JOURNEYS WITHIN THE LEUCOPHOROPTERINI:

REVISION OF THE TRIBE, GENERA AND SPECIES, AND DESCRIPTION OF NEW GENERA AND SPECIES FROM AUSTRALIA AND THE INDO-PACIFIC

A Dissertation

by

KATRINA LOUISE MENARD

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

May 2011

Major Subject: Entomology

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Approved by:

Chair of Committee,	James Woolley
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ABSTRACT

Journeys within the Leucophoropterini:

Revision of the Tribe, Genera and Species, and Description of New Genera and Species from Australia and the Indo-Pacific.

(May 2011)

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Chair of Advisory Committee: Dr. James Woolley

The tribe Leucophoropterini (Miridae: Phylinae) is a diverse assemblage of primarily Indo-Pacific and Australian bugs which are united by simple, small genitalia and a trend towards ant-mimetic body forms. Previous to this work, the relationship of the Leucophoropterini to the other tribes of Phylinae, as well as the generic relationships within the lineage, was unresolved. Further, the characters initially proposed to unite the tribe are brought into question with the addition of several recently discovered taxa from Australia. The Leucophoropterini is first re-evaluated within a phylogenetic analysis of the subfamily Phylinae, using a combined molecular and morphological dataset to test the monophyly of the lineage, re-test the character synapomorphies supporting it, and to determine the closest relatives to the tribe. The molecular dataset includes 4 genes (COII, 16S, 28S, and 18S), and 123 morphological characters for 104 taxa, which is analyzed in a parsimony analysis using Tree analysis using New Technology [TNT], a model-based analysis in RAxML, and a Bayesian analysis in Mr. Bayes. All three methods resulted in phylogenetic trees with nearly identical generic and tribal groupings, and a lineage containing *Pseudophylus* Yasunaga, *Decomia* Poppius and *Tuxedo* Schuh being sister-group to the Leucophoropterini. With the closest relatives to the Leucophoropterini determined for outgroup selection, a generic revision of the tribe including both Australian and Indo-Pacific taxa is accomplished using 137 morphological characters and is analyzed in an un-weighted and implied weighted parsimony analysis using TNT for 86 leucophoropterine taxa. The Indo-Pacific taxa of Leucophoropterini are found to be related to the Australian Leucophoropterini, and at least two genera within the tribe (*Sejanus* Distant, *Leucophoroptera* Poppius) were found to be paraphyletic. Lastly, taxa are revised within the context of the generic-level phylogenetic analysis, with new genera and species from Australia and the Indo-Pacific being described.

DEDICATION

I would like to dedicate this work to my parents, Jim and Joan Menard, for their never-ending support; my advisers Dr. Randall Schuh and Dr. Woolley for their continual support in helping me accomplish this goal, and Miguel Zarate for emotional support for the duration of the writing of this work.

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Thanks also go to my friends and colleagues, and the department faculty and staff, for making my time at Texas A&M University a great experience. In particular, I would like to thank Ed Riley, Christine Johnson, and Geoff Thompson for helping with the specimen collecting and transfers between the various institutions during my research. I also want to extend my gratitude to the Woolley Lab for their support and encouragement during the last months of my research.

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CHAPTER I

INTRODUCTION

The family Miridae (Hemiptera: Heteroptera), or plant bugs, is one of the largest families of true bugs with over 10,000 described species (Schuh 2008) and potentially thousands more undescribed. Two of the largest subfamilies within this family are the sister-groups Orthotylinae and Phylinae. The focus of this study is on the subfamily Phylinae, and in particular the tribe Leucophoropterini. The Leucophoropterini is a primarily Indo-Pacific and Australian lineage with some genera that are cosmopolitan, Old-World tropical, and Palearctic. However, the phylogenetic relationship of the Leucophoropterini to the other tribes of Phylinae, the monophyly of the encorporated genera and species, and the discovery of new potential species necessitated this work. Chapter II of this work starts by analyzing the subfamily Phylinae as a whole to test the monophyly of the subfamily as well as the tribe Leucophoropterini. Further, it provided a context for which to select an outgroup for the generic revisions of the Leucophoropterini, which is accomplished in Chapter III. Lastly, in Chapter IV the genera and species of the Leucophoropterini are revised within the framework proposed by the phylogenetic analysis of Chapter III, and genera and species new to science are described. Taxa found to not belong to the Leucophoropterini based on the results of the Chapter II and Chapter III analyses are placed in other tribes or are placed in Incertae Sedis (Chapter IV).

This dissertation follows the style of *American Museum Novitates.*

CHAPTER II

TRIBAL LIMITS WITHIN THE SUBFAMILY PHYLINAE (HETEROPTERA: MIRIDAE), WITH A FOCUS ON THE TRIBE LEUCOPHOROPTERINI

Introduction

The family Miridae (Hemiptera: Heteroptera), or plant bugs, is one of the largest families of true bugs with over 10,000 described species (Schuh 2008) and potentially thousands more undescribed. Many of the genera in the seven subfamilies of Miridae are known to have close associations with particular species or genera of host-plants upon which these insects feed and reproduce (Wheeler 2001). Of the several subfamilies within Miridae that have restricted host-plant associations, Phylinae and Orthotylinae are the most well documented (Stonedahl 1990, Schuh 2006, Weirauch 2007, Schuh and Pedraza-Peñalosa 2010).

The relationship between Phylinae and Orthotylinae has been investigated by several authors, Schuh (1976) considered these groups to consolidate a single subfamily, while others (Slater 1950, Kelton 1959, Schuh 1974) have treated them as sister-groups (Fig. 1-1 in Appendix 3; all original figures in Appendix 3). Putative synapomorphies that appear to unite the Orthotylinae and Phylinae include the loss of a rounded pronotal collar (Schuh 1974); and the presence of claw hairs and pseudopulvilli on the ventral surface of the pretarsal claws (Schuh 1976). Orthotylinae are united by having fleshy, apically-convergent parempodia (Carvalho 1952, Schuh *et al.* 2009); a membranous endosoma subtended with sclerotized spicules at the base of the primary gonopore; uniquely shaped left parameres (Kelton 1959); and the posterior wall of the female genitalia with “K” structures (Slater 1950, Schuh 1974, Schuh *et al.* 2009). Phylinae are united by having a rigid, sclerotized endosoma; the phallotheca attached to the pygophore rather than the phallobase (Schuh 1974, 1984; Schuh *et al.* 2009); the conically shaped phallotheca; a biramous left paramere (Kelton 1959, Schuh 1974); and the presence of setiform parempodia (Carvalho 1952).

Phylinae is currently divided into five tribes (Schuh 1984): Pilophorini, Hallodapini, Auricillocorini, Leucophoropterini, and Phylini. Putative synapomorphies for Pilophorini include the presence of unique scales that occur in patches or covering most of the body (Fig. 1-3 L); the male endosoma with a patch of glassy spicules above a poorly developed secondary gonopore; and the pre-tarsal claws with apically-convergent parempodia (Schuh 1984, 1991; Schuh and Schwartz 1988). The apically-converging parempodia were used initially to place Pilophorini in Orthotylinae (Carvalho 1952), but later, when male genitalic characters were studied, the tribe was transferred to the Phylinae (Schuh 1974). Proposed synapomorphies of the Hallodapini are the presence of a flattened pronotal collar (Fig. 1-3 B); the head with a flat vertex, making the head appear prognathous (Fig. 1-3 I); a relatively large pygophore (Schuh 1974); and the presence of a ventral sclerotized sack in the female genitalia (Wyginer 2006). Auricillocorini, which is closely related to Hallodapini, have a pronotum with the anterior margin in the form of a flattened, sometimes weakly reflexing, collar (Fig. 1-3 G); an obsolete cuneal incisure; unique evaporatory area morphology associated with the orifice at the scent-gland; and fleshy, recurved, apically-converging parempodia (Schuh 1984). Putative synapomorphies of the Leucophoropterini include members being mostly ant-mimetic; often with a transverse fascia on the hemelytron; having a relatively small pygophore; and a small, relatively simple endosoma compared to other Phylinae (Schuh 1974, 1984). The tribe Phylini contains all other members of Phylinae and the majority of the subfamily's genera. It is defined primarily by the absence of the pronotal collar (Fig. 1-3 C) and the presence of setiform parempodia (Schuh 1974).

Within Orthotylinae and Phylinae intertribal relationships remain ambiguous, making co-evolutionary studies of host-plant relationships and comparative phylogenetic studies of character systems difficult above the genus or genus-group level. The first and still most comprehensive, phylogenetic study of the inter-tribal relationships within the Phylinae is Schuh's now twenty year old treatment of the Phylinae of the Indo-Pacific Region (Schuh 1984). In that work Pilophorini was treated as the most basal tribe, and a sister-group relationship was proposed between Auricillocorini and Hallodapini (Fig. 1-2). The non-Pilophorini emerged as a polytomous node consisting of (1) the Auricillocorini + Hallodapini, (2) Leucophoropterini tribe, and (3) a variety of unresolved Phylini genera. Following up on this initial work, it is clear that there are two areas of study that are necessary to advance knowledge of phyline phylogeny: first further clarification of intertribal relationships above the level of the Pilophorini, and second a broadening of taxon sampling beyond the Indo-Pacific Region.

Of the five tribes of the Phylinae, the boundaries of Phylini and Leucophoropterini are the most uncertain as taxa have been discovered that blur the definitions of both tribes. Work conducted in Australia as part of the Plant Bug Planetary Biodiversity Project [PBI] in particular has identified groups of genera that are unique; represent potentially monophyletic lineages (*Dilatops*, Weirauch 2006C; *Polyozus* group, Weirauch 2007), but whose relationships within Phylinae are uncertain. These taxa were originally described in Leucophoropterini and Phylini, respectively, due largely to a lack of rationale for any other groupings. While these new taxon descriptions have increased our knowledge of phyline diversity, they have also further emphasized the need for a complete reanalysis of the phyline intertribal relationships. The new analysis provided here improves the phylogenetic framework of phyline interrelationships by analyzing the largest molecular and morphological datasets assembled thus far for Phylinae. Using parsimony and model-based methods, tribal-level hypotheses are tested and analyzed. The work examines five major questions.

First, the monophyly of the five tribes of Phylinae are re-evaluated, with an expanded taxon sampling focused on Leucophoropterini. Second, previously identified putative morphological synapomorphies for each of the tribes are re-analyzed, and new synapomorphies discussed. Third, taxa from temperate regions of the world described since the tribal analysis by Schuh (1984) are tested for tribal placement. Fourth, the limits of the tribe Leucophoropterini are re-examined, focused particularly on whether the genera *Karoocapsus* Schuh (Africa) and *Tytthus* Poppius (cosmopolitan) belong within the tribe. Fifth, choice of an optimal outgroup for an infra-tribal analysis of Leucophoropterini is examined based on a larger phylogenetic analysis of the Phylinae.

Methods

Introduction

104 taxa including 8 outgroups (4 Orthotylinae, 3 Mirinae, and 1 Deraeocorinae) and representatives from all tribes of Phylinae are sampled for four genes (COII and 16S from the mitochondrial genome, and 18S and 28S from the nuclear genome) and 123 morphological characters, for a total of 6587 potential characters per taxon per analysis (including gaps for the molecular data). Outgroup selection was based on Schuh (1974) Miridae relationships, with *Deraeocoris* sp. selected as the outgroup taxon for all three phylogenetic analysis methods. Molecular sequences not generated by the author and obtained from Genbank are listed in Appendix 1, including their accession numbers. Morphological characters were initially selected from Schuh (1984) and later augmented to incorporate the morphological diversity contained in the enlarged taxon sample of the present work. Of the 123 morphological characters coded (Table 1-2), 53 pertain to the male or female genitalia, 17 characterize vestiture and surface texture, and 53 are male and/or female somatic characters. External morphology was observed and coded for characters using a dissecting microscope. Internal male and female genitalia was dissected and prepared using the methods outlined in Kelton (1959) and Slater (1950), and observed either with a dissecting microscope or a compound microscope depending on the size of the genitalia. Many character states are illustrated in Fig. 1-3 or by citing figs. in relevant published works.

DNA Protocols

Total genomic DNA was extracted from whole specimens using modified protocols of the QIAGEN DNeasy Blood and Tissue Genomic Kit (QIAGEN 2006). Individual specimens were placed into a solution of Proteinase K and Buffer ATL for tissue digestion and DNA extraction. The remaining exoskeletons were retained in glycerin and placed within genitalic vials associated with PBI Unique Specimen Identifier (USI) labels for vouchering purposes. A fragment of the large mitochondrial ribosomal subunit (16S rRNA), the entire large and small nuclear ribosomal subunits (28S rRNA and 18SrRNA, respectively), and a fragment comprising approximately 570 bp of the 3’ end of COI (the intermediate leucine tRNA), and the 5’ end of cytochrome c oxidase subunit 2 (COII) were amplified. Polymerase-chain reactions (PCR) utilized the illustra™ puReTaq Ready-To-Go PCR Beads (GE Healthcare 2007). Primer pairs used for DNA amplification are given in Table 1-3. The annealing temperature of the PCR conditions for COII varied from 44–54ºC or from 50–54ºC, while 16S, 18S, and 28S consistently worked at 48ºC. PCR purification and cycle-sequencing reactions were carried out with a Biomek NX Laboratory Automation Workstation using the Gencourt®AMPure® and CleanSEQ® systems and BigDye® Terminator v3.1 Cycle Sequencing Kit (Applied Biosystems 2002). The reactions were sequenced using an automated Applied Biosystems 3730 DNA Analyzer and edited with Sequencher™ 4.8 (Gene Codes, Ann Arbor, MI). Unaligned sequences lengths were as follows: 16S: 479-571bp, COI – COII: 1504 bp, 18S: 1117-1962bp, and 28S: 531-2345bp. For the latter two genes, shorter sequences resulted from partial or incomplete fragments being sequenced.

Alignments

The COI-COII fragment was aligned based on the amino acid composition of the conserved COI and COII protein domains for *Lygus lineolaris* (Genbank: ABY74767.1 and ABY74768.1). Fixed alignments for the 16s, 18s, and 28s genes were created using MAFFT (Katoh 2006) on the online server (http://align.bmr.kyushu-u.ac.jp/mafft/online/server/), employing the E-INS-i strategy (Katoh *et al.* 2005) for multiple conserved domains and multiple gaps under the default settings. Alignments for each partition were generated using the following default settings: gap opening penalty = 1.53 and offset value = 0.00. Including gaps, the fixed alignments yielded 569 matrix columns for 16S, 1981 columns for 18S and 2405 columns for 28S.

Morphological Character Discussion

Vestiture and Surface Texture

Character 1: The surface texture of the entire hemelytron in the Miridae is normally smooth, giving a somewhat reflective appearance [0] (Schuh 1984). But, in some Pilophorini (e.g. *Pilophorus* Hahn).and Leucophoropterini (e.g. *Papuamimus* Schuh, Schuh 1984), microsetae on the hemelytra give the hemelytra dull the reflectivity, and give the wings an overall matte appearance [1] (*Pilophorus sp*., Schuh and Schwartz 1988; Fig. 1-F).

Character 2: Most Phylinae have opaque to translucent hemelytra with some form of pigmentation [0]. However, some genera have transparent areas in the wings [1], either over fifty percent of the hemelytral area being transparent (e.g. *Decomia* spp., Schuh 1984: figs. 1105-1106) or complete transparent (e.g. *Tytthus* spp., Schuh 1984: fig. 630).

Character 3: Hemelytra with punctation [1] is common in the subfamily Deraeocorinae, whereas most Phylinae lack this character [0]. Schuh (1984) found several members of Leucophoropterini that have hemelytra with punctures at the bases of the hemelytral setae (e.g. *Arafuramiris* Schuh, Schuh 1984: fig. 674), and I consider this state homologous to the pronotal punctation in Deraeocorinae for the purposes of this study.

Character 4: In addition to the overall surface texture of the hemelytra (character 1), several genera of Phylinae have patches of microsetae or pigmentation on the surface of the hemelytron that appear to have novel reflective properties. Most Miridae have just one type of hemelytra surface texture and lack these reflective patches [0]. However, several taxa like Pilophorini often have patches of reflective areas restricted to the medial portion of the hemelytron, creating the appearance of a lighter patch on the wing when viewed at varying angles (Schuh 1984, 1991; Schuh and Schwartz 1988), possibly to give a “waist” for mimicking ants [1]. Several members of Leucophoropterini also have these patches medially on the hemelytron (e.g. *Collessicoris bellisimus* Carvalho and Gross). I coded this character separately because the selective modifications in reflectivity on parts of the hemelytron appear to be correlated with ant-mimicry rather than phylogenetic history in most of the taxa. *Dilatops fici* Weirauch has another form of modifying the appearance of the hemelytra by having opalescent patches [2] (areas that change color with angle of reflection) which do not appear to be related to ant-mimicry, but are also a form of selectively altering the reflection of light hitting the hemelytra unrelated to the overall surface texture.

Characters 5: The majority of the Miridae have simple setae on the hemelytron [0] (e.g. *Schuhistes* Menard, Menard 2010: fig 3-A). However, several modifications of the microsculpture and shape of setae on the hemelytron have evolved in the Miridae, including sericeous setae [2] (e.g. *Oligotylus* Van Duzee in Schuh 2000, *Atractotomus* Fieber in Stonedahl 1990) and scale-like setae [0] (e.g. *Pilophorus* Hahn in Schuh 1991, *Atractotomus* Fieber in Stonedahl 1990, and *Rhinacloa* Reuter in Schuh and Schwartz 1985). All members of Pilophorini have scale-like setae that are lanceolate and appressed (Schuh and Schwartz 1988: fig 1-A), while other Phylinae have tremendous diversity in scale-like setae, some bearing ridges and serrated edges, some being relatively short and some being stout to long and feather-like (e.g. *Atractotomus sp*. in Stonedahl 1990: figs 72-75). For a more detailed study of scale-like setae consult Stonedahl (1990).

Character 6: The majority of Miridae do not have scale-like setae on their scutellum [0], however many Pilophorini and Phylini have scales either in patches [1] or completely covering the scutellum [2]. If present, the most common form is scattered scales over the scutellum (e.g. *Atractotomus* Fieber in Stonedahl 1990 or *Hypseloecus munroi* (Schuh) in Schuh 1991). Some members of Pilophorini have scales on the scutellum that occur in patches (Schuh and Schwartz 1988: figs. 14 and 17; Fig. 1-3 L), an attribute that is discussed in other works focusing on this tribe (Schuh 1984, 1991; Schuh and Schwartz 1988).

Character 7: The hemelytral surface of most Miridae has the setae evenly scattered across the surface of the hemelytra [0]. Some taxa in the Phylinae, however, have unevenly distributed patches of setae [1]. This occurs in several pilophorines where scale-like setae is concentrated into rows on the hemelytra (Fig. 1-3 L), while in some leucophoropterines setae is concentrated on the clavus (e.g. *Arafurami*ris Schuh). Varying concentrations and locations of setae on the hemelytra may affect the visibility of the wing and potentially aid in ant-mimicry (e.g. *Arafuramiris* Schuh in Schuh 1984).

Character 8: The angle of setae relative to the surface of the body was hypothesized by Schuh (1984) to be phylogenetically important at the tribal level for the Indo-Pacific fauna. Most Miridae have setae that are weakly inclined or flat relative to the surface of the body and wings [0]. However, some leucophoropterines have setae that are erect and perpendicular to the surface [1] (e.g. *Biromiris enarotadi* Schuh in Schuh 1984: fig. 698).

Character 9: Miridae that have scale-like setae on the hemelytron may or may not have the scales on the rest of the body. The majority of taxa that have scale-like setae have scales on their thorax, but there are some taxa with scales only on the hemelytron (e.g. *Atractotomus minuets* (Knight) in Stonedahl 1990). If scales are present on the thorax they can either be dispersed throughout the surface of the thorax [1] (e.g. *Atractotomus* Fieber in Stonedahl 1990 or *Hypseloecus munroi* (Schuh) in Schuh 1991) or concentrated into patches [2] (e.g. *Pilophorus* Hahn in Schuh 1984, 1991; Schuh and Schwartz 1988). The patch-like distribution of scales on the thorax may aid in visually creating the appearance of a petiole for ant-mimicry when the insect is viewed from the side, since the placement of scales on the thorax is often laterally aligned with scales, a transverse fascia, or other modifications of the hemelytra thought to give the impression of a waist when viewed dorsally. Miridae without scales on the thorax are coded as [0].

Character 10: Presence of scales on the abdomen is common in Pilophorini and some Phylini. If scales are present on the hemelytron and thorax they are often present on the abdomen as well [1], but not always (e.g. *Sthenaridea singalensis* (Distant) in Schuh 1984: fig. 96). Most Miridae do not have scale-like setae on the abdomen [0].

Character 11: If scales are present on the abdomen in Phylinae, they are predominantly distributed throughout the surface [0] (e.g. *Atractotomus* Fieber in Stonedahl 1990). However, many Pilophorini with abdominal scales have the scales restricted to bands near the thorax [2] (e.g. *Pilophorus typicus* (Distant) in Schuh 1984: fig. 207), perhaps creating reflective areas that give a “pseudo-petiole” effect for ant-mimicry. Taxa coded as absent for character 10 were coded as inapplicable.

Character 12: One hypothesized character for ant-mimicry is a transverse fascia of contrasting-colored scales on the hemelytra that gives the appearance of a constriction of the pronotum of an ant (McGiver and Stonedahl 1993). The majority of Phylinae do not have a transverse fascia of contrasting scales [0], but several taxa in Pilophorini have either a complete [1], or partial transverse fascia of white to silver scales going across the anterior portion of a dark hemelytron. If the fascia does not completely cross both wings, it can either be concentrated on the clavus [3] or corium [2] (Fig. 1-3 L).

Character 13: There are two leucophoropterine genera - *Biromiris* Schuh *and Collessicoris* Carvalho and Gross – that have thick, black setae present on their hemelytra [1] either in patches or scattered across the surface (Schuh 1984). In *Waterhouseana* Carvalho these black setae are grouped into patches and roughly corresponding to areas where many ants have spines projecting from their petiole, which suggests that multiple types of setae may function in ant mimicry. Most Phylinae do not have these black setae [0].

Character 14: Schuh (1984) noted that several members of the Indo-Pacific Leucophoropterini have a fringe of erect setae ventrally on the hind-femora [1] (e.g. *Gulacapsus* Schuh in Schuh 1984: fig. 753). However, it is also present in *Blesingia gularis* Carvalho and Gross and may other Australian Leucophoropterini. These setae are not present in a majority of the Miridae [0].

Character 15: Schuh (1984) documented that two genera, including *Campylomma* Poppius and *Rhinacloa* Reuter have a row of spines on the dorsal distal margin of the hind-femora [1]. These spines were also found by Stonedahl (1990) on several species of *Atractotomus* Reuter and *Phoenicocoris* Reuter (Stonedahl 1990: figs 76-83). Most Phylinae do not have this row of spicules on the hind-femora [0].

Character 16: Most Deraeocorinae have a punctate pronotum [1] (Schuh 1974), whereas the majority of Phylinae and Orthotylinae have a smooth [0] to weakly rugulose [2] texture on the pronotum.

Head and Thoracic Structures

Character 17: The position and morphology of the head relative to the pronotum varies widely across Phylinae (Fig. 1-3 A-E), with the eyes in some taxa being so large that their posterior margin overlaps the anterior portion of the pronotum [0] (Fig. 1-3 E), to smaller eyes that are parallel to the anterior margin of the pronotum [1] (Fig. 1-3 C) or far removed [2] (Fig. 1-3 A).

Character 18: The shape of the posterior margin of the head is useful for investigations of the tribal relationships of Phylinae (Schuh 1984). Pilophorini generally have an upturned margin on the posterior margin of the vertex [0] (Fig. 1-3 D), whereas in many Phylinae this area is rounded and declining towards the pronotum [2] (Fig. 1-3 C). The majority of Phylinae have the posterior margin of the head flat and parallel to the pronotum when viewed laterally [1] (Fig. 1-3 E, H).

Character 19: Most Phylinae have mouthparts where the clypeus does not extend past the frons or is on the same plane as the frons when viewed from above, causing the labium and labrum to originate either shortly anterior to the anterior margin of the eyes (Fig. 1-3 F, H) or below them (Fig. 1-3 G) [0]. However, several members of Hallodapini, and a few Leucophoropterini, have mouthparts in which the clypeus extends anterior to the frons and causing the labium and labrum to originate in a more anterior position [1] (Fig. 1-3 I) (Schuh 1974, 1984). However, in some

Leucophoropterini (*Sejanus brittoni* Carvalho and Gross, Chapter III) the mouthparts are situated anteriorly relative to the eyes but they do not have a produced clypeus.

Character 20: Total labial length is often reported in species and generic level descriptions in Phylinae, but has not been investigated at the tribal level for phylogenetic information. Due to its probable close association with feeding style and possible links to co-evolution with host-plants, the labial length may be phylogenetically informative. Length of the labium was calculated relative to the coxae, where the apex can be at the fore-coxa [0], to the mid-coxa [1], to the hind-coxa [2], or past the hind-coxa [3].

Character 21: The majority of Phylinae have a slender labrum that covers the base of the labium when at rest [0]. However, there are several taxa with the labrum enlarged and flattened [1], possibly to increase the appearance of an "ant-like" head when viewed laterally (Fig. 1-3 of *Pilophorus maculata* Schuh; e.g. *Gulacapsus moresbyana* Schuh, Schuh 1984: fig. 754).

Character 22: The height of the eyes varies widely among Miridae, with some genera and species having elongate eyes that can take up the entire lateral view of the head [0], greater than half the height of the head when viewed laterally [1] (Fig. 1-3 G, H, I), or are relatively short eyes that take up less than half of the height of the head [2] (*Dilatops fici* Weirauch in Weirauch 2006C).

Character 23: The presence of visible ridges where the cibarial muscles attach to the head has been used recently for generic-level differentiation (Weirauch 2007), but whether it has phylogenetic utility past the generic level is unknown. The ridges are either coded as present [0] or absent [1].

Character 24: The shape of the eyes relate to the vertex can also vary among Phylinae. Some taxa, such as those in Pilophorini and some Leucophoropterini, have eyes that are not removed from the margins of the vertex [0] (Fig. 1-3 D, E). Most Phyline have eyes that bulge away from the vertex when the head is viewed anteriorly or dorsally [1] (Fig. 1-3 B and C), while other are highly modified into stalks [2] (Fig. 1-3 A).

Character 25: The width of the head (based on the distance between the lateral margins of the eyes when viewed dorsally) as compared to the width of the vertex is a useful character for estimating the lateral area of the head comprised of the eyes. In terms of eye shape, some genera may have long eyes but not wide eyes (*Pilophorus* Hahn Fig. 1-3 D) others have short but wide eyes (e.g. *Dilatops* Weirauch, Fig. 1-3 A; e.g. *Lasiolabops* Poppius). Wide eyes are considered to have the vertex taking up less than one-third the total width of the head [0]; medium-width eyes have the vertex taking up less than half the width of the head but more than one-third [1]; and narrow eyes have the vertex taking greater than half the width of the head [2].

Character 26: The shape of the vertex was found by Schuh (1984) to be a useful character for the tribal level. The majority of Phylinae have a flat [1] or convex [2] vertex; whereas those with stalked or enlarged eyes tend to have a concave vertex [0]. A ridged vertex [3] is found in some taxa where there is an uneven plane when the head is viewed anteriorly.

Character 27: Several Phylinae have heads that are produced below the eyes, having greater than one-third of the total area below them [1]. Most of these taxa are considered ant-mimics, and have heads that expand ventrally below the eyes hypothetically giving the appearance of mandibles (Fig. 1-3 F). The predominant state for Phylinae is having less than one third of the head produced below the eyes [0] (Fig. 1-3 G-I).

Character 28: Several genera (e.g. *Macrotylus* Fieber, *Tytthus* Fieber) have a post-ocular region behind the eyes, making the eyes appear to face forward when viewed dorsally and laterally [1] (Fig. 1-3 C; *Tytthus chinensis* Stal in Schuh 1984: fig. 636). The majority of Miridae have eyes that encompass the lateral sides of the head [0] (Fig. 1-3 A-B, D-E).

Character 29: Many of the hallodapines have a clypeus that projects forward, giving the head a pointed appearance when viewed dorsally [2] (Fig. 1-3 B, I). Conversely, many ant-mimicking pilophorines have a clypeus that barely extends from the front of the head and is flush with the frons [0] (Fig. 1-3 D, F). Most Phylinae have an intermediate condition in which the clypeus is weakly produced [1] (Fig. 1-3 H).

Character 30: Most Phylinae have a flat region underneath the head corresponding to the gula [0] (Schuh 1984), however there are several ant-mimicking Miridae that have this region expanded to produce the appearance of a keel [2] (Fig. 1-3 F) or expanded into a bulging, rounded area [1] (e.g. *Cyphopelta* Van Duzee).

Character 31: In several of the ant-mimicking Phylinae with a ventrally expanded head capsule the maxillary plate extends to partially cover the anterior portion of the labium [1] (Fig. 1-2 F). For most Miridae the labium is exposed [0] (Fig. 1-2 G-I).

Character 32: The posterior margin of the head relative in some Miridae is expanded towards the anterior margin of the pronotum, with the anterior portion of the pronotum curved to accommodate it [1] (*Chileria andina* Forero in Forero 2009: fig. 1). Most Phylinae have a flat posterior margin of the head and the anterior margin of the pronotum is straight when viewed dorsally [0] (Fig. 1-3 A-E).

Character 33: Antennal structure has been used several times at the tribal (Schuh 1984) and generic levels (Stonedahl 1990, Schuh 1991), and many characters are useful for species and generic differentiation. One aspect is the shape of the first antennal segment, which can either take on the shape of an inverted-bottle shape [0]; long and tubular [1]; cup-like [2]; or propeller-blade-like [3].

Character 34: The width and shape of the second antennal segment is highly variable across the Miridae, and can be sexually dimorphic in some taxa (see character 92 for discussion). Most Phylinae have a second antennal segment that is slender and almost the same width across the length, slightly wider in circumference as compared to the distal antennal segments [0]. However, in some Phylinae (e.g. *Ausejanus* MS, *Tuxedo* Schuh) the second antennal segment can be significantly thicker in circumference as compared to the distal antennal segments [1]; be club-like where the distal portion of the second antennal segment is almost twice as wide in circumference as the anterior portion [2], or twice as wide medially as compared to the distal and basal portions, forming a balloon or football-like shape for the second antennal segment [3] (e.g. *Larinocerus* Froeschner, *Ranzovius* Distant).

Character 35: The curvature of the second antennal segment was found to be phylogenetically informative by Schuh (1984), where several of the leucophoropterines (e.g. *Leucophoroptera* Poppius) have a medially curved antennal segment [1]. Most Phylinae, however, have a relatively straight second antennal segment [0].

Character 36: Several of the subfamilies of Miridae have a pronotal collar [0], whereas one of the synapomorphies proposed to unite the Orthotylinae and the Phylinae is the lack of one for several of the taxa [1]. This character was coded as present-absence, and if present the shape was further characterized in character 37.

Characters 37: The shape pronotal collar is a character used to unite the hallodapine and aurcillocorine Phylinae, and also is present in several leucophoropterines and some African Phylinae (*Eminoculus* Schuh). In Phylinae the pronotal collar is in the form of a flat collar [1] (Hallodapini, Fig. 1-3 B), or slightly reflexed anterior margin of the pronotum [2] (Leucophoropterini, Schuh 1984). A pronotal collar is also present in the Deraeocorinae, Mirinae and a few Orthotylinae, although rounded on the anterior and posterior margins [0].

Character 38: Schuh (1984) noticed that the lateral margins of the pronotum are carinate in some Leucophoropterini [0] (e.g. *Biromiris* sp. Schuh in Schuh 1984: fig. 691) as opposed to rounded [1] in a majority of Phylinae. I found a similar carina on an undescribed *Abuyogocoris* species, and there are some genera of Phylinae with the dorsal surface of the pronotum forming a ridge over the lateral surfaces (e.g. *Macrotylus* Fieber).

Character 39: Many leucophoropterines and auricillocorines have an enlarged prothorax that gives a "hump-backed" appearance when viewed laterally [0] (Fig. 1-3 G of *Cleotomiris schneirlai* Schuh), whereas the majority of Phylinae have a flat pronotum relative to the body [1].

Character 40: The shape of the pronotum can be modified in several ways in the Miridae. In most Miridae there is no visible differentiation along the lateral margins between the anterior and posterior portions [0] of the pronotum, giving the appearance of a trapezoid (Fig. 1-3 E). However, there are several taxa where there can be a clear distinction between an anterior and a posterior portion of the pronotum due to a narrowing of the anterior region, forming a bell-shape when viewed dorsally [1] (most Pilophorini, Fig. 1-3 D).

Character 41: In several mirid taxa there can be an additional demarcation between the anterior and posterior portions of the pronotum on the dorsum of the pronotum due to the possession of a thin line or apparent constriction. Several Miridae have no dorsal demarcation between the anterior and posterior margins of the pronotum [0], where as in some taxa there may be a weak demarcation [1] (e.g. *Megalopsallus ellae* Schuh and Schwartz in Schuh and Schwartz 2005: fig. 2; *Oligotylus* spp. in Schuh 2000: fig. 5). Finally there may be a relatively deep constriction between the anterior and posterior portions in many taxa considered to be ant-mimics [2] (Fig. 1-3 F).

Character 42: The posterior margin of the pronotum is straight to weakly convex when viewed dorsally for most Miridae [0], but in some cases is strongly convex [1]

(Fig. 1-3 B) or emarginate at the midline [2] (e.g. *Eminoculus* spp., especially female *E. laevigatus* Schuh and Wu, in Schuh and Wu 2009: fig. 1).

Character 43: The presence or absence of calli is sporadic across Miridae, some species lack visible calli [0] (Fig. 1-3 B, D-E) and several possess them [1] (Fig. 1-3 A and C). The character's phylogenetic utility within Phylinae has not been tested at the tribal level.

Character 44: The humeral angles of the pronotum are sometimes elevated over the bases of the wings [1] (e.g. *Eminoculus hirsutus* Schuh in Schuh and Wu 2009: fig. 1), whereas in most Phylinae they are flat [0] (*Oligotylus* spp. in Schuh 2000: fig. 5).

Character 45: Scent gland morphology was investigated by Schuh (1984), particularly with respect to Auricillocorini, which is united in part by unique morphology of scent glands (Schuh 1984: figs. 226-227). However, because homology statements of scent gland across Phylinae and Miridae are still somewhat unclear, the area of the scent gland relative to the total area of the mesepisternum was coded in a more general way in this study. The scent gland can be relatively large and take up over one half the total area of the mesepisternum [0]; be medium-sized and take up less than half but greater than a third of the area [1], be relatively small and take up less than one third the total area [2]; or be obsolete [3] (e.g. most Halticini).

Character 46: Following Schuh (1984) the visibility of the mesoscutum in dorsal view was investigated here in a larger context. Most Miridae have a visible mesoscutum [0], however some taxa have the mesoscutum covered by the posterior margin of the pronotum [1] (Fig. 1-3 G), which appears to be correlated with an expanded pronotum (character 38).

Character 47: In the majority of Phylinae the scutellum is flat or weakly rounded dorsally [0]. However, in some members of Pilophorini the scutellum is elevated to form a pyramid-shape [1] (Fig. 1-3 D; *Pilophorus alstoni* Schuh in Schuh 1984: figs. 133 and 135).

Character 48: Most Phylinae have lateral margins of the hemelytra folded transversely to partially cover the lateral margins of the body and abdomen [0], whereas some species (e.g. some Leucophoropterini) have hemelytra that lay flat on the dorsal surface [1] (Fig. 1-3 N) and the dorsal surface of the abdomen is visible when viewed laterally.

Character 49: The shape of the lateral margins of the hemelytra varies across Miridae, and the codings for this character follow Schuh (1984) who found it to be phylogenetically informative. Several taxa have weakly convex to completely straight wing margins [0] (Fig. 1-3 N, e.g. *Tytthus* Poppius). Most mirids, however, have a narrower anterior than posterior portion of the hemelytra, which weakly corresponds to the width of the thorax and abdomen [1]. The most highly-modified shape is in ant-mimicking taxa, which have a medial constriction of the hemelytral margins that corresponds to the constriction between the thorax and abdomen [2] (*Arafuramiris* Schuh and *Papuamimus* Schuh), forming the appearance the petiole of an ant (McGiver and Stonedahl 1993). The shape and angle of the lateral margins is independent of whether the wings are transversely rounded over the body margins, as most Pilophorini have constricted lateral margins and the wings are transversely rounded over the thorax and abdomen, whereas many Leucophoropterini have wings that are laterally constricted at the margins but lay flat on the body without overlap of the sides.

Character 50: The shape of the cuneus was found by Schuh (1984) to provide tribal-level synapomorphies (Auricillocorini, Schuh 1984). Most Phylinae have a cuneus that is shaped like an isosceles triangle or right triangle with the postero-medial margin forming the hypotenuse [1](Fig. 1-3 N). However, in some taxa the cuneus is elongated [0] (Fig. 1-3 M; *Karoocapsus middelburgensis* Schuh in Schuh 1974: fig. 34), or further modified to a boomerang-shape [2] (Pilophorini, Fig. 1-3 L).

Character 51: The deflection of the cuneus relative to the corium can vary in the Miridae, with most Phylinae having the cuneus deflexed ventrally from the fracture to partially or completely cover the end of the abdomen [0] (e.g. *Hypseloecus munroi* Schuh, Schuh 1974). However, several genera of Phylini, Auricillocorini and Leucophoropterini have a weak to obsolete cuneal fracture and no obvious deflection in the cuneus [1] (Fig. 1-2 N).

Character 52: The shape of the hind-femora is a useful character for characterizing several genera of Phylinae, and the states used by Schuh (1984) to analyze Phylinae tribes are expanded in this study to include outgroups from the Orthotylinae, Mirinae and Deraeocorinae. Phylinae with very elongate and slender femora include *Coquillettia* Uhler and *Karoocapsus* Schuh, where the hind-femora are almost twice as long as the pro- and mesofemora, especially in males [0]. Most Phylinae have hind-femora that are slightly longer than the rest of the femora, and the width of the base is at most twice the width at the apex [1]. Other Phylinae (e.g. *Sejanus funereus* Distant, e.g. *Campylomma* spp. Reuter) have hind-femora nearly the same length as the other femora, and whose width at the base is greater than twice the width at the apex, giving the femora a squatty appearance [2]. Ant-mimicking taxa in Phylinae can have even further modified hind-femora with the bases being approximately 1.5 times the width of medial portion, and the apex widened again apically to form knees where the hind-femur meets the metatibia [3] (e.g. *Arafuramiris* Schuh, *Leucophoroptera* Poppius). Outside Phylinae, Orthotylinae outgroup *Halticus bractatus* (Say) is unique in having hind-femora with parallel lateral margins for the majority of the length rather than tapering towards the tibia, likely due to its function in jumping.

Character 53: Most Phylinae have rounded tibia [0], but some Pilophorini and Leucophoropterini (e.g. *Waterhouseana* Carvalho, Schuh 1984: fig. 729) have the tibia laterally compressed for a majority of the length [1].

Character 54: Schuh (1976) did an extensive study on the structures of the pretarsus in Heteroptera, with a focus on the Miridae, and found several characters useful for higher-level groupings in the family. The characters and terminology for these structures in the present paper are those of Schuh (1976) and the states and codings are based on his tribal-level analysis of the Indo-Pacific Phylinae (Schuh 1984). For a detailed discussion of these structures and possible homology statements across the Heteroptera and Miridae please see Schuh (1976). Within Phylinae there is a large diversity in the shape and position of the pulvilli, which can range from being very small in size and hard to see to very large and almost completely covering the ventral surface of the claw. Figs. 21-35 in Schuh (1976) provide a survey of the different shapes. Codings for this character were as follows: pulvilli can be absent [0]; present and ventral, small to medium-sized [1]; large and covering the majority of the ventral surface of the claw [2], or pulvilli that extend the distance of the ventral surface of the claw, but are only attached to the base [3] (*Coquillettia* Uhler, *Macrotylus* Fieber, and *Denticulophallus* Schuh), which is a unique character among Phylinae.

Character 55: The majority of Phylinae have setiform parempodia (Schuh 1976), which are parallel to weakly curving towards each other [1] (Schuh 1976: figs. 23-27). One genus within Phylinae, *Semium hirtum* Reuter, has unique fleshy, rod-like parempodia in lateral view [3] (Schuh 1976: fig. 27). All of Orthotylinae and some of Phylinae (Pilophorini, some Auricillocorini, and recently described Australian taxa) have lyriform parempodia that diverge from the base outwards, then converge towards the median, then diverge out again at the apices, forming a lyriform shape [1](Schuh 1976: figs. 21, 22, 28). Mirinae and Deraeocorinae both have pulvilli that are fleshy and divergent at the tips [2] (Schuh 1976).

Character 56: To further investigate the morphology of the lyriform parempodia, I investigated whether the width of the parempodia has phylogenetic information. Orthotylinae and Pilophorini lyriform parempodia tend to be broader in width [1] (in Schuh 1976: figs. 15-20) than the relatively narrow lamellate parempodia of some Auricillocorini genera [0] (e.g. *Cleotomiroides* sp. in Schuh 1984: fig. 275).

Character 57: The presence [0] and absence [1] of claw hairs was briefly overviewed in Schuh (1984), and it was shown to be useful at the generic level for

Orthotylinae (Forero 2009). However, this character hasn't been systematically investigated within Phylinae for phylogenetic utility.

Male Abdominal and Genital Characters

Character 58: In most Phylinae the abdomen is broadly attached to the thorax [1], but in ant-mimetic Phylinae there is a constriction between the abdomen and the thorax [2] (e.g. *Waterhouseana illustris* Carvalho in Schuh 1984: fig. 732) that is thought to contribute to the appearance of an ant petiole.

Character 59: Several genera of Phylinae males bear elaborations on the pygophore such as tubercules on the ventral side [0] (*Abuyogocoris* nsp.), spines [1] (e.g. *Leucophoroptera fasciatipennis* Carvalho and Gross) or setae [2] (e.g. *Phallospinophylus setosus* Weirauch). Miridae without obvious elaborations were coded as an absence [3].

Character 60: The size of the pygophore relative to the abdomen has been used as a tribal-level diagnostic character in Leucophoropterini, and for other genera in Phylinae. The Leucophoropterini are characterized by a small pygophore compared to the size of the abdomen, being less than one-third to one-fourth the total length of the abdomen [0] (Schuh 1976). Most Phylinae have a pygophore that is approximately one third to one half the length of the abdomen [1], but there are some genera such as *Oligotylus* Van Duzee which have comparably large pygophores that are about half the length of the abdomen [2](Schuh 2000).

Character 61: There are several structural modifications of the pygophore in Miridae that have been shown to be useful at the generic level for phylogenetic analysis (Schuh 2000, Henry 1999). Most Phylinae have a pygophore that is wide at the base and then tapers ventrally towards the pygophore opening [0]. However, some genera with a relatively large endosoma, especially *Oligotylus* Van Duzee, have a pygophore that remains dorso-ventrally parallel to the abdomen and then angles up sharply to form a squared-off, box shape [1] (Schuh 2000). Several genera have the pygophore with a keel along the ventral margin [2] (e.g. *Americodema knighti* (Kerzhner and Schuh) in Henry 1999: fig. 3), which Henry (1999) found to be a genus-group synapomorphy.

Character 62: Kelton (1959) was one of the first miridologists to systematically compare male genitalic characters across the Miridae. Schuh (1974) was one of the first to phylogenetically test those characters at the subfamily level and propose synapomorphies for the male endosoma at the subfamily level. The terminology used in the present paper for the structures of the male genitalia follows Cassis (2008), who provided convincing arguments for the refinement and clarification of many of the terms used in describing male genitalia of Miridae. Mirinae and Deraeocorinae share a membranous, expandable endosoma [0], whereas Orthotylinae possess a membranous endosoma that is not expandable [1] (Kelton 1959). Phylinae share a sclerotized, strap-like or tubular endosoma whose membrane is reduced to a sheath around the endosoma [2] (Schuh 1974, 1984). Because the subfamily Phylinae is the focus of this study, the remaining male genitalic characters refer to characteristics of the rigid, sclerotized endosoma.

Character 63: The rigid-endosoma in Phylinae is most often composed of two, slender straps united membrane [0] (e.g. *Wallabicoris* Schuh in Schuh and Pedraza-Peñalosa 2010; *Oligotylus* Van Duzee in Schuh 2000), or the two straps are fused into a tube [1], as in the majority of Pilophorini (Schuh 1984, 1991; Schuh and Schwartz 1988) and several Leucophoropterini and Hallodapini (e.g. *Sejanus funereus* Distant or *Hallodapus albofasciatus* (Motschulsky) in Schuh 1984: figs 564 and 379, respectively).

Character 64: The shape of the apex and median of the endosoma and the angles relative to the base has been used as a tribal-level character for Hallodapini (Schuh 1974) and as a generic character for several Phylini (e.g. *Xiphoidellus* Schuh and Weirauch, in press). For Hallodapini, the body of the endosoma often overlaps itself and bends to form a loop [2] (e.g. *Acrorrhinium bismarkensis* Schuh in Schuh 1984: fig 320). Most Phylinae have a weakly-C or J shaped endosoma, where the apex of the endosoma curves at a weak angle medially away from the base and there is no overlap of the structure [0] (e.g. *Tuxedo* spp. in Schuh 2004A: fig. 2). Some genera have a U shaped endosoma have a relatively strong angle at the median, with the base and apex relatively close to each other [3] (*Oligotylus* Van Duzee in Schuh 2000). Leucophoropterine Phylinae has sigmoid or S-shaped endosoma where the apex and the base are located on opposite sides of the median and are oriented in different directions [1] (e.g. *Sejanus albisignatus* (Knight) in Schuh 1984: fig 511).

Character 65: The membrane on the rigid Phylinae-type endosoma is usually smooth and contiguous [0] not visible at all [2] in a majority of species. However, some taxa (*Sejanus serrulatus* Schuh, fig. 607 in Schuh 1984, *Sejanus brittoni* Carvalho and Gross) have a medial extension of the membrane with a dentate or serrated edge [1].

Character 66: The secondary gonopore, or opening where the sperm leaves the endosoma, can take various shapes. This diversity was coded as follows: the secondary gonopore being a simple, semicircular opening [0]; not having a visible secondary gonopore [1]; a sclerotized, horse-collar-shaped secondary gonopore [2]; a weakly sclerotized area corresponding to the secondary gonopore [3]; or a sclerotized area of spines [4]. Most Mirinae have a sclerotized, horse-collar shaped secondary gonopore, whereas Orthotylinae may or may not have a visible secondary gonopore (Kelton 1959). Pilophorini either have a simple opening that looks like a semicircular opening or no visible opening at all (Schuh 1991: figs. 4-5), and Leucophoropterini often have just a weakly sclerotized area that roughly corresponds to the secondary gonopore (e.g. *Sejanus* spp. in Schuh 1984: figs 511 and 514). Hallodapini have a simple sclerotized area (e.g. *Hallodapus* spp. in Schuh 1984: figs. 379 and 383) and Auricillocorini have a larger and more prominent opening (Auricillocorini in Schuh 1984: figs. 238, 251 and 267). The tribe with the most diversity morphologically is Phylini, which includes taxa representing all types above, and also includes the genus *Reuteroscopus* Kirkaldy, which has patches of spines in a sclerotized area for the secondary gonopore unique in Phylinae (Kelton 1964: figs. 5-12).

Character 67: In some genera of Phylini the secondary gonopore has a sclerite extending from the proximal end [1], the gonopore sclerite of Stonedahl (1990), which is present in several species of *Atractotomus* and *Megalopsallus* (“gs” in *Megalopsallus* spp. in Schuh 2000: fig. 13) rather than just two contiguous straps which is the predominant state in most Phylinae [0].

Character 68: Several of the subfamilies in the Miridae have sclerotized structures, or "spicules", that originate from the endosoma. If they are present, they can be either present at or near the base of the endosoma [0] or arising at a medial or subapical location [1]. In the Orthotylinae these spicules arise from the base of the endosoma (Kelton 1959: fig. 3), whereas in Mirinae and Deraeocorinae they arise medially on the endosoma or at the apices of the membranous portions (Kelton 1959: figs. 4-7).

Character 69: In most Phylinae the endosoma bears two distinct traps without medial spines [0]. However, a majority of pilophorines bear spines medially on the shaft of a tubular endosoma [1] (Schuh 1991: figs. 4-5) and can also be present in some Phylini (e.g. the *Polyozus* group Weirauch 2007: Character 19-1 in fig. 13).

Character 70: The secondary gonopore in most Phylinae arises from the endosoma without modifications of the straps below or above it [0]. However, in several Pilophorini there is a "notch" subtending the simple semi-circular opening for the secondary gonopore [1] (e.g. *Pilophorus juniperi* Knight in Schuh and Schwartz 1988: fig. 6-B).

Character 71: In most Phylinae the endosoma is relatively long compared to the width [0]. However, in some taxa (e.g. *Dilatops fici* Weirauch, *Gonoporomiris* Henry and Schuh) the length of the endosoma is relatively short compared to the width for Phylinae, giving the appearance of a comparatively "stocky" endosoma [1].

Reuteroscopus Kirkaldy and *Decomia* Poppius are enigmatic in that they have an endosoma that is relatively narrow at the base, but much more expansive towards the secondary gonopore [2], and in the case of *Reuteroscopus* with several feathery elaborations and additional structures (Kelton 1959: fig. 126).

Character 72: Unlike in Mirinae, Orthotylinae, and Deraeocorinae in which the secondary gonopore is near the base or medially on the endosoma [0], in Phylinae the secondary gonopore (if visible) is either at the apex of the endosoma or subapical [1] (e.g. many Leucophoropterini, Pilophorini and Phylini).

Characters 73: The majority of Phylini have the main straps of the endosoma united into one structure at the apex [0] (e.g. most Hallodapini, Auricillocorini, and Pilophorini). However, in several Phylini and some Leucophoropterini the apex is not unified, and is split between the two straps [1] (e.g. *Arafuramiris* Schuh in Schuh 1984).

Characters 74-76: The *Polyozus* group (Weirauch 2007) has several unique features of the endosoma unlike any other Phylinae, which are explored in more detail in Weirauch's work. Coding for these characters in this study follow Weirauch (2007).

Character 77: The majority of Phylinae do not have microspicules on the endosoma [0]; however, in several genera (e.g. *Larinocerus balius* (Knight) in Henry and Schuh 1979: fig. 21; *Eminoculus spp.* in Schuh and Wu 2009: character 46-1 in male endosoma figs.) minute microspicules occur on the endosoma either below or above the secondary gonopore [1].

Character 78: One of the hypothesized synapomorphies for Pilophorini are the long, glassy spicules present distad of the secondary gonopore [1] (see Schuh and

Schwartz 1988, and Schuh 1991 for discussion) that are absent [0] in the rest of Phylinae.

Character 79: The phallotheca, or covering for the endosoma, is often used for characters at the generic and species level in Phylinae. Most Phylinae have an unadorned structure [0], but some taxa like the *Polyozus* group (Weirauch 2007) and *Phymatopsallus* group (Schuh 2006) have multiple lobes and projections off the main structure [2], and *Decomia* Poppius has a narrow extension off the apex of the phallotheca referred to as a "nose" [1](Schuh 1984).

Character 80: For most Phylini the apex of the phallotheca is a triangular-shaped structure that tapers to a point at the apex [0] (e.g. *Tytthus chinensis* Stal in of Schuh 1984: fig. 640). Other taxa have the apex of the phallotheca modified such as *Karoocapsus* Schuh which has several species with a "duck-head" shaped apex of the phallotheca [2] (e.g. *Karoocapsus trifasciatus* Schuh in Schuh 1974: fig. 218) or extremely slender apex that has almost no tapering [1] (e.g. *Karoocapsus middelburgensis* Schuh in Schuh 1974: fig. 204). Additionally, *Pseudosthenarus* Schuh is unique in that the apex looks less triangular than trapezoidal [3] (Schuh 1974: figs. 294, 299, 301 and 304). *Nichomachus* sp. Schuh has a unique phallotheca that is a simplified tube [4].

Character 81: Schuh (1984) used the general curvature of the endosoma, whether appearing to look like a C-shape [0]; L-shape [1]; or having the apex perpendicular to the base [2] as a character, which he found to be useful at the tribal level.

Character 82: Several taxa within the Leucophoropterini have ridges on the dorsal surface of the phallotheca [0] (e.g. *Pseudoleucophoroptera mamai* Schuh in Schuh 1984: fig. 784), whereas the majority of Phylinae appear to have a smooth, contiguous dorsal surface [1] (e.g. *Acrorrhinium* Noualhier in Schuh 1984: figs 322, 328).

Character 83: One of the synapomorphies for Phylinae is the attachment of the phallotheca to the posterior wall of the pygophore [0] rather than to the phallobase [1], as in all other subfamilies in the Miridae.

Character 84: The relative size of the left versus right parameres has not been explored in a phylogenetic context. It was coded in this study to test potential phylogenetic utility as follows: left paramere larger [0]; right paramere larger [1]; or approximately equivalent in size [2].

Character 85: The shape of the right-paramere is used frequently for generic or species level differentiation in Phylinae (Schuh 2006, Weirauch 2007), and was not included in Schuh 1984 for tribal relationships. Many Phylinae have the right paramere with a narrow base, and the medial lateral margins parallel for most of the length before tapering to a point at the apex, almost lanceolate [0] (e.g. *Plagiognathus blatchleyi* in Kelton 1959: fig. 111; *Plagiognathus* sp. Fieber in Schuh 2001: fig. 25). Others have a well defined base and a rounded medial portion that tapers towards the apex (e.g. *Criocoris saliens* (Reuter, 1876) in Kelton 1959: fig. 125; *Polyozus spp.* in Weirauch 2007: fig. 7 of right parameres) looking like the shape of a leaf [1], or with a defined base and almost no tapering towards the apex that gives the appearance of a paddle [2]

(*Europiella* Reuter in Schuh 2004B). Most of the Mirinae, Deraeocorinae, and Orthotylinae have right parameres that are slender with almost no differentiation at the base from the distal portion [3] (e.g. *Creontiades debilis* Van Duzee in Kelton 1959: fig. 48) or with a rounded expansion at the apex [4] (*Orthotylus spp.* in Kelton 1959: figs. 54 and 55).

Characters 86: The left paramere has been used extensively in studies of Phylinae at the tribal (Schuh 1984) and generic level (Schuh 1974, 1984, Weirauch 2007). Phylinae are unique in having a left paramere with two processes, the anterior and posterior process (e.g. *Angelopsallus gregalis* (Van Duzee) in Schuh 2006: fig. 5) forming a structure that holds the phallotheca at rest. The two process of the left paramere can be modified in various ways, with the posterior process pointing straight and perpendicular to the base of the paramere [0] (e.g. *Sejanus albisignatus* (Knight) in Schuh 1984: fig 513), curving downwards [1] (e.g. *Hallodapus spp*. in Schuh 1984: figs. 408, 411, 414 and 418), or curving upwards [2] (e.g. *Campylomma spp*. in Schuh 1984: figs. 965, 968, 971, 973 or 976). Only Orthotylinae, if a posterior process is present, has the process parallel to the body of the paramere [3] (e.g. *Orthotylus spp.* in Kelton 1959: structure “a” in figs. 54-55).

Character 87: In Phylinae the anterior process of the left paramere is equal in size or shorter than the posterior process. The relative size of the anterior and posterior process is coded being either the same size [2]; the anterior process being longer [1]; or the posterior process being longer [0].

Character 88: Many Pilophorini and some of Phylini (e.g. *Decomia* Poppius in Schuh 1984: figs. 1099 and 1104) have the anterior process pointing in the opposite direction of the posterior process [1], whereas the vast majority of Phylinae have the anterior and posterior process pointing in the same direction [0].

Character 89: The left paramere in most Phylinae has pits on the posterior process of the paramere [1]. However, they can be absent [0] (e.g. *Decomia indochinensis* Schuh in Schuh 1984: fig. 1117), and in rare cases can be present on both processes [1] (e.g. *Dilatops fici* Weirauch, Weirauch 2006C)

Character 90: In addition to the anterior and posterior process of the left paramere, additional spines or projections also occur in some taxa. At the base of the anterior process *Pseudosthenarus* Schuh and *Decomia indochinensis* Schuh have hook-shaped projections (Schuh 1975: figs. 302, 305 and 308; and Schuh 1984: fig. 1117, respectively) that point in different directions relative to the shaft of the paramere [1]. Other taxa have an extra spine at the dorso-posterior margin of anterior process [2] (e.g. *Ancoraphylus* Weirauch in Weirauch 2007: character 11-2 in fig. 8) or a projection on the dorso-anterior margin of anterior process [3] (e.g. *Coatonocapsus transvaalensis* Schuh in Schuh 1974: fig. 239). Most Phylinae do not have additional processes [0].

Character 91: The majority of Phylini and Leucophoropterini have a left paramere with the central portion weakly expanded laterally to round [0] (Kelton 1959: structure “a” in figs. 121-123). Many of Hallodapini and recently described taxa from Australia, however, have the left paramere with a central portion expanded horizontally

[1] (e.g. *Alloeomimus muiri* Schuh in Schuh 1984: fig. 342; *Exocarpocoris spp.* in Weirauch 2007: fig. 8).

<u>Female Body Structure Characters</u>

Character 92: Many taxa in Phylinae (and Miridae in general) are sexually dimorphic, therefore male and female characters were coded separately. One of the most common forms of sexual dimorphism is in the shape of the second antennal segment. Most Phylinae have the second antennal segment longer in males than females, but the overall shape is the same [0]. However, there are some taxa where the females have very different morphologies of the structure when compared to males [1]. When there is variation in the shape of the second segment, the most common form in Phylinae is males with having thicker segments compared to females (e.g. *Atractotomus* Fieber in Stonedahl 1990: figs. 14-46 of second antennal segments) or females have club-like second antennal segments versus tubular antennae of males (many leucophoropterines).

Character 93: In Miridae some females have different head shapes than males; therefore head characters were scored separately for males and females. The differences between female and male head shape are most pronounced in genera with ant-mimetic females, such as *Karoocapsus* Schuh and *Coquillettia* Uhler, in which females have the head expanded ventrally, presumably to increase the ant-like appearance. Like the males, females were coded for eye location when viewed laterally by the following: eyes obscuring the anterior margin of the pronotum [0]; eyes parallel to the anterior margin of the pronotum [1]; and eyes strongly exerted from the anterior margin [2].

Character 94: The height of the eyes in females varies from males, in that there were no observations of females having the eyes take up the entire lateral view of the head. Females were therefore coded as either having the eyes take up at least one half the height of the head [0]; or less than half [1].

Character 95: The width of the vertex relative to the total width of the head, based on the measured distance between the lateral margins of the eyes, was coded similar to males for estimating the width of the eyes: wide eyes had a relative vertex that was less than one-third of the total width of the head [0]; medium-sized eyes had a relative vertex between one-third and one-half the total width of the head [1]; and narrow eyes had a vertex greater than one-half the total width of the head [2].

Character 96: The shape of the frons relative to the clypeus was coded in a similar manner as the males, where the frons is rounded and the clypeus is not exerted when the head is viewed dorsally [0]; the frons is concave to weakly concave and the clypeus is weakly exerted [1], or the frons is relatively obsolete, and the clypeus is strongly exerted, giving the head a pointy-appearance when viewed dorsally.

Character 97: Most female Miridae have the mesoscutum exposed [0]. However in several genera in Phylinae (*Schuhistes* Menard, Fig. 1-3 P) the mesoscutum is covered by the posterior margin of the pronotum [2], which can be found in females but not in males. Therefore this character was coded separately for the two sexes.

Character 98: The majority of females in Phylinae are macropterous, with the total length of the wing slightly shorter than the males [0] (e.g. *Atractotomus quercicola* Stonedahl in Stonedahl 1990: figs. 1 and 2 of male and female; *Plagiognathus* Fieber in

Schuh 2001: figs. 1-2). However, there are many genera with wings that are significantly shorter and brachypterous [1] (e.g. *Schuhistes lekkersingia* Menard: Fig. 1-3 P) to micropterous [2] (e.g. *Karoocapsus middelburgensis* Schuh: Fig. 1-3 O) or even apterous [3] (e.g. *Coquillettia* Uhler). Often times the last two states conform to apparent ant-mimicry (Schuh 1974, McGiver and Stonedahl 1993).

Character 99: Several female Miridae have wing margins that are more strongly convex than males [0], presumably to cover their wider abdomens (e.g. *Atractotomus quercicola* Stonedahl in Stonedahl 1990: figs. 1 and 2 of male and female; of *Schuhistes* Menard: Fig. 1-3 P), or are medially constricted [2] (e.g. several Leucophoropterini). However, the majority of female phylines have wings with straight lateral margins [1]. In most Phylinae and several strongly ant-mimetic taxa, the wing margins of male and females show little apparent differentiation (e.g. *Pilophorus* Hahn).

Character 100: The majority of the modifications to the female wing often occur with the cuneus and membrane. In most cases the cuneus and membrane are shorter than in males but shares an overall similar shape to males, with a straight to slightly convex lateral margin [0]. However, in some taxa the lateral margins of the cuneus and membrane are rounded in [1] (of *Schuhistes* Menard: Fig. 1-3 P) or both structures are absent [2] (of *Karoocapsus* Schuh: Fig. 1-3 O).

Character 101: If the cuneus is present, in most Miridae the cuneal fracture at the anterior of the cuneus forms an acute angle with the wing margin [0]. In some genera in Auricillocorini, the cuneal fracture is perpendicular to the wing margin [1] (e.g. *Cleotomiris schneirlai* Schuh in Schuh 1984).

Character 102: The overall shape of the cuneus also varies where few Phylinae genera (*Macrotylus* Fieber) have the female's cuneus in the form of an elongate triangle [0], whereas most Phylini have a very broad triangular cuneus [1] or a cuneus that forms a right triangle with the margin of the membrane [2]. Female Pilophorini have the margin of the cuneus with the membrane has a medial concavity, forming a boomerang-shaped cuneus similar to the males [3] (see Character 49 for description).

Character 103: The angle of the deflection in the cuneus can be less pronounced in female Miridae than in males, but for most Phylinae there still is a deflection [0]. However, in reduced wings where covering the abdomen is no longer a function, the deflection is obsolete [1] (e.g. *Schuhistes* Menard: Fig. 1-3 P).

<u>Female Abdomen and Genital Characters</u>

Characters 104-105: An untested potential synapomorphy for Phylinae is the possession of at least two sclerotized plates surrounded by membrane in the vestibulum (Schuh 2006: fig. 39 of ventral view of vestibulum; Wyginer 2006: fig. 3-C), the area where the endosoma enters the female during mating. These structures may be homologous to the asymmetrical margins of the gonapophysis in the Orthotylinae (Forero 2009) which is speculated to be further sclerotized into plates with Phylinae (Schwartz, personal communication). The most developed case within the Orthotylinae may be that the Halticini, which recent illustrations of the vestibulum by Namayatova and Kostantinov of *Orthocephalus styx* (Namayatova and Kostantinov 2009: fig. 19, "vulva") show remarkable similarity to the plates in some Phylinae (*Ausejanus* MS:

Figure 1-11). The most systematic study of the sclerotized vestibulum in Phylinae is for Hallodapini (Wyginer 2006) with other generic revisions contributing information, but often with varying terminology. I restrict the term "vestibulum" to the area including the sclerotized plates and the entrance of the ventral sack (following Wyginer 2006). The following states were coded for this character: no visible plates [0]; two separate plates [1]; or two interlocking plates [2].

Character 105: Surveys of Phylinae female genitalia for this study have shown that if the remnants of the plates are present in the vestibulum, they are either triangular [1] (Wyginer 2006: fig. 4 E-F, lower right illustrations of sclerotized plates attached to ventral sack), semicircular [2](e.g. *Ausejanus* MS: fig. 1-11B), asymmetrical [3](e.g. *Pilophorus juniperi* Knight: Fig. 1-11E), or rectangular [4](e.g. *Vesperocoris paddocki* (Knight) in Weirauch 2006A: fig. 6 of vestibulum). Many Mirini and some Orthotylinae have plates that are mostly membranous and relatively undefined, amorphous margins [4].

Character 106: The relative size of the plates in the vestibulum in Phylinae was compared with the width of the surrounding process of the rami. The vestibular plates are either smaller than the width of a ramus [0] (e.g. *Ausejanus* MS: Fig. 1-11B) or larger than the width of a ramus [1] (e.g. *Pilophorus juniperi* Knight: Fig. 1-11E), with no observations of equivalent size in this study. The variation in the size of the plates has not been tested for phylogenetic utility across Phylinae.

Character 107: The vestibulum in many Pilophorini, Phylini and Hallodapini projects anteriorly from the plane of the rami [1] (e.g. *Cyrtopeltocoris sp.*: Fig. 1-11D, Vs 108-0; *Angelopsallus gregalis* (Van Duzee) in Schuh 2006: fig. 5) rather than sitting flat against the anterior margins of the rami [0] (e.g. *Arizonapsallus stonedahli* Schuh in Schuh 2006: fig. 5 of the vestibulum). This can be either due to the ventral sack (or "nautiloid development of the vestibulum" in Schuh 2006) projecting anteriorly or the presence of a sclerite anterior to the vestibulum (Characters 108-110).

Character 108: In addition to the two vestibular plates, several taxa have one additional sclerite situated centrally on the anterior wall of vestibulum [1] (e.g. Sejanus albisignatus (Knight), Eyles and Schuh 2003: figs 39-40)or two asymmetrical sclerites [2] (e.g. *Strictopsallalus asperses* (Van Duzee) in Schuh 2006: fig. 39 ventral view of vestibulum). Taxa without this sclerite were coded as absent [0].

Character 109: If there is one sclerite, it can be a thin sclerotized plate [0] (of *Ausejanus* MS: Fig. 1-11B), a T shaped structure [1] (e.g. *Abuyogocoris* nsp), a broad, weakly sclerotized plate [2] (e.g. *Karoocapsus middelburgensis* Schuh: Fig. 1-11C), or a broad, thickly sclerotized plate [3] (e.g. *Pilophorus juniperi* Knight: Fig. 1-11 E).

Character 110: Several Phylinae have some degree of sclerotization of a tube near the lateral margins of the vestibulum (e.g. *Karoocapsus middelburgensis:* Fig. 1-11C; *Rubellomiris mariposa* Weirauch in Weirauch 2006B: fig. 11-E) that appears to be homologous to the ventral sack due to the similar location [2]. In the majority of the taxa sampled either the ventral sack is not easily seen and mostly membranous [1] (Fig. 1-11 F). However, in some taxa the ventral sack is highly visible and sclerotized [3], mostly in the Hallodapini (Wyginer 2006) and some Phylini (e.g. *Plagiognathus schaffneri:* Fig.

1-11A). Taxa where there appeared to be no remnants of a ventral sack were coded as absent [0].

Character 111: In the majority of Phylinae there appear to be areas of sclerotization between the dorsal labiate plate and ventral labiate plate [1] (ScDv, Figs. 1-11-12). However, in species where the female genitalia appear to be reduced or simple areas between the two plates are completely membranous [0].

Character 112: There are several areas on the dorsal labiate plate (sensu Davis 1955), which can be modified into sclerotized plates. This character was coded as present [1] or absent [2] if sclerotized areas could be located in the taxa surveyed.

Character 113: If there are sclerotized plates present on the ventral labiate plate, the following states were observed for the shapes of the structures: a thin strip of sclerotization on the margin of the dorsum [0](e.g. *Lepidargyrus ancorifer* (Fieber) in Slater 1950: fig. 16), two lobes extending from rami [1](*Largidea rubida* (Uhler) in Slater 1950: Plate 5 fig. 22), sclerotized plate(s) along the margins of the ventral labiate plate [2] (e.g. *Plagiognathus schaffneri:* Ds 114-3 in fig. 1-12 F; *Coccobaphes frontifer* (Walker) in Slater 1950: Plate 4 fig. 12), or lobes enveloping rings [3] (of *Plagiognathus schaffneri:* Ds 114-2 in Fig. 1-12 F; *Coquillettia insignis* Uhler in Slater 1950: Plate 5 fig. 17). Although the placement and shape of the various plates is complex, I have coded them as homologous structures pending further study of homology and developmental origin.

Character 114: The sclerotized rings (sensu Slater 1950 and Davis 1955) are believed to glandular in function and show tremendous diversity in the Miridae (Slater

1950). They can be fused together [0] (e.g. *Phytocoris osborni* Knight in Slater 1950: Plate 4 fig. 11), open and weakly sclerotized [1] (e.g. *Halticus intermedius* Uhler in Slater 1950: plate 7 fig. 1), thickly sclerotized [2] (e.g. *Lygocoris communis* (Knight) in Slater 1950: Plate 3 fig. 9), or small and contorted [3] (e.g. *Deraeocoris sayi* (Reuter) in Slater 1950: Plate 5 fig. 13).

Character 115: The posterior-wall (sensu Slater 1950) can have several modifications within Phylinae. The posterior-wall posterior margin can have an invagination medially when viewed from the posterior [0] (e.g. *Ausejanus* MS: Fig. 1-12 D), be flat [1] (e.g. *Lasiolabops obscurus* Poppius: Fig. 1-12 C), or have projection(s) [2] (e.g. *Cyrtopeltocoris* Reuter: Fig. 1-12 B). This medial invagination has not been investigated within a phylogenetic context across Phylinae.

Character 116: The posterior wall, especially in Phylinae, has large diversity in the degree and location of sclerotization when viewed dorsally. In some taxa the posterior wall is completely membranous [0] (e.g. *Semium hirtum* Reuter in Slater 1950: Plate 6 fig. 11). Other taxa have a central sclerite [1] (*Dicyphus discrepans* Knight in Slater 1950: fig. 6); a sclerotized anterior margin and a membranous posterior margin [2] (most Mirini, see Slater (1950) for several examples); a membranous anterior margin and a sclerotized posterior margin [3] (e.g. *Polyozus* group, Weirauch 2007: fig. 14); or the posterior wall is completely sclerotized [4] (e.g. *Pilophorus strobicola* Knight in Slater 1950: Plate 6 fig. 12).

Character 117: If there is a medial sclerite surrounded by membrane, it can be composed of 2 small sclerites [1] (e.g. *Atractotomus* Fieber), have one unified, central sclerite [2] (e.g. *Larinocerus balius* (Froeschner) in Henry and Schuh 1979: fig. 30), or a central sclerite fused to the lateral plates to form one large plate [3] (e.g. *Polyozus* group in Weirauch 2007: fig. 14). If a plate was not observed the state was coded as absent [0].

Character 118: If there is one fused plate (Character 117, state 3), there are often lateral projections next to the midline of the plate, either as two symmetrical projections [0] (e.g. *Exocarpocoris tantulus* Weirauch in Weirauch 2007: characters 34-1 and 35-1 in fig. 14), as two medial, asymmetrical projections [1] (*Polyozus galbanus* in Weirauch 2007: fig. 14), or as one, fused, projection [2] (e.g. *Phallospinophylus setosus* Weirauch, in Weirauch 2006B: fig. 11-B of posterior wall; Fig. 1-12B). Taxa without one fused plate were coded as inapplicable.

Character 119: Nichomachus Schuh in the Orthotylinae appears to be the only taxon that does not have lateral interramal sclerites on the posterior wall [0], with a majority of the taxa in this study (including all Phylinae) having them present as two lateral sclerites [1] or fused to the central sclerites when the posterior wall is viewed dorsally or laterally [2] (Fig. 1-12 A-D).

Character 120: In the Mirinae coded for this study the posterior margin of the posterior wall is upward and reflexing upward towards the anterior margin when viewed from the dorsum or laterally [0]. In all other Miridae coded for this study the posterior wall posterior margin lays flat on the same plane as the medial and anterior portions of the wall [1].

Character 121: In most Mirinae the anterior portion of the posterior wall has sclerotized elaborations such as multiple sclerotized plates above the ovipositor bulb [2] (in Slater 1950: Plate 1 figs. 4-8). In Orthotylinae there are "K" structures (Slater 1950, Schaffner and Schwartz 2008) or lateral, symmetrical invaginations anteriorly from the posterior wall next to the ovipositor bulb [0] (Slater 1950: Plate 4, figs. 14-29). In *Cyrtopeltocoris* Reuter (Fig. 1-12 B) and several of Pilophorini there is a projection on the posterior margin [1].

Character 122: At the base of ovipositor, which is rounded for the majority of the Miridae [0], in a few taxa (Fig. 1-12 B, *Cyrtopeltocoris* Reuter) there is an extension to the anterior margin of the posterior wall [1]. This character state was found in *Tytthus* Poppius and *Chlamydatus becki* Knight.

Character 123: Most female Miridae have the ovipositor held parallel to the thorax and abdomen at rest [0], whereas ant-mimetic females tend to have the ovipositor angled upwards compared to the thorax due to the correspondingly angled abdomen to mimic an ant abdomen [1].

