	0.182	0.160	0.166	0.174	0.076
90	MF422327.1 *Lychas tricarinatus*	0.136	0.182	0.160	0.174	0.156	0.174	0.172	0.066
91	MF422328.1 *Lychas tricarinatus*	0.128	0.182	0.154	0.178	0.158	0.178	0.172	0.074
92	MF422329.1 *Lychas tricarinatus*	0.138	0.182	0.158	0.176	0.158	0.176	0.174	0.068
93	MF422330.1 *Lychas tricarinatus*	0.136	0.182	0.160	0.174	0.156	0.174	0.172	0.066
94	*MK479161.1* Centruroides arctimanus	0.156	0.170	0.168	0.170	0.182	0.190	0.170	0.158
95	MK479165.1 *Centruroides barbudensis*	0.160	0.178	0.178	0.164	0.178	0.182	0.182	0.154
96	MK479171.1 *Centruroides exilimanus*	0.172	0.176	0.168	0.176	0.174	0.186	0.162	0.176
97	MK479180.1 *Centruroides insulanus*	0.148	0.156	0.158	0.146	0.172	0.178	0.144	0.136
98	MK479188.1 *Centruroides morenoi*	0.152	0.174	0.170	0.162	0.160	0.180	0.152	0.146
99	MK479196.1 *Centruroides platnicki*	0.170	0.176	0.158	0.166	0.164	0.184	0.166	0.160
100	MK479202.1 *Centruroides simplex*	0.168	0.164	0.158	0.156	0.160	0.190	0.138	0.148
101	MK479204.1 *Centruroides taino*	0.160	0.166	0.160	0.150	0.168	0.172	0.156	0.146
102	MK479207.1 *Centruroides testaceus*	0.178	0.178	0.164	0.142	0.170	0.186	0.150	0.154
103	MK479210.1 *Centruroides vittatus*	0.170	0.168	0.178	0.176	0.170	0.200	0.162	0.166
104	NC 037222.1 *Centruroides vittatus*	0.170	0.168	0.178	0.176	0.170	0.200	0.162	0.166
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.208	0.224	0.198	0.202	0.194	0.206	0.230	0.192
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.218	0.228	0.214	0.204	0.220	0.218	0.226	0.208
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.242	0.246	0.192	0.208	0.206	0.206	0.234	0.222
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.206	0.216	0.204	0.208	0.174	0.206	0.212	0.188

		73	74	75	76	77	78	79	80
1	**PP07**	0.017	0.017	0.016	0.017	0.016	0.016	0.017	0.017
2	**PP08**	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017
3	**PP11**	0.017	0.017	0.016	0.017	0.017	0.016	0.017	0.017
4	*Lychas annulatus* clade B PC01	0.017	0.017	0.016	0.016	0.016	0.016	0.017	0.017
5	*Lychas annulatus* clade A PC02	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
6	*Urodacus varians* PC03	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017
7	*Lychas annulatus* clade B PC04	0.017	0.017	0.016	0.016	0.016	0.017	0.017	0.017
8	*Urodacus* sp Telfer PC05	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
9	*Lychas annulatus* clade A PC06	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
10	*Urodacus yaschenkoki* PC07	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
11	*Urodacus yaschenkoki* PC08	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
12	*Lychas annulatus clade* B NN01	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017
13	*Lychas annulatus* clade A NN03	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
14	*Lychas annulatus* clade B NN04	0.017	0.017	0.016	0.017	0.017	0.016	0.017	0.017
15	*Lychas annulatus* NN05 clade A	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
16	*Lychas annulatus* clade A NN06	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
17	*Lychas annulatus* clade A NN07	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
18	*Lychas annulatus* clade A NN08	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
19	*Lychas annulatus* clade B NN09	0.017	0.017	0.016	0.017	0.017	0.017	0.017	0.017
20	*Lychas annulatus* clade ANN10	0.016	0.016	0.016	0.017	0.016	0.016	0.017	0.017
21	EF122605.2 *Centruroides vittatus*	0.017	0.017	0.014	0.007	0.016	0.015	0.015	0.015
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
23	KT446990. *Brachistosternus paposo*	0.018	0.018	0.017	0.017	0.017	0.017	0.018	0.018
24	KT447018.1 *Brachistosternus roigalsinai*	0.018	0.018	0.017	0.017	0.017	0.018	0.018	0.018
25	KT446957.1 *Brachistosternus ehrenbergii*	0.018	0.018	0.017	0.017	0.018	0.018	0.017	0.017
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.019	0.019	0.017	0.017	0.018	0.018	0.018	0.018
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.018	0.018	0.017	0.016	0.017	0.017	0.017	0.017
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018
29	KX517230.1 *Brachistosternus paposo*	0.018	0.018	0.017	0.017	0.017	0.017	0.018	0.018
30	KX517229.1 *Brachistosternus paposo*	0.018	0.018	0.017	0.017	0.017	0.017	0.018	0.018
31	KT446947.1 *Brachistosternus chilensis*	0.018	0.018	0.018	0.018	0.017	0.017	0.018	0.018
32	KT446928.1 *Brachistosternus aconcagua*	0.018	0.018	0.018	0.018	0.017	0.017	0.018	0.018
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.019	0.019	0.017	0.018	0.017	0.017	0.017	0.017
34	AY156581.1 *Pandinus dictator*	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.018	0.018	0.017	0.018	0.017	0.017	0.017	0.017
36	KT447015.1 *Brachistosternus roigalsinai*	0.018	0.018	0.017	0.017	0.018	0.018	0.018	0.018

		73	74	75	76	77	78	79	80
37	KT446955.1 *Brachistosternus ehrenbergii*	0.018	0.018	0.017	0.017	0.018	0.018	0.018	0.018
38	KT446946.1 *Brachistosternus chango*	0.018	0.018	0.018	0.018	0.017	0.018	0.018	0.018
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.018	0.018	0.018	0.018	0.018	0.017	0.017	0.017
41	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.018	0.018	0.017	0.017	0.018	0.018	0.017	0.017
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.019	0.019	0.017	0.017	0.018	0.018	0.018	0.017
43	KX517244.1 *Brachistosternus paposo*	0.018	0.018	0.017	0.017	0.017	0.018	0.018	0.018
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
45	KT447016.1 *Brachistosternus roigalsinai*	0.018	0.018	0.017	0.017	0.017	0.018	0.018	0.018
46	KT446986.1 *Brachistosternus negrei*	0.019	0.019	0.018	0.018	0.017	0.017	0.018	0.018
47	KT446952.1 *Brachistosternus ehrenbergii*	0.018	0.018	0.017	0.017	0.017	0.018	0.018	0.018
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
49	KT446960.1 *Brachistosternus ferrugineus*	0.018	0.018	0.018	0.017	0.017	0.017	0.017	0.017
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018
52	KT447025.1 *Brachistosternus titicaca*	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018
53	KT447014.1 *Brachistosternus roigalsinai*	0.018	0.018	0.017	0.017	0.018	0.018	0.018	0.018
54	KT188365.1 *Scorpio palmatus*	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.017
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.018	0.018	0.018	0.017	0.017	0.017	0.018	0.018
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.019	0.019	0.018	0.018	0.018	0.018	0.018	0.018
60	EF122607.2 *Centruroides vittatus*	0.017	0.017	0.014	0.007	0.016	0.015	0.015	0.015
61	EF122608.2 *Centruroides vittatus*	0.018	0.018	0.014	0.007	0.016	0.016	0.015	0.015
62	EF122612.2 *Centruroides vittatus*	0.017	0.017	0.014	0.008	0.016	0.015	0.015	0.015
63	EU381064.1 *Centruroides vittatus*	0.017	0.017	0.014	0.007	0.016	0.016	0.015	0.015
64	EU404114.1 *Centruroides vittatus*	0.018	0.018	0.014	0.004	0.016	0.015	0.015	0.015
65	HM567381.1 *Mesobuthus eupeus*	0.015	0.015	0.017	0.017	0.016	0.016	0.016	0.016
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017
67	JN018153.1 *Lychas mucronatus*	0.017	0.017	0.016	0.017	0.016	0.016	0.017	0.017
68	JN018154.1 *Parabuthus laevifrons*	0.017	0.017	0.016	0.017	0.017	0.016	0.016	0.016
69	JN018210.1 *Lychas mucronatus*	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
70	JN018211.1 *Lychas mucronatus*	0.017	0.017	0.018	0.018	0.017	0.017	0.017	0.017
71	KF997876.1 *Mesobuthus gibbosus*	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016
72	KT716037.1 *Lychas tricarinatus*	0.017	0.017	0.016	0.017	0.016	0.016	0.016	0.016

		73	74	75	76	77	78	79	80
73	KX648425.1 *Hottentotta minax*		0.000	0.017	0.017	0.017	0.017	0.017	0.017
74	KX648429.1 *Compsobuthus werneri*	0.000		0.017	0.017	0.017	0.017	0.017	0.017
75	KY982184.1 *Centruroides schmidti*	0.178	0.178		0.014	0.014	0.014	0.014	0.014
76	KY982185.1 *Centruroides vittatus*	0.188	0.188	0.110		0.016	0.015	0.015	0.015
77	KY982187.1 *Heteroctenus abudi*	0.180	0.180	0.116	0.146		0.004	0.014	0.014
78	KY982188.1 *Heteroctenus abudi*	0.174	0.174	0.116	0.136	0.010		0.014	0.014
79	KY982192.1 *Heteroctenus junceus*	0.180	0.180	0.118	0.134	0.118	0.116		0.003
80	KY982193.1 *Heteroctenus junceus*	0.176	0.176	0.114	0.134	0.114	0.112	0.004	
81	*KY982194.1* Heteroctenus junceus	0.174	0.174	0.112	0.132	0.098	0.098	0.046	0.042
82	KY982199.1 *Heteroctenus junceus*	0.176	0.176	0.122	0.114	0.120	0.118	0.058	0.058
83	KY982273.1 *Zabius fuscus*	0.182	0.182	0.160	0.160	0.150	0.152	0.150	0.148
84	MF422313.1 *Isometrus* sp.	0.172	0.172	0.180	0.178	0.174	0.180	0.176	0.176
85	MF422319.1 *Lychas tricarinatus*	0.180	0.180	0.166	0.166	0.154	0.144	0.166	0.164
86	MF422320.1 *Lychas tricarinatus*	0.180	0.180	0.164	0.168	0.152	0.142	0.166	0.164
87	MF422321.1 *Lychas tricarinatus*	0.178	0.178	0.160	0.164	0.148	0.138	0.162	0.160
88	MF422322.1 *Lychas tricarinatus*	0.180	0.180	0.164	0.168	0.152	0.142	0.166	0.164
89	MF422326.1 *Lychas tricarinatus*	0.180	0.180	0.160	0.148	0.162	0.156	0.172	0.170
90	MF422327.1 *Lychas tricarinatus*	0.170	0.170	0.148	0.138	0.156	0.146	0.166	0.164
91	MF422328.1 *Lychas tricarinatus*	0.178	0.178	0.158	0.142	0.162	0.152	0.164	0.162
92	MF422329.1 *Lychas tricarinatus*	0.170	0.170	0.146	0.140	0.156	0.146	0.168	0.166
93	MF422330.1 *Lychas tricarinatus*	0.170	0.170	0.148	0.138	0.156	0.146	0.166	0.164
94	*MK479161.1* Centruroides arctimanus	0.174	0.174	0.108	0.128	0.130	0.126	0.114	0.114
95	MK479165.1 *Centruroides barbudensis*	0.174	0.174	0.126	0.130	0.126	0.120	0.120	0.120
96	MK479171.1 *Centruroides exilimanus*	0.188	0.188	0.134	0.114	0.140	0.136	0.130	0.130
97	MK479180.1 *Centruroides insulanus*	0.164	0.164	0.098	0.116	0.116	0.108	0.122	0.118
98	MK479188.1 *Centruroides morenoi*	0.184	0.184	0.110	0.110	0.124	0.118	0.108	0.108
99	MK479196.1 *Centruroides platnicki*	0.182	0.182	0.104	0.122	0.122	0.116	0.116	0.116
100	MK479202.1 *Centruroides simplex*	0.170	0.170	0.102	0.100	0.134	0.128	0.120	0.120
101	MK479204.1 *Centruroides taino*	0.180	0.180	0.122	0.136	0.124	0.118	0.116	0.116
102	MK479207.1 *Centruroides testaceus*	0.172	0.172	0.100	0.102	0.136	0.134	0.124	0.124
103	MK479210.1 *Centruroides vittatus*	0.188	0.188	0.118	0.010	0.148	0.138	0.140	0.140
104	NC 037222.1 *Centruroides vittatus*	0.188	0.188	0.118	0.010	0.148	0.138	0.140	0.140
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.222	0.222	0.194	0.212	0.198	0.202	0.220	0.216
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.206	0.206	0.202	0.194	0.214	0.212	0.202	0.200
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.238	0.238	0.220	0.228	0.226	0.224	0.228	0.224
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.226	0.226	0.202	0.190	0.204	0.204	0.198	0.194

		81	82	83	84	85	86	87	88
1	**PP07**	0.016	0.016	0.016	0.015	0.016	0.016	0.016	0.016
2	**PP08**	0.017	0.017	0.017	0.016	0.015	0.015	0.015	0.015
3	**PP11**	0.017	0.017	0.017	0.015	0.016	0.016	0.016	0.016
4	*Lychas annulatus* clade B PC01	0.016	0.017	0.016	0.015	0.016	0.016	0.016	0.016
5	*Lychas annulatus* clade A PC02	0.017	0.017	0.016	0.015	0.015	0.015	0.015	0.015
6	*Urodacus varians* PC03	0.017	0.017	0.018	0.017	0.018	0.017	0.018	0.017
7	*Lychas annulatus* clade B PC04	0.016	0.017	0.016	0.015	0.016	0.016	0.016	0.016
8	*Urodacus* sp Telfer PC05	0.018	0.018	0.019	0.018	0.018	0.018	0.018	0.018
9	*Lychas annulatus* clade A PC06	0.017	0.017	0.016	0.015	0.015	0.015	0.015	0.015
10	*Urodacus yaschenkoki* PC07	0.018	0.017	0.019	0.018	0.018	0.018	0.018	0.018
11	*Urodacus yaschenkoki* PC08	0.018	0.017	0.019	0.018	0.018	0.018	0.018	0.018
12	*Lychas annulatus clade* B NN01	0.017	0.017	0.017	0.015	0.016	0.016	0.016	0.016
13	*Lychas annulatus* clade A NN03	0.017	0.017	0.016	0.015	0.015	0.015	0.015	0.015
14	*Lychas annulatus* clade B NN04	0.017	0.016	0.017	0.015	0.016	0.016	0.016	0.016
15	*Lychas annulatus* NN05 clade A	0.017	0.017	0.016	0.015	0.015	0.015	0.015	0.015
16	*Lychas annulatus* clade A NN06	0.017	0.017	0.016	0.015	0.015	0.015	0.015	0.015
17	*Lychas annulatus* clade A NN07	0.017	0.017	0.016	0.015	0.015	0.015	0.015	0.015
18	*Lychas annulatus* clade A NN08	0.017	0.017	0.016	0.015	0.015	0.015	0.015	0.015
19	*Lychas annulatus* clade B NN09	0.017	0.017	0.017	0.015	0.016	0.016	0.016	0.016
20	*Lychas annulatus* clade ANN10	0.017	0.017	0.016	0.015	0.015	0.015	0.015	0.015
21	EF122605.2 *Centruroides vittatus*	0.015	0.014	0.017	0.017	0.017	0.017	0.017	0.017
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
23	KT446990. *Brachistosternus paposo*	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.018
24	KT447018.1 *Brachistosternus roigalsinai*	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.018
25	KT446957.1 *Brachistosternus ehrenbergii*	0.017	0.017	0.017	0.018	0.018	0.018	0.017	0.018
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.017	0.017	0.018	0.018	0.019	0.018	0.018	0.018
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.017	0.018	0.018	0.018	0.017	0.017	0.017	0.017
29	KX517230.1 *Brachistosternus paposo*	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.018
30	KX517229.1 *Brachistosternus paposo*	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.018
31	KT446947.1 *Brachistosternus chilensis*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
32	KT446928.1 *Brachistosternus aconcagua*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.017	0.017	0.019	0.018	0.018	0.018	0.018	0.018
34	AY156581.1 *Pandinus dictator*	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.017	0.017	0.018	0.019	0.018	0.018	0.018	0.018
36	KT447015.1 *Brachistosternus roigalsinai*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018

		81	82	83	84	85	86	87	88
37	KT446955.1 *Brachistosternus ehrenbergii*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
38	KT446946.1 *Brachistosternus chango*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.018	0.019	0.018	0.019	0.019	0.019	0.019	0.019
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.017	0.017	0.017	0.018	0.018	0.018	0.018	0.018
41	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.018	0.017	0.018	0.019	0.019	0.019	0.019	0.019
43	KX517244.1 *Brachistosternus paposo*	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.018
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.018	0.017	0.018	0.019	0.018	0.018	0.018	0.018
45	KT447016.1 *Brachistosternus roigalsinai*	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.018
46	KT446986.1 *Brachistosternus negrei*	0.018	0.018	0.018	0.019	0.018	0.018	0.017	0.018
47	KT446952.1 *Brachistosternus ehrenbergii*	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
49	KT446960.1 *Brachistosternus ferrugineus*	0.017	0.017	0.017	0.018	0.018	0.018	0.018	0.018
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.017	0.017	0.018	0.018	0.018	0.018	0.018	0.018
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.018	0.017	0.018	0.018	0.018	0.018	0.018	0.018
52	KT447025.1 *Brachistosternus titicaca*	0.018	0.018	0.019	0.019	0.018	0.018	0.018	0.018
53	KT447014.1 *Brachistosternus roigalsinai*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
54	KT188365.1 *Scorpio palmatus*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.017	0.017	0.018	0.018	0.019	0.019	0.019	0.019
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.017	0.017	0.019	0.018	0.018	0.018	0.018	0.018
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.019	0.018	0.019	0.019	0.018	0.018	0.018	0.018
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.018	0.018	0.018	0.019	0.018	0.018	0.018	0.018
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
60	EF122607.2 *Centruroides vittatus*	0.015	0.014	0.017	0.017	0.017	0.017	0.017	0.017
61	EF122608.2 *Centruroides vittatus*	0.015	0.014	0.017	0.017	0.017	0.017	0.017	0.017
62	EF122612.2 *Centruroides vittatus*	0.014	0.014	0.017	0.017	0.017	0.017	0.016	0.017
63	EU381064.1 *Centruroides vittatus*	0.015	0.014	0.017	0.017	0.017	0.017	0.016	0.017
64	EU404114.1 *Centruroides vittatus*	0.015	0.015	0.016	0.017	0.017	0.017	0.017	0.017
65	HM567381.1 *Mesobuthus eupeus*	0.015	0.016	0.016	0.017	0.015	0.015	0.015	0.015
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.016	0.017	0.017	0.018	0.017	0.017	0.017	0.017
67	JN018153.1 *Lychas mucronatus*	0.017	0.017	0.017	0.016	0.016	0.016	0.016	0.016
68	JN018154.1 *Parabuthus laevifrons*	0.016	0.016	0.018	0.017	0.017	0.017	0.017	0.017
69	JN018210.1 *Lychas mucronatus*	0.017	0.017	0.018	0.016	0.017	0.017	0.016	0.017
70	JN018211.1 *Lychas mucronatus*	0.018	0.018	0.017	0.017	0.016	0.016	0.016	0.016
71	KF997876.1 *Mesobuthus gibbosus*	0.016	0.016	0.017	0.017	0.017	0.017	0.017	0.017
72	KT716037.1 *Lychas tricarinatus*	0.016	0.016	0.017	0.017	0.006	0.006	0.005	0.006