Phylogenetic Methods

Morphological characters and aligned sequences were combined and analyzed in TNT (Goloboff *et al.* 2003A). The parsimony analysis was conducted using all of the New Technology search algorithms for 1,000 random additions. Transitions and transversions were weighted equally and gaps were treated as an additional state. The shortest trees stored in the RAM were then passed to a Traditional Search using TBR. Non-parametric bootstrap values (Felsenstein 1985), were calculated in TNT using 1000 replicates under traditional search parameters. Total Bremer support (Bremer 1994) and

Partitioned Bremer support (Lambkin *et al.* 2002) were calculated using a macro script for TNT (Goloboff 2009) for all of the nodes, and by hand for partitioned bremer support values for the major nodes of interest (Table 1-6).

Bayesian analysis was undertaken with the combined morphology and molecular datasets using MrBayes (Huelsenbeck *et al.* 2001, Ronquist and Huelsenbeck 2003) with the Standard model for morphological characters and GTR+I model for each of the combined gene regions. Initially, models were tested using MrModelTest2 (Nylander 2004) using the Akaiki information criterion (AIC) for each gene, which criterion was found to be more accurate than the hierarchical likelihood ratio tests (hLRTs) (Posada and Crandall, 1998) (Table 1-4). However, the HKY+I+G model is not supported by MrBayes, and the authors of the program (Nylander 2004) suggest using the closest next complex model, in this case the GTR+I model. The MrBayes analysis was run on the Texas A&M University Brazos HPC cluster (http://brazos.tamu.edu/) using three chains (two hot, one cold) for 50,000,000 generations, sampling every 1,000 generations until convergence was achieved with an average standard deviation of split frequencies less than 0.010. Posterior probabilities for nodes were mapped using a 50% majority rule consensus tree.

Maximum likelihood analysis was performed using RAxML (Stamatakis 2006) with Rapid Bootstrapping (Stamatakis *et al.* 2008) on the molecular datasets only using the Cyberinfrastructure for Phylogenetic Research (CIPRES) Portal (v.1.15) (Miller et. al 2009). Parameters of the GTR+I model were estimated including the proportions of invariable sites (Table 1-5). The option of RAxML which automatically determined the number of bootstrap runs for the Rapid Bootstrapping resampling was chosen. Rapid-Bootstrap support values were then mapped on the nodes of the best tree.

Results

All three analyses produced trees with similar groupings of genera, with a monophyletic Phylinae that is the sister-group to Orthotylinae (Figs. 1-4 -1-9). Nodes that were shared among trees are numbered and denoted with a yellow circle. Nodes unique to a particular analysis are numbered and indicated with a green circle; nodes shared between two of analyses but not all three are either blue or pink. Simplified cladograms of the major nodes produced by each analysis, mapped with unambiguous state-change apomorphies, were constructed for ease of discussion of the relative merits of the varying topologies (Fig. 1-10).

The TNT parsimony analysis yielded 16 equally parsimonious trees of 17254 steps, whose strict consensus tree is shown in Figs. 1-4 and 1-5. Discordance between the trees was limited to species-level relationships in Ausejanus MS and *Pilophorus* Hahn. The consistency index (CI) and retention index (RI) for the most parsimonious trees excluding uninformative characters are 0.2577 and 0.7423, respectively, with 1951 parsimony-informative characters. Tribal-level groupings were tested for the relative partition support values of each gene partition and morphology as indicated in Table 1-6. CI and RI values for all of the morphological characters as calculated for the TNT consensus tree are listed in Table 1-2, with the CI ranging from 1.00 to 0.042, the RI from 1.00 to zero.

The combined morphology and molecular MrBayes tree had a standard deviation of partition probabilities across partitions of 0.007662 for the last generation, well below the recommended 0.01 (Ronquist and Huelsenbeck, 2003) and with posterior probabilities above 80% for a majority of the nodes (Figs. 1-6 and 1-7). Approximately 25% of the initial samples obtained were discarded as burn-in (20,000 trees) as suggested by the authors (Ronquist and Huelsenbeck, 2003) due to the high influence of the random starting parameters rather than the contributions of the data towards the posterior probability on the initial trees. Unambiguous state-change morphological character apomorphies for the Bayesian analysis tree topology were calculated using PAUP 4.0b for nodes discussed in detail in the discussion (Fig. 1-10 B).

The molecule-only analysis with RAxML produced a final log likelihood of -73629.09, with the GAMMA+P-Invariable site parameters shown in Table 1-5 and best tree shown in Figs. 1-8 and 1-9. The MrBayes and RAxML trees share a more similar topology for some of the tribal groupings (see Discussion), but all three trees shared the same overall generic groupings. Major tribal-level nodes in which the parsimony and MrBayes consensus trees were collapsed and simplified for comparison across trees in Fig. 1-10, for two of which unambiguous state-change morphological character apomorphies were mapped. The topology of the RAxML tree did not differ enough from the other two to merit morphological character mapping.

To compare the relative contributions of the molecular and morphological data to the analyses, partitioned Bremer support values (Bremer 1994, Lambkin *et al.* 2002) were calculated for specific nodes of interest on the TNT tree (Figs. 1-4, 1-5, Table 1-6).

The majority of the nodes had the greatest positive support provided by the 18S gene, with the 16S, 18S, and morphology providing varying support, and the COII gene being the most incongruent (Table 1-6). In previous combined gene analyses, the 18S gene sequences provided either the majority of the support for the major nodes (Schuh *et al.* 2009) or resolution for tribal-level nodes (Grazia *et al.* 2008). The 28S gene provided additional positive support at some of the deeper nodes in this analysis (Nodes 1-6) as well as many of the tribal-level nodes (Pilophorini: Node 22). The 16S gene and morphological data provided the strongest support at the generic-level groupings (Nodes 10, 12-17), whereas COII provides (minimal) positive support to only three nodes (Nodes 2, 4, 16).

The morphological character dataset contributed positive support for a majority of the nodes in the combined analysis. While many of these characters are highly homoplastic, character sets like the female genitalia are still relatively unexplored across Phylinae and homology statements are relatively crude. As such, the low CIs for some of these characters are indicators that more detailed exploration into their composition and homology are necessary.

Discussion

<u>(Node 1): Phylinae + Orthotylinae</u>

Phylinae and Orthotylinae are sister groups in all three analyses with the Deraeocorinae as an outgroup followed by Mirinae at the base of the tree, which is consistent with the relationships hypothesized by Schuh (1974). Several morphological characters support this grouping (Fig. 1-10 A, B), including the transition of a rounded pronotal collar to a flat to upturned pronotal collar (37-1, 2); the presence of claw hairs (57-0); the endosoma becoming rigid and not expandable (62-1, 2); the angle of the phallotheca becoming more curved (81-0, 1); the relative shapes of the left and right parameres becoming more disproportionate (84-0, 1); vestibular sclerites being present (104-1); the wall of the vestibulum projecting anteriorly (107-1); and the lateral plates of the posterior wall remaining flat.

Recently Schuh *et al.* (2009) placed Phylinae near the base of the Miridae, with Orthotylinae grouping with the Mirinae in a combined molecular and morphological analysis of Cimicomorph relationships. This study used the same set of genes as Schuh *et al.* (2009) in a reanalysis of the relationships of these subfamilies to verify the relationships hypothesized by Schuh (1974) and to identify the proper outgroup(s) for Phylinae relationships. Several of the morphological characters in Schuh *et al.* (2009) are also replicated in this study: the composition of Phylinae endosoma (character 62); the attachment of the phallotheca to the pygophore rather than the phallobase (character 83); the "K" structures in Orthotylinae (character 121) and the same molecular sequences for many of the taxa (see Appendix 1 for sequences used from that study). The expanded sampling within Miridae for molecular and morphological characters as well as the static alignment of the molecular data used for all three analyses likely contributed to the different result.

(Node 2): Orthotylinae

In all three analyses the Orthotylinae were found to be sister-group to Phylinae, apomorphies supporting the subfamily include the presence of lyriform parempodia (55-1); the morphology of the endosoma (62-2); and the phallotheca attaching to the phallobase (83-1). Tribal groupings of Orthotylinae currently are in flux with three to six tribes recognized depending on the author: Halticini Kirkaldy; Orthotylini Van Duzee, Nichomachini Schuh, Ceratocapsini Zimmerman, and Austromirini Carvalho (Cassis 2008). In all of the trees the members of Orthotylini (*Orthotylus rossi, Blepharidopterus chlorionis*) grouped together, and the Nichomachini (*Nichomachus* sp.) and Halticini (*Halticus bractatus*) grouped together. The Halticini and Nichomachini were also found to be grouped together recently by Tatarnic (2008) based on a phylogenetic analysis of the Halticini using morphological characters.

(Node 3): Phylinae

Three different analyses of the data, two of which combined morphological and molecular data for over a hundred taxa, resulted a monophyletic Phylinae (Node 3) that is the sister-group to Orthotylinae (Node 1 in Figs. 1-4, 1-6 and 1-8), with strong support values and several morphological synapomorphies supporting this grouping (Fig. 1-10 A-B). The presence of setiform parempodia; the rigid endosoma; the attachment of phallotheca to the pygophore; and characters of the anterior and posterior process of left paramere (which are not present in Orthotylinae or other Miridae) consistently support the monophyly of the subfamily (characters 62, 83, 88, 89 and 110, respectively).

A new potential synapomorphy for Phylinae is the presence of the ventral sac in the female genitalia (Character 110), which over the past thirty years has been sporadically documented throughout Phylinae (*Larinocerus* Froeschner in Henry and Schuh (1979)). The function of this structure has not been determined, but it is well-developed in taxa with males that have an extremely long and sinuous endosoma (most Hallodapini, some Phylini like *Chlamydatus* Curtis and *Larinocerus* Froeschner).

(Node 4): *Eminoculus*+ Hallodapini + Auricillocorini

All three analyses consistently placed Node 4 as the sister group of the remaining Phylinae with strong support (Figs. 1-4, 1-6, 1-8). Synapomorphies for this grouping include the anterior of the pronotum curving to the posterior to accommodate the rounded head (32-1); slender lyriform parempodia if present (56-0); and a medial constriction on the hemelytral margins in some of the ant-mimicking taxa (99-2) (Fig. 1-10). Excluding *Eminoculus*, the remaining taxa share the unambiguous state-change apomorphies of long, slender hind-femora (52-0); a coiled endosoma (64-2); and a heavily sclerotized ventral sac (110-3). Schuh (1984) found that Hallodapini and Auricillocorini were closely related (Fig. 1 in Schuh 1984) due to the presence of the flattened pronotal collar and the presence of members with lamellate parempodia. Schuh (1984) found that Auricillocorini were united by the presence of the unique scent gland not found in Hallodapini. This analysis supports the basal relationship of Hallodapini + Auricillocorini, but Hallodapini is rendered paraphyletic with respect to the

Auricillocorini, which suggests Hallodapini + Auricillocorini should be just one group, Hallodapini.

All three studies place *Eminoculus* Schuh as sister group of Hallodapini + Auricillocorini (Fig. 1-8), and this grouping will herein be denoted as Hallodapini *sensu lato*. Schuh (1974) noted when describing *Eminoculus* that it possesses a unique flattened pronotal collar was similar to the collar found in Hallodapini, but nonetheless placed the genus in Phylini. Recently the genus was expanded to include at least one new species without a collar (*Eminoculus atrisetosus* Schuh and Wu), but this is likely a reversal since the majority of the species have a collar. The molecular data, in addition to the presence of the flattened collar, also suggests that *Eminoculus* should be with Hallodapini. It should be noted, however, that a more detailed study of the collar is necessary because taxa that also have a flattened collar that were previously placed in Hallodapini appear to be more closely related to other tribes in Phylinae (see *Coquillettia* + *Denticulophallus*+ *Macrotylus* group Node 12 in Figs. 1-4, 1-6 and 1-8), suggesting a collar evolved multiple times. Lastly *Cremnocephalus,* which was re-sequenced for molecular data in this study, also appears to be firmly placed in Hallodapini *sensu lato* as was hypothesized by several authors (Carvalho 1952, Schuh 1974, Wyginer 2006). Its temporary placement in Orthotylinae by Schuh *et al.* (2009) is therefore likely due to DNA contamination or other errors in the sequencing.

<u>(Node 5): *Dilatops* + Remainder of Phylinae</u>

In all of the analyses the sister group to the rest of Phylinae excluding Hallodapini *sensu lato* is *Dilatops fici* Weirauch (Node 6). The unambiguous state-change apomorphy for this node that is supported in the Bayesian analysis includes the loss of the pronotal collar (36-1) (Fig. 1-10B). Excluding *Dilatops* there are several apomorphies supporting the remainder Phylinae: the lack of a post-ocular area (28-0); the L shaped phallotheca (81-1); the flat vestibulum wall (107-0); and the weakly sclerotized rings (114-1). Weirauch placed *Dilatops* in Leucophoropterini based on its similarity to the leucophoropterine genus *Lasiolabops* Poppius of Africa and the Indo-Pacific, which also has stylate eyes and feeds on *Ficus* (Moraceae), but noted that it does not have most of the characters considered synapomorphies for the tribe (Weirauch 2006C). Weirauch did suggest that the ridges on the claw could be a synapomorphy with Leucophoropterini (Fig. 17 of Weirauch 2006C), but the presence of claw ridges in other tribes and taxa (Fig. 34 of *Pilophorus sp*. in Schuh 1984) suggests that this is likely not the case. One additional species of *Dilatops* has recently been described (*Dilatops monteithi* Cassis and Weirauch) from New Caledonia.

<u>(Node 8): “South African Phylinae Group” Phylini</u>

One of the major differences between the parsimony and molecular-model based analyses is the placement of this group of South African Phylinae, which is more basal in the parsimony analysis (node 6 in Fig. 1-4) than in the Bayesian and molecular-based model analysis (node 7 in Figs. 1-6, 1-8). Nevertheless there appears to be strong support for this group in all three analyses. Morphological character states unambiguous state-change apomorphy supporting this node include the phallotheca being “L” shaped (81-1); and right paramere being leaf-shaped (85-1). The fauna of South African Phylinae is still relatively unexplored compared to other regional faunas (Nearctic, Holarctic), with the most intensive treatment by Schuh over thirty years ago (1974). With the advent of the PBI project several generic studies have been published (Schuh and Wu 2009, Menard 2010) and most genera have thus far been placed in Phylini. This independent lineage of taxa native to South Africa suggests the possibility of a larger, tribal-level grouping of genera from the African continent.

(Node 17): "*Atractotomus* Group" Phylini

This group of taxa is switched with the "South African Group" Phylini in relative placement on the deeper nodes of the TNT tree relative to the Bayesian and RAxML analyses (see node 16 in Fig. 1-5 and node 6 in Figs. 1-7 and 1-9, respectively). It is well supported in all three analyses, with the unambiguous state-change morphological character apomorphies of having no visible calli (43-0); short, flat hind-femora (52-2); the L shaped phallotheca (81-1); and the right-triangle shape of the female cuneus (102-2); with the exclusion of *Keltonia* Knight. *Keltonia* groups with this node in the parsimony analysis, but not in the other two analyses. In the Bayesian analysis the character of having greater than 1/3 of the head below the eyes (94-0) supports the node.

Several characters noted by previous authors for grouping some of these genera (Schuh and Schwartz 1985, Stonedahl 1990) appear to be more widespread than initially thought, and are possible synapomorphies for this tribal-level group. First, several of these genera have a row of spicules on the hind-femur (15-1), which was first recorded in *Campylomma* Poppius and *Rhinacloa forticornis* Reuter by Schuh (Figs. 828-9, 999, 1446 in Schuh 1984), confirmed by Schuh and Schwartz (1985) to be present on members of the entire genus of *Rhinacloa*, and subsequently found on *Phoenicocoris* Reuter and *Atractotomus* Fieber by Stonedahl (1990, Figs. 76-91). Second, all of the genera (with the exception of *Spanagonicus* Reuter) have scale-like setae with serrated edges and microsculpture (as compared to Pilophorini), which was discussed in Stonedahl (1990). Lastly, most of the genera have an endosoma with a combination of the following characteristics: slender, often twisting upon themselves; with a single, short spine at the apex; and a circular, subapical secondary gonopore (Fig. 18, 21 in Henry and Schuh 1979, Figs. 141-160 in Schuh and Schwartz 1985, Figs. 116-145 in Stonedahl 1990, Figs. 13-16 in Schuh 2000, Figs. 4-6 in Schuh and Schwartz 2005). In addition, *Larinocerus* and a majority of the *Atractotomus* species have micro-spicules subtending the secondary gonopore (Character 77, Figs. 18, 21 in Henry and Schuh 1979, Figs. 116-145 in Stonedahl 1990).

(Node 11): North American Phylini

One group of predominantly North American and Holarctic genera (Node 14) is grouped with two nodes that are a mixture of North American Hallodapini (*Coquillettia*, *Teleorhinus*) and other Phylini (*Denticulophallus* Schuh, *Macrotylus* Fieber and *Amblytylus nasutus* Kirshbaum, nodes 12 and 13) in all the analyses. While node 11 is present across all three analyses, node support values are low and no unambiguous state-change morphological apomorphies support this grouping.

(Node 12): "*Coquillettia* Group"

The placement of North American *Coquillettia* Uhler and *Teleorhinus* Uhler in Hallodapini has been debated (Schuh 1974, Wyginer 2006), with the most recent hypotheses removing the two genera from the Hallodapini and forming a separate group (Wyginer, in press). However, in all three analyses the South African genus *Denticulophallus* Schuh groups with *Coquillettia* and North American *Macrotylus* with relatively strong node support (Node 12). *Denticulophallus* has an unusual endosoma (Figs. 245-247 in Schuh 1974) that is unique among Phylinae, and the genus was initially placed in Phylini by Schuh (1974). Superficially the three genera do not look similar, however all three genera are united by having pulvilli that are attached to the base of the claw and not the ventral surface (Character 54-3, Fig. 33 in Schuh 1976). Knight (1941) was first to note that the *Coquillettia* has long pulvilli along with phyline *Macrotylus* (Schuh 1974, pg 298). In the description of *Denticulophallus,* Schuh (1974) described large, fleshy and flattened pulvilli that are attached just at the base of the claw, but it was not grouped with *Macrotylus* in that work. Additional unambiguous state-change apomorphies include the fused posterior wall (117-3) (Fig. 1-10 A-B).

(Node 13): "*Teleorhinus* Group" Hallodapini + Phylini

This grouping of *Teleorhinus* with *Amblytylus nasutus* occurs through all three analyses, and with strong support. Uniting this group are the following morphological apomorphies: the relatively forward position of the mouthparts in the males and females (19-1, 96-2); the projecting clypeus (29-2); the endosoma as a fused tube rather than two straps (63-1); the leaf-shaped right paramere (85-1); the straight posterior process of the left paramere (86-0); and the eyes being parallel to the anterior margin of the pronotum when viewed laterally (93-1). *Amblytylus* is rendered polyphyletic in these analyses, but this may be an artifact due to the limited sampling of this genus and the general paucity of samples for the molecular and morphology analysis from the Palearctic. Both taxa in this grouping also do not have the free pulvilli of the *Coquillettia* group. This result suggests that *Teleorhinus* (and *Coquillettia*) both be removed from Hallodapini, in agreement with the conclusions of Wyginer (in press) who proposes placing the genera belong in a new tribe, the Pronotocrepini.

(Node 14): "Holarctic Group" Phylini

The Phylini group is well supported across all three analyses and contains genera that are primarily Nearctic or Holarctic in distribution. Due to the relatively easy access to taxa from the Nearctic for the molecular data in this study, several genera had more than one representative species and (with exception of *Amblytylus*, see Node 13 discussion) are monophyletic. Morphological characters that are Consistent with this node include the relatively large pygophore relative to the abdomen (60-2); and the relatively large eyes as compared to the height of the head when viewed laterally in both sexes (27-0, 94-0); though these characters are not unambiguous state-change apomorphies. Analyses of the generic relationships within this group is outside the scope of this study, but I note that there appears to be strong support for a predominantly Western-North American Group (Node 15).

(Node 19): "Australian Group" Phylini + Pilophorini + *"Karoocapsus* Group"

The parsimony analysis was the only analysis that placed Pilophorini with the "Australian Phylini" and "*Karoocapsus* group", with little support and no unambiguous state-change apomorphies (Fig. 1-10B). Pilophorini was placed as sister-group to the "*Tuxedo* + *Pseudophylus"* or "*Tuxedo* + *Pseudophylus* + *Decomia"* Group in the both model-based analyses. Several morphological apomorphies support this grouping in the parsimony analyses (Fig. 1-10 A). First the phallotheca is L shaped (81-1) asymmetrical vestibular plates that are large and project into the abdomen (105-3, 106-1, 107-1); the posterior wall is fused to the central plate (117-3); and projections are visible on the posterior wall when viewed from the posterior (116-2). When Pilophorini are placed as sister group to the rest of Phylinae in the other two analyses, there is little to no strong branch support (Figs. 1-7, 1-9) and no unambiguous state-change apomorphies (Fig. 1-10 B).

(Node 20): Pilophorini

Pilophorini is one of the most well studied tribes in Phylinae, supported by multiple synapomorphies that have been tested several times (Schuh 1974, 1984, 1991; Schuh and Schwartz 1988). It is not surprising that the tribe was found to be monophyletic and highly supported in all three analyses (Figs. 1-5, 1-7, 1-9, 1-10). Morphological apomorphies that unite Pilophorini in this study (Fig. 1-10) are the presence of scales on the scutellum (6-1); the presence of patches of scales on the thorax

(9-1 and 9-2) and presence of scales on the abdomen (10); the upturned margin on the back of the head (18-1); lamellate parempodia (55-1); the tube like endosoma (63-1) with a simple semi-circular opening for the secondary gonopore (66-0) and long glassy spicules above the opening (78-1); and the phallotheca that is duck-head shaped (80-2) and perpendicular to the base (81-2); and a completely sclerotized posterior wall.

Although the monophyly of Pilophorini was expected, the tribe's placement within the larger context of Phylinae is vastly different than that hypothesized initially by Schuh (1974, 1976, and 1984) (Fig. 1-2). Despite some uncertainty in the present study about whether Pilophorini are sister group to the Australian Phylini and *Karoocapsus* group (see discussion of Node 19), Pilophorini are not sister group to the remainder of Phylinae in all three analyses. This basal placement in Schuh (1974, 1976, and 1984) was based primarily on the presence of the lamellate parempodia, which was why it was placed in Orthotylinae initially (Carvalho 1952). The tribe was then moved to Phylinae and the lamellate parempodia were considered to be a plesiomorphic state, and taxa that possessed that character were considered basal (Schuh 1974, 1976, 1984). With the tremendous efforts over the last twenty years to describe the diversity in Phylinae, it is now known that lamellate parempodia are present in at least three different unrelated groups: Hallodapini+ Auricillocorini, Pilophorini, and some Australian Phylini (see discussion of Node 22, conclusion). In addition, we now know that other genitalic characters that appeared unique to Pilophorini have similar states in other lineages (the medial spine on the endosoma, which is similar to the medial spine found in the

Australian Phylini group). Therefore, it appears that Pilophorini is a more derived group than initially thought based on characters other than the parempodia.

(Node 21): "Australian Group" Phylini + "*Karoocapsus* Group" Phylini

All three analyses found strong support for the sister-group relationship of the Australian Phylini Group and the *Karoocapsus* group, including an unambiguous state-change apomorphy of an expanded central area of the left paramere (91-1) (Fig. 1-10 A-B).

(Node 22): "Australian Group" Phylini

This group of Australian taxa, including *Ancoraphylus* Weirauch, *Exocarpocoris* Weirauch, *Polyozus* Eyles and Schuh (Weirauch 2007) and *Wallabicoris* Schuh and Pedraza-Peñalosa has strong morphological and molecular support and is present in all the analyses. Unambiguous state-change apomorphies include relatively large eyes (94-0); two asymmetrical sclerites on the anterior wall of the vestibulum (108-2); and the posterior wall membranous anteriorly (117-3). This group has the potential to increase in size as more taxa are described from Australia, where based on preliminary estimates there are hundreds of taxa yet to be described. For example, *Melaleucoides* (Schuh and Weirauch, in press) is believed to be part of this grouping (Schuh, personal communication) and possesses lamellate parempodia, which would make it the third occurrence of this type of parempodia in Phylinae.

(Node 23): "*Karoocapsus* Group"

The *Karoocapsus* Group receives strong support in all three analyses. Including *Pseudosthenarus* there are several potential morphological apomorphies for this grouping, including the curving of the head into the anterior portion of the pronotum (32-1) and the right-angle shape of the female cuneus (102-2). Excluding *Pseudosthenarus,* unambiguous state-change apomorphies include the posterior margins of the eye being parallel to the anterior margin of the head (17-1); the rounded margin of the cuneus in females (100-1); and anterior projections on the posterior wall when viewed from the posterior (115-2). All the genera excluding *Pseudosthenarus* also have extremely simple, an often tube-like endosoma with small to no visible secondary gonopore (Figs. 197, 200, 201, 203 of *Karoocapsus* in Schuh 1974, Figs. 79, 124 of *Semium hirtum* and *Criocoris saliens* in Kelton 1959, Figs. 639, 642 and 645 of *Tytthus sp.* in Schuh 1984), whereas *Pseudosthenarus* has a slender endosoma with an expansive apex unlike any other Phylinae (Figs. 293-309 in Schuh 1974). In addition, many of the genera are highly sexually dimorphic; the females having moderately to extremely reduced wings (females in *Karoocapsus* are micropterous and ant-mimetic, Fig. 1-3 O); and members possess scale-like setae (*Criocoris, Karoocapsus*).

Karoocapsus and *Tytthus* were placed in Leucophoropterini by Schuh (1974) based primarily on the possession of simple and small genitalia; however the present analyses show they are more closely related to Pilophorini than to Leucophoropterini *sensu stricto* (see discussion of node 28). There are several distinct characteristics of the morphology in *Karoocapsus* as compared to Leucophoropterini *sensu stricto* (Node 28) that support its removal from the latter tribe. First, although *Karoocapsus* males were first described as ant-mimetic and therefore placed in Leucophoropterini, it is the females that show the most convincing mimicry by possessing brachypterous wings with a largely exposed abdomen that gives the appearance of a petiole (Fig. 1-3 O). The genera within Leucophoropterini *sensu stricto*, if they show ant-mimicry, have developed wings in both sexes. Second, many *Karoocapsus* species have scale-like setae (*Karoocapsus middelburgensis* Schuh), which are not present in any of the genera in Leucophoropterini except for *Lasiolabops*, whose assignment to the Leucophoropterini can be questioned. Cosmopolitan *Tytthus* is also morphologically different from Leucophoropterini in that it has almost completely membranous wings; small eyes with a post-ocular area; and almost no indications of ant-mimicry. Overall it is clear that the *Karoocapsus* and *Tytthus* are unrelated to Leucophoropterini *sensu stricto* and should be excluded from the tribe.

<u>(Node 24): Leucophoropterini + *Decomia* + *Tuxedo*+ *Pseudophylus* Phylini</u>

Only the parsimony and Bayes analyses group these three genera with Leucophoropterini, and the latter analysis is the only one with strong node support. Because the RAxML analysis used molecular data only, the grouping of these taxa by Bayes and Parsimony analyses suggests that there is additional signal being provided at this node by the morphological characters. These morphological characters (Figs. 1-10 A-B) include eyes that bulge away from the surface of the head (24-1); a weakly sclerotized secondary gonopore (66-3); and large eyes (94-0, 95-1). Nevertheless this grouping indicates that Leucophoropterini are more closely related to taxa from the Indo-Pacific than to other taxa from Australia, which is important for outgroup selection in the subsequent within-tribal analysis of Leucophoropterini (Chapter III).

(Node 26): *"Decomia"+ "Tuxedo+ Pseudophylus"* Group

Only the Bayesian analysis placed *Decomia* in its own lineage, whereas in the other two analyses it is grouped with *Tuxedo* and *Pseudophylus*. *Pseudophylus* morphology was not coded due to the degree of degradation of the specimen caused by the DNA extraction procedure, so any morphological support of is node is limited to comparing *Decomia* and *Tuxedo*, both of which are diverse genera (Schuh 1984, 2004A) not well sampled in this analysis. Therefore, although *Decomia* is grouped with these two genera in these two analyses, support for a grouping of these three genera is not strong compared to strong support for a sister-group relationship of *Pseudophylus* and *Tuxedo*.

Schuh (1984) was the first to propose that *Decomia* may be a unique lineage in due to its presence of flabellate pulvilli; splayed left paramere; the overall shape of the endosoma and secondary gonopore; the nose on the phallotheca; partially hyaline hemelytra and dark wing patterning diagnostic for the genus (Schuh 1984). In addition, several female genitalic characteristics newly documented for the genus were found to be diagnostic for a *Decomia* group lineage, such as the sclerotized ventral sac (110-3); sclerotized lobes extending from the rami in the dorsal labiate plate (113-1); and a central sclerite surrounded by membrane on the posterior wall (116-1).

The genus *Tuxedo* is endemic to the Western North America and the grouping with *Pseudophylus* from Japan and *Decomia* from the Indo-Pacific (the latter with high node support) has interesting biogeography implications. First, it appears that *Tuxedo* is more closely related to taxa from the Palearctic or Old-World tropics than to the other nodes containing primarily Nearctic and Holarctic taxa. Second, the genera of Phylinae that are most often confused with *Tuxedo* based on coloration and general habitus are *Sejanus* Distant from South-Eastern Australia in the Leucophoropterini. Both genera are predominantly dark brown to red with bright contrastingly covered transverse fascia, dark red or brown hind-femora that contrast to the light-colored fore- and mesofemora, and sexual dimorphic in coloration of the hemelytra and second antennal segments (Fig. 1 in Schuh 2004). Schuh (2004) argued that *Tuxedo* Schuh may be more closely related to Phylini genera *Pinophylu*s Schwartz and Schuh, and *Plesiodema* Reuter based on several habitus and genitalic characters, but did not test the relative placement of the genus within the currently recognized tribes. While superficially looking like many of the *Ausejanus* MS species, I believe that *Tuxedo* Schuh belongs to a group of Phylinae that are sister-group to the Leucophoropterini but do not belong in the tribe due to the larger size of the male genitalia and pygophore, and the elaborations on the apex of the endosoma (Schuh 2004: fig 2). Sampling of *Pinophylus* Schwartz and Schuh and *Plesiodema* Reuter are needed to further clarify this hypothesis.

(Node 28): Leucophoropterini

Leucophoropterini Schuh has the type genus *Leucophoroptera* Poppius described from Australia with two included species, both represented by female specimens only (*L. fasciatipennis, L. quadrimaculata*). Both of these species are included in the analysis, and are included in the now monophyletic Leucophoropterini. Genera assigned to the tribe have included *Myrmicopsella* Poppius, *Sejanus* Distant, *Karoocapsus* Schuh, and *Tytthus* Fieber (Schuh 1974), the latter two genera are now placed in the *Karoocapsus* group (Node 23). Synapomorphies hypothesized for the tribe include ant-mimicry; the presence of a transverse fascia across the anterior margin of the hemelytra; the relatively small pygophore relative to the abdomen; and small, simple genitalia (Schuh 1974).

The concept of the Leucophoropterini expanded greatly after Carvalho and Gross (1982) described four new genera and several species to the "Leucophoroptera-Group" from Australia. The authors described a majority of the species in *Sejanus* Distant and *Leucophoroptera* Poppius (also basing their descriptions on female specimens and holotypes, especially in the latter genus), and described the new genera *Blesingia, Collessicoris*, *Porophoroptera*, and *Leucophoroptera fasciatipennis*. Though the rational for adding these taxa to the tribe was based on a perceived degree of ant-mimicry, a majority of the taxa are not ant-mimicking and several have characters that make their placement in the Leucophoropterini questionable (Chapter III). The concept of the Leucophoropterini was broadened further by Schuh (1984), who greatly expanded the representation of the tribe in the Indo-Pacific by describing 11 new genera and proposing several generic groupings within the tribe, such as the *Gulacapsus* Group and *Ctypomiris* Group (Schuh 1984). Schuh (1984) did a phylogenetic analysis of the tribe's Indo-

Pacific taxa, but how those taxa relate to the South African and Australian taxa has not been tested until this study.

In all three analyses there is a consistent grouping of the Australian *Sejanus* species of Carvalho and Gross (1982) with several Indo-Pacific genera proposed to be in Leucophoropterini by Schuh (e.g. *Ctypomiris* Group, Schuh 1984). There also is a subgroup of *Sejanus* species from the Palearctic (*S. juglandis* Yasunaga, *S. potanini* (Reuter)) with one Australian species (*Sejanus brittoni* Carvalho and Gross) herein referred to as *Sejanus sensu stricto* due to the possible synapomorphies with the type species of *Sejanus* (*Sejanus funereus* Distant) from Sri Lanka (see Chapter III). Morphological apomorphies for the Leucophoropterini grouping include the strongly thicker second antennal segment as compared to the rest of the segments (34-1); a general C-shaped phallotheca (82-0); and membranous dorsal labiate plate (112-0). In addition, the characters proposed by Schuh (1982) to unite Leucophoropterini are revised based on the following: the characters proposed to contribute to ant mimicry (e.g. Character 30-1 of the head extending below the eyes to mimic mandibles) are present in several lineages in addition to Leucophoropterini, and therefore are not uniquely diagnostic for the tribe; several other genera outside of Leucophoropterini (e.g. *Tuxedo* Schuh) have transverse fascias; “simple” genitalia, if defined as having minimal ornamentation and elaborations, is present in *Karoocapsus* Group as well as Leucophoropterini, necessitating a detailed characterization of the endosoma to be a unique defining character for the Leucophoropterini; and several lineages other than Leucophoropterini (e.g. *Karoocapsus* Group) have relatively small pygophores. For these reasons, I propose the following revised combination of characters diagnostic for members the tribe in addition to the apomorphies mentioned above: the combination of a relatively small C, J or S-shaped endosoma composed of two separate (e.g. *Arafuramiris* Schuh) or fused (*Sejanus* sensu stricto) straps, without elaborations or spines at the apex, and with a weakly sclerotized to horse-collared, subapical secondary gonopore. Most member of the tribe (though not coded as a character in this analysis) are also dark brown (*Sejanus* sensu stricto, *Sejanus mcdonaldi* Carvalho and Gross), castaneous (*Arafuramiris* Schuh, *Papuamimus* Schuh), or reddish-burgundy (*Sejanus neboissi* Carvalho and Gross) for the thorax and head, never white or light in coloration. However, because sampling in this analysis is biased towards Australian taxa, and a majority of the diversity of Leucophoropterini is in the Indo-Pacific, these apomorphies may not represent the diversity of potential characters for this group and are investigated further in Chapter III with an expanded taxon sampling of the Indo-Pacific members of the tribe.

However, conservatively it can be said that Leucophoropterini appear to be a primarily Indo-Australian with extensions into the Palearctic. Its closest relatives are from the Indo-Pacific and Palearctic rather than other Phylini from Australia (see Node 13) for outgroup selection (see Node 26). Additionally, *Karoocapsus, Tytthus,* and *Dilatops* are unlikely to be related to Leucophoropterini, and will not be used in the generic level revision and analysis of the tribe.

Conclusion

This study was initially undertaken primarily to determine an outgroup for Leucophoropterini tribal revision. It quickly grew into a larger conceptual analysis of the subfamily that now appears more complex than ever in regard to tribal relationships. Even with a heavily North American taxon bias (with several smaller contributions of taxa from Australia, South Africa, Thailand, and Russia), several changes are clearly required in the tribal classification of Phylinae.

First, the older, well-studied tribes (Pilophorini, Hallodapini in the sense of the present paper) continue to be monophyletic, whereas the tribes proposed within the last thirty years (Leucophoropterini), or groups based on absence characters (Phylini). Over the last fifty years discovery and description of taxa in Phylinae has exploded, with several treatments in areas such as Australia, South Africa, North America, the Old-World Tropics, and Africa that previously have not had the same descriptive history as the Palearctic regions with their well established generic groupings. This resulted in a rapid accumulation of taxa with new and novel morphologies, but without robust hypotheses of phylogenetic relationships to accommodate them. Phylini grew to become a polyphyletic group for anything that could not be placed elsewhere, included several independent lineages, some of which cross multiple geographic regions. Only after a tribe has been tested multiple times, with its character systems analyzed and tested, can new taxa accurately be placed. This study indicates several groups that, over time and with a global treatment and testing can potentially be as strong as Pilophorini and Hallodapini.

Second, several character systems that had been hypothesized to provide strong support for the relationships among the tribes within the subfamily should be reconsidered. As the overall topology shows, Pilophorini are not the sister group to the rest of Phylinae as proposed by Schuh (1974, 1976, 1984), indicating that the presence of lamellate parempodia is not a plesiomorphic condition for the pilophorines. Nor are lamellate parempodia likely the plesiomorphic condition for Hallodapini *sensu stricto.* The basal taxa of the tribe possess setiform parempodia with a possible reversal to lamellate parempodia in former Auricillocorini taxa such as *Cleotomiroide*s Schuh. This analysis suggests the lamellate parempodia has evolved at least one other time in the Australian *Melaleucoides* group (Schuh and Weirauch, in press), and that those that possess the trait are not necessarily related. The pronotal collar also appears to have evolved multiple times, and *Coquillettia* and *Teleorhinus* are not closely related to the "true" hallodapines, given that both taxa share apomorphies with other groups (*Coquillettia* Group, Node 12). In addition, several other promising character systems are emerging (female genitalic characters, setae), but they will require a more detailed and broader analysis than possible in this survey.

Third, while a great effort was placed on obtaining as many taxa as possible for molecular and morphological characters for this analysis, better sampling of the Palearctic and African fauna are needed to further resolve tribal relationships among Phylinae. The Holarctic "*Atractotomus* Group" (Node 17) and "South African" Group (Node 8) are the nodes with the least consistent placement among the trees from the different analyses, and the lowest support at the nodes resolving the tribal relationships.

For the “*Atractotomus* Group” inconsistent placement among the three analyses is likely due to many of the Holarctic genera (*Chlamydatus, Atractotomus*) not having Palearctic species sampled to provide a broader character context. Even within the relatively well sampled North American Phylini group (Node 14) there is lack of well-supported resolution past the genus-level (Figs. 1-4, 1-6, 1-8). Lack of context due to insufficient sampling is likely why *Keltonia* Knight is inconsistently placed among the analyses. The genus was placed with the *Atractotomus* Group in the parsimony analysis, the *Coquillettia* group in the RAxML analysis, and the North American Group with the Bayesian analysis. The relatively long branch length of *Keltonia* in the RAxML analysis (Fig. 1-9) suggests that the molecular data for this taxon may be highly autapomorphic, causing the taxon to group differently in each analysis, unlike *Reuteroscopus* which also has a relatively long branch but consistently groups with *Roburocoris maculosus*.

Lastly, there are several independent lineages of North-American Phylini which need to be compared with the Palearctic Phylini fauna to determine the “true” Phylini and provide context for a revision of the subfamily. The type genus of Phylini is the Palearctic genus *Phylus* Hahn, whose relationship with other Palearctic taxa has not been tested in a phylogenetic context. A revision including the Palearctic Phylini is critical for several reasons. The first question is whether the Palearctic Phylini is composed of one evolutionary lineage, or several independent lineages. A para- or polyphyletic Palearctic Phylini has to be revised to be limited to the lineage containing the type genus *Phylus.* Second, a larger sampling of the Palearctic Phylini is needed to determine whether tribal-level groupings containing Holarctic genera (*Atractotomus* group) are an independent lineage or are closely related to taxa in either the Palearctic or Nearctic. Finally, there is strong evidence in this study that at least one Western North-American genus, *Tuxedo* Schuh is more closely related to the Eastern Palearctic Phylini fauna (*Pseudophylus* Yasunaga) than with genera found in the Western region of North America (*Pygovepres* Weirauch, *Phallospinophylus* Weirauch), suggesting there are other possible Holarctic lineages.

This study provides a preliminary framework to revisit the tribal groupings within Phylinae and provides possible synapomorphies for further study and investigation. It also has indicated that several traits considered plesiomorphies for the subfamily such as the pronotal collar and lamellate parempodia should be reevaluated at the tribal level. Most of the morphological characters in this analysis had fairly low consistency indices, with exceptions in characters that are synapomorphies in well-studied groups (Pilophorini genitalia, *Polyozus* group genitalia). The inclusion of several female genitalic characters also had some support in nodes, but overall these characters had low consistency indices compared to the rest of the character systems. Rather than discount morphological characters because of their low consistency indices, this study indicates the need for future studies of comparative morphology to discover more accurate homology statements. Even morphological characters with weak support at some nodes have the potential to be more informative once they are refined and tested by reciprocal illumination. This is especially true for the female genitalia, which merit continued exploration and documentation across Phylinae and within some of these subgroups proposed in this analysis.

Finally, by reevaluating Leucophoropterini, it is possible to analyze the tribe with the correct outgroups (*Decomia, Tuxedo*) excluding those taxa likely to be unrelated (*Karoocapsus, Tytthus, Dilatops*). This will lead to a more accurate and comprehensive study of the tribal and generic studies in the following chapters. However, any taxonomic changes outside of Leucophoropterini at the tribal level would be preemptive and outside the scope of this work, and will be suspended until a more distributed sampling of the incredible diversity of Phylinae is accomplished outside of this dissertation.

CHAPTER III

A PHYLOGENETIC STUDY OF THE GENERIC RELATIONSHIPS WITHIN LEUCOPHOROPTERINI SCHUH (MIRIDAE: PHYLINAE)

Introduction

The Leucophoropterini (Miridae: Phylinae) is a relatively small tribe within the Phylinae that contains twenty-two genera and over one hundred species, mostly endemic to the Indo-Pacific and Australia. The type genus *Leucophoroptera* Poppius was described from Australia with two included species, both represented by female specimens only (*Leucophoroptera. fasciatipennis, Leucophoroptera quadrimaculata:* Poppius 1914). Schuh (1974) defined the tribe based on the members having the following characters: the presence of a transverse fascia across the anterior margin of the hemelytra; the relatively small pygophore relative to the abdomen; small, simple genitalia; and a trend towards ant-mimicking body forms. Genera initially assigned to the tribe were *Myrmicopsella* Poppius (Madagascar: Poppius 1914), *Sejanus* Distant (Oriental, Palearctic: Distant 1910; Yasunaga 2001), *Karoocapsus* Schuh (South Africa: Schuh 1974), and *Tytthus* Fieber (cosmopolitan: Schuh 1984) in addition to the Australian Leucophoroptera (Schuh 1974). However, based on my analysis of Phylinae the Leucophoropterini appears to be restricted to Australia and the Indo-Pacific (Chapter II) and *Karoocapsus* + *Tytthus* represent a separate clade (Chapter II node 23) that I call the *Karoocapsus* Group.

The Leucophoropterini was expanded greatly when Carvalho and Gross (1982) increased the Australian representation by describing four new genera and adding thirty-seven species to the tribe. The main characteristic for including these taxa within Leucophoropterini was perceived ant-mimicry (Carvalho and Gross 1982), rather than sharing the hypothesized male genitalic synapomorphies proposed by Schuh (1974). As a result, inclusion of the newly described genera *Blesingia, Collessicoris*, *Porophoroptera*, and *Aitkenia* was subjective and reliant on the authors' concept of an ant-mimetic body form. Whether an insect's body form is functionally ant-mimetic requires field or lab experimentation (McGiver and Stonedahl 1993), which is outside the scope of this work. As a result, it is imperative that placement of the genera described by Carvalho and Gross be tested for quantifiable, discrete characters that can be objectively compared across the tribe, such as the male-genitalia synapomorphies of Schuh (1974). Unfortunately, several of the new species in Carvalho and Gross (1982), especially in *Leucophoroptera* and *Sejanus,* were described based on female specimens only. In addition, taxa based on male specimens, such as *Aitkenia* spp., appear to be conspecific with females described under *Leucophoroptera* and *Sejanus*, suggesting there are several synonyms. Lastly, many of the *Sejanus* spp. described by Carvalho and Gross appear to constitute several independent genera, some of which do not belong within the Leucophoropterini. The majority of *Sejanus* spp. described by Carvalho and Gross (1982) are more closely aligned to *Sejanus albisignatus* (Knight) from New Zealand than to the type species *Sejanus funereus* Distant from Sri Lanka, with several possible characters differentiating the two lineages tested in this analysis. Additionally, two species-group taxa of *Sejanus* are being moved to the non-leucophoropterine genus *Xiphoidellus* (Schuh and Weirauch, (in press)) indicating the need for significant changes in the existing taxonomy in order to assess the monophyly of these Leucophoropterini.

Shortly after Carvalho and Gross (1982) expanded the Australian fauna of Leucophoropterini, Schuh (1984) added an additional 10 new genera and over 30 new species to the Leucophoropterini from the Indo-Pacific, and included a phylogenetic analysis of the tribe. While limiting his study to the Indo-Pacific fauna, Schuh (1984) clearly provided evidence that a majority of the newly described genera and species in this region conform to Leucophoropterini as earlier delineated by Schuh (1974): all have relatively small pygophores with minute to small, simple male genitalia, small female genitalia, a transverse fascia in many of the taxa, and a trend towards ant-mimicry (Schuh 1984). How the Indo-Pacific genera relate to the Australian fauna described by Carvalho and Gross (1982) has not been tested within a phylogenetic framework, although Schuh (1984) did make some brief observations on possible misplacements by Carvalho and Gross (1982).

Two Indo-Pacific genera (*Arafuramiris* Schuh, *Gulacapsus* Schuh) have distributions extending into northern Australia (Schuh 1984), but Australian portion of those distributions was not addressed due to the regional scope of Schuh's work and the ongoing work of Carvalho and Gross (1982). Placement of the Australian taxa within these genera is well-supported by several diagnostic characters, such as the presence of long, sericeous setae on the clavus and a keel-like gula. However, the relationship of

Schuh's (1984) Indo-Pacific *Sejanus* spp. to Carvalho and Gross' (1982) Australian *Sejanus* taxa remains unclear. Many of the *Sejanus* taxa of Schuh (1984) closely resemble the type species *Sejanus funereus* Distant by having a relatively small, C-shaped endosoma, weak sexual dimorphism in coloration and morphology, small size, and dark brown to black coloration. The *Sejanus* taxa of Carvalho and Gross have an S-shaped endosoma, strong sexual dimorphism in coloration and morphology, larger size, and burgundy, golden, and light brown coloration of the hemelytron. In this work I readdress the generic limits of *Sejanus* in a phylogenetic context, testing whether the Australian, Palearctic, and Oriental species comprise different independent lineages with unique synapomorphies, and if so how these lineages are related to one another.

This phylogenetic analysis of Leucophoropterini will address four questions.

1. The monophyly of the genera within Leucophoropterini is tested.
2. The hypothesized generic relationships within the Indo-Pacific Leucophoropterini proposed by Schuh (1984) are tested with the expanded taxon sampling of taxa for Australia.
3. The monophyly of the generic concepts used by Carvalho and Gross (1982) are tested.
4. Additional morphological synapomorphies for the tribe not tested in the subfamily analysis (Chapter II) are addressed.

Methods

Introduction

91 Leucophoropterini species and 5 outgroup species are coded for 137 morphological characters, representing all but five genera of the tribe. Outgroup selection is based on the subfamily analysis of Phylinae and includes three species of the sister-group genus *Tuxedo* Schuh, and two Pilophorini (*Hypseloecus munroi* Schuh, *Pilophorus alstoni* Schuh). *Decomia* Poppius is not used as an outgroup, despite its being sister to *Tuxedo* + *Pseudophylus* Yasunaga Leucophoropterini (Chapter II), due to its highly autapomorphic morphology (Schuh 1984, Chapter II), which renders the majority of characters coded for this taxon phylogenetically uninformative. Morphological characters were initially selected from Schuh (1984) and later augmented to incorporate the morphological diversity expressed within the broader taxon sampling of the present work. Of the 137 morphological characters coded (Appendix 2), 27 pertain to the male or female genitalia, 12 characterize vestiture and surface texture, 40 characterize color, and 58 are somatic characters. I was not able to examine several species in Schuh (1984) that are known only from the type. As a result, characters for these taxa are coded from the original descriptions. The majority of the Australian species of Carvalho and Gross (1982) are coded directly from long series of specimens in good condition from recent collecting efforts in Australia by Gerry Cassis and Randall Schuh. External morphology was observed and coded using a dissecting microscope. Internal male and female genitalia were dissected and prepared using the methods outlined in Kelton (1959) and Slater (1950), respectively, and observed either with a

dissecting microscope or a compound microscope, depending on their size. Many character states are illustrated herein (Figs 2-4, 2-5, and 2-6), while for others the reader is directed to relevant published works.

Phylogenetic Methods

The morphological character dataset was analyzed in TNT 1.1 (Goloboff *et al.* 2003B). An unweighted parsimony analysis was conducted using all of the New Technology search algorithms for 5,000 random additions. The shortest trees were then passed to a Traditional Search using TBR branch swapping. Symmetric resampling values (Goloboff *et al.* 2003A) were calculated in TNT using 100 replicates under traditional search parameters for efficient computation speed with a default 33% change probability. Unlike bootstrap and jackknife values, symmetric resampling values are not affected by character weight and transformation costs (Goloboff *et al.* 2003A, Goloboff *et al.* 2003B). To test the fit of the data with respect to homoplasy, implied weighting (Farris 1969, Carpenter 1988, Goloboff 1993) was applied in a separate TNT parsimony analysis using all of the New Technology search algorithms for 5,000 random additions and the constant of concavity (K) set to the default value of 3.

Taxa Not Included

The monophyly of Leucophoropterini was tested in the combined morphological and molecular analysis of the Phylinae (Chapter II), and three of the included genera rendered the tribe polyphyletic: *Dilatops* Weirauch, *Karoocapsus* Schuh and *Tytthus*

Poppius. These taxa were therefore not included in the tribal analysis, as a monophyletic lineage is necessary to accurately analyze the within-tribal relationships. Several other genera and species of Leucophoropterini are not included based on the inability to access the type or representative material of the species, inability to identify species based on poor quality of the type material or the descriptions, or otherwise unclear placement in the Leucophoropterini.

Results

The parsimony analysis yielded 144 most parsimonious trees with a length of 1297 steps, the strict consensus of which is shown in Figure 2-7. Most of the variation in the topologies was due to ambiguity of species-level relationships in *Sejanus*, so one of the ninety trees was chosen at random to calculate the character support values. The consistency index (CI): 0.1812; homoplasy index (HI): 0.8188; retention index (RI): 0.6579; and rescaled consistency index (RC): 0.1192. The CI and RI values for each of the morphological characters are listed in Appendix 2, with the CI ranging from 0.059 to 1.00, the RI from zero to 1.00. The implied weighting analysis yielded one tree whose length is 1384 steps, which is shown in Figure 2-8. State-change synapomorphies supporting nodes for each analysis were calculated using PAUP 4.0b (Swofford 2003) and mapped for major nodes of the strict consensus tree and implied weighting tree, the latter illustrated on a diagram for discussion (Fig 2-9).

Both the parsimony analysis and the implied weighting analysis resulted in a monophyletic Leucophoropterini with *Tuxedo* as its sister-group (Figures 2-7, 2-8).

However, in the consensus tree *Sejanus* sensu-stricto is derived from the *Ausejanus* MS group in *Sejanus* sensu latu (Figure 2-7), with no apomorphies or strong support. In the implied weighting analysis, however, there is a separate grouping of *Sejanus* sensu stricto taxa (including type species of *Sejanus funereus*) and the Australian *Sejanus* species (*Ausejanus* MS, Figure 2-8). One species of Leucophoroptera (*Leucophoroptera macrozonata* Carvalho and Gross) groups within the *Ausejanus* clade in the implied weighting tree (Fig 2-8), where as it is in a polytomy at the base of Leucophoropterini in the strict consensus tree (Fig 2-7). In both trees *Leucophoroptera* is polyphyletic (Figs 2-7, 2-8). Type species *Leucophoroptera quadrimaculata* consistently groups with new *Leucophoroptera* species *Leucophoroptera kangarooina* MS and *Leucophoroptera gloriosa* MS (herein referred to as *Leucophoroptera* sensu stricto), separate from all other species of *Leucophoroptera* (Figs 2-7, 2-8). However, in the implied weighting tree *Leucophoroptera* sensu stricto is sister group to the *Gulacapsus* clade and the *Ctypomiris* clade (Fig 2-7), whereas in the implied weighting tree the clade is sister group to only the *Gulacapsus* Clade (Fig 2-8). The three species of *Leucophoroptera* described by Schuh (1984: *Leucophoroptera solomonensis*, *Leucophoroptera philippinensis*, and *Leucophoroptera novoirlandense*) also group separately from the remainder of *Leucophoroptera* in the *Ctypomiris* clade (Figs 2-7, 2-8).

Both analyses also support the *Gulacapsus* clade of Schuh (1984), which includes the following genera: *Pseudoleucophoroptera, Gulacapsus, Pseudohallodapocoris,* and *Trichocephalocapsus* (Fig 2-2). However, *Pseudoleucophoroptera* was found to be polyphyletic in both analyses (Figs 2-7, 2-8), and in the strict consensus tree *Trichocephalocapsus* renders *Gulacapsus* paraphyletic (Fig 2-7). *Aitkenia*, *Blesingia*, and *Leucophoroptera* are also polyphyletic in both analyses (Figs 2-7, 2-8). *Aitkenia latevagans, Aitkenia uptoni, Aitkenia monteithi*, and *Aitkenia exocarpos* MS are either sister group to the remaining Leucophoropterini (excluding *Sejanus*) in the strict consensus tree (Fig 2-7), or individual species are sister-group to either the *Gulacapsus* Clade or *Ctypomiris* Clade (Fig 2-8). *Aitkenia cantrelli*, *Aitkenia grandis*, *Leucophoroptera fasciatipennis*, and *Blesingia gularis* consistently group together as sister-group to the genera of the *Gulacapsus* Group of Schuh (1984) in both analyses, with the strict consensus tree grouping *Pseudoleucophoroptera mamai* with the latter genera (Fig 2-7) and in the implied weighting analysis *Pseudoleucophoroptera promeceops* (Fig 2-8).

The *Ctypomiris* clades include all of the genera of the *Ctypomiris* clade of Schuh (1984): *Abuyogocoris, Solomonomimus, Biromiris, Ctypomiris, Papuamimus, Arafuramiris,* and *Waterhouseana* Carvalho in both analyses (Figs 2-7, 2-8). Additional taxa in this clade include Australian genus *Collessicoris* and several new genera from Papua New Guinea (*Johnstonsoni phalarosus* MS, *Papuamiroides elongatus* MS; Figs 2-7 to 2-9). Genera *Waterhouseana, Papuamimus, Arafuramiris, Papuamiroides* MS and *Missanos* MS consistently group together in both analyses, with *Missanos* MS and *Waterhouseana* sister-group to the node containing *Papuamimus* and *Arafuramiris* in the implied weighting tree (Fig 2-8), and the all of the latter genera in an unresolved polytomy in the strict consensus tree (Fig 2-7). Also consistent between analyses is a grouping of *Abuyogocoris,* new genus *Austrodapus* MS and *Solomonomimus* (Figs 2-7, 2-8). In the strict consensus tree this clade, with *Ctypomiris* and the *Leucophoroptera* species described by Schuh (1984), is separate and sister-group to a clade containing *Waterhouseana, Collessicoris, Papuamimus, Arafuramiris*, and new genera *Papuamiroides* MS and *Missanos* MS (Fig 2-7). However, in the implied weighting tree instead of two separate lineages *Leucophoroptera philippinensis, Leucophoroptera solomonensis*, and *Leucophoroptera novoirlandense* are sister-group to the remaining genera of the *Ctypomiris* clade, and the node containing *Solomonomimus, Abuyogocoris*, and *Austrodapus* MS is sister group to *Ctypomiris, Papuamiroides, Missanos, Waterhouseana, Papuamimus* and *Arafuramiris* (Fig 2-8). The relationship of *Biromiris* to the other genera in the *Ctypomiris* clade differs between the analyses; the genus is sister-group to *Waterhouseana, Missanos* MS, *Papuamimus, Papuamiroides*, and *Arafuramiris* in the strict consensus tree (Fig 2-7), whereas it grouped with *Collessicoris* in a node that is sister-group to all of the remaining *Ctypomiris* clade genera except the three species of *Leucophoroptera* in the implied weighting analysis (Fig 2-8). Both topologies of the *Ctypomiris* clade significantly differ from the generic relationships initially proposed by Schuh (1984) (Fig 2-2).

The topologies in both the implied and strict consensus tree differ significantly from the results of Chapter II for generic relationships within the tribe (Chapter II, Figs 1-4 to 1-10). In the analysis of the tribal relationships, the node containing the *Ctypomiris* taxa (*Papuamimus*, *Arafuramiris*) has strong support, and is sister-group to the remainder of Leucophoropterini. Within the rest of the genera, the taxa of *Sejanus* sensu-stricto group also with strong support, and are sister-group to a clade of *Ausejanus*

MS taxa, *Leucophoroptera*, *Blesingia gularis*, and *Collessicoris bellissimus* (Fig 2-6). The analysis in Chapter II had a much larger character-set with the additional molecular information (Chapter II). However, this analysis has at least three times more taxa of Leucophoropterini to contribute representative morphological diversity and provide a context of the generic relationships of the tribe. To address whether the varying topologies are due to character sampling or taxon sampling would require a larger dataset with greater overlap of both properties for comparison, which is not possible at this present time. Therefore, until this can be addressed I will focus the discussion of the relationships among generic-groupings based on the morphological analysis.

Lastly, for the discussion of the generic relationships of Leucophoropterini I will focus on the results of the implied weighting tree for the following reasons. First, the majority of the groupings of taxa in the strict consensus tree (Fig 2-7) do not have strong node support. Second, over half of the morphological characters in this analysis have CI values less than 0.200 (Table 2-4), indicating significant homoplasy. The implied weighting scheme attempts to mitigate the effects of homoplasy by penalizing characters with greater homoplasy, allowing less homoplastic characters to influence tree construction more strongly (Farris 1969, Carpenter 1988, Goloboff 1993). In reducing the effects of homoplasy, the resulting topology of the implied weighting tree (Figure 2-8) is more consistent with the results found in Chapter II of Leucophoropterini using both morphological and molecular information (Chapter II: Fig. 1-5 and 1-7) and molecular only (Chapter II: Fig 1-9). *Sejanus* sensu stricto and *Ausejanus* MS group as separate clades in both the implied weighting and the Chapter II results for

Leucophoropterini, the later with strong node support (Chapter II: Figs 1-5, 1-7 and 1-9). Therefore, based on the agreement of the implied weighting tree with the results of Chapter II, I focus on these results (Fig 2-8) for the discussion of generic relationships in Leucophoropterini.

Discussion

(Node 1): *Tuxedo* Schuh + LEUCOPHOROPTERINI

Tuxedo is sister group of Leucophoropterini, which is consistent with Chapter II (Figs 1-5, 1-7, 1-9). Schuh (2004) noted that *Tuxedo* looks very similar to *Ausejanus* MS and may belong to Leucophoropterini. However, the similarities of *Tuxedo* genitalia to North American genera *Pinophylus* Schwartz and Schuh, and *Plesiodema* Reuter as observed by Schuh (2004) indicate that there is likely a close relationship between these genera. The relationships of *Tuxedo* with *Plesiodema* and *Pinophylus* in a phylogenetic context are outside the scope of this work. Therefore, I am taking the conservative approach and do not include *Tuxedo* in the Leucophoropterini.

(Node 2): LEUCOPHOROPTERINI

Leucophoropterini in monophyletic (Fig 2-7, 2-8), which is consistent with the results in Chapter II. The type genus *Leucophoroptera* is firmly grouped within the tribe. Synapomorphies for this node include a genital capsule that is less than 1/3 the total length of the abdomen (87-0), a central sclerite on the anterior of the vestibulum (136-0), and a dorsal labiate plate without sclerotized portions (137-0) (Fig 2-9). These characters are consistent with the synapomorphies of Leucophoropterini in Chapter II, which included the following additional synapomorphies in the context of the subfamily: a relatively small, S-shaped, C-shaped or J-shaped endosoma; and a relatively simple posterior wall (Chapter II, Node 28).

Schuh (1974) united Leucophoropterini on the basis of perceived ant-mimicry in several of the taxa, and the possession of characters associated with this. Ant-mimic features include the presence of a transverse fascia (Schuh 1974), a medial constriction of the lateral margins of the hemelytra to mimic an ant petiole, modifications of the coloration and structure of antennae to appear geniculate (McGiver and Stonedahl 1993); and potentially the presence of contrasting colored scales or hairs to mimic spines and other structures of the petiole (e.g. *Waterhouseana illustris*, 2-5 B). Basal leucophoropterine clades *Ausejanus* MS and *Sejanus* sensu stricto (Fig 2-8) have, at most, a transverse fascia, and therefore ant-mimicry appears to be a more derived condition.

<u>(Node 3): *Sejanus* sensu-stricto</u>

The clade of *Sejanus* spp. from the Palearctic and Indo-Pacific corresponding to the *Sejanus* sensu stricto grouping of Chapter II, and which includes type species *Sejanus funereus*, is a monophyletic group, sister to all the remaining Leucophoropterini. The following synapomorphies support this node: the anterior of the hemelytra without a transverse fascia (3-0); cuneus having at least two spots of contrasting coloration at the anterior margin (11-2); completely dark meso-coxae (21-3); pro- and meso-femora that are dark basally, light apically (23-1, 24-2); a cuneus that is less than 1/3 the total length of the wing membrane (74-0), and an secondary gonopore that is not easily visible (92-0) (Fig 2-9). Excluding castaneous *Sejanus cinnameus* Schuh, *Sejanus* sensu-stricto species also are predominantly dark brown in coloration (1-1). There are several species groupings within *Sejanus* sensu stricto that correspond to Schuh (1984) or are new based on this analysis:

- *serrulatus* group: There is a grouping of *Sejanus brittoni*, *Sejanus palumae*, *Sejanus melas*, *Sejanus serrulatus*, and *Sejanus elongatus* as sister-group to the remaining *Sejanus* species (Fig 2-8), united by the serrations on the membrane of the endosoma (91-1).
- *ecnomioides* group: There is a grouping of *Sejanus economiscos*, *Sejanus ecnomioides*, and *Sejanus ecnomios* that corresponds to one of the *Sejanus* clades (Fig 2-1: "*Sejanus* in part* 3") proposed by Schuh (1982). These three species were united by the elevated left paramere (Figure 2-1) (character 105-1).
- *funereus* group: This clade includes *Sejanus umi* Schuh, *Sejanus funeroides* Schuh, and the type species *Sejanus funereus* (Fig 2-8) herein referred to as the *funereus* group. This grouping is united by flat dorso-posterior margin of the left paramere (99-1).
- *spiculatus* group: this grouping of *Sejanus howardae* Carvalho and Gross, *Sejanus luzonicus* Schuh, *Sejanus isarog*, and *Sejanus spiculatus* Schuh is based on the completely light fourth antennal segment (18-0).

Schuh (1984) argued that *Sejanus* was the most difficult genus in Leucophoropterini to resolve and interpret due to its diversity and lack of clear-cut species-group distinctions. Even after the majority of the taxa related to *Sejanus albisignatus* and taxa described by Carvalho and Gross (1982) are excluded (see Node 5, *Ausejanus* MS), the remaining *Sejanus* sensu-stricto taxa are resolved only for these four nodes in the implied weighting analysis (Fig 2-8). The type species of *Sejanus* (*Sejanus funereus*) was described from Sri Lanka, and at least ten species other species have sporadic distributions throughout the Orient and eastern Palearctic, including four from Japan alone (Yasunaga 2001). Schuh (1984) found over thirty species in the Indo-Pacific, an area with no previous record of the genus. Equivalent exploration of the Oriental region will likely to discover tremendous diversity of this genus. As it currently stands, there is only enough information to confidently state the following. First, *Sejanus* should be restricted to the taxa in *Sejanus* sensu stricto that form a monophyletic lineage. Second, there is at least one species group that is supported in this study by the strict consensus parsimony tree, implied tree, and Schuh (1984): the *ecnomioides* group. Lastly, the implied weighting tree suggests a *funereus*, *serrulatus*, and *spiculatus* group, but taxonomic changes should await further support and corroboration.

(Node 4): *Ausejanus* MS

In the implied weighting tree (Fig 2-8) there is a distinct grouping of primarily Australian species that correspond to the general body-form and *Sejanus albisignatus*

(Knight), herein referred to as the *Ausejanus* MS group. Knight (1938) described two species*: Idatiella albisignatus* from New Zealand, and *Idatiella chinai* from Sri Lanka. *Idatiella* was later synonymized with *Sejanus* by Carvalho (1958) along with *Eosthenarus* Poppius. Most of the taxa from those genera conform to the body type and genitalia form of *Sejanus* sensu-stricto (Node 3) from the Orient. However, *Sejanus albisignatus* and other species of Node 4 differ considerably from *Sejanus* sensu stricto.

Synapomorphies that support *Ausejanus* MS a monophyletic lineage (Fig 2-8) are as follows. First, all of taxa have a white stripe on the anterior margin of the cuneal fracture in the males, with the majority having less than one half the length white (11-4); a completely dark second antennal segment in the males (16-4); a partially thickened cuneal fracture (76-1); an S-shaped endosoma (90-1); a weakly sclerotized secondary gonopore (92-2); and an L-shaped phallotheca (95-1) (Fig 2-9).

Tuxedo is similar in size, color, and body form to *Ausejanus* MS, but possesses a C-shaped endosoma instead of the S-shaped endosoma of *Ausejanus* MS taxa. There are some *Sejanus* species with an S-shaped endosoma (e.g. *Sejanus ecnomioides*, Schuh 1982: fig 549), but share the size and body morphology that is identical to most *Sejanus* species. Also unique for Leucophoropterini is the male endosoma in *Ausejanus* MS being nearly identical in morphology across all of the taxa in this grouping (Chapter IV), whereas in *Sejanus* and *Tuxedo* there is variation in the structures and elaborations on the endosoma (e.g. *Tuxedo*, Schuh 2004: fig 2). For these reasons I argue that *Sejanus albisignatus*, *Sejanus ansevata*, *Leucophoroptera macrozonata*, and the majority of *Sejanus* species described by Carvalho and Gross from Australia should be placed in a new genus, *Ausejanus* MS. Within *Ausejanus* MS there are several potential species groups based on the implied weighting tree (Fig 2-8).

- *mcdonaldi* group: *Sejanus mcdonaldi* and *Sejanus tasmaniae* are united by the following synapomorphies: completely dark first antennal segments (15-3); completely dark meso-femora (24-3); completely dark mid and hind tibiae (26-3); dark basally, light distally hind tibiae (27-2); the clypeus exerted and visible in dorsal view in males (50-1); and the absence of a transverse fascia in females (106-0).
- *femoralis* group: *Sejanus femoralis*, *Sejanus luteoelytratus*, and *Ausejanus arvensis* n.sp. are united by the light coloration of the hemelytron (1-3) and the light coloration of the meta-femora in females (114-0).
- *meridionalis* group: synapomorphies that unite the remaining *Ausejanus* MS taxa are the following: a light basally, light dark second antennal segment in males (16-1); and the angle of the cuneus in females being close to 90 degrees relative to the lateral margins of the corium (124-1).

<u>(Node 5): *Ctypomiris* clade + *Leucophoroptera* clade</u>

The *Ctypomiris* clade (Node 19) and *Leucophoroptera* clade (Node 7) form a monophyletic lineage containing the remaining genera of the Leucophoropterini. Synapomorphies supporting this node include the following: a dark posterior margin along the transverse fascia (7-1); a weakly white pigmented dorsal margin of the scent gland and metepisternum (19-1); meso-and hind coxae that are most dark with lighter areas apically (21-2, 22-2); dark basally, light distally fore and meso-tibiae coloration (26-2); a distinctly dull, matted surface of the hemelytron (32-0); the presence of reflective patches on the hemelytron (34-1); the presence of setae in defined patches in addition to evenly distributed setae (40-1); and a clypeus that is exerted and visible in dorsal view (119-1)(Fig 2-9).

(Node 6): *Aitkenia sensu-stricto*

Aitkenia was found to be polyphyletic (Fig 2-8) with two species grouped in the *Blesingia* clade (Node 11) and two at the base of the *Leucophoroptera* clade (Node 7), reflecting the ambiguity in the definition of the genus as described by Carvalho and Gross (1982). Therefore, I am taking a conservative approach and restricting the genus to type species *Aitkenia latevagans* and *Aitkenia exocarpos* nsp. *Aitkenia latevagans* and *Aitkenia exocarpos* MS share the synapomorphy of the scent gland size (68-2), overall general castaneous coloration; a complete transverse fascia with a dark posterior margin; the presence of reflective patches on the hemelytra; the inpunctate hemelytron; and the medium-sized, dorso-ventrally flattened meta-femora. The remaining species placed in *Aitkenia* by Carvalho and Gross (1982) are discussed elsewhere.

(Node 7) *Leucophoroptera* clade

Schuh (1984) united the *Gulacapsus* clade based on the synapomorphies of a fringe of erect setae on the meta-femora (character 36-1) and eyes that occupy less than two-thirds the height of the head (character 47-1). These characters continue to be consistent with this node, and include additional synapomorphies: the fascia being composed of a transparent area (5-1); the presence of short golden or silverish setae (39-1); a partially thickened cuneal fracture margin (76-1); and elongate, slender hind femora (81-0) (Fig 2-9). In my analysis several Australian Leucophoropterini taxa, including the type species of Leucophoroptera, *Leucophoroptera quadrimaculata*, are now included and therefore is renamed the *Leucophoroptera* clade. Two taxa of *Aitkenia* (*Aitkenia uptoni, Aitkenia monteithi*) are now sister to a node containing *Leucophoroptera quadrimaculata* (*Leucophoroptera* sensu-stricto, Node 10) and the true *Gulacapsus* clade (Node 7) (Figs 2-7 to 2-9).

(Nodes 8-9): *Neaitkenia* MS (*Aitkenia uptoni* + *Aitkenia monteithi*)

Aitkenia uptoni and *Aitkenia monteithi* are found to be sister-groups to the remaining genera in the *Gulacapsus* clade in the implied weighting tree (Figs 2-8, 2-9) and possess synapomorphies with that clade that distinguish them as a distinct lineage from *Aitkenia* sensu-stricto (Node 6). As a result, they are removed from *Aitkenia* and moved into new genus *Neaitkenia* MS, united by the unique synapomorphy of the relatively thin posterior process of the left paramere (observed only in on *Aitkenia monteithi*: character 101-1). First, Carvalho and Gross (1982) created *Aitkenia uptoni* as a composite taxon with the external morphology characterized by a population in New South Wales, and the male genitalia by a population in Queensland. I was not able to access the Queensland paratypes to verify they belong in the same species; therefore I did not code the abdominal nor genitalic characters. Despite this missing information, *Aitkenia monteithi* and *Aitkenia uptoni* were still found to be closely related based on external morphology. Further, if the male genitalia of the Queensland population are confirmed to be the same as the type specimens, *Aitkenia monteithi* and *Aitkenia uptoni* share the synapomorphy of the left paramere based on the illustrations of the genitalia in the original description.

(Node 10): *Leucophoroptera* sensu-stricto (*Leucophoroptera quadrimaculata*, *Leucophoroptera kangarooina* MS, and *Leucophoroptera gloriosa* MS)

Leucophoroptera quadrimaculata, the type species of the genus *Leucophoroptera*, groups with the new species *Leucophoroptera kangarooina* and *Leucophoroptera gloriosa* (Fig 2-8). Synapomorphies uniting this clade include: greater than one-half of the anterior margin of the cuneus being white (11-5); the clypeus being exerted in males and visible when the head is viewed dorsally (50-1); the total length of the labium reaching past the meta-coxae (53-3); the absence of any thickenings on the lateral margins or the fracture of the cuneus (75-0, 76-0); the left and right parameres being approximately equal in size (97-1); and the females having a box- shaped pronotum (121-1) (Fig 2-9).

Leucophoroptera was initially described on the basis of female specimens for included species *Leucophoroptera quadrimaculata* and *Leucophoroptera fasciatipennis* (Poppius 1914). This unconventional designation made comparisons of species and generic concepts to other Phylinae difficult since most Miridae taxa are united by male somatic and genitalic character synapomorphies. Carvalho and Gross (1982) also described four species of *Leucophoroptera* based on females, one of which was included in this analysis (*Leucophoroptera macrozonata*). Schuh (1984) described an additional three species of *Leucophoroptera* based on male specimens only. With the study of both male and female specimens, the limits of the genus have changed. *Leucophoroptera fasciatipennis* does not group with the type species *Leucophoroptera quadrimaculata*, but instead is grouped with *Blesingia* (Figs 2-8, 2-9, Node 12); *Leucophoroptera macrozonata* now groups with *Ausejanus* MS (Node 4). *Leucophoroptera philippinensis* Schuh, *Leucophoroptera solomonensis* Schuh, and *Leucophoroptera noirlandense* Schuh are also not congeneric with *Leucophoroptera* sensu-stricto (Figs 2-8) grouping instead with the *Ctypomiris* clade (Node 21), and are placed in two new genera (*Transeleucophoroptera* MS Node 20; and *Neoleucophoroptera* MS Node 21, respectively).

(Node 11): *Gulacapsus* clade

This node contains all of the taxa initially proposed by Schuh (1984) for the Indo-Pacific *Gulacapsus* Group: *Pseudoleucophoroptera, Gulacapsus, Trichocephalocapsus,* and *Pseudohallodapocoris* (Fig 2-3). In addition, it includes *Blesingia*, two species formerly placed in *Aitkenia*, and one species formerly placed in *Leucophoroptera* (*Leucophoroptera fasciatipennis*), all from Australia (Fig 2-8). All of these taxa have the additional synapomorphy of a curved second antennal segment (57-1) (Fig 2-9).

<u>(Node 12): *Blesingia* Carvalho and Gross</u>

Two species of *Blesingia* (*Blesingia tamborinea*, *Blesingia gularis*), two formerly placed in *Aitkenia* (*Aitkenia cantrelli*, *Aitkenia grandis*), the paraphyletic assemblage of *Pseudoleucophoroptera*, and *Leucophoroptera fasciatipennis* group together in a clade (Fig 2-8) united by the following synapomorphies: pro-coxae mostly light, with dark areas apically (20-1); lateral margins of the cuneus distinctly curving medially, not continuous with the lateral margins of the corium (77-1); and a short, spine-like protuberance on the pygophore (86-2)(Fig 2-9). Carvalho and Gross (1982) united *Blesingia* based on the possession of a relatively narrow anterior margin of the pronotum compared to *Leucophoroptera*. This character is known to be present in several Leucophoropterini outside of *Blesingia*, and therefore is not a useful synapomorphy for the genus. Further, the type species of the genus, *Blesingia gularis,* was previously only known from females, which made comparing species and generic concepts difficult with other species of Leucophoropterini, including *Blesingia* (e.g. *Blesingia tamborinea*).

Pseudoleucophoroptera was described by Schuh (1984) by the pronotum not being strongly elevated (62-0) and the absence of a flattened pronotal collar (60-0) (Fig 2-3). However, in this analysis *Pseudoleucophoroptera* is rendered paraphyletic by *Blesingia* (Fig 2-8) and is therefore is synonymized under the senior name. *Aitkenia cantrelli* and *Aitkenia grandis* are moved to *Blesingia,* therefore maintaining a monophyletic *Aitkenia* (Node 6). *Leucophoroptera fasciatipennis* was placed in *Blesingia* by Carvalho and Gross (1982) without explanation, and was subsequently moved back *to Leucophoroptera* by Schuh (1984). This study confirms that *Leucophoroptera fasciatipennis* (Node 10) is not closely related to *Leucophoroptera quadrimaculata*.

(Node 13): *Johnstonsoni* MS + *Gulacapsus* Schuh + *Trichocephalocapsus* Schuh + *Pseudohallodapocoris* Schuh

Several synapomorphies unite *Gulacapsus*, *Trichocephalocapsus*, *Pseudohallodapocoris,* and new genus *Johnstonsoni* with respect to the other members of the *Gulacapsus* clade. These include: the posterior margin of the eyes parallel to the anterior margin of the pronotum (42-1); the presence of a narrow, depressed collar (60-1); a narrowing of the anterior lateral margins pronotum that forms a bell-shape in males and females (63-1, 121-2); a weak, dorsal indentation between the anterior and posterior portions of the pronotum (64-1); and the absence of an ovipositor spine (127-0) (Fig 2-9).

(Node 14): *Johnstonsoni phalarosus* MS

A newly discovered species from Papua New Guinea was included in this analysis for potential placement among the currently described Leucophoropterini genera, and does not group with any of the currently recognized taxa (Figs 2-7 to 2-9). The following characters is unique for this taxon: a white-pigmented projection on the dorso-lateral margin of the metepisternum (19-4); the pro-coxae being mostly dark with lighter areas apically (20-2); the vertex being wider than one-half the total width of the head (49-2); the absence of visible cyberial ridges on the frons (50-1); the presence of a thickened lobe of the posterior lateral margin of the corium, over the cuneus (72-1); hind femora that are medium in length and dorso-ventrally flattened (81-1); a leaf-shaped right paramere (98-1); the angle of the cuneal fracture being close to 90 degrees relative to the lateral margins of the corium in females (124-1); and the cuneus in females without a deflection (125-1) (Fig 2-9). *Johnstonsoni* MS represents a unique genus based on the following evidence. First, it possesses several characters that are only present in genera within the *Ctypomiris* clade: a white-pigmented projection on the dorso-lateral margin of the metepisternum which is also found only in *Biromiris* (Schuh 1984, Node 27); and a vertex that is relatively wide and taking up over half the total width of the head, a character only found in other leucophoropterine genus *Collessicoris* MS (Node 25). However, *Johnstonsoni* MS possesses an overall dark coloration and a dull surface of the head, pronotum, scutellum and thorax like most taxa of the Leucophoroptera clade. Therefore I am placing this taxon in its own genus.

(Node 15): *Gulacapsus* Schuh + *Trichocephalocapsus* Schuh + *Pseudohallodapocoris* Schuh

Schuh (1984) united *Gulacapsus, Trichocephalocapsus* and *Pseudohallodapocoris* as a separate clade within the *Gulacapsus* clade, though without providing explicit synapomorphies (Fig 2-3). These three genera are united in the present analysis by the following synapomorphies: a declining posterior margin of the head (47-3); a first labial segment that does not go past the posterior margin of the head (52-0);

the absence of any thickened areas on the cuneus (75-0, 76-0); eyes that take up less than one half the height of the head in females (117-1); and a clypeus that is not visible in dorsal view in females (119-0).

(Node 16): *Gulacapsus* Schuh

In the implied weighting tree all known species of *Gulacapsus* and one new species (*Gulacapsus australiensis*) form a monophyletic lineage, united by the following unambiguous synapomorphies: a light basally, light dark third antennal segment (17-1); the gula in the form of a keel (55-2); and females with a medial constriction on the lateral margins (127-2). Species of *Gulacapsus* are highly variable in size, pronotal morphologies, and coloration of the cuneus. *Gulacapsus moresbyana* is fairly large, with a relatively dramatic enlargement of the keel-like gula (Schuh 1984: fig 755), whereas *Gulacapsus novoguinensis* is relatively small and the gula is less pronounced (Schuh 1984: fig 757). However, the lateral compression of the gula is unique, which is absent in all the other taxa with an elongate gula (e.g. *Blesingia gularis*). Carvalho and Gross (1982) noted that at least two of the taxa in their work had keel-like gula (*Blesingia gularis*, *Aitkenia cantrelli*), but I observed each to have an elongate gula but not laterally compressed, a state therefore not homologous to the condition in *Gulacapsus*.

(Node 17): *Trichocephalocapsus* Schuh + *Pseudohallodapocoris* Schuh

Trichocephalocapsus was found to be sister-group to *Pseudohallodapocoris* based on the synapomorphies of the swollen pronotum (62-1) and the laterally compressed meta-tibiae (82-1) (Fig 2-9). This result is consistent with from Schuh (1984), where *Trichocephalocapsus*, *Pseudohallodapocoris* and *Gulacapsus* were in an unresolved polytomy (Fig 2-1). Both *Pseudohallodapocoris* and *Gulacapsus* also have a relatively well-developed pronotal collar compared to the remainder of the Leucophoropterini (e.g. *Pseudohallodapocoris*, Schuh 1984: figs 769, 771).

(Node 18): *Trichocephalocapsus* Schuh

Trichocephalocapsus spp. are the following synapomorphies: the contrastingly colored corial margin (10-1); completely dark first antennal segment (15-3); dense, long setae scattered on the head (38-1); eyes that are strongly exerted from the anterior margin of the pronotum (42-2); an elongate, flat gula (55-1); a broad, flattened pronotal collar (60-2); and a cuneus with a medial indentation on the margin with the membrane, forming a crescent-shape (80-1)(Fig 2-9).

(Node 19): *Pseudohallodapocoris* Schuh

Schuh (1984) initially did not find any synapomorphies for *Pseudohallodapocoris* (Fig 2-3, Table 2-3), however with the present analysis the species are united by the following synapomorphies: no white pigmentation along the lateral margins of the metepimeron and scent gland (19-0); mostly dark pro-coxae with light areas apically (20-2); relatively long, obvious interocular setae (37-1); and the lateral margins of the pronotum being relatively contiguous, forming a trapezoidal pronotum (63-0) (Fig 2-9).

<u>(Node 20): *Ctypomiris* clade</u>

The Indo-Pacific *Ctypomiris* clade of Schuh (1984) now includes the following taxa: *Biromiris*, *Ctypomiris*, *Solomonomimus*, *Abuyogocoris*, *Waterhouseana*, *Papuamimus*, and *Arafuramiris*, Indo-Pacific *Leucophoroptera* species (*Leucophoroptera philippinensis, Leucophoroptera solomonensis, Leucophoroptera novoirlandense*), Australian *Collessicoris,* and several new genera and species from Australia and Papua New Guinea (Figs 2-7, 2-8). They are united by the following synapomorphies: the presence of transparent areas on the posterior, lateral margins of the corium (9-1); a second antennal segment that is light basally, light dark (16-1); a light basally, light dark third antennal segment (17-1); hind tibiae that are dark basally, light distally (27-2); setae that are evenly dispersed on the hemelytron (40-0); and a curved second antennal segment (57-1) (Fig 2-9).

<u>(Node 21): *Transeleucophoroptera* MS (*Leucophoroptera philippinensis* Schuh)</u>

Leucophoroptera philippinensis is the sister-group to the remaining members of the *Ctypomiris* clade (excluding the basal *Aitkenia exocarpos* MS) in the implied weighting tree (Figs 2-8, 2-9), and has the following characters: greater than one half of the anterior margin of the cuneus white (11-5); pro-coxae that are mostly light with dark areas apically (20-1); a distinctly punctured hemelytron (33-1); vertex less than one-third the total width of the head (49-0); clypeus exerted and visible when head in dorsal view (50-1); first labial segment not surpassing the posterior margin of head (52-0); labrum laterally flattened, with a diameter thinner than the diameter of first labial segment (54-

1); male abdomen narrow posterior to the thorax and expansive nearing the genital capsule (84-0); a C or J-shaped endosoma (90-0); phallotheca with ridges on the surface (96-1); and left paramere with the dorso-lateral margins flattened (99-1) (Fig 2-9).

Schuh (1984) presumably united *Leucophoroptera philippinensis*, *L. solomonensis*, and *L. novoirlandense* in *Leucophoroptera* due to their lack of a pronotal collar, though all three species are unique in coloration and structure. My analysis does not support that hypothesis (Fig 2-8) as all three species are not congeneric with type species *Leucophoroptera quadrimaculata* (Node 10). Further, *Leucophoroptera philippinensis* is unique in that it potentially represents an intermediary morphology between the *Ctypomiris* clade and the *Gulacapsus* clade: being primarily dark brown in coloration, having a dull surface texture on the head and thorax, and thin, elongate hind femora as many members of the *Gulacapsus* Clade, yet possessing hemelytral punctation as in the *Ctypomiris* clade (e.g. *Papuamimus*, *Arafuramiris*, and *Waterhouseana*). It also is distinct from the other *Leucophoroptera species* described by Schuh (1984) in having a relatively narrow vertex, an elongate, narrow body with a more pronounced medial constriction, and a relatively elongate face (Schuh 1984: figs 491-492). Lastly, the genitalia of *Leucophoroptera philippinensis* are unlike any other Leucophoropterini, with the apex of the endosoma only weakly twisting and appearing almost J-shaped rather than S-shaped (Schuh 1984: fig 493). *Leucophoroptera philippinensis* is clearly a distinct lineage and is placed in the new genus *Transeleucophoroptera* MS.

(Node 22): *Neoleucophoroptera* MS (*Leucophoroptera solomonensis Schuh + Leucophoroptera novoirlandense* Schuh)

Leucophoroptera solomonensis and *L. novoirlandense* (Figs 2-8, 2-9) are united based on the following synapomorphies: the posterior margin of the cuneus being a contrasting color (13-1); and the coxae being mostly light in coloration (20-0, 21-0, 22-0). The body shapes of the two taxa also are similar in that the lateral margins of the pronotum are nearly straight and form trapezoidal-shape, the corial margins that are weakly constricted medially, the long and slender hind femora, neither species has punctation on the wings, and the vertex that takes up more than one-third the total width of the head. However, it is clear that both taxa are not related to *Leucophoroptera quadrimaculata* and therefore are placed in the new genus *Neoleucophoroptera* MS.

(Node 23) True *Ctypomiris* clade

The True *Ctypomiris* clade, excluding *Transeleucophoroptera* MS and *Neoleucophoroptera* MS, includes all of taxa proposed by Schuh (1984) for the *Ctypomiris* clade, as well as *Collessicoris* Carvalho and Gross newly described Australian taxa (Figs 2-7 to 2-9). Uniting this node are the following synapomorphies: a clypeus that is exerted and visible in dorsal view (50-1); the presence of a narrow pronotal collar with the anterior margins weakly reflexed (60-1); an elevated and swollen pronotum (62-1); a mesoscutum that is hidden by the posterior margin of the pronotum (66-1); a flat hemelytron (70-1); a cuneus that is swollen on the anterior portion of the lateral margin for less than half of the total length of the cuneus (75-1); a partially thickened lateral margin of the cuneus (76-1), and hind femora that are swollen the joints with the meta-tibiae (81-3).

(Node 24): *Biromiris* Schuh + *Collessicoris* Carvalho and Gross

Collessicoris and *Biromiris* are united as sister-groups in this analysis based on the following synapomorphies: a complete transverse fascia (3-2); mostly dark coxae with lighter areas apically (20-2, 21-2, 22-2); hemelytra with reflective patches focused primarily on the medial portion of the hemelytra (35-2); the frons obscuring the clypeus in dorsal view, the clypeus not being strongly exerted (51-0), and the lateral margins of the hemelytron being medially constricted in males and females (71-2, 126-2). *Collessicoris* and *Biromiris* superficially look very similar with the long, erect setae and swollen pronotum, but the differences in the pronotal carina, coloration, and structure of the gula clearly separate the genera.

(Node 25): *Collessicoris* Carvalho and Gross

Collessicoris bellissimus was found to be the sister-group to a node containing the Indo-Pacific and Australian *Biromiris* spp. (Figs 2-8 to 2-9). Character states for this taxon include: the presence of a white patch posterior to the apex of the claval suture (8-1); a first antennal segment that is light basally, dark apically (15-1); hind tibiae that are light basally, dark distally (27-1); the presence of a contrasting-colored area on the abdomen posterior to the thorax (30-1); a vertex that is not visible, obscured by anterior margin of eyes (45-1); a vertex in males that takes up greater than one-third the total width of the head (49-1); hind femora that are medium length, flat (81-0); a phallotheca with ridges on the surface (96-1); a flat dorso-medial margin of the left paramere (99-1); the presence of lateral transparent areas in females (107-1); and the clypeus exerted and visible in females (119-1)(Fig 2-9).

Collessicoris shows dramatic sexual dimorphism in head shape within Leucophoropterini. Females have an extremely wide head for Leucophoropterini (Fig 2-5 A), the total width of the head being at least one third greater than males. All other Leucophoropterini females have the head equal in width to males. The color pattern of the hemelytron in *Collessicoris* is unique in Leucophoropterini, possessing an additional yellow transverse stripe along the anterior portion of the corium (Fig 2-6 A), posterior to the dark transverse line that is a synapomorphy for the *Leucophoroptera* clade. Although *Collessicoris* possesses long erect setae like *Biromiris*, it does not possess the pronotal carina which is a synapomorphy of the former taxon, or the dull surface texture of the head and thorax of the latter taxon. Therefore it clearly is a distinct taxon.

(Node 26): *Biromiris* Schuh

Schuh (1984) the following attributes as synapomorphies of *Biromiris*: pronotal carina (61-0) along the anterior, lateral margins (*Biromiris enarotadi* Schuh, Schuh 1984: fig 691); terete third and fourth antennal segments (59-1); and a gula with a distinct roll or “double chin” (55-3). These characters continue to support the Indo-Pacific *Biromiris* spp. (*Biromiris bulolo, B. enarotadi, B. cyclops*) as a monophyletic group, and the character of the pronotal carina unites three new taxa from Australia into the genus (*Biromiris cassisini* MS, *Biromiris sheyvillis* MS, and *Biromiris binjouri* MS). The terete third and fourth segments are found only in *Biromiris sheyvillis* MS, and neither *B. sheyvillis* MS or *B. cassis* MS has the "double-chin" (55-3) documented in the Indo-Pacific taxa (Schuh 1984) and *B. binjouri* MS. New synapomorphies documented for *Biromiris* based on this analysis include the following: long, obvious interocular setae (37-1); the protruding scutellum (67-1); the length of the cuneus being less than one-third the total length of the membrane (74-0); and an abdomen that is constricted at the thorax, widening towards the genital capsule (84-0) (Figs 2-9).

<u>(Node 28): *Solomonomimus* Schuh + *Austrodapus* MS + *Abuyogocoris* Schuh + remaining genera of *Ctypomiris* Group</u>

Synapomorphies supporting this node are the following: the possession of a partial transverse fascia on the anterior margin of the hemelytron (3-1); a lack of pigmentation on the scent gland and dorso-lateral margin of the metepisternum (19-0); light colored pro- and meso-femora in males (23-0, 24-0); a punctate hemelytron (33-1); and light basally, dark distally meso-femora in females (113-1) (Fig 2-9). This clade is also supported by a distinctly shiny head and pronotum, the narrowed anterior portion of the pronotum, and swollen posterior portion of the pronotum that obscures the mesoscutum from dorsal view.

(Node 29) *Solomonomimus* Schuh + *Abuyogocoris* Schuh + *Austrodapus* MS

This clade is supported by the following synapomorphies: the absence of a dark posterior margin of the transverse fascia (7-0); the lack of transparent patches on the lateral margins of the corium (9-0); a shiny hemelytron (32-1); the lack of reflective patches on the hemelytron (34-0); eyes that are distinctly removed or bulging from the vertex (44-1); a weak indentation between the anterior and posterior portions of the pronotum (64-1); and a posterior margin of the pronotum that is straight to nearly convex (65-1) (Fig 2-9).

(Node 30) *Solomonomimus* Schuh

Solomonomimus is a monotypic genus sister to a clade containing *Abuyogocoris* and new genus *Austrodapus* MS (Figs 2-8 to 2-9). In this analysis *Solomonomimus* is a unique taxon based on the following combination of characters: a completely dark scent gland and dorso-lateral margin of metepisternum versus the completely white scent gland in *Abuyogocoris* and *Austrodapus* MS; setae that are in defined patches in addition to scattered simple setae (40-1), which are absent in all the other taxa in this node; and club-like second antennal segments (56-1). Schuh (1984) found *Solomonomimus roroni* to be closely related to *Biromiris* based on the presence of erect setae (Fig 2-2), but considered it to be a distinct taxon based on not possessing a pronotal carina (61-1); possessing a punctate hemelytron (33-1); and having linear third and fourth antennal segment (59-0).

(Node 31): *Austrodapus* MS + *Abuyogocoris* Schuh

The genus *Abuyogocoris* is sister-group with a new genus from Australia, *Austrodapus* MS, in my analysis (Figs 2-7 to 2-9). Synapomorphies uniting this node include: a primarily castaneous hemelytron (2-1); the anterior transverse fascia composed of a contrasting color (5-0); the cuneal posterior color being the same coloration as the hemelytron (13-0); a completely white scent gland (19-3); the posterior margins of the eyes being parallel to the anterior margin of the pronotum (42-1); and a transversely rounded hemelytron (70-0) (Fig 2-9).

(Node 32): *Austrodapus nitens* MS

A new taxon from Australia, *Austrodapus nitens* MS, initially identified by Carvalho but never described, is found to be sister to *Abuyogocoris* (Figs 2-8 to 2-9). Unique character states for this lineage that differentiate it from *Abuyogocoris* include the following: completely dark third antennal segments (17-2); fore coxae that are mostly light with dark areas apically (20-1); completely dark pro- and meso-femora (23-3, 24-3); the absence of a light-colored stripe on the abdomen distad from the thorax (30-0); an exposed mesoscutum in males and females (66-0, 122-0); tubercules on the ventral side of the genital capsule (86-1); a genital capsule larger than one-third the length of the abdomen but less than one-half the total length (87-1); the presence of dentations or striations on the endosoma (91-1); a partial transverse fascia in the females (106-1); less than one-half the anterior margin of the cuneus white in females (108-4); the posterior margins of the eyes in females being parallel to the anterior margin of the eyes (116-1); the clypeus being exerted and visible when the head is viewed dorsally in females (119-1); and a straight to narrowed anteriorly, wide distally hemelytron (126-1) (Fig 2-9). Additional differences include the overall larger size (at least twice as large as *Abuyogocoris calien*); and the presence of sericeous setae over the dorsum of the hemelytron (39-2) that is absent in *Abuyogocoris*.

(Node 33): *Abuyogocoris* Schuh

Abuyogocoris is a monophyletic lineage (Figs 2-8 to 2-9), on the basis of the following synapomorphies: the presence of a partial transverse fascia in males (3-2); greater than one-half of the anterior of the cuneus being white (11-5); a completely light second antennal segment (16-0); the clypeus being flush with the frons and not visible in dorsal view (50-0); the posterior margin of the pronotum being concave (65-2); the scent gland taking up more than one-half the total area of the metepisternum (68-0); the cuneus being less than one-third the total length of the membrane (74-0); the absence of any thickenings on the cuneus (75-0, 76-0); and the lateral margins of the cuneus distinctly convex and not continuous with the lateral margins of the corium (77-1). The male endosoma is also unique, with the apex being split into two structures, with the posterior strap forming a fan-like lobe (e.g. *Abuyogocoris tawaitawi*, Schuh 1984: fig 659; *Abuyogocoris liwo*, Schuh 1984: fig 662).

Abuyogocoris was found to be sister-group to the remaining *Ctypomiris* clade genera by Schuh (1984) based on the hemelytra being distinctly shining and it lacking the other synapomorphies of the clade (Figs 2-2), such as the flat hemelytron (70-0) and medial constriction of the lateral corial margins (71-2). *Abuyogocoris* now appears to be firmly imbedded in the *Ctypomiris* clade, and *Collessicoris bellissimus* and *Biromiris* are now sister-groups to and the remaining genera of the *Ctypomiris* clade (Figs 2-8 to 2-9).

(Node 34) *Ctypomiris* Schuh + *Papuamiroides* MS + *Waterhouseana* Carvalho + *Missanos* MS + *Papuamimus* Schuh + *Arafuramiris* Schuh

In the analysis of Schuh (1984) *Ctypomiris* was part of a polytomy also containing *Solomonomimus + Biromiris,* and *Papuamimus + Arafuramiris + Waterhouseana* (Fig 2-2). In this analysis *Biromiris* and *Solomonomimus* are excluded from this node, and the remaining genera share the synapomorphy of the bases of the setae on the hemelytron being distinctly dark (29-1).

(Node 35) *Ctypomiris* Schuh

Ctypomiris is monophyletic and sister-group to the remaining genera of the *Ctypomiris* clade (Figs 2-8, 2-9). Synapomorphies for the genus are: greater than one-half of the anterior margin of the cuneus white (11-5); the absence of vein pigmentation (14-0); completely light pro-coxae (20-0); a straight second antennal segment (57-0); the presence of a hook-like process at the apex of the endosoma that is longer than the secondary gonopore (93-2); and a left paramere with the posterior process curving downward (100-1) (Fig 2-9).

Schuh (1984) united *Ctypomiris* based on the synapomorphies of the endosoma with one or two spine-like processes arising just past the secondary gonopore, meta-femora with stridulatory plectrum on the inner distal surface, and the humeral angles of the pronotum shoulder-like (Schuh 1984; Fig 2-2). The unique endosoma within the Leucophoropterini (Schuh 1984: figs 703 and 706) continues to be a synapomorphy for the genus, including the new species from the Solomon Islands (Fig 2-9).

(Node 36): *Papuamiroides* MS + *Waterhouseana* Carvalho + *Missanos* MS + *Papuamimus* Schuh + *Arafuramiris* Schuh

Papuamimus, Waterhouseana, and *Arafuramiris* were found to be closely related by Schuh (1984; Fig 2-2), but in this analysis a new genus *Papuamiroides* was found to be sister-group to the former three genera and sharing several synapomorphies: a castaneous head, thorax, pronotum and scutellum (2-1); the absence of a transverse fascia on the anterior of the hemelytron (3-0); a second antennal segment that is dark with a lightening in coloration medially in males and females (16-3, 110-3); a light meso-femora (24-1); the angle of the cuneal fracture relative to the lateral margins of the cuneus nearly 90 degrees in males and females (78-1, 124-1); a male abdomen that is constricted past the thorax, widening distally anterior to the gonopore (84-0); a longer than wide second abdominal segment (85-1); the presence of transparent areas on the posterior, lateral margins of females (107-1); and the anterior margin of the cuneus being less than one-half white (108-4) (Fig 2-9).

<u>(Node 37): *Papuamiroides* MS</u>

Papuamiroides possesses the following autapomorphies: greater than one-third of the total height of the head is below the eyes (46-1); second antennal segments that are longer than twice the width of the head (58-1); the absence of a pronotal collar (60-0); a weakly sclerotized, amorphous secondary gonopore (92-1); the presence of a spine at the apex of the endosoma (94-0); ridges on the surface of the phallotheca (96-1); hind femora in females that are light basally, dark distally (114-1); the clypeus being exerted and visible in females when the head is viewed dorsally (119-1); a club-shaped second antennal segment in females (120-0); and the cuneal fracture in females not deflecting (125-1). Initially I considered this taxon a species of *Papuamimus* based on the external morphology, but based on the following characters it is clearly a separate taxon. In *Papuamimus* the apex of the male endosoma is split into two separate structures (e.g. *Papuamimus maai*, Schuh 1984: fig 721) whereas the apex is one united structure in *Papuamiroides*, and the overall size of the endosoma is twice as large as *Papuamimus* and all other Leucophoropterini; the second antennal segment in males and females is significantly longer than in species of *Papuamimus*, being longer than twice the width of the head; and *Papuamiroides* lacks a pronotal collar, unlike *Papuamimus*.

<u>(Node 38): *Papuamimus* Schuh + *Arafuramiris* + *Waterhouseana* Carvalho + *Missanos gulafuscos* MS</u>

Schuh (1984) found *Papuamimus*, *Waterhouseana*, and *Arafuramiris* to be related based on the following synapomorphies: the lateral corial margins strongly sinuous [constricted medially] (71-2); the exocorium greatly reduced on the anterior half of the corium, costa obscured on dorsal view [reduced R+M vein] (69-1); the second abdominal segment distinctly longer than wide (85-1) and abdominal sternites two with striate areas lateroventerally. The character of the abdominal striations was not coded here because most of the specimens from Papua New Guinea used in this analysis are card-mounted, obscuring the ventral side of the abdomen. With the addition of new genus *Missanos* MS, synapomorphies uniting this clade are the following: club-like second antennal segments in the males (56-1); first antennal segments that are light basally, light dark (109-1); and abdomens in females that are contiguous in coloration with the thorax (115-0).

(Node 39): *Waterhouseana* Carvalho + *Missanos* MS

Waterhouseana consistently grouped with new genus *Missanos* MS in an monophyletic lineage (Figs 2-7 and 2-8) based on the following synapomorphies: dark meso-femora in males and females (24-3, 114-3); long, dense facial setae on the ventral-posterior space of the head (38-2); vertex that is less than one-third the total width of the head (49-0); and the first labial segment not extending past the posterior margin of the head (52-0). The dense patch of setae on the ventro-posterior margin of the head in particular is unique among all other Leucophoropterini.

(Node 40): *Missanos* MS

This genus is represented by the new species *Missanos gulafuscos* MS, which was initially thought to be *Papuamimus*, but on closer inspection it possessed the distinctive patch of setae below the head and the relatively elongate, flat head of *Waterhouseana* (Schuh 1984: fig 740). However, *Missanos* does not have the constricted pronotum of *Waterhouseana* (Schuh 1984: figs 740, 729) and the medial constriction of the lateral corial margins is less pronounced. Therefore, I do not consider this taxon congeneric with *Waterhouseana*, but a closely related sister group as shown in both analyses, and likely representing an intermediary stage between the body forms of *Papuamimus* and *Arafuramiris* and the relatively autapomorphic *Waterhouseana*. Synapomorphies for this taxon are the following: the presence of a complete transverse fascia (3-2); the absence of a dark posterior margin of the transverse fascia (7-0); eyes that take up greater than one-half the total height of the head (43-2); eyes that are distinctly bulging from the vertex (44-1); a scent gland that is less than one third the total area of the scent gland (68-2); and females with a light basally, light dark third antennal segment (111-1).

(Node 41): *Waterhouseana* Carvalho

Previous to this analysis *Waterhouseana* was a monotypic genus, however one new species of *Waterhouseana* has been discovered in samples of canopy fogging from Papua New Guinea, varying from type species *Waterhouseana illustris* only in overall body size and the lack of a patch of dark setae below the claval suture. Synapomorphies uniting *Waterhouseana* spp. in this analysis include: a vertex that is visible when the head is viewed laterally (45-0); a pronotum that is constricted anteriorly and posteriorly at the median in males and females (63-2, 64-2, 121-3); a thickening on the anterior, lateral margin of the cuneal greater or equal to half the length of the cuneus (75-2); the margin of the cuneus and the membrane being angled inwards towards the corium, forming a crescent shape (80-1); laterally compressed hind tibiae (82-1); a short, spine-like protuberance on the genital capsule (86-2); and a small, notch-like ovipositor spine (127-1) (Fig 2-9). The synapomorphies in this analysis are consistent with Schuh (1984) for the genus: the head and genae densely covered with heavy, erect, dark setae; and the pronotum constricted medially.

(Node 42): *Papuamimus* Schuh + *Arafuramiris* Schuh

In the implied weighting tree *Papuamimus* and *Arafuramiris* are found to be the most derived sister-group within the *Ctypomiris* clade (Fig 2-8). Uniting this clade are the following synapomorphies: the long, obvious interocular setae (37-1); the shelf-like posterior margin of the vertex (47-1); the weak indentation between the anterior and posterior portions of the pronotum (64-1); a scutellum with the anterior margin dorsally expanded and touching the posterior margin of the pronotum (67-2); and the apex of the endosoma being split into two straps at the apex (88-2) (Fig 2-9). This generic grouping is in contrast to Schuh (1984) where *Waterhouseana* and *Arafuramiris* sister groups (Fig 2-2) with the synapomorphy lacking a transverse fascia on the corium. With *Missanos* MS as sister-group to *Waterhouseana* in this analysis, the former which does possess a partial transverse fascia, the synapomorphy no longer holds. Therefore, there is stronger evidence for a sister-group relationship between *Papuamimus* and *Arafuramiris*.

(Node 43): *Papuamimus* Schuh

Papuamimus was found to be a monophyletic lineage in Schuh (1984) based on it being the only taxon between *Waterhouseana* and *Arafuramiris* to not have unique autapomorphies defining it (Fig 2-2). In this analysis the two species are united with the following synapomorphies: the absence of vein pigmentation (14-0); mostly light pro- and meta-coxae with dark areas apically (20-1, 22-1); a straight to slightly concave posterior margin of the pronotum (65-1); a scent gland that is less than one third the total area of the metepisternum (68-2); the presence of an air-space on the lateral margins of the cuneus (73-1); a cuneus that is thickened on the anterior, lateral margins for equal or greater than half the total length of the cuneus (75-2); and the presence of a spine on the apex of the endosoma (94-0). The shape of the endosoma is particularly diagnostic for the genus, as it is the only taxon within Leucophoropterini with an apical spine and the posterior strap shorter than the anterior strap (Schuh 1984: fig 721).

(Node 44): *Arafuramiris* Schuh

Taxa of *Arafuramiris* from the Indo-Pacific as well as new species from Australia consistently group as a monophyletic lineage (Figs 2-7 and 2-8). Synapomorphies uniting *Arafuramiris* in this analysis are the following: light basally, light dark second antennal segments (16-1); light basally, dark distally fourth antennal segments (18-1); a distinctly shiny hemelytron (32-1); a dense patch of sericeous setae focused on the clavus (41-0); eyes that are distinctly bulging from the vertex (44-1); laterally compressed hind tibiae (82-1); a sclerotized, horse-collar shaped and sometimes folded over secondary gonopore (92-1); the clypeus is exerted and visible when the head is viewed dorsally in females (119-1); an ovipositor that is angled upwards with the abdomen (128-1); and a the posterior wall possessing projections (136-2) (Fig 2-9).

Schuh (1984) found the following synapomorphies for *Arafuramiris* (Fig 2-2) that clearly distinguished it from the other genera of the Indo-Pacific: parempodia that are moderately fleshy and convergent apically; the anterior pronotal lobe narrowed, more or less parallel-sided and distinct from the posterior lobe; hemelytra with a fascia-like arc of sericeous, appressed setae just posterior to the scutellum; and the vestiture of dorsum always with some flattened, lanceolate, sericeous setae. The characters of the pronotum continue to support this clade, as does the distinct patch of setae (41-0). The character of the parempodia was not coded in this analysis since the parempodia of most of the taxa in this analysis could not be imaged with the scanning electron microscope to compare homology statements. Of all the characters supporting this node, the form of the male genitalia and the patch of setae on the clavus are the most convincing synapomorphies for this group as they are found nowhere else in the Leucophoropterini.

Conclusion

The tribe Leucophoropterini has had a complicated history since its initial formation by Schuh (1974). First, it was created to group the relatively autapomorphic and ant-mimicking *Karoocapsus* Schuh from South Africa, *Myrmicopsella* Poppius from Madagascar, and cosmopolitan *Tytthus* Poppius, to *Leucophoroptera* from Australia. All of those genera are now found to be in separate lineages, with only type genus *Leucophoroptera* and *Sejanus* remaining in the Leucophoropterini (Chapter II). Second, type genus *Leucophoroptera* was unconventionally described on the basis of females, as were most of the Leucophoropterini by Carvalho and Gross (1982). This made comparisons between the male-specimen based Leucophoropterini described by Schuh (1984) difficult, especially when several taxa show high sexual dimorphism.

This study is the first attempt to analyze the tribe with both male and female specimens of taxa of Poppius (1914), Carvalho and Gross (1982) and Schuh (1984), therefore providing a consistent framework of male and female genitalic and somatic characters. Further, several genera are now revised based on the association of both male and female specimens, particularly the Australian fauna. *Leucophoroptera* was found to be polyphyletic and is now restricted to type species *Leucophoroptera quadrimaculata* and two new species from Australia (Node 10). Australian genus *Blesingia* Carvalho and Gross now includes the taxa of *Pseudoleucophoroptera*, extending the distribution range of the genus into the Indo-Pacific. *Aitkenia* was also found to be polyphyletic, and now is restricted to type species *Aitkenia latevagans* and a newly described taxon (*Aitkenia exocarpos* MS). Lastly, there now is clear evidence that there is a distinct lineage of primarily Australian *Sejanus* species (*Ausejanus* MS) that is separate from the lineage of *Sejanus* containing the type-species *Sejanus funereus*.

Most of the genera described by Schuh for the Indo-Pacific (e.g. *Arafuramiris*) continue to be monophyletic and supported by several synapomorphies, and now include several taxa from Northern Australia (e.g. *Gulacapsus australiensis* MS, *Arafuramiris oswaldi* MS). However, most of the generic relationships within the Indo-Pacific Leucophoropterini have changed with the addition of the Australian taxa of Carvalho and Gross (1982) and several new taxa from Papua New Guinea (e.g. *Johnstonsoni* MS). These generic relationships will continue to be refined as more leucophoropterine taxa are discovered, particularly in Papua New Guinea and North Queensland where there appears to be the greatest diversity. This study takes the initial first step in providing a clear framework for the Leucophoropterini, and now further investigation and assignment of taxa to the tribe can be undertaken and based on clear synapomorphies.

CHAPTER IV

THE LEUCOPHOROPTERINI OF AUSTRALIA AND THE INDO-PACIFIC: REVISION AND KEY TO THE CURRENTLY RECOGNIZED GENERA OF LEUCOPHOROPTERINI, REDESCRIPTION OF THE AUSTRALIAN FAUNA, AND DESCRIPTIONS OF NEW GENERA AND SPECIES

Introduction

The Planetary Biodiversity Inventory of the plant bug subfamilies Orthotylinae and Phylinae, a National Science Foundation (USA) funded project conducted extensive collecting in Australia, producing large numbers of previously unknown taxa. Several of these taxa belong to the tribe Leucophoropterini, which is predominantly from Australia and the Indo-Pacific (Chapter II). The monophyly of the currently recognized genera was tested for monophyly in a phylogenetic analysis (Chapter III), and are here revised. Keys to the genera and species of Leucophoropterini are provided, and taxa new to science are described.

Materials and Methods

During the course of this research project, matrix code labels were affixed to the Specimens Examined. These codes are 'unique specimen identifiers' (USIs), which include an institution and project code (AMNH_PBI) followed by a unique number (00368204). USI codes are included for all specimens examined and illustrated. All latitude-longitude data for localities are written in degrees and decimal parts thereof.

Altitude data are given in metric units. Please refer to www.discoverlife.org and http://research.amnh.org/pbi/ to access additional information on specimens examined for the Planetary Biodiversity Inventories project.

Structural information is documented through the use of light and scanning electron microscopy. Color habitus images of the bugs and images of the female genitalia were prepared using a Zeiss Axiovision camera attached to a Leica stereo microscope, captured using Zeiss Axiovision software, and serially focused stacks of images were combined in Helicon Focus. Habitus photos were shot at different magnifications due to size differences among the specimens, therefore the images are resized so that relative sizes can be deduced from comparison of the specimen images. Actual sizes of specimens can be determined by referring to Table 1. Female genitalia were prepared by suspending the dissected structures in glycerin and photographed in the same manner as the habitus photos. All measurements are in millimeters and were made using an eyepiece reticle on a Zeiss Stemi DRC stereo microscope, whose measurements were calibrated into micrometers for each magnification using a spreadsheet in Microsoft Excel 2003 (Appendix 3-1). Acronyms used in text are as follows: n.sp.= new species; descr. = description; fig. = figures; diag. = diagnosis; biol.= biology; DV= dorsal view; MG= male genitalia; FG= female genitalia; n.gen= new genus.

Collection abbreviations used in text are as follows: ANIC (Australian National Collection, Canberra, Australia); AM (Australian Museum, Sydney, Australia); BMNH (British Museum of Natural History, London, England); BPIQ (Department of Primary

Industries of Queensland, Brisbane, Australia); BPBM (Bernice P. Bishop Museum, Honolulu); CAS (California Academy of Sciences, San Francisco); DPIQ (Department of Primary Industries of Queensland, Brisbane, Australia); HUES (The Biological Laboratory, Hokkaido University of Education, Sapporo, Japan); IRSB (The Belgian Royal Institute of Natural Sciences, Bruxelles, Belgium); NMV (National Museum of Victoria, Melbourne, Australia); QU (Queensland University, Brisbane, Australia); QM (Queensland Museum, Brisbane, Australia); SAMA (South Australian Museum, Adelaide, Australia); TAMU (Texas A&M University, College Station); USNM (National Museum of Natural History, Smithsonian Institution, Washington, D.C.); UNSW (University of New South Wales, Sydney, Australia); WADA (Western Australia Museum Department of Agriculture, Perth, Australia); ZISP (Zoological Institute, Russian Academy of Sciences, Saint Petersburg, Russia); and ZMUH (Zoological Museum of the University, Helsinki).

Key to the Genera of Leucophoropterini

1. Less than 2.25mm long; cuneus usually with two white spots on anterior margin of the cuneus; legs relatively short and equal to or less than four times longer than wide; endosoma C shaped.. *Sejanus* Distant.

\- Greater than 2.25mm long; cuneus never with two white spots on the anterior margin; legs at least four times longer than wide; male endosoma S-shaped……2

2. Anterior of hemelytron always lacking a dark brown transverse line; surface of hemelytron shiny and smooth, never punctate or possessing reflective patches...***Ausejanus,* n. gen**.

- Anterior of hemelytron with a dark brown transverse line; if lacking a dark transverse line, possessing a punctate hemelytron; reflective patches present on the hemelytron…..…………...…………………………………………………3

3. Possessing only simple setae on the hemelytron……………………………….4

- Possessing additional types of setae on the hemelytron (silverish to gold flattened setae, elongate and erect, sericeous setae)……………………………7

4. Possessing punctation on the inner surface of the distal apex of the clavus next to suture; lateral margins of hemelytron strongly constricted medially…………… ………………………………………………***Transeleucophoroptera,* n. gen**.

- Lacking punctation, lateral margins of hemelytron parallel-sided to weakly constricted medially…………………………………………..……….…..5

5. Femora dorso-ventrally flattened; primarily castaneous in coloration on hemelytron………………...……...………...........*Aitkenia* Carvalho and Gross.

- Femora rounded; dark brown, yellowish, or light brown in coloration…………..6

6. Anterior margin of the cuneus with white band equal in width across the length; posterior coloration of cuneus continuous with light brown to castaneous, never dark brown or black.....…………………..…………….…………...***Neaitkenia,* n. gen.**

- White band on anterior margin of cuneus greater in width on the lateral margins than the interior margins; posterior coloration of cuneus dark brown to blackish..

...………………………..………………..……..***Neoleucophoroptera*, n. gen.**

7. Surface of head, pronotum and scutellum distinctly shiny; mesoscutum often partially or completely hidden under the posterior margin of the pronotum; sometimes possessing a white area below the claval suture; possessing elongate, erect setae or sericeous setae on the hemelytron; hemelytron often punctate…………………………………………………*Ctypomiris* Group……..8

\- Surface of head, pronotum and scutellum dull; mesoscutum never completely obscured by the posterior margin of the pronotum; white area below the claval suture always absent; possessing short, subadpressed gold or silverish setae but never long, erect setae or sericeous setae; hemelytron never flat or punctate…...... …………………………………………………...*Gulacapsus* Group…….18

8. Lacking punctation on the hemelytron; possessing long, thick, dark erect setae in addition to simple setae……………………………………….……………9

\- Possessing punctation on the hemelytron; if possessing long, erect setae light brown and relatively thin………………………...…………………..………10

9. Hemelytron with a transverse yellow band posterior to a complete anterior transverse fascia, lacking a pronotal carina…...*Collessicoris* Carvalho and Gross.

\- Hemelytron lacking a transverse yellow band, possessing a pronotal carina…….. ...……………………………………………………………*Biromiris* Schuh.

10. Possessing a partial to complete transverse fascia without a dark posterior margin; mesoscutum exposed; hemelytron convex; posterior coloration of cuneus

same as hemelytron; if possessing a pronotal collar, broad and circling entire anterior margin of the pronotum……………..……………...……….…………..11

- With a partial to complete transverse fascia with a dark posterior margin; mesoscutum hidden under the posterior margin of the pronotum; hemelytra held flat over the thorax and abdomen; posterior coloration of the cuneus distinctly darker than hemelytron; if possessing a pronotal collar, narrow and reflexed….12

11. Cuneus relatively short, taking up less than one-third the total length of the wing membrane; possessing a complete transverse fascia; hemelytra never with short, golden sericeous setae..………*Abuyogocoris* Schuh.

- Cuneus relatively long, taking up more than one-third the total length of the membrane; possessing only partial transverse fascia limited to the clavus; hemelytra covered with short, golden sericeous setae..........…***Austrodapus*, n.gen.**

12. Lateral margins of hemelytron weakly constricted medially, width at narrowest point more than 3/4ths the width of the posterior margin of the pronotum……..13

- Lateral margins of hemelytron strongly constricted medially, width at narrowest point less than 3/4ths the width of the posterior margin of the pronotum……....14

13. Humeral angles shoulder-like; endosoma with spines or additional processes at apex (e.g. figs 703, 706 in Schuh 1984)……………….……....*Ctypomiris* Schuh.

- Humeral angles flat……………………...…...………...…*Solomonomimus* Schuh.

14. Head with the ventral-posterior surface covered with dense, dark long setae..…15

- Head not as above……………………...…………………………………...…16

15. Pronotum medially constricted, watch-glass shaped…..*Waterhouseana* Carvalho.

- Pronotum not medially constricted, bell-shaped……..…………..***Missanos* n.gen.**

16. Hemelytron with long, sericeous setae on the clavus……..…*Arafuramiris* Schuh.

- Hemelytron lacking long, sericeous setae…………………………………....17

17. Antennae nearly twice the width of the head; endosoma united at apex…………..
…………………...………………..…...……………………***Papuamiroides* n. gen.**

- Antennae less than twice the width of the head; separated at apex into an anterior and posterior strap (e.g. Schuh 1984: Fig. 721)……………. *Papuamimus* Schuh.

18. Wings nearly parallel-sided and elongate; cuneus always with greater than ½ of the anterior surface white; posterior of pronotum never swollen; females with the anterior margin of the pronotum nearly equal in width as the posterior margin, box-like shape in anterior view....................................*Leucophoroptera* Poppius.

- Wings narrowed anteriorly, widening posteriorly or weakly medially constricted; posterior of pronotum often swollen; anterior margin of cuneus rarely white for ½ of the anterior margin; females with the anterior margin of the pronotum narrow compared to the posterior margin, bell-shaped in dorsal view.......……19

19. Flattened pronotal collar absent; eyes partially obscure the anterior margin of the pronotum……………..…………………………....*Blesingia* Carvalho and Gross.

- Flattened pronotal collar present; eyes parallel or anterior to the anterior margin of the pronotum..…...……..……………………………………….…………20

20. Eyes greater than ½ the total height of the head, parallel to the anterior margin of the pronotum; head never possessing long, dense setae………….……………..…21

- Eyes greater than ½ the total height of the head, exerted from the anterior margin of the pronotum; head sometimes possessing long, dense setae………………..22

21. Lateral margin of the metepisternum with a small patch of white on the dorso-lateral surface; vertex nearly twice the width of one eye...….***Johnstonsoni* n. gen**.

- Lateral margin of the metepisternum with an elongate white band on the dorso-lateral surface that extends ventrally to the scent gland; vertex less than twice the width of one eye……………………………..…..….*Pseudohallodapocoris* Schuh.

22. Gula elongate, not keel-like; head with long, dense setae on the vertex and gena; lateral margins of the corium white…...……..……....*Trichocephalocapsus* Schuh.

- Gula keel-like; head without long, dense setae as above; lateral margins of the corium same coloration as majority of the hemelytron........….*Gulacapsus* Schuh.

Diagnoses and Descriptions of Genera and Species

Abuyogocoris Schuh

Abuyogocoris Schuh, 1984: 192 (n. gen., descr., disc.)

TYPE SPECIES: *Abuyogocoris abuyog* Schuh by original designation.

DIAGNOSIS: Recognized by the distinctly shiny hemelytron, head, pronotum, scutellum and thorax, the punctate hemelytron that is transversely rounded, the broad and complete white to yellowish transverse fascia, the large white area on the anterior margin of the cuneus, the small size of cuneus that is less than one-fourth the total area of the wing membrane, the presence of long, erect setae on the dorsal surface and long interocular setae, the broad and flat pronotal collar, the flat vertex and broad head, the fan-like apical, posterior process on the endosoma, and the broad and almost blade-like posterior process of the left paramere.

FEMALE: Unknown, though see discussion..

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands, Indonesia.

DISCUSSION: The four known species of *Abuyogocoris* have variety of body morphs: two species have broad eyes with a narrow vertex nearly half the width of one eye and a short body (e.g. *A. abuyog, A. tawitawi*), one has a narrow vertex but elongate body, similar to *Austrodapus* (e.g. *A. liwo*), and the fourth has a wide vertex greater in width than one compound eye and short body (e.g. *A. calien*). However, the distinctive endosoma and left paramere, the punctate and shiny hemelytron, and the lack of sericeous setae support its generic status. Two unidentified females that share the characteristics of *Abuyogocoris*, possibly representing a new species, have been found in the Northern Territory of Australia.

Abuyogocoris abuyog Schuh

Abuyogocoris abuyog Schuh, 1984: 196, figs 648-649 (n. sp., diag., descr., DV).

DIAGNOSIS: Recognized by the dark brown coloration, the broad yellow transverse fascia, and the base of the abdomen being yellow.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: *Abuyogocoris abuyog* is very similar in overall morphology, size and shape to *Abuyogocoris tawitawi*, which Schuh (1984) separates based on slight differences in the coloration of the head and abdomen, and variation in the dimensions between the two species.

HOLOTYPE: **PHILIPPINE ISLANDS: Leyte Island:** Abuyog, 35 mi. S of Tacloban, July 9-12, 1961, P.I. Nat. Mus. and AMNH Expedition. 1♂ (AMNH).

Abuyogocoris calian Schuh

Abuyogocoris calian Schuh, 1984: 196, figs. 648, 654 (n. sp., diag. descr., DV).

DIAGNOSIS: Recognized by the generic diagnosis, its very small size, the wide vertex whose width is close to one and one-fourth times the width of one eye, the long ommatidia setae, the dark castaneous coloration, and the broad transverse fascia.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: One female has been associated with this species and is similar in coloration, size and structure with exception of the vertex, where in females the width is wider relative to males.

HOLOTYPE: **PHILIPPINE ISLANDS: Mindanao:** Davao Prov., Calien, June 13, C.S. Clagg. 1♂ (AMNH).

SPECIMENS EXAMINED: **INDONESIA: Sumatera Utara (North Sumatra):** Dumoga-Bone N.P., 400 m, 19 Jul 1985, Unknown, 1♂ (00354492), 1♀ (00354493) (BMNH).

Abuyogocoris liwo Schuh

Abuyogocoris liwo Schuh, 1984: 197, figs. 648, 655, 659-661 (n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by the relatively large size, the faint transverse fascia, the wide and ventrally-directed posterior process of the left paramere, and the anterior process of the left paramere that point in an alternate direction of the posterior process.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: *Abuyogocoris liwo* looks the most similar to *Austrodapus nitens* in overall body shape and dimensions. The shape of the left paramere and the complete transverse fascia in *A. liwo* separate the two taxa..

HOLOTYPE: **PHILIPPINE ISLANDS: Luzon:** Mountain Prov., Liwo, 8 km. NE of Mayoyao, 1000-1300 m., June 1-6, 1967, light trap, H. M. Torrevillas. 1♂ (BPBM). [not examined].

Abuyogocoris tawitawi Schuh

Abuyogocoris tawitawi Schuh, 1984: 197, figs. 648, 656, 662-664 (n. sp., diag., descr., DV, figs. head-pronotum, MG).

DIAGNOSIS: Recognized by the relatively large and bulging eyes, the broad yellow-white transverse fascia, the yellow-brown head, the castaneous coloration of the hemelytron and thorax, the broad posterior process of the left paramere that is directed perpendicular to the base of the paramere, and the anterior process of the left paramere being blunt and small, directed perpendicular to the posterior process of the left paramere.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: *Abuyogocoris tawitawi* looks the most similar in external dimensions and appearance to *A. abuyog*, but the coloration of the head and the pronotum differentiate the two. The male genitalia of *A. abuyog* were not able to be compared to to the genitalia of *A. tawitawi*.

HOLOTYPE: **PHILIPPINES: Tawitawi Group:** Lapid at Manalik Channel, 5.07°N 119.81°E, 19 Nov 1961, Noona Dan Expedition, Holotype, 1♂ (00127968) (ZMUC). [not examined]

Aitkenia Carvalho and Gross

Figures (3-6, 3-9, 3-10, 3-25)

Aitkenia latevagans Carvalho and Gross, 1982: 41, figs. 59-62, 118A (n. sp., descr., disc., DV, MG).

TYPE SPECIES: *Aitkenia latevagans* Carvalho and Gross, by original designation.

DIAGNOSIS: Recognized by the castaneous coloration, the nearly complete to complete white transverse fascia with a dark brown posterior margin, the lateral margins of the corium being parallel-sided, the dorso-ventrally flattened hind femora, the presence of only simple setae. Females recognized by the trapezoidal to box-shaped pronotum in dorsal view with the anterior margin relatively narrow compared to the posterior margin, and the convex lateral margins of the hemelytron compared to *Leucophoroptera*.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 2.92-2.97mm, width across pronotum 0.89- 0.90, width across widest part of wings 0.94- 0.99. COLORATION: Brown, light brown and castaneous. Head: Brown. Eyes deep red to purple. Labium brown. First antennal segment golden, remaining antennal segments completely dark brown. Thorax: Pronotum, scutellum and thorax dark brown. Dorso-lateral margin of metepisternum and scent gland with a relatively narrow white band, width equal to about one fifth of the total width of the scent gland. *Legs:* All coxae brown, meso and meta-coxae sometimes gold distally. All femora brown. The pro and meso-tibiae are basally dark brown, distally golden, with the meta-tibiae completely dark brown and with parallel rows of dark spicules. Tarsomeres dark brown. *Hemelytra:*

primarily light brown to castaneous with a translucent to whitish transverse fascia on the anterior margin of the hemelytron occupying most of the anterior margin of the corium and most of the clavus excluding adjacent to the claval suture, with a dark brown posterior margin that transverses across the entirety of the wing. The posterior-lateral margins of the corium reddish-castaneous. The anterior margin of the cuneus white with a yellowish tinge at the lateral margins, occupying less than one-fifth the total area of the cuneus, the posterior coloration reddish-brown. Abdomen: Brown.

SURFACE AND VESTITURE: Dorsal surface of body and hemelytron covered with fine, golden simple setae, the medial portion of the hemelytron and the median of the claval suture possess reflective patches.

STRUCTURE: Head: Dorsally clypeus sometimes visible, either being obscured by the frons in anterior view or visible with the clypeus surpassing the frons anteriorly in dorsal view. Vertex flat and declining along the posterior margin, width less than width of compound eye. Eye height greater than one and half the total height of the head, the vertex visible in lateral view anterior to the anterior surface of the eyes, less than to equal to one third of the head below the eyes, the posterior margin of the eyes partially obscuring the anterior margin of the pronotum. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two long and equal to in diameter or wider than segment one, increasing in diameter distally toward segment three. Length of antennal segment two equal to one and one-quarter times the total width of the head or short of one and a third times the width of the head. Antennal segments three and four slender and less than half the length of segment two. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four reaching apex of metacoxa. Thorax: Pronotum more than twice as wide as long, no demarcation between the anterior and posterior margins laterally or dorsally, the dorsal surface nearly flat, lateral margins straight forming a trapezoidal appearance in dorsal view. Pronotal collar is not present. Mesoscutum exposed, scutellum weakly transversely rounded. Scent-gland taking up approximately third the total area of the metepimeron. *Legs:* moderate length, slender with meta-femora weakly flattened dorso-ventrally. Claws of moderate length and width, pulvilli taking up less than half of claw length . Parempodia parallel and hair-like. *Hemelytra*: Lateral margins nearly parallel-sided, dorsally transversely rounded. Cuneus triangular, length approximately equal to one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, and with a partial thickening on the lateral margins of cuneus in the area occupied by the white margin. Abdomen: narrow, elongate.

GENITALIA: (Fig. 3-10: A-H): Pygophore: Relatively small and with a small protuberance on the ventral-posterior surface, occupying about one-fourth length of abdomen, ventral margin sloping upwards towards apex. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, weakly sclerotized or horse-collar shaped, located at apex of endosoma (Figs 3-10: A, F). Phallotheca: Of phyline type, C- shaped, apex gently tapering toward a point, sometimes with ridges on the ventral-anterior surface (Figs 3-10: D, H). Right Paramere: Paramere moderately sized, smaller than left paramere, nearly parallel-sided and with a tapering, pointed apex (Figs 3-10: A, E). Left Paramere: Left paramere moderately sized; posterior process slender, with sensory pits, directed perpendicular to the base of the paramere, relatively elongate compared to the anterior process; anterior process stout but without sensory pits on interior margin, dorsal margin at or below the median of the total height; dorso-medial surface between the anterior and posterior processes rounded to nearly flat (Fig. 3-10: C, G).

Female: Macropterous, medium-sized, with nearly parallel lateral margins. Total length 2.62-3.17mm, width across pronotum 0.87- 0.96, width across widest part of wings 0.99-1.09. COLORATION: Similar patterning as males but with a much darker brown coloration and the second antennal segment can be a lighter brown basally (Fig). SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Head: Clypeus produced, strongly exerted in dorsal view. Vertex convex, width greater than one and half times the width of one compound eye. Eyes taking up less than the total height of the head in lateral view. Antennal segment two long and more slender than segment one at basal joint with antennal segment one, increasing in diameter distally toward segment three. Length of antennal segment two ranging from just over one and one-tenth fourth times the total width of the head to less than one and one-fourth times the total width. Thorax: Pronotum more than twice as wide as long, the width of the anterior margin nearly at least four-fifths the total width of the posterior margin to being nearly equal in width. Mesoscutum is exposed, scutellum weakly transversely rounded. *Hemelytra:* Lateral margins convex, dorsally transversely rounded. Cuneus shorter and wider than males, fracture angled anteromesially. *Abdomen:* Parallel-sided, ventral margin sloping dorsally. Spine present on the ventral surface of the ovipositor in females (3-25: C). The remaining characters are the same as males. GENITALIA (Fig. 3-25: A, B, D): Vestibulum comprising of two separate, triangular-shaped sclerotized plates with no visible lateral tube, but with an apical sclerite that covers the entrance between the two vestibular sclerites sclerotized areas present on lateral margins of rami between dorsal and ventral labiate plates, rings weakly sclerotized (Fig: 3-25: D). Posterior wall mostly membranous, with posterior margin sclerotized across margin and possessing a flat medial invagination (Fig. 3-25: A) and the lateral interramal plates sclerotized (Fig. 3-25: B).

HOSTS: Primarily Santalaceae and Casuarinaceae, also found on Asteraceae (*Olearia* sp.).

DISTRIBUTION: Eastern Australia.

DISCUSSION: The original description of *Aitkenia* was extremely vague and essentially unusable, indicating only that the taxon was distinct from *Ausejanus* by the relatively narrow vertex, the tendency for the second antennal segment to be somewhat flattened, the anterior of the pronotum more narrow, and a slight constriction of the median of the hemelytron in dorsal view (Carvalho and Gross 1982). These characters can characterize several other genera besides *Aitkenia*, and the species of Aitkenia which demonstrate these characters most strongly now belong in *Blesingia* (e.g. *Blesingia cantrelli* (Carvalho and Gross)).

Aitkenia exocarpos, new species

Figures (3-6, 3-8, 3-10: A-D, 3-25: A-D)

DIAGNOSIS: Recognized by the relatively elongate head as compared to *A. casuarina* with at least one-fourth of the total height of the head below the eyes, the wider margin of white along the dorso-lateral margin of the metepisternum that extends ventrally to the lateral margin of the scent gland, and the genitalia. Females are recognized by the more box-like shaped pronotum compared to *A. latevagans*.

DESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 2.97mm, width across pronotum 0.84, width across widest part of wings 0.99. COLORATION: Dorso-lateral margin of metepisternum and scent gland with a narrow white band that extends into the anterior-lateral margins, width equal to about one fifth of the total width of the scent gland. STRUCTURE: Anterior margin of the frons surpasses the anterior margin of the clypeus, obscuring the clypeus in dorsal view, area of the head below the eyes greater than one-fourth the total height of the head (Fig 3-9).

GENITALIA: (Figs 3-10: A-D) Endosoma: Apex of endosoma relatively broad, secondary gonopore appearing horse-collar-shaped when viewed dorsally (Fig. 3-10: B). Phallotheca: ventral-anterior surface smooth, lacking ridges (Fig. 3-10: D). Left Paramere: Dorsal medial-surface rounded.

Female: Macropterous, medium-sized, with nearly parallel lateral margins. Total length 2.57-2.82mm, width across pronotum 0.83- 0.94, width across widest part of wings 0.91-1.03. STRUCTURE: Vertex takes up greater than half the total width of the head. Length of second antennal segment is greater than one and one-tenth times the width of the head. Hemelytral margins are weakly constricted medially.

COLORATION: Same coloration pattern as males except the transverse fascia is a more opaque white coloration versus the nearly transparent fascia of males.

ETYMOLOGY: Named for the genus of plants on which this species was collected.

HOSTS: Primarily *Exocarpos* sp. (Santalaceae), also sporadically found on Fabaceae and Asteraceae.

DISTRIBUTION: Throughout Australia.

DISCUSSION: Only two males were found for this species and both are relatively teneral, however the relatively narrow area of the head below the eyes as compared to type species *Aitkenia latevagans* confirms that it represents a different lineage. Further, associated females have a more trapezoidal-shaped pronotum as compared to females of *A. latevagans,* whose anterior margin of the pronotum is closer in width to the posterior margin. Lastly, this species appears to be host-specific to *Casuarina cunninghamiana*, unlike *A. latevagans* which males and females were collected in large numbers on Santalaceae.

HOLOTYPE: **AUSTRALIA: South Australia:** 5 km SW of Whyalla, 33.05085°S 137.5004°E, 30 m, 21 Oct 1996, Schuh and Cassis, *Exocarpos aphyllus* R.Br. (Santalaceae), det. PERTH staff PERTH 05056209, 1♂ (00273352) (AMNH).

PARATYPES: **AUSTRALIA: Northern Territory:** Renner Springs, 27 Nov 1972, D. H. Colless, 1♂ (00168816) (ANIC). **South Australia:** 5 km SW of Whyalla, 33.05085°S 137.5004°E, 30 m, 21 Oct 1996, Schuh and Cassis, *Exocarpos aphyllus*

R.Br. (Santalaceae), det. PERTH staff PERTH 05056209, 3♀ (00393279 - 00393281) (AM). 20 km W of Nepabunna, Mt. Serle, 30.55365°S 138.8304°E, 630 m, 07 Nov 1998, Schuh, Cassis, Silveira, *Acacia victoriae* Benth. (Fabaceae), det. Det: Royal Bot Gard. NSW NSW427617, 1♀ (00393287) *Exocarpos aphyllus* R. Br. (Santalaceae), det. Det: Royal Bot Gard. NSW NSW427339, 7♀ (00393282 - 00393286, 00393288 - 00393289) (AM). 28.8 km N of Port Augusta on Stuart Hiway, 32.26667°S 137.5692°E, 77 m, 19 Oct 2001, Cassis, Silveira, Wall, *Exocarpos aphyllus* R.Br. (Santalaceae), det. NSW staff NSW658282, 3♂ (00274793 - 00274795), 1♀ (00274792) (AM). 75 km NW of Morgan, 5 km N Cane Grass, 33.53334°S 140.05°E, 100 m, 02 Nov 1995, Schuh, Cassis, and Gross, *Exocarpos aphyllus* R. Br. (Thymelaeaceae), det. B.M. Wiecek 1996 NSW 395968, 1♀ (00393278) (AM). 96 km NW of Morgan, Pine Valley Stn, 33.31667°S 140.2°E, 150 m, 02 Nov 1995, Schuh, Cassis, and Gross, *Exocarpos aphyllus* R. Br. (Santalaceae), det. B.M. Wiecek 1996 NSW 395968, 9♀ (00273339 - 00273343, 00273348 - 00273351) (AMNH). Mt Serle district (near Gammon Ranges National Park), 30.55001°S 138.837°E, 567 m, 08 Nov 2001, Cassis, Schuh, Schwartz, *Exocarpos aphyllus* R.Br. (Santalaceae), det. NSW staff NSW666360, 3♀ (00371773 - 00371775) (AMNH). Tea Tree Swamp, 6mi W of Warooka, 27 Jan 1962, P. Aitken, 1♂ (00169262) (SAMA). Wilochcreek, 60 km N Port-Augusta, 31.95°S 137.76666°E, 30 Apr 1978, V.I. Tobias, 1♂ (00229519) (ZISP). **Western Australia:** Blowholes Rd NW of North West Coastal Hiway, Beagle Hill Area, 24.49068°S 113.4626°E, 20 m, 27 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Exocarpos aphyllus* R.Br. (Santalaceae), det. PERTH staff PERTH6988741, 1♀ (00195999) (AMNH). Eneabba on

Brand Hiway, 29.80735°S 115.2699°E, 100 m, 31 Oct 1996, Schuh and Cassis, *Exocarpos* sp. (Santalaceae), 2♀ (00088826, 00088827) (AM). Newman Rocks, 136.5 km E of Norseman, 32.11084°S 123.1704°E, 250 m, 22 Oct 1996, Schuh and Cassis, *Olearia* sp. (Asteraceae), det. PERTH staff PERTH 05095050, 1♀ (00272182) (AMNH).

Aitkenia latevagans Carvalho and Gross

Figures (3-6, 3-8, 3-9, 3-10: E-H)

Aitkenia latevagans Carvalho and Gross, 1982: 41, figs. 59-62, 118A (n. sp., descr., disc., DV, MG).

DIAGNOSIS: Recognized by the castaneous coloration, the nearly complete white transverse fascia with a dark brown posterior margin, the lateral margins of the corium being parallel-sided, the dorso-ventrally flattened hind femora, and the shape of the left paramere. Females recognized by the trapezoidal-shaped pronotum in dorsal view with the anterior margin relatively narrow compared to the posterior margin.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 2.92-2.97mm, width across pronotum 0.89- 0.90, width across widest part of wings 0.94- 0.99. COLORATION: Dorso-lateral margin of metepisternum with a relatively narrow white band which does not extend to the lateral margin of the scent gland, width equal to about one eighth of the total width of the metepisternum. The rest of the characters as in generic description. STRUCTURE: Anterior margin of the clypeus surpasses the anterior margin of the frons, clypeus visible in anterior view. Less than one-third of the total height of the head below the eyes (Fig 3-9).GENITALIA (Figs 3-10: E-H): Pygophore tapering dorsally towards apex with a very small protrusion on the ventral-posterior surface. Endosoma: Apex relatively narrow, secondary gonopore weakly sclerotized and not horse-collar shaped (Fig. 3-10: F). Phallotheca: Anterior-ventral margin with ridges (Fig. 3-10: H). Left Paramere: Dorso-medial margin nearly flat between the anterior and posterior process (Fig. 3-10: G).

Female: Macropterous, medium-sized, with nearly parallel lateral margins. Total length 2.62-3.17mm, width across pronotum 0.87- 0.96, width across widest part of wings 0.99-1.09. STRUCTURE: Vertex taking up half of the total width of the head. Length antennal segment two over one and one-fourth times the total width of the head. COLORATION: Dark brown the dominant color rather than castaneous in males, females have the second antennal segment basally lighter in coloration than males in some specimens. White margin of dorso-lateral margin of metepisternum extends ventrally to base of scent gland unlike males.

HOSTS: Casuarinaceae, specifically *Casuarina cunninghamiana* Miq.

DISTRIBUTION: New South Wales.

DISCUSSION: Carvalho and Gross (1982) described this species based on specimen from the Australian Capital Territory and illustrated the genitalia from a specimen from the Northern Territory, which they did not designate as a due to the high variability that they observed for this species. Based on subsequent investigation of the specimen used for the illustrations, the second specimen is in fact a specimen of *Aitkenia exocarpos*. The male genitalia are therefore redrawn for this species.

HOLOTYPE: **AUSTALIA: AUSTRALIA**: Australian Capital Territory: Cotter River, 7.xii.1962, D.K. McAlpine. 1♂ (ANIC).

SPECIMENS EXAMINED: **AUSTRALIA: New South Wales:** 43 km SE of Braidwood, Deua National Park, Deua River, 35.76339°S 149.92323°E, 100 m, 10 Nov 1995, Schuh and Cassis, (Casuarinaceae), 2♀ (00088899, 00088900) (AM). Bateman's Bay, 35.71475°S 150.1839°E, 2 m, 21 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Casuarina glauca* Sieber ex Spreng. (Casuarinaceae), det. NSW staff NSW658209, 1♀ (00272788) (AMNH). Warrumbungle National Park, Wambelong Campground, 31.21666°S 149.08333°E, 550 m, 25 Oct 1995, Schuh and Cassis, *Casuarina cunninghamiana subsp. cunninghamiana* Miq. (Casuarinaceae), det. R.G. Coveny 1996 NSW 395933, 4♀ (00275380 - 00275383) (AM), *Casuarina cunninghamiana subsp. cunninghamiana* Miq. (Casuarinaceae), det. R.G. Coveny 1996 NSW 395933, 2♂ (00272033, 00272034), 17♀ (00272037 - 00272053) (AMNH). Yadboro State Forest, Castle Campground, 35.22°S 150.1°E, 20 Jan 1994, G. Cassis, *Casuarina cunninghamiana* Miq. (Casuarinaceae), 5♀ (00371957 - 00371961) (AM).

Arafuramiris Schuh

Figures (3-7, 3-11, 3-25: E-G)

Arafuramiris Schuh, 1984: 199 (n. gen., diag., descr.)

TYPE SPECIES: *Arafuramiris biakanus* Schuh, 1984 by original designation.

DIAGNOSIS: Recognized by the large eyes, the flat to convex vertex, the strongly medially constricted pronotum with the posterior portion strongly swollen and completely obscuring the mesoscutum in dorsal view, the presence of long sericeous setae focused on the anterior of the clavus, the short and golden serious setae covering the rest of the punctate hemelytron, the castaneous coloration, the meta-femora with knee-like swellings at the joint with the meta-tibiae, the longer than wide first abdominal sternite and overall petiolate form of the abdomen, the presence of striated area on the abdomen that is visible in scanning electron microscopy, and the form of the male genitalia.

REDESCRIPTION: *Male*: Macropterous, small-sized, medially constricted. Total length 2.82-3.71mm, width across pronotum 0.92-1.08, width across widest part of wings 0.79-1.09. COLORATION: Brown and castaneous. Head: Castaneous. Eyes silver. Labium golden anteriorly dark brown distally. First antennal segment golden, second antennal segment golden basally and light brown distally, third antennal segment golden, fourth antennal segments golden basally and dark brown distally. Thorax: Pronotum, scutellum and thorax mostly dark brown to castaneous. Dorso-lateral margin of metepisternum and scent gland continuous in coloration with the rest of the thoracic pleuron. *Legs:* All coxae basally dark brown distally golden, the pro-coxae with most of the area dark brown. All femora brown, sometimes a lighter brown on the ventral surface, the meta-femora can be darker brown. All tibiae are dark brown basally and golden distally, meta-tibiae possessing two parallel rows of dark spicules. Basal tarsomeres golden, dark brown for distal segments. *Hemelytra:* Light brown, with the anterior margin of the clavus abutting the scutellum a darker, chocolate brown. Lateral-posterior margins of the corium distally dark brown with small transparent areas situated at level with the posterior apex of the claval suture. Anterior margins of the cuneus posterior to the cuneal fracture mostly transparent with the interior margin lateral to the cuneus pigmented yellowish-white, the posterior portion of the cuneus a dark brown. Membrane dark brown with weak brown pigmentation along the wing-veins Abdomen: dark brown with the second and third abdominal segments a lighter brown to white coloration.

SURFACE AND VESTITURE: Dorsal surface of body and hemelytron covered with long, erect light-brown setae, the hemelytron punctate and also possessing short and golden-metallic-like across the surface and a patch of long, sericeous setae on the anterior portion of the clavus and in a small patch posterior to the apex of the claval commissure.

STRUCTURE: Head: Clypeus anterior to the anterior margin of the frons or flush with the frons in lateral view, either visible in dorsal view or hidden, frons convex to flat. Cyberial muscle attachment sites visible on frons. Vertex flat or concave, with the posterior margin raised for the medial half and the lateral margins declining, forming a shelf-like appearance, width equivalent to approximately half the total width of one eye to twice the width of one eye. Eyes weakly to strongly removed from the anterior margin of the vertex, vertex hidden or visible in lateral view by the anterior surface of the eyes, and the eyes taking up greater than three-fourths the total height of the head in lateral view to the total height of the head, the posterior margin of the eyes obscure the anterior margin of the pronotum. Gula obsolete Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head . Antennal segment two long and wider in diameter than segment one, increasing in diameter distally toward segment three. Length of antennal segment nearly equal to the width of the head to one and one-third times the total width of the head, weakly curving medially. Antennal segments three and four equal in width to base of second antennal segment, less than half the length of segment two. Labrum narrow. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four extending past the pro-coxae to nearly reaching the meso-coxae. Thorax: Pronotum greater than two-thirds as long as wide, dorsal surface flat along the anterior portion, swollen dorsally and convex on the posterior portion of the pronotum, with a dorsal indentation separating the anterior and posterior portions, dorsal lateral margins narrowed anteriorly and widening distally forming a bell-shaped pronotum in dorsal view, the length of the anterior portion of pronotum well differentiated from the posterior portion and varying in length. A narrow and reflexed pronotal collar is present. Mesoscutum hidden by the posterior margin of the pronotum, the scutellum is swollen medially and anteriorly the posterior margin of the pronotum. Scent-gland taking up less than one-third the total area of the metepimeron. *Legs:* elongate, narrow, hind-femora widening in diameter distally anterior to joint to the meta-tibiae forming a knee-like appearance. Claws of moderate length and width, pulvilli taking up less than half of claw length. Parempodia parallel and hair-like. *Hemelytra*: Elongate, lateral margins strongly constricted medially with the anterior lateral margins narrower than the posterior lateral margins or vise versa, wings flat. R+M vein terminating early near median of hemelytron. Cuneus narrow triangular with the lateral margins weakly curving convexly, length greater than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially. Abdomen: narrow for most of length, expanding in diameter to the pygophore to form a petiolate shape, first abdominal sternite longer than wide. GENITALIA: Pygophore: small, taking up less than one-fifth the total length of the abdomen, without elaborations, ventral surface nearly parallel to anterior surface. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex into two separate processes, the posterior process angled in a different direction from the anterior process, the anterior process with a horse-collared shape secondary gonopore located subapically (Fig. 3-11: A, E). Phallotheca: Of phyline type, apex broadly tapering toward a point, the main body elongate and nearly perpendicular to the apex forming an L shape (Fig. 3-11: D) or curved relative to the apex forming a C –shape (Fig. 3-11:G), sometimes with ridges on the anterior margin of the posterior process. Right Paramere: Paramere moderately sized, smaller than the left paramere, relatively elongate and nearly parallel-sided (Fig. 3-11: C). Left Paramere: Left paramere moderately sized; posterior process of intermediate width to wide, with sensory pits, and gently curving ventrally; anterior process stout but without sensory pits on interior margin, the dorsal surface of the anterior arm near median of total height of paramere (Fig. 3-11: F) to nearly equal in height to the dorsal surface of the posterior process (Fig. 3-11: B); dorso-medial margin between anterior and posterior pits either rounded (Fig. 3-11:F, Schuh 1984: Fig. 677) or with the dorsal surface of the posterior process raised relative to the median of the two processes forming a convex margin (Fig. 3-11: B).