		81	82	83	84	85	86	87	88
73	KX648425.1 *Hottentotta minax*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
74	KX648429.1 *Compsobuthus werneri*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
75	KY982184.1 *Centruroides schmidti*	0.014	0.015	0.016	0.017	0.017	0.017	0.016	0.017
76	KY982185.1 *Centruroides vittatus*	0.015	0.014	0.016	0.017	0.017	0.017	0.017	0.017
77	KY982187.1 *Heteroctenus abudi*	0.013	0.015	0.016	0.017	0.016	0.016	0.016	0.016
78	KY982188.1 *Heteroctenus abudi*	0.013	0.014	0.016	0.017	0.016	0.016	0.015	0.016
79	KY982192.1 *Heteroctenus junceus*	0.009	0.010	0.016	0.017	0.017	0.017	0.016	0.017
80	KY982193.1 *Heteroctenus junceus*	0.009	0.010	0.016	0.017	0.017	0.017	0.016	0.017
81	*KY982194.1* Heteroctenus junceus		0.010	0.016	0.017	0.016	0.016	0.016	0.016
82	KY982199.1 *Heteroctenus junceus*	0.054		0.016	0.017	0.016	0.016	0.016	0.016
83	KY982273.1 *Zabius fuscus*	0.156	0.160		0.018	0.017	0.017	0.017	0.017
84	MF422313.1 *Isometrus* sp.	0.176	0.180	0.190		0.016	0.016	0.017	0.016
85	MF422319.1 *Lychas tricarinatus*	0.152	0.158	0.182	0.162		0.003	0.003	0.003
86	MF422320.1 *Lychas tricarinatus*	0.156	0.158	0.180	0.162	0.006		0.003	0.000
87	MF422321.1 *Lychas tricarinatus*	0.152	0.154	0.176	0.164	0.006	0.004		0.003
88	MF422322.1 *Lychas tricarinatus*	0.156	0.158	0.180	0.162	0.006	0.000	0.004	
89	MF422326.1 *Lychas tricarinatus*	0.162	0.172	0.174	0.162	0.074	0.068	0.072	0.068
90	MF422327.1 *Lychas tricarinatus*	0.158	0.162	0.176	0.160	0.064	0.062	0.058	0.062
91	MF422328.1 *Lychas tricarinatus*	0.156	0.174	0.166	0.168	0.072	0.074	0.070	0.074
92	MF422329.1 *Lychas tricarinatus*	0.160	0.164	0.176	0.160	0.066	0.064	0.060	0.064
93	MF422330.1 *Lychas tricarinatus*	0.158	0.162	0.176	0.160	0.064	0.062	0.058	0.062
94	*MK479161.1* Centruroides arctimanus	0.114	0.114	0.158	0.164	0.162	0.160	0.158	0.160
95	MK479165.1 *Centruroides barbudensis*	0.122	0.118	0.152	0.178	0.152	0.148	0.150	0.148
96	MK479171.1 *Centruroides exilimanus*	0.130	0.124	0.154	0.166	0.176	0.174	0.172	0.174
97	MK479180.1 *Centruroides insulanus*	0.108	0.112	0.160	0.176	0.144	0.142	0.140	0.142
98	MK479188.1 *Centruroides morenoi*	0.100	0.114	0.176	0.182	0.144	0.144	0.142	0.144
99	MK479196.1 *Centruroides platnicki*	0.112	0.110	0.148	0.172	0.162	0.164	0.160	0.164
100	MK479202.1 *Centruroides simplex*	0.110	0.104	0.180	0.170	0.150	0.152	0.148	0.152
101	MK479204.1 *Centruroides taino*	0.102	0.114	0.162	0.178	0.140	0.140	0.138	0.140
102	MK479207.1 *Centruroides testaceus*	0.122	0.106	0.164	0.184	0.152	0.150	0.146	0.150
103	MK479210.1 *Centruroides vittatus*	0.136	0.122	0.164	0.180	0.168	0.170	0.166	0.170
104	NC 037222.1 *Centruroides vittatus*	0.136	0.122	0.164	0.180	0.168	0.170	0.166	0.170
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.202	0.220	0.232	0.206	0.188	0.190	0.186	0.190
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.202	0.190	0.198	0.214	0.206	0.204	0.206	0.204
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.222	0.230	0.220	0.204	0.218	0.220	0.220	0.220
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.196	0.188	0.200	0.210	0.198	0.198	0.194	0.198

		89	90	91	92	93	94	95	96
1	**PP07**	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
2	**PP08**	0.015	0.016	0.016	0.016	0.016	0.017	0.017	0.017
3	**PP11**	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
4	*Lychas annulatus* clade B PC01	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
5	*Lychas annulatus* clade A PC02	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
6	*Urodacus varians* PC03	0.018	0.017	0.018	0.017	0.017	0.018	0.018	0.017
7	*Lychas annulatus* clade B PC04	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
8	*Urodacus* sp Telfer PC05	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
9	*Lychas annulatus* clade A PC06	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
10	*Urodacus yaschenkoki* PC07	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
11	*Urodacus yaschenkoki* PC08	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
12	*Lychas annulatus clade* B NN01	0.016	0.016	0.017	0.016	0.016	0.017	0.017	0.017
13	*Lychas annulatus* clade A NN03	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
14	*Lychas annulatus* clade B NN04	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
15	*Lychas annulatus* NN05 clade A	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
16	*Lychas annulatus* clade A NN06	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
17	*Lychas annulatus* clade A NN07	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
18	*Lychas annulatus* clade A NN08	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
19	*Lychas annulatus* clade B NN09	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
20	*Lychas annulatus* clade ANN10	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
21	EF122605.2 *Centruroides vittatus*	0.016	0.015	0.016	0.016	0.015	0.016	0.015	0.014
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
23	KT446990. *Brachistosternus paposo*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
24	KT447018.1 *Brachistosternus roigalsinai*	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.017
25	KT446957.1 *Brachistosternus ehrenbergii*	0.018	0.018	0.018	0.017	0.018	0.018	0.017	0.017
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.019	0.018	0.019	0.018	0.018	0.018	0.018	0.018
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.018	0.018	0.018	0.018	0.018	0.017	0.017	0.017
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.018	0.018	0.017	0.018	0.018	0.018	0.018	0.018
29	KX517230.1 *Brachistosternus paposo*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
30	KX517229.1 *Brachistosternus paposo*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
31	KT446947.1 *Brachistosternus chilensis*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
32	KT446928.1 *Brachistosternus aconcagua*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
34	AY156581.1 *Pandinus dictator*	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.017
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
36	KT447015.1 *Brachistosternus roigalsinai*	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018

		89	90	91	92	93	94	95	96
37	KT446955.1 *Brachistosternus ehrenbergii*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
38	KT446946.1 *Brachistosternus chango*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.019	0.019	0.019	0.019	0.019	0.018	0.019	0.018
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.017
41	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.018	0.018	0.018	0.018	0.018	0.017	0.017	0.017
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.019	0.019	0.019	0.019	0.019	0.018	0.018	0.018
43	KX517244.1 *Brachistosternus paposo*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.017
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
45	KT447016.1 *Brachistosternus roigalsinai*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
46	KT446986.1 *Brachistosternus negrei*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
47	KT446952.1 *Brachistosternus ehrenbergii*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
49	KT446960.1 *Brachistosternus ferrugineus*	0.018	0.018	0.018	0.018	0.018	0.017	0.018	0.018
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.018	0.017	0.017	0.017	0.017	0.018	0.018	0.018
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.017
52	KT447025.1 *Brachistosternus titicaca*	0.019	0.018	0.019	0.019	0.018	0.018	0.018	0.019
53	KT447014.1 *Brachistosternus roigalsinai*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
54	KT188365.1 *Scorpio palmatus*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.018	0.019	0.018	0.019	0.019	0.018	0.018	0.018
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.018	0.019	0.019	0.019	0.019	0.019	0.018	0.018
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.018	0.018	0.018	0.018	0.018	0.018	0.017	0.018
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
60	EF122607.2 *Centruroides vittatus*	0.016	0.015	0.016	0.016	0.015	0.016	0.015	0.014
61	EF122608.2 *Centruroides vittatus*	0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.014
62	EF122612.2 *Centruroides vittatus*	0.016	0.015	0.016	0.015	0.015	0.015	0.015	0.014
63	EU381064.1 *Centruroides vittatus*	0.016	0.015	0.016	0.015	0.015	0.015	0.015	0.014
64	EU404114.1 *Centruroides vittatus*	0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.015
65	HM567381.1 *Mesobuthus eupeus*	0.016	0.015	0.015	0.015	0.015	0.016	0.016	0.017
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
67	JN018153.1 *Lychas mucronatus*	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
68	JN018154.1 *Parabuthus laevifrons*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
69	JN018210.1 *Lychas mucronatus*	0.016	0.016	0.016	0.016	0.016	0.017	0.017	0.017
70	JN018211.1 *Lychas mucronatus*	0.017	0.017	0.017	0.017	0.017	0.018	0.017	0.017
71	KF997876.1 *Mesobuthus gibbosus*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.016
72	KT716037.1 *Lychas tricarinatus*	0.012	0.011	0.012	0.011	0.011	0.016	0.016	0.017

		89	90	91	92	93	94	95	96
73	KX648425.1 *Hottentotta minax*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
74	KX648429.1 *Compsobuthus werneri*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
75	KY982184.1 *Centruroides schmidti*	0.016	0.016	0.016	0.016	0.016	0.014	0.015	0.015
76	KY982185.1 *Centruroides vittatus*	0.016	0.015	0.016	0.016	0.015	0.015	0.015	0.014
77	KY982187.1 *Heteroctenus abudi*	0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.016
78	KY982188.1 *Heteroctenus abudi*	0.016	0.016	0.016	0.016	0.016	0.015	0.015	0.015
79	KY982192.1 *Heteroctenus junceus*	0.017	0.017	0.017	0.017	0.017	0.014	0.015	0.015
80	KY982193.1 *Heteroctenus junceus*	0.017	0.017	0.016	0.017	0.017	0.014	0.015	0.015
81	*KY982194.1* Heteroctenus junceus	0.016	0.016	0.016	0.016	0.016	0.014	0.015	0.015
82	KY982199.1 *Heteroctenus junceus*	0.017	0.016	0.017	0.017	0.016	0.014	0.014	0.015
83	KY982273.1 *Zabius fuscus*	0.017	0.017	0.017	0.017	0.017	0.016	0.016	0.016
84	MF422313.1 *Isometrus* sp.	0.016	0.016	0.017	0.016	0.016	0.017	0.017	0.017
85	MF422319.1 *Lychas tricarinatus*	0.012	0.011	0.012	0.011	0.011	0.016	0.016	0.017
86	MF422320.1 *Lychas tricarinatus*	0.011	0.011	0.012	0.011	0.011	0.016	0.016	0.017
87	MF422321.1 *Lychas tricarinatus*	0.012	0.010	0.011	0.011	0.010	0.016	0.016	0.017
88	MF422322.1 *Lychas tricarinatus*	0.011	0.011	0.012	0.011	0.011	0.016	0.016	0.017
89	MF422326.1 *Lychas tricarinatus*		0.010	0.009	0.010	0.010	0.016	0.016	0.017
90	MF422327.1 *Lychas tricarinatus*	0.048		0.009	0.002	0.000	0.016	0.016	0.017
91	MF422328.1 *Lychas tricarinatus*	0.042	0.038		0.009	0.009	0.016	0.016	0.017
92	MF422329.1 *Lychas tricarinatus*	0.050	0.002	0.040		0.002	0.016	0.016	0.017
93	MF422330.1 *Lychas tricarinatus*	0.048	0.000	0.038	0.002		0.016	0.016	0.017
94	*MK479161.1* Centruroides arctimanus	0.158	0.156	0.150	0.156	0.156		0.014	0.015
95	MK479165.1 *Centruroides barbudensis*	0.158	0.150	0.152	0.152	0.150	0.112		0.016
96	MK479171.1 *Centruroides exilimanus*	0.174	0.170	0.178	0.172	0.170	0.122	0.140	
97	MK479180.1 *Centruroides insulanus*	0.142	0.136	0.134	0.138	0.136	0.090	0.110	0.116
98	MK479188.1 *Centruroides morenoi*	0.146	0.138	0.142	0.140	0.138	0.116	0.102	0.118
99	MK479196.1 *Centruroides platnicki*	0.162	0.156	0.154	0.158	0.156	0.102	0.100	0.136
100	MK479202.1 *Centruroides simplex*	0.146	0.150	0.152	0.152	0.150	0.124	0.134	0.106
101	MK479204.1 *Centruroides taino*	0.162	0.154	0.158	0.156	0.154	0.116	0.100	0.142
102	MK479207.1 *Centruroides testaceus*	0.142	0.148	0.150	0.150	0.148	0.126	0.124	0.108
103	MK479210.1 *Centruroides vittatus*	0.150	0.140	0.144	0.142	0.140	0.132	0.132	0.118
104	NC 037222.1 *Centruroides vittatus*	0.150	0.140	0.144	0.142	0.140	0.132	0.132	0.118
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.218	0.204	0.206	0.206	0.204	0.206	0.220	0.216
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.208	0.212	0.218	0.212	0.212	0.208	0.210	0.206
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.224	0.232	0.228	0.230	0.232	0.228	0.236	0.228
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.206	0.208	0.206	0.210	0.208	0.206	0.216	0.188

		97	98	99	100	101	102	103	104
1	**PP07**	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
2	**PP08**	0.016	0.017	0.016	0.016	0.016	0.017	0.017	0.017
3	**PP11**	0.017	0.017	0.016	0.016	0.016	0.016	0.017	0.017
4	*Lychas annulatus* clade B PC01	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.016
5	*Lychas annulatus* clade A PC02	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
6	*Urodacus varians* PC03	0.017	0.018	0.017	0.018	0.017	0.017	0.018	0.018
7	*Lychas annulatus* clade B PC04	0.017	0.017	0.016	0.016	0.016	0.016	0.016	0.016
8	*Urodacus* sp Telfer PC05	0.018	0.017	0.018	0.017	0.018	0.017	0.018	0.018
9	*Lychas annulatus* clade A PC06	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
10	*Urodacus yaschenkoki* PC07	0.017	0.018	0.018	0.017	0.017	0.017	0.018	0.018
11	*Urodacus yaschenkoki* PC08	0.017	0.018	0.018	0.017	0.017	0.017	0.018	0.018
12	*Lychas annulatus clade* B NN01	0.017	0.017	0.017	0.016	0.016	0.016	0.017	0.017
13	*Lychas annulatus* clade A NN03	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
14	*Lychas annulatus* clade B NN04	0.017	0.017	0.017	0.016	0.016	0.016	0.017	0.017
15	*Lychas annulatus* NN05 clade A	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
16	*Lychas annulatus* clade A NN06	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
17	*Lychas annulatus* clade A NN07	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
18	*Lychas annulatus* clade A NN08	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
19	*Lychas annulatus* clade B NN09	0.017	0.017	0.017	0.016	0.016	0.016	0.017	0.017
20	*Lychas annulatus* clade ANN10	0.016	0.017	0.016	0.016	0.016	0.016	0.017	0.017
21	EF122605.2 *Centruroides vittatus*	0.015	0.014	0.015	0.013	0.015	0.014	0.008	0.008
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.017	0.018	0.018	0.017	0.018	0.017	0.018	0.018
23	KT446990. *Brachistosternus paposo*	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017
24	KT447018.1 *Brachistosternus roigalsinai*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
25	KT446957.1 *Brachistosternus ehrenbergii*	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.017	0.017	0.017	0.017	0.018	0.017	0.018	0.018
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.017	0.017	0.017	0.017	0.016	0.017	0.017	0.017
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.017	0.017	0.018	0.017	0.017	0.017	0.018	0.018
29	KX517230.1 *Brachistosternus paposo*	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017
30	KX517229.1 *Brachistosternus paposo*	0.018	0.017	0.017	0.017	0.017	0.017	0.017	0.017
31	KT446947.1 *Brachistosternus chilensis*	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018
32	KT446928.1 *Brachistosternus aconcagua*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.017	0.017	0.018	0.017	0.018	0.018	0.018	0.018
34	AY156581.1 *Pandinus dictator*	0.016	0.017	0.017	0.016	0.017	0.016	0.017	0.017
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.018
36	KT447015.1 *Brachistosternus roigalsinai*	0.018	0.017	0.017	0.017	0.018	0.017	0.017	0.017

		97	98	99	100	101	102	103	104
37	KT446955.1 *Brachistosternus ehrenbergii*	0.018	0.018	0.017	0.017	0.017	0.017	0.017	0.017
38	KT446946.1 *Brachistosternus chango*	0.017	0.017	0.017	0.018	0.017	0.018	0.018	0.018
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.017	0.018	0.017	0.017	0.018	0.017	0.018	0.018
41	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.017	0.016	0.017	0.017	0.018	0.017	0.017	0.017
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.017	0.018	0.018	0.017	0.018	0.017	0.018	0.018
43	KX517244.1 *Brachistosternus paposo*	0.018	0.017	0.017	0.017	0.018	0.017	0.017	0.017
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.018	0.018	0.018	0.017	0.018	0.018	0.018	0.018
45	KT447016.1 *Brachistosternus roigalsinai*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
46	KT446986.1 *Brachistosternus negrei*	0.017	0.018	0.017	0.018	0.018	0.018	0.018	0.018
47	KT446952.1 *Brachistosternus ehrenbergii*	0.017	0.018	0.017	0.017	0.017	0.017	0.018	0.018
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.018	0.018	0.018	0.018	0.017	0.017	0.018	0.018
49	KT446960.1 *Brachistosternus ferrugineus*	0.017	0.018	0.017	0.017	0.017	0.018	0.017	0.017
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.017	0.017	0.017	0.017	0.017	0.017	0.018	0.018
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
52	KT447025.1 *Brachistosternus titicaca*	0.018	0.018	0.018	0.019	0.018	0.018	0.018	0.018
53	KT447014.1 *Brachistosternus roigalsinai*	0.018	0.017	0.017	0.017	0.017	0.017	0.018	0.018
54	KT188365.1 *Scorpio palmatus*	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.018	0.018	0.017	0.018	0.017	0.017	0.018	0.018
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.017	0.017	0.018	0.017	0.017	0.017	0.017	0.017
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.017	0.018	0.018	0.018	0.018	0.018	0.018	0.018
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.018	0.018	0.018	0.018	0.018	0.018	0.018	0.018
60	EF122607.2 *Centruroides vittatus*	0.015	0.014	0.015	0.013	0.015	0.014	0.008	0.008
61	EF122608.2 *Centruroides vittatus*	0.015	0.014	0.015	0.014	0.015	0.014	0.008	0.008
62	EF122612.2 *Centruroides vittatus*	0.015	0.013	0.015	0.013	0.015	0.014	0.008	0.008
63	EU381064.1 *Centruroides vittatus*	0.015	0.013	0.015	0.013	0.015	0.014	0.008	0.008
64	EU404114.1 *Centruroides vittatus*	0.014	0.014	0.015	0.014	0.015	0.014	0.002	0.002
65	HM567381.1 *Mesobuthus eupeus*	0.016	0.016	0.017	0.017	0.016	0.017	0.017	0.017
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.016	0.017	0.017	0.017	0.017	0.017	0.017	0.017
67	JN018153.1 *Lychas mucronatus*	0.016	0.017	0.016	0.016	0.016	0.017	0.017	0.017
68	JN018154.1 *Parabuthus laevifrons*	0.016	0.016	0.017	0.016	0.016	0.016	0.017	0.017
69	JN018210.1 *Lychas mucronatus*	0.017	0.016	0.017	0.016	0.017	0.017	0.017	0.017
70	JN018211.1 *Lychas mucronatus*	0.017	0.017	0.017	0.018	0.017	0.017	0.018	0.018
71	KF997876.1 *Mesobuthus gibbosus*	0.016	0.016	0.017	0.015	0.016	0.016	0.016	0.016
72	KT716037.1 *Lychas tricarinatus*	0.015	0.016	0.016	0.016	0.016	0.016	0.017	0.017