Female: Macropterous, small, medially constricted. Total length 2.67-3.12mm, width across pronotum 0.89- 0.99, width across widest part of wings 0.84-1.03. COLORATION: Primarily castaneous, similar patterning as males with exception of the second antennal segment which is more yellow basally, the third antennal segment distally dark brown, fourth antennal segment mostly dark brown, and the abdomen a darker brown than the head and thorax. SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Clypeus extends past the anterior margin of the frons, weakly visible in dorsal view, frons more convex than males. Vertex convex, nearly twice the width of one compound eye to twice the width, eyes not taking up the total height of the head in lateral view. Length of antennal segment two nearly equal to the total width of the head. Abdomen petiolate, anterior half posterior from thorax sharply declining ventrally in lateral view and constricted relative to the posterior half in dorsal view, posterior half of abdomen sloping dorsally. Lateral margins of abdomen sometimes wider than lateral margins of hemelytron. Spine absent on the ventral surface of the ovipositor in females. Ovipositor spine absent. The remaining characters are the same as males. GENITALIA (Fig. 3-25: E-G): Vestibulum comprising of two relatively large, separate, triangular-shaped sclerotized plates with no visible lateral tube, but with a relatively broad apical sclerite that covers the entrance between the two vestibular sclerites (Fig. 3-25: E): sclerotized areas present on lateral margins of rami between dorsal and ventral labiate plates, rings weakly sclerotized (Fig. 3-25: E). Posterior wall mostly membranous, with posterior margin sclerotized across margin and possessing an additionally sclerotized medial plate (Fig. 2-25: F) forming a medial projection in posterior view (Fig. 3-25: G). Lateral interramal plates sclerotized (Fig. 3-25: F).

HOSTS: Cupressaceae and Euphorbiaceae.

DISTRIBUTION: Papua New Guinea, Northern Australia (Northern Territory, Queensland).

DISCUSSION: *Arafuramiris* is relatively easy to identify due to the possession of the long sericeous setae on the clavus, which is not present in any other Leucophoropterini. Previously only described from the Indo-Pacific, three new species are here described from Northern Australia.

Arafuramiris biakanus Schuh

Arafuramiris biakanus Schuh, 1984: 202. figs. 665, 666, 676-678. (n. sp., diag., descr., DV, figs. head-pronotum, MG)

DIAGNOSIS: Recognized by characters of the generic diagnosis, the relatively small eyes that take up only three-fourths the total height of the head in lateral view, the width of the vertex being at least twice the width of one eye, the lateral margins of the abdomen in females being wider than the lateral margins of the abdomen, and the indentation and clear differentiation between the anterior and posterior portions of the pronotum.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea and Indonesia.

DISCUSSION: I was able to view recently specimens of this species from Papua New Guinea and the shape of the head shape and eyes are distinctive compared to all other species of *Arafuramiris*. Most species of *Arafuramiris* have the eyes dominating the dorsal surface and the lateral surface of the head, whereas in *A. biakanus* the vertex dominates the head.

HOLOTYPE: **PAPUA NEW GUINEA: Morobe Prov.:** Bulolo, 282 m., August 13, 1956, E. J. Ford, Jr. 1♂ (BPBM). [not examined]

SPECIMENS EXAMINED: **INDONESIA: Biak Island:** Biak Island: Strand, 0.99783°S 135.98089°E, 61 m, 24 Jun 1959, T.C. Maa, Paratype, 1♂ (00196055) (AMNH), Paratype, 1♂ (00321083), 1♀ (00321082) (BPBM). **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 24 May 1995, O. Missa, 1♀ (00302157) (ISNB); 09 Apr 1996, O. Missa, Light Trap, 1♀ (00302120) (ISNB); 07 Jun 1996, O. Missa, 3♂ (00196011, 00196013, 00302156), 3♀ (00196018, 00302158, 00302160) (ISNB).

Arafuramiris dreikikir Schuh

Arafuramiris dreikikir Schuh, 1984: 203, figs 665, 679, 682, 683. (n. sp., diag., descr., DV, figs. head-pronotum)

DIAGNOSIS: Recognized by characters of the generic diagnosis, the medium-size, the eyes that do not take up the entire lateral height of the head, the vertex width greater than the width of half of one compound eye, the darker coloration and the relatively narrow anterior margins of the pronotum.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea

DISCUSSION: *Arafuramiris oswaldi* is similar in overall morphology and coloration to *A. dreikikir*, but the latter species has a flat frons versus the relatively convex frons of *A. oswaldi*, is larger in size, the posterior lateral margins of the hemelytron are wider than the anterior lateral margins, and possess visible clypeal muscle attachment sites.

HOLOTYPE: **PAPUA NEW GUINEA: East Sepik Prov**,; Dreikikir, 300-400 m., June 22, 1961, light trap, J. L. and M. Gressitt. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **INDONESIA: Papua:** Nabire, S. Geelwink Bay, 3.36667°S 135.48333°E, 02 Jul 1962 - 09 Jul 1962, J. L. Gressitt, 1♀ (00318937) (BPBM). **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 1995, O. Missa, 7♀ (00301955 - 00301959, 00302164 - 00302165) (ISNB); 24 May 1995, O. Missa, 1♀ (00196016) (ISNB); 30 Jun 1995, O. Missa, 1♀ (00301954) (ISNB); 03 Aug 1995, O. Missa, 2♀ (00301960, 00302166) (ISNB); 01 May 1996, O. Missa, 3♂ (00196014, 00302135 - 00302136), 1♀ (00302140) (ISNB); 05 Jun 1996, O. Missa, Light Trap, 1♀ (00302133) (ISNB); 28 Jun 1996, O. Missa, 2♂ (00302137, 00302138), 1♀ (00302139) (ISNB).

Arafuramiris gressitti Schuh

Arafuramiris gressitti Schuh, 1984: 204, figs. 665, 680, 684, 685. (n. sp., diag., descr., DV, figs. head-pronotum)

DIAGNOSIS: Recognized by characters of the generic diagnosis, the broad eyes that take up the entirety of the lateral and anterior height of the head, the vertex that nearly equal to half the width of one eye, the lighter coloration, and the small size.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Indonesia.

DISCUSSION: The large eyes that dominate the lateral and anterior height of the head, the lighter coloration, and the small size make it one of the more easily recognized species of *Arafuramiris*.

HOLOTYPE: **INDONESIA: West Irian:** Hollandia Binnen, 100 m; November 24, 1958, light trap, J. L. Gressitt. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 16 Mar 1993, O. Missa, 2♂ (00302171, 00302172) (ISNB); 17 May 1993, O. Missa, Light Trap, 2♂ (00302168, 00302169) (ISNB); 19 May 1993, O. Missa, 1♂ (00302149) (ISNB); 31 May 1993, O. Missa, Light Trap, 1♂ (00302142), 1♂ (00302141) (ISNB); 08 Jun 1993, O. Missa, Light Trap, 1♂ (00302167) (ISNB); 1995, O. Missa, 2♂ (00301932, 00301933), 2♂ (00301937, 00302159), 6♀ (00301922 - 00301924, 00302007, 00302180 - 00302181), Light Trap, 1♂ (00301934) (ISNB); 24 May 1995, O. Missa, 4♂ (00301952, 00302161 - 00302163), 1♀ (00301951) (ISNB); 26 May 1995, O. Missa, 1♂ (00302176), 1♀ (00196017) (ISNB); 14 Jun 1995, O. Missa, 3♂ (00301941 - 00301942, 00302006) (ISNB); 30 Jun 1995, O. Missa, 3♂ (00301930 - 00301931, 00302178) (ISNB); 30 Jun 1995, O. Missa, 2♂ (00301943, 00301944)

(ISNB); 13 Jul 1995, O. Missa, 1♀ (00302008) (ISNB); 03 Aug 1995, O. Missa, 1♂ (00301940), 4♀ (00301926 - 00301929) (ISNB); 04 Aug 1995, O. Missa, 2♀ (00301925, 00302009) (ISNB); Apr 1996, O. Missa, Light Trap, 1♀ (00302134) (ISNB); 09 Apr 1996, O. Missa, Light Trap, 3♂ (00301947, 00302174 - 00302175) (ISNB); 10 Apr 1996, O. Missa, Light Trap, 1♂ (00302173) (ISNB); 15 Apr 1996, O. Missa, Light Trap, 1♂ (00302177) (ISNB); 24 Apr 1996, O. Missa, Light Trap, 1♂ (00302179) (ISNB); 01 May 1996, O. Missa, 1♂ (00301953) (ISNB); 03 Jun 1996, O. Missa, Light Trap, 3♂ (00301938 - 00301939, 00302150) (ISNB); 05 Jun 1996, O. Missa, Light Trap, 1♂ (00301948) (ISNB); 10 Jun 1996, O. Missa, Light Trap, 1♂ (00301946), 1♂ (00302148) (ISNB); 11 Jun 1996, O. Missa, Light Trap, 1♂ (00302004) (ISNB); 17 Jun 1996, O. Missa, Light Trap, 1♂(00301945) (ISNB); 18 Jun 1996, O. Missa, 1♂ (00301950) (ISNB); 04 Jul 1996, O. Missa, Light Trap, 2♂ (00301949, 00302005), 1♂ (00302170) (ISNB); 09 Jul 1996, O. Missa, Light Trap, 2♂ (00301935, 00301936) (ISNB); 10 Jul 1996, O. Missa, Light Trap, 1♂ (00302151) (ISNB).

Arafuramiris heath, new species

Figure (3-7)

DIAGNOSIS: Recognized by the small size, the width of the vertex being nearly equal in width to one compound eye, the dark coxae, the transparent anterior lateral margins of the cuneus, the relatively long second antennal segment, and the eyes not taking up the entire height of the head with the vertex visible in lateral view. Females recognized by the lateral margins of the abdomen visible below the lateral margins of the hemelytron.

DESCRIPTION: *Male*: Macropterous, small-sized, medially constricted. Total length 2.97mm, width across pronotum 1.02, width across widest part of wings 0.94. COLORATION: Eyes silver. Membrane dark brown with weak brown pigmentation along the wing-veins. Abdomen dark brown, with the second and third abdominal segments a lighter brown to white coloration. The rest of the coloration as in generic description. STRUCTURE: Clypeus anterior to the anterior margin of the frons in lateral view, visible in dorsal view, frons convex. Vertex flat, with the posterior margin raised for the medial half and the lateral margins declining, forming a shelf-like appearance, width equivalent to approximately half the total width of one eye. Eyes weakly removed from the anterior margin of the vertex, vertex visible in lateral view by the anterior surface of the eyes and the eyes taking up greater than one half the total height of the head in lateral view. Length of the second antennal segment nearly equal to one and one-third times the total width of the head. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four nearly reaching the meso-coxae. Anterior portion of pronotum relatively broad and well differentiated from the posterior portion. Anterior lateral margins of hemelytra narrower than the posterior lateral margins. Length of cuneus greater than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially. GENITALIA: pygophore small, taking up less than one-fifth the total length of the abdomen, without elaborations, ventral surface nearly parallel to anterior surface. Endosoma, phallotheca and parameres not examined.

Female: Macropterous, small, medially constricted. Total length 2.67mm, width across pronotum 0.90, width across widest part of wings 0.89. COLORATION, SURFACE TEXTURE AND VESTITURE as in generic description. STRUCTURE: Clypeus extends past the anterior margin of the frons, weakly visible in dorsal view, frons more convex than males. Vertex nearly twice the width of one compound eye and convex, eyes not taking up the total height of the head in lateral view. Ventral surface of abdomen parallel to dorsal surface for greater than one-half of the posterior length, first abdominal sternite distinctly narrowed compared to rest of the abdominal segments, the lateral margins of the abdomen wider than the lateral margins of the hemelytron. Ovipositor spine absent. The remaining characters are the same as males. GENITALIA: Not examined.

ETYMOLOGY: Named for the host plant vegetation, which was listed as heath. Noun in apposition.

HOSTS: Heath, referring to a shrubby, sclerophyll vegetation type in Australia.

DISTRIBUTION: Queensland.

DISCUSSION: This species initially was considered a population of *Arafuramiris biakanus*, but the much wider head, and the width of the vertex being nearly equivalent to the width of one compound eye versus nearly twice as wide as one eye in *A. biakanus* indicates they are separate species. This species is only known from the male holotype and female paratype which were not dissected for the genitalia.

HOLOTYPE: **AUSTRALIA: Queensland:** 24km NNW Heathlands, 11.55°S 142.46666°E, 19 Jun 1993, I.D.Naumann & P. Zborowski, heath. 1♂ (00088832) (AM).

PARATYPES: **AUSTRALIA: Queensland:** 24km NNW Heathlands, 11.55°S 142.46666°E, 19 Jun 1993, I.D.Naumann & P. Zborowski, heath, 1♀ (00088840) (AM).

Arafuramiris jimmi Schuh

Arafuramiris jimmi Schuh, 1984: 205, figs. 665, 681. (n. sp., diag., descr., DV)

DIAGNOSIS: Recognized by characters of the generic diagnosis, the large size, the width of the vertex being approximately the same size as the width of one compound eye, the relatively short and narrow-sided anterior portion of the pronotum, and the rounded frons.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: This species is similar in size to *Arafuramiris queenslandi* but is differentiated by the wider vertex and the more elongate and narrow anterior portion of the pronotum.

HOLOTYPE: **PAPUA NEW GUINEA: Western Highlands Prov.:** Korop, Upper Jimmi River Valley, 1300 m, July 12, 1955, light trap, J.L. Gressit. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED**: PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 12 Apr 1996, O. Missa, 2♂ (00196000, 00302153), 5♀ (00196007 - 00196008, 00302154 - 00302155, 01960015) (ISNB). Baku Forest Stn, 5.1°S 145.48°E, 80 m, 04 Feb 1978 -12 Feb 1978, W. C. Gagne, 1♂ (00318941) (BPBM). **Sandaun aka**

West Sepik Province: Angoram, 10 m, 14 Aug 1969, J. L. Gressitt, 1♀ (00318940) (BPBM).

Arafuramiris oswaldi, new species

Figures (3-7, 3-11: A-D)

DIAGNOSIS: Recognized by the small size, the relatively convex and projecting frons, the presence of the transparent air-space on the lateral margins of the cuneus, the relatively narrow lateral posterior margins of the hemelytron, the relatively elongate anterior portion of the pronotum, and the shape of the male genitalia.

DESCRIPTION: *Male*: Macropterous, small, medially constricted. Total length 2.82-2.97mm, width across pronotum 0.92- 0.94, width across widest part of wings 0.79-0.89. COLORATION: As in generic description. STRUCTURE: Clypeus flush with the anterior margin of the frons in lateral view, not visible in dorsal view, frons convex. Vertex concave, with the posterior margin raised for the medial half and the lateral margins declining, forming a shelf-like appearance, width equivalent to approximately half the total width of one eye. Eyes strongly removed from the anterior margin of the vertex, vertex hidden in lateral view by the anterior surface of the eyes and the eyes taking up the entire height of the head in lateral view, the posterior margin of the eyes obscure the anterior margin of the pronotum. Length of antennal segment nearly equal to one and one-tenth times the total width of the head, weakly curving medially. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four surpassing the pro-coxae. Anterior portion of pronotum relatively elongate and well differentiated from the posterior portion. Posterior lateral margins of the hemelytra narrower than the anterior lateral margins. Cuneus length greater than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially. GENITALIA: (Figs 3-11: A-D). Pygophore: small, taking up less than one-fifth the total length of the abdomen, without elaborations, ventral surface nearly parallel to anterior surface. Endosoma: Relatively small compared to *Arafuramiris queenslandi*, apex of posterior strap terminates posterior to the anterior margin of the secondary gonopore (Fig. 3-11: E). Phallotheca: Of phyline type, fairly small, C-shaped, apex gently tapering toward a point, anterior surface of posterior process with ridges (Fig. 3-11: G). Left Paramere: Left paramere moderately sized; posterior process broad, with sensory pits, and gently curving ventrally; anterior process stout but without sensory pits on interior margin, the dorsal surface ventral to the midline of the total height of the paramere; dorso-medial margin between the anterior and posterior processes curved (Fig. 3-11: F.)

Female: Unknown.

ETYMOLOGY: Named for the collector of two of the specimens, Dr. John Oswald.

HOSTS: Unknown; Mercury vapor light.

DISTRIBUTION: Queensland and Northern Territory.

DISCUSSION: This species is most similar to Papua New Guinea species *Arafuramiris gressitti* in overall morphology and size, however *A. oswaldi* can be differentiated by the narrow posterior margins of the hemelytra, the convex frons rather than straight frons, and the transparent lateral margins of the anterior of the cuneus.

HOLOTYPE: **AUSTRALIA: Northern Territory:** ca. 50km SE Kununurra, 64.07388°S 129.08888°E, 12 Jun 1998, J. Oswald. 1♂ (00248380) (TAMU).

PARATYPES: **AUSTRALIA: Northern Territory: AUSTRALIA: Northern Territory:** 6km S Pine Creek (town), 13.8725°S 131.80583°E, 02 Jun 1998, J. Oswald, 1♂ (00248088) (TAMU). ca. 50km SE Kununurra, 64.07388°S 129.08888°E, 12 Jun 1998, J. Oswald, 1♂ (00248382) (TAMU). **Queensland:** 3km NE Mt. Webb, 15.05°S 145.15°W, 01 Oct 1980 - 30 Oct 1980, J. C. Cardale, 1♂ (00168815) (ANIC).

Arafuramiris queenslandi, new species

Figures (3-7, 3-11, 3-25: E-G)

DIAGNOSIS: Recognized by the large size, the presence of the transparent air-space on the lateral margins of the cuneus, and the large eyes. Similar in overall size to *Arafuramiris jimmi* but the narrower vertex, eyes that encompass the total height of the head in lateral view in *A. queenslandi* separate the two species.

DESCRIPTION: *Male*: Macropterous, medium-sized, medially constricted. Total length 3.22-3.71mm, width across pronotum 0.94-1.08, width across widest part of wings 0.99-1.09. COLORATION: Pronotum, scutellum and thorax mostly dark brown, the anterior portion of the pronotum a lighter brown coloration. Membrane light brown and without pigmentation on the wing-veins. Abdomen dark brown with the second and third abdominal segments a lighter brown to castaneous coloration. STRUCTURE: Clypeus flush with the anterior margin of the frons in lateral view, not visible in dorsal view, frons convex. Vertex concave, with the posterior margin raised for the medial half and the lateral margins declining, forming a shelf-like appearance, width equivalent to approximately half the total width of one eye. Eyes strongly removed from the anterior margin of the vertex, vertex hidden in lateral view by the anterior surface of the eyes and the eyes taking up the entire height of the head in lateral view, the posterior margin of the eyes obscure the anterior margin of the pronotum. Length of antennal segment two equal in length to the width of the head, weakly curving medially. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four surpassing the meso-coxae. Anterior portion of pronotum relatively short and not as well differentiated as the other Australian species of *Arafuramiris*. Hemelytral anterior lateral margins narrower than the posterior lateral margins. Cuneus length greater than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially. GENITALIA: (Figs 3-11: A-D). Pygophore: small, taking up less than one-fifth the total length of the abdomen, without elaborations, ventral surface nearly parallel to anterior surface. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex into two separate processes, the posterior process angled in a different direction from the anterior process, the posterior process terminating anterior to the basal margin of the secondary gonopore (Fig. 3-11: A). Phallotheca: Relatively elongate, apex of paramere nearly perpendicular to posterior process, L-shaped, anterior margin of posterior process with ridges. (Fig. 3-11: D). Right Paramere: Paramere moderately sized, smaller than the left paramere, with nearly parallel sides (Fig. 3-11: C). Left Paramere: Posterior process relatively narrow and with the dorsal surface nearly straight; anterior process stout but without sensory pits on interior margin, the dorsal surface of the anterior arm above the median of the total height of paramere; dorso-medial surface concave (Fig. 3-11: B).

Female: Macropterous, medium sized, medially constricted. Total length 2.87-3.12mm, width across pronotum 0.89- 0.99, width across widest part of wings 0.84-1.03. COLORATION, SURFACE TEXTURE AND VESTITURE: As in generic description. STRUCTURE: Clypeus extends past the anterior margin of the frons, weakly visible in dorsal view. Vertex nearly twice the width of one compound eye and convex, eyes not taking up the total height of the head in lateral view. Length of antennal segment two nearly equal to the total width of the head. Ventral surface of abdomen parallel to dorsal surface for greater than one-half of the posterior length, lateral margins narrower than the lateral margins of the hemelytron. Ovipositor spine absent. The remaining characters are the same as males. GENITALIA: as in generic description.

ETYMOLOGY: Named for the Australian state where the known specimens were collected; noun in apposition.

HOSTS: Primarily Cupressaceae and Euphorbiaceae.

DISTRIBUTION: Queensland.

DISCUSSION: This species is similar in morphology to *Arafuramiris gressitti* from Papua New Guinea but is much larger in size, the length of the anterior portion of the pronotum is shorter, and the lateral margins of the cuneus are transparent, all of which indicate that *Arafuramiris queenslandi* is a separate species.

HOLOTYPE: **AUSTRALIA: Queensland:** 11.2km S of Lolworth Homestead, 20.26922°S 145.00658°E, 741 m, 18 May 2006, Cassis, Barrow, Finlay, Symonds, *Petalostigma pubescens* Domin (Euphorbiaceae), det. RBG staff 1♂ (00392760) (AMNH).

PARATYPES: **AUSTRALIA: Queensland:** ***Cape York Islands Co.:*** Price of Wales Island, Aug 1920, J. A. Kusche, 1♂ (00318909) (BPBM). 11.2km S of Lolworth Homestead, 20.26922°S 145.00658°E, 741 m, 18 May 2006, Cassis, Barrow, Finlay, Symonds, 1♀ (00197202) *Petalostigma pubescens* Domin (Euphorbiaceae), det. RBG staff, 6♂ (00392761 - 00392766), 9♀ (00392767 - 00392775) (AMNH). 19.5km N of Mareeba, 16.81938°S 145.36766°E, 406 m, 24 May 2006, Cassis, Barrow, Finlay, Symonds, 1♀ (00195669) *Callitris intratropica* Benth. (Cupressaceae), det. RBG staff, 2♂ (00392779, 00392780), 1♀ (00392781) (AMNH). Bundaberg, 24.8694°S 152.35375°E, 10 m, 09 Dec 1904, Koebele, 1♂ (00318908) (BPBM). Cairns, Hartleys Creek, 24 Apr 1957, W. W. Wirth, 1♀ (00318911) (USNM). Davies Creek National Park, 6km SE of Kennedy Hwy on Davies Creek Rd, 17.00525°S 145.56841°E, 445 m, 31 May 2006, Cassis, Barrow, Finlay, Symonds, 1♂ (00392776), 1♀ (00392777) (AMNH). Mid-Queensland, 1942 -1945, Unknown, 1♀ (00318910) (BMNH). ca. 30km SE of Chillagoe, on Burke Developmental Rd, 17.36519°S 144.71405°E, 547 m, 01 Jun 2006, Cassis, Barrow, Finlay, Symonds, 1♀ (00392778) (AMNH).

Ausejanus, new genus

Figures (3-1, 3-2, 3-3, 3-4, 3-12, 3-13, 3-26: A-D)

TYPE SPECIES: *Sejanus albisignatus* (Knight, 1938 p. 25).

DIAGNOSIS: Distinguishable from other genera in the Leucophoropterini and other Australian genera by the combination of primarily red to dark brown coloration of the body and hemelytra, a contrastingly-colored white to transparent transverse fascia on the anterior portion of the hemelytra in all but two species, the presence of only simple setae in the wing and body vestiture, a simple male S-shaped endosoma composed of two straps united by a membrane and simple secondary gonopore, the sexual dimorphism in coloration of the second antennal segment and hemelytron between males and females, and large reddish to purple eyes.

DESCRIPTION: *Male*: Macropterous, relatively small to medium-sized, elongate and parallel-sided. Total length 2.38-3.96mm, width across pronotum 0.76 -1.09, width across widest part of wings 0.89 -1.38. COLORATION: Hemelytra gold yellow, light brown to dark brown, and ruby red to burgundy, with a majority of the species having a transverse, transparent or white pigmented fascia on anterior portion. <u>Head:</u> Head red, medium brown or dark brown. First antennal segment gold to light brown, segment two red basally or gold yellow with darkening distally towards joint with third segment or completely dark, third antennal segment completely to dark brown except at joint with second segment where pale, fourth segment dark brown. Labium same color as head. Eyes ruby-red to dark red. <u>Thorax:</u> Pronotum and scutellum red, medium brown, or dark brown. Thorax red, medium brown or dark brown. Scent gland same coloration as thorax or paler. Presence of a white band along posterior-dorsal edge of the metepisternum and scent gland in some species (fig). *Legs:* Pro-coxa entirely light yellow, red, light brown or dark brown, with meso and meta-coxae darker basally and golden apically, light brown, red, or completely dark brown. Pro and meso-femora gold brown, red, light brown to dark brown, meta-femora gold, dark red to burgundy. Tibial segments gold or dark brown with parallel rows of dark spicules. Tarsomeres completely dark brown or light basally and darkening distally to brown near claw. *Hemelytra:* Primarily red, burgundy, gold, light brown or dark brown, sometimes with a transparent to white-colored partial to complete transverse fascia on anterior portion of hemelytra. Transverse fascia can range from paler area next to claval suture to a complete fascia that transverses the clavus and corium. Cuneus white along fracture, coloration extending approximately one-half to one-third of cuneus, remainder of cuneus dark red to brown. Membrane light brown, with wing veins colored in some species red to dark brown. <u>Abdomen:</u> Red, dark brown, or gold, with abdominal sclerites 3-7 weakly lighter in coloration.

SURFACE AND VESTITURE: Dorsum shining, densely covered with subadpressed, simple gold setae.

STRUCTURE: <u>Head:</u> The clypeus in dorsal view is visible and produced, the eyes occupy a majority of the width and height of the head. Vertex flat, width ranging from less than width of compound eye to greater than width of compound eyes. Eye height equal to total height of head or nearly equal, the anterior margins of the eyes removed from the dorsal surface of the vertex, the posterior margins partially obscuring the anterior margin of the pronotum. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head . Antennal segment two long and equal to in diameter or wider than segment one, increasing in diameter distally toward segment three. Length of antennal segment two just longer than the width of the head to at least one and a half times the width of the head. Antennal segments three and four slender and less than half the length of segment two. Apex of labial segment one surpassing the posterior margin of the head, and apex of the forth segment reaching or passing the apex of metacoxa. Thorax: Pronotum more than twice as wide as long, no demarcation between the anterior and posterior margins laterally or dorsally, the dorsal surface nearly flat, lateral margins straight forming a trapezoidal appearance in dorsal view. Calli weakly visible and raised. Pronotum without a collar. Mesoscutum exposed, scutellum weakly transversely rounded. Scent-gland taking up approximately half of metepimeron. *Legs:* long, slender with meta-femora weakly flattened dorso-ventrally. Claws of moderate length and width, pulvilli taking up less than half of claw length . Parempodia parallel and hair-like. *Hemelytra*: Lateral margins weakly sinuous, dorsally transversely rounded. Cuneus elongate triangular being at least equal to or longer than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, and with or without thickenings on the lateral margins or posterior to the cuneal fracture. Abdomen: narrow, elongate, with genital capsule taking up less than 1/3 total length.

GENITALIA: (Figs 3-12, 3-13): Pygophore: Relatively small and lacking elaborations, occupying about one-fourth length of abdomen, ventral margin sloping upwards towards apex. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, weakly sclerotized, located at apex of endosoma (Fig. 3-11: A). Phallotheca: Of phyline type, fairly small, C-to L-shaped, apex gently tapering toward a point (Fig. 3-12:-B) or twisted at apex (3-13: C). Right Paramere: Paramere moderately sized, smaller than left paramere, parallel-sided (Fig. 3-13: D) to wider medially and with a tapering, pointed apex (Fig. 3-31: C). Left Paramere: Left paramere moderately sized; posterior process slender, with sensory pits, and gently curving ventrally, relatively elongate compared to the anterior process (Fig. 3-12: E-L) or relatively short and closer in size to anterior process (Figs 3-13: A, B, D); anterior process stout but without sensory pits on interior margin.

Female: Macropterous. Total length 2.30 -3.66mm, width across pronotum 0.76-1.22, width across widest part of wings 1.04-1.54. COLORATION: Similar coloration as males, but often pigmentation is much more intense, with transverse fascia (if present) often containing white pigmentation to further contrast with red, dark red, brown, or dark-brown hemelytra. Sexual dimorphism in coloration occurs in the second antennal segment, which is dark apically and lighter basally (Fig).

SURFACE TEXTURE AND VESTITURE: As in males.

STRUCTURE: Head: Clypeus produced, minimally to strongly exerted in dorsal view. Vertex convex, width ranging from less than width of compound eye to greater than width of compound eyes. Eyes taking up less than the total height of the head in lateral view. Antennal segment two longer and more slender than segment one at basal joint with antennal segment one, increasing in diameter distally. Length of antennal segment two ranges from just short of the total width of the head to one and one-fourth times the total width of the head. Pronotum more than twice as wide as long. Mesoscutum exposed, scutellum weakly transversely rounded. Lateral margins of the hemelytron are convex, dorsally transversely rounded. Cuneus shorter and wider than males, cuneal fracture angled anteromesially. The abdomen is parallel-sided, ventral margin sloping dorsally. Spine present on the ventral surface of the ovipositor in some females. The remaining characters are the same as males.

GENITALIA (Fig. 3-26: A-D): Vestibulum comprising of two separate, triangular-shaped sclerotized plates with no visible lateral tube, but with a narrow apical sclerite that covers the entrance between the two vestibular sclerites (Fig: 3-26: C.): sclerotized areas present on lateral margins of rami between dorsal and ventral labiate plates, rings weakly sclerotized (Fig. 3-26: D). Posterior wall mostly membranous, with posterior margin sclerotized across margin and possessing a medial invagination (Fig. 3-26: A) and the lateral interramal plates sclerotized (Fig: 3-26: B).

ETYMOLOGY: A name formed by combining Australia and *Sejanus*; masculine.

HOSTS: Mostly endemic genera of Fabaceae, Myrtaceae, and Asteraceae in Australia, although several species are generalists and show little host specificity (e.g. *Ausejanus albisignatus* on introduced apple trees in New Zealand).

DISTRIBUTION: Throughout Australia and parts of southern Papua New Guinea, New Caledonia, New Zealand, and Mauritius.

DISCUSSION: *Ausejanus* is described to accommodate many of the Australian species previously placed in *Sejanus*, but found to be a distinct lineage in my analysis of the generic limits within the tribe (Chapter II and II). *Ausejanus* has several morphological and genitalic features that unite the included species, including the shape of the male endosoma. There is slight variation between the shape of the left paramere and phallotheca in only three species, *A. minutus, A. bournda*, and *A. uralla,* which have the anterior process closer in length to the posterior process (Fig. 3-12: A, B, D), whereas all of the other species of *Ausejanus* have the posterior process relatively elongate (Fig. 3-12: D-K). Also, in *A. bournda* the phallotheca is relatively narrow, with a twisted apex, and with ridges on the posterior surface (Fig. 3-13: C), whereas the remaining *Ausejanus* species have an untwisted apex and a relatively wide body (Fig. 3-12: B, 3-13:E). The overwhelming majority of species, however, do not have any quantifiable difference in the form of the male genitalia useful for identification. Therefore, I emphasize the external morphology and coloration for the majority of the species-level character information. The female genitalia are identical for all of the currently known species. Species described by Carvalho and Gross on the basis of female holotypes were associated with male specimens when possible and re-diagnosed on the basis of male characters. Species that could not be confidently associated with a male specimens are treated as *incertae sedis*. All holotypes of new species males.

Ausejanus albisignatus (Knight), new combination

Figures (3-2, 3-13: G, K)

Idatiella albisignatus Knight, 1938: 25 (n.sp.).

Sejanus albisignata (Knight) – Carvalho, 1958: 141 (catalog, n. comb)

Sejanus albisignatus Steyskal, 1973: 207 (correction); Carvalho and Gross, 1982: 28, figs 40-42, 110 (descr., dist., disc., fig.); Schuh, 1984: 502, 509-513 (as *S. albosignatus*; diag., DV, MG); Eyles and Schuh, 2003: (diag., distr., biology, fig., DV, MG, FG).

Sejanus intermedius Carvalho and Gross, 1982: 24, figs. 49-52,112 (n. sp., descr., disc., DV) –NEW SYNONYMY.

DIAGNOSIS: Distinguishable from the other members of *Ausejanus* by the combination of a relatively small intraocular distance in the males, the deep-burgundy to brown of the wings with a contrasting transparent fascia limited to the claval suture in eastern populations but also expanded into the corium in southern and western Australian populations, and yellow to gold pro and meso femora and reddish-brown meta-femora. Coloration can be is similar to *Ausejanus meridionalis* and *Ausejanus iris* but the fascia in *A. albisignatus* males lacks white pigmentation found in the other species and instead is primarily transparent.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.09-3.96mm, width across pronotum 0.92-1.09, width across widest part of wings 1.08-1.38. COLORATION: General coloration dark brown, with wings primarily burgundy to brown in color with a transverse, transparent fascia on anterior portion. Head dark to medium brown. First antennal segment gold to light brown, segments two and four dark brown, third antennal segment dark brown with paler coloration at joint with second segment. Labium dark brown. Eyes ruby-red to dark red. Thorax, pronotum and scutellum dark brown. Scent gland with same dark brown coloration as thorax or paler brown. Pro-coxa either entirely light yellow or brown basally and golden distally, meso and meta coxa dark red or brown basally and gold apically. Pro and meso-femora gold brown, meta-femora dark red to burgundy. Tibial segments gold with parallel rows of dark spicules. Basal tarsomeres light, darkening distally to brown near claw. Hemelytra primarily burgundy to brown hemelytra with a transparent partial fascia along claval suture for over half the length from the anterior margin of the clavus to a wide band that completely transverses the majority of the anterior portion of the corium and the distal third of the clavus. Cuneus white along fracture, coloration extending approximately one-half to one-third of cuneus, remainder of cuneus dark red to brown. Membrane light brown. Abdomen dark brown, with abdominal sclerites 3-7 somewhat lighter.

STRUCTURE: Eyes when viewed laterally encompass total height of head, vertex width less than width of an eye. Antennal segment two nearly as long as one and a half times the width of the head. Remaining structure characteristics are as in generic description.

GENITALIA: As in generic description.

Female: Macropterous. Total length 2.92-3.66mm, width pronotum 0.90-1.22, width at widest part of wings 1.09-1.54. STRUCTURE: Vertex less than half the total width of the head. Length antennal segment two nearly one and one-fifth times the total width of the head. COLORATION: General coloration dark red to brown, with wings having a more conspicuous transparent fascia than males. Second antennal segment gold basally with darkening towards joint with third antennal segment. Transverse fascia widest along claval suture (Figure 3-2). Cuneus white along fracture, coloration extending approximately one-half to two-thirds of cuneus, remainder of cuneus dark red to brown.

GENITALIA: As in generic description.

HOSTS: Mostly Fabaceae and Myrtaceae, but other families include Casuarinaceae, Sapidaceae, Ericaceae, Malvaceae, Proteaceae, Asteraceae, Thymelaceae, Chenopodiaceae, Lauraceae, Papilionaceae and Mimosaceae.

DISTRIBUTION: Eastern Australia, New Zealand, and Mauritius.

DISCUSSION: Knight (1938) initially described this species from New Zealand, and it was later found to be present in Australia (Carvalho and Gross 1982) and the Indo-Pacific (Schuh 1984). The type, most of the eastern-Australian specimens, and specimens from the Indo-Pacific have the transverse fascia limited mostly to the lateral area around the claval suture. Carvalho and Gross (1982) used the relatively narrow placement of the fascia as one of the delineating factors between *Sejanus albisignatus* (Knight) and *Sejanus intermedius* Carvalho and Gross, which are otherwise identical in morphology and the remainder of the coloration of the body. However, based on my study of the *Ausejanus* fauna of South and Western Australia, the area of the transverse fascia appears to be highly variable, and there are several intermediate forms between the eastern fauna of *Ausejanus albisignatus* with the incomplete fascia and populations in South and Western Australia with a more complete fascia. Therefore *Sejanus intermedius* is synonymized with *Ausejanus albisignatus*. It appears that *A. albisignatus* is a hyper-diverse assemblage of populations across Australia and New Zealand, all united by alternate characters such as the relatively narrow vertex, the overall burgundy to reddish-brown coloration of the hemelytron, the lack of distinct white pigmentation in the transverse fascia, and the coloration of the appendages (Fig. 3-2).

Ausejanus albisignatus is also unique in the large number of host plants. This may be partly due to it being at least partially predatory. Several records describe the species feeding on other small, soft-bodied insects such as psyllids and mites in apple orchards of New Zealand (Wearing and Attfield 2002, Martin et al. 2007), and psyllids in New South Wales (personal observation). This lack of fidelity on a particular host plant may explain why members of this species have been able to establish themselves as far away as Mauritius, and are successful predators in commercial apple groves in New Zealand. However, detailed population-level rearing and breeding studies are needed to test this hypothesis, especially for the Australian populations where there has been less focus on the biology as in New Zealand.

HOLOTYPE: **New Zealand: Nelson:** Research Orchard, 41.295°S 173.249°E, 16 Nov 1931, L. J. Durnbleton, 1♂ (00085514) (BMNH) [not examined]

SPECIMENS EXAMINED: **AUSTRALIA: Australian Capital Territory:** Black Mountain, 35.26387°S 149.10051°E, 19 Nov 1985, G. Cassis, *Acacia decurrens* (Wendl.f.) Willd. (Fabaceae), 1♀(00090995) (AM); 1990, Kireychuk, 1♀ (00229518) (ZISP); 03 Nov 1990 - 04 Nov 1990, Kireychuk, 3♂ (00229464 - 00229466) (ZISP). Botanic Gardens, Canberra, 35.27882°S 149.10913°E, 584 m, 16 Nov 1998, L. Mound, *Acacia melanoxylon* R.Br. (Fabaceae), 2♀ (00088854, 00088855) (AM). **New South Wales:** Araluen, 35.65001°S 149.8167°E, 50 m, 11 Nov 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. (Fabaceae), det. B.J. Conn 1996 NSW 395993, 3♀ (00090991 -

00090993), *Acacia mearnsii* De Wild. (Fabaceae), det. B.J. Conn 1996 NSW 395993, 1♀ (00272736) (AMNH). Ashton Park, 33.84819°S 151.24394°E, 3 m, 15 Oct 1958, M. I. Nikitin, 1♀ (00174009) (BMNH). Bateman's Bay, 35.71475°S 150.1839°E, 2 m, 21 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Casuarina glauca* Sieber ex Spreng. (Casuarinaceae), det. NSW staff NSW658209, 1♂ (00272744) (AMNH). Booti Booti NP, 32.27972°S 152.52444°E, 08 Oct 1997, L. Wilkie, 2♀ (00274261, 00274262) (AM); 09 Oct 1997, L. Wilkie, 1♀ (00274255) (AM). Bootie Booti NP, 32.26305°S 152.36527°E, 08 Nov 1997, L. Wilkie, *Monotoca elliptica* (Sm.) R.Br. (Ericaceae), 1♀ (00274263) (AM). Bournda National Park, North Wallagoot, Turingal Head, 36.78452°S 149.9568°E, 16 m, 20 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Kunzea ambigua* (Sm.) Druce (Myrtaceae), det. NSW staff NSW658199, 4♀ (00272732 - 00272735) *Melaleuca processillaris* (Sol. ex Gaertn.) Sm. (Myrtaceae), det. NSW staff NSW658203, 1♂ (00272743) (AMNH). Cabramatta, Valley of Georges River, 33.89444°S 150.9375°E, 24 Sep 1960, M. I. Nikitin, 1♂ (00174017) (BMNH); 01 Oct 1960, M. I. Nikitin, 2♀ (00174014, 00174015) (BMNH); 02 Oct 1960, M. I. Nikitin, 1♂ (00174011), 2♀ (00174012, 00174013) (BMNH), 1♂ (00318902) (BPBM); 03 Nov 1962, M. I. Nikitin, 1♀ (00174016) (BMNH). Calbramatta, 33.895°S 150.9359°E, 25 m, 28 Dec 1965, M. I. Nikitin, 1♂ (00174018) (BMNH). Casula, 33.9473°S 150.9077°E, 48 m, 14 Nov 1958, M. I. Nikitin, 1♀ (00174019) (BMNH). Dee Why Beach, off Dee Why Parade Road, 33.75°S 151.28333°E, 22 Nov 2006 -23 Nov 2006, K. Menard and N. Tatarnic, *Melaleuca* sp. (Myrtaceae), 2♂ (00108522, 00272148), 7♀ (00197192 - 00197198) (AMNH). Deua N.P., Wolli Property, 35.94517°S 149°E, 08 Oct 1988, G.

Cassis, *Acacia* sp. (Fabaceae), 1♂ (00088852), 1♀ (00088853) (AM). Dorrigo, 30.3333°S 152.7°E, 566 m, W. Heron, 2♀ (00371743, 00371744) (AMNH). Liverpool, 33.92505°S 150.9244°E, 28 m, 20 Nov 1964, M. I. Nikitin, 1♂ (00174010) (BMNH). Myall Lakes NP, 32.57916°S 152.29083°E, 08 Oct 1997, L. Wilkie, *Monotoca elliptica* (Sm.) R.Br. (Ericaceae), 1♀ (00274240) (AM); 09 Oct 1997, L. Wilkie, *Monotoca elliptica* (Sm.) R.Br. (Ericaceae), 1♂ (00274180), 1♀ (00274264) (AM); 10 Oct 1997, L. Wilkie, *Monotoca elliptica* (Sm.) R.Br. (Ericaceae), 1♂ (00274172) (AM). Myall Lakes National Park, 32.487°S 152.39216°E, 10 Nov 1997, L. Wilkie, *Monotoca elliptica* (Sm.) R.Br. (Ericaceae), 1♂ (00274236) (AM). Sydney, 33.8652°S 151.2096°E, 05 Feb 1931, K. C. McKeown, 1♂ (00393689) (AM); Oct 1931, K. K. Spence, 1♀ (00168818) (ANIC). **Queensland:** Paluma Dam Rd, 18.95°S 146.15°E, 09 Nov 1990, W. F. Chamberlain, 1♀ (00370668) (TAMU). **South Australia:** 1 km S of Riverton, 34.16667°S 138.75°E, 250 m, 30 Oct 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. [introduced] (Fabaceae), det. B.J. Conn 1996 NSW 395959, 1♂ (00272142), 10♀ (00273474 - 00273483) (AMNH). 7 km E Para Wirra National Park near Williamstown, 34.70001°S 138.85°E, 250 m, 31 Oct 1995, Schuh, Cassis, and Gross, *Acacia paradoxa* DC. (Fabaceae), det. B.J. Conn 1996 NSW 395964, 4♀ (00274819 - 00274822) (AM), *Acacia paradoxa* DC. (Fabaceae), det. B.J. Conn 1996 NSW 395964, 1♂ (00274807), 32♀ (00197138 - 00197142, 00274809 - 00274818, 00274823 - 00274839) *Dodonaea viscosa* Jacq. (Sapindaceae), det. P.G. Wilson 1996 NSW 395965, 1♂ (00272143), 1♀ (00273416) (AMNH), *Acacia paradoxa* DC. (Fabaceae), det. B.J. Conn 1996 NSW 395964, 1♀ (00197143) (USNM). Colonel Light Gardens, 34.9836°S 138.5921°E, 199 m, 20 Nov 1957, R. V. Southcott, *Grevillea robusta* (Proteaceae), 2♂ (00169063, 00169064), 1♀ (00169066) (SAMA). Fleurieu Peninsula, Deep Creek Cons. Pk., 35.62777°S 138.22194°E, 270 m, 25 Nov 1989 - 08 Dec 1989, R. Wharton and J. Bracken, 1♂ (00090979) (AM). Hindmarsh Falls, 35.43998°S 138.58282°E, 224 m, 24 Dec 1961, E.B. Britton and N. Tindale, 1♀ (00174024) (BMNH). Mount Lofty, 34.974°S 138.709°E, 31 Dec 1912, R. E. Turner, 1♀ (00174021) (BMNH). Para Wirra National Park, 34.91668°S 138.9167°E, 350 m, 31 Oct 1995, Schuh, Cassis, and Gross, *Acacia paradoxa* DC. (Fabaceae), det. B.J. Conn 1996 NSW 395964, 7♂ (00273355 - 00273360, 00273415), 57♀ (00273417 - 00273473) (AMNH). **Tasmania:** 2.9 km SE from Southwest National Park (Maydena access): junction Scott's Peak Rd and Frodshams' Pass, 42.83639°S 146.37898°E, 570 m, 17 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia mucronata* Willd. ex H.L.Wendl. (Fabaceae), det. NSW staff NSW658221, 5♀ (00272264 - 00272268) (AM). Lifey Falls Rd., 01 Mar 1990, G. Cassis, *Helichrysum* sp. (Asteraceae), 5♂ (00393697 - 00393701), 8♀ (00393702 - 00393709) (AM). Mt. Field National Park, Russell Falls Visitor Centre, 42.68151°S 146.7168°E, 167 m, 16 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia melanoxylon* R.Br. (Fabaceae), det. NSW staff NSW658217, 14♀ (00272250 - 00272263) (AM). Mt. Pine [Pine Lake], 41.74202°S 146.70254°E, 1196 m, 28 Feb 1990, G. Cassis, *Leptospermum* sp. (Myrtaceae), 1♀ (00393749) (AM). Southwest National Park (Maydena access): Edgar Campground on Scotts Peak Rd, 43.03019°S 146.3497°E, 293 m, 19 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia mucronata* Willd. ex H.L.Wendl. (Fabaceae), det. NSW staff NSW658234, 1♂ (00272249), 10♀

(00272269 - 00272278) (AM), *Acacia mucronata* Willd. ex H.L.Wendl. (Fabaceae), det. NSW staff NSW658234, 1♀ (00108556) (AMNH). Southwest National Park: Cockle Creek, on Whale Walk Track, 43.57847°S 146.901°E, 13 m, 20 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia verticillata subsp. verticillata* (L'Her.) Willd. (Fabaceae), det. NSW staff NSW658239, 3♂ (00272242 - 00272244) (AMNH). Strathgordon, Lake Pedder Chalet, 42.76859°S 146.0461°E, 337 m, 18 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia mucronata* Willd. ex H.L.Wendl. (Fabaceae), det. NSW staff NSW658226, 4♂ (00272245 - 00272248), 5♀ (00272279 - 00272283) (AM), *Acacia mucronata* Willd. ex H.L.Wendl. (Fabaceae), det. NSW staff NSW658226, 1♂ (00108558), 1♀ (00108555) (AMNH). Tarraleah Power Station grounds, on A10, NW of Hamilton, 42.29848°S 146.4584°E, 366 m, 22 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus rosmarinifolius* (Labill.) DC. (Asteraceae), det. Field ID, 1♂ (00108582) (AMNH). **Victoria:** 5 km E of Cann River, Reedy Creek, 37.5681°S 149.2036°E, 70 m, 19 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Dillwynia glaberrima* Sm. (Fabaceae), det. NSW staff NSW658195, 1♀ (00273076) (AMNH). 8 km NW of Peterborough, 38.56668°S 142.8°E, 50 m, 05 Nov 1995, Schuh and Cassis, *Acacia verticillata var. verticillata* (L'Her.) Willd. (Fabaceae), det. B.J. Conn 1996 NSW 395992, 1♂ (00274309), 3♀ (00274313 - 00274315) (AM), 8♂ (00273139 - 00273142, 00273144 - 00273147), 1♀ (00273148) (AMNH). 9km N Apollo Bay, 38.72679°S 143.66943°E, 113 m, 20 Dec 1989, R. Wharton, 2♀ (00370666, 00370667) (TAMU). Beauchamp Falls, 38.64885°S 143.6004°E, 454 m, 18 Jan 1962, P. Aitken, 1♀ (00169260) (QDPI). Brodribb River, 64 km W of Cann River, 37.2°S 148.5833°E, 50 m, 08 Nov 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. [introduced] (Fabaceae), det. B.J. Conn 1996 NSW 395993, 2♀ (00274310, 00274311) (AM), 2♂ (00272140, 00274305), 3♀ (00273149 - 00273151) (AMNH). Discovery Bay Coastal Park, Lake Monibeong, 38.13534°S 141.184°E, 5 m, 07 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Acacia longifolia subsp. sophorae* (Labill.) Court (Fabaceae), det. Field ID, 1♀ (00273112) (AMNH). Discovery Bay National Park, Swan Lake Beach area, 38.21766°S 141.3098°E, 33 m, 08 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Olearia glutinosa* (Lindl.) Benth. (Asteraceae), det. NSW staff NSW658135, 1♀ (00273207), 1♂ (00273194) (AMNH). Little Desert National Park, 5-6 km W of McDonald Hiway, 36.61668°S 141.1667°E, 150 m, 03 Nov 1995, Schuh and Cassis, *Acacia acinacea* Lindl. (Fabaceae), det. B.J. Conn 1996 NSW 395983, 1♀ (00274316) (AM), 4♂ (00273160 - 00273163), 6♀ (00273281 - 00273286) (AMNH). Lower Glenelg National Park, 38.0476°S 141.1596°E, 20 m, 07 Nov 2002, Cassis, Schuh, Schwartz, Silveira, 1♂ (00273114), 3♀ (00273109 - 00273111) (AMNH). Montmorency, 37.71754°S 145.12103°E, 82 m, 10 Dec 1966, E. Hamilton-Smith, 1♂ (00169068) (SAMA). Wilsons Promonotory National Park, Darley River area, 38.97705°S 146.2749°E, 50 m, 18 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Leptospermum lanigerum* Maiden & Betche (Myrtaceae), det. NSW staff NSW658184, 8♂ (00273152 - 00273159), 10♀ (00273287 - 00273296) (AMNH). Wilsons Promonotory National Park, Sqeaky Bay trail, opposite Lilly Pilly car park, 39.02365°S 146.8199°E, 53 m, 18 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Kunzea ambigua* (Sm.) Druce (Myrtaceae), det. NSW staff NSW658180, 16♂ (00273209 - 00273223, 00273227), 24♀ (00273225 - 00273226,

00273228 - 00273249) (AMNH). Wyperfeld National Park, Moonah Track, 35.46302°S 142.0464°E, 65 m, 04 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Acacia brachybotrya* Benth. (Fabaceae), det. NSW staff NSW658103, 9♀ (00273255 - 00273263) *Acacia montana* Benth. (Fabaceae), det. NSW staff NSW658102, 1♂ (00273164), 5♀ (00273250 - 00273254) (AMNH). **Western Australia:** 2 km W of Caves Road, Leeuwin Naturaliste National Park, 34.1497°S 115.0657°E, 100 m, 04 Dec 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Acacia pentadenia* Lindl. (Mimosaceae), det. PERTH staff PERTH 05671752, 6♀ (00371925 - 00371930) *Bossiaea disticha* Lindl. (Papilionaceae), det. PERTH staff PERTH 05671841, 2♂ (00371038, 00371039), 24♀ (00371040 - 00371052, 00371914 - 00371924) (AM), *Pimelea sylvestris* R.Br. (Thymelaeaceae), det. PERTH staff PERTH 05671140, 1♂ (00108527) *Bossiaea disticha* Lindl. (Papilionaceae), det. PERTH staff PERTH 05671841, 1♂ (00271930), 8♀ (00108534, 00272150 - 00272156) (AMNH). 2.1 km W of Broke Inlet Road on Chesapeak Road, D'Entrecasteaux National Park, 34.8918°S 116.4644°E, 30 m, 02 Dec 1999, R.T. Schuh and G. Cassis, *Jacksonia horrida* DC. (Papilionaceae), det. PERTH staff PERTH 05670500, 1♀ (00371055) (AM). 3 km S of Kojonup, Sampson Road, 33.87088°S 117.1648°E, 310 m, 08 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Melaleuca rhaphiophylla* Schauer (Myrtaceae), det. PERTH staff PERTH 05879183, 1♂ (00272164) (AMNH). 10 km east of Porongurup, 34.66482°S 117.95218°E, 159 m, 02 Dec 1982, W. F. Chamberlain, 1♂ (00248072) (TAMU). 10.3 km N of South Coast Hiway on North Walpole Road toward Mt. Frankland, 34.89687°S 116.7099°E, 190 m, 02 Dec 1999, R.T. Schuh and G. Cassis, *Acacia pentadenia* Lindl. (Mimosaceae), det.

PERTH staff PERTH 05672120, 1♂ (00371845), 5♀ (00371846 - 00371850), 2♀ (00197171, 00197172) (AM), 1♂ (00271929), 20♀ (00108513, 00108533, 00197120 - 00197137) (AMNH), 1♂ (00272158) (USNM). 12.5 km W of Broke Inlet Road on Chesapeak Road, D'Entrecasteaux National Park, 34.84055°S 116.3724°E, 20 m, 02 Dec 1999, R.T. Schuh and G. Cassis, *Callistachys lanceolata* Vent. (Papilionaceae), det. PERTH staff PERTH 05670837, 5♀ (00197173 - 00197177) (AM), 6♂ (00197157 - 00197162) (AMNH). 14mi W. Southern Cross, 31.23178°S 119.32833°E, 375 m, 16 Sep 1962, E. S. Ross & D. Q. Cavagnaro, 1♀ (00373924) (WADA). 15 mi W of Merredin, 31.548°S 118.055°E, 275 m, 15 Sep 1962, E. S. Ross & D. Q. Cavagnaro, 2♂ (00373918, 00373922), 3♀ (00373919 - 00373921) (WADA). 31.1 km W of Broke Inlet Road on Chesapeak Road, 34.77748°S 116.193°E, 40 m, 03 Dec 1999, R.T. Schuh and G. Cassis, 3♀ (00371851 - 00371853) (AM). 39 km N of Albany, Millinup Road at Chester Pass Hiway, 34.70677°S 117.959°E, 260 m, 30 Nov 1999, R.T. Schuh and G. Cassis, *Callistachys lanceolata* Vent. (Papilionaceae), det. PERTH staff PERTH 05670322, 1♂ (00108530), 2♀ (00272165, 00272171) (AMNH). Albany, 35.0227°S 117.88139°E, Jan 1966, J. A. Grant, 1♂ (00174023), 1♀ (00174022) (BMNH), 11♂ (00318877 - 00318887), 14♀ (00318888 - 00318901) (BPBM); Augusta, 34.34212°S 115.1661°E, 30 m, 04 Dec 1999, R.T. Schuh and G. Cassis, *Agonis flexuosa* (Willd.) Sweet (Myrtaceae), 6♂ (00090973 - 00090978), 8♀ (00090980 - 00090987), *Hakea oleifolia* (Sm.)R.Br. (Proteaceae), det. PERTH staff PERTH 05670462, 2♀ (00371053, 00371054) (AM), *Melaleuca incana incana* R.Br. (Myrtaceae), det. PERTH staff PERTH 05671906, 2♂ (00108526, 00108529), 4♀ (00272160 - 00272163) (AMNH).

Cape Leeuwin, 34.37154°S 115.1363°E, 20 m, 04 Dec 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Agonis flexuosa* (Willd.) Sweet (Myrtaceae) PERTH 05670152, 2♂ (00371836, 00371837), 7♀ (00371838 - 00371844) (AM). Conspicuous Beach, Walpole-Nornalup National Park, 10 km E of Nornalup, 35.03725°S 116.8443°E, 30 m, 17 Dec 1997, Schuh, Cassis, Brailovsky, *Agonis flexuosa var. flexuosa* (Willd.) Sweet (Myrtaceae), det. PERTH staff PERTH 05055423, 2♂ (00108528, 00271913) (AMNH). Cosy Corner Beach East, Torbay Sound, W of Albany, 35.06033°S 117.6446°E, 2 m, 01 Dec 1999, R.T. Schuh, G. Cassis, & R. Silveira, 1♂ (00371912), 1♀ (00371913) (AM), *Agonis flexuosa var. flexuosa* (Willd.) Sweet (Myrtaceae), det. PERTH staff PERTH 05671809, 4♂ (00197116 - 00197119) (AMNH). Dewel Cove, North of Augusta, 34.27011°S 115.05871°E, 79 m, 31 Oct 1982, W. F. Chamberlain, 1♂ (00248073) (TAMU). Helena Valley, 31.57°S 116.33°E, 27 Sep 1979, J.R. Hanley, *Acacia* sp. (Fabaceae), 1♂ (00373917) (WADA). Mosman Park, Perth, 32.0209°S 115.7687°E, 20 m, 24 Nov 1998, G. Cassis, *Agonis flexuosa* (Willd.) Sweet (Myrtaceae), det. Perth PERTH 05227410, 11♀ (00197105 - 00197115), 9♂ (00197069 - 00197077), 22♀ (00197078 - 00197099), 23♀ (00197046 - 00197068) (AMNH); 30 Nov 1998, G. Cassis, *Agonis flexuosa* (Willd.) Sweet (Myrtaceae), det. Perth PERTH 05227410, 5♀ (00197100 - 00197104) (AMNH); 15 Nov 1999, R.T. Schuh and G. Cassis, *Agonis flexuosa flexuosa* (Willd.) Sweet (Myrtaceae), det. PERTH staff PERTH 05670152, 9♂ (00371931 - 00371939), 21♀ (00371034 - 00371037, 00371940 - 00371956) *Eucalyptus* sp. (Myrtaceae), det. PERTH staff PERTH 05670969, 1♀ (00090966) (AM), *Agonis flexuosa flexuosa* (Willd.) Sweet (Myrtaceae), det. PERTH staff PERTH 05670152, 1♂

(00108512), 1♀ (00108531), 1♂ (00271927), 15♂ (00108594, 00271914 - 00271926, 00271928), 56♀ (00108593, 00271931 - 00271943, 00272100 - 00272138, 00272141, 00272144 - 00272145), (AMNH). Peak Charles National Park Campground, 32.88335°S 121.1703°E, 300 m, 20 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, *Rhagodia preissii preissii* Moq. (Chenopodiaceae), det. PERTH staff PERTH 05670713, 1♀ (00108539) (AMNH). Perth, 31.9554°S 115.85858°E, 07 Dec 1971, J. A. Slater, *Melaleuca rhaphiophylla* Schauer (Myrtaceae), 1♂ (00371714) (AMNH); 12 Dec 1971, J. A. Slater, *Melaleuca rhaphiophylla* Schauer (Myrtaceae), 1♀ (00371742), 6♀ (00371736 - 00371741) (AMNH); 14 Dec 1971, J. A. Slater, 1♂ (00371715) (AMNH); 17 Dec 1971, J. A. Slater, 1♂ (00090969) (AM), *Melaleuca rhaphiophylla* Schauer (Myrtaceae), 1♂ (00371716) (AMNH). Point Rd Campground. Leeuwin Naturaliste National Park, 34.09361°S 115.02416°E, 74 m, 03 Dec 1998, G. Cassis, *Cassytha racemosa* Nees (Lauraceae), det. WA Herbarium Staff PERTH 05227259, 1♀ (00272157) (AMNH). Wateroo National Park, 30.26666°S 115°E, 08 Sep 1990, G. Cassis, *Acacia* sp. (Fabaceae), 5♂ (00393752 - 00393756), 18♀ (00393757 - 00393774) (AM). Yalgorup National Park, 32.83583°S 115.65111°E, 27 Nov 1998, G. Cassis, *Conospermum triplinervium* R.Br. (Proteaceae) PERTH 05227488, 1♀ (00272139) (AMNH). Yallingup, 33.71877°S 115.13087°E, 59 m, 01 Dec 1913 -12 Dec 1913, R. E. Turner, 1♂ (00174020) (BMNH). Yanchep National Park, 31.534°S 115.68°E, 08 Dec 1971, J. A. Slater, 2♂ (00371717, 00371718), 14♀ (00371720 - 00371721, 00371723 - 00371734) *Agonis flexuosa* (Willd.) Sweet (Myrtaceae), 1♂ (00371719), 2♀ (00371722, 00371735) (AMNH). ca 13 km E of Denmark on South Coast Hiway, 34.99397°S

117.5086°E, 80 m, 01 Dec 1999, R.T. Schuh and G. Cassis, *Beaufortia sparsa* R.Br. (Myrtaceae), det. PERTH staff PERTH 05671949, 2♀ (00090967, 00090968) (AM). **MAURITIUS:** unknown, 20.2°S 57.5°E, Mar 1974, J. C. M. Carvalho, 1♂ (00271693) (USNM). **NEW ZEALAND: Canterbury:** Rakaia, 43.75544°S 172.0219°E, 105 m, Feb 1955, T. M. Wells, 1♂ (00196088) (AMNH). **Nelson:** ***Richmond Co.:*** Research Orchard, Appleby, 41.29555°S 173.09888°E, 3 m, Oct 1970, E. Collyer, 3♂ (00246621 - 00246623), 1♀ (00246620) (TAMU), 4♂ (00271686 - 00271689) (USNM). Paddy's Knob, 41.8326°S 172.82292°E, 1141 m, 14 Jan 1976, W.J. Knight, 2♀ (00354482, 00354483) (BMNH); 14 Jan 1976, A.K. Walker, 1♂ (00354481), 1♀ (00354484) (BMNH). **Otago:** Between Tarras and Queenstown, 44.93333°S 169°E, 09 Feb 1992, Kovalev, 1♂ (00229467) (ZISP). Christchurch, 43.53333°S 172.66667°E, 17 Jan 1978, J. T. Polhemus, 1♂ (00095330) (AMNH). Nelson, Research Orchard, 41.295°S 173.249°E, 16 Nov 1931, L. J. Durnbleton, Holotype, 1♂ (00085514) (BMNH); Dec 1970, E. Collyer, 2♀ (00271684, 00271685) (AMNH). **PAPUA NEW GUINEA: Morobe Province:** Mount Kaindi, 7.35°S 146.68333°E, 2350 m, 11 Dec 1976, G. F. Hevel and R. E. Dietz IV, 1♂ (00271736) (USNM).

Ausejanus ansevata (Schuh), new combination

Sejanus ansevata Schuh 1984: 156, figs. 503, 505-507, 514-516 (n. sp., diag., descr., DV, MG, SEM).

DISCUSSION: Recognized by the completely brown head, thorax, pronotum, scutellum and antennae, the lack of any coloration on the anterior margin of the cuneus next to the cuneal fracture, the completely yellow legs and coxae, and the lack of a transverse fascia. This species was described by Schuh (1984) in *Sejanus*, yet based on my phylogenetic analysis of the genera of the tribe instead groups in the Ausejanus clade (Node 4, Chapter III). The S-shape of the male endosoma with a weakly sclerotized secondary gonopore (Schuh 1984: Fig. 514), the shape of the left paramere with a relatively narrow, elongate posterior process as compared to the anterior process (Schuh 1984: Fig. 515), and the relatively elongate cuneus (Schuh 1984: Fig. 503) as compared to *Sejanus* sensu-strictu clearly groups the taxon in *Ausejanus*.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown; collected at lights.

DISTRIBUTION: New Caledonia.

HOLOTYPE: **NEW CALEDONIA:** Anse Vata, November 16, 1958, at light, C.R. Joyce collector, 1 ♂(BPBM) [not examined].

SPECIMENS EXAMINED: **NEW CALEDONIA: Province Sud:** Anse Vata, 22.31666°S 166.43305°E, 23 Oct 1958, C.R. Joyce, Light Trap, Paratype, 1♂ (00321189) (BPBM); 08 Nov 1958, C.R. Joyce, Paratype, 2♂ (00196089, 00196090) (AMNH), Light Trap, Paratype, 4♂ (00321185 - 00321188) (BPBM); 16 Nov 1958, C.R. Joyce, Light Trap, Paratype, 1♂ (00321190) (BPBM). Anse Vata, 16 Nov 1958, C.R. Joyce, Light Trap, 1♂ (00095331) (AMNH).

Ausejanus arvensus, new species

Figs (3-3, 3-12: H)

DIAGNOSIS: Identifiable from other species of *Ausejanus* by the combination of a transparent, incomplete fascia restricted to the claval suture, light brown to mauve hemelytra, and dark reddish-brown posterior margin of the cuneus in the males. Females similar in fascia pattern but usually with white pigment within fascia, darker-brown coloration of the hemelytra and posterior margin of the cuneus.

DESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.56-3.86mm, width across pronotum 0.95-1.02, and width across widest part of wings 1.19-1.34. COLORATION: General coloration dark brown, light brown, and white. Head dark brown. First antennal segment gold, remaining antennal segments dark brown. First and second labial segments gold, third and fourth dark brown. Eyes dark red. Thorax, pronotum, scutellum dark brown. Thoracic pleura dark brown. Pro coxae gold, meso and meta coxae dark brown basally, gold anteriorly. Pro and meso-femora gold, meta femora gold basally, light brown on anterior one-half. Tibiae gold, meta-tibiae with parallel rows of dark spicules. Clavus dark brown, lightening to transparent laterally along claval suture three-fourths the distance anteriorly from base of corium to form partial fascia. Transparent area of partial fascia thickest in anterior portion of the hemelytra, corresponding to one-third the distance of wing; remaining portion of hemelytra towards cuneus light brown to light reddish-brown. Cuneus with pigmented white band along the basal margin for less than a third of the cuneal length, dark brownish-red for posterior portions near the distal margins with membrane.

Membrane light brown with some dark pigmentation around wing veins. STRUCTURE: Eyes when viewed laterally encompass the total height of head, vertex width less than width of an eye. Antennal segment two just longer than one and a quarter times the total width of the head. Remaining structure characteristics are as in generic description. GENITALIA: As in generic description.

Female: Macropterous. Total length 2.77-3.07mm, width pronotum 0.92- 0.99, width at widest part of wings 1.09-1.29. STRUCTURE: Vertex equal to half the total width of the head. Length antennal segment two just wider than the total width of the head. COLORATION: General coloration similar to males, but showing variation on the following characteristics. Second antennal segment with larger portion gold basally, third antennal segment with minimal lightening to gold with joint to second segment. Partial fascia usually containing white pigment and is more easily visible in females, hemelytra and posterior cuneal coloration dark brown to dark reddish brown, anterior portion of cuneus with wider band of white pigmentation along margin.

ETYMOLOGY: Named for the type locality Arve River Park; masculine.

HOSTS: Primarily *Ozothamnus sp.* R.Br. (Asteraceae), with some records on *Leptospermum lanigerum* (Myrtaceae) and *Oxybolium arborescens* (Fabaceae).

DISTRIBUTION: Tasmania.

DISCUSSION: This species appears to be extremely close to *Ausejanus albisignatus* in hemelytral transverse fascia patterning and general coloration, however the difference in the males of *A. arvensus* having extremely pale coloring of the anterior of the hemelytra as compared to *Ausejanus albisignatus* and other species of *Ausejanus* clearly separates it apart. This species also does not have red coloration on the distal portions of the meta-femora that is prevalent in *A. albisignatus,* instead having a gold to light brown coloration. Lastly, unlike *A. albisignatus* and some of the other more widely distributed taxa that feed primarily on a wide variety of Fabaceae and Myrtaceae, *Ausejanus arvensus* appears to be host specific on this one genus (*Ozothamnus*) of Asteraceae.

HOLOTYPE: **AUSTRALIA: Tasmania:** 13.8 km N of Crabtree on Jeffery's track (C6180), 42.88893°S 147.05144°E, 643 m, 21 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus rosmarinifolius* (Labill.) DC. (Asteraceae), det. NSW staff NSW658244, 1♂ (00272387) (AMNH).

PARATYPES: **AUSTRALIA: Tasmania:** 0.5 km NW of Southwest National Park (Maydena access): Huon Campground, off of Scotts Peak Rd, 43.03732°S 146.29721°E, 276 m, 19 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum lanigerum* Maiden & Betche (Myrtaceae), det. NSW staff NSW658232, 4♂ (00272411 - 00272414) (AMNH). 4.1 km N of Huon Hwy & Pilliger Ave intersection, Mt. Wellington, The Springs, 42.91707°S 147.25546°E, 684 m, 15 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Oxylobium arborescens* R.Br. (Fabaceae), det. NSW staff NSW658211, 4♂ (00108565, 00272391 - 00272393), 3♀ (00272415 - 00272416, 00272418) (AMNH). 13.8 km N of Crabtree on Jeffery's track (C6180), 42.88893°S 147.05144°E, 643 m, 21 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus rosmarinifolius* (Labill.) DC. (Asteraceae), det. NSW staff NSW658244, 2♂ (00272385, 00272386), 2♀ (00272407, 00272408) (AMNH). 53.1 km S of Wynyard on Murchison Hiway (A10) near pond on S side of road, 41.30545°S 145.59042°E, 570 m, 25 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus rosmarinifolius* (Labill.) DC. (Asteraceae), det. NSW staff NSW658258, 3♂ (00272388 - 00272390), 2♀ (00272409, 00272410) (AMNH). Arve River Picnic Ground on C632, 43.15874°S 146.8068°E, 172 m, 21 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus ferrugineus* (Labill.) Sweet (Asteraceae), det. Field ID, 1♂ (00108579), 2♀ (00108563, 00272395) (AMNH). Tarraleah Power Station grounds, on A10, NW of Hamilton, 42.29848°S 146.4584°E, 366 m, 22 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus rosmarinifolius* (Labill.) DC. (Asteraceae), det. Field ID, 2♂ (00108557, 00272394), 12♀ (00108564, 00272396 - 00272406) (AMNH).

Ausejanus bournda, new species

Figures (3-3, 3-13: B, C)

DIAGNOSIS: Nearly identical in coloration to *Ausejanus uralla* and *Ausejanus minutus* except for the completely dark brown hemelytron with a weakly transparent area in the corium along the medial portion of the claval sutures. Recognized by the apically gold coxae, the shape of the left paramere and the phallotheca, and the intermediate size between *A. uralla* and *A. minutus. Females* are nearly identical in coloration to females of *A. uralla* and *A. minutus*.

DESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.22-3.55mm, width across pronotum 0.90- 0.94, width across widest part of wings 1.09-1.18. COLORATION: General coloration dark brown, with a weakly transparent area in the corium along the medial portion of the claval sutures, and anterior margins of the cuneus white. Head dark brown. All antennal segments brown, with the second antennal segment a shade darker brown. Labium dark brown. Eyes dark red to purple. Thorax, pronotum and scutellum dark brown. Thoracic pleura dark brown, dorso-lateral margin of metepisternum and scent gland with a thin white margin. All coxae entirely dark brown with apical lightening to gold at joint with trochanter. Pro-femora dark basally, gold distally, the meso and meta-femora completely dark brown. Pro and meso-tibial segments brown basally, gold distally, the meta-tibiae are completely dark brown and with parallel rows of dark spicules. All tarsomeres are dark brown. Hemelytra dark brown, with a weakly transparent area in the corium along the medial portion of the claval sutures, at most one fourth of the area of the cuneus along the anterior margin of the cuneal fracture distinctly white with a reddish-tinge along the anterior margins with the cuneal fracture. Abdomen dark brown. STRUCTURE: Vertex width narrower than the width of one eye, eyes nearly taking up total height of head when head is viewed laterally. Length of antennal segment two one and one-third the total width of the head. GENITALIA: <u>Phallotheca:</u> L-shaped, relatively narrow with the apex gently tapering toward a twisted point (Fig. 3-13: C) <u>Left Paramere:</u> posterior process relatively short and closer in size to anterior process, the apex of posterior process directed ventrally (Fig. 3-13: B).

Female: Macropterous. Total length 2.67-3.07mm, width pronotum 0.87- 0.95, width at widest part of wings 1.14-1.24. STRUCTURE: Vertex nearly takes up half the total width of the head. Length antennal segment two one and one-fifth times the total width of the head. COLORATION: Hemelytron darker in coloration than males, the transverse fascia is much more pronounced with the anterior of the corium completely white with the fascia and with the anterior margin transitioning from a gold brown into dark brown rather than a relatively defined line in males, the fore-femora are darker with apical lightening to gold at joint with fore-tibiae less pronounced, the dorso-posterior margin of the metepisternum with a wider white margin, and the cuneus which has larger portions white.

ETYMOLOGY: Named for the collecting site of Bournda National Park in New South Wales. Noun in apposition.

HOSTS: Myrtaceae, specifically *Melaleucae processillaris* (Sol. Ex Gaertn.) and *Kunzea ambigua* (Sm).

DISTRIBUTION: New South Wales.

DISCUSSION: This coloration in this species is very similar to *Ausejanus minutus* and *Ausejanus uralla*, and all three species have the anterior process of the left paramere relatively short compared to the rest of the *Ausejanus* species. However, the subtle differences in coloration in the males, the angle of the apex in the posterior process of the left paramere, and the phallotheca clearly indicate they are separate species.

HOLOTYPE: **AUSTRALIA: New South Wales:** Bournda National Park, North Wallagoot, Turingal Head, 36.78452°S 149.9568°E, 16 m, 20 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Melaleuca processillaris* (Sol. ex Gaertn.) Sm. (Myrtaceae), det. NSW staff NSW658203 1♂ (00272737) (AMNH).

PARATYPES: **AUSTRALIA: New South Wales:** Bournda National Park, North Wallagoot, Turingal Head, 36.78452°S 149.9568°E, 16 m, 20 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Kunzea ambigua* (Sm.) Druce (Myrtaceae), det. NSW staff NSW658199, 1♂ (00089931) (AM), *Kunzea ambigua* (Sm.) Druce (Myrtaceae), det. NSW staff NSW658199, 1♂ (00274150) *Melaleuca processillaris* (Sol. ex Gaertn.) Sm. (Myrtaceae), det. NSW staff NSW658203, 4♂ (00272738 - 00272741), 11♀ (00272721 - 00272731) (AMNH).

Ausejanus cordatus, new species

Figures (3-1, 3-12: B)

DIAGNOSIS: Unique within *Ausejanus* for its small size, and white, heart-shaped color pattern on the predominantly dark red to brown hemelytra, the relatively short second antennal segment, and completely yellow second and third second antennal segments.

DESCRIPTION: *Male*: Macropterous, small, elongate and parallel-sided. Total length 2.38-2.87mm, width across pronotum 0.76- 0.93, width across widest part of wings 0.89-1.09. COLORATION: General coloration dark red, brown, and white. Head brown to burgundy. Antennal segments one through three yellow, with light-brown tinge at distal ends of segments two and three in some populations; segment four completely light brown. First labial segment bright red, second and third segments yellow, and fourth brown. Thorax, pronotum, and scutellum dark red to brown, scent glad ventrally with lighter coloration next to area of coxae. All coxae yellow. Pro-and meso-femora yellow, meta-femora yellowish basally, dark red distally. Tibiae gold, meta-femora with parallel rows of dark spicules. Basal tarsomeres gold, distal segments dark brown.

Hemelytra dark red, with white pigmented partial fascia on the anterior portion of the wing covering medial portion of clavus and a portion of corium parallel to clavus, forming a heart shape when wings are joined. Extreme distal margin of corium anterior to cuneal fracture weakly white. Cuneus with white pigment along cuneal fracture approximately half the distance to apical margin, dark red for remaining portions. Membrane light brown with light brown pigmentation around wing veins. Abdomen predominantly dark red, with abdominal segments 4-7 a lighter shade of orange on ventral surface. STRUCTURE: Eyes when viewed laterally encompass the total height of head, vertex width less than width of an eye. Length of antennal segment two slightly longer than the total width of the head. Remaining structure characteristics are as in generic description. GENITALIA: As in generic description.

Female: Macropterous. Total length 2.57-2.67mm, width pronotum 0.90- 0.95, width at widest part of wings 1.14. STRUCTURE: Vertex over half the total width of the head. Length antennal segment two nearly as wide as the total width of the head. COLORATION: Same coloration as male with exception of scent gland which has a larger area white ventrally and the cuneus which has larger portions of white and second antennal segments having a larger portion of area gold.

ETYMOLOGY: named for the unique heart-shaped coloration pattern of the hemelytra, a noun in apposition.

ETYMOLOGY: From the Latin “cordatus”, for the heart-shaped white patterning on the hemelytron.

HOSTS: Tiliaceae.

DISTRIBUTION: Western Australia and Northern Territory.

DISCUSSION: *Ausejanus cordatus* is a particularly attractive species whose unique color pattern appears to be consistent among populations and localities, making it relatively easy to identify to species. It also has a relatively short second antennal segment that is only slightly longer than the total width of the head, like *A. iris,* but the distinctive coloration patterns of the hemelytron clearly delineate the two.

HOLOTYPE: **AUSTRALIA: Western Australia:** 4.5 km NW of jct of Blowholes Rd and North West Coastal Hiway, N of Carnarvon, 24.72267°S 113.7158°E, 28 m, 27 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Corchorus carnarvonensis* Halford (Tiliaceae), det. PERTH staff PERTH6988660. 1♂ (00196684) (AMNH).

PARATYPES: **AUSTRALIA: Northern Territory:** 32km N of Elliott, 17.55205°S 133.54269°E, 211 m, 07 Apr 1980, G.F. Hevel and J.A. Fortin, 2♂ (00271737, 00271738) (USNM). **Western Australia:** ***West Kimberley Co.:*** 8km S of Cape Bertholet, 17.25°S 122.16667°E, 1 m, 16 Apr 1977, D. H. Colless, 1♀ (00168826) (ANIC); 19 Apr 1977, D. H. Colless, 1♂ (00168805) (ANIC). 4.5 km NW of jct of Blowholes Rd and North West Coastal Hiway, N of Carnarvon, 24.72267°S 113.7158°E, 28 m, 27 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, *Corchorus carnarvonensis* Halford (Tiliaceae), det. PERTH staff PERTH6988660, 1♂ (00196682), 1♀ (00196685) *Corchorus carnarvonensis* Halford (Tiliaceae), det. PERTH staff PERTH6988660, 5♂ (00196116 - 00196118, 00196681, 00196683), 6♀ (00196115, 00196686 - 00196690) (AMNH). Kimberley Dist., Dampier Peninsula, Barred Ck, 17.5625°S 122.2005°E, 18 May 1999, G.Cassis, R.Silveira, 1♂ (00090970) (AM).

Pilbara Dist., Shay Gap Rd 15.1 km NE of Muccan Homestead, 20.22244°S 120.1494°E, 130 m, 27 May 1999, G.Cassis, R.Silveira, 1♂ (00090971) (AM).

Ausejanus femoralis (Carvalho and Gross), new combination

Figures (3-1, 3-12: F)

Sejanus femoralis Carvalho and Gross, 1982: 27, Figs 37-39, 109 (n. sp., descr., disc., DV, MG)

DIAGNOSIS: Unique among *Ausejanus* species by having a combination of the ventral surface of the abdomen a different color than thorax and head in females, the relatively large portion of the cuneus pigmented with white in males and almost completely pigmented white in females.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.32-3.79mm, width across pronotum 0.96-1.13, width across widest part of wings 1.14-1.29. COLORATION: General coloration brown, gold, and white. Head dark brown. First antennal segment gold basally, dark brown distally; remaining antennal segments dark brown. First and second labial segments gold, third and fourth dark brown. Eyes dark red. Thorax, pronotum, scutellum dark brown. Thoracic pleuron mostly dark-brown, pale on dorsal half of posterior margin. Pro coxae gold, meso and meta coxae dark brown basally gold anteriorly. Pro and meso-femora gold, meta femora gold basally, dark brown on anterior one-third. Tibiae dark gold, meta-tibiae with parallel rows of dark spicules. Anterior of clavus dark brown, anterior of corium with transparent yellowish-white coloration that does not cross into clavus across suture until approximately three-fourths of the distance of clavus from apical margin, forming a transverse fascia. Portion of fascia that transverses the clavus a wide yellowish band, clavus transitioning back into dark brown for remaining posterior portion. Apical half of corium medium brown. Cuneus with transparent yellowish-white band for over half of cuneal length, dark brown for posterior portions near the distal margins with membrane. Membrane brown with some dark pigmentation around wing veins. Abdomen dark brown. STRUCTURE: Eyes when viewed laterally encompass the total height of head, vertex width less than width of an eye. Length of antennal segment two nearly one and a half times the width of the head. Remaining structure characteristics are as in generic description. GENITALIA: As in generic description.

Female: Macropterous. Total length 3.02-3.61mm, width pronotum 1.06-1.23, width at widest part of wings 1.24-1.49. STRUCTURE: Vertex taking up less than half the total width of the head. Length antennal segment two one and one-fifth times the total width of the head. COLORATION: Same coloration as male with exception of the second antennal segment which has larger area gold and the cuneus, which is almost completely transparent yellowish-white. Abdomen unique for *Ausejanus* females that ventral surface is completely yellow, contrasting to the primarily dark brown thorax and head.

HOSTS: Araliaceae and Fabaceae.

DISTRIBUTION: New South Wales, Queensland.

DISCUSSION: The unique color pattern of the abdomen on the females makes recognition of females of this species fairly easy, which is not the case for many of the other *Ausejanus* species (e.g. *Ausejanus albisignatus*).

HOLOTYPE: **AUSTRALIA: Queensland:** Brisbane, 21.x.1964, H.A. Rose. 1♂ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: New South Wales:** Ashton Park, 33.84819°S 151.24394°E, 3 m, 15 Oct 1958, M. I. Nikitin, 1♂ (00372014) (AM), 11♂ (00173984 - 00173994), 14♀ (00173995 - 00174008) (BMNH). Dead Horse Gap 9km. from Thredbo Snowy Mts., 36.52351°S 148.2649°E, 1545 m, 11 Feb 1979, D. K. McAlpine & B. J. Day, 1♂ (00393647), 1♀ (00393648) (AM). Kuring-gai Chase N.P., 33.651°S 151.201°E, 06 Nov 1989, G. Cassis, 8♀ (00088841 - 00088846, 00088848 - 00088849) *Pomaderris* sp. (Rhamnaceae), 1♀ (00088847) (AM). Myall Lakes National Park, 10.3 km S Seal Rocks Rd on Hawks Nest Rd, 32.50001°S 152.35°E, 5 m, 20 Oct 1995, Schuh and Cassis, *Astrotricha longifolia* Benth. (Araliaceae), det. B.M. Wiecek 1996 NSW 395907, 1♂ (00272648), 42♀ (00272669, 00272671 - 00272711) (AMNH). Narranbeen, 33.71666°S 151.3°E, 28 Oct 1922, A. Musgrave, Paratype, 1♀ (00393300) (AM). Neilson Park, 28.8239°S 153.29447°E, 12 m, 23 Oct 1932, K. K. Spence, Paratype, 1♀ (00393301) (AM). Royal National Park, Warumbul Picnic Area, 34.06667°S 151.1048°E, 20 m, 14 Nov 2001, Cassis, Schuh, Schwartz, Silveira, *Acacia irrorata subsp. irrorata* Sieber ex Spreng. (Fabaceae), det. NSW staff NSW666408, 1♂ (00274234) (AM). St. Forest W of Ulladulla, above Carters Creek, 35.5152°S 150.0346°E, 200 m, 11 Nov 1995, Schuh and Cassis, *Astrotricha latifolia* Benth.

(Araliaceae), det. B.M. Wiecek 1996 NSW 396004, 11♂ (00089903, 00089910 - 00089912, 00089918, 00089922 - 00089923, 00089934, 00274141 - 00274143), 26♀ (00089901 - 00089902, 00089904 - 00089909, 00089913 - 00089914, 00089916 - 00089917, 00089919 - 00089921, 00089924 - 00089927, 00089932 - 00089933, 00274144 - 00274145, 00274148, 00372012 - 00372013) (AM), *Astrotricha latifolia* Benth. (Araliaceae), det. B.M. Wiecek 1996 NSW 396004, 14♂ (00195985, 00272630, 00272632 - 00272636, 00272638, 00272640 - 00272644, 00272647), 26♀ (00272629, 00272631, 00272637, 00272639, 00272646, 00272649 - 00272668, 00272670) (AMNH). [The Royal] National Park, 34.072°S 151.05789°E, 20 m, Oct 1932, K. K. B., Paratype, 2♀ (00393299, 00393302) (AM).

Ausejanus iris, new species

Figures (3-2, 3-12: J)

DIAGNOSIS: Distinguished from the other members of *Ausejanus* by the overall dark coloration, the completely dark fore, mid and hind femora, and the dark brown to burgundy hemelytron with a complete transverse fascia possessing white pigmentation in the males. Females possess a completely white-pigmented, complete transverse fascia on a dark brown to burgundy hemelytron. Coloration is similar to some populations of *Ausejanus albisignatus*, but males and females have both pro and meso-femora completely dark brown, both sexes possess white pigmentation in the transverse fascia, and wider vertex relative to the total width of the head.

DESCRIPTION: *Male*: Macropterous, small, elongate and parallel-sided. Total length 2.67-2.97mm, width across pronotum 0.88- 0.92, width across widest part of wings 1.04-1.09. COLORATION: General coloration dark brown, with a white transverse fascia on anterior margin of the wings and anterior margins of the cuneus. Head dark brown. All antennal segments dark brown. Labium dark brown. Eyes dark red to purple. Thorax, pronotum and scutellum dark brown. Thoracic pleura dark brown. Pro-coxa light brown, meso and meta-coxa dark brown basally and apically light brown. All femora light brown. All tibial segments light brown, with meta-tibiae weakly darker in coloration and with parallel rows of dark spicules. Basal tarsomeres light, darkening distally to brown near claw. Hemelytra brown, with anterior margin of the wings and along the anterior margin of the clavus dark brown adjacent to the scutellum, a white transverse fascia with white pigmentation focused on the claval suture, the majority of the medial area of the hemelytron a dark brown to burgundy coloration, at least half of the area of the cuneus along the anterior margin of the cuneal fracture distinctly white, sometimes with an orangish-tinge along the lateral margins. Abdomen dark brown, with abdominal sclerites 3-7 lighter in coloration.

STRUCTURE: Vertex width slightly wider than the width of one eye, eye height nearly total height of head. Length of antennal segment two slightly longer than total width of the head. . GENITALIA: See generic description.

Female: Macropterous. Total length 2.48mm, width pronotum 0.92, width at widest part of wings 1.09. STRUCTURE: Vertex occupying over half of the total width of the head. Length antennal segment two equal to the total width of the head.

COLORATION: Same coloration as male with the following exceptions: of the pro-coxae which is a gold in coloration rather than light brown, the dorso-posterior margin of the metepisternum with a thin yellow line, and the cuneus which has larger portions white.

ETYMOLOGY: Named for the Iris River, near the collecting locality in Tasmania. Noun in apposition.

HOSTS: *Ozothamnus hookeri* Sond. (Asteraceae)

DISTRIBUTION: Tasmania.

DISCUSSION: This species is very similar in coloration and size to *Ausejanus minutus* collected on Myrtaceae hosts in Tasmania, particularly because the females of both species have the anterior margin of the transverse fascia a gold coloration. However, the combination of males with white pigmentation and the Asteraceae host plant (*Ozothamnu*s) clearly separate the two. *Ausejanus arvensus* also found on *Ozothamnus spp*. but neither males nor females have white pigmentation and the hemelytra are lighter in coloration.

HOLOTYPE: **AUSTRALIA: Tasmania:** 12 km N of Cradle Valley on Iris River, 41.55148°S 145.9622°E, 782 m, 26 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus hookeri* Sond. (Asteraceae), det. NSW staff NSW658265 1♂ (00108569) (AMNH).

PARATYPES: **AUSTRALIA: Tasmania:** 12 km N of Cradle Valley on Iris River, 41.55148°S 145.9622°E, 782 m, 26 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus hookeri* Sond. (Asteraceae), det. NSW staff NSW658265, 2♂ (00108571, 00108572), 1♀ (00108570) (AMNH).

Ausejanus luteoelytratus (Carvalho and Gross), new combination.

Fig. (3-2)

Sejanus luteoelytratus Carvalho and Gross 1982: 25, Figs 31-33, 107 (n. sp., descr., DV, MG)

DIAGNOSIS: Unique from other species in *Ausejanus* for its combination of primarily whitish hemelytra, white pigmented cuneal stripe, small size compared to other species of *Ausejanus*, completely gold femora on all legs with meta-femora having red maculation on distal portion, and mostly gold second antennal segments.

REDESCRIPTION: *Male*: Macropterous, small-sized, elongate and parallel-sided. Total length 3.22-3.46mm, width across pronotum 0.84- 0.89, width across widest part of wings 0.99-1.09. COLORATION: General coloration dark brown and white. Head dark brown. First antennal segment gold, second segment primarily gold with small dark band at joint with third antennal segment, remaining antennal segments gold brown to dark brown. First and second labial segments gold, third and fourth dark brown. Eyes dark red to deep purple. Thorax, pronotum, scutellum dark brown. Thoracic pleura dark brown, pale on dorsal half of posterior margin. Coxae dark brown basally, gold anteriorly. Femora and tibiae gold, meta-tibiae with parallel rows of dark spicules. Basal tarsal segments gold, darkening distally. Primarily tan in coloration, with a paler transparent band corresponding to a transverse fascia across the anterior part of the wings medially across the clavus, darkening with dispersed transparent brown pigmentation distally around tip of clavus and claval suture and with a deeper brown color around the margin of the distal part of the corium next to the basal margin of the membrane, forming a dark brown inverted-V pattern. Cuneus with pigmented white band along the basal margin for approximately a third of the cuneal length, dark brown for the remaining posterior portions near the distal margins with membrane. Membrane light brown with some dark pigmentation around wing veins. Abdomen dark brown. STRUCTURE: Eyes when viewed laterally encompass height of head, vertex width approximately the width of a compound eye. Remaining structure characteristics are as in generic description.

GENITALIA: As in generic description.

Female: Macropterous. Total length 2.30-2.42mm, width pronotum 0.76- 0.84, width widest part of wings 1.04-1.09. STRUCTURE: Vertex over half the total width of the head. Length second antennal segment over one and one-forth times the total width of the head. COLORATION: General coloration similar to males, anterior portion of cuneus with wider band of white pigmentation along margin.

HOSTS: Primarily Chenopodiaceae, with a few specimens found on *Cassisa* sp. (Asteraceae) and *Acacia* sp. (Fabaceae).

DISTRIBUTION: South Australia and Queensland.

DISCUSSION: This species is most similar to *Ausejanus arvensus* in the tan and mauve coloration of the hemelytra, but *Ausejanus luteoelytratus* can be recognized by the smaller size, the dark inverted V pigmentation pattern on the distal margins of the corium, the presence of a faint transverse fascia that runs across the clavus and the corium, the dark brown anterior portion of the cuneus, the maculation on the hind femora, and the lighter second antennal segments.

HOLOTYPE: **AUSTRALIA: South Australia:** Northern Flinders Ranges, Yudnamutana Gorge, 3.vi.1976, P.B. McQuillan. (Reg. Nos 121, 073-4). 1♂ (SAM).

SPECIMENS EXAMINED: **AUSTRALIA: Queensland:** 8.2 km E of Mungallala, 26.46401°S 147.6248°E, 560 m, 31 Oct 1998, Schuh, Cassis, Silveira, *Acacia* sp. (Fabaceae), det. Royal Botanic Gardens NSW, 1♀ (00197203) *Cassisa* sp. (Asteraceae), det. Det: Royal Bot Gard. NSW, 4♀ (00195651, 00195998, 00371769 - 00371770) (AMNH). **South Australia:** 5 km N Yunta toward Arkaroola, 32.53334°S 139.55°E, 250 m, 29 Oct 1995, Schuh and Cassis, *Undetermined* sp. (Chenopodiaceae), det. R.T. Schuh NSW 395955, 15♂ (00273380 - 00273384, 00273386 - 00273395), 8♀ (00273397 - 00273399, 00273408 - 00273412), 1♀ (00273414) (AMNH). 52 km SW of Yunta, 32.83335°S 139.1°E, 500 m, 30 Oct 1995, Schuh and Cassis, *Undetermined* sp. (Chenopodiaceae), det. R.T. Schuh NSW 395955, 6♂ (00273374 - 00273379), 5♀ (00273401 - 00273405).

Ausejanus macrozonata (Carvalho and Gross), new combination.

Figures (3-1)

Leucophoroptera macrozonata Carvalho and Gross 1982: 23, fig. 117 (n. sp., descr., disc., DV)

DIAGNOSIS: Recognized by the deep red hemelytral coloration, burgundy-brown head, thorax, pronotum and scutellum, the white pigmentation in the complete transverse fascia, and the completely dark red pro, meso and hind femora. Females are further diagnostic by being the only *Ausejanus* species with a nearly completely white anterior portion of the hemelytron with a burgundy to brown posterior.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 2.97, width across pronotum 0.88, width across widest part of wings 0.99. COLORATION: General coloration maroon to burgundy, with wings primarily burgundy with a transverse, white pigmented fascia on the anterior portion. Head dark to medium brown. Antennal segments one, three and four gold, segments two gold basally, dark distally. Labium gold basally, brown distally. Eyes ruby-red to dark red. Thorax, pronotum and scutellum dark burgundy, dorso-lateral margin of metepisternum with thin yellow margin. All coxae dark red to burgundy. Pro and meso-femora dark burgundy with gold coloration at joint with tibiae, meta-femora completely dark red to burgundy. Tibial segments gold, meta-tibiae with parallel rows of dark spicules. Basal tarsomeres light, darkening distally to brown near claw. Hemelytra primarily burgundy with a complete yellowish-white transverse fascia on the anterior portion containing white pigmentation in portion that transverses the clavus and the interior margins of the corium. Cuneus white along fracture with an orangish lateral margin, coloration extending approximately one-third of the total area, remainder of cuneus dark red to brown. Abdomen burgundy. STRUCTURE: Eyes when viewed laterally nearly encompass the total height of head, vertex width greater than width of an eye. Length of antennal segment two slightly shorter than one and one-forth times the total width of the head. Remaining structure characteristics are as in generic description.

GENITALIA: As in generic description.

Female: Macropterous. Total length 2.52-2.57mm, width pronotum 0.84- 0.88, width at widest part of wings 1.04-1.06. STRUCTURE: Vertex takes up over half the total width of the head. Second antennal segment nearly one and one-tenth times the total width of the head. COLORATION: Same coloration as male with exception of the hemelytron and the dorso-lateral surface of the metepisternum. The anterior portion of the corium and clavus are nearly completely pigmented white from the median of the hemelytron to just subapical to the wing bases and the interior margins abutting the scutellum which transition into a gold brown. Females also have at least half of the total anterior area of the cuneus and a greater portion of the dorso-lateral surface of the hemelytron white.

HOSTS: *Acacia leptostachya* Benth (Fabaceae). Also collected at lights.

DISTRIBUTION: Western Australia and Queensland..

DISCUSSION: This species was previously known only from the poorly preserved and teneral female holotype. However, the relatively large portion of the anterior margin of the hemelytron being white and the completely dark red femora is diagnostic, which made subsequent identification of two recently collected specimens and one associated male possible. This species is similar to *Ausejanus cordatus* in possessing distinct white pigmentation and deep red coloration of the hemelytron in both the males and female specimens, however the patterning of the white is more restricted into the medial portions of the hemelytron in *A. cordatus* and the pro and meso-femora are gold instead of burgundy as in *A. macrozonata*.

HOLOTYPE: **AUSTRALIA: Queensland:** Split Rock, 14km S. of Laura, 23-16.vi.1975, G.B. Monteith. 1 ♀ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: Queensland:** ca. 30km SE of Chillagoe, on Burke Developmental Rd, 17.36519°S 144.71405°E, 547 m, 01 Jun 2006, Cassis, Barrow, Finlay, Symonds, *Acacia leptostachya* Benth. (Fabaceae-Mimosaceae), det. RBG staff, 1♀ (00392784) (AMNH). **Western Australia:** Pilbara Dist., Shay Gap Rd 15.1 km NE of Muccan Homestead, 20.22244°S 120.1494°E, 130 m, 27 May 1999, G.Cassis, R.Silveira, 1♂ (00195679), 1♀ (00195680) (AMNH).

Ausejanus mcdonaldi (Carvalho and Gross), new combination.

Figures (3-3)

Sejanus melaleucae Carvalho and Gross, 1982: 21, Fig. 120 (n. sp., descr., disc., DV) – NEW SYNONYMY

Sejanus mcdonaldi Carvalho and Gross, 1982: 21, Figs 22-24, 103 (n. sp., descr., disc., DV, MG)

DIAGNOSIS: Males almost completely brown in body coloration and hemelytra, unlike a majority of the species of *Ausejanus* which have at least a partial to complete fascia across the anterior portion of the wings. In addition, males have reduced pigmentation of the white stripe on the anterior margin of the cuneus, relatively thick second antennal segments and smaller eyes than other species in the genus. Females lighter in coloration with the hemelytra being a gold-brown, the stripe along the apical margin of the cuneus being an orange-coloration rather than white, and lack of a partial or complete fascia.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.32-3.89mm, width across pronotum 0.86-1.10, width across widest part of wings 1.09-1.39. COLORATION: General coloration brown. Head dark brown. All antennal segments dark brown. All labial segments dark brown. Eyes dark red. Thorax, pronotum, scutellum dark brown. Thoracic pleuron dark-brown. Pro-coxae gold, meso and meta-coxae dark brown basally, gold anteriorly. Pro and meso-femora gold brown, meta-femora dark brown. Tibiae gold brown, meta-tibiae with parallel rows of dark spicules. Tarsi dark brown. Hemelytra completely dark brown to brown, lack a partial or complete fascia. Cuneus with yellowish-white pigmented band present as a thin line along anterior margin of cuneus to a thick band with a width approximately one-fourth total length of the cuneus, the posterior cuneal coloration dark brown. Abdomen dark brown with segments 3-7 a paler brown.

STRUCTURE: Second antennal segment wider in diameter compared to other species of *Ausejanus*. Eyes relatively small and not taking up the total height of head when viewed laterally, width of the vertex wider than the width of one eye. Length of second antennal segment nearly as long as one and a half times the total width of the head. Remaining structure characteristics are as in generic description.

GENITALIA: As in generic description.

Female: Macropterous. Total length 2.97-3.36mm, width pronotum 0.94-1.06, width at widest part of wings 1.34-1.39. STRUCTURE: Vertex taking up over half of the total width of the head. Length second antennal segment one and one-fifth times the total width of the head. COLORATION: Females generally lighter in coloration than males. First antennal segment gold brown, second antennal golden-brown basally then transitioning into dark brown distally for approximately half way along segment length, third and fourth segment dark brown. Hemelytra primarily gold-brown in coloration, without a partial or complete fascia on the anterior portion. Cuneus yellowish-orange along anterior margin with hemelytra for less than one-fourth total length, remaining posterior portion gold brown to darker brown.

HOSTS: Fabaceae and Myrtaceae.

DISTRIBUTION: South-Eastern and Southern Australia.

DISCUSSION: This species has a relatively high amount of sexual dimorphism in coloration compared to other species of *Ausejanus,* with the males being a darker color than females and having a thicker and completely dark brown second antennal segment. The female type specimen of *Sejanus melaleucae* is identical to the females of *A. mcdonaldi,* which can have a dark brown or lighter brown coloration of the hemelytron in the same population. Additionally, both species are found in the same geographic area. Male paratypes from New South Wales of Carvalho and Gross (1982) show a larger amount of white pigmentation on the anterior portion of the cuneus than a majority of the specimens recently collected in Tasmania, but the remainder of the coloration and structural description by Carvalho and Gross are consistent.

HOLOTYPE: **AUSTRALIA: Tasmania**: Hugel River, Lake St Clair, 15.ii.1955, sweeping shrubs, T.E. Woodward 1♂ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: New South Wales:** Dandahra cr. Gwdir Hwy, 29.51424°S 152.31264°E, 1000 m, 29 Nov 1962, E. S. Ross & D. Q. Cavagnaro, Paratype, 1♂ (00169074) (SAMA). **Tasmania:** 0.5 km NW of Southwest National Park (Maydena access): Huon Campground, off of Scotts Peak Rd, 43.03732°S 146.29721°E, 276 m, 19 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum lanigerum* Maiden & Betche (Myrtaceae), det. NSW staff NSW658232, 43♂ (00108523, 00272472 - 00272507, 00272509 - 00272513, 00272531), 21♀ (00108524, 00108550, 00272557 - 00272575) (AMNH). 0.5 km N of, Cradle Mountain -Lake St. Clair National Park, boat ramp: Visitor Centre, 42.11581°S 146.1796°E, 756 m, 22 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia mucronata* Willd. ex H.L.Wendl. (Fabaceae), det. Field ID, 50♂ (00108549, 00272419 - 00272467), 12♀ (00272576 - 00272587) (AMNH). 2.9 km SE from Southwest National Park (Maydena access): junction Scott's Peak Rd and Frodshams' Pass, 42.83639°S 146.37898°E, 570 m, 17 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia mucronata* Willd. ex H.L.Wendl. (Fabaceae), det. NSW staff NSW658221, 2♂ (00272542, 00272543) (AMNH). Cradle Mountain -Lake St Clair Nat Park, Ronny Creek carpark and Little Kate House vicinity, 41.63579°S 145.94963°E, 868 m, 26 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum lanigerum* Maiden & Betche (Myrtaceae), det. NSW staff NSW658262, 5♂ (00108544, 00272468 - 00272471), 5♀ (00272588 - 00272592) (AMNH). Mt. Wellington, The Springs, 42.9149°S 147.2465°E, 804 m, 15 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum scoparium* J.R.Forst. & G.Forst. (Myrtaceae), det. Field ID, 11♂ (00108543, 00272519 - 00272528), 1♀ (00272593) (AMNH). Southwest National Park (Maydena access): Edgar Campground on Scotts Peak Rd, 43.03019°S 146.3497°E, 293 m, 19 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia dealbata* Link. (Fabaceae), det. NSW staff NSW658235, 1♂ (00108546) *Leptospermum scoparium* J.R.Forst. & G.Forst. (Myrtaceae), det. NSW staff NSW658233, 17♂ (00272514 - 00272518, 00272529 - 00272530, 00272532 - 00272541). Southwest National Park (Maydena access): junction Scott's Peak Rd and Frodsham's Pass, 42.81372°S 146.3855°E, 500 m, 17 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum lanigerum* Maiden & Betche (Myrtaceae), det. NSW staff NSW658220, 1♀ (00272594) (AMNH). Strathgordon, Lake Pedder Chalet, 42.76859°S 146.0461°E, 337 m, 18 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia mucronata* Willd. ex H.L.Wendl. (Fabaceae), det. NSW staff NSW658226, 14♂ (00108545, 00272544 - 00272556) (AMNH). Tarraleah Power Station grounds, on A10, NW of Hamilton, 42.29848°S 146.4584°E, 366 m, 22 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus rosmarinifolius* (Labill.) DC. (Asteraceae), det. Field ID, 1♀ (00272596) (AMNH).

Ausejanus meridionalis (Carvalho and Gross), new combination.

Figures (3-1, 3-12: D)

Sejanus meridionalis Carvalho and Gross, 1982: 32, fig. 106 (n. sp., descr., disc., DV)

DIAGNOSIS: Distinguishable from the other members of *Ausejanus* by the combination of the relatively smaller size, the ruby-red coloration of the wings with a contrasting white-pigmented complete fascia in the males, yellow pro and meso-femora and ruby red meta-femora, and dark brown thorax and abdomen. Coloration can be is similar to *Ausejanus albisignatus,* but the fascia in the latter taxon is primarily transparent in males rather than with white pigment in *A. meridionalis*.

REDESCRIPTION: *Male*: Macropterous, small, elongate and parallel-sided. Total length 2.72-3.19mm, width across pronotum 0.84- 0.92, width across widest part of wings 0.94-1.11. COLORATION: General coloration dark brown, with wings primarily burgundy to brown in color with a transverse, transparent fascia on anterior portion. Head dark to medium brown. First antennal segment gold to light brown, segments two and four are dark brown, with third antennal segment dark brown with paling at joint with second segment. Labium dark brown. Eyes ruby-red to dark red. Thorax, pronotum and scutellum dark brown. Thoracic pleura dark brown. Pro-coxa entirely light yellow, meso and meta-coxa dark red basally and gold apically. Pro and meso-femora gold brown, meta-femora dark. Tibial segments gold with parallel rows of dark spicules. Basal tarsomeres light, darkening distally to brown near claw. Hemelytra primarily dark red to ruby red, with a white pigmented complete transverse fascia on anterior portion of hemelytron whose anterior, medial margin passes just posterior to the posterior apex of the scutellum. Cuneus white pigmented along fracture, coloration extending approximately one-half to one-third of cuneus, remainder of cuneus dark red. Membrane light brown, veins sometimes with subtle red pigmentation. Abdomen dark brown, with abdominal sclerites 3-7 lighter in coloration. STRUCTURE: Eyes not taking up the total height of head when viewed laterally, width of the vertex equivalent to the width of one eye. Length of second antennal segment nearly as long as one and one-third times the total width of the head. Remaining structure characteristics are as in generic description. GENITALIA: As in generic description.

Female: Macropterous. Total length 2.43-2.87mm, width pronotum 0.86- 0.95, width at widest part of wings: 0.99-1.19. STRUCTURE: Vertex taking over half of the total width of the head. Length second antennal segment nearly one and one-tenth times the total width of the head. COLORATION: Similar to males in general coloration but with the following exceptions: wings having a broader complete transparent fascia than males, second antennal segment gold basally with darkening towards joint with third antennal segment, and cuneus with larger, white pigmented area along apical fracture margin, coloration extending approximately one-half to two-thirds of cuneus, remainder of cuneus dark red.

HOSTS: Primarily Fabaceae, Myrtaceae and Thymeleaceae.

DISTRIBUTION: South Australia, New South Wales, Victoria, Western Australia, Tasmania.

DISCUSSION: *Ausejanus meridionalis* was described by Carvalho and Gross on the basis of a female holotype, which now is associated with male specimens. Females are fairly easy to associate with the males for this species because both sexes have bright-red hemelytra and a white-pigmented, broad transverse fascia. Males of *A. meridionalis* also have white pigmentation in the transverse fascia, which is absent in most *Ausejanus* species.

HOLOTYPE: **AUSTRALIA: South Australia:** Warradale, 1.x.1972. ex *Acacia,* P.McQuillan, (Reg. No. 121,055). 1♀ (SAM).

SPECIMENS EXAMINED: **AUSTRALIA**: **New South Wales:** Monga State Forest, 35.58333°S 149.91666°E, 26 Nov 1979, Zaytsev, 1♀ (00229493) (ZISP). Nabiac, 4km SW, 32.11666°S 152.35°E, 22 Sep 1991, T. Gush, 1♀ (00274267) (AM). **South Australia:** Tea Tree Gully, 34.81928°S 138.72738°E, 220 m, 02 Nov 1957, R. V. Southcott, *Acacia paradoxa* D. C. (Fabaceae), Paratype, 1♀ (00169266) (SAMA). **Tasmania:** 0.5 km NW of Southwest National Park (Maydena access): Huon Campground, off of Scotts Peak Rd, 43.03732°S 146.29721°E, 276 m, 19 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum lanigerum* Maiden & Betche (Myrtaceae), det. NSW staff NSW658232, 1♀ (00272026) (AMNH). **Victoria:** 4 km S of Cann River, 37.63335°S 149.1333°E, 100 m, 08 Nov 1995, Schuh and Cassis, *Pultenaea hispidula* R. Br. ex Benth. (Fabaceae), det. P.H. Weston 1996 NSW 395994, 5♀ (00274287 - 00274288, 00274290 - 00274292) (AM), *Pultenaea hispidula* R. Br. ex Benth. (Fabaceae), det. P.H. Weston 1996 NSW 395994, 4♀ (00273115, 00273120 - 00273121, 00273123) (AMNH). Brodribb River, 64 km W of Cann River, 37.2°S 148.5833°E, 50 m, 08 Nov 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. [introduced] (Fabaceae), det. B.J. Conn 1996 NSW 395993, 1♀ (00088891) (AM). Discovery Bay Coastal Park, Quarry Rd carpark area, at beach, 38.11753°S 141.1302°E, 28 m, 07 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Pimelea serpyllifolia subsp. serpyllifolia* R.Br. (Thymelaeaceae), det. NSW staff NSW658128, 69♂ (00059060, 00272840 - 00272841, 00272843 - 00272861, 00272863 - 00272909), 175♀ (00059061, 00272842, 00272910 - 00272952, 00272955 - 00273049, 00273090 - 00273108, 00371771 - 00371772, 02723077 - 02723085, 02723087 - 02723089, 02723092 - 02723093) (AMNH). Discovery Bay National Park, Swan Lake Beach area, 38.21766°S 141.3098°E, 33 m, 08 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Pimelea serpyllifolia subsp. serpyllifolia* R. Br. (Thymelaeaceae), det. Field ID, 16♂ (00272823 - 00272838), 25♀ (00273050 - 00273074) (AMNH). Little Desert National Park, 5-6 km W of McDonald Hiway, 36.61668°S 141.1667°E, 150 m, 03 Nov 1995, Schuh and Cassis, *Acacia acinacea* Lindl. (Fabaceae), det. B.J. Conn 1996 NSW 395983, 17♀ (00273264 - 00273280) (AMNH). **Western Australia:** 2.3 km E of Esperance on Fisheries Road, 33.81039°S 121.9334°E, 10 m, 23 Nov 1999, R.T. Schuh and G. Cassis, *Melaleuca cuticularis* Labill. (Myrtaceae), det. PERTH staff PERTH 05670357, 1♂ (00371028), 5♀ (00371029 - 00371033) (AM). 3 km S of Kojonup, Sampson Road, 33.87088°S 117.1648°E, 310 m, 08 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Melaleuca rhaphiophylla* Schauer (Myrtaceae), det. PERTH staff PERTH 05879183, 3♀ (00272166 - 00272168) (AMNH). Bunbury, 33.32711°S 115.63699°E, 10 Dec 1958 -22 Dec 1958, A Snell, 1♀ (00168819) (ANIC). King George's Sound, 33.52203°S 115.37277°E, 1900, Unknown, 1♀ (00393690) (AM).

Ausejanus minutus, new species

Figures (3-4, 3-12: A, 3-13: D)

DIAGNOSIS: *Ausejanus minutus* is identical in coloration to *Ausejanus bournda*, but is recognized by the smaller size and the differences in shape of the left and right parameres. *Females* are nearly identical in coloration to females of *A. uralla*.

DESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 2.87-3.32mm, width across pronotum 0.80- 0.89, width across widest part of wings 1.04-1.19. COLORATION: General coloration dark brown, with a weakly transparent area in the corium along the medial portion of the claval sutures that forms a weakly visible transverse fascia in some specimens, and anterior margins of the cuneus white. Head dark brown. All antennal segments brown, with the second antennal segment a shade darker brown. Labium dark brown. Eyes dark red to purple. Thorax, pronotum and scutellum dark brown. Dorso-lateral margin of metepisternum and scent gland with a thin white margin. All coxae entirely dark brown with apical lightening to gold at joint with trochanter. Pro-femora dark basally, gold distally, the meso and meta-femora completely dark brown. Pro and meso-tibial segments brown basally, gold distally, the meta-tibiae are completely dark brown and with parallel rows of dark spicules. Basal tarsomeres gold, darkening to dark brown on distal segments. Dark brown, with a weakly transparent area in the corium along the medial portion of the claval sutures that transverses over the clavus and forms a complete transverse fascia in some specimens, at most one fourth of the area of the cuneus along the anterior margin of the cuneal fracture distinctly white with a reddish-tinge along the anterior margins with the cuneal fracture. Abdomen dark brown. STRUCTURE: Vertex width equal to the width of one eye, eyes taking up total height of head when head is viewed laterally. Length of antennal segment two over one and one-third the total width of the head. GENITALIA: Left Paramere: posterior process relatively short and closer in size to anterior process, the apex of posterior process directed ventrally (Fig. 3-13 D).

Female: Macropterous. Total length 2.43-3.07mm, width pronotum 0.78- 0.99, width at widest part of wings 0.99-1.29. STRUCTURE: Vertex equal to half the total width of the head. Length of antennal segment two equal to one and one-fifth the times the total width of the head. COLORATION: Same coloration as male with the following exceptions: the transverse fascia is much more pronounced with the anterior of the corium completely white with the fascia and with the anterior margin transitioning from a gold brown into dark brown rather than a relatively defined line in males, the fore-femora are darker with apical lightening to gold at joint with fore-tibiae less pronounced, the dorso-posterior margin of the metepisternum with a wider white margin, and the cuneus which has larger portions white.

ETYMOLOGY: From the Latin noun for small, due to its relatively small size as compared to other *Ausejanus* species.

HOSTS: Myrtaceae, specifically *Melaleucae ericifolia* Sm. and *Leptospermum lanigerum* Maiden & Betche.

DISTRIBUTION: Tasmania.

DISCUSSION: *Ausejanus minutus* is similar to the coloration of *A. bournda* and *A. uralla*, but is differentiated from the former by the lack of a transverse fascia in the males, and separated from the latter by the relatively narrow posterior process of the left paramere, the wider area of white on the anterior margin of the cuneus, and the light brown coloration of the hemelytron in females.

HOLOTYPE: **AUSTRALIA: Tasmania:** 0.5 km SE of Couta Rocks: 'Murphy's Spring', terminus of C214, Mick Murphy's House, 41.18012°S 144.68716°E, 8 m, 24 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Melaleuca ericifolia* Sm. (Myrtaceae), det. Field ID. 1♂ (00271953) (AMNH).

PARATYPES: **AUSTRALIA: Tasmania:** 0.5 km NW of Southwest National Park (Maydena access): Huon Campground, off of Scotts Peak Rd, 43.03732°S 146.29721°E, 276 m, 19 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum lanigerum* Maiden & Betche (Myrtaceae), det. NSW staff NSW658232, 8♀ (00272021- 00272025, 00272027 - 00272029) (AMNH). 0.5 km SE of Couta Rocks: 'Murphy's Spring', terminus of C214, Mick Murphy's House, 41.18012°S 144.68716°E, 8 m, 24 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Melaleuca ericifolia* Sm. (Myrtaceae), det. Field ID, 14♂ (00271944 - 00271951, 00271954 - 00271958, 00271984), 49♀ (00271962 - 00271969, 00271971 - 00271983, 00271985 - 00272012) (AMNH). 8 km W of Granville Harbour: C249, 38 km WNW of Zeehan, 41.81038°S 145.03063°E, 12 m, 23 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Melaleuca ericifolia* Sm. (Myrtaceae), det. NSW staff NSW658249, 3♂ (00271959 - 00271961), 8♀ (00272013 - 00272020) (AMNH).

Ausejanus neboissi (Carvalho and Gross), new combination.

Figures (3-1, 3-12: C, E)

Sejanus neboissi Carvalho and Gross, 1982: 11, Figs 1-3, 94 (n. sp., descr., DV, MG)

DIAGNOSIS: Distinguished from other members of *Ausejanus* by the predominant red coloration of the head, thorax, abdomen, hemelytra and wing veins. Transverse fascia yellowish, unlike clear or white pigmented fascia of other members of the genus.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.02-3.21mm, width across pronotum 0.90- 0.99, width across widest part of wings 1.04-1.23. COLORATION: General coloration orange, red and yellow. Bright to brick red. Antennal segment one bright red, segment two bright red basally and transitioning into dark red distally, third segment predominantly dark red with minimal lightening at joint with second segment, and forth segment dark red. Labium bright red like head. Eyes dark red. Thorax, pronotum and scutellum bright red. Thoracic pleura dark red. Pro-coxa yellow, meso and metacoxa dark red basally, lightening to gold at joint with trochanter and femora. Pro-and meso-femora orange, meta-femora yellowish-orange basally, bright red distally. Tibiae gold, meta-tibiae with parallel rows of dark spicules. Basal tarsomeres gold, distal segments dark brown. *Hemelytra:* Anterior of corium and clavus orange, with transverse yellow fascia covering most of the basal half of the corium and middle third of clavus. Apical half of corium bright red. Cuneus orange to yellow for basal one-fourth, dark red for remaining posterior portions. Membrane light brown to beige, with orange colored wing veins. Abdomen dark red. SURFACE AND VESTITURE: As in generic description. STRUCTURE: Eyes when viewed laterally encompass the total height of head, vertex width less than width of an eye. Length of antennal segment two slightly shorter than one and one-fifths times the total width of the head. Remaining structure characteristics are as in generic description. GENITALIA: As in generic description.

Female: Macropterous. Total length 2.92-3.27mm, width pronotum 0.99-1.13, width widest part of wings 1.19-1.39. STRUCTURE: Vertex nearly half of the total width of the head. Length second antennal segment one and one-fifth times the total width of the head. COLORATION: Same coloration as male with exception of the cuneus, which has larger portions of yellow pigmentation for cuneal fascia.

HOSTS: *Muehlenbeckia florulenta* Meissner (Polygonaceae).

DISTRIBUTION: Eastern Australia.

DISCUSSION: *Ausejanus neboissi* is not a typical member of *Ausejanus* due to its unique red and orange color scheme, but is clearly congeneric given the simple S-shaped endosoma, the shape of the left paramere, and characters of the female genitalia that are diagnostic for the genus.

HOLOTYPE: **AUSTRALIA: Victoria:** Irymple, 25.xi.1964, A. Neboiss. 1♀ (NMV). [not examined]

SPECIMENS EXAMINED: **AUSTRALIA: Queensland:** 45 km N of Quilpie, 26.3423°S 144.3078°E, 280 m, 02 Nov 1998, Schuh, Cassis, Silveira, Light Trap, 11♀ (00090964 - 00090965, 00130065 - 00130071, 00130073 - 00130074) (AM), *Muehlenbeckia florulenta* Meissner (Polygonaceae), det. Det: Royal Bot Gard. NSW NSW427471, 29♂ (00130035 - 00130063), 2♀ (00130064, 00130072) (AMNH). **South**

Australia: 1 km N of Innamincka, Cooper Creek, 27.73124°S 140.7364°E, 120 m, 05 Nov 1998, Schuh, Cassis, Silveira, Light Trap, 2♀ (00089851, 00089852) (AM), 1♂ (00195646) (AMNH). 17.6 km S of Innamincka, 27.88068°S 140.6712°E, 130 m, 06 Nov 1998, Schuh, Cassis, Silveira, *Muehlenbeckia florulenta* Meissner (Polygonaceae), det. Det: Royal Bot Gard. NSW NSW427467, 2♂ (00090962, 00130034) (AM), 14♂ (00130309 - 00130310, 00130375 - 00130386), 28♀ (00130089 - 00130091, 00130093 - 00130107, 00130109, 00130111 - 00130116, 00130311 - 00130313) (AMNH).

Ausejanus tasmaniae (Carvalho and Gross), new combination.

Figures (3-3)

Sejanus brunneus Carvalho and Gross, 1982: 23, Figs 43-45, 111 (n. sp., descr., disc., DV, MG) – NEW SYNONYMY

Sejanus tasmaniae Carvalho and Gross, 1982: 23, Figs 28-30, 105 (n. sp., descr., disc., DV, MG)

DIAGNOSIS: Easily separated from other members of *Ausejanus* by the combination of the deep-red color of the hemelytra and femora, and the partial transparent fascia restricted to the claval suture, and the dark burgundy to reddish head, thorax, and body.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.52-4.05mm, width across pronotum 0.92- 0.99, width across widest part of wings 1.01-1.36. COLORATION: General coloration dark burgundy to red. Head: Dark, reddish-brown. All antennal segments dark brown. All labial segments dark brown. Eyes dark red. Thorax, pronotum, and scutellum dark reddish-brown. Pro-coxae gold, meso and meta-coxae reddish-brown. Femora dark red to red. Tibiae red basally, golden brown distally, meta-tibiae with parallel rows of dark spicules. Tarsi dark brown. Anterior portion of wings near attachment to thorax dark reddish-brown, lightening in pigmentation to a ruby-red basally towards cuneus and darkening in the clavus along the margins with the scutellum and along the claval commissure. The partial fascia consists of transparent areas along the middle portion of the length of the claval suture, contrasting with the dark red pigmentation inside the clavus. Cuneus with white pigmented line along the anterior margin of cuneus extending for approximately one-fourth total length of cuneus, remaining posterior coloration dark red. Membrane brown, with veins retaining a small amount of red to orange pigmentation. Abdomen dark reddish-brown. STRUCTURE: Eyes relatively small, width of eyes less than vertex width and not taking up height of head when viewed laterally. Length of antennal segment two longer than one and two-fifth times the width of the head. Remaining structure characteristics are as in generic description.

GENITALIA: As in generic description.

Female: Macropterous. Total length 3.16-3.29mm, width pronotum 0.95-1.02, width at widest part of the wings 1.04-1.34. STRUCTURE: Vertex over half the total width of the head. Length second antennal segment nearly one and one-fourth times the total width of the head. COLORATION: Females generally brighter red than males, but overall similar in coloration pattern. First antennal segment dark brown, second segment dark brown basally at joint with first segment then transitioning into a gold color, and on distal one-third of length transitioning back do dark brown, third segment gold basally then transitioning distally to dark brown, and fourth segment dark brown. Coloration of the hemelytra as in males but with more extensive transparent areas along the claval suture. Cuneus whitish-yellow along anterior margin with hemelytra for more than half total cuneal length, remaining posterior portion dark red. GENITALIA: As in generic description.

HOSTS: *Leptospermum sp.* J.R.Forster & G.Forster (Myrtaceae).

DISTRIBUTION: Tasmania.

DISCUSSION: *Sejanus brunneus* Carvalho and Gross was described as being identical to *Sejanus albisignatus* in external morphology excluding the lengths of the second and third antennal segments, which were described as 10-20% shorter in *S. brunneus* than *S. albisignatus* (Carvalho and Gross 1982). However, based on images of the type of *S. brunneus*, the species in fact is *A. tasmaniae*. It shares the characters of a transparent fascia along the claval suture on a dominantly red hemelytra; a deep red to burgundy head, thorax, pronotum, and scutellum; and having all the femora dark red as in *A. tasmaniae*. Characters differing *A. tasmaniae* from A. *albisignatus* is the combination of completely dark brown antennal segments, all three sets of femora being dark-red, and having relatively small eyes compared to *A. albisignatus*. *A. tasmaniae* also appears to be host specific to one genus of Myrtaceae (*Leptospermum*), unlike *A. albisignatus* with several dozen host plants from multiple families.

HOLOTYPE: **AUSTRALIA: Tasmania:** L. Dobson, on subalpine shrubs, 6.ii.1955, T.E. Woodward. 1♂ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: Tasmania:** Cradle Mountain -Lake Saint Clair National Park, Visitor Centre, Cradle Mountain, 41.59618°S 145.9308°E, 823 m, 25 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum rupestre* Hook.f. (Myrtaceae), det. NSW staff NSW658260, 17♂ (00108554, 00272597 - 00272611, 00272614), 2♀ (00108552, 00272615) *Leptospermum scoparium* J.R.Forst. & G.Forst. (Myrtaceae), det. NSW staff NSW658233, 8♀ (00272620 - 00272627) (AMNH). Cradle Mountain -Lake St Clair Nat Park, Ronny Creek carpark and Little Kate House vicinity, 41.63579°S 145.94963°E, 868 m, 26 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum lanigerum* Maiden & Betche (Myrtaceae), det. NSW staff NSW658262, 1♂ (00272612), 1♀ (00272628) *Leptospermum lanigerum* Maiden & Betche (Myrtaceae), det. NSW staff NSW658263, 1♀ (00108551) (AMNH). Mt. Pine, 28 Feb 1990, G. Cassis, *Leptospermum* sp. (Myrtaceae), 11♂ (00393710 - 00393720), 28♀ (00393721 - 00393748) (AM). Southwest National Park (Maydena access): Edgar Campground on Scotts Peak Rd, 43.03019°S 146.3497°E, 293 m, 19 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Leptospermum scoparium* J.R.Forst. & G.Forst. (Myrtaceae), det. NSW staff NSW658233, 6♂ (00108553, 00272613, 00272616 - 00272619) (AMNH).

Ausejanus tiramisu, new species

Figure (3-1)

DIAGNOSIS: Distinguished from other members of *Ausejanus* by the dark brown coloration of the legs and all of the antennal segments, the patterning on the hemelytra of a pale white patch on a dark brown background on the posterior portion of the corium, and the relatively small eyes for the genus.

DESCRIPTION: *Male*: Macropterous, small, elongate and parallel-sided. Total length 2.57-3.26mm, width across pronotum 0.81- 0.95, width across widest part of wings 0.89-1.09. COLORATION: General coloration chocolate brown and white. Head dark to medium brown. Antennal coloration dark brown. Labium dark brown. Eyes ruby-red. Thorax, pronotum and scutellum dark brown. Coxae dark brown basally, lightening to gold at joint with trochanter and femora. Pro-and meso-femora proximally dark brown, distally light brown. Meta-femora completely dark brown. Pro-and meso-tibiae proximally gold, dark brown distally. Metatibia completely dark brown with parallel rows of dark spicules. Tarsomeres completely dark on all legs. Corium and clavus brown with a white transverse fascia covering most of the basal half of the corium and middle third of clavus. Clavus dark brown next to margin of scutellum and distal one fourth corresponding to dark area of corium. Apical half of corium brown with lightening towards the middle portion of the last half of each wing, approximately corresponding to the apex of the claval commissure. Cuneus white for basal one-half, dark brown for remaining posterior portions. Membrane dark brown. Abdomen dark brown, with abdominal sclerites 3-7 weakly lighter in coloration. STRUCTURE: Vertex width approximately same width as an eye, eye height nearly total height of head. Length of antennal segment two just less than one and one-third the total width of the head. GENITALIA: See generic description.

Female: Macropterous. Total length 2.23-2.72, width pronotum 0.81- 0.90, width at widest part of wings 0.81- 0.90. STRUCTURE: Vertex over half the total width of the head. Length of the second antennal segment nearly one and one-tenth times the total width of the head. COLORATION: Same coloration as male with exception of cuneus and margin of metepimeron, which have larger portions white.

ETYMOLOGY: Named for the unique coloration pattern of the hemelytra that mirrors the interior layers of the famous tiramisu Italian dessert.

HOSTS: Recorded primarily from *Olearia axillaris* (DC.) Benth (Asteraceae), including nymphs, suggesting this is a breeding host plant. Also recorded on *Boronia alata* Sm. (Rutaceae).

DISTRIBUTION: Western Australia along the coast, most likely wherever host plant is located.

DISCUSSION: Most similar in coloration pattern to *Ausejanus vividus,* but unique in its patterning of the posterior portion of the hemelytra containing a white patch versus being completely dark brown as in *A. vividus,* and *A. tiramisu is* structurally different in having eyes shorter in height and width relative to the total width of the head. *Ausejanus tiramisu* appears to be host specific to one genus and species of plant, *Olearia axillaries,* where it was collected in large numbers along with nymphs.

HOLOTYPE: **AUSTRALIA: Western Australia:** Conspicuous Beach, Walpole-Nornalup National Park, 10 km E of Nornalup, 35.03725°S 116.8443°E, 30 m, 17 Dec 1997, Schuh, Cassis, Brailovsky, *Olearia axillaris* (DC.) Benth. (Asteraceae), det. PERTH staff PERTH 05095328. 1♂ (00108592) (AMNH).

PARATYPES: **AUSTRALIA: Western Australia:** Blowholes Rd NW of North West Coastal Hiway, Beagle Hill Area, 24.49068°S 113.4626°E, 20 m, 27 Oct 2004, Cassis, Wall, Weirauch, Tatarnic, Symonds, 1♀ (00195642) (AMNH). Cape Leeuwin, Leeuwin Naturaliste National Park, 34.37277°S 115.135°E, 02 Dec 1998, G. Cassis, 2♂ (00196978- 00196979), 2♀ (00196980- 00196981) (AMNH). Cape Naturaliste National Park, 33.54034°S 115.0123°E, 50 m, 14 Dec 1997, Schuh, Cassis, Brailovsky, *Olearia axillaris* (DC.) Benth. (Asteraceae), det. PERTH staff PERTH 05055334, 10♂ (00196965 - 00196967, 00272054 - 00272060), 15♀ (00196968 - 00196977, 00271790 - 00271793, 00275379) (AMNH). Conspicuous Beach, Walpole-Nornalup National Park, 10 km E of Nornalup, 35.03725°S 116.8443°E, 30 m, 17 Dec 1997, Schuh, Cassis, Brailovsky, *Olearia axillaris* (DC.) Benth. (Asteraceae), det. PERTH staff PERTH 05095328, 2♂ (00272066, 00272080) *Olearia axillaris* (DC.) Benth. (Asteraceae), det. PERTH staff PERTH 05095328, 49♂ (00108519, 00108537 - 00108538, 00196904 - 00196924, 00271788, 00272061 - 00272065, 00272067 - 00272079, 00272081 - 00272086), 56♀ (00108518, 00108541 - 00108542, 00196925 - 00196952, 00271794 - 00271818) (AMNH). Gnarabup Beach, 33.99527°S 114.99138°E, 03 Dec 1998, G. Cassis, *Boronia alata* Sm. (Rutaceae) PERTH 05227593, 1♂ (00197000), 1♀ (00196999) (AMNH). Greenough River Mouth, 28.86304°S 114.6343°E, 05 Nov 2004, Cassis, Weirauch, Tatarnic, Symonds, *Olearia axillaris* (DC.) Benth. (Asteraceae), det. PERTH staff PERTH6988334, 14♂ (00197032 - 00197045), 19♀ (00197013 - 00197031) (AMNH). Sloping Rocks, Leeuwin Naturaliste NP, 34.09777°S 114.99305°E, 02 Dec 1998, G. Cassis, 2♂ (00275376, 00275377), 11♀ (00275378, 00275396 - 00275405), 11♂ (00275384 - 00275394) (AM). Yalgorup National Park, 32.83472°S 115.6524°E, 80 m, 04 Dec 1999, R.T. Schuh and G. Cassis, *Olearia axillaris* (DC.) Benth. (Asteraceae), det. PERTH staff PERTH 05671744, 17♂ (00196694 - 00196710), 44♀ (00196717 - 00196760) (AMNH). Yalgorup National Park, 32.83583°S 115.65111°E, 27 Nov 1998, G. Cassis, *Olearia axillaris* (DC.) Benth. (Asteraceae), det. PERTH staff PERTH 05227461, 43♂ (00196762 - 00196798, 00196898 - 00196903), 77♀ (00196799 - 00196875) (AMNH).

Ausejanus uestaustralianus (Carvalho and Gross), new combination.

Figures (3-2)

Sejanus uestaustralianus Carvalho and Gross 1982: 22, figs. 25-27, 104 (n. sp., descr., disc., DV, MG)

DIAGNOSIS: Recognized by the red hemelytral coloration on the posterior portion of the hemelytron, the yellowish anterior portion without a distinct transverse fascia, and the completely yellow femora (including the hind femora) and tibiae. *Ausejanus albisignatus* is similar in coloration to *Ausejanus albisignatus* but the latter taxon has the red hind-femora and less of the anterior portion of the hemelytron occupied by yellow or white in a transverse fascia.

DESCRIPTION: *Male*: Macropterous, small, elongate and parallel-sided. Total length 3.81 mm, width across pronotum 0.92, width across widest part of wings 1.24. COLORATION: Dark red and yellowish-white. Head dark to medium brown. First antennal segment golden, remaining antennal segments light brown. Labium dark brown.

Eyes ruby-red. Thorax, pronotum and scutellum dark brown. Pro-coxae golden, meso and meta-coxae basally dark red, golden distally. Pro-and meso-femora golden, meta-femora completely dark red. All tibiae gold, meta-tibiae with parallel rows of dark spicules. Tarsomeres light brown. Anterior of clavus adjacent to scutellum deep red and apex of clavus pinkish, remaining coloration yellowish white. Anterior half and lateral margins of the corium yellowish white, median and posterior area pinkish red. Cuneus white for basal one-third, dark red for remaining posterior portions. Membrane light brown with red-pigmented wing veins. Abdomen dark brown, with abdominal sclerites 3-7 weakly lighter in coloration. STRUCTURE: Vertex width less than the width of one compound eye, eye height nearly total height of head. Length of antennal segment two just less than one and one-third the total width of the head. GENITALIA: See generic description.

Female: Unknown.

HOSTS: Unknown.

DISTRIBUTION: South-western Western Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** Stirling National Park, 22.ix.1965, E.Britton and Uther Backer. 1♂(ANIC).

SPECIMENS EXAMINED: **AUSTRALIA: Victoria:** Lake Albacutya near Rainbow, 06 Sep 1974, Z. Liepa, 1♂ (00393681) (AM). **Western Australia:** Stirling National Park, 22.ix.1965, E.Britton and Uther Backer. Paratypes 2♂(ANIC).

Ausejanus uralla, new species

Figures (3-3, 3-13:A)

DIAGNOSIS: Distinguished from the other members of *Ausejanus* by the overall dark coloration, the dark brown basally and golden distally fore-femora and dark meso and meta-femora, and the dark brown hemelytron with thin, white to transparent transverse fascia. Females possess a complete, white transverse fascia without distinct white pigmentation on a light brown hemelytron. Coloration is similar to some populations of *Ausejanus minutus* and *Ausejanus bournda* but males in the former species are smaller, do not have a complete transverse fascia, and females possess white pigmentation.

DESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.51-3.61mm, width across pronotum 1.03-1.06, width across widest part of wings 1.24-1.29. COLORATION: General coloration dark brown, with a thin white transverse fascia on anterior margin of the wings and anterior margins of the cuneus. Head dark brown. All antennal segments dark brown. Labium dark brown. Eyes dark red to purple. Thorax, pronotum and scutellum dark brown. Thoracic pleura dark brown, dorso-lateral margin of metepisternum and scent gland with a thin white margin. All coxae entirely dark brown. Pro-femora mostly dark brown with distal margin with pro-tibiae transitioning to gold most pronounced on the ventral surface, the meso and meta-femora completely dark brown. Pro and meso-tibial segments brown basally, gold distally, the meta-tibiae are completely dark brown and with parallel rows of dark spicules. All tarsomeres are dark brown. Hemelytra dark brown, with relatively thin

white transparent transverse fascia whose anterior margin is posterior to the posterior apex of the scutellum but not meeting it and lacking white pigmentation, at least one third of the area of the cuneus along the anterior margin of the cuneal fracture distinctly white with a reddish-tinge along the anterior margins with the cuneal fracture. Abdomen dark brown.
STRUCTURE: Vertex width narrower than the width of one eye, eyes taking up total height of head when head is viewed laterally. Length of antennal segment two just short of one and a half times the total width of the head. GENITALIA: <u>Left Paramere</u>: posterior process relatively short and closer in size to anterior process, posterior process straight, the apex of posterior process directed ventrally.

Female: Macropterous. Total length 2.87-3.02mm, width pronotum 1.03-1.08, width at widest part of wings 1.19-1.29. STRUCTURE: Vertex taking up nearly twice the width of the head. Length of the second antennal segment one and one-fourth times the width of the head. COLORATION: Hemelytron coloration dark than males, the transverse fascia is much more pronounced with the anterior of the corium completely white with the fascia and with the anterior margin transitioning from a gold brown into dark brown rather than a relatively defined line in males, the dorso-posterior margin of the metepisternum with the white margin wider than males, and the cuneus which has larger portions white.

ETYMOLOGY: Named for the collecting site near the town of Uralla in New South Wales. Noun in apposition.

HOST: *Leptospermum brevipes* F. Muell. (Myrtaceae).

DISTRIBUTION: New South Wales.

DISCUSSION: This species is very similar in coloration to *Ausejanus minutus* and *Ausejanus bournda* and all three species feed primarily on Myrtaceae. However, *Ausejanus uralla* is nearly twice the size of *A. minutus* and *A. bournda*, and the males of *A. uralla* have a transverse fascia. Males and females of *A. uralla* also may be confused with darker populations of *Ausejanus albisignatus* based on similar size, but the dark first antennal segments, the narrow fascia, and dark pro and meso-femora of *A. uralla* clearly differentiates the two.

HOLOTYPE: **AUSTRALIA: New South Wales:** 20 km E of Retreat (W. of Uralla), 30.63335°S 151.25°E, 1000 m, 23 Oct 1995, Schuh and Cassis, *Leptospermum brevipes* F. Muell. (Myrtaceae), det. P.G. Wilson 1996 NSW 395916. 1♂ (00272779) (AMNH).

PARATYPES: **AUSTRALIA: New South Wales:** 20 km E of Retreat (W. of Uralla), 30.63335°S 151.25°E, 1000 m, 23 Oct 1995, Schuh and Cassis, *Leptospermum brevipes* F. Muell. (Myrtaceae), det. P.G. Wilson 1996 NSW 395916, 2♂ (00393312, 00393313), 5♀ (00393314 - 00393318) (AM), *Leptospermum brevipes* F. Muell. (Myrtaceae), det. P.G. Wilson 1996 NSW 395916, 1♂ (00272778), 1♀ (00272781) (AMNH).

Ausejanus vividus (Carvalho and Gross), new combination.

Figures (3-3, 3-12: I)

Sejanus vividus Carvalho and Gross, 1982: 33, Figs 53-55, 113 (n. sp., descr., disc., DV, MG)

DIAGNOSIS: Differentiated from other species of *Ausejanus* by the combination of relatively large, white pigmented complete transverse fascia on the anterior portion of the hemelytra, the completely dark brown antennal segments, head, thorax, legs and abdomen. Similar in coloration to *Ausejanus tiramisu*, however the posterior portion of the hemelytra is continuously dark brown in *Ausejanus vividus* and the eyes are bigger than *Ausejanus tiramisu*.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.31-4.46mm, width across pronotum 0.89-1.08, width across widest part of wings 1.09-1.44. COLORATION: General coloration dark brown and white. Head dark brown. All antennal segments dark brown, labium dark brown like head. Eyes dark red. Thorax, pronotum and scutellum dark brown. Thoracic pleura dark brown, pale on dorsal half of posterior margin. Coxae dark brown basally, margins with trochanters white. Trochanters white. Pro-femora dark brown to maroon basally, paling in coloration towards joint with tibiae. Meso and meta femora dark brown. Pro and meso tibiae light brown basally, darkening towards tarsomeres. Meta-tibiae predominantly dark brown with light brown margin with femora, also with parallel rows of dark spicules. Anterior of clavus dark brown, anterior of corium with transparent coloration to white pigment that does not cross into clavus across suture until approximately three-fourths of the distance of clavus from apical margin, forming a transverse fascia. Portion of white pigment transverses the clavus, clavus transitioning back into dark brown for remaining posterior portion. Apical half of corium dark brown. Cuneus with white pigmented band for basal one-third, dark brown for remaining posterior portions. Membrane brown. Abdomen dark red.

STRUCTURE: Eyes when viewed laterally encompass height of head, vertex width approximately equal to width of eye. Remaining structure characteristics are as in generic description. GENITALIA: As in generic description.

Female: Macropterous. Total length 2.20-3.56, width pronotum 0.90-1.06, width at widest part of wings 1.09-1.34. STRUCTURE: Vertex nearly taking up half of the total width of the head. Length of the second antennal segment one and one-firths times the total width of the head. COLORATION: Same coloration as male with exception of the cuneus, which has larger portions pigmented white.

HOSTS: Mostly Fabaceae (*Acacia* sp.), but also recorded on Asteraceae, Myrtaceae, Araliaceae, and Malvaceae.

DISTRIBUTION: Eastern coast of Australia, from Tasmania to Queensland.

DISCUSSION: One of the most easily recognized and attractive species of *Ausejanus,* this species is widely distributed in Australia. There is slight variation in coloration for *Ausejanus vividus* where male specimens collected in southern latitudes of Australia (e.g. Tasmania) are darker in leg coloration and have less white pigmentation on their transverse fascia, but the associated females show no differences between populations and make identification to this species fairly easy. *A. vividus* males and females share similar in coloration to *Ausejanus uralla*, but males of *A. vividus* have a relatively wide transverse fascia compared to the thin strip of *A. uralla*. Further, females of *A. vividus* have a distinct division between the anterior margin of the transverse fascia and the dark anterior area of the corium and clavus, whereas in *A. uralla* females the line is not as defined and the anterior margin is a gold coloration.

HOLOTYPE: **AUSTRALIA: Queensland:** Brisbane, 22.ix.1964, H. A. Rose. 1♂ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: Australian Capital Territory:** Black Mountain, 35.26387°S 149.10051°E, 19 Nov 1985, G. Cassis, *Acacia decurrens* Willd. (Fabaceae), 1♀ (00088825), 1♀ (00090919) (AM). **New South Wales:** 9 km N of Pambula, Green Pinch Dam, 36.91668°S 149.9°E, 250 m, 10 Nov 1995, Schuh and Cassis, *Cassisa longifolia* R. Br. (Asteraceae), det. J. Everett 1996 NSW 395999, 2♀ (00272712, 00272713) (AMNH). 17 km N of Bega, 36.58334°S 149.8333°E, 50 m, 10 Nov 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. (Fabaceae), det. B.J. Conn 1996 NSW 395993, 1♂ (00272752), 3♀(00272765 - 00272767) (AMNH). 20 km E of Retreat (W. of Uralla), 30.63335°S 151.25°E, 1000 m, 23 Oct 1995, Schuh and Cassis, *Leptospermum brevipes* F. Muell. (Myrtaceae), det. P.G. Wilson 1996 NSW 395916, 2♀ (00089929, 00090945) (AM). 43 km SE of Braidwood, Deua National Park, Deua River, 35.76339°S 149.92323°E, 100 m, 10 Nov 1995, Schuh and Cassis, 3♂ (00272745 - 00272747), 2♀ (00272768, 00272769) (AMNH). Araluen, 35.65001°S 149.8167°E, 50 m, 11 Nov 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. (Fabaceae), det. B.J. Conn 1996 NSW 395993, 9♀ (00090910 - 00090918) (AM), 2♂ (00272753, 00272754), 5♀ (00272755, 00272770 - 00272772) (AMNH). Bournda National Park, North Wallagoot, Turingal Head, 36.78452°S 149.9568°E, 16 m, 20 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Acacia mearnsii* De Wild. (Fabaceae), det. NSW staff NSW658198, 1♂ (00274151) (AM), *Acacia mearnsii* De Wild. (Fabaceae), det. NSW staff NSW658193, 8♀ (00272757 - 00272764) *Acacia mearnsii* De Wild. (Fabaceae), det. NSW staff NSW658198, 4♂ (00272748 - 00272751), 1♀ (00272720) (AMNH). Clarence, 33.46666°S 150.23333°E, 23 Dec 1990, T. Gush, *Leptospermum grandiflorum* Sm. (Myrtaceae), 2♀ (00274146, 00274147) (AM). Monga State Forest, 35.58333°S 149.91666°E, 26 Sep 1979, G.S. Medvedev, 1♀ (00229471); 26 Nov 1979, Zaytsev, 6♂ (00229483 - 00229488), 14♀ (00229468 - 00229470, 00229472 - 00229482). Royal National Park, 15 Oct 1993, G. Cassis, *Acacia decurrens* (Fabaceae), 9♂ (00090948 - 00090956), 14♀ (00090928 - 00090941), 8♀ (00090920 - 00090927) (AM). Royal National Park, Warumbul Picnic Area, 34.06667°S 151.1048°E, 20 m, 14 Nov 2001, Cassis, Schuh, Schwartz, Silveira, 3♂ (00274229, 02724227 - 02724228), 4♀ (00274230 - 00274233) (AM), *Acacia irrorata subsp. irrorata* Sieber ex Spreng. (Fabaceae), det. NSW staff NSW666408, 3♂ (00128215 - 00128217), 5♀ (00128222, 00128218 - 00128221) (AMNH). Spring Hill, 33.39857°S 149.15225°E, 945 m, 03 Dec 2006, K. Menard and N. Tatarnic, *Acacia mearnsii* De Wild. (Fabaceae), 1♀ (00272774) (AMNH). St. Forest W of Ulladulla, above Carters Creek, 35.5152°S 150.0346°E, 200 m, 11 Nov 1995, Schuh and Cassis, *Astrotricha latifolia* Benth. (Araliaceae), det. B.M. Wiecek 1996 NSW 396004, 1♀ (00274149) (AM). **Queensland:** 8.2 km E of Mungallala, 26.46401°S 147.6248°E, 560 m, 31 Oct 1998, Schuh, Cassis, Silveira, *Cassisa* sp. (Asteraceae), det. Det: Royal Bot Gard. NSW, 6♂ (00196984 - 00196989), 4♀ (00195982, 00196996 - 00196998) (AMNH). Brisbane, 27.46785°S 153.02801°E, 01 Aug 1964, J. T. Medler, 1♀ (00271743) (USNM). Kondaii Circuit, Bunya Mts. N.P., 05 Dec 1985, G. Cassis, 1♀ (00088828) (AM). **Tasmania:** 4.1 km N of Huon Hwy & Pilliger Ave intersection, Mt. Wellington, The Springs, 42.91707°S 147.25546°E, 684 m, 15 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Oxylobium arborescens* R.Br. (Fabaceae), det. NSW staff NSW658211, 1♀ (00108517, 00272417) (AM), 1♀ (00108517) (AMNH). 7 km W of Southwest National Park (Maydena access): intersection of Frodsham's Pass and Gordon River Rd, 42.82103°S 146.31018°E, 306 m, 18 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia dealbata* Link (Fabaceae), det. NSW staff NSW658224, 7♂ (00108516, 00272335 - 00272340), 9♀ (00108548, 00272312 - 00272319) (AMNH). Alma Reserve on C132, 22 km S of junction with C145, 41.27618°S 146.23228°E, 40 m, 26 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia dealbata subsp. dealbata* Link (Fabaceae), det. Field ID, 2♂ (00272354, 00272355), 5♀ (00272291 - 00272295) (AMNH). Arve River Picnic Ground on C632, 43.15874°S 146.8068°E, 172 m, 21 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia dealbata subsp. dealbata* Link (Fabaceae), det. Field ID, 3♂ (00272350 - 00272351, 00272356), 2♀ (00272288, 00272289) (AMNH). Avoca Picnic Area, just NW of A4, 41.78387°S 147.7182°E, 197 m, 27 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia dealbata* Link (Fabaceae), det. NSW staff NSW658224, 5♀ (00272320 - 00272324), 2♂ (00272348, 00272349) (AMNH). Devonport, town greenbelt, 41.20759°S 146.3245°E, 195 m, 11 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Acacia* *baileyana x ? dealbata (probably)* (Fabaceae), det. NSW staff NSW658143, 1♂ (00274140) (AM). Geeveston, 7km WNW, 43.15°S 146.66666°E, 14 Feb 1992, T. Gush, 1♀ (00274139) (AM). Mt. Field National Park, Russell Falls Visitor Centre, 42.68151°S 146.7168°E, 167 m, 16 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia dealbata subsp. dealbata* Link (Fabaceae), det. NSW staff NSW658219, 4♂ (00272331 - 00272334), 9♀ (00272296 - 00272304) (AMNH). Sandspit River Forest Reserve, Wielangta Forest Drive, 42.6941°S 147.8608°E, 60 m, 14 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Acacia dealbata* Link (Fabaceae), det. Field ID, 1♀ (00272290) (AMNH). Strathgordon, Lake Pedder Chalet, 42.76859°S 146.0461°E, 337 m, 18 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Acacia dealbata subsp. dealbata* Link (Fabaceae), det. NSW staff NSW658225, 7♂ (00272341 - 00272347), 8♀ (00108547, 00272305 - 00272311) (AMNH). Tarraleah Power Station grounds, on A10, NW of Hamilton, 42.29848°S 146.4584°E, 366 m, 22 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Ozothamnus rosmarinifolius* (Labill.) DC. (Asteraceae), det. Field ID, 5♀ (00272325 - 00272329) *Acacia dealbata subsp. dealbata* Link (Fabaceae), det. Field ID, 2♂ (00272352, 00272353), 1♀ (00272330) (AMNH). **Victoria:** 5 km E of Cann River, Reedy Creek, 37.5681°S 149.2036°E, 70 m, 19 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Acacia mearnsii* De Wild. (Fabaceae), det. NSW staff NSW658193, 1♀ (00274312) (AM). Brodribb River, 64 km W of Cann River, 37.2°S 148.5833°E, 50 m, 08 Nov 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. [introduced] (Fabaceae), det. B.J. Conn 1996 NSW 395993, 7♂ (00274298 - 00274304), 4♀ (00090946 - 00090947, 00274306 - 00274307) (AM), 10♂ (00273125 - 00273134), 4♀ (00273135 - 00273138)

(AMNH). **Western Australia:** Mt. Augustus, 24.33333°S 116.83333°E, 03 Sep 1980, C.A.Howard & T.F.Houston, *Abutilon lepidum* (F.Muell.) A.S.Mitch. (Malvaceae), 3♀ (00202584 - 00202586) (WAMP).