		97	98	99	100	101	102	103	104
73	KX648425.1 *Hottentotta minax*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
74	KX648429.1 *Compsobuthus werneri*	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
75	KY982184.1 *Centruroides schmidti*	0.013	0.014	0.014	0.014	0.015	0.013	0.014	0.014
76	KY982185.1 *Centruroides vittatus*	0.014	0.014	0.015	0.013	0.015	0.014	0.004	0.004
77	KY982187.1 *Heteroctenus abudi*	0.014	0.015	0.015	0.015	0.015	0.015	0.016	0.016
78	KY982188.1 *Heteroctenus abudi*	0.014	0.014	0.014	0.015	0.014	0.015	0.015	0.015
79	KY982192.1 *Heteroctenus junceus*	0.015	0.014	0.014	0.015	0.014	0.015	0.016	0.016
80	KY982193.1 *Heteroctenus junceus*	0.014	0.014	0.014	0.015	0.014	0.015	0.016	0.016
81	*KY982194.1* Heteroctenus junceus	0.014	0.013	0.014	0.014	0.014	0.015	0.015	0.015
82	KY982199.1 *Heteroctenus junceus*	0.014	0.014	0.014	0.014	0.014	0.014	0.015	0.015
83	KY982273.1 *Zabius fuscus*	0.016	0.017	0.016	0.017	0.016	0.017	0.017	0.017
84	MF422313.1 *Isometrus* sp.	0.017	0.017	0.017	0.017	0.017	0.017	0.017	0.017
85	MF422319.1 *Lychas tricarinatus*	0.016	0.016	0.016	0.016	0.016	0.016	0.017	0.017
86	MF422320.1 *Lychas tricarinatus*	0.016	0.016	0.017	0.016	0.016	0.016	0.017	0.017
87	MF422321.1 *Lychas tricarinatus*	0.016	0.016	0.016	0.016	0.015	0.016	0.017	0.017
88	MF422322.1 *Lychas tricarinatus*	0.016	0.016	0.017	0.016	0.016	0.016	0.017	0.017
89	MF422326.1 *Lychas tricarinatus*	0.016	0.016	0.016	0.016	0.016	0.016	0.016	0.016
90	MF422327.1 *Lychas tricarinatus*	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016
91	MF422328.1 *Lychas tricarinatus*	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016
92	MF422329.1 *Lychas tricarinatus*	0.015	0.016	0.016	0.016	0.016	0.016	0.016	0.016
93	MF422330.1 *Lychas tricarinatus*	0.015	0.015	0.016	0.016	0.016	0.016	0.016	0.016
94	*MK479161.1* Centruroides arctimanus	0.013	0.014	0.014	0.015	0.014	0.015	0.015	0.015
95	MK479165.1 *Centruroides barbudensis*	0.014	0.014	0.013	0.015	0.013	0.015	0.015	0.015
96	MK479171.1 *Centruroides exilimanus*	0.014	0.014	0.015	0.014	0.016	0.014	0.014	0.014
97	MK479180.1 *Centruroides insulanus*		0.014	0.014	0.014	0.013	0.015	0.014	0.014
98	MK479188.1 *Centruroides morenoi*	0.104		0.015	0.013	0.014	0.013	0.014	0.014
99	MK479196.1 *Centruroides platnicki*	0.110	0.124		0.014	0.012	0.015	0.015	0.015
100	MK479202.1 *Centruroides simplex*	0.104	0.098	0.116		0.015	0.010	0.014	0.014
101	MK479204.1 *Centruroides taino*	0.094	0.108	0.074	0.134		0.015	0.016	0.016
102	MK479207.1 *Centruroides testaceus*	0.122	0.092	0.132	0.056	0.128		0.014	0.014
103	MK479210.1 *Centruroides vittatus*	0.116	0.114	0.128	0.108	0.140	0.110		0.000
104	NC 037222.1 *Centruroides vittatus*	0.116	0.114	0.128	0.108	0.140	0.110	0.000	
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29	0.196	0.204	0.216	0.186	0.206	0.194	0.216	0.216
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.204	0.212	0.208	0.182	0.220	0.188	0.200	0.200
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.232	0.228	0.220	0.226	0.230	0.236	0.230	0.230
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.190	0.200	0.190	0.192	0.204	0.190	0.194	0.194

		105	106	107	108
1	**PP07**	0.018	0.018	0.018	0.018
2	**PP08**	0.017	0.018	0.018	0.017
3	**PP11**	0.018	0.018	0.018	0.018
4	*Lychas annulatus* clade B PC01	0.018	0.018	0.018	0.017
5	*Lychas annulatus* clade A PC02	0.017	0.018	0.018	0.017
6	*Urodacus varians* PC03	0.016	0.017	0.017	0.016
7	*Lychas annulatus* clade B PC04	0.018	0.018	0.018	0.017
8	*Urodacus* sp Telfer PC05	0.016	0.017	0.017	0.016
9	*Lychas annulatus* clade A PC06	0.017	0.018	0.018	0.017
10	*Urodacus yaschenkoki* PC07	0.016	0.017	0.017	0.016
11	*Urodacus yaschenkoki* PC08	0.016	0.017	0.017	0.016
12	*Lychas annulatus clade* B NN01	0.018	0.018	0.018	0.018
13	*Lychas annulatus* clade A NN03	0.017	0.018	0.018	0.017
14	*Lychas annulatus* clade B NN04	0.018	0.018	0.018	0.018
15	*Lychas annulatus* NN05 clade A	0.017	0.018	0.018	0.017
16	*Lychas annulatus* clade A NN06	0.017	0.018	0.018	0.017
17	*Lychas annulatus* clade A NN07	0.017	0.018	0.018	0.017
18	*Lychas annulatus* clade A NN08	0.017	0.018	0.018	0.017
19	*Lychas annulatus* clade B NN09	0.018	0.018	0.018	0.018
20	*Lychas annulatus* clade ANN10	0.017	0.018	0.018	0.017
21	EF122605.2 *Centruroides vittatus*	0.018	0.018	0.019	0.017
22	KY295225.1 *Urodacus planimanus* voucher WAM-T129654	0.016	0.017	0.016	0.015
23	KT446990. *Brachistosternus paposo*	0.016	0.017	0.017	0.016
24	KT447018.1 *Brachistosternus roigalsinai*	0.016	0.017	0.016	0.017
25	KT446957.1 *Brachistosternus ehrenbergii*	0.016	0.017	0.016	0.016
26	KM514656.1 *Diplocentrus rectimanus* voucher AMCC:LP2032	0.018	0.018	0.018	0.017
27	KM514633.1 *Didymocentrus krausi* voucher AMCC:LP1987	0.016	0.018	0.017	0.016
28	KM514635.1 *Kolotl magnus* voucher AMCC:LP7029	0.016	0.018	0.017	0.015
29	KX517230.1 *Brachistosternus paposo*	0.016	0.017	0.017	0.016
30	KX517229.1 *Brachistosternus paposo*	0.016	0.017	0.017	0.016
31	KT446947.1 *Brachistosternus chilensis*	0.016	0.018	0.016	0.016
32	KT446928.1 *Brachistosternus aconcagua*	0.016	0.018	0.016	0.016
33	KM514636.1 *Kolotl poncei* voucher AMCC:LP7030	0.016	0.018	0.017	0.016
34	AY156581.1 *Pandinus dictator*	0.017	0.018	0.017	0.016
35	KM514642.1 *Diplocentrus cozumel* voucher AMCC:LP4102	0.017	0.018	0.017	0.016
36	KT447015.1 *Brachistosternus roigalsinai*	0.016	0.017	0.017	0.016

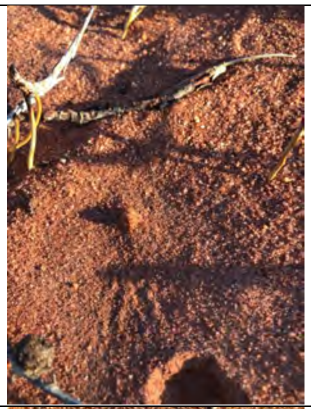
		105	106	107	108
37	KT446955.1 *Brachistosternus ehrenbergii*	0.016	0.017	0.016	0.016
38	KT446946.1 *Brachistosternus chango*	0.016	0.018	0.016	0.016
39	KM274783.1 *Konetontli chamelaensis* voucher LP7675	0.016	0.018	0.017	0.017
40	KU755656.1 *Brachistosternus* sp. 10 LP-2016 voucher AMCC:LP8355	0.017	0.017	0.016	0.016
41	JQ514251.1 *Pandinus imperator* voucher Sc1050	0.017	0.018	0.018	0.016
42	KM514641.1 *Diplocentrus coylei* voucher AMCC:LP7031	0.017	0.018	0.017	0.016
43	KX517244.1 *Brachistosternus paposo*	0.016	0.017	0.017	0.016
44	KU755642.1 *Brachistosternus turpuq* voucher AMCC:LP8346	0.016	0.017	0.017	0.017
45	KT447016.1 *Brachistosternus roigalsinai*	0.017	0.017	0.017	0.017
46	KT446986.1 *Brachistosternus negrei*	0.016	0.018	0.016	0.015
47	KT446952.1 *Brachistosternus ehrenbergii*	0.016	0.018	0.016	0.015
48	JX909544.1 *Paruroctonus boreus* voucher SKY42/AMNH	0.016	0.018	0.018	0.017
49	KT446960.1 *Brachistosternus ferrugineus*	0.016	0.018	0.017	0.016
50	KM514634.1 *Didymocentrus lesueurii* voucher AMCC:LP3638	0.016	0.017	0.017	0.016
51	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.016	0.017	0.017	0.000
52	KT447025.1 *Brachistosternus titicaca*	0.016	0.018	0.016	0.016
53	KT447014.1 *Brachistosternus roigalsinai*	0.017	0.017	0.017	0.017
54	KT188365.1 *Scorpio palmatus*	0.017	0.018	0.018	0.016
55	JQ514255.1 *Chactas* sp. AVDM-2012 voucher Sc1000	0.017	0.018	0.018	0.016
56	JQ514248. *Opistophthalmus boehmi* voucher Sc1137	0.017	0.019	0.018	0.016
57	KM274845.1 *Paravaejovis spinigerus* voucher LP6317	0.017	0.018	0.018	0.017
58	KM274724.1 *Smeringurus grandis* voucher LP8690	0.017	0.018	0.017	0.017
59	KT188368.1 *Scorpio palmatus* isolate 12286D	0.017	0.018	0.018	0.016
60	EF122607.2 *Centruroides vittatus*	0.018	0.018	0.019	0.017
61	EF122608.2 *Centruroides vittatus*	0.018	0.018	0.019	0.017
62	EF122612.2 *Centruroides vittatus*	0.018	0.018	0.019	0.017
63	EU381064.1 *Centruroides vittatus*	0.018	0.018	0.019	0.017
64	EU404114.1 *Centruroides vittatus*	0.018	0.018	0.019	0.018
65	HM567381.1 *Mesobuthus eupeus*	0.018	0.018	0.019	0.018
66	JF700146.1 *Mesobuthus martensii* voucher AS27MT03	0.019	0.019	0.019	0.018
67	JN018153.1 *Lychas mucronatus*	0.018	0.018	0.018	0.018
68	JN018154.1 *Parabuthus laevifrons*	0.018	0.018	0.018	0.018
69	JN018210.1 *Lychas mucronatus*	0.018	0.019	0.018	0.017
70	JN018211.1 *Lychas mucronatus*	0.018	0.018	0.018	0.018
71	KF997876.1 *Mesobuthus gibbosus*	0.019	0.019	0.019	0.018
72	KT716037.1 *Lychas tricarinatus*	0.018	0.018	0.019	0.017

		105	106	107	108
73	KX648425.1 *Hottentotta minax*	0.019	0.018	0.019	0.019
74	KX648429.1 *Compsobuthus werneri*	0.019	0.018	0.019	0.019
75	KY982184.1 *Centruroides schmidti*	0.018	0.018	0.019	0.018
76	KY982185.1 *Centruroides vittatus*	0.018	0.018	0.019	0.018
77	KY982187.1 *Heteroctenus abudi*	0.018	0.018	0.019	0.018
78	KY982188.1 *Heteroctenus abudi*	0.018	0.018	0.019	0.018
79	KY982192.1 *Heteroctenus junceus*	0.019	0.018	0.019	0.018
80	KY982193.1 *Heteroctenus junceus*	0.018	0.018	0.019	0.018
81	*KY982194.1* Heteroctenus junceus	0.018	0.018	0.019	0.018
82	KY982199.1 *Heteroctenus junceus*	0.019	0.018	0.019	0.017
83	KY982273.1 *Zabius fuscus*	0.019	0.018	0.019	0.018
84	MF422313.1 *Isometrus* sp.	0.018	0.018	0.018	0.018
85	MF422319.1 *Lychas tricarinatus*	0.017	0.018	0.018	0.018
86	MF422320.1 *Lychas tricarinatus*	0.018	0.018	0.019	0.018
87	MF422321.1 *Lychas tricarinatus*	0.017	0.018	0.019	0.018
88	MF422322.1 *Lychas tricarinatus*	0.018	0.018	0.019	0.018
89	MF422326.1 *Lychas tricarinatus*	0.018	0.018	0.019	0.018
90	MF422327.1 *Lychas tricarinatus*	0.018	0.018	0.019	0.018
91	MF422328.1 *Lychas tricarinatus*	0.018	0.018	0.019	0.018
92	MF422329.1 *Lychas tricarinatus*	0.018	0.018	0.019	0.018
93	MF422330.1 *Lychas tricarinatus*	0.018	0.018	0.019	0.018
94	*MK479161.1* Centruroides arctimanus	0.018	0.018	0.019	0.018
95	MK479165.1 *Centruroides barbudensis*	0.019	0.018	0.019	0.018
96	MK479171.1 *Centruroides exilimanus*	0.018	0.018	0.019	0.017
97	MK479180.1 *Centruroides insulanus*	0.018	0.018	0.019	0.018
98	MK479188.1 *Centruroides morenoi*	0.018	0.018	0.019	0.018
99	MK479196.1 *Centruroides platnicki*	0.018	0.018	0.019	0.018
100	MK479202.1 *Centruroides simplex*	0.017	0.017	0.019	0.018
101	MK479204.1 *Centruroides taino*	0.018	0.019	0.019	0.018
102	MK479207.1 *Centruroides testaceus*	0.018	0.017	0.019	0.018
103	MK479210.1 *Centruroides vittatus*	0.018	0.018	0.019	0.018
104	NC 037222.1 *Centruroides vittatus*	0.018	0.018	0.019	0.018
105	JN018156.1 *Belisarius xambeui* voucher MNHN-JAD29		0.018	0.016	0.016
106	JN018163.1 *Chaerilus julietteae* voucher MNHN-JAB32	0.198		0.019	0.017
107	HM418309.1 *Iurus kinzelbachi* voucher VF-0846-1	0.154	0.224		0.017
108	KF548118.1 *Opisthacanthus asper* voucher Sc1087	0.162	0.188	0.180	

Appendix 8

SRE Results for the Winu Project Area

Specimen	Site	Family	Genetic Lineage/Taxonomic ID	Previously Recorded?	SRE Status	Burrow/Specimen Photo
M20190520.WIN09P-01	WIN09P	Barychelidae	*Idommata* sp. BBT_B39	No – new species	Potential SRE	NA
M20190518.WINSRE07-03	WINSRE07	Nemesiidae	*Aname* sp. N147	No – new species	Potential SRE	 
M20190518.WINSRE07-01	WINSRE07	Nemesiidae	*Aname* sp. N148	No – new species	Potential SRE	NA
M20190513.WINSRE02-01	WINSRE02	Nemesiidae	*Aname* sp. N149	No – new species	Potential SRE	NA
M20190518.WINSRE04-01	WINSRE04	Nemesiidae	Genus ? N150	No – new species	Potential SRE	
M20190517.WINSRE03-01	WINSRE03	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	
M20190518.WINSRE03-01	WINSRE03	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	NA
M20190516.WINSRE05-01	WINSRE05	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	NA
M20190516.WINSRE05-02	WINSRE05	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	NA
M20190518.WINSRE07-02	WINSRE07	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	NA
M20190518.WINSRE08-01	WINSRE08	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	NA
M20190518.WINSRE08-02	WINSRE08	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	NA
M20190518.WINSRE08-03	WINSRE08	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	

Specimen	Site	Family	Genetic Lineage/Taxonomic ID	Previously Recorded?	SRE Status	Burrow/Specimen Photo
M20190518.WINSRE08-04	WINSRE08	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	NA
M20190518.WINSRE06-01	WINSRE06	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	
M20190518.WINSRE06-02	WINSRE06	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	
M20190513.WINSRE02-02	WINSRE02	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	NA
M20190518.WINSRE08-05	WINSRE08	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	
M20190518.WINSRE08-06	WINSRE08	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	

Specimen	Site	Family	Genetic Lineage/Taxonomic ID	Previously Recorded?	SRE Status	Burrow/Specimen Photo
M20190518.WINSRE08-07	WINSRE08	Nemesiidae	*Kwonkan* sp. N151	No – new species	Potential SRE	
M20190518.WINSRE06-03	WINSRE06	Nemesiidae	Nemesiidae sp.	NA (didn't amplify)	NA	NA
M20190517.WINSRE03-02	WINSRE03	Undetermined	Araneomorph sp.	NA	Unlikely to be an SRE	
S20190518.WIN02P-01	WIN02P	Buthidae	*Lychas annulatus* clade B	Yes – widespread distribution	Not an SRE	NA
S20190519.WIN05P-01	WIN05P	Buthidae	*Lychas annulatus* clade A	Yes – widespread distribution	Not an SRE	NA
S20190517.WIN08P-01	WIN08P	Buthidae	*Lychas annulatus* clade B	Yes – widespread distribution	Not an SRE	NA
S20190515.WIN10P-02	WIN10P	Buthidae	*Lychas annulatus* clade A	Yes – widespread distribution	Not an SRE	NA
S20190516.WIN04P-01	WIN04P	Urodacidae	*Urodachus varians*	Yes – records from Gibson Desert, eastern Pilbara and Sandy Desert	Undetermined (Potential SRE)	NA
S20190515.WIN10P-01	WIN10P	Urodacidae	*Urodacus* sp. 'telfer'	Yes – records from south of Telfer	Potential SRE	NA
S20190518.WINSRE02-01	WINSRE02	Urodacidae	*Urodacus* '*yaschenkoi* species complex'	No – other species in this complex have been recorded from central Queensland to WA goldfields	Potential SRE	NA
S20190518.WINSRE02-02	WINSRE02	Urodacidae	*Urodacus* '*yaschenkoi* species complex'	No – other species in this complex have been recorded from central Queensland to WA goldfields	Potential SRE	NA
M20190924.WIN01P-01	WIN01P	Nemesiidae	*Aname* sp. N148	No	Potential SRE	NA
M20190923.WIN09P-02	WIN09P	Nemesiidae	*Aname* sp. N152	No	Potential SRE	NA
M20190923.WIN09P-01	WIN09P	Nemesiidae	*Aname* sp. N152	No	Potential SRE	NA
M20190924.WIN09P-01	WIN09P	Nemesiidae	*Aname* sp. N152	No	Potential SRE	NA
M20190923.WIN02P-01	WIN02P	Nemesiidae	*Aname* sp. N153	No	Potential SRE	NA
M20190921.WINSRE12-01	WINSRE12	Nemesiidae	*Kwonkan* sp. N151	No	Potential SRE	NA
S20190919.WIN01P-01	WIN01P	Buthidae	*Lychas annulatus* clade B	Yes	Not an SRE	NA
S20190919.WIN04P-01	WIN04P	Buthidae	*Lychas annulatus* clade B	Yes	Not an SRE	NA
S20190919.WIN04P-02	WIN04P	Buthidae	*Lychas* sp.	NA	NA (failed to sequence)	NA
S20190919.WIN05P-01	WIN05P	Buthidae	*Lychas adonis*	Yes	Potential SRE (failed to sequence. Morphological ID)	NA
S20190922.WIN10P-01	WIN10P	Urodacinae	*Urodachus* sp. 'telfer'	Yes	Potential SRE (failed to sequence. Morphological ID)	NA

Appendix 9

Regulation 17 Licence 08-000993-4

Department of Parks and Wildlife

Enquiries: 17 DICK PERRY AVE, KENSINGTON, WESTERN AUSTRALIA
Telephone: 08 9219 9000
Facsimile: 08 9219 8242
Web Site: https://wildlifelicensing.dpaw.wa.gov.au
Correspondance: **Locked Bag 30**
Bentley Delivery Centre WA 6983

Wildlife Conservation Act 1950

REGULATION 17

Regulation 17 – Licence to take fauna for scientific purposes (Regulation 17 - Standard)

The undermentioned person may take fauna for research or other scientific purposes and where authorised, keep it in captivity, subject to the following and attached conditions, which may be added to, suspended or otherwise varied as considered fit.