Austrodapus, new genus

Figures (3-7, 3-14, 3-25: E-H)

TYPE SPECIES: *Austrodapus nitens*, new species.

DIAGNOSIS: Recognized by the large size, castaneous to dark brown coloration, the distinctly shiny head, pronotum and scutellum, the flat pronotal collar, the swollen posterior portion of the pronotum that is convexly rounded and with narrow lateral margins in the anterior portion, the eyes that are exerted from the anterior margin of the pronotum, the long interocular setae and long erect golden setae on the meta-tibiae, the punctate hemelytron with both long erect simple setae and short golden sericeous setae but without reflective patches, the transversely rounded hemelytral margins that are weakly constricted medially, the tubercules on the posterior-ventral margin of the pygophore, and the form of the male genitalia.

DESCRIPTION: *Male*: Macropterous, large, medially constricted. Total length 3.07-3.27mm, width across pronotum 1.06-1.11, width across widest part of wings 1.04-1.06. COLORATION: Castaneous to chocolate brown. <u>Head:</u> Brown, castaneous to golden. Eyes deep red to dark purple. Labium light brown. First antennal segment golden, second antennal segment completely dark brown, third antennal segment golden basally, dark distally, fourth segment brown. <u>Thorax:</u> Pronotum, scutellum and thorax dark brown to castaneous. Dorso-lateral margin of metepisternum and scent gland continuous in coloration with thoracic pleura. *Legs:* Pro coxae reddish brown, meso-coxae golden with brown margin adjacent to thorax basally, meta-coxae completely golden. All femora castaneous to brown, all tibiae are basally dark brown to castaneous, distally golden, with the meta-tibiae with parallel rows of dark spicules and long, obvious golden setae. Basal tarsomeres golden, distal segments dark brown. *Hemelytra:* Primarily castaneous to dark brown with a white partial fascia occupying the median of the posterior half of the clavus, posterior to the apex of the scutellum, the lateral margins anterior to the cuneus may have a reddish tinge. The anterior margin of the cuneus is white with a yellowish tinge at the lateral margins, occupying nearly one-third the total area of the cuneus, the posterior coloration is dark brown or castaneous like corium. Membrane light brown with darker brown patches along the posterior-lateral margins, brown-colored wing veins. Abdomen: brown to castaneous, darker in coloration than rest of the insect.

SURFACE AND VESTITURE: Dorsal surface of body and eyes covered with long erect light brown setae. Head, pronotum and scutellum distinctly shiny. Hemelytron punctate, also covered with long erect light brown setae but also includes short golden sericeous setae covering the majority of the surface, lacking reflective patches.

STRUCTURE: Head: Clypeus exerted, surpassing the anterior margin of the frons and visible in dorsal view. Vertex convex and declining along the posterior margin, width nearly equal to twice the width of one compound eye, visible in lateral view. Dorsal surface of the eyes weakly removed from the vertex, height greater than one and half the total height of the head, approximately one-fourth of the total height of the head below the eyes, the posterior margin of the eyes parallel to the anterior margin of the pronotum. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two long and equal to in diameter or wider than segment one, increasing in diameter distally toward segment three. Length of antennal segment two equal to one nearly one and one-third times the width of the head. Antennal segments three and four slender and less than half the length of segment two. Apex of the first labial segment subapical to the posterior margin of the head, the apex of segment four reaching apex of meso-coxa. Thorax: Pronotum more than one and one-half times as wide as long. Flat, narrow pronotal collar present. Mesoscutum exposed, scutellum weakly transversely rounded. Scent-gland taking up approximately one-third the total area of the metepimeron. *Legs:* moderate length, slender with meta-femora widening in diameter subapically with joint to meta-tibiae forming a knee-like shape. Claws of moderate length and width, pulvilli small and taking up less than half of claw length. Parempodia parallel and hair-like. *Hemelytra*: Lateral margins nearly parallel-sided, dorsally transversely rounded. Cuneus triangular, length approximately equal to one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, the lateral and anterior margin of the cuneus occupied by white thickened. Abdomen: narrow, elongate, parallel-sided, the first abdominal sternite wider than long. GENITALIA (Fig. 3-14): Pygophore: taking up approximately one-fourth the total length of the abdomen. Endosoma: Relatively large, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane that forms a fan-like extension near the apex, the margin terminating below the base of the secondary gonopore. Secondary gonopore small, weakly sclerotized or horse-collar shaped, located at apex of endosoma (Fig. 3-14: A). <u>Phallotheca:</u> Of phyline type, large, C- shaped, apex gently tapering toward a point (Fig. 3-14: C). <u>Right Paramere:</u> Paramere moderately sized, smaller than left paramere, narrow at apex and widening subapically, with a tapering, pointed apex (Fig. 3-14: D). <u>Left Paramere:</u> Left paramere moderately sized; posterior process slender, with spicules, and nearly straight for its length with the dorsal margin folded over ventrally; posterior process relatively elongate compared to the anterior process; anterior process stout but without spicules on interior margin, apex directed ventrally. Main area of body between the anterior and posterior processes is rounded (Fig. 3-14: B).

Female: Macropterous, medium-sized, medially constricted. Total length 3.07-3.32mm, width across pronotum 1.08-1.14, width across widest part of wings 1.14-1.19. COLORATION: Similar patterning as males, with the abdomen completely dark brown in contrast to the overall castaneous coloration of the thorax and head (Fig). SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Clypeus produced, strongly exerted in dorsal view. Vertex convex, width greater than twice the width of one compound eye. Eyes taking up greater than half the total height of the head in lateral view, dorsal surface of the eyes continuous with the dorsum of the vertex. Abdomen parallel-sided, anterior half posterior from thorax gently declining ventrally, posterior half of abdomen convex and curving apically to the dorsal surface of the abdomen. Spine present on the ventral surface of the ovipositor in females. The remaining characters are the same as males. GENITALIA (Fig. 3-26: E-H): Vestibulum comprising of two separate, triangular-shaped sclerotized plates with no visible lateral tube, but with a T-shaped apical sclerite that covers the entrance between the two vestibular sclerites (Fig: 3-26: G). Sclerotized areas present on lateral margins of rami between dorsal and ventral labiate plates, rings weakly sclerotized (Fig. 3-26: H). Posterior wall mostly membranous, with posterior margin sclerotized across margin with a flat surface (Fig. 3-26: E), and the lateral interramal plates sclerotized (Fig: 3-26: F).

ETYMOLOGY: A name proposed by J.C.M. Carvalho for two of the examined specimens but never published; masculine.

HOSTS: Fabaceae, primarily *Acacia* spp.

DISTRIBUTION: New South Wales.

DISCUSSION: The male endosoma of *Austrodapus* looks very similar to the endosoma of *Abuyogocoris* (Schuh 1984: figs 659, 662) with a membrane that extends dorsally from the median of the anterior half of the endosoma and ending subapically, and it may be analogous or homologous of a fan-like structure illustrated in Schuh (1984). I was not able to observe the male genitalia of *Abuyogocoris*. However, the differences in the structure of the left paramere, the presence of the sericeous setae on the hemelytron, and the overall larger size indicates *Abuyogocoris* and *Austrodapus* are different genera.

Austrodapus nitens, new species.

Figures (3-7, 3-14, 3-26: E-H)

DIAGNOSIS: Recognized by the generic diagnosis.

DESCRIPTION: See generic description.

ETYMOLOGY: From the Latin “nitens”, shiny.

HOSTS: *Acacia* spp. (Fabaceae).

DISTRIBUTION: New South Wales

DISCUSSION: Within *Abuyogocoris* there is variability in the size and overall coloration of the specimens; some are more castaneous whereas others are more dark brown, and specimens collected more to the North of Australia tend to be bigger than specimens from the South of Australia. However there are no differences in the genitalia, patterning of the cuneus, the partial transverse fascia, appendages or antennae to indicate the color differences warrant separation into separate species.

HOLOTYPE: **AUSTRALIA: New South Wales:** Spring Hill, 33.39857°S 149.15225°E, 945 m, 03 Dec 2006, K. Menard and N. Tatarnic, *Acacia mearnsii* (Fabaceae),1♂ (00392789) (AMNH).

PARATYPES: **AUSTRALIA: Australian Capital Territory:** Black Mountain, 35.26387°S 149.10051°E, 21 Jan 1972, R. L. Kitching, *Acacia baileyana* F. Muell. (Fabaceae), 2♀ (00393692, 00393693) (AM). **New South Wales:** 6 mi. ESE of Nelson Bay, 29 Nov 1967, Britton and Misko, 1♂ (00168829) (ANIC). Araluen, 35.65001°S 149.8167°E, 50 m, 11 Nov 1995, Schuh and Cassis, *Acacia mearnsii* De Wild. (Fabaceae), det. B.J. Conn 1996 NSW 395993, 1♀ (00392797) (AM). Dee Why Beach, off Dee Why Parade Road, 33.75°S 151.28333°E, 22 Nov 2006 - 23 Nov 2006, K. Menard and N. Tatarnic, *Acacia irrorata subsp. irrorata* Sieber ex Spreng. (Fabaceae), det. NSW staff NSW666408, 1♀ (00128214) (AMNH). Dharug National Park, 2km S Wisemans Ferry, 33.22°S 150.03°E, 28 Nov 2006, K. Menard and N. Tatarnic, *Acacia mearnsii* (Fabaceae), 1♂ (00392791), 4♀ (00195989, 00392793 - 00392795) (AMNH). Royal National Park, Warumbul Picnic Area, 34.06667°S 151.1048°E, 20 m, 14 Nov 2001, Cassis, Schuh, Schwartz, Silveira, *Acacia irrorata subsp. irrorata* Sieber ex Spreng. (Fabaceae), det. NSW staff NSW666408, 10♂ (00274217 - 00274226) (AM). Spring Hill, 33.39857°S 149.15225°E, 945 m, 03 Dec 2006, K. Menard and N. Tatarnic, *Acacia mearnsii* (Fabaceae), 2♂ (00392788, 00392790) (AMNH).

Biromiris Schuh

Figures (3-6, 3-9)

Biromiris Schuh 1984: pp. 206-208 (n. gen., diag., descr.)

TYPE SPECIES: *Biromiris enarotadi* Schuh, by original designation.

DIAGNOSIS: Recognized by the carina on the lateral margins of the pronotum, the double-chin-like gula, the terete third and fourth antennal segments, the white dorso-lateral process of the metepisternum dorsal to the scent gland, the long ommatidia setae, the partial transverse fascia comprised of transparent patches on the anterior of the corium, the combination of long erect setae and short silverish setae, and the flat hemelytron.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate, weakly medially constricted. Total length 3.12-3.56mm, width across pronotum 1.01-1.06, width across widest part of wings 0.99-1.04. COLORATION: Orange, dark brown or castaneous. <u>Head:</u> Dark brown, castaneous or orange. Eyes silver or dark purple. Labium golden to brown. First antennal segment golden, second antennal segment golden basally and light brown distally, third and fourth antennal segments completely brown. <u>Thorax:</u> Pronotum, scutellum and thorax dark brown, castaneous or orangish. Dorso-lateral margin of metepisternum with a small white-colored protuberance, scent gland lighter in coloration than thorax or similar in coloration. *Legs:* Coxae coloration variable, either all brown or with brown coloration basally and light coloration distally for the pro and meta-coxae. Pro and meso-femora light brown to golden, meta-femora usually a darker coloration. All tibiae are dark brown basally, golden distally, meta-tibiae with parallel rows of dark spicules. Basal tarsomeres golden, dark brown for distal segments to completely golden or completely brown. *Hemelytra:* Anterior margin of corium castaneous brown to golden with an incomplete transparent fascia that occupies most of the anterior portion of the corium, the posterior margin of the transparent areas with a dark brown margin that may or may not extend across the median of the clavus. Remainder of the hemelytron castaneous, orange to light brown, lateral posterior margins of the hemelytra completely opaque, reddish brown to brown. Between one-third and one-fourth of the total area of the cuneus is white posterior to the claval fracture, with the lateral margins sometimes possessing a yellowish tinge, the posterior coloration of the cuneus a darker coloration than the majority of the corium. Membrane light to dark brown with or without dark brown pigmentation around wing veins.

Abdomen: Castaneous to dark brown.

SURFACE AND VESTITURE: Dorsal surface of body and hemelytron covered with long, erect light-brown to black setae, the hemelytron also possessing scattered, short and silverish to golden setae and sometimes patches of erect black setae. The medial portion of the hemelytron and the median of the claval suture possess reflective patches. Ommatidia setae are long and obvious.

STRUCTURE: Head: Clypeus weakly projecting beyond the anterior margin of the frons in lateral view, barely visible in dorsal view. Vertex weakly concave to convex, with the posterior margin raised for the medial half and the lateral margins declining, forming a shelf-like appearance, width nearly the width of one compound eye to nearly twice the width of an eye. Cyberial muscle attachment sites visible on the frons. Eyes weakly removed from the anterior margin of the vertex, the vertex partially visible in lateral view by the anterior surface of the eyes, the eyes taking up greater than half of the total height of the head, and the posterior margin of the eyes obscure the anterior margin of the pronotum. One-third to one-forth of the total height of the head is below the eyes, gula short and with an additional ridge forming a double-chin appearance. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two long and wider in diameter than segment one, increasing in diameter distally toward segment three. Length of antennal segment two nearly equal to the width of the head to nearly one and one-third times the width of the head, weakly curving medially. Antennal segments three and four are nearly equal in diameter as antennal segment two, tubular to terete-shaped, less than half the length of segment two. Labrum thin. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four reaching apex of meso or meta-coxa. Thorax: Pronotum less than twice as wide as long, dorsal surface swollen dorsally and convex, without a dorsal indentation separating the anterior and posterior portions, dorsal lateral margins narrowed anteriorly and widening distally forming a bell-shaped pronotum in dorsal view or straight and forming a trapezoidal shape in dorsal view. The lateral sides of the pronotum have a narrow to broad shelf-like carina along the medial line that extends from the first third of the length of the pronotum to along its entire length (Fig. 3-9: *Biromiris binjouri, Biromiris cassis*), the anterior portions weakly to easily visible dorsally. A thin, partially reflexed collar present. Mesoscutum obscured by the posterior margin of the pronotum, scutellum weakly protruding medially. Scent-gland taking up less than one-fourth the total area of the metepimeron. *Legs:* elongate, narrow, meta-femora with the widest diameter pre-apical to joint with meta-tibiae forming a knee-like hind femur. Claws of moderate length and width, pulvilli taking up less than half of claw length. Parempodia parallel and hair-like. *Hemelytra*: Elongate, lateral margins constricted medially, dorsally flat, with the lateral margins of the corium anterior the cuneus expanded to form a lobe over the fracture. Cuneus triangular, length approximately less than to greater than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, and with a partial thickening on the lateral margins of cuneus in the area occupied by the white margin. Abdomen: narrow for most of length, expanding in diameter to the pygophore. Pygophore taking up less than one-fifth to one third the total length of the abdomen.

GENITALIA: Endosoma: Relatively large, slender at base and wider at apex, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, weakly sclerotized, located at apex of endosoma. Phallotheca: C-shaped, relatively short at base, apex tapering to a narrow point (Schuh 1984: Fig. 760). Right Paramere: not examined. Left Paramere: Left paramere moderately sized; posterior process relatively wide, wider than base of the paramere, with spicules, directed ventrally with a concave curvature along the dorsal margin, relatively elongate compared to the anterior process; anterior process stout but without spicules on interior margin, dorsal surface sub equal to midline of the total height of the paramere; dorsal surface of median portion between anterior and posterior processes convex (Schuh 1984: Fig. 759).

Female: Unknown.

HOSTS: Unknown.

DISTRIBUTION: North and Eastern Australia, Indonesia and Papua New Guinea.

DISCUSSION: This genus was previously only known from Papua New Guinea, however, at least three new species have been identified in Australia based on synapomorphies of the pronotal carina, and the white process on the dorso-lateral surface of the metepisternum. The presence of terete third and fourth antennal segments and the double-chin-like gula that are synapomorphies of the Papua New Guinea species are also present in the Australian species *B. sheyville*.

Biromiris binjouri, new species

Figures (3-6, 3-9)

DIAGNOSIS: Recognized by the characters in the generic description, the small size, the dark-maroon to brown coloration, the lack of terete-shaped third and fourth antennal segments, the wide vertex, and the broad pronotal carina that is almost shelf-like on the lateral margins.

DESCRIPTION: *Male*: Macropterous, medium-sized, elongate, weakly medially constricted. Total length 3.12mm, width across pronotum 1.01, width across widest part of wings 0.99. COLORATION: Head brown. Eyes silverish. Labium brown with medial area lighter. First antennal segment golden, second antennal segment golden basally for first third, orangish brown medially for middle third, brown distally for last third, third antennal segment mostly yellow-oranges basally for approximately three-fourths of the total length and brown distally, fourth antennal segment completely brown. Pronotum, scutellum and thorax castaneous with the posterior margin of the pronotum dark brown. Scent gland same coloration as the thorax. Pro-coxae dark reddish with white margin basal to joint with pro-femora, meso-coxae brown basally, transparent white for remainder of length, meta-coxae dark basally and light distally at the margin with the meta-femora. Pro and meso-femora are brown, meta-femora a deeper brown red coloration. Anterior margin of corium dark brown along with anterior half of the clavus transitioning into a transparent partial fascia with a dark brown margin that takes up one-third of the total area of the anterior portion of the corium. Remainder of the hemelytron dark brown, lateral posterior margins of the hemelytra completely opaque, reddish brown. Over one-third of the total area of the cuneus is white posterior to the claval fracture, occupying less than one-third the total area of the cuneus, the posterior coloration darker reddish-brown than corium. Abdomen brown.

STRUCTURE: Clypeus projecting beyond the anterior margin of the frons in lateral view, barely visible in dorsal view. Vertex flat, with the posterior margin raised for the medial half and the lateral margins declining forming a shelf-like appearance, width nearly twice the width of one compound eye. Approximately one-third of the total height of the head is below the eyes. Length of antennal segment two greater than one and one-third times the total width of the head to twice the width of the head, weakly curving medially. Antennal segments three and four slender. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four reaching apex of meta-coxa. Pronotum less than twice as wide as long, dorsal surface swollen dorsally and convex, without a dorsal indentation separating the anterior and posterior portions, dorsal lateral margins nearly straight, forming almost a trapezoidal-shaped pronotum in dorsal view, lateral sides with a broad shelf-like carina along the medial line with the anterior portions visible dorsally as lateral extensions. Cuneal length approximately less than one-third the total length of the wing membrane. GENITALIA: not examined.

Female: unknown.

ETYMOLOGY: Named for the collecting locality of Binjour Plateau, masculine.

HOSTS: Unknown: vine scrub, pit-fall trap.

DISTRIBUTION: Southeast Queensland.

DISCUSSION: This species has the pronotal carina as a broad ridge unlike the narrow ridge found in most species of *Biromiris*. It is known only by the holotype specimen.

HOLOTYPE: **AUSTRALIA: Queensland:** Binjour Plateau, Swains Rd, 25.53333°S 151.5°E, 340 m, 23 Sep 1997 -21 Dec 1997, Cook and Monteith. 1♂ (00291236) (QM).

Biromiris bulolo Schuh

Biromiris bulolo Schuh, 1984: 208, figs. 686-687. (n. gen., diag., descr.)

DIAGNOSIS: Recognized by characters of the generic diagnosis, the concave posterior margin of the vertex, the relatively small size, the nearly straight lateral margins of the pronotum that form a trapezoidal-shaped pronotum in dorsal view, the terete third and fourth antennal segments, and the patches of erect, black setae.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea; unassociated females found in Northern Australia.

Discussion: I was able to examine recently collected specimens of this species from Papua New Guinea in which the patches of dark setae are unique among all the currently known species of *Biromiris*. Four female specimens of this species were identified from northern Australia but are not described until corresponding male specimens are found confirm that they are conspecific.

HOLOTYPE: **PAPUA NEW GUINEA: Morobe Prov.:** Bulolo, 282 m., August 13, 1956, E. J. Ford, Jr. 1♂ (BPBM). [not examined]

SPECIMENS EXAMINED: **AUSTRALIA: Queensland:** 3km NE Julatten, 16.35°S 145.22°E, 26 Sep 1980, J. C. Cardale, 1♀ (00168811) (ANIC). Bundaberg, 24.8694°S 152.35375°E, 10 m, 09 Dec 1904, Koebele, 2♀ (00318903, 00318904) (BPBM). Kuranda, 16.8172°S 145.635°E, 06 Jul 1919, F. X. Williams, 1♀ (00318905) (BPBM).

Biromiris cassisi, new species

Figures (3-6, 3-9)

DIAGNOSIS: Similar in hemelytral coloration patterning as *Biromiris binjouri* but recognized by the castaneous coloration of the head, thorax and legs, the relatively narrow pronotal carina and the larger size.

DESCRIPTION: *Male*: Macropterous, medium-sized, elongate, weakly medially constricted. Total length 3.22mm, width across pronotum 1.03, width across widest part of wings 1.04. COLORATION: Head castaneous. Eyes dark brown. Labium lighter brown. First antennal segment golden, second antennal segment golden basally and brown distally, third antennal segment light basally for approximately one-eighth of the total length and brown distally, fourth antennal segment completely brown. Pronotum, scutellum and thorax dark brown. Scent gland same coloration as the thorax. Pro-coxae dark reddish with white margin basal to joint with pro-femora, meso-coxae brown basally, transparent white for remainder of length, meta-coxae dark basally and light distally at the margin with the meta-femora. Pro and meso-femora brown, meta-femora missing in specimen. The pro and meso-tibiae are dark brown basally, light brown distally. Tarsomeres dark brown. Anterior margin of corium castaneous brown, the anterior half of the clavus transitioning into a transparent partial fascia with a dark brown margin that takes up one-third of the total area of the anterior portion of the corium, the dark margin extending across the median of the clavus. Remainder of the hemelytron castaneous, lateral posterior margins of the hemelytra completely opaque, reddish brown and the margin of the corium and the anterior of the membrane a darker brown. Over one-third of the total area of the cuneus is white posterior to the claval fracture, with the lateral margins possessing a reddish tinge, occupying less than one-third the total area of the cuneus, the posterior coloration darker reddish-brown than corium. Abdomen castaneous.

STRUCTURE: Clypeus projecting beyond the anterior margin of the frons in lateral view, barely visible in dorsal view. Vertex flat, width nearly one and one-half times the width of one compound eye. Approximately one-third of the total height of the head is below the eyes. Length of antennal segment two greater than one and one-third times the total width of the head, weakly curving medially. Antennal segments three and four slender. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four reaching apex of meta-coxa. Dorsal lateral margins of the pronotum nearly straight, forming almost a trapezoidal-shaped pronotum in dorsal view, lateral sides with a narrow shelf-like carina along the medial line with the anterior portions visible dorsally as lateral extensions. Scent-gland taking up less than one-fourth the total area of the metepimeron. Cuneus triangular, length approximately less than one-third the total length of the wing membrane. Pygophore taking up less than one-fifth the total length of the abdomen. GENITALIA: not examined.

Female: unknown.

ETYMOLOGY: Named for the collector Gerasimos Cassis.

HOSTS: Unknown.

DISTRIBUTION: New South Wales.

DISCUSSION: This species is only known from the male holotype and I did not dissect the male genitalia.

HOLOTYPE: **AUSTRALIA: New South Wales:** Cooloola N.P., 8km along road to Pooma Lake, Dec 1986, G. Cassis. 1♂ (00088850) (AM).

Biromiris cyclops Schuh

Biromiris cyclops Schuh, 1984: 209, Figs 686, 688. (n. gen., diag., descr.)

DIAGNOSIS: Recognized by characters of the generic diagnosis, the flat posterior margin of the vertex, the small size, the vertex being relatively narrow and nearly equal to the width of one compound eye, the narrowing of the anterior lateral margins of the pronotum relative to the posterior lateral margins forming a bell-shape in dorsal view, and the lack of patches of black setae on the hemelytron.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Indonesia.

Discussion: This species is most similar to *Biromiris bulolo* in external morphology and size, and is relatively small compared to the rest of the Indo-Pacific and Australian fauna. The lateral pronotal carina is also partially visible in dorsal view in *Biromiris cyclops*, which is not the case for the other two Indo-Pacific species, which is visible in the Australian *Biromiris* fauna.

HOLOTYPE: INDONESIA: West Irian: Cyclops Mountains, Ifar, 300m., June 22 1959. T.C. Maa. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **INDONESIA: Irian Jaya:** Cyclops Mountains, Ifar, 2.6°S 140.61°E, 300 m, 21 Jun 1959, T.C. Maa, Paratype, 1♀ (00321086) (BPBM). Ifar, W. Sentani, Cyclops Mountains, 200 m, 19 Jun 1959 -21 Jun 1959, T. C. Maa, 1♀ (00318944) (BPBM).

Biromiris enarotadi Schuh

Figure (3-6)

Biromiris enarotadi Schuh 1984: 209, fig. 686, 689-698 (n. sp., diag., descr., DV, figs. head-pronotum, MG, SEM)

DIAGNOSIS: Recognized by the relatively wide vertex, the orange-castaneous coloration, the large size and the relatively weakly swollen pronotum.

REDESCRIPTION: *Male*: Macropterous, medium to large-sized, elongate, medially constricted. Total length 3.56mm, width across pronotum 1.03, width across widest part of wings 0.99. COLORATION: Head orangish light-brown. Eyes dark purple. Labium completely orange. Antennal segments missing in specimen examined, however in original description cited as first antennal segment completely golden to golden basally, dark distally, second antennal segment brown, third and fourth antennal segments completely brown. Pronotum, scutellum and thorax orangish brown. Scent gland continuous in coloration with the thorax. Pro-coxae golden-orange, meso-coxae golden, meta-coxae dark red. Pro and meso-femora golden, meta-femora mostly dark red excluding apex with tibiae where golden. All tarsomeres are golden. Hemelytra orangish-castaneous, with a partial transparent transverse fascia on the anterior margin of the hemelytron possessing a dark posterior margin, occupying a wide band across the median of the anterior margin of the corium. The posterior lateral margins of the corium weakly transparent posterior to the median of the hemelytron, transitioning into a reddish-castaneous color anterior to the cuneal fracture. Over one-third of the total area of the cuneus posterior to the cuneal fracture white, the posterior coloration dark reddish-brown to brown. Membrane is light brown with weak dark brown pigmentation on the wing veins. Abdomen brown. STRUCTURE: Clypeus flush with the frons in lateral view, barely visible in dorsal view. Vertex flat, width greater than the width of one compound eye. Cyberial muscle attachment sites visible on the frons. Eyes weakly removed from the anterior margin of the vertex, the vertex partially visible in lateral view by the anterior surface of the eyes, the eyes taking up greater than half of the total height of the head, and the posterior margin of the eyes obscure the anterior margin of the pronotum. Approximately one-fourth of the total height of the head is below the eyes. Length of antennal segment two greater than one and one-half times the total width of the head to twice the width of the head. Antennal segments three and four terete.

Apex of the labium reaching the meso-coxa. Pronotum less than twice as wide as long, dorsal surface weakly swollen dorsally and convex, without a dorsal indentation separating the anterior and posterior portions, lateral margins nearly straight, forming almost a trapezoidal-shaped pronotum in dorsal view, lateral sides with a thin, carina-like ridge along the medial line (Schuh 1984: fig. 691). Scent-gland taking up less than one-fourth the total area of the metepimeron. Cuneus length approximately less than one-third the total length of the wing membrane.

GENITALIA: Pygophore: Relatively large, with the ventral surface nearly flat and the anterior surface declining, taking up one-third the total length of the abdomen. Endosoma: Relatively large, slender at base and wider at apex, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, weakly sclerotized, located at apex of endosoma. Phallotheca: C-shaped, relatively short at base, apex tapering to a narrow point (Schuh 1984: Fig. 760). Right Paramere: not examined. Left Paramere: Left paramere moderately sized; posterior process relatively wide, wider than base of the paramere, with sensory pits, directed ventrally with a concave curvature along the dorsal margin, relatively elongate compared to the anterior process; anterior process stout but without sensory pits on interior margin, dorsal surface sub equal to midline of the total height of the paramere; dorsal surface of median portion between anterior and posterior processes convex (Schuh 1984: Fig. 759).

Female: Unknown.

HOSTS: Unknown, collected at light trap.

Distribution: Indonesia, Queensland Australia.

Discussion: The specimen examined from Queensland is nearly identical to the paratypes from Papua New Guinea except is larger in size and lighter in coloration, the latter likely due to fading.

Holotype: INDONESIA: West Irian: Wisselmeren, Duroto E of Enarotadi, 1800 m., August 21, 1955, J.L. Gressit. 1♂ (BPBM). [not examined].

Specimens Examined: **AUSTRALIA: Queensland:** Forest Station, Bulburin State Forest via Many Peaks, 2000 m, 02 Apr 1972 - 05 Apr 1972, S. R. Monteith, 1♂ (00169265) (SAMA). **INDONESIA: Papua:** ***Paniai Division Co.:*** Wisselmeren: Enarotadi, 3.91669°S 136.35017°E, 2000 m, 02 Aug 1955, J. L. Gressitt, Paratype, 1♂ (00321087) (BPBM); 21 Aug 1955, J. L. Gressitt, Paratype, 1♂ (00321088) (BPBM).

Biromiris sheyville, new species

Figures (3-6)

Diagnosis: Recognized by the relatively strong medial constriction of the lateral hemelytral margins, being the only Australian *Biromiris* sp. with terete-shaped third and fourth antennal segments, the short second antennal segment, the yellowish coloration of the posterior apices of the clavus, the completely dark brown coxae, and the large size.

Description: *Male*: Macropterous, medium-sized, elongate, weakly medially constricted. Total length 3.56mm, width across pronotum 1.06, width across widest part of wings 0.99. COLORATION: Head dark brown. Eyes silver. First antennal segment golden, second antennal segment golden basally and light brown distally, third and fourth antennal segments completely brown. Pronotum, scutellum and thorax dark brown. Scent gland lighter in coloration than thorax. *Legs:* All coxae dark brown with white margin basal to joint with femora. Pro and meso-femora light brown, meta-femora darker brown. All tibiae are dark brown basally, golden distally, meta-tibiae also with parallel rows of dark spicules. Basal tarsomeres golden, dark brown for distal segments. Anterior margin of corium castaneous brown along with anterior half of the clavus, transitioning into a transparent partial fascia with a dark brown margin that takes up one-third of the total area of the anterior portion of the corium, the dark margin extending across the median of the clavus. Remainder of the hemelytron castaneous, lateral posterior margins of the hemelytra completely opaque, reddish brown and the margin of the corium and the anterior of the membrane a darker brown, posterior apices of clavus yellowish. Over one-fourth of the total area of the cuneus is white posterior to the claval fracture, with the lateral margins possessing a yellowish tinge, occupying less than one-fourth the total area of the cuneus, the posterior coloration darker reddish-brown than corium. Membrane dark brown with dark brown pigmentation around wing veins. Abdomen dark brown.

STRUCTURE: Clypeus projecting beyond the anterior margin of the frons in lateral view, barely visible in dorsal view. Vertex weakly concave, width nearly one and one-half times the width of one compound eye. Approximately one-third of the total height of the head is below the eyes. Antennal segments three and four terete-shaped. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four reaching apex of meta-coxa. Pronotum less than twice as wide as long, dorsal surface swollen dorsally and convex, without a dorsal indentation separating the anterior and posterior portions, dorsal lateral margins narrowed anteriorly and widening distally forming a bell-shaped pronotum in dorsal view, lateral sides with a narrow shelf-like carina along the medial line that extends only on the first third of the length of the pronotum and the anterior portions weakly visible dorsally. Scent-gland taking up less than one-fourth the total area of the metepimeron. Cuneus length approximately greater than one-third the total length of the wing membrane. Abdomen narrow for most of length, expanding in diameter to the pygophore. GENITALIA: Pygophore taking up less than one-fifth the total length of the abdomen. Remaining structures not examined.

Female: Unknown.

ETYMOLOGY: Named for the collecting locality of Scheyville, noun in apposition.

HOSTS: Myrtaceae, from pyrethrum fogging *Eucalyptus*.

DISTRIBUTION: Eastern New South Wales.

DISCUSSION: This species is only known from the male holotype and one other specimen from the same collecting event which is missing its head, pronotum, all appendages and abdomen and therefore is not designated as a paratype.

Holotype: **AUSTRALIA: New South Wales:** Scheyville, 33.607°S 150.885°E, Oct 1987, H. F. Recher, *Eucalyptus crebra* F. Muell. (Myrtaceae). 1♂ (00291399) (QDPI).

Other Specimens Examined: **AUSTRALIA: New South Wales:** Scheyville, 33.607°S 150.885°E, Oct 1987, H. F. Recher, *Eucalyptus moluccana* (Myrtaceae), 1♂ (00393674) (AM).

Blesingia Carvalho and Gross

Figures (3-5, 3-15, 3-27: A-B)

Blesingia Carvalho and Gross 1982: 42 (n. gen., descr., disc. key to spp.)

Pseudoleucophoroptera Schuh 1984: 235 (n. gen., diag., descr., disc.) NEW SYNONYMY

TYPE SPECIES: *Blesingia gularis* Carvalho and Gross, 1982 by original designation.

DIAGNOSIS: Recognized by the relatively elongate face with equal to greater than one-third of the total height of the head below the eyes, the medially constricted lateral margins of the hemelytron, the trapezoidal pronotum lacking a flattened pronotal collar on the anterior margin, the relatively elongate second antennal segment, the narrow and elongate hind-femora, the presence of a row of fringe-like setae on the meta-femora, and the posterior margin of the eyes obscuring the anterior margin of the pronotum.

REDESCRIPTION: *Male*: Macropterous, medium to large-sized, elongate, medially constricted. Total length 2.96-4.06mm, width across pronotum 0.94-1.12, width across widest part of wings 0.99-1.22. COLORATION: Brown, light brown and castaneous. <u>Head:</u> Brown. Eyes silver, dark brown or purple. Labium completely brown or with medial sections lighter in coloration. First antennal segment completely golden to golden basally, dark distally, second antennal segment brown, third antennal segment completely brown or light basally and brown distally, fourth antennal segment completely brown. <u>Thorax:</u> Pronotum, scutellum and thorax dark brown. Dorso-lateral margin of metepisternum and scent gland with a relatively narrow white band, width equal to about one-eighth of the total width of the scent gland to one fourth the width, scent gland either continuous in coloration with thorax or lighter in coloration. *Legs:* Pro-coxae entirely or partially white, meso-coxae reddish brown to brown, meta-coxae dark basally light distally for over half of the length to completely dark brown. Pro-femora golden to dark brown, mid femora light to dark brown, hind femora brown. The pro and meso-tibiae are basally dark brown, distally golden, with the meta-tibiae light apically at joint with meta-femora, dark brown for the remainder of the length or brown basally and golden distally, and with parallel rows of dark spicules. Basal tarsomeres golden and distal segments dark brown to all segments being dark brown. *Hemelytra:* Brown with a transparent transverse fascia on the anterior margin of the hemelytron occupying a narrow band across most of the anterior margin of the corium to most of the anterior surface, narrowing to a band across the clavus, with a dark brown posterior margin to the fascia that transverses across the entirety of the wing. The posterior-lateral margins of the corium dark brown to a reddish-castaneous color. The anterior margin of the cuneus and sometimes the posterior margin of the corium anterior to the cuneal fracture white with a yellowish tinge at the lateral margins, occupying less than one-fifth the total area of the cuneus to nearly one-third, the posterior coloration dark reddish-brown to brown. Abdomen: Brown.

SURFACE AND VESTITURE: Dorsal surface of body and hemelytron covered with long, light brown simple setae and short, silverish setae concentrated anterior and posterior to the transverse fascia of the hemelytron. The medial portion of the hemelytron and the median of the claval suture possess reflective patches. Postero-ventral surface of the meta-femora with a row of setae forming a distinctive fringe appearance.

STRUCTURE: Head: Dorsally clypeus partially visible to obscured by the frons in dorsal and lateral view. Area of head below eyes in anterior view relatively narrow and constricted laterally with a width just wider than the width of the vertex to narrower than the width of the vertex. Vertex weakly concave to flat, with the posterior raised for the medial half and the lateral margins declining forming a shelf-like appearance or completely flat, width equal to or less than width of compound eye. Eyes contiguous with the anterior margin of the vertex to weakly removed. Eye height greater than one and half the total height of the head, the vertex partially visible to obscured in lateral view by the anterior surface of the eyes, and the posterior margin of the eyes obscures the anterior margin of the pronotum. At least one-third the total height of the head below the eyes to up to half of the total height, gula short to elongate, flat. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head . Antennal segment two long and wider in diameter than segment one, increasing in diameter distally toward segment three. Length of antennal segment two greater than one and one-half times the total width of the head to twice the width of the head, weakly curving medially. Antennal segments three and four slender and less than half to one-third of the total length of segment two. Labrum thin to swollen, laterally compressed and blade-like, diameter less than the first labial segment. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four reaching apex of meso-to meta-coxae. Thorax: Pronotum less than twice as wide as long to nearly as long as wide, dorsal surface flat to weakly swollen dorsally on the posterior portion, with or without a dorsal indentation separating the anterior and posterior portions, lateral margins narrow anteriorly, widening posteriorly forming almost a bell-shaped pronotum in dorsal view to nearly straight and forming a trapezoidal-shaped pronotum. A thin, partially reflexed collar present. Mesoscutum exposed, scutellum weakly transversely rounded. Scent-gland taking up less than or equal to a third the total area of the metepimeron. *Legs:* elongate, narrow, meta-tibiae convexly curved near median and weakly laterally compressed medially to tubular and straight. Claws of moderate length and width, pulvilli taking up less than half of claw length . Parempodia parallel and hair-like. *Hemelytra*: Elongate, lateral margins weakly constricted medially, dorsally transversely rounded. Cuneus triangular, length approximately equal to one-third the total length of the wing membrane to less than one-fourth the length of the membrane, the cuneal fracture angled anteromesially, and with a partial thickening on the lateral margins of cuneus in the area occupied by the white margin in some taxa. Abdomen: narrow, elongate. GENITALIA: (Fig. 3-15): Pygophore: Relatively small and with a minute to small protuberance on the ventral-posterior surface, occupying about one-third to one-fourth the length of abdomen, ventral margin sloping upwards towards apex. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, weakly sclerotized or horse-collar shaped, located at apex of endosoma (Fig. 3-15 A, F, Schuh 1984: Fig. 782). Phallotheca: Of phyline type, fairly small, C- shaped, apex gently tapering toward a point (Fig. 3-15: B, H, Schuh 1984: Fig.

784). Right Paramere: Paramere relatively short, smaller than left paramere, parallel-sided, without an apical spine (Fig. 3-15: E). Left Paramere: Left paramere moderately sized; posterior process broad, with sensory pits, gently curving dorsally and with a convex dorsal margin, and relatively elongate compared to the anterior process; anterior process stout but without sensory pits on interior margin, dorsal margin below the median of the total height of the left paramere; dorso-medial margin flat and at a nearly forty-five degree angle to the base of the paramere (Fig. 3-15 G, Schuh 1984: Fig. 783) to convex (Fig. 3-15:C).

Female: Macropterous, medium-sized, medially constricted. Total length 2.97-3.56mm, width across pronotum 0.80- 0.96, width across widest part of wings 0.94-1.19. COLORATION: Similar patterning as males but with a much darker brown coloration and a larger portion of the cuneus white (Fig). SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Head: Clypeus not as produced as males, vertex convex, width slighter wider than the width of one compound eye. Eyes taking up less than half the total height of the head in lateral view to over one half, dorsal surface of the eyes continuous with the dorsum of the vertex to weakly removed. Gula more elongate and developed than in males. Antennal segment two long and more slender than segment one at basal joint with antennal segment one, increasing in diameter distally toward segment three, club-like in some females. Abdomen is parallel-sided, anterior half to one-fourth of the length posterior from thorax sharply declining ventrally, posterior half of abdomen parallel to the dorsal surface of the abdomen. Ovipositor spine present. The remaining characters are the same as males. GENITALIA (Fig. 3-27: A-B):

Vestibulum comprising of two separate, triangular-shaped sclerotized plates with no visible lateral tube, but with a thin apical sclerite that covers the entrance between the two vestibular sclerites. Sclerotized areas present on lateral margins of rami between dorsal and ventral labiate plates, rings weakly sclerotized (Fig. 3-27: B). Posterior wall mostly membranous, with posterior margin sclerotized across margin and possessing a medial invagination similar to *Aitkenia* (Fig 3-25:A), the lateral interramal plates sclerotized (Fig. 3-27: A).

HOSTS: Mostly Myrtaceae, but also recorded from Asteraceae, Chenopodiaceae, Lamiaceae, and Solanaceae.

DISTRIBUTION: Papua New Guinea and Australia.

DISCUSSION: *Blesingia* was described on the female-specimen based type species *Blesingia gularis*, female *Blesingia latezonata*, and male-specimen based *Blesingia tamborinea* and *Blesingia elegans*. *Blesingia latezonata* and *B. elegans* are found to be junior synonyms of *Leucophoroptera quadrimaculata* and are synonymized. Male specimens of *B. gularis* and *B. tamborinea* represented the genus in my phylogenetic analysis of the tribe (Chapter III). *Leucophoroptera fasciatipennis, Aitkenia grandis, Aitkenia cantrelli* and *Pseudoleucophoroptera* now are united in *Blesingia* (Node 12: Chapter III) and therefore are placed as new combinations or synonymized. Males are documented for the type species *B. gularis* and also for *B. fasciatipennis* (Poppius).

Blesingia cantrelli (Carvalho and Gross), new combination.

Figs (3-5, 3-9)

Aitkenia cantrelli Carvalho and Gross 1982: 44, figs. 70-72, 118C (n. sp., descr., DV, MG)

DIAGNOSIS: Overall morphology similar to *Blesingia gularis*, including relatively elongate head. However, the width of the vertex is narrower than *B. gularis*, the relatively swollen posterior area of the pronotum, the mostly dark brown meta-coxae, and the whitish scent-gland differentiate the two species.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate, medially constricted. Total length 2.96mm, width across pronotum 0.99, width across widest part of wings 0.94 (cited from original description). COLORATION: Light brown. Eyes dark brown to purplish. Labium mostly brown with medial lightening. First antennal segment golden basally, dark brown dorsally, second antennal segment dark brown, third antennal segment white for basal one-third of the length, remaining area brown, fourth antennal segment brown. Dorso-lateral margin of metepisternum with a thin white line, the scent gland is whitish. Pro-coxae white basally and dark distally for over half of the total length, meso-coxae dark brown, meta-coxae dark brown with white at distal margin with meta-femora. Pro-femora light, meso-femora dark brown, meta-femora absent in Specimens Examined. All tibiae are basally dark brown, distally golden. Basal tarsomeres golden brown, dark brown for the distal segments. Hemelytra primarily dark brown, with the anterior half of the dark brown, with a transparent transverse fascia on the anterior margin of the hemelytron occupying a thin strip of the posterior half of the anterior margin of the corium, and transverses as a thin strip across the median of the clavus, the posterior area of the clavus dark brown like the remaining area of the corium, the transverse fascia with a dark brown posterior margin to the fascia that transverses across the entirety of the wing. The anterior margin of the cuneus and part of the lateral margin white, occupying less than one-fifth the total area of the cuneus, the posterior coloration dark brown. STRUCTURE: Clypeus not visible in dorsal view, not surpassing the frons anteriorly in dorsal or lateral view. Area of head below eyes in anterior view constricted laterally and width wider than width of the vertex. Vertex convex, with the posterior margin flat, taking up less than one-third the total width of the head and less than half the width of one compound eye. Eyes removed from the anterior margin of the vertex, height greater than half the total height of the head, vertex not visible in lateral view. Greater than one-third the total height of the head below the eyes, gula is elongate, flat. Length of antennal segment two nearly one and three-quarters times the total width of the head, weakly curving medially. Labrum thickened but not laterally compressed. Apex of the first labial segment does not extend past the posterior margin of the head, apex reaching the base of the meso-coxae. Pronotum wider than long, posterior area of pronotum swollen and with the dorsal surface of the pronotum sharply angled ventrally, weakly demarcated between the anterior and posterior portions of the pronotum. Calli weakly visible. Scent gland taking up less than one-fifth the total area of the metepisternum. Width of the anterior margins of the hemelytron equal to the width of the posterior margins of the hemelytron. Cuneus nearly triangular with the lateral margins weakly angled inset relative to the lateral margins of the corium, angled inwards and relatively convex, length less about one-third the total length of the wing membrane. GENITALIA: (see Carvalho and Gross, 1982: Figs 70-72): Pygophore: not examined. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, weakly sclerotized, located at apex of endosoma. Phallotheca: not examined. Right Paramere: not examined. Left Paramere: Left paramere large; posterior process narrow for all of length, with sensory pits, and directed dorsally, relatively elongate compared to the anterior process; anterior process stout but without sensory pits on interior margin, distance between the dorsal margin of the posterior process and the dorsal surface of the anterior process less than half the total height of the paramere; angle of dorsal margin of main body uniting the anterior and posterior process nearly straight and at a nearly 45 degree angle to the base.

Female: Unknown.

HOSTS: Unknown.

DISTRIBUTION: North Queensland.

DISCUSSION: I was able to view images of the holotype of this species only, and the description of the male genitalia is based on the original illustrations. Superficially this species looks similar to *B. gularis*, but the differences in the shape of the left paramere, the relatively narrow vertex, and the coloration of the coxae indicates they are separate taxa.

HOLOTYPE: **AUSTRALIA: North Queensland:** Split Rock, 14km S. of Laura, 23-26.vi.1975. G.B. Monteith 1♂ (QM).

Blesingia fasciatipennis (Poppius), new combination.

Figures (3-5, 3-9, 3-15:A-C)

Leucophoroptera fasciatipennis Poppius, 1921, p 57 (n.sp.),

Blesingia fasciatipennis (Poppius), Carvalho and Gross, 1982, p 48, fig. 122. (n. comb., descr., disc., DV); Schuh, 1984 (disc.).

DIAGNOSIS: Recognized by the orange-reddish colored interior of the clavus, the overall castaneous and brownish coloration, the relatively short head with less than one-half of the total area of the head below the eyes, and characters of the male genitalia.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate, medially constricted. Total length 3.37-3.61mm, width across pronotum 0.95-1.02, width across widest part of wings 0.99-1.19. COLORATION: Brown, light brown and castaneous. Eyes deep red to purple. Labium brown. First antennal segment golden, second antennal segment brown, third antennal segment light basally for approximately one-forth the total length and brown distally for the remaining length, fourth antennal segment completely brown. Dorso-lateral margin of metepisternum and scent gland with a relatively narrow white band, width equal to about one-fifth of the total width of the scent gland. Pro-coxae golden, meso-coxae reddish brown, meta-coxae dark basally light distally for less than half of the total length. Pro-and meso-femora light brown, meta-femora dark brown. The pro and meso-tibiae are basally dark brown, distally golden, with the meta-tibiae light apically at joint with meta-femora then dark brown until the median of the length where it transitions to golden and with parallel rows of dark spicules. Tarsomeres golden brown. Hemelytra mostly brown, with the anterior half of the clavus orange, with a transparent transverse fascia on the anterior margin of the hemelytron occupying most of the anterior margin of the corium and transverses the median of the clavus, the posterior area of the clavus dark brown like the remaining area of the corium, the transverse fascia with a dark brown posterior margin to the fascia that transverses across the entirety of the wing. The posterior-lateral margins of the corium a reddish-castaneous or dark brown in coloration above the cuneal fracture. The anterior margin of the cuneus and part of the lateral margin white, occupying less than one-fifth the total area of the cuneus, the posterior coloration dark brown. Membrane light brown, wing veins without pigmentation.

STRUCTURE: Clypeus not visible in dorsal view, not surpassing the frons anteriorly in dorsal or lateral view. Area of head below eyes in anterior view constricted laterally but width wider than width of the vertex. Vertex weakly concave, with the posterior margin flat. Eyes strongly removed from the anterior margin of the vertex, height greater than half the total height of the head, obscuring the vertex in lateral view, the posterior margin of the eyes obscures the anterior margin of the pronotum. Less than one-third the total height of the head below the eyes, gula is short, flat. Length of antennal segment two greater than one and one-half times the total width of the head, weakly curving medially. Labrum slender, not laterally compressed. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four reaching apex of meta-coxa. Pronotum less than twice as wide as long, dorsally surface flat and lacking a dorsal demarcation between the anterior and posterior portions of the pronotum, lateral margins straight and forming a trapezoidal shape in dorsal view. Calli weakly visible. Scent-gland taking up approximately a third the total area of the metepimeron. Hemelytron lateral posterior margins wider than the posterior margin of the pronotum. Cuneus nearly triangular with the lateral margins weakly angled inwards and convex, length less than one-third the total length of the wing membrane, and with a partial thickening on the lateral margins of cuneus in the area occupied by the white margin. GENITALIA: (Fig3-15 A-C): Pygophore occupying about one-fourth length of abdomen, ventral margin of pygophore weakly sloping upwards towards apex. Secondary gonopore sclerotized, forming a horse-collar shape. Posterior process of left paramere relatively narrow for genus, the dorso-medial margin between the anterior and posterior processes convex anterior to the anterior process, the dorsal surface of the anterior process ventral to the median of the total height of the left paramere (Fid 3-15: C).

Female: Macropterous, medium-sized, medially constricted. Total length 3.07-3.56mm, width across pronotum 0.93- 0.96, width across widest part of wings 1.01-1.19. COLORATION: Similar patterning as males but with a much darker brown coloration and a larger portion of the cuneus white (Fig). SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Clypeus weakly produced and anterior to frons, sometimes visible in dorsal view. Vertex convex, width slighter wider than the width of one compound eye. Eyes taking up over half the total height of the head in lateral view, dorsal surface of the eyes continuous with the dorsum of the vertex. Height of head below eyes greater in females than males taking up at least one-third the total height of the head, the gula is more developed, elongate and flat. Antennal segment two long and more slender than segment one at basal joint with antennal segment one, increasing in diameter distally toward segment three. Length of antennal segment two at least one and one-third times the total width of the head. Ventral surface of abdomen parallel to dorsal surface for greater than three-fourths of the posterior length. The remaining characters are the same as males.

HOSTS: Mostly Myrtaceae, also Asteraceae, Chenopodiaceae, Lamiaceae, and Solanaceae.

DISTRIBUTION: Throughout Australia.

DISCUSSION: This species was one of the initial two species described by Poppius (1921) in *Leucophoroptera*. The location of the holotype was found to be in the Finnish Museum of Natural History (Museum of Zoology Helsinki) rather than the Hungarian Museum as cited in the original literature. Carvalho and Gross (1982) placed this species with *Blesingia* presumably based on the elongate head and the narrow vertex. Schuh (1995) moved *L. fasciatipennis* back into *Leucophoroptera*, however in my analysis of the tribe *L. fasciatipennis* is not closely related to type species *Leucophoroptera quadrimaculata*, and instead groups in a clade with the *Blesingia* type-species of *Blesingia gularis*. Therefore *L. fasciatipennis* is moved back into *Blesingia*. My association of recently collected male specimens with type female is based on finding females collected with males identical to the original description and an image of the holotype taken by Schuh (available on the PBI locality database and Discover Life website www.discoverlife.org).

HOLOTYPE: **AUSTRALIA: New South Wales**: Rylston. 1 ♀ (ZMUH). [not examined]

SPECIMENS EXAMINED: **AUSTRALIA: New South Wales:** 9.5 km E of Balranald on Sturt Hwy, 34.702°S 143.615°E, 20 Oct 1996, Schuh and Cassis, *Atriplex nummularia omissa* Aellen (Chenopodiaceae), det. PERTH staff PERTH 05054680, 1♂ (00272032) (AMNH). Ashfield, 33.8991°S 151.1246°E, 02 Feb 1980, D. A. Doolan, 1♀ (00291395) (QDPI). Binalong, 18 Mar 1959, E. Lewis, 1♂ (00393649) (AM). Booti Booti NP, 32.27972°S 152.52444°E, 14 Nov 1996, L. Wilkie, *Leptospermum laevigata* (Gaertn.) F. Muell. (Myrtaceae), 3♀ (00274194, 00274192, 00274193) (AM); 29 Apr 1997, L. Wilkie, *Monotoca elliptica* (Sm.)R.Br. (Myrtaceae), 1♂ (00274190) (AM); 03 Apr 1998, L. Wilkie, *Chrysanthemoides monilifera* (L.) Norlindh (Asteraceae), 1♂ (00274189) *Leptospermum laevigata* (Gaertn.) F. Muell. (Myrtaceae), 1♂ (00274188) (AM). Botany Bay, 34.01657°S 151.22799°E, 35 m, 1900, Biro, 1♀ (00099712) (MZH). Broken Hill, 31.95°S 141.4333°E, 303 m, Feb 1964, P. W. Shepherd, 1♂ (00393653) (AM). Kinchega National Park, Cawndilla Campground, 32.55001°S 142.2°E, 100 m, 28 Oct 1995, Schuh and Cassis, *Eucalyptus largiflorens* F.Muell. (Myrtaceae), det. K.D. Hill 1996 NSW 395954, 2♂ (00274278, 00274280), 6♀ (00274274 - 00274277, 00274279, 00274283) (AM), *Eucalyptus largiflorens* F.Muell. (Myrtaceae), det. K.D. Hill 1996 NSW 395954, 6♂ (00272797, 00272799, 00272802, 00272804 - 00272806), 10♀ (00272796, 00272798, 00272800 - 00272801, 00272803, 00272807 - 00272811)

(AMNH). Myall Lakes National Park, 32.487°S 152.39216°E, 14 Dec 1996, L. Wilkie, *Leptospermum laevigatum* (Gaertn.) F. Muell. (Myrtaceae), 1♀ (00274186) (AM); 01 Jun 1997, L. Wilkie, 1♀ (00274187) (AM); 04 Apr 1998, L. Wilkie, *Leptospermum laevigatum* (Gaertn.) F. Muell. (Myrtaceae), 1♀ (00274191) (AM). **Queensland:** Mid. Queensland, 1942, Unknown, 3♀ (00345586 - 00345588) (BMNH). mid.Queensl, 1942, Unknown, 3♀ (00354486, 00354488 - 00354489) (BMNH). Brisbane, 27.46785°S 153.02801°E, 20 Nov 1935, H. Hacker, 1♀ (00291397) (QDPI). Cape York Peninsula, 24.5km SE of Laura, 15.68297°S 144.59136°E, 127 m, 25 May 2006, Cassis, Barrow, Finlay, Symonds, 2♂ (00392740, 00392741) (AMNH). **South Australia:** 15kms W. Tailem Bend, 12 May 1980, G., J. & A. Holloway, 1♀ (00291394) (QDPI). Oraparinna Nat. Pk. nr Oraparinna Crk., 15 Jun 1978, J. A. Forrest, 1♀ (00169259) (SAMA). Tea Tree Swamp, 6mi W of Warooka, 27 Jan 1962, P. Aitken, 1♀ (00169263) (SAMA). **Tasmania:** 0.5 km SE of Couta Rocks: 'Murphy's Spring', terminus of C214, Mick Murphy's House, 41.18012°S 144.68716°E, 8 m, 24 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Melaleuca ericifolia* Sm. (Myrtaceae), det. Field ID, 1♀ (00108591) (AMNH). Pelion Hut, 3 km S Mt. Oakleigh, 41.83333°S 146.05°E, 18 Nov 1991 -23 Nov 1991, E. Nielsen, G. Clark, 1♂ (00291396) (QDPI). **Western Australia:** 63km EbyN of Norseman, 06 May 1983, E. S. Nielson & E. D. Edwards, 1♂ (00168813) (ANIC). Forest Grove Road, 0.9 km E of Caves Road, 34.07227°S 115.0462°E, 60 m, 15 Dec 1997, Schuh, Cassis, Brailovsky, *Kunzea glabrescens* Toelken (Myrtaceae), det. PERTH staff PERTH 05056330, 3♀ (00274130 - 00274132) (AM). Mosman Park, Perth, 32.0209°S 115.7687°E, 20 m, 24 Nov 1998, G. Cassis, *Agonis flexuosa* (Willd.) Sweet

(Myrtaceae), 3♀ (00196039 - 00196040, 00196042) (AM); 30 Nov 1998, G. Cassis, *Hemiandra glabra* Benth. (Lamiaceae), 8♀ (00196028 - 00196035) (AM); 05 Dec 1998, G. Cassis, *Eucalyptus* sp. (Myrtaceae), 2♀ (00196041, 00196044) (AM), *Hemiandra glabra* Benth. (Lamiaceae), 4♂ (00196022 - 00196024, 00196027), 2♀ (00196025, 00196026) *Agonis flexuosa* (Willd.) Sweet (Myrtaceae), 2♂ (00196037, 00196038) (AMNH); 15 Nov 1999, R.T. Schuh and G. Cassis, *Eucalyptus* sp. (Myrtaceae), det. PERTH staff PERTH 05670969, 1♂ (00202588), 1♀ (00202589) (WAMP). Perth, 31.9333°S 115.8333°E, 32 m, 07 Dec 1971, J. A. Slater, *Melaleuca rhaphiophylla* Schauer (Myrtaceae), 1♂ (00195659) (AMNH). Roebuck Plains, 17.96°S 122.435°E, 21 Jul 1996 -24 Jul 1996, N. Reygaert, 2♂ (00393654, 00393655) (AM).

Blesingia grandis (Carvalho and Gross), new combination.

Figure (3-5)

Aitkenia grandis Carvalho and Gross 1982: 45, figs. 73-75, 120 (n. sp., descr., DV, MG)

DIAGNOSIS: Coloration similar to *Blesingia tamborinea*, but much larger in size, all of the femora are completely dark brown, and the width of the anterior portion of the hemelytron is equal in width to the posterior portion.

REDESCRIPTION: *Male*: Macropterous, large, elongate, medially constricted. Total length 4.06mm, width across pronotum 1.12, width across widest part of wings 1.22 (cited from original description). COLORATION: Dark brown. Eyes silverish. Labium mostly brown with medial lightening. First antennal segment golden basally, dark brown distally, remaining segments dark brown. Dorso-lateral margin of metepisternum and scent gland with a broad white margin equivalent in width to half the width of the scent gland. Pro-coxae white with a reddish tinge distally, meso-coxae dark brown, meta-coxae light basally, dark distally for less than half of the total length. All femora dark brown. All tibiae are basally dark brown, distally golden, the meta-femora also with parallel rows of dark spicules and lighter coloration at joint with meta-femora. Basal tarsomeres golden brown, dark brown for the distal segments. Hemelytra primarily dark brown with a transparent transverse fascia on the anterior margin of the hemelytron occupying the posterior half of the anterior margin of the corium, and transverses as a thin strip across the median of the clavus, the posterior area of the clavus dark brown like the remaining area of the corium, the transverse fascia with a dark brown posterior margin to the fascia that transverses across the entirety of the wing. The anterior margin of the cuneus and part of the lateral margin white, occupying less than one-fourth the total area of the cuneus, the posterior coloration dark brown. Membrane light brown, wing veins without pigmentation.

STRUCTURE: Clypeus weakly visible in dorsal view, barely surpassing the frons anteriorly in dorsal or lateral view. Area of head below eyes in anterior view constricted laterally and width wider than width of the vertex. Vertex convex, with the posterior margin flat, taking up less than one-third the total width of the head and less than the width of one compound eye. Eyes weakly removed from the anterior margin of the vertex, height greater than half the total height of the head, vertex not visible in lateral view, the posterior margin of the eyes obscures the anterior margin of the pronotum. Greater than one-third the total height of the head below the eyes, gula is relatively intermediary-sized in length for the genus, flat. Length of antennal segment two greater than one and one-half times the total width of the head, weakly curving medially. Labrum thickened at base for one half of the length of the buccula but not laterally compressed, the remaining of the length slender. Apex of the first labial segment does not extend past the posterior margin of the head, the apex of segment four reaching apex of meso-coxa. Pronotum as wide as long, posterior area of pronotum swollen and with the dorsal surface of the pronotum sharply angled ventrally, lacking a dorsal demarcation between the anterior and posterior portions of the pronotum, lateral margins straight and forming a trapezoidal shape in dorsal view. Calli weakly visible. Scent gland not visible in specimen examined. Meta-tibiae straight and tubular. Anterior margins of the hemelytron nearly equal in width to the posterior margins of the hemelytra, dorsally transversely rounded. Cuneus nearly triangular with the lateral margins weakly angled inwards and convex, length less about one-third the total length of the wing membrane, the cuneal fracture angled anteromesially.

GENITALIA: (see Carvalho and Gross, 1982: Figs 73-75): Pygophore not examined. Posterior process of left paramere wide and tapering to a point subapically, apex directed ventrally, relatively elongate compared to the anterior process; anterior process stout, distance between the dorsal margin of the posterior process and the dorsal surface of the anterior process approximately at the median of the total height of the paramere; angle of dorsal margin of main body uniting the anterior and posterior process nearly straight and perpendicular to the base.

Female: Unknown.

HOSTS: Unknown.

DISTRIBUTION: Victoria.

DISCUSSION: Both the holotype specimen (not examined) and the paratype examined of this species are teneral; therefore I did not dissect the paratype to re-examine the genitalia. I redescribed the main features I could discern from the original illustrations and the external morphology of the paratype.

HOLOTYPE: **AUSTRALIA: Victoria**: 6km S. of Warburton, 27.ii.1976, A. Neboiss. 1 ♂ (MVMA)

SPECIMENS EXAMINED: **AUSTRALIA: Victoria:** 6km S. of Warburton, 27 Feb 1976, A. Neboiss, Paratype, 1♂ (00392783) (MVMA).

Blesingia gularis Carvalho and Gross

Figures (3-5, 3-15: E-H, 3-27: A-B)

Blesingia gularis Carvalho and Gross 1982: 47, fig. 121 (n. sp., descr., DV)

DIAGNOSIS: Recognized by the brown and white coloration of the wings, the long brown simple setae, the elongate head with a correspondingly long, flat gula, the expanded and laterally compressed basal area of the labrum, the white pro-femora, and the male genitalia.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate, medially constricted. Total length 3.32-3.76mm, width across pronotum 1.02-1.16, width across widest part of wings 1.01-1.04. COLORATION: Brown, light brown and castaneous. Eyes deep red to purple. Labium brown. First antennal segment golden, second antennal

segment brown, third antennal segment light basally for approximately half of length and brown distally, fourth antennal segment completely brown. Dorso-lateral margin of metepisternum and scent gland with a relatively narrow white band, width equal to about one-eighth of the total width of the scent gland. Pro-coxae white, meso-coxae reddish brown, meta-coxae dark basally light distally for over half of the length. Pro-femora golden and sometimes with a dark brown anterior margin, meso and meta-femora brown. The pro and meso-tibiae are basally dark brown, distally golden, with the meta-tibiae light apically at joint with meta-femora, dark brown for the remainder of the length and with parallel rows of dark spicules. Tarsomeres dark brown. Hemelytra brown with a transparent transverse fascia on the anterior margin of the hemelytron occupying most of the anterior margin of the corium and most of the median of the clavus, the anterior margins of the clavus being a darker brown than the corium, with a dark brown posterior margin to the fascia that transverses across the entirety of the wing. The posterior-lateral margins of the corium a darker brown color anterior to the cuneal fracture. The anterior margin of the cuneus and part of the lateral margin white with a yellowish tinge at the lateral margins, occupying less than one-third the total area of the cuneus, the posterior coloration dark brown. Membrane brown, wing veins with dark brown pigmentation.
STRUCTURE: Dorsally clypeus partially visible, surpassing the frons anteriorly in dorsal view. Area of head below eyes in anterior view relatively narrow and constricted laterally, width approximately same width as vertex. Vertex weakly concave, with the posterior margin raised for the medial half and the lateral margins declining, forming a shelf-like appearance, width less than width of compound eye. Eyes weakly removed

from the anterior margin of the vertex. Eye height greater than one and half the total height of the head, obscuring the vertex in lateral view, the posterior margin of the eyes obscures the anterior margin of the pronotum. Nearly one-half of the total height of the head the head below the eyes, gula is elongate, flat. Length of antennal segment two greater than one and one-half times the total width of the head, weakly curving medially. Labrum laterally compressed and blade-like, diameter less than the first labial segment. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four reaching apex of meso-coxa. Pronotum less than twice as wide as long, weakly swollen dorsally on the posterior portion but without a dorsal indentation separating the anterior and posterior portions, lateral margins narrow anteriorly, widening posteriorly forming almost a bell-shaped pronotum in dorsal view. Scent-gland taking up less than a third the total area of the metepimeron. Meta-tibiae convexly curved near median and weakly laterally compressed medially. Hemelytral posterior margins wider than the posterior margin of the pronotum, dorsally transversely rounded. Cuneus triangular, length approximately equal to one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, and with a partial thickening on the lateral margins of cuneus in the area occupied by the white margin.

GENITALIA: (Fig. 3-15 E-H): Pygophore occupies about one-fifth the total length of abdomen. Posterior process of left paramere relatively broad, gently curving dorsally, anterior process stout and with dorsal margin near the midline for the total height of the paramere, dorso-medial margin nearly straight and angled at a 45 degree angle compared to base of paramere (Fig. 3-15: G).

Female: Macropterous, medium-sized, medially constricted. Total length 2.97-3.22mm, width across pronotum 0.80- 0.88, width across widest part of wings 0.94-1.06. COLORATION: Similar patterning as males but with a much darker brown coloration and a larger portion of the cuneus white and the fore-femora sometimes being complete dark brown (Fig). SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Head: Clypeus flush with the frons in lateral view, not visible in dorsal view. Vertex convex, width slighter wider than the width of one compound eye. Eyes taking up less than half the total height of the head in lateral view, dorsal surface of the eyes continuous with the dorsum of the vertex. Gula elongate and developed as in males, greater than half the total height of the head below the eyes. Antennal segment two, club-like. Length of antennal segment two one and one-fifth times the total width of the head. Pronotum forming stronger bell-shape when viewed dorsally than males. Abdomen parallel-sided, anterior half posterior from thorax sharply declining ventrally, posterior half of abdomen parallel to the dorsal surface of the abdomen.

HOSTS: Mostly Solanaceae; also on Fabaceae.

DISTRIBUTION: Northern Australia.

DISCUSSION: *Blesingia gularis* was described based on female specimens (Carvalho and Gross 1982). With the recent collecting efforts of Randall Schuh and Gerasimos Cassis, males are now associated with this taxon and both sexes are documented and illustrated. Superficially *Blesingia gularis* looks like members of *Gulacapsus*, but the gula in the latter taxon is a defined keel that extends posteriorly past the posterior margins of the eyes, whereas in *B. gularis* the gula is flat and does not extend past the eyes. Further, *B. gula* lacks the flattened pronotal collar of most *Gulacapsus* spp.

HOLOTYPE: **AUSTRALIA: Northern Territory:** Warlock Ponds, 23.viii.1964, T.E. Woodward. 1♂ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: Queensland:** 8.2 km E of Mungallala, 26.46401°S 147.6248°E, 560 m, 31 Oct 1998, Schuh, Cassis, Silveira, *Solanum cf. nemophilum* F. Muell. (Solanaceae), det. Det: Royal Bot Gard. NSW NSW427370, 7♂ (00393624 - 00393630), 15♀ (00393631 - 00393645) (AM), *Solanum cf. nemophilum* F. Muell. (Solanaceae), det. Det: Royal Bot Gard. NSW NSW427370, 9♂ (00058600, 00196045 - 00196051, 00196388), 24♀ (00195664, 00196052 - 00196053, 00196389, 00196391, 0197199, 00392742 - 00392759) (AMNH). Cape York Peninsula, 24.5km SE of Laura, 15.68297°S 144.59136°E, 127 m, 25 May 2006, Cassis, Barrow, Finlay, Symonds, 1♀ (00195667) (AMNH). ca. 30km SE of Chillagoe, on Burke Developmental Rd, 17.36519°S 144.71405°E, 547 m, 01 Jun 2006, Cassis, Barrow, Finlay, Symonds, *Tephrosia macrostachya* (Benth.) Domin (Fabaceae-Faboideae), det. RBG staff, 1♂ (00393779), 2♀ (00393777, 00393778) (AM). **Western Australia:** ca. 25 km W of Towrana Homestead, on Pimbee Rd, Pimbee Conservation Park, 25.47776°S 115.0497°E, 183 m, 04 Nov 2004, Cassis, Weirauch, Tatarnic, Symonds, *Solanum lasiophyllum* Poir. (Solanaceae), det. PERTH staff PERTH6989276, 1♀ (00195700) (AMNH).

Blesingia promeceops (Schuh), new combination.

Pseudoleucophoroptera promeceops Schuh 1984: 239, figs. 772, 774, 780, 781 (n. sp., diag., descr., DV, figs. head-pronotum)

DISCUSSION: This species is recognized by the elongate face much like *Blesingia gularis* and *Blesingia cantrelli* (the area of the head below the eyes is greater than 1/3 the total height of the head), but it is distinct in having the second antennal segment nearly twice as long as the width of the head, the ridge-like carina on the face (Schuh 1984: Fig. 781), the lack of a white anterior margin of the cuneus, and the small size of the cuneus relative to the wing membrane.

Female: Unknown.

HOSTS: Unknown, collected in light traps.

DISTRIBUTION: Solomon Islands.

HOLOTYPE: **SOLOMON ISLANDS: SE Santa Ysabel:** Tatamba, 0-50m., September 8, 1964, light trap, R. Straatman, 1 ♂ (BPBM). [not examined]

SPECIMENS EXAMINED: **SOLOMON ISLANDS: Guadalcanal:** Gold Ridge-Suta (Jonapau), 9.5996°S 160.18426°E, 868 m, 26 Jun 1956, J. L. Gressitt, 1♀ (00321073) (BPBM).

Blesingia mamai (Schuh), new combination.

Pseudoleucophoroptera mamai Schuh 1984: 238, figs. 773, 775-779, 782-784 (n. sp., diag., descr., DV, figs. MG)

DISCUSSION: This species externally looks very similar to *Blesingia fasciatipennis* as noted by Schuh (1984), however the predominant dark brown coloration, the second antennal segment being nearly twice the width of the head, the relatively short area of the head below the eyes (one-fifth the total height of head below the eyes), the round meta-tibiae, and the posterior margin of the corium abutting the cuneal fracture also white along with the anterior of the cuneus clearly differentiate it from the other species of *Blesingia*.

Female: Unknown.

HOSTS: Unknown, collected by traps.

DISTRIBUTION: Papua New Guinea.

HOLOTYPE: **PAPUA NEW GUINEA: Central Province:** Mamai Plantation E of Port Glasgow, 150m, February 13 1965, R. Straatman collector. 1 ♂ (BPBM). [not examined]

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: Central Province:** Mamai Platn., E of Prt Glasgow, 10.26666°S 149.5°E, 46 m, 13 Feb 1965, R. Straatman, Paratype, 1♂ (00321071) (BPBM). **Southern Highlands:** Koroba, 40km W of Tari, 5.70341°S 142.73146°E, 1727 m, 19 Sep 1963, R. Straatman, Light Trap, Paratype, 1♂ (00321072) (BPBM).

Blesingia tamborinea Carvalho and Gross

Figures (3-5, 3-16)

Blesingia tamborinea Carvalho and Gross 1982: 50, figs. 79-81, 125 (n. sp., descr., DV, MG).

DIAGNOSIS: Recognized by the wide anterior portion of the hemelytron, the relatively swollen posterior margin of the pronotum, and the thickened base of the labrum.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate, medially constricted. Total length 3.12mm, width across pronotum 0.98, width across widest part of wings 1.09. COLORATION: Brown, light brown and castaneous. Eyes deep red to purple. Labium brown. First antennal segment golden basally, dark brown distally, remaining segments dark brown. Dorso-lateral margin of metepisternum and scent gland with a wide white band, width at widest point equal to about one-half of the total width of the scent gland. Pro-coxae white with a reddish tinge distally, meso-coxae reddish brown, meta-coxae dark basally light distally for less than half of the total length. Pro- and meso-femora light brown, meta-femora dark brown. All tibiae are basally dark brown, distally golden, the meta-femora also with parallel rows of dark spicules. Basal tarsomeres golden brown, dark brown for the distal segments. Hemelytra dark brown with a transparent transverse fascia on the anterior margin of the hemelytron occupying most of the anterior margin of the corium and transverses the median of the clavus, the posterior area of the clavus dark brown like the remaining area of the corium, the transverse fascia with a dark brown posterior margin to the fascia that transverses across the entirety of the wing. The anterior margin of the cuneus and part of the lateral margin white, occupying less than one-fourth the total area of the cuneus, the posterior coloration dark brown. STRUCTURE: Clypeus not visible in dorsal view, not surpassing the frons anteriorly in dorsal or lateral view. Area of head below eyes in anterior view weakly constricted laterally and width wider than width of the vertex. Vertex convex, with the posterior margin flat, width nearly equal to the width of one compound eye and less than one-third the total width of the head. Eyes weakly removed from the anterior margin of the vertex, height greater than half the total height of the head, vertex visible in lateral view. Greater than one-third the total height of the head below the eyes, gula is short, flat. Length of antennal segment two greater than one and one-half times the total width of the head, weakly curving medially. Labrum thickened at base for one half of the length of the buccula but not laterally compressed, the remaining of the length slender. Apex of the first labial segment does not extend past the posterior margin of the head, the apex of segment four reaching apex of meso-coxa. Pronotum less than twice as wide as long, posterior area of pronotum swollen and with the dorsal surface of the pronotum sharply angled ventrally, lacking a dorsal demarcation between the anterior and posterior portions of the pronotum, lateral margins straight and forming a trapezoidal shape in dorsal view, Scent-gland taking up approximately one half of the total area of the metepimeron. Meta-tibiae straight and tubular. Anterior lateral margins of the hemelytron wider than the posterior margins. Cuneus nearly triangular with the lateral margins weakly angled inwards and convex, length less about one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, and with a partial thickening on the lateral margins of cuneus in the area occupied by the white margin. GENITALIA (Figure 3-16): Pygophore: Relatively small and with a small protuberance on the ventral-posterior surface, occupying about one-third the total length of abdomen, ventral margin of pygophore weakly sloping upwards towards apex. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, weakly sclerotized or horse-collar shaped, located at apex of endosoma (Carvalho and Gross, 1982: Fig. 79). Phallotheca: C- shaped, apex gently tapering toward a point (Fig. 3-16: A). Right Paramere: Paramere moderately sized, smaller than left paramere, parallel-sided (Fig. 3-16: B). Left Paramere: Left paramere moderately sized; posterior process of medium width and gently curving ventrally, relatively elongate compared to the anterior process (Fig. 3-16: C; Carvalho and Gross, 1982: Fig. 80).

Female: Unknown.

HOSTS: Unknown, collected at M.V. light.

DISTRIBUTION: Queensland.

NOMENCLATURAL NOTES: *Blesingia tamborinea* was spelled two different ways in the original work: *Blesingia tamborinea* in the description and illustrations and *Blesingia tamborinie* in the key and introduction. As first reviser I select *Blesingia tamborinea* as the correct spelling due to its association with the original description.

DISCUSSION: The holotype specimen of this species is badly damaged, with the legs glued separately on the card, the abdomen and one half of the wing missing (Fig. 3-16). However, the shape of the pronotum, the antennal coloration, and the overall coloration still allowed for the identification of one additional specimen. The male genitalia are described based on the original description and images of the genitalia from the holotype, because the additional specimen examined is the only intact specimen for the species and I therefore chose not to dissect it.

HOLOTYPE: **AUSTRALIA: Queensland:** Tamborine Mountain, 17.iii.1964, G. Monteithi. 1♂ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: Queensland:** Kenmore, 08 Jan 1977, M.A. Schneider, 1♂ (00393672) (AM).

Collessicoris Carvalho and Gross

Figures (3-7, 3-17, 3-27: C-D)

Collessicoris Carvalho and Gross 1982: 53 (n. gen., descr.)

TYPE SPECIES: *Collessicoris bellissimus* Carvalho and Gross, by original designation.

DIAGNOSIS: Recognized by the relatively flat, wide head, the yellow transverse fascia in addition to the white transverse fascia, the presence of long, erect setae without hemelytral punctation, and the flat hemelytral margins. Females recognized by the wide head that is nearly as wide as the width of the posterior margin of the pronotum, the club-like second antennal segment, and the brachypterous wings.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate, weakly medially constricted. Total length 2.92-3.07mm, width across pronotum 0.88- 0.89, width across widest part of wings 0.92- 0.94. COLORATION: Brown, light brown and castaneous. Head: Brown. Eyes deep red to purple. Labium brown with medial lighter. First antennal segment golden, second antennal segment golden basally brown distally, third antennal segment light basally for approximately one-eighth of the total length and brown distally, fourth antennal segment completely brown. Thorax: Pronotum, scutellum and thorax dark brown. Dorso-lateral margin of metepisternum and scent gland with a relatively narrow orangish-yellow band, width equal to about one-fourth of the total width of the scent gland. *Legs:* Pro and meso-coxae brown basally for most of length golden distally at joint with femora, meta-coxae dark basally for half of the length and light distally for the remainder of the length. Pro-femora brown basally and lightening to light brown distally, mid and hind femora brown. The pro and meso-tibiae are basally dark brown, distally golden, with the meta-tibiae light apically at joint with meta-femora, dark brown for the remainder of the apical half and then transitioning back to golden for remainder of the posterior half, with parallel rows of dark spicules along the entire length. Basal tarsomeres golden, distal segments dark brown. *Hemelytra:* Anterior margin of corium dark brown along with anterior half of the clavus transitioning into a transparent complete fascia that takes up one-third of the total area of the anterior portion of the corium and a thin-strip at the median of the clavus but not extending medially to claval suture. Posterior to the transverse fascia is a dark brown margin that extends across the entire width of the wings, followed by a yellowish-gold diffuse transverse fascia that also extends across the entirety of the wing that is anterior to the median of the hemelytron. The posterior area of the corial margin has lateral transparent areas, remainder of the corium dark brown. Over one-third of the total area of the cuneus is white posterior to the claval fracture with a yellowish tinge at the lateral margins, the posterior coloration dark reddish-brown. Membrane light brown. Abdomen: Brown.

SURFACE AND VESTITURE: Dorsal surface of body and hemelytron covered with long, erect light-brown setae. The medial portion of the hemelytron and the median of the claval suture possess reflective patches.

STRUCTURE: Head: Relatively flat antero-posteriorly, dorsally clypeus weakly visible, barely surpassing the frons anteriorly in dorsal view. Cyberial muscle attachment sites visible on the surface of frons. Area of head below eyes in anterior view relatively wide and short. Vertex flat, with the posterior raised for the medial half and the lateral margins declining, forming a shelf-like appearance, width greater than width of compound eye. Eyes nearly continuous with the anterior margin of the vertex. Eye height greater than one and half the total height of the head, the vertex visible in lateral, the posterior margin of the eyes obscures the anterior margin of the pronotum. Nearly one-third of the total height of the head the head below the eyes, gula short, flat. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head . Antennal segment two long and narrower in diameter than segment one, increasing in diameter distally toward segment three. Length of antennal segment two nearly one and one-half times the total width of the head, weakly curving medially. Antennal segments three and four slender and less than half the length of segment two. Labrum narrow in diameter. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment four extending past apex of meso-coxa. Thorax: Pronotum less than twice as wide as long, weakly swollen dorsally on the posterior portion but without a dorsal indentation separating the anterior and posterior portions, lateral margins angled straight, forming a trapezoidal-shaped pronotum in dorsal view. A thin, partially reflexed collar present but not flattened collar. Mesoscutum hidden, scutellum dorso-anterior margin raised compared to the posterior portion, whole structure transversely rounded. Scent-gland taking up greater than a third the total area of the metepimeron. *Legs:* elongate, rounded, meta-tibiae convexly curved near median and weakly laterally compressed medially. Claws of moderate length and width, pulvilli taking up less than half of claw length . Parempodia parallel and hair-like. *Hemelytra*: Elongate, lateral margins weakly constricted medially and the posterior margins wider than the posterior margin of the pronotum, hemelytra flat on dorsal surface of body and not obscuring the lateral margins of the thorax and abdomen. Lateral margins of the corium anterior the cuneal fracture swollen and elongated, forming a lobe-like structure. Cuneus triangular, length approximately greater than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, and with a partial thickening on the lateral margins of cuneus in the area occupied by the white margin. Abdomen: narrow, elongate. GENITALIA: (Fig. 3-16): Pygophore: Relatively small, unelaborated, occupying about one-fifth length of abdomen, ventral margin weakly sloping upwards towards apex. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, horse-collar shaped, located at apex of endosoma (Fig. 3-16: A). Phallotheca: Of phyline type, fairly small, C -shaped, apex gently tapering toward a point (Fig. 3-16: D). Right Paramere: Paramere moderately sized, smaller than left paramere, lateral expanded to one side at the base, tapering to a pointed apex (Fig. 3-16: C). Left Paramere: Left paramere moderately sized; posterior process narrow and with the dorsal margin medially convex, gently curving anteriorly, relatively elongate compared to the anterior process, and with sensory pits; anterior process stout, the dorsal surface far removed from the posterior process and the median of the total height (Fig. 3-16: B).

Female: Brachypterous, medium-sized, medially constricted. Total length 2.72-2.92mm, width across pronotum 0.82- 0.88, width across widest part of wings 0.81-0.89. COLORATION: Similar patterning as males but with a larger portion of the anterior of the second antennal segment yellow and more of the total area of the cuneus white (Fig). SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Head: Head much wider than males, nearly equal in width to the posterior margin of the pronotum and wider than the width of the anterior margin. Clypeus produced, exerted in dorsal view. Vertex convex, width twice as wide than the width of one compound eye. Eyes taking up approximately half the total height of the head in lateral view, dorsal surface of the eyes continuous with the dorsum of the vertex. Gula short, flat and more developed than males, greater than one-third the total height of the head below the eyes. Antennal segment two long and more slender than segment one at basal joint with antennal segment one, increasing in diameter distally toward segment three, club-like.

Length of antennal segment two just longer than the total width of the head. Thorax: Pronotum less than twice as wide as long, the anterior lateral margins nearly straight and forming a box-shape when viewed dorsally. Mesoscutum and anterior of scutellum are hidden by the posterior margin of the pronotum, scutellum weakly transversely rounded. *Hemelytra:* Apex of wings subapical to posterior margin of abdomen, lateral margins weakly medially constricted. Cuneus shorter than males, fracture angled anteromesially. *Abdomen:* Parallel-sided, anterior half posterior from thorax sharply declining ventrally, posterior half of abdomen parallel to the dorsal surface of the abdomen. Ovipositor spine present. The remaining characters are the same as males. GENITALIA (Fig 3-27: C-D): Vestibulum comprising of two relatively large, separate, triangular-shaped sclerotized plates with no visible lateral tube, but with a narrow apical sclerite that covers the entrance between the two vestibular sclerites, sclerotized areas present on lateral margins of rami between dorsal and ventral labiate plates, rings weakly sclerotized (Fig. 3-27: D). Posterior wall mostly membranous, with posterior margin sclerotized and flat, the lateral interramal plates sclerotized (Fig. 3-27: E).

HOSTS: Goodeniaceae.

DISTRIBUTION: Eastern Australia.

DISCUSSION: Only the type species *Collessicoris bellissimus* is currently known for this genus; however, this taxon is distinctive compared to all other Leucophoropterini in color patterning and the shape of the head and pronotum in males and females.

Collessicoris bellissimus Carvalho and Gross

Figures (3-7, 3-17, 3-27: C-D)

Collessicoris bellissimus Carvalho and Gross 1982: 53, figs. 89--92, 127 (n. sp., descr., disc., DV, MG)

DIAGNOSIS: See generic diagnosis.

DESCRIPTION: See generic description.

HOSTS: Goodeniaceae.

DISTRIBUTION: Eastern Australia.

DISCUSSION: Previous to this work the species was known from a female holotype and a broken male specimen designated as a paratype. The redescription of the species and genus includes a more detailed assessment of the male somatic and genitalic characters.

HOLOTYPE: **AUSTRALIA: New South Wales:** Durras Lake, South Coast, 22.ii.1965, D. H. Colless 1♀ (ANIC). [not examined]

SPECIMENS EXAMINED: **AUSTRALIA: New South Wales:** Otford, 34.215°S 151.001°E, 10 Feb 1962, D. K. McAlpine, 1♂ (00393677) (AM); 24 Nov 1962, D. K. McAlpine, 1♀ (00393691) (AM). Royal National Park, Lady Carrington Drive, 34.15°S 151.0293°E, 78 m, 14 Nov 2001, Cassis, Schuh, Schwartz, Silveira, 3♂ (00274200 - 00274202), 9♀ (00274203 - 00274206, 00274208 - 00274209, 00274212 - 00274213, 00274215) *Goodenia ovata* Sm. (Goodeniaceae), det. NSW staff NSW666420, 1♀ (00274198) (AM), 1♀ (00274210) *Goodenia ovata* Sm. (Goodeniaceae), 2♂ (00128239, 00128241), 1♀ (00128240) *Goodenia ovata* Sm. (Goodeniaceae), det. NSW staff

NSW666420, 7♀ (00128242 - 00128248) (AMNH). **South Australia:** 139.2 km SE of William Creek, Finnis Springs (63 km NW of Maree), 29.60001°S 137.4175°E, 21 m, 07 Nov 2001, Cassis, Schuh, Schwartz, 1♂ (00274695) (AM), 1♂ (00274694), 1♀ (00274693) (AMNH).

Ctypomiris Schuh

Figs (3-8, 3-18)

Ctypomiris Schuh 1984: 221 (n. gen., descr., disc.)

TYPE SPECIES: *Ctypomiris brendae* Schuh, by original designation.

DIAGNOSIS: Recognized by the posterior portion of the pronotum being swollen, convex in lateral view and completely obscuring the mesoscutum in dorsal view, the humeral angles of the pronotum that appear shoulder-like in dorsal view, the presence of a flat pronotal collar, the punctate and flat hemelytron with a weak medial constriction, the lateral posterior margins of the hemelytron expanded into a lobe-like process anterior and dorsal to the cuneal fracture, the R+M vein terminating at the median of the hemelytron, the lateral posterior margins with a transparent area on the corium, the partial transparent transverse fascia, the posterior area of the cuneus being darker in coloration than the remaining coloration of the hemelytron, and the spine-like apical processes of the endosoma.

FEMALE: Similar to males but smaller in size, with a wider vertex, the area of the head below the eyes more produced anteriorly and ventrally, the second antennal segment narrower than males, and the pronotum appearing less swollen in lateral view.

HOSTS: Unknown.

DISTRIBUTION: Solomon Islands and Papua New Guinea.

DISCUSSION: *Ctypomiris* is unique for Leucophoropterini in possessing shoulder-like humeral angles of the pronotum and having a protrudring process at the apex of the endosoma with spicules (Fig 3-18; Schuh 1984: figs 703,706), which is unique to the genus. The majority of Leucophoropterini have a simple, blunt, unadorned apex of the endosoma (e.g. *Ausejanus* spp.).

Ctypomiris brendae Schuh

Ctypomiris brendae Schuh, 1984: 213, figs. 699-705 (n. sp., diag., descr., DV, figs. head-pronotum, MG)

DIAGNOSIS: Recognized by the generic diagnosis, its castaneous coloration, the relatively small eyes, the majority of the length of the head anterior to the anterior margin of the eyes, the weakly swollen pronotum, and the form of the male genitalia.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown.

DISTRIBUTION: Solomon Islands.

HOLOTYPE: **SOLOMON ISLANDS: Malaita**: Tangtalau-Kwalo, 200 m, 30 Sep 1957, J. L. Gressitt, 1♂ (BPBM) [not examined]

SPECIMENS EXAMINED: **SOLOMON ISLANDS: Malaita:** E. of Kwalo (E. of Auki), 8.76234°S 160.70578°E, 350 m, 28 Sep 1957, J. L. Gressitt, Paratype, 1♂

(00321081), 1♀ (00321084) (BPBM). Tangtalau-Kwalo, 200 m, 30 Sep 1957, J. L. Gressitt, Paratype, 1♀ (00321085) (BPBM).

Ctypomiris kokure Schuh

Ctypomiris kokure Schuh, 1984: 213, figs. 699, 707-714 (n. sp., diag., descr., figs. head-pronotum, SEM)

DIAGNOSIS: Recognized by the castaneous body, the castaneous anteriorly, yellowish-golden distally colored hemelytra posterior to the apex of the scutellum, less than one-third of the total length of the head anterior to the anterior margin of the eyes, and the form of the male genitalia.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea

HOLOTYPE: **PAPUA NEW GUINEA: Bougainville Province:** Kokure, nr. Crown Prince Ra., 900 m, Jun 11, 1956, J. L. Gressitt, 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: Bougainville Province:** Boku, 6.566°S 155.35°E, 50 m, 03 Jun 1956, E.J. Ford, Jnr, Paratype, 1♀ (00095319) (AMNH). Kokure, 6.00031°S 154.9994°E, 690 m, 15 Jun 1956, J. L. Gressitt, Paratype, 1♀ (00321080) (BPBM). Kokure, nr. Crown Prince Ra., 6.39286°S 155.50237°E, 900 m, 09 Jun 1956, J. L. Gressitt, Paratype, 1♂ (00321078), 1♀ (00321079) (BPBM); 10 Jun 1956, J. L. Gressitt, Paratype, 1♀ (00196060) (AMNH), Paratype, 1♀ (00321077) (BPBM).

Ctypomiris solomonensis, new species

Figures (3-8, 3-18)

DIAGNOSIS: Recognized by the small size, the completely yellowish-white clavus and corium and apex of the scutellum, the yellowish-brown to castaneous head, the dark brown pronotum, the golden basally and brown distally coloration of the membrane, the completely golden appendages, meso and meta-thoracic pleuron and all of the abdominal segments excluding the pygophore which is dark brown, and the characters of the male genitalia.

DESCRIPTION: *Male*: Macropterous, small, weakly medially constricted. Total length 2.38- 2.52mm, width across pronotum 0.73- 0.76, width across widest part of wings 0.77- 0.79. COLORATION: Dark brown and golden yellow. <u>Head:</u> Yellow brown to castaneous, generally lighter in coloration along the anterior margin. Eyes deep red to dark purple. Labium golden. First antennal segment golden, second antennal segment golden with distal margin with antennal segment three dark brown, third antennal segment golden basally, brown distally, fourth segment brown. <u>Thorax:</u> Pronotum, thoracic pleura and anterior two-thirds of scutellum dark brown. Dorso-lateral margin of metepisternum dark brown, ventral area of scent gland golden, anterior area dark brown like thoracic pleura. *Legs:* All coxae golden. All femora orangish-golden in coloration. Tibiae are basally orangish, distally golden, with the meta-tibiae with parallel rows of dark spicules. All tarsomeres golden. *Hemelytra:* Golden with a transparent partial transverse fascia limited to the anterior area of the corium and possessing a dark posterior margin, the lateral posterior margins also possessing transparent areas anterior to the orange lobe-like extension overlapping the cuneal fracture. A transparent area is present below the dark brown tinted apex of claval commissure, occupying a majority of the surface anterior to the anterior margin of the wing membrane and with a dark brown posterior margin. Cuneus is primarily white with a dark brown narrow band lateral to the margin with the membrane occupying the distal two-thirds of the margin. Bases of setae on hemelytron pigmented dark brown. Membrane golden basally adjacent to white area of cuneus, brown for remainder of the length and continuous with the brown band of the cuneus, the wing veins in the brown portion of the membrane pigmented dark brown. <u>Abdomen:</u> brown to castaneous. SURFACE AND VESTITURE: Dorsal surface of body and eyes covered with long erect golden setae. Head, pronotum and scutellum distinctly shiny. Hemelytron punctate and also possessing dark brown, erect setae. STRUCTURE: <u>Head:</u> Clypeus visible and surpassing the anterior margin of the frons in lateral view and visible in dorsal view. Vertex convex and flat along the posterior margin, width nearly equal to twice the width of one compound eye. Eye height nearly encompassing the lateral view of the head, the vertex visible in lateral view, gula obsolete. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two long and narrower in diameter than segment one, increasing in diameter distally toward segment three but still narrower than antennal segment one at apex. Length of antennal segment 2 equal to one nearly one and one-third times the width of the head. Antennal segments 3 and 4 slender and less than one-fifth the length of segment 2. Apex of the first labial segment subapical of the head, the apex of segment four reaching apex of meso-coxa. <u>Thorax:</u> Pronotum nearly one and one half times as wide as long, the dorsal is swollen dorsally and convex in lateral view, lateral margins of pronotum weakly concave and forming a bell-shaped pronotum in dorsal view, the humeral angles swollen anteriorly and laterally to appear shoulder-like. Flat and narrow pronotal collar present. Mesoscutum hidden under the posterior margin of the pronotum, anterior of scutellum weakly swollen dorsally. Scent-gland taking up approximately third the total area of the metepimeron. *Legs:* moderate length, slender with meta-femora widest in diameter subapical to joint with meta-tibiae and appearing knee-like. Claws of moderate length, relatively wide in diameter, pulvilli taking up less than half of claw length . Parempodia parallel and hair-like. *Hemelytra*: Lateral margins weakly medially constricted, dorsally flat. R+M vein terminating at median of hemelytron. Cuneus short triangular, length approximately equal to one-third the total length of the wing membrane or longer, the cuneal fracture angled anteromesially and with the lateral margins thickened in area pigmented white. Abdomen: narrow, elongate.

GENITALIA (Fig. 3-18: A-C): Pygophore: box-like in shape, small, taking up less than one-fifth the total area of the abdomen. Endosoma: Small, slender, twisted, S-shaped, composed of two sclerotized straps unified by membrane, the apex composed of a spine-like process with ridges at the apex and the anterior strap folded subapically. Secondary gonopore small, weakly sclerotized and subapical to the spine-like process (Fig. 3-18: C). Phallotheca: Of phyline type, small, L- shaped, apex gently tapering toward a point, base elongate (Fig. 3-18: A). Right Paramere: not examined. Left Paramere: Left paramere moderately sized; posterior process broad, with sensory pits, and curved ventrally medially, the dorsal surface appearing convex, posterior process relatively elongate compared to the anterior process; anterior process stout but without sensory pits on interior margin, apex directed anteriorly and slightly perpendicular to the base of the paramere, the dorsal surface below the median line of the total height of the paramere. Dorso-medial margin between the anterior and posterior processes is rounded (Fig. 3-18: B).

Female: Unknown.

ETYMOLOGY: Named for the Solomon Islands.

HOSTS: Unknown, collected in light traps or canopy fogging.

DISTRIBUTION: The Solomon Islands.

DISCUSSION: This species is clearly within *Ctypomiris* based on its sharing all of the diagnostic characters of the genus, particularly the apical morphology of the endosoma.

HOLOTYPE: **SOLOMON ISLANDS: Guadalcanal:** 13 mi W of Honiara, 28 Jan 1984, N. L. H. Krauss. 1♂ (00318947) (BPBM).

PARATYPES: **SOLOMON ISLANDS: Mono Isl.:** Mono Is., 300 m, 06 Nov 1980 - 11 Nov 1980, J. L. Gressitt, 1♂ (00318948) (BPBM).

Gulacapsus Schuh

Figures (3-6, 3-9, 3-19)

Gulacapsus Schuh 1984: pp 224-227 (n. gen., diag., descr.)

TYPE SPECIES: *Gulacapsus novoguinensis* Schuh, by original designation.

DIAGNOSIS: Recognized by the laterally compressed, keel-like gula, greater than one-third of the total area of the head below the eyes, the posterior margin of the eyes parallel or exerted from the anterior margin of the pronotum, the pronotal collar that is sometimes in the form of a broad band, the transverse fascia posterior to the apex of the scutellum, the presence of a row of fringe-like setae on the meta-femora; and the presence of reflective patches and silverish-setae on the hemelytron.

REDESCRIPTION: *Male*: Macropterous, small, medially constricted. Total length 3.32mm, width across pronotum 0.75, width across widest part of wings 0.89. COLORATION: Brown and castaneous. Head: Dark brown. Eyes dark purple. Labium light brown. First antennal segment golden, second antennal segment golden basally and light brown distally to completely brown, third antennal segment golden basally, dark brown distally, and fourth antennal segments completely brown. Thorax: Pronotum, scutellum and thorax dark brown. Dorso-lateral margin of metepisternum and scent gland with a narrow white margin, equaling to one-fourth the total width of the scent gland. *Legs:* Pro-coxae completely white, meso-coxae dark reddish-brown, meta-coxae brown basally for nearly half of the length, white distally. Pro-femora golden-white, and meso and meta-femora dark brown. Pro and meso-tibiae are dark brown basally and golden distally, meta-tibiae golden apically at joint with meta-femur, dark brown for the remainder of the length and also possessing two parallel rows of dark spicules. Basal tarsomeres golden, dark brown for distal segments. *Hemelytra:* Anterior margin of corium dark brown along with anterior half of the clavus transitioning into a complete or partial white fascia with a dark brown margin, taking up to one-third of the total area of the anterior portion of the corium and part of the median of the clavus, the dark posterior margin extending across the entire width of the wing. Remainder of the hemelytron light to dark brown, lateral posterior margins of the hemelytra sometimes reddish brown. Cuneus same coloration as the hemelytron or rarely with a narrow white band on the anterior margin. Membrane dark brown without pigmentation on wing veins. Abdomen: Dark brown. SURFACE AND VESTITURE: Dorsal surface of body and hemelytron covered with long, erect light-brown setae, the hemelytron also possessing short and silverish setae near the transverse fascia. The medial portion of the hemelytron and the median of the claval suture possess reflective patches. Postero-ventral surface of the meta-femora with a row of setae forming a distinctive fringe appearance.

STRUCTURE: Head: Clypeus projecting beyond the anterior margin of the frons in lateral view, visible in dorsal view. Vertex flat to weakly convex with the posterior margin declining, width one-third the width of one compound eye to nearly equal in width to one eye. Eyes weakly removed from the anterior margin of the vertex, vertex partially visible in lateral view, the eyes taking up greater than half of the total height of the head, and the posterior margin of the eyes obscure the anterior margin of the pronotum. Area below the eyes appearing laterally compressed when viewed anteriorly but wider than vertex, nearly one half of the total height of the head is below the eyes, gula elongate and dorso-laterally compressed to form a keel-shape. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two long and wider in diameter than segment one, increasing in diameter distally toward segment three. Length of antennal segment two more than one and a half times the total width of the head, weakly curving medially. Antennal segments three and four narrow, less than half the length of segment two. Labrum laterally compressed and nearly the width of the pro-femora to nearly the same width as the labium. Apex of the first labial segment does not extend past the posterior margin of the head, the apex of segment four surpassing the pro-coxae to reaching the meso-coxae. Thorax: Pronotum greater than two-thirds as long as wide, dorsal surface swollen dorsally and convex in the posterior portion of the pronotum, sometimes with a dorsal indentation separating the anterior and posterior portions, dorsal lateral margins narrowed anteriorly and widening distally forming a bell-shaped pronotum in dorsal view. A narrow but flat pronotal collar is present. Mesoscutum is exposed, the scutellum is transversely rounded. Scent-gland taking up less than one-third the total area of the metepimeron. *Legs:* elongate, narrow. Claws of moderate length and width, pulvilli taking up less than half of claw length . Parempodia parallel and hair-like. *Hemelytra*: Elongate, lateral margins constricted medially with the anterior lateral margins narrower than the posterior lateral margins, transversely rounded. Cuneus narrow triangular, length approximately equal to one-third the total length of the wing membrane, the cuneal fracture angled anteromesially. Abdomen: narrow for most of length, expanding in diameter to the pygophore. GENITALIA: (Figs. 3-19: A-D): Pygophore taking up less than one-fourth the total length of the abdomen. Endosoma: Small, slender, twisted, S-shaped, composed of two sclerotized straps unified by membrane (Schuh 1984: Fig. 758), apex sometimes twisted and reflexed (Fig. 3-19: B). Secondary gonopore small, horse-collar shaped (Fig. 3-19: B) to weakly sclerotized (Schuh 1984:Fig. 758). Phallotheca: Of phyline type, small, L-shaped, apex gently tapering toward a point, base short (Fig. 3-19: A, Schuh 1984: Fig. 760). Right Paramere: small, relatively short with nearly parallel lateral margins, apex rounded (Fig. 3-19:A). Left Paramere: Left paramere moderately sized; posterior process broad, with sensory pits, dorsal surface convex with apex directed perpendicular to the base of the paramere, posterior process relatively elongate compared to the anterior process; anterior process stout but without sensory pits on interior margin, apex directed perpendicular to the base of the paramere, the dorsal surface below the median line of the total height of the paramere. Dorso-medial margin between the anterior and posterior processes is convex (Fig. 3-19: B) to straight (Schuh 1984: Fig. 759).

Female: Macropterous, small, medially constricted. Total length 3.02mm, width across pronotum 0.91, width across widest part of wings 0.76. COLORATION: Similar patterning as males with exception of the second antennal segment which is more yellow basally. SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Height of head below eyes greater in females than males taking up at least one-half the total height of the head, the gula is more developed and elongate. Antennal segment two long and more slender than segment one at basal joint with antennal segment one, increasing in diameter distally toward segment three. Length of antennal segment two at least one and one-half times the total width of the head. Ventral surface of abdomen parallel to dorsal surface for greater than one-half of the posterior length. Ovipositor spine present. The remaining characters are the same as males. GENITALIA: not examined.

HOSTS: Unknown, collected by trap.

DISTRIBUTION: Indonesia, Papua New Guinea and the Northern Territory in Australia.

DISCUSSION: Schuh (1984) noted that there were two specimens from Black Jungle, Northern Territory that represented another species of *Gulacapsus* but did not describe it presumably due to the regional focus of his work. The male and female specimens have all of the diagnostic characters of the genus including the distinctive head shape, but differ in coloration patterns of the cuneus and antennae compared to the fauna of Papua New Guinea.

Gulacapsus australiensis, new species

Figures (3-6, 3-9, 3-19)

DIAGNOSIS: Recognized by the completely white pro-femora, the dark basally and light distally tibiae, and the presence of a spine on the ovipositor in females. Similar in coloration pattern to *Blesingia gularis* but differentiated by unicolorous cuneus and the structural characters of the head and eyes.

DESCRIPTION: *Male*: Macropterous, small, medially constricted. Total length 3.32mm, width across pronotum 0.75, width across widest part of wings 0.89. COLORATION: Head dark brown. Eyes dark purple. Labium light brown. First antennal segment golden, second antennal segment golden basally and light brown distally, third antennal segment golden basally, dark brown distally, and fourth antennal segments completely brown. Pronotum, scutellum and thorax dark brown. Dorso-lateral margin of metepisternum and scent gland with a narrow white margin, equaling to one-fourth the total width of the scent gland. Pro-coxae completely white, meso-coxae dark reddish-brown, meta-coxae brown basally for nearly half of the length, white distally. Pro-femora golden-white, and meso and meta-femora dark brown. Pro and meso-tibiae are dark brown basally and golden distally, meta-tibiae golden apically at joint with meta-femur, dark brown for the remainder of the length and also possessing two parallel rows of dark spicules. Basal tarsomeres golden, dark brown for distal segments. Anterior margin of corium dark brown along with anterior half of the clavus transitioning into a complete white fascia with a dark brown margin, taking up one-third of the total area of the anterior portion of the corium and part of the median of the clavus, the dark posterior margin extending across the entire width of the wing. Remainder of the hemelytron light brown, lateral posterior margins of the hemelytra reddish brown. Cuneus same coloration as the hemelytron. Membrane dark brown without pigmentation on wing veins. Abdomen dark brown.

STRUCTURE: Clypeus projecting beyond the anterior margin of the frons in lateral view, visible in dorsal view. Vertex flat with the posterior margin declining, width one-third the width of one compound eye, eyes weakly removed from the anterior margin of the vertex. Nearly one half of the total height of the head is below the eyes. Length of antennal segment two more than one and a half times the total width of the head, weakly curving medially. Labrum laterally compressed but not elongate. Apex of segment four surpassing the pro-coxae. Pronotum nearly two-thirds as long as wide, dorsal surface swollen dorsally and convex in the posterior portion of the pronotum, with a dorsal indentation separating the anterior and posterior portions, dorsal lateral margins narrowed anteriorly and widening distally forming a bell-shaped pronotum in dorsal view. Scent-gland taking up less than one-third the total area of the metepimeron. Cuneus narrow triangular, length approximately equal to one-third the total length of the wing membrane. Abdomen narrow for most of length, expanding in diameter to the pygophore. GENITALIA (Figs. 3-19: A-D): Pygophore missing from genital vial of holotype. Endosoma: Small, slender, twisted, S-shaped, composed of two sclerotized straps unified by membrane, the apex twisted and reflexed. Secondary gonopore small, horse-collar shaped (Fig. 3-19: B). Phallotheca: Of phyline type, small, L- shaped, apex gently tapering toward a point, base short (Fig. 3-19: A). Right Paramere: small, relatively short with nearly parallel lateral margins, apex rounded (Fig. 3-19:A). Left Paramere: Left paramere moderately sized; posterior process broad, with sensory pits, dorsal surface convex with apex directed perpendicular to the base of the paramere, posterior process relatively elongate compared to the anterior process; anterior process stout but without sensory pits on interior margin, apex directed perpendicular to the base of the paramere, the dorsal surface below the median line of the total height of the paramere. Dorso-medial margin between the anterior and posterior processes is convex (Fig. 3-19: B).

Female: Macropterous, small, medially constricted. Total length 3.02mm, width across pronotum 0.91, width across widest part of wings 0.76. COLORATION: Similar patterning as males with exception of the second antennal segment which is more yellow basally. SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Height of head below eyes greater in females than males taking up at least one-half the total height of the head, the gula is more developed and elongate. Length of antennal segment two at least one and one-half times the total width of the head. Ventral surface of abdomen parallel to dorsal surface for greater than one-half of the posterior length. Ovipositor spine present. The remaining characters are the same as males. GENITALIA: not examined.

ETYMOLOGY: named for this species' presence in Australia.

HOSTS: Unknown.

DISTRIBUTION: Northern Territory.

DISCUSSION: The endosoma of *G. australiensis* differs from genitalia illustrated by Schuh (1984) for the genus in the shape of the secondary gonopore, but the keel-like gula, the shape and coloration patterns of the hemelytra, the pronotal collar, and the exerted posterior margin of the eyes clearly place this species in *Gulacapsus*.

HOLOTYPE: **AUSTRALIA: Northern Territory:** Black Jungle, nr. Humpty-doo, 24 Nov 1958, J. L. Gressitt.1♂ (00318906) (BPBM).

PARATYPES: **AUSTRALIA: Northern Territory:** Black Jungle, nr. Humpty-doo, 24 Nov 1958, J. L. Gressitt, 1♀ (00318907) (BPBM). Daly River, 13.75°S 130.7°E, 09 Aug 1980 -10 Aug 1980, M. B. Malipatil, 2♀ (00393669, 00393670) (AM). Fogg Dam area, 12.56666°S 131.3°E, 14 Oct 1980, M. B. Malipatil, 1♂ (00393668) (AM).

Gulacapsus moresbyana Schuh

Gulacapsus moresbyana Schuh, 1984: 227, figs. 744-745, 754-755. (n. sp., diag., descr., DV, figs. head-pronotum)

DIAGNOSIS: Recognized by characters of the generic diagnosis, the large size and the extremely elongate face compared to the other species of *Gulacapsus*, the elongate and flattened labrum that is equivalent in height to the total height of the head below the eyes, the mostly dark brown coloration, the elevated posterior portion of the pronotum, and the long hind femora.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown, collected in light traps.

DISTRIBUTION: Papua New Guinea.

Discussion: Previous to this study *Gulacapsus moresbyana* was known only from the type specimen, which I was not able to examine. However, this is the largest *Gulacapsus* species and has the most developed and pronounced keel-like gula, features that clearly differentiate it from the other species.

HOLOTYPE: **PAPUA NEW GUINEA: Central Prov.;** Daradee Plantation, 80km. N to Port Moresby, 500m., September 7, 1959. T.C. Maa. 1♂ (BPBM). [not examined].

Gulacapsus nondugl Schuh

Gulacapsus nondugl Schuh, 1984: 227, figs. 744, 746. (n. sp., diag., descr., DV, figs. head-pronotum)

DIAGNOSIS: Recognized by the characters of the generic diagnosis, the rich brown coloration, the nearly complete transverse fascia, the basally light cuneus, and the relatively large size.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown, collected in light traps.

DISTRIBUTION: Eastern Papua New Guinea.

Discussion: This species is the only species with the anterior margin of the cuneus white, which in combination with the characters of the elongate keel-like gula make it relatively easy to identify. *Gulacapsus moresbyana* is also large in size but the hind femora are shorter and nearly equal in length to the fore and middle legs in *G. nondugl*, and the keel-like gula and labrum are less developed compared to *G. moresbyana*.

HOLOTYPE: **PAPUA NEW GUINEA: Western Highlands Prov:** Nondugl, 1600m., July 8, 1955, J. L. Gressit. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: unknown:** Akivitana River, 1550 m, 10 Jan 1965, J. & M. Sedlacek, Paratype, 1♂ (00318873) (BPBM).

Gulacapsus novoguinensis Schuh

Gulacapsus novoguinensis Schuh, 1984: 227, figs. 744, 746. (n. sp., diag., descr., DV, figs. head-pronotum)

DIAGNOSIS: Recognized by the characters of the generic diagnosis, the narrow body form, the small size, the unicolorous cuneus, the weakly swollen posterior margin of the pronotum, and the partial transverse fascia that is limited most to the anterior of the clavus.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown, light traps.

DISTRIBUTION: Indonesia and Papua New Guinea

Discussion: This species is one of the smallest species of *Gulacapsus* and the most similar to Australian species *Gulacapsus australiensis* in shape and size. Both have the posterior lateral margins of the hemelytra nearly parallel-sided with a weak medial constriction and a shorter cuneus than the other species; however, the completely dark fore femora and the partial transverse fascia *in G. novoguinensis* clearly separate the two.

HOLOTYPE: **INDONESIA: West Irian:** Hollandia-Bidden, 25 m., October 16, 1957, light trap, J.L. Gressitt. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 1995, O. Missa, 1♀ (00318958) (ISNB); 02 Aug 1995, O. Missa, 1♀ (00318957) (ISNB); 03 May 1996, O. Missa, 1♀ (00302015) (ISNB); 09 May 1996, O. Missa, 1♂ (00302010), 5♀ (00302011 - 00302014, 00302122) (ISNB); 03 Jul 1996, O.

Missa, 1♀ (00302128) (ISNB); 24 Jul 1996, O. Missa, 1♀ (00196004) (ISNB). Wanuma, 4.9°S 145.31667°E, 600 m, Aug 1968, N. L. H. Krauss, Paratype, 1♂ (00318874) (BPBM). **Western Province:** Oriomo River, 8.8°S 143.08333°E, 3 m, 04 Aug 1964, H. Clissold, Light Trap, Paratype, 1♂ (00318875) (BPBM).

Johnstonsoni new genus

Figures (3-8, 3-20)

TYPE SPECIES: *Johnstonsoni phalarosus*, new species.

DIAGNOSIS: Recognized by the small size, the predominantly dark brown coloration, the white transverse fascia on the anterior surface of the hemelytron, the majority of the hemelytral surface covered with reflective patches, the wide vertex and small eyes, the completely dark brown antennal segments and appendages, the pygophore lacking a spine-like process on the ventral-posterior surface, and the characteristics of the male genitalia.

DESCRIPTION: *Male*: Macropterous, small, weakly medially constricted. Total length 2.17- 2.23mm, width across pronotum 0.63-0.65, width across widest part of wings 0.64. COLORATION: Dark brown and white. Head: Dark brown. Eyes deep red to purple. Labium light brown with distal darkening. All antennal segments brown. Thorax: Pronotum, scutellum and thorax dark brown. Dorso-lateral margin of metepisternum with white margin that does not extend ventrally to scent gland, scent gland continuous in coloration with thorax. *Legs:* All coxae and femora are dark brown. Pro and meso-tibiae are basally dark brown and distally golden, meta-tibiae basally golden at joint with meta-femur then dark brown for over half of the basal length and transitioning to golden for distal one-third of length, the meta-tibiae also with parallel rows of dark spicules along the entire length. Basal tarsomeres golden, distal segments dark brown. *Hemelytra:* Primarily dark brown with a partial transverse fascia, most of the anterior of the corium whitish transparent posterior to the dark brown wing base, partially extending into the lateral margins of the clavus at midpoint of length but not reaching the claval suture, the posterior margin a darker brown that completely transverses the width of the wing. The remainder of the corium dark brown. The anterior lateral margin of the cuneus is white for over one-half the total area of the cuneus, the posterior coloration is dark brown. Membrane light brown with wing veins lacking pigmentation. Abdomen: dark brown.

SURFACE AND VESTITURE: Dorsal surface of body and eyes covered with simple, recumbent setae. Head, pronotum and scutellum distinctly dull. The majority of the hemelytral surface with reflective patches, also possessing short, silverish setae adjacent and posterior to the transverse fascia. STRUCTURE: Head: Relatively elongate with small eyes. Clypeus anterior to the anterior margin of the frons in lateral view and exerted, visible in dorsal view. Vertex convex, the posterior margin flat, width equal to twice the width of one compound eye. Dorsal margin of the eyes continuous with the vertex, total height of the eyes greater than half the total height of the head, vertex visible in lateral view, approximately one-third of the total height of the head below the eyes. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two elongate and equal in diameter than antennal segment one, approximately equal diameter across the length. Length of antennal segment two nearly one and one-third times the total width of the head. Antennal segments three and four slender and less than half the length of segment two. Apex of the first labial segment extends past the posterior margin of the head, the apex of segment surpassing apex of meta-coxa. Thorax: Pronotum one and one-half times longer than wide, the anterior lateral margins narrowed compared to the posterior lateral margins forming a bell-shaped pronotum in dorsal view, the dorsal surface weakly convex in lateral view. Narrow and flat pronotal collar present. Mesoscutum visible, scutellum transversely rounded. Scent-gland taking up approximately one-forth the total area of the metepimeron. *Legs:* elongate, slender, not dorso-ventrally flattened. Claws small and of moderate width, pulvilli taking up less than half of claw length and small. Parempodia parallel and hair-like. *Hemelytra*: Lateral margins nearly parallel-sided, transversely rounded. Cuneus triangular with the interior margin with membrane weakly convex, total length approximately one-fourth the total length of the wing membrane, lacking swellings along the lateral margins. Abdomen: narrow, parallel-sided, first abdominal sternites wider than long. GENITALIA: (Fig. 3-19): Pygophore: Relatively small, without elaborations, occupying about one-fourth the total length of abdomen, ventral margin flat. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, twisted, located at apex of endosoma (Fig. 3-20: A). Phallotheca: Of phyline type, roughly L-shaped, apex gently tapering toward a point (Fig. 3-20: D). Right Paramere: Paramere small, smaller than left paramere, widest medially and tapering at the apex, diamond-shaped (Fig. 3-19:C). Left Paramere: Left paramere moderately sized; posterior process broad, the dorsal margin weakly convex medially, apex directed perpendicular to the base of the paramere, with sensory pits, and relatively elongate compared to the anterior process; anterior process stout, with the anterior margin ventral to the median of the total height of the paramere; dorso-medial margin between the anterior and posterior processes nearly straight and parallel to the base of the paramere (Fig. 3-20:B).

Female: Macropterous, small, parallel-sided. Total length 2.08-2.33mm, width across pronotum 0.63-0.65, width across widest part of wings 0.64-0.79. COLORATION: Similar patterning as males. SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Head: Vertex wider in females than males, greater than twice the width of one compound eye. Antennal segment two morphology same as males, length one and one-tenth times the total width of the head. Abdomen parallel-sided, anterior one-fifth posterior from thorax sharply declining ventrally, remaining ventral surface of abdomen parallel to the dorsal surface of the abdomen. Presence of ovipositor spine could not be observed due to the way the specimen was glued ventrally on the card. The remaining characters are the same as males. GENITALIA: not examined.

ETYMOLOGY: Named for a member of my thesis committee, Dr. Spencer Johnston, masculine.

HOSTS: Unknown, collected by canopy foggings and light traps.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: The overall shape and coloration of *Johnstonsoni* is superficially similar to *Leucophoroptera;* however, this genus is smaller in size, lacks the spine-like process on the pygophore, and the white coloration of some antennal segments and coxae as found in *Leucophoroptera*.

Johnstonsoni phalarosus, new species

Figures (3-8, 3-20)

DIAGNOSIS: See generic diagnosis.

DESCRIPTION: See generic description.

ETYMOLOGY: Named after the Greek "phalaros" for the white patch on the anterior of the cuneus, masculine.

HOSTS: Unknown, collected by traps and canopy fogging.

DISTRIBUTION: Papua New Guinea.

HOLOTYPE: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 1995, O. Missa. 1♂ (00302025) (ISNB).

PARATYPES: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 12 May 1993, O. Missa, 2♂ (00302023, 00302024) (ISNB); 13 Jul 1995, O. Missa, 2♂ (00302028, 00302029), 2♀ (00302030, 00302031) (ISNB); 04 Aug 1995, O. Missa, 1♂ (00302026), 1♀ (00302027) (ISNB).

Leucophoroptera Poppius 1921

Figures (3-4, 3-5, 3-9, 3-21, 3-27: E-F)

Leucophoroptera Poppius, 1921, p. 56; (n. gen.); Carvalho, 1958, p. 138 (cat.) ; Schuh, 1974, pp. 304-305; (disc.) ; Carvalho and Gross, 1982, pp. 35-36. (descr., disc., key to spp.); Schuh, 1984, pp. 143-144. (diag., disc).

TYPE SPECIES: *Leucophoroptera quadrimaculata* Poppius, 1921 by original designation.

DIAGNOSIS: Recognized by the relatively elongate wings in males, the dark and white coloration with a majority of the area of the anterior of the cuneus and the anterior of the corium white, the relatively elongate head, the presence of a row of fringe-like setae on the meta-femora, and the male genitalia. Females are recognized by the box-like pronotum with the anterior margin nearly equal in width to the posterior margin, and the parallel-sided lateral margins of the hemelytron.

REDESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 2.62-3.59mm, width across pronotum 0.68- 0.83, width across widest part of wings 0.84- 0.99. COLORATION: Dark brown and white. <u>Head:</u> Dark brown to blackish. Eyes deep red to purple. Labium brown. First antennal segment gold, remaining antennal segments completely dark brown. <u>Thorax:</u> Pronotum, scutellum and thorax dark brown. Dorso-lateral margin of metepisternum and scent gland with a relatively thick white band, width equal to about a third of the total width of the scent gland. *Legs:* Coxae completely dark brown or dark brown basally and white distally. Femora either completely dark brown or dark brown basally, white distally. Pro and meso-tibiae either dark brown or white, meta-tibiae white basally, dark brown distally. Tarsomeres dark brown. *Hemelytra:* primarily dark brown, with a translucent to whitish transverse fascia on the anterior margin of the hemelytron occupying most of the anterior margin of the corium and either a approximately one-fourth the width or nearly the entire width of the clavus at approximately the posterior three-fourths of the length of the claval suture, with a dark brown posterior margin along the fascia that transverses across the entirety of the wing. The medial-lateral margins of the corium posterior to the transverse fascia are weakly to strongly transparent, with the corium past the claval commissure and margins of the cuneal fracture chocolate brown. The anterior margin of the cuneus is completely white for greater than one-half the total length of the cuneus, the posterior portion a dark brown to reddish-brown. Membrane brown to light brown with dark-brown colored veins. <u>Abdomen:</u> Dark brown. SURFACE AND VESTITURE: Dorsal surface of body and hemelytron covered with fine, gold simple setae, the medial portion of the hemelytron and the median of the claval suture possess reflective patches. Postero-ventral surface of the meta-femora with a row of setae forming a distinctive fringe appearance. STRUCTURE: <u>Head:</u> Frons convex, clypeus exerted and partially visible in the dorsal view of the head. Vertex convex, the posterior margin flat, width equal to or almost twice the width of one compound eye. Area below eyes at least one-third the total height of the head in lateral view, the gula is well developed. Eyes confluent with dorsal surface of the vertex or distinctly removed in anterior view, occupying the about two-thirds the total height of the head in lateral view, the posterior margin partially obscuring the anterior of the pronotum. Apex of the first segment of the labium extends past the posterior margin of the head, the apex of the fourth segment surpassing the apex of the meta-coxae. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head . Antennal segment two long and more slender than segment one at basal joint with antennal segment one, increasing in diameter distally toward segment three. Length of antennal segment two ranging from over one and a half times the width of head to nearly twice the width. Antennal segments three and four slender and less than half the length of segment two. Thorax: Pronotum nearly twice as wide as long, no demarcation between the anterior and posterior margins laterally or dorsally, the dorsal surface nearly flat, lateral margins straight forming a trapezoidal appearance in dorsal view. Calli and pronotal collar absent. Mesoscutum partially exposed, scutellum weakly transversely rounded. *Legs:* elongate, narrow, hind femora more than one and one-third times longer than pro and meso-femora, all femora weakly flattened dorso-ventrally. *Hemelytra*: Lateral margins parallel-sided, dorsally transversely rounded. Cuneus triangular, not thickened along the anterior next to the cuneal fracture or lateral margins, relatively elongate and equaling to or more than one half the total length of the membrane, and with the cuneal fracture angled anteromesially. Abdomen: Elongate and parallel-sided.

GENITALIA (Fig. 3-21): Pygophore: Relatively small and with a very small protrusion on the ventral-posterior surface of the apex in the type species, occupying about one-fourth length of abdomen, ventrally margin sloping upwards toward opening to almost box-like. Endosoma: Relatively small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small to medium-sized, located at apex of endosoma (Fig. 3-21: B, F). Phallotheca: Of phyline type, fairly small, C-shaped, apex gently tapering toward a point (Fig. 3-21: D, H). Right Paramere: Paramere moderately sized, approximately same size as left paramere or smaller, with a relatively wide base that is asymmetrically expanded on the right side, forming a knife shape (Fig. 3-10: A) or rounded and without a distinctly pointed apex (Fig. 3-21: E). Left Paramere: Left paramere moderately sized; posterior process slender, with the dorsal surface convex medially, the apex of directed dorsally (Fig. 3-21: G) or ventrally (Fig. 3-21: C), with sensory pits; anterior process stout and with the dorsal surface below the median of the total height of the paramere; dorso-medial margin between anterior and posterior processes curved.

Female: (Fig 3-9): Macropterous, medium-sized, with nearly parallel lateral margins. Total length 2.47-2.52mm, width across pronotum 0.71- 0.73, width across widest part of wings 0.72- 0.74. COLORATION: Similar coloration as males, though if sexual dimorphism in coloration occurs it is in the second antennal segment, where females will have the basal margin lighter in coloration to males. STRUCTURE: Frons and clypeus projecting anteriorly more than males, vertex concave and wider than males. Antennal segment two long and more slender than segment one at basal joint with antennal segment one, increasing in diameter distally toward segment three. Length of antennal segment two ranging from just shorter of one and a third times the total width of the head to greater than one and two-thirds times the total width of the head. Pronotum is relatively box-like, with the anterior margin of the pronotum nearly equal in width to the posterior margin. The lateral margins of the hemelytron are parallel-sided, equal to or less than the width across as the width of the posterior margin of the pronotum. The cuneus is shorter and wider in females than males. Abdomen tapering apically from the median or distal two-thirds of the total length. Ovipositor sometimes present. The remaining characters are the same as males. GENITALIA (Fig. 3-27: E-F): Vestibulum comprising of two separate, triangular-shaped sclerotized plates with no visible lateral tube, but with a relatively wide apical sclerite that covers the entrance between the two vestibular sclerites, sclerotized areas present on lateral margins of rami between dorsal and ventral labiate plates, rings weakly sclerotized (Fig. 3-27: F). Posterior wall mostly membranous, with posterior margin sclerotized across margin and possessing a medial invagination similar to *Aitkenia* (Fig. 3-25:A) and the lateral interramal plates sclerotized (Fig. 3-27: E).

HOSTS: Primarily Myrtaceae, though also found on Fabaceae, Thymelaeaceae, Goodeniaceae, and Lauraceae.

DISTRIBUTION: Throughout Australia.

DISCUSSION: *Leucophoroptera* was initially described by Poppius (1921) on the basis of female specimens who included two species: *L. fasciatipennis* and *L. quadrimaculata*, both from New South Wales Australia. Carvalho and Gross (1982) then expanded the genus by describing four more species, also on the basis of females (*L. cavenda*, *L. nitador*, *L. macrozonata*, and *L. fasciata*), and moved *L. fasciatipennis* to the genus *Blesingia* Carvalho and Gross. *Blesingia elegans* is based on a teneral specimen of *L. quadrimaculata*. *Leucophoroptera nitador* is nearly identical to *L. quadrimaculata* females with exception of the lighter-colored basal area of second antennal segment, which are also found in some females of *L. quadrimaculata*; therefore; the two species are here synonymized with *L. quadrimaculata.* Schuh (1984) described three additional species from the Indo-Pacific (*L. novoirlandense*, *L. philippinensis*, and *L. solomonensis*) based on male specimens. My phylogenetic analysis of the tribe, including characters from both male and female specimens, found *Leucophoroptera* to be polyphyletic (Chapter III) and the type species, *L. quadrimaculata,* was found to group with two new species from Australia (*Leucophoroptera kangarooina,* and *Leucophoroptera gloriosa*. Male somatic and genitalia characters are herein documented for *L. quadrimaculata.*

Leucophoroptera cavenda Carvalho and Gross.

Figures (3-5, 3-9)

Leucophoroptera cavenda Carvalho and Gross, 1982: 35, Fig. 115 (Descr., disc., DV.)

Diagnosis: Male unknown, females recognized by the distal half of the meta-coxae being completely white, the white lateral margins to the first abdominal tergite, and the convex lateral margins of the hemelytron, and the trapezoidal-shaped pronotum in females.

Redescription: *Females:* COLORATION: Head dark brown to blackish. Eyes deep red to purple. Labium brown. First antennal segment gold, remaining antennal segments completely dark brown. Pronotum, scutellum and thorax dark brown. Dorso-lateral margin of metepisternum and scent gland with a relatively thick white band, width equal to about a third of the total width of the scent gland. Lateral margin of first abdominal tergite white. Fore and mid-coxae completely dark brown, hind-coxae dark basally, white distally for over half of the area of the coxae. The remaining structures are the leg are missing. Hemelytra primarily dark brown, with a translucent to whitish transverse fascia on the anterior margin of the hemelytron, occupying most of the anterior margin of the corium and nearly extends across the median of the clavus, with a dark brown posterior margin along the fascia which transverses across the entirety of the wing. The remaining area of the hemelytra dark brown. The anterior margin of the cuneus is completely white for greater than one-half the total length of the cuneus, the posterior portion dark brown. Membrane brown with dark-brown colored veins. Abdomen dark brown. STRUCTURE: Frons convex, clypeus exerted and partially visible in the dorsal view of the head. Vertex convex, the posterior margin flat, width nearly twice the width of one compound eye, over one-third the total width of the head. Area below eyes at least one-third the total height of the head in lateral view. Eyes confluent with dorsal surface of the vertex, occupying the about two-thirds the total height of the head in lateral view, the posterior margin partially obscuring the anterior of the pronotum. Apex of the first segment of the labium extends past the posterior margin of the head, the apex of the fourth segment surpassing the apex of the meta-coxae. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head . Antennal segment two long and more slender than segment one at basal joint with antennal segment one, increasing in diameter distally toward segment three. Length of antennal segment two ranging from over one and a half times the width of head to nearly twice the width. Antennal segments three and four slender and less than half the length of segment two. Pronotum nearly twice as wide as long. Calli and pronotal collar absent. Mesoscutum exposed, scutellum weakly transversely rounded. Hemelytra lateral margins convex, dorsally transversely rounded. Cuneus triangular, not thickened along the anterior next to the cuneal fracture or lateral margins, relatively elongate and equaling to or more than one half the total length of the membrane, and with the cuneal fracture angled anteromesially. Abdomen parallel-sided, ovipositor parallel to the dorsal margin of the abdomen. Ovipositor spine present.

GENITALIA: Not examined.

HOSTS: Unknown.

DISTRIBUTION: Tasmania

DISCUSSION: I was able to view images of the holotype, which is based on one female specimen from Tasmania, but was not able to examine the other two paratypes. Though the external morphology is very similar to females of *Aitkenia* with the convex lateral margins of the wings and the more trapezoidal pronotum, (especially *Aitkenia latevagans*), it possesses the wing color patterning that is more similar to *Leucophoroptera quadrimaculata* in being mostly dark brown and the anterior margin of the corium being whitish to transparent. It also is distinct in having a white lateral margin to the first abdominal tergite and a majority of the hind-coxae being white, which was not observed for any of the other females in either of the two genera. Until males are associated, *Leucophoroptera cavenda* should stay in *Leucophoroptera*.

HOLOTYPE: **AUSTRALIA: Tasmania**: Hobart, Lea. Reg, No. 120,983. 1♀ (SAM).

Leucophoroptera fasciata Carvalho and Gross

Leucophoroptera fasciata Carvalho and Gross, 1982: 38, Fig. 116 (n. sp., descr., DV)

DIAGNOSIS: Females recognized by the broad, complete white transverse fascia that dominates the anterior margin of the hemelytron, the weakly convex lateral margins, the strongly exerted clypeus, the light basal one-half of the third antennal segment, and the completely dark coxae.

HOSTS: Unknown.

DISTRIBUTION: New South Wales

DISCUSSION: This taxon is currently known only from the female holotype, which I was not able to examine. The habitus llustration in the original description suggests that it may be a member of *Leucophoroptera* based on the relatively broad pronotum, the short silvery-setae, and the strongly exerted clypeus. However, *L. fasciata* differs from most of the other female *Leucophoroptera* with the broad, complete white transverse fascia, which I have observed elsewhere in female Leucophoropterini only in *Leucophoroptera mucronata*, which is now placed in *Ausejanus* and is primarily dark red in coloration and not dark brown. Because I was not able to examine the type directly, and are there associated males for additional somatic and genitalic characters, I am taking the conservative approach and leave this taxon in *Leucophoroptera*.

HOLOTYPE: AUSTRALIA: New South Wales: Springwood, 1900. Biro, 1♀ (ZMUH). [not examined].

Leucophoroptera gloriosa, new species.

Figures (3-4)

DIAGNOSIS: Recognized by the relatively narrow transverse white fascia with the portion crossing the clavus broken into two adjacent white spots, the narrow vertex, and the gold basally and dark brown distally second antennal segment.

DESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 2.87mm, width across pronotum 0.83, width across widest part of wings 0.84. COLORATION: Eyes pinkish-silver. First antennal segment gold, second antennal segments gold basally, dark brown distally. Third and fourth segments missing in only specimen. Dorso-lateral margin of metepisternum and scent gland with a relatively thick white band, width equal to about a third of the total width of the scent gland. Pro coxae completely dark, meso and meta-coxae dark brown basally, white distally. Pro and meso-femora brown basally and white distally, meta-femora completely brown. Pro and meso-tibiae white, the meta-tibiae white anteriorly at joint with the meta-femora with the remainder of the surface dark brown with parallel rows of dark spicules. All tarsomeres are gold. Hemelytra primarily dark brown with narrow transverse white fascia with the portion crossing the clavus broken into two adjacent white spots, with a dark brown posterior margin which transverses across the entirety of the wing. The medial-lateral margins of the corium posterior to the transverse fascia are weakly transparent, with the posterior corial margins anterior to the cuneal fracture chocolate brown. The anterior margin of the cuneus is completely white for greater than one-half the total length of the cuneus, the posterior portion a dark brown to reddish-brown. Membrane light-brown with dark-brown colored veins. SURFACE AND VESTITURE: Gold simple setae longer that in *L. quadrimaculata* and *L. kangarooina.* STRUCTURE: Frons convex, clypeus exerted and partially visible in the dorsal view of the head. Vertex convex, the posterior margin flat, width equal to the width of one eye. Area below eyes at least one-third the total height of the head in lateral view, the gula is well developed. Eyes visibly removed from the dorsal surface of the vertex in anterior view, occupying the about two-thirds the total height of the head in lateral view, the posterior margin partially obscuring the anterior of the pronotum. Second antennal segment nearly one and a half times the width of head. The rest of the characters are as in generic description. GENITALIA: could not be located in the genital capsule attached with the lone holotype specimen, and therefore is not diagnosed.

Female: unknown.

ETYMOLOGY: Named from Mt. Glorious on which it was collected, feminine.

HOSTS: Unknown, collecting label states Rain Forest.

DISTRIBUTION: Queensland.

DISCUSSION: This species has several unique characters not seen in L. *quadrimaculata* and *L. kangarooina*, but is placed in *Leucophoroptera* based on the phylogenetic analysis of the tribe and the shared characters of the almost completely white cuneus (Chapter III). Until the genitalia are diagnosed for this species, this taxon is placed in *Leucophoroptera.*

HOLOTYPE: **AUSTRALIA: Queensland:** Mt Glorious, 27.33333°S 152.7667°E, 750 m, 05 Feb 1961 - 08 Feb 1961, Rain Forest, J. L. & M. Gressit collectors, 1♂ (00321198) (BPBM).

Leucophoroptera kangarooina, new species.

Figures (3-4, 3-9, 3-21: A-D)

DIAGNOSIS: Recognized by the small size, the well-defined transparent areas on the lateral-posterior margin of the corium, the distally white pro and meso-femora, the completely white pro and meso-tibiae, and lack of a protuberance on the ventral-posterior surface of the gonopore. Females also recognized by the pronotum being less box-like in appearance than *L. quadrimaculata* and appearing more trapezoidal in dorsal view.

DESCRIPTION: *Male*: Macropterous, small, elongate and parallel-sided. Total length 2.62-2.77mm, width across pronotum 0.68- 0.73, width across widest part of wings 0.84- 0.89. COLORATION: Eyes red to pinkish. First antennal segments gold, second antennal segments completely dark brown, third segments light basally and dark distally for over two-fourths the distal length, fourth segments dark basally. Dorso-lateral margin of metepisternum and scent gland with a relatively thick white band, width equal to about a third of the total width of the scent gland. All coxae dark brown basally, white distally for approximately half of the length of the coxae. Pro and meso-femora brown basally white distally, meta-femora completely brown. Pro and meso-tibiae white, the meta-tibiae white anteriorly at joint with the meta-femora with the remainder of the surface dark brown with parallel rows of dark spicules. Basal tarsomeres light, distal segments dark brown. Hemelytra primarily dark brown with a translucent to whitish transverse fascia on the anterior margin of the hemelytron occupying most of the anterior margin of the corium and part of the clavus at approximately the posterior three-fourths of the length of the claval suture, with a dark brown posterior margin that transverses across the entirety of the wing. The medial-lateral margins of the corium posterior to the transverse fascia distinctly transparent. The anterior margin of the cuneus is completely white for greater than one-half the total length of the cuneus, the posterior portion a dark brown to reddish-brown. Membrane light-brown with dark-brown colored veins. Frons convex, clypeus exerted and partially visible in the dorsal view of the head. Vertex convex, the posterior margin flat, width almost twice the width of one eye. Area below eyes at least one-third the total height of the head in lateral view, the gula is well developed. Eyes confluent with dorsal surface of the vertex in anterior view, occupying the about two-thirds the total height of the head in lateral view, the posterior margin partially obscuring the anterior of the pronotum. GENITALIA (Figs 3-21: A-D): Secondary gonopore relatively large, horse-collar shaped. Right paramere knife-shaped. Posterior process of the left paramere directed ventrally, relatively narrow.

Female: Macropterous, medium-sized, with nearly parallel lateral margins. Total length 2.47-2.52mm, width across pronotum 0.71- 0.73, width across widest part of wings 0.72- 0.74. COLORATION: Same coloration pattern as males.

STRUCTURE: The second antennal segment is less than one and three-tenths times the total width of the head. Width of the vertex over twice as wide as the total width of one eye. Abdomen tapers anteriorly along distal one-half of the ventral surface. The remaining characters are as in the generic description.

GENITALIA: As in generic description.

ETYMOLOGY: Named after the collecting locality of Kangaroo Island.

HOSTS: Unknown.

DISTRIBUTION: Kangaroo Island, South Australia.

DISCUSSION: Most of the specimens of this species are in poor condition and appear to be partially bleached, causing a lighter coloration than is probably seen in nature.

HOLOTYPE: **AUSTRALIA: South Australia:** Kangaroo Island, Kelley Hills Caves Cons. Park, 35.98818°S 136.87859°E, 13 m, 27 Dec 1989, R. Wharton, 1♂ (00248080) (TAMU).

PARATYPES: **AUSTRALIA: South Australia:** Kangaroo Island, Flinders Chase National Park, Rocky River., 35.95831°S 136.65853°E, 38 m, 25 Dec 1989 - 06 Jan 1990, R. Wharton, 2♀ (00248074, 00248087) (TAMU). Kangaroo Island, Kelley Hills Caves Cons. Park, 35.98818°S 136.87859°E, 13 m, 27 Dec 1989, R. Wharton, 6♂ (00248076 - 00248077, 00248079, 00248081 - 00248082, 00248085), 1♀ (00248084) (TAMU).

Leucophoroptera quadrimaculata Poppius 1921

Figures (3-5, 3-9, 3-21: E-H)

Leucophoroptera quadrimaculata Poppius, 1921: 57, pl. 2, fig. 2 (n. sp.); Carvalho, 1958: 138 (cat.); Schuh, 1974: 306; Schuh, 1984: 143.

Leucophoroptera nitador Carvalho and Gross, 1982: (n. sp., descr., disc., DV) – NEW SYNONYMY

Blesingia elegans Carvalho and Gross, 1982: 49, figs. 76-78, 124 (n. sp., descr., disc., DV, MG) – NEW SYNONYMY

Blesingia latezonata Carvalho and Gross, 1982: 49, fig. 132 (n. sp., descr., disc., DV) – NEW SYNONYMY

DIAGNOSIS: Recognized by the relatively elongate and parallel-sided wings in males, the overall dark brown and white coloration with most of the anterior of the cuneus white, the presence of reflective patches on the medial portion of the wings, the relatively elongate face but shorter in height than most members of *Blesingia*, and the structure of the parameres. Females recognized by the relatively box-like shape of the pronotum with the anterior margin just sub equal in width to the posterior margin, the length of the wings extending past the apex of the abdomen, and whose lateral margins are parallel-sided and relatively narrow.

DESCRIPTION: *Male*: Macropterous, medium-sized, elongate and parallel-sided. Total length 3.07-3.59mm, width across pronotum 0.76- 0.83, width across widest part of wings 0.94- 0.99. COLORATION: Eyes deep red to purple. First antennal segment gold, remaining antennal segments completely dark brown. Dorso-lateral margin of metepisternum and scent gland with a relatively thick white band, width equal to about a third of the total width of the scent gland. Pro and meso-coxae dark brown, meta-coxae dark brown, white distally. All femora and the pro and meso-tibiae dark brown, with the meta-tibiae white anteriorly at joint with the meta-femora with parallel rows of dark spicules. Tarsomeres dark brown. Hemelytra primarily dark brown with a translucent to whitish transverse fascia on the anterior margin of the hemelytron occupying most of the anterior margin of the corium and one-fourth the width of the clavus at approximately the posterior three-fourths of the length of the claval suture, with a dark brown posterior margin that transverses across the entirety of the wing. The medial-lateral margins of the corium posterior to the transverse fascia are weakly transparent, with the corium past the claval commissure and margins of the cuneal fracture a chocolate brown. The anterior margin of the cuneus is completely white for greater than one-half the total length of the cuneus, the posterior portion a dark brown to reddish-brown. Membrane brown to light brown with dark-brown colored veins. STRUCTURE: Eyes distinctly removed in anterior view. Second antennal segment one and a half times the width of the head or nearly twice the width. The cuneus takes up at least half the total length of the membrane. The rest characters are as in the generic description. GENITALIA (Fig. 3-21: E-H): Pygophore almost box-like, with a very small protrusion on the ventral-posterior surface. Secondary gonopore relatively small, horse-collar shaped (Fig. 3-21: F). Right paramere relatively rounded, widest medially (Fig. 3-21: E). Left paramere with posterior process relatively wide, directed dorsally (Fig. 3-21: G).

Female: Macropterous, medium-sized, with nearly parallel lateral margins. Total length 2.62-2.72mm, width across pronotum 0.75- 0.76, width across widest part of wings 0.77- 0.79. COLORATION: Same coloration pattern as males with the following exception: females have the second antennal segment lighter in coloration basally than males in some specimens. STRUCTURE: Second antennal segment one and two thirds times the total width of the head. Width vertex nearly twice the width of one eye. Abdomen tapers anteriorly along distal one-third of the ventral surface. The remaining characters are as in the generic description.

HOSTS: Mostly Myrtaceae, though also found on Fabaceae, Thymelaeaceae, Goodeniaceae, Lauraceae and Lauraceae.

DISTRIBUTION: Throughout Australia.

DISCUSSION: The location of the holotype of this species is currently unknown, though it was originally listed as being in Hungary. Therefore, I based my concept of *L. quadrimaculata* on the original description, collecting locality of the type relative to the other specimens I have examined, and the original illustration of the species. There is no other species of *Leucophoroptera* (or Leucophoropterini) that has the nearly parallel-sided wings found in *L. quadrimaculata* females, the nearly triangular head, and the distinctive wing patterning of the anterior of the clavus being completely white. Associated males are also diagnosed for the first time.

HOLOTYPE: AUSTRALIA: New South Wales: Sydney. 4.XI. 1900. Biró. 1 ♀ (Mus. Hung. Et. Helsingf.). [not examined].