Director General

Conditions

1 The licensee shall comply with the provisions of the Wildlife Conservation Act 1950, Wildlife Conservation Regulations 1970 and any Notices in force under this legislation.

2 The licensee shall take fauna only in the manner stated on the endorsed Regulation 17 licence application form and endorsed related correspondence.

3 Unless specifically authorised in the conditions of this Licence or otherwise in writing by the Director General, species of fauna declared as likely to become extinct, rare or otherwise in need of special protection shall not be taken.

4 Any by-catch of fauna, which is declared to be rare, likely to become extinct, or otherwise in need of special protection shall be released immediately at the point of capture. Where such fauna taken under this licence is injured or deceased, the licensee shall contact the Department's Wildlife Licensing Section for advice on disposal. Records must be kept of any such fauna so captured and details are to be included in the report required under further condition below.

5 Any interaction involving Gazetted Threatened Fauna that may be harmful to the fauna and/or invasive may require approval from the Commonwealth Department of the Environment ph 02 6274 1111. Interaction with such species is controlled by the Commonwealth Environment Protection and Biodiversity Conservation Act 1999 and Environment Protection and Biodiversity Conservation Regulations 2000 as well as the Wildlife Conservation Act 1950 and Wildlife Conservation Regulations 1970.

6 No fauna shall be taken in areas where it would impinge on pre-existing scientific research programs.

7 Except in the case of approved lethal traps, the licensee shall ensure that measures are taken in the capture and handling of fauna to prevent injury or mortality resulting from that capture or handling. Where traps or other mechanical means or devices are used to capture fauna these shall be deployed so as to prevent exposure of trapped animals to ants and debilitating weather conditions and inspected at regular intervals throughout each day of their use. At the conclusion of research all markers used, and signs and structures erected by the licensee shall be removed and the environment returned to its original condition.

8 Not more than ten specimens of any one protected species of fauna shall be taken and removed from any location less than 20km apart. Where exceptional circumstances make it necessary to take a larger number of specimens from a particular location in order to obtain adequate statistical data, the collector must proceed with circumspection and justify their actions to the Director General in advance.

9 The licensee shall not release any fauna or their progeny in any area where it does not naturally occur, nor hand such fauna over to any other person or authority unless approved by the Director General, nor dispose of the remains of such fauna in any manner likely to confuse the natural or present day distribution of the species.

10 Bioprospecting involving the removal of sample aquatic and terrestrial organisms for chemical extraction and bioactivity screening shall not be conducted without specific written approval by the Director General.

11 No fauna shall be taken from any CALM land, as defined in the Conservation and Land Management Regulations 2002, without prior written approval of the Director General. No fauna shall be taken from any public land without the prior written approval of the Government Authority managing that land.

12 The licensee shall not enter upon any private property or pastoral lease for the purposes of this licence, nor take any fauna from any private land or pastoral lease without the prior consent in writing of the owner or occupier. Similarly, in the case of Aboriginal lands, the licensee must not enter upon or take fauna from such lands without the written approval of the Department of Aboriginal Affairs and/or the relevant native title holders or applicants.

13 Copies of this licence and any written approval or consent required by conditions of this licence must be carried by the licensee and any person/s authorised under the licence at all times when conducting activities relevant to the licence and must be presented to an authorised officer of the Department upon request.

14 All holotypes and syntypes and a half share of paratypes of species or subspecies permitted to be permanently taken under this licence shall be donated to the Western Australian Museum. Duplicates (one pair in each case) of any species collected, which represents a significant extension of geographic range shall upon request be donated to the Western Australian Museum.

15 To prevent any unnecessary collecting in this State, all specimens and material taken and retained under the authority of this license shall, upon request, be loaned to the Western Australian Museum. Any unused portion or portions of any specimen collected under the authority of this license shall be offered to the Western Australian Museum for inclusion in its collection or made available to other scientific workers if so required.

16 Within one month of the expiration of this licence, the holder shall submit an electronic return into the department's Wildlife Licensing System, detailing the locality, site, geocode, date and number of each species of fauna captured, sighted or vouchered during the currency of the licence. A copy of any paper, report or thesis resulting from the research shall upon completion be lodged with the Director General.

Purpose

Level 1 reconnaissance survey by opportunistic observation; and a Level 2 fauna survey using cage, Elliott, dry pit and funnel traps, hand foraging, and via spotlighting/head torching, secondary signs/evidence and habitat assessment; and a Targeted conservation significant fauna survey for bilby (Macrotis lagotis) by active searching, secondary signs/evidence and habitat assessment; and a Short Range Endemic (SRE) invertebrate fauna survey by foraging (raking, sieving and excavation); and a Targeted wader (shorebirds and migratory birds) survey by visual observation, secondary signs/evidence and habitat assessment. Captured vertebrate fauna will be release at capture site and collected invertebrate fauna may be retained as specimens. For the Asian Renewable Energy Hub Terrestrial Environmental Impact Assessment

Locations

Pilbara Region, near the southwest boundary of the Kimberley region, approximately 30km inland from Eighty Mile Beach and extending east onto the margin of the Great Sandy Desert, wader and waterbird surveys at Walyarta (Mandora Marsh) and nearby areas of 80 mile beach.

Authorised Person

Surname	Given name(s)
Humphreys	Garth
Teale	Roy
Ford	Stewart
Greenham	Michael
Keirle	David
Sawers	Paul
Traditional Landowners	Nyangumarta Rangers
King	Jacinta
Graff	John

Department of Parks and Wildlife

Enquiries:	17 DICK PERRY AVE, KENSINGTON, WESTERN AUSTRALIA
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Correspondance:	**Locked Bag 30**
	Bentley Delivery Centre WA 6983

Date of Issue 11/10/2017
Valid From 11/10/2017
Date of Expiry 23/08/2018

Licensee: Mr Daniel Kamien
Address Biota Environmental Sciences Pty Ltd
PO Box 155
Leederville WA 6903
Australia

Issued by a Wildlife Licensing Officer of the Department of Parks and Wildlife under delegation from the Minister for Environment pursuant to section 133(1) of the Conservation and Land Management Act 1984.

Appendix 10

Site x Species List for Winu Road Access Corridor Section 2

Reptiles

Family	Species Name	Common Name	State	Federal	AHF01PF	AHF02PF	AHF03F	AHF04PF	AHF05PF	AHF06PF	AHF10PF	AHF12PF	AHF13PF	AHF15E	AHF15PF	AHF16PF	AHF17PF	AHF18PF	AHF18E	AHF19PF	AHF20PF	AHFOpp	AHFCAM015-01	General Search	Nocturnal Search
Carphodactylidae	*Nephrurus laevissimus*															1				12	4			1	
Carphodactylidae	*Nephrurus levis*								1				2			1		1							
Diplodactylidae	*Diplodactylus laevis*	Desert Fat-tailed Gecko			7	3		11	14	14	21	16	8					3		3	14				
Diplodactylidae	*Lucasium stenodactylum*				5	1		4	4		2	6	7		3	11	28	3		3	3				
Diplodactylidae	*Rhynchoedura ornata*	Western Beaked Gecko			3	1		1		1	14	9	3		3	1	6	3			1	1			
Diplodactylidae	*Strophurus ciliaris*				2		2	8	13	9	1	2	1		5		1	6		3	8	6			
Diplodactylidae	*Strophurus elderi*												2		1		1			5	1				
Diplodactylidae	*Strophurus jeanae*				2			1			1										1				
Gekkonidae	*Gehyra montium*							1		1															
Gekkonidae	*Gehyra pilbara*									4														2	
Gekkonidae	*Gehyra purpurascens*				1											1		1							
Gekkonidae	*Gehyra variegata*				1			1			2					1	1	1		1	2				
Gekkonidae	*Heteronotia binoei*	Bynoe's Gecko							2	9			2				1	1		3	1				
Pygopodidae	*Delma butleri*				1	4			5	2		10	2								1				
Pygopodidae	*Delma desmosa*				2	9	1	3	4	3	1	2	3		1			3		7	2				
Pygopodidae	*Delma nasuta*											5								1	1				
Pygopodidae	*Lialis burtonis*				3	3		4	1		1	1				1		1		6	2				
Pygopodidae	*Pygopus nigriceps*				1			1		2	4														1
Agamidae	*Ctenophorus caudicinctus*	Ring-tailed Dragon																				2			
Agamidae	*Ctenophorus isolepis*	Military Dragon			26	9	2	34	37	23	35	39	49		28	28	65	47		31	31				
Agamidae	*Ctenophorus nuchalis*	Central Netted Dragon								3	1				1		7			1		1			
Agamidae	*Diporiphora paraconvergens*	Grey-striped Western Desert Dragon						2		1							1	1		4	2				
Agamidae	*Diporiphora pindan*	Pindan Dragon			1			4	1						3	1		2		3		1			
Agamidae	*Diporiphora vescus*	Northern Pilbara Tree Dragon						1									1								
Agamidae	*Gowidon longirostris*	Long-nosed Dragon															1								
Agamidae	*Pogona minor*				1	2		2	3	3										4	1	1			
Scincidae	*Carlia triacantha*				1	1	4	1	1		3	6													
Scincidae	*Ctenotus brooksi*																			7					
Scincidae	*Ctenotus grandis*				2			2			3		1		1		1	3							
Scincidae	*Ctenotus helenae*							1				1			2	1	2	5		1	1				
Scincidae	*Ctenotus pantherinus*	Leopard Ctenotus			7	7	6	11	14	4	20	11	21		5	2	4	30		7	13		1		
Scincidae	*Ctenotus piankai*				1	4		1	1	2	1	1	2			2		1		1	1				
Scincidae	*Ctenotus quattuordecimlineatus*							2				1			1	5		2		2	4				
Scincidae	*Ctenotus rufescens*					5		1	1								2			1					
Scincidae	*Ctenotus saxatilis*	Rock Ctenotus				2	8																		

Family	Species Name	Common Name	State	Federal	AHF01PF	AHF02PF	AHF03F	AHF04PF	AHF05PF	AHF06PF	AHF10PF	AHF12PF	AHF13PF	AHF15E	AHF15PF	AHF16PF	AHF17PF	AHF18PF	AHF18E	AHF19PF	AHF20PF	AHFOpp	AHFCAM015-01	General Search	Nocturnal Search
Scincidae	*Ctenotus schomburgkii*					5			1	11	1	1													
Scincidae	*Eremiascincus musivus*	Mosaic Desert Skink			2							2	1		1	2	5	4		1					
Scincidae	*Eremiascincus pallidus*	Western Narrow-banded Skink			1							1	2		15	1	4	3		1	1				
Scincidae	*Eremiascincus richardsonii*	Broad-banded Sand Swimmer						1																	
Scincidae	*Lerista bipes*				60	49		39	32	22	32	15	5		56	58	72	61		35	60				
Scincidae	*Lerista separanda*		P2															1		1					
Scincidae	*Lerista vermicularis*														40	1				84	2				
Scincidae	*Menetia greyii*				1								2												
Scincidae	*Morethia ruficauda*				2			1	1			5	2			1		4		1					
Scincidae	*Notoscincus ornatus*				1			1	2	4	11	8	1			1	1	2		1	2				
Scincidae	*Tiliqua multifasciata*	Central Blue-tongue					1	1	3		2	1										1			
Varanidae	*Varanus acanthurus*	Spiny-tailed Goanna				2			1							1					1			1	
Varanidae	*Varanus brevicauda*	Short-tailed Pygmy Goanna			1			2					1							1	4				
Varanidae	*Varanus eremius*	Pygmy Desert Goanna			2			1	4	2	4	3	7		2	1		2		4	2				
Varanidae	*Varanus giganteus*	Perentie																				2			
Varanidae	*Varanus gilleni*	Pygmy Mulga Goanna															1	2							
Varanidae	*Varanus gouldii*	Bungarra or Sand Goanna					1		1			1	2		1			1			2				
Typhlopidae	*Anilios ammodytes*				1	9		5	1	3	3	1	2		3										
Typhlopidae	*Anilios grypus*							1								1	3	2			6				
Typhlopidae	*Anilios pilbarensis*																			1					
Pythonidae	*Antaresia stimsoni*	Stimson's Python				2																			
Pythonidae	*Aspidites melanocephalus*	Black-headed Python																				1			
Elapidae	*Demansia rufescens*	Rufous Whipsnake																				1			
Elapidae	*Pseudechis australis*	Mulga Snake																							2
Elapidae	*Pseudonaja mengdeni*	Western Brown Snake						2	1																
Elapidae	*Pseudonaja modesta*	Ringed Brown Snake				1	1	1	2	5								1			1	1		1	
Elapidae	*Simoselaps anomalus*	Desert Banded Snake			4			3	2	1			1		29	3	9	4		6	3				

Amphibians

Family	Species Name	Common Name	AHF01PF	AHF04PF	AHF10PF	AHF15PF	AHF16PF	AHF17PF	AHF18PF	AHF19PF	AHF20PF
Limnodynastidae	*Notaden nichollsi*	Desert Spadefoot	6	2	1	41	2	6	3	5	7
Myobatrachidae	*Uperoleia micromeles*	Tanami Toadlet				5				13	

Ground-dwelling Mammals

Family	Species	Common Name	State	Federal	AHF01PF	AHF02PF	AHF03F	AHF04PF	AHF05PF	AHF06PF	AHF10PF	AHF12PF	AHF13PF	AHF14CE	AHF15E	AHF15PF	AHF16PF	AHF17PF	AHF18PF	AHF18E	AHF19PF	AHF20PF	AHFMM01	AHFOpp	Bilby Search	General Search	NQ and BFRW Search
Dasyuridae	*Dasykaluta rosamondae*	Kaluta											1														
Dasyuridae	*Dasyurus hallucatus*	Northern Quoll	EN	Endangered																				1S			
Dasyuridae	*Ningaui timealeyi*	Pilbara Ningaui														3											
Dasyuridae	*Planigale ingrami*	Long-tailed Planigale				4		2		6											1						
Dasyuridae	*Pseudantechinus roryi*	Rory's Pseudantechinus								1																	
Dasyuridae	*Sminthopsis youngsoni*	Lesser Hairy-footed Dunnart									1	1	1						1			1					
Thylacomyidae	*Macrotis lagotis*	Bilby, Dalgyte	VU	Vulnerable																					7T, 26B, 2D, 1MC		
Notoryctidae	*Notoryctes caurinus*	Northern Marsupial Mole	P4																				1T				
Macropodidae	*Notamacropus agilis*	Agile Wallaby																							1T		
Macropodidae	*Osphranter rufus*	Red Kangaroo, Marlu																							1		
Macropodidae	*Petrogale lateralis lateralis*	Black-footed Rock-wallaby	EN	Endangered										1										6S, 5T			2, 1T, 1S, 1MC
Muridae	*Mus musculus*	House Mouse						1													1	1					
Muridae	*Notomys alexis*	Spinifex Hopping-mouse															1										
Muridae	*Pseudomys chapmani*	Western Pebble-mound Mouse	P4																					3M			
Muridae	*Pseudomys desertor*	Desert Mouse						1																			
Muridae	*Pseudomys hermannsburgensis*	Sandy Inland Mouse							1		1	2	3						1								
Canidae	*Canis familiaris dingo*	Dingo																						1T		1T	
Felidae	*Felis catus*	Cat													1T		1T							1	1T	1T	
Camelidae	*Camelus dromedarius*	Dromedary, Camel																						1T			

Bats

Family	Species Name	Common Name	AHF1169-02	AHFBat1169-01	CAM654-14E	AHF897-1	AHF827-1	AHF897-02	NQ and BFRW Search	General Search
Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheath-tailed Bat	•	•						
Emballonuridae	*Taphozous georgianus*	Common Sheath-tailed Bat	•		•				8	1
Molossidae	*Austronomus australis*	White-striped Free-tailed Bat	•	•						
Molossidae	*Chaerephon jobensis*	Greater Northern Free-tailed Bat	•							
Molossidae	*Ozimops lumsdenae*	Northern Free-tailed Bat	•							
Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat	•	•	•					
Vespertilionidae	*Nyctophilus geoffroyi*	Lesser Long-eared Bat	•							
Vespertilionidae	*Scotorepens greyii*	Little Broad-nosed Bat	•	•	•					

Birds

Family	Species Name	Common Name	State	Federal	AHF01PF	AHF02PF	AHF03F	AHF04PF	AHF05PF	AHF06PF	AHF10PF	AHF12PF	AHF13PF	AHF14E	AHF15PF	AHF16PF	AHF17PF	AHF18PF	AHF19PF	AHF20PF	AHFOpp	Nocturnal Search	ARUs
Phasianidae	*Coturnix ypsilophora*	Brown Quail																					•
Columbidae	*Phaps chalcoptera*	Common Bronzewing							1														
Columbidae	*Ocyphaps lophotes*	Crested Pigeon			6	1		2															•
Columbidae	*Geopelia cuneata*	Diamond Dove				1		1							2								
Podargidae	*Podargus strigoides*	Tawny Frogmouth																			1	2	
Eurostopodidae	*Eurostopodus argus*	Spotted Nightjar		Marine																	3		
Pelecanidae	*Pelecanus conspicillatus*	Australian Pelican		Marine				5													5		
Ardeidae	*Ardea pacifica*	White-necked Heron						1													1		
Ardeidae	*Nycticorax caledonicus*	Nankeen Night-Heron		Marine																	2		•
Accipitridae	*Elanus axillaris*	Black-shouldered Kite				1																	
Accipitridae	*Haliastur sphenurus*	Whistling Kite		Marine																1	1		
Accipitridae	*Accipiter fasciatus*	Brown Goshawk		Marine														1					
Accipitridae	*Accipiter cirrocephalus*	Collared Sparrowhawk																			1		
Accipitridae	*Circus assimilis*	Spotted Harrier						1					1								2		
Falconidae	*Falco cenchroides*	Nankeen Kestrel		Marine							1			1				1			4		
Falconidae	*Falco berigora*	Brown Falcon																			1		
Falconidae	*Falco longipennis*	Australian Hobby																			2		
Otididae	*Ardeotis australis*	Australian Bustard			1	1			1		1	1	1					1			8		
Charadriidae	*Elseyornis melanops*	Black-fronted Dotterel																			2		•
Charadriidae	*Vanellus miles*	Masked Lapwing																					•
Turnicidae	*Turnix velox*	Little Button-quail			2	2	1	3	4		1	1	1	3		2					4		
Glareolidae	*Glareola maldivarum*	Oriental Pratincole	MI	Migratory																	5		•
Cacatuidae	*Calyptorhynchus banksii*	Red-tailed Black-Cockatoo			5																2		•
Cacatuidae	*Eolophus roseicapillus*	Galah			2																		•
Cacatuidae	*Nymphicus hollandicus*	Cockatiel																			39		•
Psittacidae	*Melopsittacus undulatus*	Budgerigar			10	2							13					15					•
Cuculidae	*Centropus phasianinus*	Pheasant Coucal												2									
Cuculidae	*Chalcites basalis*	Horsfield's Bronze-Cuckoo																			1		
Cuculidae	*Chalcites osculans*	Black-eared Cuckoo		Marine																			•
Cuculidae	*Cacomantis pallidus*	Pallid Cuckoo		Marine	1																		•
Tytonidae	*Tyto javanica*	Eastern Barn Owl																					•
Halcyonidae	*Todiramphus pyrrhopygius*	Red-backed Kingfisher			1						1					1					1		•
Meropidae	*Merops ornatus*	Rainbow Bee-eater		Marine							1		3				2				8		•
Maluridae	*Malurus leucopterus*	White-winged Fairy-wren																			1		•
Maluridae	*Malurus lamberti*	Variegated Fairy-wren				1		3	4					6			3				4		•
Meliphagidae	*Certhionyx variegatus*	Pied Honeyeater																			3		•
Meliphagidae	*Lichenostomus virescens*	Singing Honeyeater			5	5	6	6	2	4	16	11	21	16	5	6	14	15	35	2	56		•

Family	Species Name	Common Name	State	Federal	AHF01PF	AHF02PF	AHF03F	AHF04PF	AHF05PF	AHF06PF	AHF10PF	AHF12PF	AHF13PF	AHF14E	AHF15PF	AHF16PF	AHF17PF	AHF18PF	AHF19PF	AHF20PF	AHFOpp	Nocturnal Search	ARUs
Meliphagidae	*Lichenostomus keartlandi*	Grey-headed Honeyeater																2					•
Meliphagidae	*Manorina flavigula*	Yellow-throated Miner			11	1	3				2			1		2	2		11	2	7		•
Meliphagidae	*Acanthagenys rufogularis*	Spiny-cheeked Honeyeater																					•
Meliphagidae	*Epthianura tricolor*	Crimson Chat													13	1	33	8			110		•
Meliphagidae	*Sugomel niger*	Black Honeyeater																					•
Meliphagidae	*Lichmera indistincta*	Brown Honeyeater									1	1									5		•
Eupetidae	*Psophodes occidentalis*	Chiming Wedgebill													1	2	6	2			2		
Campephagidae	*Coracina novaehollandiae*	Black-faced Cuckoo-shrike		Marine		1								1							2		•
Campephagidae	*Lalage sueurii*	White-winged Triller															5	4	2		18		
Pachycephalidae	*Pachycephala rufiventris*	Rufous Whistler																1					•
Pachycephalidae	*Oreoica gutturalis*	Crested Bellbird										1			2	2		2			1		•
Artamidae	*Artamus personatus*	Masked Woodswallow						1															•
Artamidae	*Artamus cinereus*	Black-faced Woodswallow			1			9	4		1	1	3	1	3	3	2		8	1	11		•
Artamidae	*Cracticus nigrogularis*	Pied Butcherbird			10	7	1							2									•
Rhipiduridae	*Rhipidura leucophrys*	Willie Wagtail				2			2		1			5		1	2				1		•
Corvidae	*Corvus bennetti*	Little Crow																					•
Corvidae	*Corvus orru*	Torresian Crow										1											•
Alaudidae	*Mirafra javanica*	Horsfield's Bushlark					5	2	1	4													•
Megaluridae	*Cincloramphus mathewsi*	Rufous Songlark									2							1	2				
Megaluridae	*Cincloramphus cruralis*	Brown Songlark										5	1						1		3		
Megaluridae	*Eremiornis carteri*	Spinifexbird																					•
Hirundinidae	*Petrochelidon ariel*	Fairy Martin																			140		•
Estrildidae	*Taeniopygia guttata*	Zebra Finch						15			6			4							7		•
Estrildidae	*Emblema pictum*	Painted Finch				1		1			2										20		•
Estrildidae	*Heteromunia pectoralis*	Pictorella Mannikin																			3		
Motacillidae	*Anthus novaeseelandiae*	Australasian Pipit		Marine																	1		•

Appendix 11

Helix Molecular Solutions SRE Report for Winu Road Access Corridor Section 2

Helix Molecular Solutions

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9 August 2018

Garth Humphreys
Biota Environmental Sciences
Level 1 / 228 Carr Place
Leederville WA 6007

Via email

Re. Report on the molecular systematics of the targeted SRE invertebrates from the Asian Hub RE Fauna survey.

Dear Garth,

Following is a summary of the results of the invertebrate molecular investigation we have completed for the Asian Hub Re Fauna survey. Results suggest that all camaenid snail specimens belong to the described *Rhagada ka*rajarri and these records extend the species distribution substantially. Nine of the ten buthid scorpions were successfully sequenced and belong to two clades of *Lychas annulatus* (also recognised as *Hemilychas alexandrinus*) and show mean sequence divergence of 7.8 % from one another. Amongst the 29 spider specimens, 15 belonged to four distinct species of nemesiid mygalomorphs and belonging to a single genus *Aname*, three of the species haven't been recorded previously. Nine specimens of spiders were found to be Araneomorphae with their family placement uncertain. A further five spider specimens were unsuccessful during the sequencing process. All twenty-four specimens of camaenid snails sequenced belonged to the recently described *R. karajarri* species and these records markedly increase the distribution of the species.

Thanks once again for collaborating on this project with Helix. We hope we can continue to provide you with useful information, and feel free to contact us if you have any questions or would like to discuss the results in detail.

Sincerely,

Dr. Zoë Hamilton, Dr. Terrie Finston and Yvette Hitchen
Helix Molecular Solutions

Background and Objective

Sixty-three specimens of invertebrate fauna belonging to four taxonomic groups (Camaenidae, Buthidae, Araneae, Araneomorphae) from the Asian Hub RE Fauna Survey area in the Great Sandy Desert and Dampierland biogeographic Regions were sequenced for variation at the mitochondrial cytochrome oxidase subunit I gene (*COI*). The resulting molecular sequences were then assessed to determine the number of taxa present and compare these results to those sequences publically available on GenBank and those already in Helix's database for context.

Executive summary

- Twenty-four specimens of camaenid *Rhagada* land snails from the survey area were sequenced and assessed for variation at the *COI* mtDNA gene. The molecular data were then placed within an existing molecular taxonomic framework for *Rhagada*, using *COI* mtDNA sequences from GenBank in order to accurately determine what species the Asian Hub camaenids showed affinity to. A single species *Rhagada karajarri* was recorded.
- Two divergent clades of buthid scorpions were sequences for *COI* mtDNA. Preliminary analyses with sequences available on GenBank found two divergent lineages with mean divergence of 7.8%. Collaboration with Dr. Joel Huey from the WA Museum enabled more accurate resolution of these specimens. These specimens show affinity to the *Lychas annulatus* species clade (also recognised as *Hemilychas alexandrinus*), this species has an extensive distribution across the arid interior of Australia. There was substantial divergence between the clades, the significance of which cannot be resolved until the buthid phylogenetic relationships and taxonomy have been revised.
- Four species of nemesiid mygalomorph spiders all Belonging to the genus *Aname* were amongst the fifteen successfully sequenced mygale specimens. Three of these have not been recorded previously.
- Nine spider specimens sequenced belonged to the Araneomorphae infraorder and family placement was undetermined with the sequence data available.

Methods

Twenty-four specimens of camaenid land snails from four sampling locations all belonging to the genus *Rhagada,* along with ten specimens of buthid scorpions from four sampling locations, and twenty-nine suspected mygalomorph spiders from ten sampling locations were sequenced for variation at the cytochrome oxidase subunit I gene (*COI*) using primers LCOI & HCO2 (Folmer *et al*., 1994)

All resulting sequences were edited using SEQUENCHER software (Gene Codes Corporation, Ann Arbor, MI, USA). Alignment was performed with CLUSTAL W (Thompson *et al*., 1994) using default parameters. DNA nucleotide sequences were translated into protein sequences to ensure that the amplified sequences corresponded to the target mtDNA. The translated protein sequences were then checked for the presence of stop codons. All sequences were 'BLAST'ed (Basic Local Alignment Search Tool) with the NCBI (National Centre for Biotechnology Information). This program compares DNA nucleotide sequences with a library of sequences and identifies sequences within the database that resemble the query sequences above a certain threshold. Genetic distances between unique genetic sequences (haplotypes) were measured using uncorrected p-distances (total percentage of nucleotides different between sequences). To account for polymorphism within lineages, the net genetic diversity of Nei (1987) was calculated to give a 'corrected' distance between lineages.

For phylogenetic analysis, likelihood ratio tests using the Bayesian Information Criterion were calculated in MEGA 6.06 (Tamura *et al*., 2013) to determine the best-fit model of evolution. Maximum Likelihood was used to construct the phylogenetic tree, incorporating the best-fit model of evolution. Details of analyses are described for each taxonomic group.

Results

Camaenidae

The camaenid genus *Rhagada* is the most species-rich genus of land snails in Western Australia's semi-arid Pilbara region, where it shows both morphological conservatism within and among species over large distances (Solem, 1997; Johnson *et al*., 2012; Hamilton & Johnson, 2015), and extreme morphological diversification of shell traits over relatively small areas (Stankowski, 2011, 2013, 2015; Stankowski & Johnson, 2014; Johnson *et al.,* 2016). This contrasting pattern of morphological variation in the genus, in addition to repeated incidences of convergent shell morphologies between distinct cryptic taxa (Hamilton, in prep), and the occurrence of narrow hybrid zones with morphological intermediates between distinct taxa (Hamilton & Johnson, 2015) highlights the need for the use of molecular markers in addition to morphological taxonomy for species diagnosis.

Reference specimens and outgroups

A number of reference samples of *Rhagada* were obtained from GenBank for the purposes of providing a taxonomic framework in which the specimens from the survey could be accurately placed. These included all described species from the Pilbara region, previously examined in tests of species taxonomy (Johnson *et al*., 2012; 2016), plus several species from the Kimberley region, from which the Pilbara lineages were derived (Köhler & Criscione, 2013; Burghardt & Köhler, 2014). GenBank accession numbers are shown in parenthesis for the samples used in the analyses and included *Rhagada convicta* (KF151996; JQ362681.1; KF151996.1; JQ362679.1; JQ362696.1; JQ362689.1; JQ362682.1), *R. capensis* (JQ362694.1; JQ362693.1), *R. barrowensis* (KC617888.1; KC617889.1), *R. torulus* (JQ362699.1; JQ362700.1), *R. globosa* (JQ362697.1; JQ362698.1), *R. richardsonii* (JQ362675.1; JQ362676.1; KC703158.1), *R*. sp. 'Pannawonica' (KM405439.1; KM405441.1; KM405442.1), *R. radleyi* (JQ362687.1; JQ362688.1; JQ362685.1; JQ362686.1), *R. pilbarana* (JQ362683.1; JQ362684.1), *R. ngurrana* (JQ362717.1; JQ362718.1), *R. elachystoma* (KP085400.1), *R. dampierana* (KP085399.1), *R. minima* (KF152059.1), *R. dringi* (JQ362674.1; JQ362673.1), *R. karajarri* (KC703133.1; [WAM S49582a]; KC703134.1 [WAM S49582b]), *R. warora* (KC703111.1 [WAM S49580a]), *R. kessneri* (KC703109.1[WAM S37678a]), *R. harti* (KC703143.1 [WAM S49576]), and *R. biggeana* (KC703112.1 [WAM S36739a]).

A *COI* sequence belonging to the land snail *Baudinella tuberculata* (HQ245450.1 [WAM S37063]) was used as the outgroup for all analyses, owing to its relationship with *Rhagada* within the Camaenidae (Johnson *et al*., 2012).

Phylogenetic Analysis

Phylogenetic analyses were calculated in MEGA 6.06 (Tamura *et al*., 2013) using maximum likelihood (ML) with 1000 bootstrap replicates, based on the genetic distances with T92 + G + I as the best-fit model of evolution (Tamura Nei, with gamma distribution and invariant sites). The parameter for the gamma distribution was 0.89. The phylogenetic analysis, which included the fifteen camaenid snail specimens from the survey area, as well as fifty-one reference *Rhagada* specimens obtained from GenBank, placed the Asian Hub *Rhagada* specimens within the *R. karajarri* lineage (Figure 2).

Differentiation within and between lineages

Of the fifteen Asian hub *Rhagada* specimens examined (Table 1), six had shared haplotypes, the remaining nine all had unique haplotypes. Amongst these *Rhagada* specimens from the study area, there was 0.0 % to 5.9 % molecular variation at *COI* (Table 2). The mean sequence divergence between the *Rhagada* specimens from the Asian Hub sample sites, and specimens of *R. karajarri,* the species to which they showed most affinity was 6.1 %. The *R. karajarri* specimens were from Port Smith around 185 km to the north (Table 3). This contrasts the vast amount of differentiation (17.3 %, Table 3) found between the Asian Hub *Rhagada* specimens and *R. dringi*, just 40 km to the north-east. This is a remarkable result as the sample localities for the Asian hub *Rhagada* place these specimens well within the distribution of the described distribution of *R. dringi* according to Solem (1997). However, the molecular results imply that a revision of this species' distribution is required. The results reveal that *Rhagada* from the study area form a strongly supported group with the recently described *R. karajarri* (Burghardt & Köhler, 2014). This extends the distribution of this species significantly, and furthermore suggests that what Solem (1997) described as *R. dringi* (from morphological characters only) may well be the *R. karajarri* species, and what we have interpreted previously as *R. dringi* (Johnson *et al*., 2012; Burghardt & Köhler, 2014) is in fact an undescribed *Rhagada* species with an extremely limited distribution.

Buthidae

The Buthidae are the largest family of scorpions with 1053 species known under 92 genera (Rein, 2015). Few molecular investigations of phylogenetic relationships in the family Buthidae are available (Gantenbein *et al*., 2000; 2003; Fet *et al*., 2003; Gantenbein & Largiadèr, 2003; Mirshamsi *et al*., 2010; Sousa *et al*., 2010, 2011; Suranse *et al*., 2017). Nevertheless, all these studies agree that morpho-taxonomy has limitations in differentiating and defining species boundaries, with findings that several currently recognized species are species groups comprising undescribed taxa. Morphological variability in buthids within taxa, along with morphological similarity between taxa, has led to taxonomic confusion and underscores the value of the inclusion of molecular data for species delineation in scorpions (Yamashita & Rhoads, 2013).

Summary

Nine of the ten specimens of buthid scorpions were successfully sequenced for *COI* (Table 4). Phylogenetic analyses including the limited available buthid GenBank specimens imply that two clades exist amongst the collected specimens with up to 8.00 % sequence divergence between them (7.8 % mean divergence between clades) (Table 5 & 6)). Collaboration with Dr. Joel Huey, a researcher at the WA Museum, enabled more accurate placement of the buthid scorpions in question. The nine specimens were included in a subsequent phylogenetic analysis by Dr. Joel Huey with his more extensive collection of sequences, which are not yet publically available. This analysis placed the Asian Hub specimens in a species clade along with specimens identified as *Lychas annulatus* by Lorenzo Prendini (American Museum of Natural History). This species is also recognised as *Hemilychas alexandrinus,* which according to the Atlas of Living Australia has a large distributional range across the arid zone of Australia.

Reference specimens and outgroups

Four haplotypes were among the nine successfully sequenced specimens from the Asian Hub study area, one of which was shared amongst five individuals. These sequences were analysed along with reference scorpion specimens belonging to the family Buthidae. These included one specimen of *Mesobuthus martensii* (GenBank accession # JF700146.1), one specimen of *Lychas tricarinatus* (GenBank accession # KT716037.1), three specimens of *Lychas mucronatus* (GenBank accession # JN018211.1, JN018153.1, & JN018210.1) and one specimen of *Centruroides vittatus* (GenBank accession # EU404114.1). The *Mesobuthus* and *Centuroides* sequences were used at outgroups in the analysis.

Phylogenetic analysis

Phylogenetic analyses were calculated in MEGA 6.06 (Tamura *et al*., 2013) using maximum likelihood (ML) with 1000 bootstrap replicates, based on the genetic distances with Tamura-Nei with gamma distribution as the best-fit model of evolution (TN93 + G). The parameter for the gamma distribution was 0.17. The preliminary phylogenetic analysis, which included the nine specimens from the survey area, as well as the four reference specimens obtained from GenBank, revealed two distinct and strongly supported clades of Asian Hub specimens (Figure 2). Subsequent analysis performed by Dr. Joel Huey (WA Museum) with the use of his extensive collection of Australian buthid sequences that are not yet publicly available place the two clades of buthid scorpions within the *Lychas annulatus* clade. This species is also recognised as *Hemilychas alexandrinus.*

Differentiation within and between lineages.

The two lineages of *Lychas annulatus* (Dr. Joel Huey pers. comm.) from the Asian Hub study area showed sequence divergence from one another by a mean of 7.8 %. Each lineage showed a mean within divergence of 0.00 % (0.00 - 0.00)(clade A) and 0.10 % (0.9 – 1.2)(clade B).

Family undetermined
Nine of the sequenced spider specimens did not belong to the Mygalomorphae infraorder (Table 7). Instead a 'megablast' search places them within the Araneomorphae. Their family assignment is unresolved as numerous identity assignments were found including the families Deinopidae, Mesysmaucheniidae, Dictynidae, Salticidae, Sparassidae, and Phyxelididae with 88% similarity (see appendix 1 –'megaBLAST' results).

Araneae
The infraorder of Arachnida, Mygalmomorphae, includes trapdoor spiders and their kin, and they are frequently identified as short-range endemics (SREs)(e.g. Harvey *et al*., 2011; Castalanelli *et al*., 2014). Identification of species has traditionally been performed using morphological techniques, however, only males can be used in identification, as both females and juveniles lack the diagnostic characters used in identification, and furthermore there is a large backlog of undescribed taxa. DNA barcoding with the use of *COI* mtDNA has become a rapid, objective method aiding mygalomorph species identifications and their distributions, and is recognised as providing important information that regulatory authorities can use to assess environmental impacts of large-scale developments (Harvey *et al*., 2008; Environmental Protection Authority, 2009; Castalanelli *et al*., 2014). Extensive molecular work has been conducted on the trap-door spider fauna of Western Australia (Helix, 2009a &b, 2010, 2011a - k, 2012a - h, 2013a & b, 2014a - d, 2015a - e). The resulting dataset provides a molecular framework that can be used to provide regional context for localised sampling.

Reference specimens and outgroups
A number of reference specimens (n = 460) were used including in preliminary analyses to determine the family placement of the mygale specimens. This included 71 Barychelidae samples, 37 Ctenizidae samples, 115 Idiopidae samples, 207 Nemesiidae samples, and 30 Actinopidae samples. Preliminary analyses placed the Asian hub mygale specimens within the Nemesiidae family (Table 7), subsequent analyses therefore included only nemesiid specimens that were within 15 % sequence divergence.

The family Nemesiidae is one of the most diverse and species-rich mygalomorph families in Australia, with 15 genera and 99 named species (Castalanelli *et al*., 2014; 2017). Representative specimens from four other myaglomorph families were used as outgroups (T112080 Synothele MYG127 BBW from Barychelidae; T96581-Conothele MYG059 CAN from Ctenizidae; T96336 Aganippe MYG017 IDI 173 from Idiopidae; T96308 Missulena MYG049 A2 from Actinopidae).

Phylogenetic analysis
Phylogenetic analyses were calculated in MEGA 6.06 (Tamura *et al*., 2013) using maximum likelihood (ML) with 1000 bootstrap replicates, based on the genetic distances with Tamura-Nei with Gamma distribution as the best-fit model of evolution (TN93 + G). The parameter for the gamma distribution was 0.23. The phylogenetic analysis, which included the thirteen haplotypes for the fifteen specimens from the survey area, as well as the forty-six nemesiid reference specimens within 15% sequence divergence obtained both from Helix's database and from GenBank. Fifteen nemesiid mygale specimens were amongst the samples collected from the Asian Hub survey. Phylogenetic analyses found four distinct clades of nemesiid mygalomorph spiders amongst these specimens.

Differentiation within and between lineages
Thirteen haplotypes existed amongst the fifteen nemesiid specimens (Table 8). None of the specimens sequenced match haplotypes on our molecular database, or on GenBank. The mygale specimens belonged to four separate clades (N7, N138, N139, N140). These clades showed mean divergences of 3.2 % (N7) & 0.4 % (N140) within and substantial between clade divergences with mean divergence ranging from 12.1 % to 19.2 % (Tables 8 & 9). By applying the 9.5 % sequence divergence 'cut-off' that was tested by Castalanelli *et al*., (2014), these levels of sequence divergence indicate that the specimens belong to four distinct nemesiid species. One clade showed associations with reference specimens with individuals showing between 3.8 % to 6.3 % sequence divergence from the 'KJ744648' individual from Genbank, 4.8 % to 5.8 % from the KJ744648 GenBank specimen, and 4.6 % to 6.3 % divergence from the

NBT_N7_AD748. These reference specimens (KJ744649, KJ744648, & NBT_N7_AD748) were collected between 245 km & 300 km to the south-west of the Asian Hub specimens from the same lineage(see Appendix 2 for genetic p-distance between all specimens). This result implies this species has a large distribution. The remaining three clades are only distantly associated with reference specimens (Table 9), with sequence divergences of 10.9 % ('NN35' & KJ745288) to the closest related samples for clade N138, and sequence divergences of 17.0 % for clade N139 ('NN29' & KJ744688), and 14.5 % for clade N140 ('NN32' with individuals JQ772139, KJ45375, NBC_N6_AD577), and are therefore likely to be new species (see Appendix 2 for genetic p-distances between all specimens).

Conclusions

The mtDNA gene cytochrome oxidase 1 (*COI*) is widely considered to show suitable variation to distinguish species (Hebert *et al*., 2003a), and the use of this gene can be extremely effective for 'DNA barcoding' in taxa where clear differentiation exists between intra and interspecific levels of divergence (e.g. Hebert *et al*., 2004a; 2004b). In a comparison of *COI* sequences for over 13,000 pairs of taxa, Hebert *et al* (2003b) found a mean of 11.1% sequence divergence between distinct species. Nearly 80% of these comparisons found that species pairs differed from one another by greater than 8% sequence divergence. Despite its merits in barcoding however, a taxon by taxon approach, examining the amount of phylogenetic variation within and between taxa is the most widely accepted method of delineating species and their distributions, especially in areas where rapidly expanding mining operations outpace taxonomic treatment of unresolved taxa.

<u>Camaenidae</u>

The *Rhagada* land snail specimens undoubtedly belong to the recently described *R. karajarri* species, and extend its distribution markedly (by 180 km). This result also calls for a revision of the *R. dringi* species and its apparently very limited distribution. Morphological similarities between the species have led to taxonomic confusion with a perceived extensive distribution for *R. dringi* according to Solem (1997) based on morphological characters alone.

<u>Buthidae</u>

Two distinct clades of were evident amongst the buthid specimens sequenced. These appear to be two divergent clades belonging to *Lychas annulatus*. The significance of the divergent clades cannot be resolved until the buthid phylogenetic relationships and taxonomy have been revised.

<u>Araneae</u>

Four distinct undescribed species of nemesiid mygales were apparent, all from the genus *Aname* three of which are likely to be newly recorded species.

References

Australian Faunal Directory. Australian Government, Department of Sustainability, Environment, Water, Population and Communities http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/index.html

Brower AVZ. 1994. Rapid morphological radiation and convergence among races of the butterfly Heliconius erato inferred from patterns of mitochondrial DNA evolution. *Proceedings of the National Academy of Sciences USA*. **91**: 6491-6495.

Burghardt I, Köhler F. 2014. *Rhagada* revisited: on the taxonomy of species from the Kimberley and Dampierland, Western Australia (Pulmonata, Camaenidae). *Molluscan Research* **35**: 37-50.

Castalanelli MA, Huey JA, Hillyer MJ, Harvey MS. 2017. Molecular and morphological evidence for a new genus of small trapdoor spiders from arid Western Australia (Araneae: Mygalomorphae: Nemesiidae: Anaminae). *Invertebrate Systematics* **31**: 492-505.

Environmental Protection Authority 2009. Sampling if short range endemic invertebrate fauna for environmental impact assessment in Western Australia. In 'Guidance for the Assessment of Environmental Factors (in accordance with the Environmental Protection Act 1986). Vol. No. 20'. pp. 1-31.

Fet V, Gantenbein B, Gromov AV, Lowe G, Lourenço WR. 2003. The first molecular phylogeny of Buthidae (Scorpiones). *Euscorpius*. **4**: 1–10.

Folmer O, Black M, Hoeh W, Lutz R, Vrijenhoek R. 1994. DNA primers for amplification of mitochondrial cytochrome c oxidase subunit I from diverse metazoan invertebrates. *Molecular Marine Biology and Biotechnology* **3**: 294-299.

Gantenbein B, Kropf C, Largiadèr CR, Scholl A. 2000. Molecular and mor- phological evidence for the presence of a new buthid taxon (Scorpiones: Buthidae) on the island of Cyprus. *Revue Suisse Zoologie*. **107**: 213–232.

Gantenbein B, Fet V, Gromov AV. 2003. The First DNA phylogeny of four species of *Mesobuthus* (Scorpiones, Buthidae) from Eurasia. *Journal of Arachnology*. **31**: 412–420.

Gantenbein B, Largiadèr CR. 2003. The phylogeographic importance of the Strait of Gibraltar as a gene flow barrier in terrestrial arthropods: a case study with the scorpion *Buthus occitanus* as model organism. *Molecular Phylogenetics and Evolution* **28**: 119–130.

Hamilton ZR, Johnson MS. 2015. Hybridization between genetically and morphologically divergent forms of *Rhagada* (Gastropoda: Camaenidae) snails at a zone of secondary contact). *Biological Journal of the Linnean Society* **114**: 348-362.

Harvey MS, Berry O, Edward KL, Humphreys G. 2008. Molecular and morphological systematics of hypogean schizomids (Schizomida: Hubbardiidae) in semiarid Australia. *Invertebrate Systematics* **22**: 167-194.

Harvey MS, Rix MG, Framenau VW, Hamilton ZR, Johnson MS, Teale RJ, Humphreys G, Humphreys WF. 2011. Protecting the innocent: studying short-range endemic taxa enhances conservation outcomes. *Invertebrate Systematics* **25**: 1-10.

Hebert PDN, Cywinska A, Ball SL, deWaard JR. 2003a. Biological identifications through DNA barcodes. *Proceedings of the Royal Society of London B* **270**: 313-321.

Hebert PDN, Ratnasingham S, deWaard JR. 2003. Barcoding animal life: cytochrome c oxidase subunit 1 divergences among closely related species. *Proceedings of the Royal Society of London B (supplement)* **270**, S96-S99.

Hebert, P.D.N., Penton EH, Burns JM, Janzen DH, Hallwachs W. 2004a. Ten species in one: DNA barcoding reveals cryptic species in the neotropical skipper butterfly *Astraptes fulgerator*. *PNAS* **101**: 14812-14817.

Hebert PDN, Stoeckle MY, Zemiak TS, Francis CM 2004b. Identification of birds through DNA barcodes. *PLoS Biology* **2**: 1657–1663.

Helix 2009a. Report on the molecular systematics of *Aganippe castellum*. Unpublished report for Biota Environmental Sciences.

Helix 2009b. Report on the molecular systematics of wishbone spider *Aname*. Unpublished report for BHP Billiton.

Helix 2010. Report on the molecular systematics of mygalomorph spiders from Forestania. Unpublished report for Biota Environmental Sciences.

Helix 2011a. Report on the molecular systematics of *Galeosoma* from Forestania. Unpublished report for Biota Environmental Sciences.

Helix 2011b. Report on the molecular systematics of Mygalomorphae from Forrestania. Unpublished report for Biota Environmental Sciences.

Helix 2011c. Report on the molecular systematics of Mygalomorphae from Deception. Unpublished report for Biota Environmental Sciences.

Helix 2011d. Report on the molecular systematics of Mygalomorphae from South Parmelia. Unpublished report for Biota Environmental Sciences.

Helix 2011e. Report on the molecular systematics of Mygalomorphae from Jinidi. Unpublished report for Biota Environmental Sciences.

Helix 2011f. Report on the molecular systematics of Mygalomorphae from Southern Flank. Unpublished report for Biota Environmental Sciences.

Helix 2011g. Report on the molecular systematics of Mygalomorphae from Area C to Yandi. Unpublished report for Biota Environmental Sciences.

Helix 2011h. Report on the molecular systematics of Mygalomorphae from Hammersley Irrigation. Unpublished report for Biota Environmental Sciences.

Helix 2011i. Report on the molecular systematics of Mygalomorphae from Mudlark. Unpublished report for Biota Environmental Sciences.

Helix 2011j. Report on the molecular systematics of Mygalomorphae from Marillana. Unpublished report for Biota Environmental Sciences.

Helix 2011k. Report on the molecular systematics of Mygalomorphae from Jinidi to Manline. Unpublished report for Biota Environmental Sciences.

Helix 2011l. Report on the molecular systematics of Mygalomorphae from Eastern Deviation. Unpublished report for Biota Environmental Sciences.

Helix 2012a. Report on the molecular systematics of Mygalomorphae from the Pilbara. Unpublished report for Biota Environmental Sciences, 31 January.

Helix 2012b. Report on the molecular systematics of Mygalomorphae from West Turner Syncline. Unpublished report for Biota Environmental Sciences.

Helix 2012. Report on the molecular systematics of Mygalomorphae from Southern Flank to Jinidi. Unpublished report for Biota Environmental Sciences.

Helix 2012c. Report on the molecular systematics of Mygalomorphae from Koodaideri West Corridor. Unpublished report for Biota Environmental Sciences.

Helix 2012d. Report on the molecular systematics of Mygalomorphae from Koodaideri phase IV and Koodaideri South. Unpublished report for Biota Environmental Sciences.

Helix 2012e. Report on the molecular systematics of Mygalomorphae from Cape Lambert. Unpublished report for Biota Environmental Sciences.

Helix 2012f. Report on the molecular systematics of Mygalomorphae from Marra Mamba. Unpublished report for Biota Environmental Sciences.

Helix 2012g. Report on the molecular systematics of Mygalomorphae from Mt Richardson. Unpublished report for Biota Environmental Sciences.

Helix 2012h. Report on the molecular systematics of Mygalomorphae from West Turner Extension. Unpublished report for Biota Environmental Sciences.

Helix 2013a. Report on the molecular systematics of Mygalomorphae from Mt Richardson phase I and II. Unpublished report for Biota Environmental Sciences.

Helix 2013b. Report on the molecular systematics of mygalomorphae from Koodaideri rail corridor. Unpublished report for Biota Environmental Sciences.

Helix 2014a. Molecular systematics of mygalomorphae from Kundip. Unpublished report for Biota Environmental Sciences.

Helix 2014b. Molecular systematics of mygalomorphae from Koodaideri northern extension. Unpublished report for Biota Environmental Sciences.

Helix 2014c Molecular Systematics of mygalomorphae from Yandi Billiards. Unpublished report for Biota Environmental Sciences.

Helix 2014d. Molecular systematics of mygalomorphae from Yandi Billiards phase 2. Unpublished report for Biota Environmental Sciences.

Helix 2015a. Report on the molecular systematics of mygalomorphae from Bungaroo Valley. Unpublished report for Biota Environmental Sciences.

Helix 2015b. Report on the molecular systematics of mygalomorphae form Baby Hope Downs. Unpublished report for Biota Environmental Sciences.

Helix 2015c. Molecular systematics of mygalomorphae from Yandi Oxbow. Unpublished report for Biota Environmental Sciences.

Helix 2015d. Molecular systematics of mygalopmorphae from Red Hill. Unpublished report for Biota Environmental Sciences.

Helix 2015e. Molecular systematics of mygalomorphae from the Buckland Hills Level 2 fauna survey. Unpublished report for Biota Environmental Sciences.

Johnson MS, Hamilton ZR, Teale R, Kendrick PG. 2012. Endemic evolutionary radiation of *Rhagada* land snails (Pulmonata: Camaenidae) in a continental archipelago in northern Western Australia. *Biological Journal of the Linnean Society* **106**: 316-327.

Johnson MS, Stankowski S, Kendrick PG, Hamilton ZR, Teale RJ. 2016. Diversity, complementary distributions and taxonomy of *Rhagada* land snails (Gastropoda: Camaenidae) on the Burrup Peninsula, Western Australia. *Invertebrate Systematics* **30**: 323-334.

Köhler F, Criscione F. 2013. Small snails in a big place: a radiation in the semi-arid rangelands in northern Australia (Eupulmonata, Camaenidae, *Nanotrachia* gen. nov.). *Zoological Journal of the Linnean Society* **169**: 103-123.

Mirshamsi O, Sari A, Elahi E, Hosseinie S. 2010. Phylogenetic relationships of *Mesobuthus eupeus* (CL Koch, 1839) inferred from COI sequences (Scorpiones: Buthidae). *Journal of Natural History* **44**: 2851–2872.

Nei M. 1987. DNA polymorphism within and between populations. In: *Molecular Evolutionary Genetics*. pp.254-286. Columbia University Press New York, NY.

Rein JO. 2015. Scorpion files. Species List. Buthidae. [Cited 2015 October 7]. Available from: http://www.ntnu.no/ub/scorpion-files/buthidae.php.

Simon C, Fratl F, Beckenbach A, Crespi, B, Liu H, Flook P. 1996. Evolution, weighting, and phylogenetic utility of mitochondrial gene sequences and a compilation of conserved polymerase chain reaction primers. *Annals of the Entomological Society* **87**: 651-701.

Solem A. 1997. Camaenid land snails from Western and Central Australia (Mollusca: Pulmonata: Camaenidae): VII. Taxa from Dampierland through the Nullarbor. *Records of the Western Australian Museum Supplement* **50**: 1461– 1906.

Sousa P, Froufe E, Alves PC, Harris DJ. 2010. Genetic diversity within scorpions of the genus *Buthus* from the Iberian Peninsula: mitochondrial DNA sequence data indicate additional distinct cryptic lineages. *Journal of Arachnology*. **38**: 206–211.

Stankowski S. 2011. Extreme, continuous variation in an island snail: local diversification and association of shell form with the current environment. *Biological Journal of the Linnean Society* **104**: 756-769.

Stankowski S. 2013. Ecological speciation in an island snail: evidence for the parallel evolution of a novel ecotype and maintenance by ecologically dependent postzygotic selection. *Molecular Ecology* **22**: 2726-2741.

Stankowski S. 2015. Layers of contingency shroud pervasive ecological divergence in a local radiation of land snails. *Biological Journal of the Linnean Society* **116**: 267-276.

Stankowski S, Johnson MS. 2014. Biogeographic discordance of molecular phylogenetic and phenotypic variation in a continental archipelago radiation of land snails. *BMC Evolutionary Biology* **14**: 1-12.

Suranse V, Sawant NS, Paripatyadar SV, Krutha K, Paingankar MS, Padhye AD, Bastawade DB, Dahanukar N. 2017. First molecular phylogeny of scorpions of the family Buthidae from India. *Mitochondrial DNA Part A* **28**: 606-611.

Tamura K, Peterson D, Peterson N, Stecher G, Nei M, Kumar S. 2011. MEGA 5: Molecular Evolutionary Genetic Analysis Version 6. *Molecular Biology and Evolution* **28**: 2731 – 2739.

Tamura K, Stecher G, Peterson D, Filipski A, Kumar S. 2013. MEGA 6: Molecular Evolutionary Genetic Analysis using Maximum Likelihood, evolutionary distance, and Maximum Parsimony methods. *Molecular Biology and Evolution* **30**: 2725 – 2729.

Thompson J, Higgins D, Gibson T. 1994. CLUSTAL W: improving the sensitivity of progressive multiple sequence alignment through sequence weighting, position-specific gap penalties and weight matrix choice. *Nucleic Acids Research* **22**, 4673–4680. doi:10.1093/nar/ 22.22.4673

Yamashita T, Rhoads DD. 2013. Species delimitation and morphological divergence in the scorpion *Centroides vitta*tus (Say, 1821): Insights from phylogeography. *PLoS One* **8**: e68282.

Table 1. Camaenid *Rhagada* snail specimens used in the present study, and the genetic lineage to which they belong.

Biota Specimen ID	Helix Lab ID	Genetic Lineage/ Taxonomic ID
Cable track site 2-01	NN40	*Rhagada karajarri*
Cable track site 2-02	NN41	*Rhagada karajarri*
Cable track site 2-03	NN42	*Rhagada karajarri*
Cable track site 2-04	NN43	*Rhagada karajarri*
Cable track site 2-05	NN44	*Rhagada karajarri*
Cable track site 2-06	NN45	*Rhagada karajarri*
Opp North Beach-01	NN46	*Rhagada karajarri*
Opp North Beach-02	NN47	*Rhagada karajarri*
Opp North Beach-03	NN48	*Rhagada karajarri*
Paddock-01	NN49	*Rhagada karajarri*
Paddock-02	NN50	*Rhagada karajarri*
Paddock-03	NN51	*Rhagada karajarri*
Paddock-04	NN52	*Rhagada karajarri*
Paddock-05	NN53	*Rhagada karajarri*
Paddock-06	NN54	*Rhagada karajarri*
Paddock-07	NN55	*Rhagada karajarri*
Paddock-08	NN56	*Rhagada karajarri*
Paddock-09	NN57	*Rhagada karajarri*
Inland Dunes-01	NN58	*Rhagada karajarri*
Inland Dunes-02	NN59	*Rhagada karajarri*
Inland Dunes-03	NN60	*Rhagada karajarri*
Inland Dunes-04	NN61	*Rhagada karajarri*

Table 2. Genetic p-distance (below) and the associated standard error (above) between camaenid haplotypes of *Rhagada* from the Asian Hub area as shown in Figure 1. Specimens identified with '*' are those representing shared haplotypes. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

	NN40	NN41	NN45*	NN46*	NN48	NN50	NN51*	NN56*	NN57*	NN58	NN61*
NN40		0.003	0.003	0.009	0.003	0.003	0.003	0.003	0.002	0.002	0.008
NN41	0.009		0.002	0.009	0.002	0.002	0.002	0.003	0.003	0.003	0.009
NN45*	0.007	0.004		0.009	0.002	0.002	0.001	0.002	0.002	0.003	0.009
NN46*	0.056	0.059	0.057		0.009	0.009	0.009	0.009	0.009	0.009	0.003
NN48	0.007	0.004	0.003	0.054		0.002	0.001	0.002	0.002	0.003	0.008
NN50	0.007	0.004	0.003	0.057	0.003		0.001	0.002	0.002	0.003	0.009
NN51*	0.006	0.003	0.001	0.056	0.001	0.001		0.001	0.002	0.002	0.009
NN56*	0.007	0.004	0.003	0.054	0.003	0.003	0.001		0.002	0.003	0.008
NN57*	0.003	0.006	0.004	0.056	0.004	0.004	0.003	0.004		0.001	0.008
NN58	0.004	0.007	0.006	0.056	0.006	0.006	0.004	0.006	0.001		0.008
NN61*	0.054	0.057	0.056	0.004	0.053	0.056	0.054	0.053	0.054	0.054	

Table 3. Mean between group distances (below) and standard error (s.e.) (above) for 22 lineages of camaenid snails utilised in analyses.

	Asian Hub *Rhagada*	*Baudinella*	*R. barrowensis*	*R. capensis*	*R. convicta*	*R. elachystoma*	*R. dringi*	*R. globosa*	*R. ngurrana*	*R. pilbarana*	*R.,radleyi*	*R. richardsonii*	*R. sp. Pannawonica*	*R. torulus*	*R. karajarri*	*R. biggeana*	*R. harti*	*R. kessneri*	*R. setzeri*	*R. waroora*
ian Hub agada		0.017	0.015	0.015	0.014	0.015	0.014	0.014	0.016	0.015	0.014	0.015	0.015	0.015	0.009	0.015	0.015	0.015	0.016	0.016
udinella	0.214		0.017	0.018	0.015	0.015	0.017	0.016	0.016	0.016	0.016	0.016	0.017	0.016	0.018	0.017	0.016	0.016	0.017	0.017
arrowensis	0.182	0.202		0.016	0.011	0.015	0.014	0.015	0.015	0.014	0.012	0.013	0.015	0.015	0.016	0.017	0.016	0.016	0.016	0.016
capensis	0.192	0.195	0.172		0.014	0.014	0.015	0.012	0.015	0.015	0.015	0.015	0.015	0.012	0.016	0.017	0.015	0.017	0.016	0.017
convicta	0.185	0.193	0.118	0.165		0.013	0.011	0.013	0.014	0.011	0.010	0.012	0.014	0.014	0.015	0.015	0.014	0.015	0.015	0.015
achystoma	0.181	0.185	0.173	0.143	0.158		0.014	0.013	0.011	0.014	0.014	0.014	0.014	0.014	0.016	0.015	0.015	0.015	0.014	0.016
dringi	0.173	0.180	0.139	0.163	0.124	0.154		0.014	0.015	0.014	0.013	0.014	0.014	0.015	0.015	0.016	0.015	0.016	0.015	0.017
globosa	0.164	0.176	0.159	0.096	0.154	0.137	0.149		0.015	0.014	0.015	0.015	0.014	0.011	0.015	0.016	0.015	0.016	0.016	0.017
ngurrana	0.199	0.186	0.173	0.158	0.169	0.102	0.157	0.156		0.015	0.015	0.015	0.015	0.015	0.016	0.017	0.016	0.017	0.016	0.017
pilbarana	0.199	0.210	0.131	0.177	0.115	0.166	0.154	0.155	0.163		0.012	0.012	0.014	0.015	0.016	0.016	0.014	0.016	0.016	0.018
radleyi	0.175	0.193	0.109	0.159	0.095	0.147	0.129	0.155	0.159	0.104		0.013	0.015	0.015	0.015	0.016	0.015	0.016	0.016	0.016
hardsonii	0.183	0.188	0.124	0.165	0.117	0.155	0.143	0.165	0.169	0.108	0.110		0.015	0.015	0.016	0.016	0.015	0.016	0.016	0.017
sp. *nnawonica*	0.195	0.192	0.171	0.147	0.164	0.143	0.146	0.138	0.148	0.165	0.165	0.161		0.014	0.016	0.017	0.015	0.017	0.017	0.017
torulus	0.183	0.189	0.174	0.107	0.168	0.146	0.156	0.089	0.164	0.159	0.162	0.165	0.141		0.015	0.016	0.015	0.017	0.016	0.017
karajarri	0.061	0.220	0.185	0.195	0.186	0.181	0.166	0.177	0.199	0.195	0.180	0.179	0.197	0.181		0.017	0.016	0.016	0.017	0.016
biggeana	0.208	0.196	0.192	0.194	0.192	0.186	0.186	0.190	0.199	0.200	0.178	0.188	0.194	0.189	0.207		0.015	0.015	0.017	0.018
harti	0.193	0.181	0.168	0.171	0.169	0.183	0.152	0.155	0.186	0.167	0.163	0.168	0.172	0.162	0.190	0.155		0.016	0.016	0.017
kessneri	0.193	0.205	0.181	0.204	0.182	0.163	0.186	0.189	0.181	0.181	0.165	0.176	0.179	0.202	0.180	0.143	0.183		0.017	0.017
setzeri	0.188	0.185	0.171	0.169	0.176	0.154	0.168	0.161	0.170	0.180	0.164	0.175	0.172	0.173	0.184	0.199	0.185	0.197		0.018
waroora	0.198	0.210	0.205	0.213	0.201	0.205	0.207	0.207	0.181	0.210	0.193	0.203	0.216	0.223	0.199	0.214	0.190	0.214	0.212	
solorensis	0.185	0.186	0.178	0.176	0.176	0.161	0.165	0.156	0.156	0.169	0.165	0.186	0.151	0.164	0.187	0.198	0.177	0.192	0.129	0.214
setzeri auroensis	0.203	0.201	0.182	0.175	0.186	0.164	0.174	0.173	0.175	0.190	0.174	0.189	0.180	0.181	0.195	0.206	0.187	0.198	0.039	0.222

Table. Mean within group p-distances for the twenty-two clades of *Rhagada* and the associated variance (s.e.), representing the seventy-three individuals of camaenid snails utilised in analyses. n/a= not applicable

	Species	p-distance	s.e.
80-mile Beach	**Asian Hub *Rhagada***	0.027787934	0.004473486
Dampierland	***R. karajarri***	0.007312614	0.002986689
Pilbara Mainland	***R. dringi***	0.003656307	0.002449676
	R. convicta	0.070647979	0.006588534
	R. pilbarana	0.010968921	0.00419212
	R. radleyi	0.012797075	0.004568103
	R. richardsonii	0.009140768	0.004057425
	R.* sp. *Pannawonica	0.002437538	0.001670985
	R. barrowensis	0.007312614	0.003402982
Shark Bay Region	***R. capensis***	0.001828154	0.001733956
	R. torulus	0.020109689	0.005928764
	R. globosa	0.016453382	0.005209184
Pilbara Islands	***R. ngurrana***	0	0
	R. elachystoma	0.0511883	0.007477044
Kimberley Region	***R. waroora***	n/a	n/a
	R. biggeana	n/a	n/a
	R. harti	n/a	n/a
	R. kessneri	n/a	n/a
	***Baudinella* (outgroup)**	n/a	n/a
Lesser Sundas	***R. setzeri***	n/a	n/a
	R. solorensis	0.001828154	0.001792877
	R. setzeri atauroensis	0.010603291	0.002637137

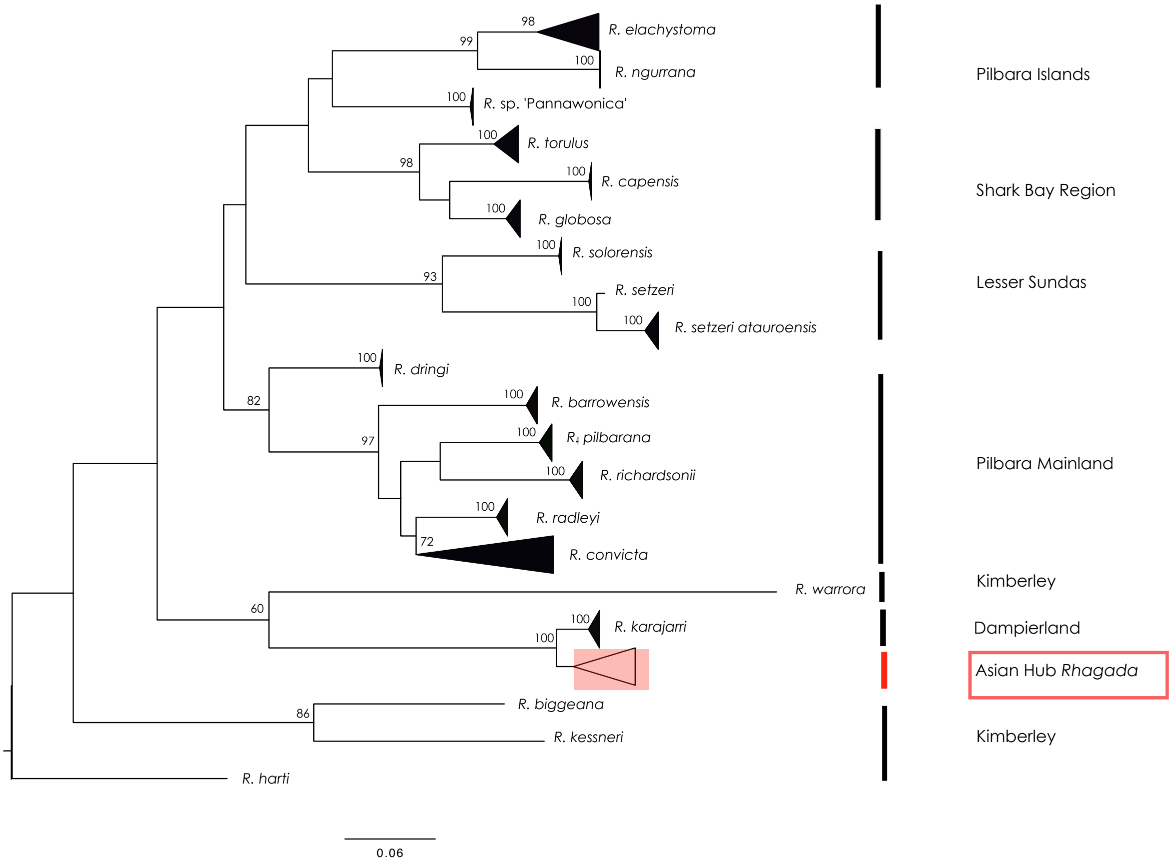

Figure 1. Maximum likelihood analysis of *Rhagada COI* mtDNA sequences, showing the placement of the Asian Hub *Rhagada* within the current taxonomic framework of *Rhagada* species from the Pilbara, Dampierland, Kimberley and Lesser Sundas. Terminal nodes are collapsed. Numbers on nodes indicate nodal support by means of maximum likelihood (ML) bootstrap values. Bootstrap values <60 are not shown. Scale indicates inferred evolutionary distance (substitutions/site).

Table 4. Buthid scorpion specimens used in the present study, and the species and genetic lineage to which they belong. Highlighted specimens were unsuccessful during the PCR process.

Biota Specimen ID	Helix Lab ID	Taxonomic ID	Genetic lineage
Sc20170828AHF16-2	NN01	*Lychas annulatus*	B
Sc20170828AHF15-1	NN02	PCR unsuccessful	n/a
Sc20170828AHF19-2	NN03	*Lychas annulatus*	B
Sc20170939AHF16-1	NN04	*Lychas annulatus*	B
Sc20170828AHF19-2	NN05	*Lychas annulatus*	B
Sc20170828AHF19-3	NN06	*Lychas annulatus*	A
Sc20170828AHF19-1	NN07	*Lychas annulatus*	A
Sc20170828AHF19-1	NN08	*Lychas annulatus*	A
Sc20170828AHF18-1	NN09	*Lychas annulatus*	B
Sc20170828AHF19-4	NN10	*Lychas annulatus*	B

Table 5. Genetic p- distance (below) and associated standard error (above) between haplotypes of buthid specimens of *Lychas annulatus* as shown in Figure 2. Specimens identified with '*' represent shared haplotypes. Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

	NN01 B	**NN09 B**	**NN04 B**	**NN03 A**
NN01 B		0.004	0.003	0.010
NN09 B	0.012		0.003	0.010
NN04 B	0.009	0.009		0.010
NN03 * A	0.082	0.076	0.076	

Table 6. Genetic p-distance (below) and associated standard error (above) between Asian Hub buthid specimens and reference buthid specimens obtained from GenBank

	NN01	**NN03**	**NN04**	**NN05**	**NN06**	**NN07**	**NN08**	**NN09**	**NN10**	**KT716037.1 *Lychas tricarinatus***	**JN018211.1 *Lychas mucronatus***	**JN018153.1 *Lychas mucronatus***	**JN018210.1 *Lychas mucronatus***	**EU404114.1 *Centruroides vittatus***	**JF700146.1 *Mesobuthus martensii***
NN01		0.012	0.004	0.012	0.012	0.012	0.012	0.005	0.012	0.016	0.016	0.015	0.016	0.016	0.017
NN03	0.084		0.011	0.000	0.000	0.000	0.000	0.012	0.000	0.015	0.016	0.014	0.015	0.016	0.017
NN04	0.008	0.076		0.011	0.011	0.011	0.011	0.005	0.011	0.016	0.016	0.015	0.016	0.016	0.017
NN05	0.084	0.000	0.076		0.000	0.000	0.000	0.012	0.000	0.015	0.016	0.014	0.015	0.016	0.017
NN06	0.084	0.000	0.076	0.000		0.000	0.000	0.012	0.000	0.015	0.016	0.014	0.015	0.016	0.017
NN07	0.084	0.000	0.076	0.000	0.000		0.000	0.012	0.000	0.015	0.016	0.014	0.015	0.016	0.017
NN08	0.084	0.000	0.076	0.000	0.000	0.000		0.012	0.000	0.015	0.016	0.014	0.015	0.016	0.017
NN09	0.014	0.078	0.010	0.078	0.078	0.078	0.078		0.012	0.016	0.015	0.015	0.016	0.016	0.017
NN10	0.084	0.000	0.076	0.000	0.000	0.000	0.000	0.078		0.015	0.016	0.014	0.015	0.016	0.017
KT716037.1 *Lychas tricarinatus*	0.162	0.138	0.154	0.138	0.138	0.138	0.138	0.152	0.138		0.017	0.016	0.015	0.016	0.017
JN018211.1 *Lychas mucronatus*	0.152	0.160	0.156	0.160	0.160	0.160	0.160	0.150	0.160	0.158		0.012	0.016	0.018	0.018
JN018153.1 *Lychas mucronatus*	0.148	0.126	0.142	0.126	0.126	0.126	0.126	0.144	0.126	0.166	0.088		0.015	0.016	0.016
JN018210.1 *Lychas mucronatus*	0.154	0.148	0.154	0.148	0.148	0.148	0.148	0.152	0.148	0.156	0.170	0.154		0.016	0.018
EU404114.1 *Centruroides vittatus*	0.162	0.182	0.162	0.182	0.182	0.182	0.182	0.166	0.182	0.166	0.202	0.180	0.166		0.016
JF700146.1 *Mesobuthus martensii*	0.182	0.182	0.182	0.182	0.182	0.182	0.182	0.184	0.182	0.182	0.200	0.172	0.182	0.164	

Table 7. Mean within group distances for the two lineages of *Lychas annulatus*.

	distance	s.e.
A	0.000	0.000
B	0.010	0.003

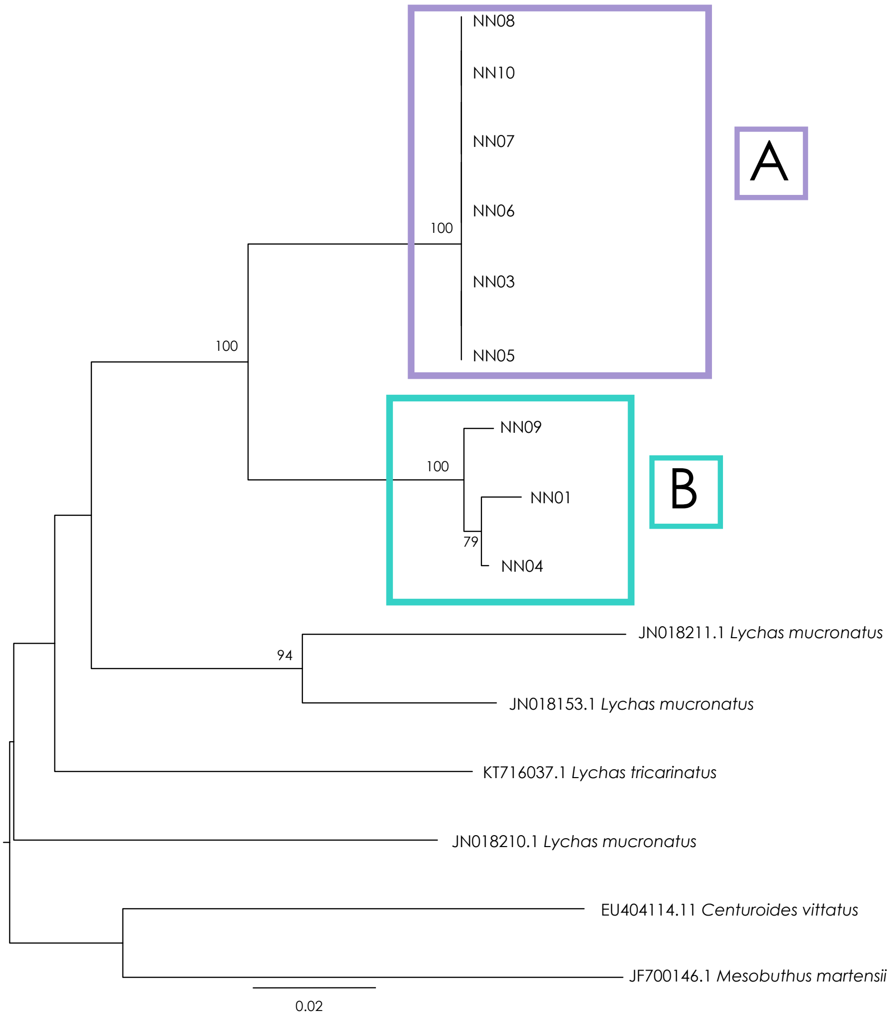

Figure 2. Maximum Likelihood analysis of *COI* haplotypes of buthid scorpion specimens of *Lychas annulatus* from the Asian Hub study area. Numbers on nodes correspond to bootstrap support. Bootstrap < 65 not shown. Lineages are labelled A and B, as referred to in the text and Tables 5 and 7. Scale bar = number of substitutions per site.

Table 8. Mygalomorph specimens used in the present study, and the genetic lineage to which they belong. Grey shading represents either unsuccessful sequencing, or non-mygalomorph lineages. Coloured shading corresponds to colour-coding of species represented in Figure 3.

Biota Specimen ID	Helix Lab ID	Taxonomic ID	Genetic lineage	Species
M20170831.AHF01-01	NN11	Nemesiidae	NRF	N7
M20170904.AHF01-01	NN15	Nemesiidae	NRG	N7
M20170903.AHF06-01	NN16	Nemesiidae	NRH	N7
M20170830.AHF07-01	NN17	Nemesiidae	NRI	N7
M20170830.AHF07-02	NN18	Nemesiidae	NRJ	N7
M20170903.AHF07-01	NN19	Nemesiidae	NRI	N7
M20170830.AHF10-01	NN20	Nemesiidae	NRK	N7
M20170904.AHF10.SRE-01	NN21	Nemesiidae	NRL	N7
M20170901.AHF.SRE03-01	NN29	Nemesiidae	NRR	N139
M20170901.AHF.SRE03-02	NN30	Nemesiidae	NRR	N139
M20170830.AHF.SRE02-02	NN32	Nemesiidae	NRS	N140
M20170829.AHF13.SRE-01	NN35	Nemesiidae	NRP	N138
M20170904.AHF13.SRE-01	NN36	Nemesiidae	NRQ	N138
M20170904.AHF12.SRE-01	NN37	Nemesiidae	NRM	N7
M20170904.AHF??.Bary-02	NN38	Nemesiidae	NRO	N7
M20170828.AHF12-01	NN25			Unusable sequence
M20170902.AHF13-01	NN26			Unusable sequence
M20170902.AHF13-02	NN27			Unusable sequence
M20170903.AHF13-01	NN28			Unusable sequence
M20170830.AHF.SRE02-01	NN31			Failed PCR
M20170903.AHF01-01	NN12			Not mygalmorph
M20170903.AHF01-02	NN13			Not mygalmorph
M20170903.AHF01-03	NN14			Not mygalmorph
M20170904.AHF10.SRE-03	NN22			Not mygalmorph
M20170904.AHF10.SRE-04	NN23			Not mygalmorph
M20170904.AHF10.SRE-05	NN24			Not mygalmorph
M20170904.AHF07.SRE-01	NN33			Not mygalmorph
M20170904.AHF07.SRE-01b	NN34			Not mygalmorph
M20170904.AHF07.SRE-02	NN39			Not mygalmorph

Table 9. Genetic p-distance (below) and the associated variance (s.e. – above) between the 13 haplotypes (lineages) representing the 15 sequenced specimens of nemesiid mygalomorphs, as shown in Figure 3. Shading in distance matrix corresponds to colour-coding of lineages in Figure 3.Un-corrected p-distances do not account for mutational saturation, which results from back mutations, and therefore provide a conservative estimate of genetic distance.

		N7									N138		N139	N140
		NRF_N7_NN11	NRG_N7_NN15	NRH_N7_NN16	NRI_N7_NN17	NRJ_N7_NN18	NRK_N7_NN20	NRL_N7_NN21	NRM_N7_NN37	NRO_N7_NN38	NRP_N138_NN35	NRQ_N138_NN36	NRR_N139_NN29	NRS_N140_NN32
N7	NRF_N7_NN11		0.004	0.005	0.004	0.005	0.007	0.007	0.008	0.006	0.012	0.012	0.015	0.013
	NRG_N7_NN15	0.012		0.006	0.005	0.005	0.007	0.007	0.008	0.007	0.011	0.011	0.014	0.012
	NRH_N7_NN16	0.022	0.025		0.004	0.004	0.007	0.007	0.009	0.007	0.012	0.012	0.015	0.013
	NRI_N7_NN17	0.015	0.018	0.013		0.003	0.007	0.007	0.008	0.007	0.011	0.011	0.015	0.013
	NRJ_N7_NN18	0.015	0.018	0.010	0.009		0.007	0.007	0.008	0.006	0.011	0.011	0.015	0.013
	NRK_N7_NN20	0.034	0.040	0.038	0.037	0.037		0.002	0.008	0.004	0.012	0.012	0.015	0.013
	NRL_N7_NN21	0.034	0.040	0.038	0.037	0.037	0.003		0.008	0.004	0.012	0.012	0.015	0.013
	NRM_N7_NN37	0.047	0.050	0.055	0.050	0.050	0.052	0.055		0.009	0.012	0.013	0.015	0.013
	NRO_N7_NN38	0.032	0.038	0.034	0.035	0.032	0.010	0.010	0.056		0.012	0.012	0.015	0.013
N138	NRP_N138_NN35	0.117	0.112	0.122	0.115	0.115	0.124	0.124	0.128	0.125		0.003	0.014	0.013
	NRQ_N138_NN36	0.119	0.115	0.121	0.117	0.117	0.127	0.127	0.131	0.128	0.004		0.014	0.013
N139	NRR_N139_NN29	0.193	0.190	0.196	0.190	0.192	0.187	0.184	0.206	0.186	0.190	0.195		0.014
N140	NRS_N140_NN32	0.146	0.149	0.152	0.150	0.152	0.150	0.150	0.164	0.149	0.165	0.170	0.162	

Table 10. Mean within group distances for the four lineages of nemesiid mygalomorph spiders. n/a= not applicable.

	Mean Within group p-dist	s.e.
N7	0.042259657	0.004966469
N112	0.012475278	0.00288803
N6	0.048504211	0.004855819
N5	0.016430853	0.00274486
N4	0	0
MYG182	0	0
MYG030	0	0
N138	0.004792332	0.00268387
N139	n/a	n/a
N140	n/a	n/a

Table 11. Mean between group (species) p-distances (below) and associated variance (s.e. – above). Species names correspond to those depicted in Figure 3.

	N7	N112	N6	N5	N4	MYG182	MYG030	N138	N139	N140
N7		0.009	0.011	0.011	0.012	0.012	0.012	0.012	0.014	0.013
N112	0.093		0.011	0.012	0.012	0.013	0.012	0.012	0.015	0.014
N6	0.122	0.126		0.012	0.012	0.013	0.012	0.011	0.015	0.013
N5	0.131	0.130	0.133		0.013	0.013	0.013	0.013	0.015	0.014
N4	0.139	0.141	0.164	0.159		0.014	0.012	0.013	0.016	0.014
MYG182	0.141	0.135	0.167	0.160	0.145		0.014	0.013	0.015	0.015
MYG030	0.151	0.141	0.150	0.140	0.137	0.152		0.014	0.016	0.014
N138	0.127	0.121	0.114	0.139	0.161	0.147	0.148		0.015	0.014
N139	0.201	0.196	0.200	0.200	0.214	0.196	0.195	0.200		0.014
N140	0.163	0.172	0.172	0.174	0.184	0.176	0.168	0.178	0.171	

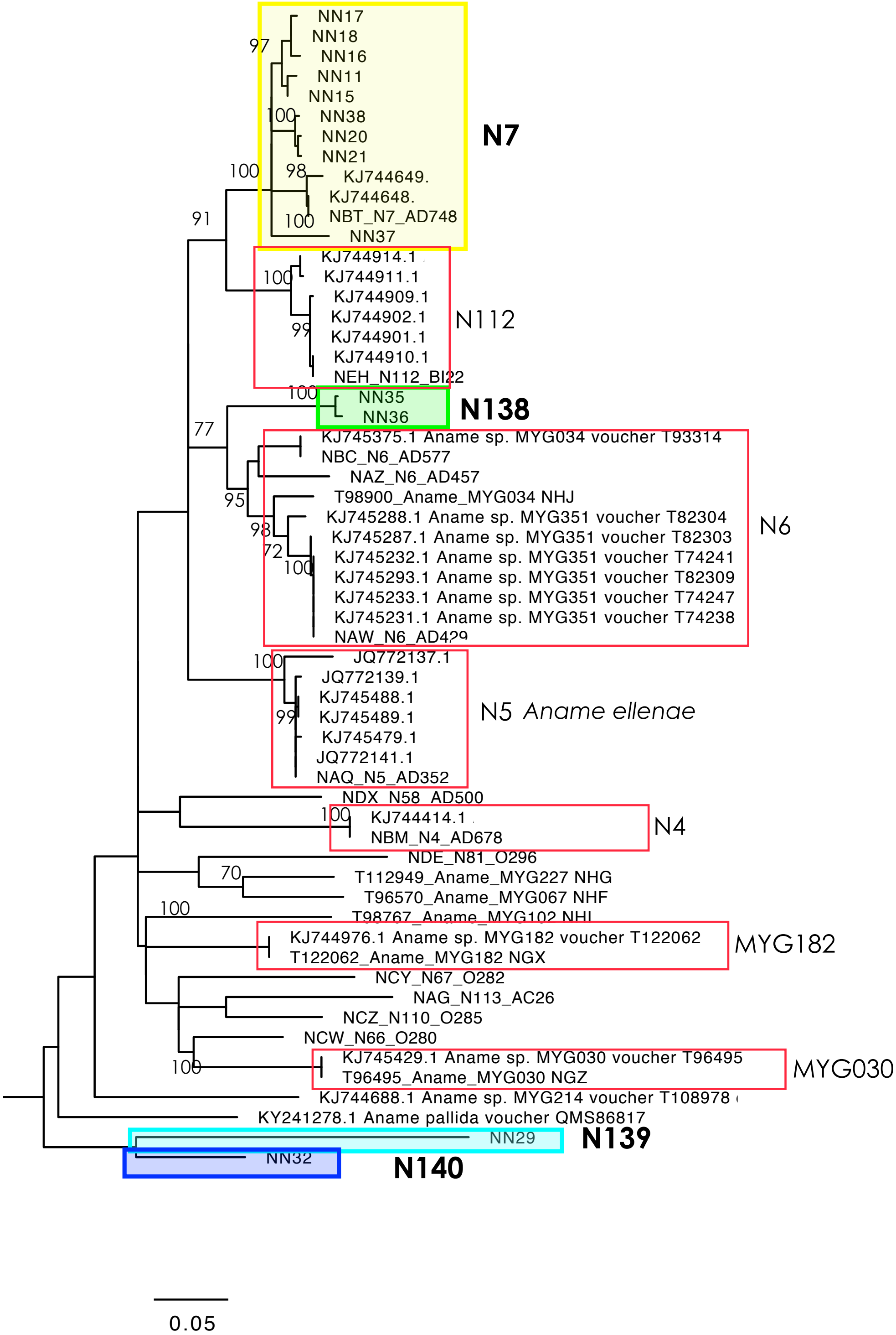

Figure 3. Maximum likelihood analysis of *COI* haplotypes of mygalomorph spider specimens from the Asian Hub area along with reference nemesiid lineages within15 % sequence divergence. Numbers on nodes correspond to posterior probabilities. Numbers on nodes represent bootstrap support. Support < 65 not shown. Scale bar = number of substitutions per site.

Appendix 1. ‘megaBLAST’ search results for Aranemorph specimen ‘NN12’.

Query sample	Sequence ID of reference specimen	Identity (%)	Maximum Score
NN12	KY017668.1	88.113	797
NN12	KY017666.1	87.982	793
NN12	MF467716.1	88.316	787
NN12	KY017865.1	87.892	785
NN12	KP209084.1	88.244	784
NN12	KP209083.1	88.244	784
NN12	KP209044.1	88.244	784
NN12	KP209064.1	87.994	776
NN12	JN817103.1	87.225	774
NN12	KP209067.1	87.897	773
NN12	KP209040.1	87.86	773
NN12	LC310806.1	87.389	771
NN12	KY017626.1	88.438	771
NN12	KY017896.1	87.332	769
NN12	MF811495.1	87.709	767
NN12	KX537030.1	87.709	767
NN12	KX536941.1	87.709	767
NN12	KP209089.1	87.786	767
NN12	KP209042.1	87.746	767
NN12	JF886125.1	87.709	767
NN12	JF886119.1	87.709	767
NN12	LC310805.1	87.24	765
NN12	KP253809.1	87.69	765
NN12	KF442792.1	88	765
NN12	JF411100.1	87.69	765
NN12	FJ525318.1	87.709	765
NN12	KP271816.1	87.221	763
NN12	KM244672.1	86.95	763
NN12	MG816011.1	87.519	760
NN12	KY018010.1	87.164	760
NN12	KY017931.1	87.145	758
NN12	KP209075.1	87.481	756
NN12	JN817216.1	86.676	756
NN12	JN308800.1	87.405	756
NN12	KY018006.1	87.988	754
NN12	KY017776.1	86.924	754
NN12	KY017677.1	86.996	754
NN12	KX537443.1	87.405	754
NN12	KX536876.1	87.405	754
NN12	JN817253.1	86.569	754
NN12	JN817244.1	86.569	754
NN12	JN817199.1	86.745	754
NN12	KY778983.1	87.771	752
NN12	KY018062.1	86.905	752
NN12	KY017920.1	86.924	752
NN12	KY017816.1	86.924	752
NN12	KP646410.1	87.462	752
NN12	JF411084.1	87.273	750
NN12	KY018047.1	86.756	749
NN12	KY017863.1	86.866	749
NN12	KM831538.1	87.234	749
NN12	JF884504.1	87.234	749
NN12	HQ924668.1	87.215	749
NN12	KY017715.1	87.234	747
NN12	KY017671.1	86.846	747
NN12	KP646571.1	87.309	747
NN12	JN817081.1	86.423	747
NN12	KY778930.1	87.695	745
NN12	KU875804.1	87.082	745
NN12	KX762063.1	87.102	745
NN12	KP209090.1	87.141	745
NN12	KP209041.1	87.121	745
NN12	KP651040.1	87.121	745
NN12	JF884514.1	87.082	745
NN12	KY017593.1	86.716	743
NN12	KY268627.1	87.062	743
NN12	LN887155.1	86.736	743

Query sample	Sequence ID of reference specimen	Identity (%)	Maximum Score
NN12	KP650494.1	87.062	743
NN12	KM825530.1	87.082	743
NN12	KM507783.1	86.277	743
NN12	JN817198.1	86.451	743
NN12	JF411087.1	87.102	743
NN12	JF884507.1	87.082	743
NN12	JF884494.1	87.082	743
NN12	GU682805.1	87.062	743
NN12	FJ263794.1	86.297	743
NN12	MF812590.1	86.97	741
NN12	KY778791.1	87.422	741
NN12	KY017688.1	86.587	741
NN12	KY017672.1	86.677	741
NN12	KY017559.1	86.607	741
NN12	KP648977.1	87.156	741
NN12	KT174686.1	87.009	741
NN12	KT174685.1	87.102	741
NN12	KT174684.1	87.009	741
NN12	JN018132.1	87.956	741
NN12	GU682857.1	87.043	741
NN12	KY017695.1	86.567	739
NN12	KY269287.1	86.95	739
NN12	KY268719.1	86.93	739
NN12	KY268704.1	86.95	739
NN12	KY268308.1	86.95	739
NN12	KX537479.1	86.93	739
NN12	KX537432.1	86.95	739
NN12	KX537196.1	86.95	739
NN12	GU682908.1	87.062	739
NN12	LC310804.1	86.558	737
NN12	KY017787.1	86.567	737
NN12	KY268430.1	86.93	737
NN12	KX537314.1	86.91	737

Appendix 2. Genetic p-distances and the associated variance (standard error) for all nemesiid mygale specimens within 15 % sequence divergence of Asian Hub mygale specimens.

Appendix 12

SRE Results for Winu Road Access Corridor Section 2

Specimen	**Site**	**Family**	**Genetic Lineage/Taxonomic ID**	**Previously Recorded?**	**SRE Status**
M20170904.AHF13.SRE-01	AHF13PF	Nemesiidae	*Aname* (N138)	No – new species	Potential SRE
M20170829.AHF13.SRE-01	AHF13PF	Nemesiidae	*Aname* (N138)	No – new species	Potential SRE
M20170901.AHF.SRE03-01	AHFSRE03	Nemesiidae	*Aname* (N139)	No – new species	Potential SRE
M20170901.AHF.SRE03-02	AHFSRE03	Nemesiidae	*Aname* (N139)	No – new species	Potential SRE
M20170830.AHF.SRE02-02	AHFSRE02	Nemesiidae	*Aname* (N140)	No – new species	Potential SRE
M20170904.AHF??.Bary-02	AHFSRE01	Nemesiidae	*Aname* (N7)	Yes	Not and SRE
M20170904.AHF12.SRE-01	AHF13PF	Nemesiidae	*Aname* (N7)	Yes	Not and SRE
M20170830.AHF10-01	AHF10PF	Nemesiidae	*Aname* (N7)	Yes	Not and SRE
M20170904.AHF10.SRE-01	AHF10PF	Nemesiidae	*Aname* (N7)	Yes	Not and SRE
M20170903.AHF06-01	AHF06PF	Nemesiidae	*Aname* (N7)	Yes	Not and SRE
M20170831.AHF01-01	AHF01PF	Nemesiidae	*Aname* (N7)	Yes	Not and SRE
M20170904.AHF01-01	AHF01PF	Nemesiidae	*Aname* (N7)	Yes	Not and SRE
M20170904.AHF10.SRE-03	AHF10PF	Undetermined	Araneomorphae sp.	Unknown	Not and SRE
M20170904.AHF10.SRE-04	AHF10PF	Undetermined	Araneomorphae sp.	Unknown	Not and SRE
M20170904.AHF10.SRE-05	AHF10PF	Undetermined	Araneomorphae sp.	Unknown	Not and SRE
M20170903.AHF01-01	AHF01PF	Undetermined	Araneomorphae sp.	Unknown	Not and SRE
M20170903.AHF01-02	AHF01PF	Undetermined	Araneomorphae sp.	Unknown	Not and SRE
M20170903.AHF01-03	AHF01PF	Undetermined	Araneomorphae sp.	Unknown	Not and SRE
SC20170828AHF18-1	AHF18PF	Buthidae	*Lychas annulatus*	Yes – widespread distribution	Not and SRE
SC20170828AHF19-2	AHF19PF	Buthidae	*Lychas annulatus*	Yes – widespread distribution	Not and SRE
Sc20170828AHF19-2	AHF19PF	Buthidae	*Lychas annulatus*	Yes – widespread distribution	Not and SRE
Sc20170828AHF19-3	AHF19PF	Buthidae	*Lychas annulatus*	Yes – widespread distribution	Not and SRE
Sc20170828AHF19-1	AHF19PF	Buthidae	*Lychas annulatus*	Yes – widespread distribution	Not and SRE
Sc20170828AHF19-1	AHF19PF	Buthidae	*Lychas annulatus*	Yes – widespread distribution	Not and SRE
Sc20170828AHF19-4	AHF19PF	Buthidae	*Lychas annulatus*	Yes – widespread distribution	Not and SRE
Sc20170828AHF16-2	AHF16PF	Buthidae	*Lychas annulatus*	Yes – widespread distribution	Not and SRE
Sc20170828AHF16-1	AHF16PF	Buthidae	*Lychas annulatus*	Yes – widespread distribution	Not and SRE
M20170830.AHF.SRE02-01	AHFSRE02	Undetermined	Mygalomorphae sp.	NA (failed to sequence)	NA
M20170902.AHF13-02	AHF13PF	Undetermined	Mygalomorphae sp.	NA (failed to sequence)	NA
M20170902.AHF13-01	AHF13PF	Undetermined	Mygalomorphae sp.	NA (failed to sequence)	NA
M20170903.AHF13-01	AHF13PF	Undetermined	Mygalomorphae sp.	NA (failed to sequence)	NA
M20170828.AHF12-01	AHF12PF	Undetermined	Mygalomorphae sp.	NA (failed to sequence)	NA