SPECIMENS EXAMINED: **AUSTRALIA: New South Wales:** 7km S of Mt. Kaputar, 30.281°S 150.167°E, 24 Oct 1995, Schuh and Cassis, *Pimelea glauca* R. Br. (Thymelaeaceae), det. D.C. Godden 1996 NSW 395662, 1♀ (00393267) (AM). Botany Bay, 34.01657°S 151.22799°E, 35 m, 1900, H. Petersen, 5♀ (00271739, 00301021, 00374124, 00374126 - 00374127) (USNM). Cronulla, 34.05197°S 151.15366°E, 23 m, Dec 1924, H. Petersen, 4♀ (00301022 - 00301025) (USNM). Neilson Park, 28.8239°S 153.29447°E, 12 m, 1900, K. K. Spence, 1♂ (00168821) (ANIC). Rotary L/out Pigeon House Ra NW of Milton, 35.265°S 150.351°E, 22 Feb 1979, Z. Liepa, 1♀ (00393679) (AM). **Queensland:** Maleny, 26.767°S 152.85°E, May 1936, Unknown, 1♂ (00393650) (AM). **Tasmania:** 0.5 km SE of Couta Rocks: 'Murphy's Spring', terminus of C214, Mick Murphy's House, 41.18012°S 144.68716°E, 8 m, 24 Jan 2004, M. D. Schwartz and P. P. Tinerella, *Melaleuca ericifolia* Sm. (Myrtaceae), det. Field ID, 4♂ (00108535, 00108540, 00272035 - 00272036), 7♀ (00272092, 00272094 - 00272099) (AMNH). **Victoria:** 5 km E of Cann River, Reedy Creek, 37.5681°S 149.2036°E, 70 m, 19 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Dillwynia glaberrima* Sm. (Fabaceae), det. NSW staff NSW658195, 1♀ (00272031) (AMNH). Wannon R. near Jimmy's Creek, Grampians, 37.37206°S 142.51336°E, 333 m, 10 Dec 1977, D.K. McAlpine and M.A. Schneider, 1♂ (00393652) (AM). **Western Australia:** 0.5 km N of Fisheries Road on Balladonia Road, 33.73981°S 123.0921°E, 120 m, 25 Nov 1999, R.T. Schuh and G. Cassis, *Verticordia brownii* (Desf.)DC. (Myrtaceae), det. PERTH staff PERTH 05670292, 2♂ (00393268, 00393269) (AM). 1.1 km E of Cape Arid National Park boundary, 33.75268°S 123.2588°E, 150 m, 25 Nov 1999, R.T. Schuh and G. Cassis, *Verticordia brownii* (Desf.)DC. (Myrtaceae), det. PERTH staff PERTH 05670292, 1♀ (00393266) (AM). 2.1 km S of Coorow-Greenhead Rd, on Cockleshell Gully Rd, 30.08751°S 115.12°E, 156 m, 06 Nov 2004, Cassis, Weirauch, Tatarnic, Symonds, *Lechenaultia floribunda* Benth. (Goodeniaceae), det. PERTH staff PERTH6987486, 1♀ (00108536) (AMNH). 3.5 km N of Mt. Chudalup, D'Entrecasteaux National Park, 34.73335°S 116.0889°E, 50 m, 15 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, 1♀ (00393262) (AM). 17 km N of Albany, Simpson Road at Chester Pass Hiway, 34.89933°S 117.9148°E, 170 m, 30 Nov 1999, R.T. Schuh and G. Cassis, *Pericalymma ellipticum ellipticum* (Endl.)Schauer (Myrtaceae), det. PERTH staff PERTH 05671868, 1♀ (00393265) (AM). Cosy Corner Beach East, Torbay Sound, W of Albany, 35.06033°S 117.6446°E, 2 m, 01 Dec 1999, R.T. Schuh, G. Cassis, & R. Silveira, 1♀ (00274749) *Pimelea rosea* R.Br. (Thymelaeaceae), det. PERTH staff PERTH 05671353, 1♀ (00393264) (AM). Hellfire Bay, Cape Le Grande National Park, 34.00398°S 122.1696°E, 30 m, 24 Nov 1999, R.T. Schuh and G. Cassis, 1♂ (00274758) (AM). Leeuwin Naturaliste National Park, Canal Rocks, 33.66513°S 115.0165°E, 50 m, 15 Dec 1997, Schuh, Cassis, Brailovsky, Asquith, *Cassytha racemosa forma racemosa* Nees (Lauraceae), det. PERTH staff PERTH 05056322, 1♀ (00393263) (AM). Rossiter Bay, Cape Le Grande National Park, 33.96726°S 122.2674°E, 3 m, 23 Nov 1999, R.T. Schuh, G. Cassis, & R. Silveira, 1♂ (00274756) *Pimelea ferruginea* Labill. (Thymelaeaceae), det. PERTH staff PERTH 05672341, 1♂ (00393260) *Darwinia vestita* (Endl.)Benth. (Myrtaceae), det. PERTH staff PERTH 05671698, 1♀ (00274754) (AM). Shannon River, 1 km N of Chesapeak Road, 34.83782°S 116.3755°E, 20 m, 03 Dec 1999, R.T.

Schuh and G. Cassis, *Mirbelia dilatata* R.Br. (Papilionaceae), det. PERTH staff PERTH 05670810, 1♂ (00274133), 1♀ (00274134) (AM). Yalgorup National Park, 32.845°S 115.66138°E, 27 Nov 1998, G. Cassis, *Olearia axillaris* (DC.) Benth. (Asteraceae), det. PERTH staff PERTH 05227461, 2♀ (00393270, 00393271) (AM). ca 13 km E of Denmark on South Coast Hiway, 34.99397°S 117.5086°E, 80 m, 01 Dec 1999, R.T. Schuh and G. Cassis, *Beaufortia sparsa* R.Br. (Myrtaceae), det. PERTH staff PERTH 05671949, 1♂ (00393272), 5♀ (00393273 - 00393277) (AM), *Melaleuca ericifolia* Sm. (Myrtaceae), det. Field ID, 1♂ (00273337) (AMNH). nr. Pemberton, 24.44463°S 116.0349°E, 128 m, 26 Jan 1966, J. A. Grant, 1♀ (00321199) (BMNH).

Missanos, new genus

Figures (3-8)

TYPE SPECIES: *Missanos gulafuscos*, new species.

DIAGNOSIS: Recognized by the wide and flat head with dense dark brown setae on the gula and ventral surface of the head, the narrowed anterior lateral margins of the pronotum forming a bell-shaped pronotum in dorsal view, the posterior area of the pronotum swollen dorsally and weakly demarcated from the anterior portion in lateral view, the short second antennal segment that is shorter than the width of the head and covered with long, erect golden setae, the flat and medially constricted punctate hemelytron, the posterior-lateral margins of the hemelytron thickened into a lobe-like swelling over the cuneal fracture, and the petiolate abdomen.

DESCRIPTION: *Male*: Macropterous, small, weakly medially constricted. Total length 2.62mm, width across pronotum 0.75-0.76, width across widest part of wings 0.69. COLORATION: Brown, light brown and castaneous. Head: Castaneous. Eyes deep red to silver. Labium light brown with distal darkening. All antennal segments brown. Thorax: Pronotum, scutellum and thorax dark brown, anterior margin of pronotum sometimes castaneous. Dorso-lateral margin of metepisternum and scent gland continuous in coloration with thorax. *Legs:* Pro and meso-coxae light brown to castaneous, meta-coxae dark basally for half of the length and light distally for the remainder of the length. All femora dark brown with lighter brown coloration ventrally, especially with the meta-femora. All tibiae are basally dark brown, distally golden, with the meta-tibiae with parallel rows of dark spicules along the entire length. Basal tarsomeres golden, distal segments dark brown. *Hemelytra:* Primarily castaneous to dark brown with anterior of the corium castaneous to golden brown, clavus castaneous with medial area darker brown, transparent areas on lateral-posterior margins adjacent to apex of clavus with a dark posterior margin that transverses the entirety of the wing, white patch along medial margin of corium posterior to the clavus and anterior the wing membrane surrounded with a dark brown margin, apex of the lateral corial margins anterior to the cuneus with a thin dark brown margin and medially golden brown. The anterior lateral margin of the cuneus is white for nearly one-fourth the total area of the cuneus, the posterior coloration is dark brown. Membrane light brown with wing veins lacking pigmentation. Abdomen: First abdominal sternites yellowish with a dark posterior margin, the second abdominal sternite white to transparent, remaining segments dark brown. SURFACE AND VESTITURE: Dorsal surface of body and eyes covered with long, erect light brown setae. Head, pronotum and scutellum distinctly shiny. Hemelytron punctate, also covered with long, erect light brown setae but also includes long, erect black setae evenly distributed over the surface of the wings. Genae, gula and ventral surface of the head with long, dense black setae. Reflective patches present on clavus and cuneus.

STRUCTURE: Head: Wide, flat, lateral margins including eyes obscuring the anterior margin of the pronotum in lateral view. Clypeus flush with the anterior margin of the frons in lateral view, not visible in dorsal view. Vertex convex, the posterior margin shelf-like, width less than one-third the width of one compound eye. Dorsal margin of the eyes dorsal to the vertex, giving the head a heart-like appearance in anterior view, total height of the eyes nearly the total height of the head, vertex partially visible in lateral view. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two short and narrower in diameter than antennal segment one, increasing in diameter distally toward segment three on distal one-fifth. Length of antennal segment two shorter than the total width of the head. Antennal segments three and four nearly equal in diameter as segment two and less than half the length of segment two. Apex of the first labial segment subapical to the posterior margin of the head, the apex of segment surpassing apex of pro-coxa. Thorax: Pronotum one and one-third times wider than long, the anterior lateral margins narrowed compared to the posterior lateral margins forming a bell-shaped pronotum in dorsal view, the posterior portion swollen dorsally and appearing strongly convex in lateral view. Narrow and flat pronotal collar present. Mesoscutum hidden by the posterior margin of the pronotum, scutellum swollen anteriorly to posterior margin of the pronotum. Scent-gland taking up approximately one-forth the total area of the metepimeron. *Legs:* moderate length, slender with meta-femora wider in diameter subapically to joint with meta-tibiae and appearing knee-like. Claws of moderate length and width, pulvilli taking up less than half of claw length and small. Parempodia parallel and hair-like. *Hemelytra*: Lateral margins weakly medially constricted, dorsally flat. Lateral margins anterior to the cuneal fracture swollen, forming a lobe-like process. Cuneus triangular with the interior margin with membrane weakly convex, total length greater than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, the lateral margins weakly swollen along the margin occupied by the white pigmentation. <u>Abdomen:</u> narrow anteriorly, widening posteriorly, petiolate. First abdominal sternite longer than wide. <u>Pygophore:</u> Relatively small with a spine-like process on the dorsal-posterior margin, occupying about one-fifth the total length of abdomen, ventral margin weakly sloping upwards towards apex.

GENITALIA: not examined.

Female: Brachypterous, small, weakly medially constricted. Total length 2.47mm, width across pronotum 0.69, width across widest part of wings 0.74. COLORATION: Similar patterning as males. SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: <u>Head:</u> Wider than males, vertex convex width as wide as one and one-half times one compound eye. Antennal segment two morphology same as males, length less than the total width of the head. <u>Thorax:</u>

Pronotum one and one-third times wider than long, the lateral margins weakly medially constricted and anterior margins narrow, forming roughly a bell-shaped pronotum in dorsal view. Mesoscutum and anterior of scutellum are hidden by the posterior margin of the pronotum, scutellum weakly transversely rounded. *Hemelytra:* Apex of wings subapical to posterior margin of abdomen, lateral margins weakly medially constricted. Cuneus shorter than males, fracture angled anteromesially. *Abdomen:* Petiolate, anterior half posterior from thorax sharply declining ventrally in lateral view and constricted relative to the posterior half in dorsal view, posterior half of abdomen sloping dorsally. Presence of ovipositor spine could not be observed due to the way the specimen was glued ventrally on the card. The remaining characters are the same as males. GENITALIA: not examined.

ETYMOLOGY: Named after the collector of most of the Papuan New Guinea samples used in this study, Oliver Missa; masculine.

HOSTS: Unknown. Canopy fogging and light traps.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: This genus is closely related to *Waterhouseana* due to the identical wing and body coloration, the presence of a wide and flat head whose posterolateral margins (including the eyes) wrap around the anterior margins of the pronotum to form a shield-like appearance dorsally, the presence of dense setae on the gula and gena, and the petiolate abdomen. *Missanos* is unique in lacking the medially constricted pronotum that is distinctive of *Waterhouseana* and possesses very short, narrow antennae with dense erect golden setae. I was not able to dissect the genitalia due to the fragility of the specimens when removed from the card-mounts.

Missanos gulafuscos, new species

Figures (3-8)

DIAGNOSIS: See generic diagnosis.

DESCRIPTION: See generic description.

ETYMOLOGY: Named for the long, dark brownish-gray setae on the gula and ventral surface of the head, masculine.

HOSTS: Unknown, collected in light traps and by canopy fogging.

DISTRIBUTION: Papua New Guinea.

HOLOTYPE: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 11 Jun 1996, O. Missa, Light Trap, 1♂ (00302042) (ISNB).

PARATYPES: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 27 Jun 1995, O. Missa, 1♀ (00302043) (ISNB); 10 Jun 1996, O. Missa, Light Trap, 1♂ (00302040) (ISNB); 11 Jun 1996, O. Missa, 1♂ (00302041) (ISNB).

Neaitkenia, new genus

Figure (3-6)

TYPE SPECIES: *Neaitkenia monteithi* (Carvalho and Gross).

DIAGNOSIS: Recognized by the dark brown to castaneous coloration, the weakly medially-constricted lateral margins of the hemelytra, the dark, elongate and narrow hind femora, the presence of only simple setae and reflective patches, the vertex being narrow than the width of one eye, at least one third of the total height of the head below the eyes, the presence of a row of fringe-like setae on the meta-femora, and the completely white to transparent transverse fascia.

DESCRIPTION: *Male*: Macropterous, small, elongate, and parallel-sided. Total length 2.92-2.99mm, width across pronotum 0.89-1.00, width across widest part of wings 0.94-1.00. COLORATION: Mostly brown with transparent to whitish transverse fascia. <u>Head:</u> Brown. Eyes silver to dark purple. Labium brown. First antennal segment golden, second antennal segment completely dark brown, third antennal segment dark brown or white basally, dark distally, fourth with basal lightening and darkening distally or dark brown. <u>Thorax:</u> Pronotum, scutellum and thorax dark brown to dark castaneous. Dorso-lateral margin of metepisternum and scent gland with a relatively narrow white band, width equal to about one-fourth of the total width of the scent gland. *Legs:* Pro coxae brown to white, meso-coxae brown, meta-coxae brown basally and white apically. Pro femora brown or brown basally, light distally, meso and meta-femora brown. The pro and meso-tibiae are basally dark brown, distally golden, with the meta-tibiae white anteriorly with joint of meta-tibiae and brown for the majority of the remaining surface and with parallel rows of dark spicules. Tarsomeres dark brown. *Hemelytra:* Primarily brown with a translucent to whitish transverse fascia on the anterior margin of the hemelytron occupying most of the anterior margin of the corium and part of the medial area of the clavus, with a dark brown posterior margin which transverses across the entirety of the wing. The remaining coloration of the corium light brown, with the area anterior to the cuneal fracture a more reddish dark brown or with a transparent area posterior to the dark brown posterior margin of the transverse fascia. The anterior margin of the cuneus is white with a yellowish tinge at the lateral margins, occupying less than one-fifth the total area of the cuneus, the posterior coloration is a reddish-brown. Membrane light brown with brown-colored wing veins. Abdomen: Brown. SURFACE AND VESTITURE: Dorsal surface of body and hemelytron covered with fine, golden simple setae, the medial portion of the hemelytron and the median of the claval suture possess reflective patches. STRUCTURE: Head: Clypeus visible and surpassing the anterior margin of the frons in dorsal view or obscured by the anterior margin of the frons. Vertex convex and declining along the posterior margin, width less than width of compound eye. Eye height greater than one and a half times the total height of the head, the vertex obscured in lateral view by the anterior surface of the eyes, approximately one third of the total height of the head below the eyes. Posterior margin of the eyes partially obscures the anterior margin of the pronotum, pronotal collar absent. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two long and equal to in diameter or wider than segment one, increasing in diameter distally toward segment three. Length of antennal segment two equal to one and one-quarter times the total width of the head or short of one and a third times the width of the head. Antennal segments three and four slender and less than half the length of segment two. Apex of the first labial segment subapical to the posterior margin of the head to extending past the head, the apex of segment four reaching apex of meso-coxa. Thorax: Pronotum more than twice as wide as long, no demarcation between the anterior and posterior margins laterally or dorsally, the dorsal surface nearly flat, lateral margins straight forming a trapezoidal appearance in dorsal view. Mesoscutum exposed, scutellum weakly transversely rounded. Scent-gland taking up approximately third the total area of the metepimeron. *Legs:* moderate length, slender with meta-femora weakly flattened dorso-ventrally. Claws of moderate length and width, pulvilli taking up less than half of claw length . Parempodia parallel and hair-like. *Hemelytra*: Lateral margins nearly parallel-sided to weakly medially constricted, dorsally transversely rounded. Cuneus triangular, length approximately equal to one-third the total length of the wing membrane or longer, the cuneal fracture angled anteromesially. <u>Abdomen:</u> narrow, elongate, with genital capsule taking up less than 1/3 total length. GENITALIA: See discussion.

Female: Unknown.

ETYMOLOGY: From the Latin “neo” for new and *Aitkenia* from the genus of original placement of the type species; feminine.

HOSTS: Unknown.

DISTRIBUTION: New South Wales, and Queensland.

DISCUSSION: *Aitkenia* Carvalho and Gross was found to be polyphyletic based on my phylogenetic analysis of the tribe (Chapter III), and species *Neaitkenia uptoni* and *N. monteith*i were not found to be in a monophyletic lineage with type species *Aitkenia latevagans.* Further, both differ from *A. latevagans* in the shape of the hind femora, coloration, and the structure of the head. The male genitalia of this genus are not described, however, for the following reasons. First, because the abdomen of *N. uptoni* is missing from the type specimen and the specimen examined, and the male genitalia illustrated for that taxon may not be conspecific (see also *N. uptoni* discussion). Second, *N. monteithi* is known only from the type and the paratype, and I could not examine the genitalia; herefore I refer to the original illustrations of the genitalia of *N. monteithi*.

Neaitkenia monteithi (Carvalho and Gross), new combination.

Figure (3-6)

Aitkenia monteithi Carvalho and Gross, 1982: 42. figs. 63-65, 119 (n. sp., descr., disc., DV, MG).

DIAGNOSIS: Recognized by the pro and meso femora being basally dark, lighter distally, the transparent area posterior to the dark posterior margin of the transverse fascia, the completely dark brown antennal segments, and the relatively small size of the cuneus with the lateral margins inset relative to the lateral margins of the corium.

REDESCRIPTION: *Male:* Macropterous, small, medially constricted. Total length 2.99mm, width across pronotum 1.00, width across widest part of wings 1.00 (based on original description). COLORATION: Brown with white areas on anterior of the corium and anterior margin of the cuneus. <u>Head:</u> Brown. Eyes deep red to purple. First and second antennal segments brown, third antennal segment white basally, dark distally and fourth with basal lightening and darkening distally. Fore-coxae light, meso-coxae brown, meta-coxae white basally, dark distally. Pro-femora basally dark basally, lighter distally, meso-and meta-femora dark brown. Hemelytra brown with a transparent to whitish transverse fascia on the anterior margin of the hemelytron occupying all of the anterior margin of the corium and most of the medial area of the clavus, with a dark brown posterior margin that transverses across the entirety of the wing, anterior to a transparent to whitish band across the median of the hemelytron. The anterior margin of the cuneus is narrowly white with, occupying less than one-fifth the total area of the cuneus, the posterior coloration brown. STRUCTURE: Clypeus not visible in the dorsal view of the head, the frons is relatively rounded. Eye height greater than one and half the total height of the head, weakly removed from the surface of the vertex. Apex of the first labial does not extend past the posterior margin of the head, the apex of segment four reaching apex of meso-coxa. Lateral margins of the hemelytra weakly constricted medially, dorsally transversely rounded. Cuneus triangular, length approximately equal to one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, and inset relative to the lateral margins of the corium. GENITALIA: not examined, see original description.

Female: Unknown.

HOSTS: Unknown.

DISTRIBUTION: Queensland.

DISCUSSION: The redescription of this species is based on examination of the holotype and the original description.

HOLOTYPE: **AUSTRALIA: Queensland**: Pat Creek, 11km N. of Archer Crossing via Coen, 28-29.vi.1975, G.B. Monteith. 1 ♂ (QU).

Neaitkenia uptoni (Carvalho and Gross), new combination

Figures (3-6)

Aitkenia uptoni Carvalho and Gross, 1982: 43, figs. 66-69, 118B. (n. sp., descr., disc., DV, MG)

DIAGNOSIS: Recognized by the dark castaneous coloration, the weakly medially-constricted lateral margins of the hemelytra, the dark castaneous, elongate and narrow hind femora, the presence of only simple setae, the vertex being narrow than the width of one eye, at least one third of the total height of the head below the eyes, and the completely white to transparent transverse fascia.

DESCRIPTION: *Male*: Macropterous, small, elongate, and parallel-sided. Total length 2.86mm, width across pronotum 0.91, width across widest part of wings 0.83 (from original description). COLORATION: Mostly dark castaneous with transparent to whitish transverse fascia. Head: Brown. Eyes silver. First antennal segment golden, remaining segments dark brown. Dorso-lateral margin of metepisternum and scent gland with a relatively narrow white band, width equal to about one-fourth of the total width of the scent gland. Pro and meso-coxae brown, meta-coxae brown basally and white apically. Hemelytra primarily brown with a translucent to whitish transverse fascia on the anterior margin of the hemelytron occupying most of the anterior margin of the corium and part of the medial area of the clavus, with a dark brown posterior margin which transverses across the entirety of the wing. The remaining coloration of the corium light brown, with the area anterior to the cuneal fracture a more reddish dark brown. The anterior margin of the cuneus is white with a yellowish tinge at the lateral margins, occupying less than one-fifth the total area of the cuneus, the posterior coloration is a reddish-brown. STRUCTURE: Head: Clypeus visible and surpassing the anterior margin of the frons in dorsal view. Vertex convex and declining along the posterior margin, width less than width of compound eye. Eye height greater than one and half the total height of the head, the vertex obscured in lateral view by the anterior surface of the eyes, approximately one third of the total height of the head below the eyes. Apex of the first labial segment extends past the posterior margin of the head. Lateral margins of hemelytra nearly parallel-sided. Cuneus triangular, length approximately equal to one-third the total length of the wing membrane, the cuneal fracture angled anteromesially. GENITALIA: abdomen and pygophore missing in Specimens Examined, see discussion.

Female: Unknown.

TYPE SPECIES: *Neaitkenia uptoni* (Carvalho and Gross).

HOSTS: Unknown.

DISTRIBUTION: New South Wales, and Queensland.

DISCUSSION: Carvalho and Gross (1982) described the external morphology of the holotype from New South Wales, but illustrated the male genitalia from paratype specimens from Queensland, because the type and the other specimen from New South Wales were missing the abdomen. The authors noted significant differences in the dimensions of specimens from the two populations, which suggests they may not be conspecific. I was unable to examine the paratypes from Queensland to verify whether they are the same taxon, and therefore redescribe the species based on the external morphology of the topotypic paratype. I do not redescribe the male genitalia.

HOLOTYPE: **AUSTRALIA: New South Wales:** 5 miles N.W. of Coffs Harb., 244 m, 01 Nov 1955, M. S. Upton, 1♂ (ANIC).

SPECIMENS EXAMINED: **AUSTRALIA: New South Wales:** 5 miles N.W. of Coffs Harb., 244 m, 01 Nov 1955, M. S. Upton, 1♂ (00168820) (ANIC).

Neoleucophoroptera, new genus

TYPE SPECIES: *Neoleucophoroptera solomonensis* (Schuh).

DIAGNOSIS: Recognized by the lack of a pronotal collar, castaneous to golden coloration, the nearly parallel-sided lateral margins of the hemelytron, the completely smooth and inpunctate hemelytron, the lateral margins of the corium anterior to the cuneal fracture swollen and forming a lobe-like process, the lack of a complete transverse fascia, the white anterior margin of the cuneus widest at the lateral margins and with the remaining posterior coloration a dark brown coloration darker than the coloration of the majority of the hemelytron, the nearly straight lateral margins of the pronotum that forms a trapezoidal-shaped pronotum in dorsal view, the width of the vertex being approximately equal to the width of one eye, the relatively short head with less than one-fifth of the total area of the head below the eyes, the lateral the elongate and rounded hind-femora, and the form of the male genitalia.

FEMALE: Unknown.

ETYMOLOGY: From the Latin *neo* for new and *Leucophoroptera* for the genus of original placement of the type species; feminine.

HOSTS: Unknown, collected in light traps.

DISTRIBUTION: Papua New Guinea and the Solomon Islands.

DISCUSSION: *Neoleucophoroptera* is described to accommodate two species placed in *Leucophoroptera* by Schuh (1984) (*Leucophoroptera novoirlandense, Leucophoroptera solomonensis*), that are not closely related to type species *Leucophoroptera quadrimaculata*. Further, these two species have several characters that separate them from *Leucophoroptera philippensis*, which is now placed in the new genus *Transeleucophoroptera*: the lack of punctation on the hemelytron, the nearly parallel-sided lateral margins of the pronotum, and the relatively short head with less than one-third of the area of the head below the eyes.

Neoleucophoroptera novoirlandense (Schuh), new combination.

Leucophoroptera novoirlandense Schuh, 1984: 146, figs. 475, 478, 480-488, 491-495 (n. sp., diag., descr., DV, figs. head-pronotum)

DIAGNOSIS: Recognized by the golden coloration of the hemelytron, the castaneous cuneus with a relatively narrow white anterior margin, the complete transverse fascia with transparent patches taking up most of the lateral anterior margins of the corium, the eyes taking up nearly the lateral height of the head and with anterior margins that obscure the vertex in lateral view, the short area of the head below the face, and the weakly swollen dorsal margin of the pronotum.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

HOLOTYPE: **PAPUA NEW GUINEA: New Ireland Prov.**: SW New Ireland, ridge above Camp Bishop, 15 km up Kait River, 250-750m., July 13, 1956, J.L. Gressitt. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: New Ireland Province:** Gilingil Pl'n, 2 m, 16 Jul 1956, J. L. Gressitt, Paratype, 1♂ (00095328) (AMNH). Ridge above Camp Bishop, 15km up Kait R., 4.48744°S 152.76638°E, 284 m, 10 Jul 1956, J. L. Gressitt, Paratype, 1♂ (00318870) (BPBM); 13 Jul 1956, J. L. Gressitt, Paratype, 1♀ (00318871) (BPBM).

Neoleucophoroptera solomonensis (Schuh), new combination.

Leucophoroptera solomonensis Schuh, 1984: 149, figs. 476, 479, 490 (n. sp., diag., descr., DV, figs. head-pronotum

DIAGNOSIS: Recognized by the overall castaneous coloration with the posterior one-half of the corium reddish, the antennal segment two light on the proximal two-thirds of the length, the relatively broad white anterior margin of the cuneus, the eyes taking up the majority of the height of the head but not obscuring the vertex in lateral view, the obsolete gula, and the relatively flat dorsal margin of the pronotum.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown.

DISTRIBUTION: Solomon Islands.

HOLOTYPE: **SOLOMON ISLANDS: NW Malaita**: Dala, June 19, 1964, malaise trap, R. Straatman. 1♂ (BPBM). [not examined].

Papuamimus Schuh

Papuamimus Schuh, 1984: 217 (n. gen., descr., disc.)

TYPE SPECIES: *Papuamimus irianicus* Schuh by original designation.

DIAGNOSIS: Recognized by the large eyes whose anterior margin is strongly removed from the vertex, the flattened pronotal collar, the highly polished head, pronotum, and scutellum, the narrow anterior margins of the pronotum and wide posterior margins that form a bell-shape in dorsal view, the posterior portion of the pronotum swollen that in lateral view appearing convex and with a posterior margin that completely obscures the mesoscutum, the flat and punctate hemelytron whose lateral margins are strongly constricted medially, the lateral-posterior transparent areas on the corium, the incomplete transverse fascia, the posterior-lateral margins of the hemelytron swollen to form a lobe anterior to the cuneal fracture, the petiolate abdomen, the pygophore lacking a dorsal spine-like process, the dark posterior coloration of the cuneus, and the male genitalia. Differentiated from *Arafuramiris* by the lack of a patch of sericeous setae on the clavus.

FEMALE: Similar to males but smaller in size, shorter wings, with a wider vertex, the anterior margin of the eyes continuous with the angle of the vertex, and the second antennal segment shorter and more club-like than males.

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea, Indonesia.

DISCUSSION: *Papuamimus* is similar in overall shape, size and morphology to *Arafuramiris* Schuh, but the lacks the sericeous setae on the clavus and the posterior process of the endosoma terminating just past the anterior margin of the secondary gonopore, versus extending in length near the apex of the anterior process, as seen in *Arafuramiris*.

Papuamimus irianicus Schuh

Papuamimus irianicus Schuh, 1984: 218. figs. 715, 716, 719-723. (n. sp., diag., descr., DV, figs. head-pronotum, MG)

DIAGNOSIS: Recognized by the generic diagnosis, the completely castaneous coloration of the of the second antennal segment, the nearly equal diameter of the second antennal segment for the length and nearly equivalent to the width of antennal segment one, the more strongly swollen posterior portion of the pronotum that is distinctly concave in appearance in lateral view and not clearly differentiated dorsally from the anterior portion of the pronotum, and the anterior lateral margins of the hemelytra being wider than the posterior margins.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown, collected by traps and canopy fogging.

DISTRIBUTION: Papua New Guinea, Irian Jaya.

Holotype: **INDONESIA: West Irian:** Cyclops Mountains, Ifar, 300 m., June 21, 1959, T.C. Maa. 1♂ (BPBM). [not examined].

Specimens Examined: **INDONESIA: Irian Jaya:** Cyclops Mountains, Ifar, 2.6°S 140.61°E, 300 m, 21 Jun 1959, T.C. Maa, Paratype, 1♂ (00321076) (BPBM). **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 09 Jun 1995, O. Missa, 1♂ (00302124) (ISNB); 10 Jun 1996, O. Missa, Light Trap, 1♂ (00302131) (ISNB).

Papuamimus maai Schuh

Papuamimus maai Schuh, 1984: 218. figs. 715, 716, 719-723. (n. sp., diag., descr., DV, figs. head-pronotum, MG)

DIAGNOSIS: Recognized by the generic diagnosis, the dark brown at the extreme base and distal two-fifths of the second antennal segment with medial yellowish coloration, the majority of the basal length of antennal segment two narrower in diameter than antennal segment one, and the swollen posterior area of the pronotum that is weakly differentiated from anterior margin of the pronotum in lateral view.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown, collected by traps and Canopy Fogging.

DISTRIBUTION: Papua New Guinea, Indonesia.

Holotype: **INDONESIA: West Irian:** Biak Island, strand, June 24, 1959, T.C. Maa. 1♂ (BPBM). [not examined].

Specimens Examined: **INDO PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 1995, O. Missa, 2♂ (00301961, 00301962) (ISNB); 02 May 1995, O. Missa, 1♂ (00301982) (ISNB); 05 May 1995, O. Missa, 3♀ (00301998 -

00302000) (ISNB); 10 May 1995, O. Missa, 1♂ (00301967), 3♀ (00196002, 00301991 - 00301992) (ISNB); 11 May 1995, O. Missa, 1♂ (00196387) (ISNB); 25 May 1995, O. Missa, 1♀ (00301994) (ISNB); 09 Jun 1995, O. Missa, 2♀ (00301996, 00301997) (ISNB); 14 Jun 1995, O. Missa, 3♂ (00301963 - 00301964, 00301969), 1♀ (00302001) (ISNB); 25 Jun 1995, O. Missa, 1♂ (00301979) (ISNB); 25 Jul 1995, O. Missa, 1♂ (00301981) (ISNB); 09 Apr 1996, O. Missa, Light Trap, 2♂ (00301968, 00301975) (ISNB); 17 Apr 1996, O. Missa, 3♂ (00301988 - 00301990) (ISNB); 01 May 1996, O. Missa, 1♂ (00301980) (ISNB); 15 May 1996, O. Missa, 2♂ (00301984, 00301985), 2♀ (00301993, 00302132) (ISNB); 04 Jun 1996, O. Missa, Light Trap, 1♂ (00301974) (ISNB); 05 Jun 1996, O. Missa, Light Trap, 3♂ (00301971 - 00301973) (ISNB); 06 Jun 1996, O. Missa, 1♂ (00301970) (ISNB); 07 Jun 1996, O. Missa, 1♂ (00301977) (ISNB); 18 Jun 1996, O. Missa, 1♂ (00301983), Light Trap, 1♂ (00302046) (ISNB); 23 Jun 1996, O. Missa, 1♂ (00301978) (ISNB); 27 Jun 1996, O. Missa, 1♂ (00301976) (ISNB); 09 Jul 1996, O. Missa, Light Trap, 2♂ (00301965, 00301966) (ISNB); 25 Jul 1996, O. Missa, 2♂ (00301986, 00301987), 1♀ (00301995) (ISNB).

Papuamiroides, new genus

Figures (3-7, 3-22)

TYPE SPECIES: *Papuamiroides elongatus*, new species.

DIAGNOSIS: Recognized by the narrow and elongate second antennal segment, the shape of the head, the distinctly shiny head, thorax, pronotum and scutellum, the punctate and flat hemelytron with strongly constricted medial margins, the patterning on the hemelytron, and the apex of the endosoma in the form of a spine.

DESCRIPTION: *Male*: Macropterous, large, medially constricted. Total length 2.77-2.82mm, width across pronotum 0.71-0.75, width across widest part of wings 0.74-0.77. COLORATION: Brown, light brown and castaneous. Head: Castaneous. Eyes deep red to purple. Labium light brown with distal darkening. First antennal segment dorsally brown on distal one-half and golden for the rest, second antennal segment dark brown along margin with first antennal segment and golden for over half of the remaining length before transitioning back to dark brown for last distal one-third, third antennal segment completely golden, fourth antennal segment dark brown. Thorax: Pronotum, scutellum and thorax castaneous, anterior margin of pronotum sometimes a more golden coloration. Dorso-lateral margin of metepisternum and scent gland continuous in coloration with thorax. *Legs:* Pro and meso-coxae light brown to castaneous, meta-coxae dark basally for half of the length and light distally for the remainder of the length. All femora dark brown with lighter brown coloration ventrally, especially with the meta-femora. All tibiae are basally dark brown, distally golden, with the meta-tibiae with parallel rows of dark spicules along the entire length. Basal tarsomeres golden, distal segments dark brown. *Hemelytra:* Primarily castaneous to dark brown with anterior of the corium castaneous to golden brown, clavus castaneous with medial area darker brown, transparent areas on lateral-posterior margins adjacent to apex of clavus with a dark posterior margin that transverses the entirety of the wing, white patch along medial margin of corium posterior to the clavus and anterior the wing membrane surrounded with a dark brown margin, apex of the lateral corial margins anterior to the cuneus with a thin dark brown margin and medially golden brown. The anterior lateral margin of the cuneus is white for nearly one-fourth the total area of the cuneus, the posterior coloration is dark brown. Membrane light brown with wing veins lacking pigmentation. Abdomen: First abdominal sternites yellowish with a dark posterior margin, the second abdominal sternite white to transparent, remaining segments dark brown.

SURFACE AND VESTITURE: Dorsal surface of body and eyes covered with long, erect light brown setae. Head, pronotum and scutellum distinctly shiny. Hemelytron punctate also covered with long erect light brown setae but also includes long, erect black setae evenly distributed over the surface of the wings. Reflective patches present on clavus and cuneus. STRUCTURE: Head: Wide and flat. Clypeus surpassing the anterior margin of the frons in dorsal view and barely visible in dorsal view. Vertex weakly convex, posterior margin shelf-like, width nearly equal to the width of one compound eye. Eye height greater than one and half the total height of the head, the dorsal margins of the eyes weakly removed from the anterior margin of the vertex, the vertex visible in lateral view, approximately one third of the total height of the head below the eyes. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two diameter narrower in diameter than segment one, increasing in diameter distally toward segment three. Length of antennal segment two equal to one and one-half times the width of the head. Antennal segments three and four slender and less than half the length of segment two. Apex of the first labial segment subapical to the posterior margin of the posterior margin of the head, apex of segment four reaching apex of meso-coxa. Thorax: Pronotum one quarter times wider than. Narrow, weakly reflexed pronotal collar present. Mesoscutum hidden by the posterior margin of the pronotum, anterior of scutellum swollen dorsally. Scent-gland taking up approximately one-fourth the total area of the metepimeron. *Legs:* moderate length, slender with meta-femora weakly flattened dorso-ventrally. Claws of moderate length and width, pulvilli taking up less than half of claw length. Parempodia parallel and hair-like. *Hemelytra*: Lateral margins strongly medially constricted, dorsally flat. R+M vein terminates near median of hemelytron. Cuneus triangular with the interior margin with membrane weakly convex, total length greater than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, the lateral margins weakly swollen along the margin occupied by the white pigmentation. Abdomen: narrow anteriorly, widening posteriorly, petiolate. First abdominal sternite longer than wide. GENITALIA (Fig. 3-22): Pygophore: small, taking up less than one-fourth the total length of the abdomen, lacking any spines or elaborations. Endosoma: Small, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane, and fusing at the apex to form a spine-like process. Secondary gonopore small, weakly sclerotized, located subapically from apex of endosoma (Fig. 3-22: A). Phallotheca: Moderately sized, L- shaped, apex gently tapering toward a point with the ventral surface expanded ventrally preapically (Fig. 3-22: D). Right Paramere: Paramere moderately sized, nearly equal in size to left paramere, the lateral margins nearly parallel, with a tapering, pointed apex (Fig. 3-22: B). Left Paramere: Left paramere moderately sized; posterior process of relatively medium width, with sensory pits, the dorsal surface nearly straight, apex directed perpendicular to the base of the left paramere, posterior process relatively elongate compared to the anterior process. Anterior process short, dorsal margin near median of total height of paramere. Main area of body between the anterior and posterior processes is rounded (Fig. 3-22: C).

Female: Brachypterous, small, medially constricted. Total length 2.52-2.62mm, width across pronotum 0.60-0.69, width across widest part of wings 0.69-0.74. COLORATION: Similar patterning as males. SURFACE TEXTURE AND VESTITURE: As in males. STRUCTURE: Clypeus produced, exerted in dorsal view. Vertex convex, width greater than twice the width of one compound eye. Eyes taking up nearly half the total height of the head in lateral view, dorsal surface of the eyes continuous with the dorsum of the vertex. Length of antennal segment nearly one and one-third times the total width of the head. Pronotum weakly medially constricted in dorsal view, the lateral margins of the anterior portion of the pronotum narrower than the posterior lateral margins. Apex of hemelytra does not extend over the apex of the abdomen. *Abdomen:* Petiolate, anterior half posterior from thorax sharply declining ventrally in lateral view and constricted relative to the posterior half in dorsal view, posterior half of abdomen sloping dorsally. Spine absent on the ventral surface of the ovipositor in females. The remaining characters are the same as males. GENITALIA: not examined.

ETYMOLOGY: Name for the similar appearance to *Papuamimus*; masculine.

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: *Papuamiroides* is closely related to *Papuamimus* in overall appearance and morphology, however the narrow and elongate second antennal segment and the form of the male genitalia separate the two genera. Further, in other closely related genera *Arafuramiris, Missanos* and *Waterhouseana,* the length of the second antennal segment never is more than 1.3 times longer than the width of the head.

Papuamiroides elongatus, new species.

Figures (3-7, 3-22)

DIAGNOSIS: Recognized by the generic diagnosis.

DESCRIPTION: See generic description.

ETYMOLOGY: Named for the elongate second antennal segment.

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: There is some variability in the width of the vertex relative to the total width of the head in males and females of this species, but the external morphology, genitalia, and the presence of the elongate and narrow antennae unite them as a single taxon.

HOLOTYPE: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 15 May 1996, O. Missa, 1♂ (00302049) (ISNB).

PARATYPES: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S

145.75°E, 17 Apr 1996, O. Missa, 1♀ (00302055) (ISNB); 15 May 1996, O. Missa, 3♂ (00302047 - 00302050), 3♀ (00302052 - 00302054) (ISNB).

Pseudohallodapocoris Schuh

Pseudohallodapocoris Schuh 1984: 230 (n. gen., diag., descr.)

TYPE SPECIES: *Pseudohallodapocoris ifar* Schuh by original designation.

DIAGNOSIS: Recognized by the large eyes that are exerted from the anterior margin of the pronotum, the broad pronotal collar, the flattened pronotal collar, the swelling of the posterior portion of the pronotum relative to the anterior portion and appearing convex in lateral view, the dorsal demarcation between the anterior and posterior portions, the laterally flattened labrum, the exerted clypeus that is anterior to the anterior margin of the frons and visible in dorsal view, the declining posterior margin of the vertex, the small cuneus that takes up less than one-fourth the total length of the wing membrane, the spine-like process on the ventral-posterior surface of the pygophore, the fringe of setae on the meta-femora, and the shape of the posterior process on the left paramere.

FEMALE: Unknown.

HOSTS: Unknown

DISTRIBUTION: Papua New Guinea, Indonesia.

DISCUSSION: This is the only genus with the eyes exerted from the anterior margin of the pronotum, with a broad collar, and with the area below the eyes relatively short (taking up less than one half the total height of the head in lateral view). Only

Trichocephalocapsus and *Gulacapsus* also have the eyes removed from the anterior margin of the pronotum and have a relatively broad pronotal collar, but the area below the eyes is much larger, more developed, and highly modified. The left paramere is also unique with the apex of the posterior process widening subapically before tapering into a point (Schuh 1984: fig. 766), whereas in most Leucophoropterini the posterior process is continuous in width or evenly tapers to the apex. For additional discussion of this genus see Schuh (1984).

Pseudohallodapocoris ifar Schuh

Pseudohallodapocoris ifar Schuh 1984: 233, figs. 761, 762, 765-767 (n. sp., diag., descr., DV, MG)

DIAGNOSIS: Recognized by the cuneus with less than one-half of the anterior area of the cuneus posterior to the cuneal fracture white, the relatively narrow transverse fascia that transverses the hemelytron near the median rather than posterior to the apex of the scutellum, the anterior portion of the pronotum weakly separated from the posterior portion, and the shape of the male genitalia.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Western New Guinea [Indonesia].

DISCUSSION: I was not able to examine the holotype of this species, but the original description and illustrations of the male genitalia clearly indicate it is unique.

HOLOTYPE: **INDONESIA: West Irian:** Cyclops Mountains, Ifar, 300m., June 22, 1959, T.C. Maa. 1♂ (BPBM). [not examined].

Pseudohallodapocoris kokoda Schuh

Pseudohallodapocoris kokoda Schuh 1984: 233, figs. 761, 763, 768, 769 (n. sp., diag., descr., DV, figs. head-pronotum)

DIAGNOSIS: Recognized by the incomplete transverse fascia on the hemelytron, the majority of the area of the anterior of the cuneus white, the weakly removed anterior surface of the eyes compared to the vertex and the vertex completely visible in lateral view, the relatively weakly swollen posterior portion of the pronotum, and the relatively short anterior portion of the pronotum.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown

DISTRIBUTION: Papua New Guinea.

DISCUSSION: I was not able to examine the holotype of this species, but the the relatively small eyes compared to the other species, and the less pronounced differentiation between the anterior and posterior portions of the pronotum, and the other characters in the diagnosis clearly indicate it is unique.

HOLOTYPE: **PAPUA NEW GUINEA: Northern Prov.:** Kokoda, 400 m., March 22, 1956, J.L. Gressit. 1♂ (BPBM). [not examined].

Pseudohallodapocoris wau Schuh

Pseudohallodapocoris wau Schuh 1984: 234, figs. 761, 764, 770, 771 (n. sp., diag., descr., DV, figs. head-pronotum)

DIAGNOSIS: Recognized by the incomplete transverse fascia on the hemelytron, the clear differentiation between the anterior and posterior portions of the pronotum with a posterior portion curved distinctly convexly in lateral view, the laterally flattened labrum, and the light coloration of the exocorium at the level of the apex of the claval commissure.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: I was not able to examine the holotype of this species, but the the strongly swollen and convex posterior portion of the pronotum, shape of the head, coloration, and the other characters in the diagnosis clearly indicate it is unique.

HOLOTYPE: **PAPUA NEW GUINEA: Morobe Prov.:** Wau, 1250 m., April 12, 1965, malaise trap, J. Sedlacek. 1♂ (BPBM). [not examined].

Sejanus Distant

Figures (3-4, 3-23)

Sejanus Distant, 1910: 20. (n. gen., syn. by Carvalho, 1952A:66)

Idatius Distant 1910: 20. (n. gen., junior homonym of *Idatius* Fairmaire, 1906, Coleoptera; syn. by Carvalho, 1952:66)

Eosthenarus Poppius 1915: 72 (n. gen., syn. by Kerzhner and Schuh, 1995)

Idatiella China 1926: 288 (n. name for *Idatius* Distant)

Sejanus Distant – Carvalho and Gross 1982: 7 (descr., disc., key to Australian spp. and subspp.); Schuh 1984: 150 (diag., descr., disc., key to Indo Pacific spp.); Kerzhner and Schuh 1995: 5 (rev. syn.); Yasunaga 2001: pp 121-126 (nsp., diag., key to Japanese spp).

TYPE SPECIES: *Sejanus funereus* Distant, by original designation.

DIAGNOSIS: Recognized by the small size, dark brown to rarely reddish coloration lacking punctation or maculation, the presence of only simple setae, the transversely rounded hemelytral margins, the lack of a complete transverse fascia if present at all, the relatively large eyes that nearly or completely encompass the total height of the head in lateral view, the absence of a pronotal collar, the cuneus sometimes with two white spots on the lateral margins, the relatively simple C to J-shaped endosoma sometimes with a well-developed secondary gonopore, and the relatively short, dorso-ventrally compressed hind-femora.

REDESCRIPTION: *Male*: Macropterous, small, parallel-sided. Total length 2.03-2.23mm, width across pronotum 0.77- 0.90, width across widest part of wings 0.94-0.99. COLORATION: Dark brown to rarely reddish. <u>Head:</u> Dark brown to blackish. Eyes deep red to purple, rarely silver. Labium completely brown or with medial segments a lighter golden coloration. First antennal segment golden to dark brown, second antennal segment basally golden and distally dark to completely dark brown, third and forth antennal segments completely golden, golden basally dark-brown distally, or completely dark brown. <u>Thorax:</u> Pronotum, scutellum and thorax dark brown.

Dorso-lateral margin of metepisternum and scent gland contiguous in coloration with the thorax and lacking white pigmentation to possessing a white band of varying thickness along the dorso-lateral margin. *Legs:* Coxae brown to reddish basally golden distally, completely golden or completely brown to red. Femora dark brown or red basally and golden distally, completely golden or completely dark brown to red with the meta-femora usually continuous in one coloration. All tibiae completely golden, dark brown basally and golden distally, or rarely completely dark brown. Meta-tibiae with parallel rows of dark spicules. Tarsomeres completely golden, basal segments dark brown and distal segments golden, or completely dark brown. *Hemelytra:* Completely brown or rarely reddish, sometimes with luteous markings adjacent to the claval suture or on the median of the clavus. Anterior margin of cuneus with or without two lateral white spots that may or may not be partially fused or a narrow white band along the anterior margin of the cuneus posterior to the cuneal fracture, posterior coloration of the cuneus equivalent to coloration of majority of the hemelytron. Membrane light brown with medial lightening to completely dark brown, with or without wing vein pigmentation. <u>Abdomen:</u> Dark red or brown. SURFACE AND VESTITURE: Dorsal surface of body and hemelytron covered with fine, golden simple setae. Lacking reflective patches on hemelytral surface.

STRUCTURE: <u>Head:</u> Frons convex, clypeus anterior to surface of frons and visible in the dorsal view of the head to obscured by the frons and not visible in dorsal view. Vertex flat to weakly convex, the posterior margin flat, wider than the width of one eye. Eyes removed from dorsal surface of vertex in anterior view, occupying the entire height of the head in lateral view or with the vertex visible anteriorly, the posterior margin of the eyes partially obscuring the anterior of the pronotum. Labium just passing the apex of the meso-coxae to extending past the meta-coxae. Second antennal segment equal in length to the width of the head or over one and two-fifths times the width of head. Thorax: Pronotum more than twice as wide as long with the lateral margins straight and angled nearly 45 degrees from the anterior margin of the pronotum forming a trapezoidal shape in dorsal view, dorsal surface of pronotum flat and lacking a dorsal demarcation between the anterior and posterior portions, calli not visible. Lateral margins of the pronotum with a single dark, stout spine approximately one-third length from the anterior margin. Calli absent. Mesoscutum exposed, scutellum weakly transversely rounded. *Legs:* relatively short, hind femora less than one and one-fourth times to one and one-third times longer than pro and meso-femora, all femora weakly flattened dorso-ventrally. *Hemelytra*: Lateral margins nearly parallel-sided, dorsally transversely rounded. Cuneus triangular, relatively short and equaling less than one-third the total length of the membrane to rarely longer than one-third the total length, cuneal fracture angled anteromesially. Abdomen: Parallel-sided, the pygophore taking up at most one-firth to nearly one-third the total length of the abdomen. GENITALIA: Pygophore tapering dorsally towards apex, unadorned. Endosoma: C to J-shaped, flat, small, with a weakly developed to well-developed and horse-collar-shaped secondary gonopore. Modifications of the apex include spines or rarely a serrated membrane. Membrane surrounding endosoma smooth, with spicules, or sometimes with a medial extension with serrations that extends over the distal half of the endosoma and sometimes anterior around the apex. Phallotheca: Surface smooth to rarely with ridges, C to L-shaped, apex tapering to point without ornamentations. Right paramere: small, sub equal in size to left paramere, parallel-sided to wider medially with a pointed apex. Left paramere: larger in size than right paramere; posterior process elongate, narrow, with or without sensory pits, apex angled dorsally or ventrally, rarely curved medially with apex directed dorsally; anterior process short, stocky, apex rarely directed in alternate direction of posterior process (*Sejanus ecnomios* Schuh, Schuh 1984: Fig. 545), dorsal surface of anterior process ventral to or at the midline of the total height of the paramere. Main body of paramere sometimes medially expanded (Schuh 1984: figs 545, 548).

Female: Macropterous, small, rounded with convex lateral margins. Total length 2.26-2.62mm, width across pronotum 0.89-1.02, width across widest part of wings 1.08-1.19. COLORATION: Basal half of second antennal segment sometimes more yellow in females than males, overall coloration darker and more intense. SURFACE AND VESTITURE. Same as males. STRUCTURE: Width of the vertex relative to the total width of the head wider in females and the lateral hemelytral margins more convex. Rest of characters as in males. GENITALIA: Vestibulum comprising of two separate, triangular-shaped sclerotized plates with no visible lateral tube, but with an apical sclerite that covers the entrance between the two vestibular sclerites, sclerotized areas present on lateral margins of rami between dorsal and ventral labiate plates, rings weakly sclerotized. Posterior wall mostly membranous, with posterior margin sclerotized across margin and possessing a medial invagination and the lateral interramal plates sclerotized.

HOSTS: Mostly unknown, but the Australian species are recorded primarily on Myrtaceae and Casuarinaceae.

DISTRIBUTION: Oriental Region, Palearctic Region, the Indo-Pacific and Australia.

DISCUSSION: *Sejanus* remains one of the largest genera of Leucophoropterini and also the most widely distributed, with species as far west as India and Sri Lanka, as far east as New Caledonia, as far north as Japan and Russia, and as far south as Australia. *Sejanus* is unique with the apical morphology of the endosoma having spines, serrated membrane, or other elaborations, whereas most genera of Leucophoropterini have a simple S-shaped endosoma with a weakly sclerotized secondary gonopore at the apex and no other modifications. Schuh (1984) noted that *Sejanus* is superficially like *Campylomma*, but lacks the spines on the hind-femora, the bladelike apical process on the endosoma, and the coloration pattern of the cuneus. Based on my revision of the genus, *Sejanus* also lacks the maculation on the femora and tibiae that are present in most *Campylomma* spp.

Sejanus amami Yasunaga

Sejanus amami Yasunaga 2001: 124, figs 4 and 10 (n. sp., descr., disc., DV, MG).

Diagnosis: Recognized by the primarily dark brown coloration with a thin white band on the cuneus along the cuneal fracture, completely golden first antennal segment, and golden-brown coloration of basal one-third of antennal segment two.

DESCRIPTION: See Yasunaga (2001).

HOSTS: Unknown.

DISTRIBUTION: Japan (Amami-Oshima Is.).

DISCUSSION: I was unable to examine specimens of this species directly, but based on the original description, habitus images of the males, and the illustrations provided by Yasunaga (2001), it is without doubt a member of *Sejanus*: the small size; a small, C-shaped endosoma with a weakly sclerotized secondary gonopore; primarily dark brown coloration with the anterior of the cuneus with a thin white band along the margin with the cuneal fracture, the absence of maculation on the hind-tibiae; and the short, flat hind femora.

HOLOTYPE: JAPAN: Ryukyus: Amami-Oshima Is., Chinaze, Naze. 10. v. 1987, T. Yasunaga 1♂ (HUES). [not examined].

Sejanus brassi Schuh

Sejanus brassi, Schuh, 1984: 159, figs 500, 520, 523-525 (diag., descr., disc., DV, MG).

DIAGNOSIS: Recognized by the castaneous coloration, the two separated white spots on the anterior margin of the cuneus, the yellowish first antennal segment, basal half of the second antennal segment, the apices of all of the femora, and all of the tibiae and tarsi, the circular subapical secondary gonopore, and the distinctly ovoid apex of the endosoma.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea

DISCUSSION: *Sejanus brassi* is similar in appearance to *Sejanus howardi,* but the latter taxon has completely yellowish femora.

HOLOTYPE: **PAPUA NEW GUINEA: Eastern Highlands Prov:** Purosa Camp, Okapa area, 15mi. SSE of Okapa Patrol Post, 1950 m., September 26-30, 1959, L. J. Brass. 1♂ (AMNH).

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: Central Province:** Mt. Dayman, Maneau Range, 9.81683°S 149.29001°E, 877 m, 30 Jun 1953 - 13 Jul 1953, G. M. Tate, Paratype, 1♂ (00196103) (AMNH). **Eastern Highlands:** Purosa Camp, Okapa area, 15 Mi. SEE Okapa Patrol Post, Camp #10, 6.66362°S 145.5655°E, 1950 m, 20 Sep 1959, L. J. Brass, Paratype, 1♂ (00196099) (AMNH); 26 Sep 1959 - 30 Sep 1959, L. J. Brass, Paratype, 3♂ (00196100 - 00196102) (AMNH).

Sejanus brevinger Yasunaga

Sejanus brevinger Yasunaga 2001: 124, figs 6 and 11 (n. sp., descr., disc., DV, MG).

DIAGNOSIS: Recognized by the small size, the completely dark brown hemelytron lacking any white pigmentation on the anterior margin of the cuneus, completely dark hind-femora, and the rounded apex of the endosoma.

DESCRIPTION: See Yasunaga (2001).

HOSTS: *Mallotus* sp. (Euphorbiaceae).

DISTRIBUTION: Japan (Shikoku, Kyushu, Ryukyus: Okinawa Is.).

DISCUSSION: The small size, short hind-femora, dark hemelytron and body, and the C-shaped endosoma as illustrated and documented in the original description clearly indicate this species firmly belongs to *Sejanus,* even though I was unable to examine specimens of this species directly. This species is unique in being almost completely dark brown, whereas most *Sejanus* species have at least part of the cuneal margin white and the apical half of the tibiae golden.

HOLOTYPE: JAPAN: Ryukyus: Okinawa Is., Mt. Nishimedake, Kunigami Village., 25.v.1993, T. Yasunaga. 1♂ (HUES). [not examined]

Sejanus brittoni Carvalho and Gross

Figures (3-4, 3-23: A-D)

Sejanus brittoni Carvalho and Gross 1982: 17, figs. 16-18, 99 (n. sp., descr., DV, MG)

DIAGNOSIS: Recognized from other members of *Sejanus* by the deep burgundy-red coloration of the hemelytron, the partial pale transverse fascia across the median of the claval suture, and the presence of a serrated membrane along the dorsal surface and apex of the endosoma. *Sejanus brittoni* is similar in coloration to *S. palumae* but the red coloration basally on the femora in *S. brittoni* and the structure of the apex of the endosoma clearly separates the two species. Females are nearly identical in coloration and patterning to males and are identical to females of *S. palumae*.

REDESCRIPTION: *Male*: Macropterous, small, elongate and parallel-sided. Total length 2.47-3.12mm, width across pronotum 0.85- 0.96, width across widest part of wings 0.99-1.24. COLORATION: Eyes deep red to purple. Labium light brown with medial segments a lighter gold color. First antennal segment gold, second antennal segment gold basally and dark distally for last one-third of total length, third antennal segment gold basally for first one-third of the total length, fourth segment completely dark brown. Dorso-lateral margin of metepisternum and scent gland continuous in coloration with thorax. Coxae mostly dark red to brownish with apical margin with faintly white. All femora reddish basally, gold distally. Tibiae gold, meta-tibiae with parallel rows of dark spicules. Basal tarsomeres gold, darkening distally to brown in last segments. Hemelytra light red to dark red with a partial, faint gold transverse fascia across the median of the clavus just posterior to the posterior apex of the scutellum. Anterior margin of cuneus with two white spots that are confluent in some specimens, one along the lateral margin and one next to the anterior margin with the membrane, the remainder of the cuneus dark red. Membrane light brown with medial lightening and posterior margin of wing veins tinted red. Abdomen dark red. STRUCTURE: Frons convex, clypeus exerted and visible in the dorsal view of the head. Vertex flat, the posterior margin flat, width approximately equal to one eye. Eyes distinctly removed from dorsal surface of vertex in anterior view, occupying the entire height of the head in lateral view, the posterior margin partially obscuring the anterior of the pronotum. Labium extending past the apex of the meta-coxae. Second antennal segment one and one third times longer than width of head. Hind femora approximately one and one-third times longer than pro and meso-femora. GENITALIA: Pygophore: Relatively small and lacking elaborations, occupying about one-fourth length of abdomen, ventral margin sloping upwards towards apex. Endosoma: Relatively small, slender, C-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, horse-collar shaped but overlapping in lateral view of illustration, located at apex of endosoma (Fig. 3-23: A). Phallotheca: Of phyline type, fairly small, L-shaped, apex relatively wide and gently tapering toward a point (Fig. 3-23: D). Right Paramere: Paramere small, smaller in total size than left paramere, parallel-sided with a tapering, pointed apex (Fig. 3-23: B). Left Paramere: Left paramere small; posterior process slender and pointed, straight, with apex directed perpendicular to the base of the paramere, relatively short and close in size to the anterior process, possessing sensory pits; anterior process stout but without pits on interior margin, dorsal surface near the median of the total height of the paramere (Fig. 3-23: C).

Female: Macropterous, small, rounded with convex lateral margins. Total length 2.33-2.77mm, width across pronotum 0.90-1.02, width across widest part of wings 1.14-1.29. STRUCTURE: Width of the vertex just short of being half the total width of the head. Length of second antennal segment one and one-tenth times the total width of the head. COLORATION: Same coloration pattern as males with the following exceptions: hemelytron darker and browner in coloration and the partial transverse fascia more obvious.

HOSTS: Primarily Myrtaceae, but also found on Rhamnaceae, Lauraceae, Elaeocarpaceae, Fabaceae, Araliaceae, Casuarinaceae, and Cunoniaceae.

DISTRIBUTION: Eastern Australia.

DISCUSSION: Carvalho and Gross (1982) stated that this species was collected at the same locality and time as *Sejanus palumae*. Both share nearly identical external morphologies, but differ in the structure of the male endosoma. My investigation of the two nominal species confirms that they do in fact have subtle differences in the external morphology as well as the male genitalia. Both species have a serrated membrane along the dorso and medial margins of the endosoma, which was not documented in the original literature. *Sejanus brittoni* differs from *S. palumae* in that the serrated membrane terminates subapically and the apex has a separate serrated portion, whereas in *S. palumae* the serrated membrane extends past the dorsal surface of the apex and partially around the anterior surface. Based on the original description and examination of the holotypes of *Sejanus rosei rosei* Carvalho and Gross and *Sejanus rosei obscurior* Carvalho and Gross, both are females of *S. palumae* Carvalho and Gross and therefore are synonymized.

HOLOTYPE: **AUSTRALIA: Queensland**: Paluma Dam, 30-31.xii.1964, H.A. Rose 1♂ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: New South Wales:** 0.5km SE of Lansdowne, 29 Oct 1990, G. Williams, *Elaeocarpus obovatus* G.Don (Elaeocarpaceae), 1♂ (00393667) (AM); 12 Nov 1990, G. Williams, *Syzygium smithii* (Poir.) Nied. (Myrtaceae), 1♀ (00393665) (AM); 19 Nov 1990, G.A. Williams, *Rhodomyrtus psidioides* (G.Don) Benth. (Myrtaceae), 1♂ (00371965) (AM). 3 km N of Lansdowne, via Taree, 31.757°S 152.534°E, 30 Oct 1990, G. Williams, *Cryptocarya microneura* Carl Meissner (Lauraceae), 1♂ (00274182) (AM). 4 km NNW of Lansdowne, 33.865°S 150.951°E, 13 Feb 1992, G. Williams, *Alphitonia excelsa* (Fenzl) Benth. (Rhamnaceae), 1♂ (00274183) (AM); 22 Feb 1992, G. Williams, *Alphitonia excelsa* (Fenzl) Benth. (Rhamnaceae), 1♂ (00274162) (AM). Ashfield, 33.8991°S 151.1246°E, 13 Apr 1980, D.

A. Doolan, 1♀ (00393688) (AM). Bournda National Park, North Wallagoot, Turingal Head, 36.78452°S 149.9568°E, 16 m, 20 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Kunzea ambigua* (Sm.) Druce (Myrtaceae), det. NSW staff NSW658199, 2♂ (00272717, 00272718), 1♀ (00272716) (AMNH). Dee Why Beach, off Dee Why Parade Road, 33.75°S 151.28333°E, 22 Nov 2006 -23 Nov 2006, K. Menard and N. Tatarnic, *Acacia mearnsii* (Fabaceae), 1♀ (00108575) *Melaleuca* sp. (Myrtaceae), 1♀ (00108560) (AMNH). Dorrigo National Park, 30.382°S 152.751°E, 13 Nov 1990 -15 Nov 1990, Kireychuk, 2♂ (00229510, 00229511) (ZISP). O'Sullivan Gap, 10km NE by N of Buladelah, 32.33333°S 152.31666°E, 15 Nov 1976, I.F.B. Common & E.D. Edwards, 1♀ (00393664) (AM). Royal National Park, Lady Carrington Drive, 34.15°S 151.0293°E, 78 m, 02 Dec 2006, K. Menard and N. Tatarnic, *Acacia mearnsii* (Fabaceae), 1♂ (00108578) (AMNH). St. Forest W of Ulladulla, above Carters Creek, 35.5152°S 150.0346°E, 200 m, 11 Nov 1995, Schuh and Cassis, *Astrotricha latifolia* Benth. (Araliaceae), det. B.M. Wiecek 1996 NSW 396004, 1♂ (00272715) (AMNH). Wingham, 31.865°S 152.368°E, 22 Nov 1990, G. Williams, *Waterhousia floribunda* (F.Muell.) B.Hyland (Myrtaceae), 1♀ (00393666) (AM); 24 Dec 1990, G. & T. Williams, *Tristaniopsis laurina* (Sm.) Peter G.Wilson & J.T.Waterh. (Myrtaceae), 1♀ (00371964) (AM). approx. 0.5 km SE of Lansdowne via Taree, 31.785°S 152.538°E, 29 Oct 1990, G. Williams, *Elaeocarpus obovata* G.Don (Elaeocarpaceae), 1♂ (00371992) (AM). **Queensland:** ***North Queensland Co.:*** Cardstone, 29 Dec 1965, K. Hyde, 1♀ (00393684) (AM). Acacia Ridge, Brisbane, 17 Oct 1964, Unknown, 1♂ (00392787) (MVMA). Atherton Tablelands, Curtain Fig. Tree National Park, 17.28736°S

145.57233°E, 762 m, 30 May 2006, Cassis, Barrow, Finlay, Symonds, 1♀ (00195668) (AMNH). Brisbane, 27.46785°S 153.02801°E, 10 Apr 1961 -15 Apr 1961, J. L. & M. Gressit, 1♂ (00318931) (BPBM). Crediton Creek, near Eungella, 12 Dec 1961, McAlpine & Lossin, Paratype, 1♂ (00393298) (AM). Millaa Millaa, 12km S Rt. 25, 31°S 147.61666°E, 01 Sep 1990, T. J. Henry, 3♂ (00374130 - 00374132), 9♀ (00374133 - 00374141) (USNM). Monto, 25 Km N., 24.68333°S 150.96666°E, 13 Dec 1990, T. Gush, 1♂ (00274273) (AM). Moses Ck. 4km NbyE of Mt. Finnigan, 15.47°S 145.17°E, 14 Oct 1980 -16 Oct 1980, T. Weir, 2♀ (00393686, 00393687) (AM). Mt. Lewis, 11.3 km along Mt. Lewis Road, 16.59194°S 145.27083°E, 30 Apr 1998, G. Cassis, 3♂ (00371867 - 00371869) (AM). National Park, Mcpherson Range, 28.35°S 153°E, 14 Mar 1982, Darlington, 1♀ (00318930) (BPBM). Paluma, 2km W., 19.01666°S 146.2°E, 02 Dec 1990, T. Gush, 4♂ (00274269 - 00274272), 1♀ (00274268) (AM). Tully Falls, 17.783°S 145.567°E, 900 m, 10 Mar 1956, J. L. Gressitt, Light Trap, 1♂ (00318914) (BPBM). **Tasmania:** 3 km E of Orford, 42.55999°S 147.8482°E, 25 m, 14 Nov 2002, Cassis, Schuh, Schwartz, Silveira, 1♀ (00272383) (AMNH). Freycinet National Park, 41.99339°S 148.2814°E, 70 m, 14 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Allocasuarina littoralis* (Salisb.) L.A.S.Johnson (Casuarinaceae), det. NSW staff NSW658170, 1♀ (00272382) (AM), *Allocasuarina littoralis* (Salisb.) L.A.S.Johnson (Casuarinaceae), det. NSW staff NSW658170, 6♀ (00108577, 00272378 - 00272381, 00272384) (AMNH). Friendly Beaches, Freycinet Peninsula, 41.98819°S 148.2876°E, 19 m, 13 Nov 2002, Cassis, Schuh, Schwartz, Silveira, *Allocasuarina littoralis* (Salisb.) L.A.S.Johnson (Casuarinaceae), det. NSW staff NSW658165, 10♂ (00108561, 00272365 - 00272372, 00272374), 3♀ (00108559, 00108574, 00272375) *Kunzea ambigua* (Sm.) Druce (Myrtaceae), det. NSW staff NSW658156, 1♂ (00108566) *Kunzea ambigua* (Sm.) Druce (Myrtaceae), det. NSW staff NSW658166, 9♂ (00272357 - 00272364, 00272373), 2♀ (00272376, 00272377) (AMNH). **Victoria:** Lower Glenelg National Park, 38.0476°S 141.1596°E, 20 m, 07 Nov 2002, Cassis, Schuh, Schwartz, Silveira, 1♀ (00272814) (AMNH). nr Belka R., Mallacoota, 02 Sep 1989 - 03 Sep 1989, McAlpine & Martin, 1♀ (00393663) (AM).

Sejanus chinai (Knight)

Idatiella chinai Knight, 1938, p. 27 (n.sp.)

Sejanus chinai (Knight) – Carvalho 1958: 141 (cat.); Schuh, 1984: 161 (disc.).

DIAGNOSIS: Similar in coloration and size to *Sejanus pricillianus* but differs in the longer, completely dark brown second antennal segment. Also recognized by the completely black first antennal segment, and the white anterior margin of the cuneus taking up two-fifths of the total area of the cuneus.

DESCRIPTION: See Knight (1938).

HOSTS: Unknown.

DISTRIBUTION: India

DISCUSSION: Schuh (1984) stated that the holotype of this taxon presumably was deposited at the British Museum (Natural History), but did not examine it. I was also not able to examine the type, nor subsequently identified specimens. However, based on the original description the species appears to be within the same size range, coloration, and body form of other *Sejanus* taxa, particularly *Sejanus pricillianus*, with which it was compared in the original diagnosis.

HOLOTYPE: **INDIA: South India:** Kodai Kanal, T.V. Campbell, 1♀ (BMNH). [not examined].

Sejanus cinnameus Schuh

Sejanus cinnameus, Schuh, 1984: 161, figs 499, 521, 526-528 (diag., descr., disc., DV, MG).

DIAGNOSIS: Recognized by the reddish-brown coloration, the two faint white spots on the anterior margin of the cuneus, the light coloration of the hemelytra, and the elongate J-shaped male endosoma with a spine-like process at the apex.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: The coloration of this species is similar to that of *Sejanus brittoni* and *Sejanus palumae*, but *Sejanus cinnameus* can be distinguished by the form of the male genitalia and the more brownish coloration.

HOLOTYPE: **PAPUA NEW GUINEA: Western Highlands Prov:** 6.4 km. W of Wabag, 2020 m., June 13, 1963, J. Sedlacek. 1♂ (BPBM) [not examined].

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: Eastern Highlands:** No. 7, Kotuni, south slopes Mt. Otto, 5.97991°S 145.48575°E, 2200 m, 04 Aug 1959 - 20 Aug 1959, L. J. Brass, Paratype, 1♂ (00196104) (AMNH). **Enga Province:** 6.4 km W

Wabag, 5.483°S 143.641°E, 2020 m, 13 Jun 1963, J. Sedlacek, Paratype, 1♂ (00095332), Paratype, 1♂ (00196105) (AMNH), Paratype, 5♂ (00321180 - 00321184) (BPBM). **Southern Highlands:** Betege, 20km NW of Koroba, 5.61062°S 142.57485°E, 1600 m, 21 Oct 1963, R. Straatman, Light Trap, Paratype, 1♂ (00321179) (BPBM).

Sejanus crassicornis (Poppius)

Eosthenarus crassicornis Poppius 1915: 73 (n. sp)

Chlamydatus crassicornis: Carvalho 1958: 32 (cat.); Carvalho 1980: 650 (diag., type specimen).

Sejanus crassicornis: Schuh, 1995: 245 (cat.)

DIAGNOSIS: See generic diagnosis

DESCRIPTION: See Poppius (1915).

HOSTS: Unknown.

DISTRIBUTION: Taiwan

DISCUSSION: I was not able to examine specimens of this species, nor images of the holotype. However, based on the brief description of the type by Carvalho (1980) it appears to have the usual overall dark brown coloration, with the apical half of the second antennal segment dark brown, the tibiae lacking spots at the bases of the tibial spines.

HOLOTYPE: **TAIWAN [Formosa]:** Sauter, Takan, 1907 1♂. (ZMUH). [not examined].

Sejanus ecnomioides Schuh

Sejanus ecnomioides Schuh, 1984: 162, figs 498, 534, 549 (diag., descr., disc., DV, MG).

DIAGNOSIS: Recognized by the castaneous coloration, the two white spots on the anterior margin of the cuneus, the pale first antennal segment, golden colored trochanters and extreme distal portions of all femora, the dorsally expanded medial portion of the left paramere forming a scoop-shape, the apical spine on the endosoma being nearly perpendicular to the main body, and the lack of a visible secondary gonopore.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Malaysia

DISCUSSION: Schuh (1984) noted that this species is very similar in appearance, overall morphology, and structure of the male genitalia to *Sejanus ecnomiscos* and *Sejanus ecnomios*, but indicated that *S. ecnomioides* is smaller in size than *S. ecnomios*, and the white spots on the cuneus in *S. ecnomioides* are more intense than in the other taxa.

HOLOTYPE: **MALAYSIA: Malaya:** Cameron Highlands, Mt. Bichang, January 2-7, 1959, L. W. Quate. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **MALAYSIA: Pahang:** ***Cameron Highlands Co.:*** Mt. Brichang, 4.51472°N 101.38355°E, 1807 m, 02 Jan 1959 - 07 Jan 1959, L. W. Quate, Paratype, 1♂ (00321171) (BPBM).

Sejanus ecnomios Schuh

Sejanus ecnomios Schuh, 1984: 162, figs 499, 535, 537-540, 541-545 (diag., descr., disc., n. sp., diag., descr., DV, MG, figs. head-pronotum).

DIAGNOSIS: Recognized by the relatively large size, the nearly completely dark coloration, the two separate white spots on the anterior margin of the cuneus, the dorsal-medial margin of the left paramere expanded and with the anterior process directed in an alternate direction from the posterior process, and the nearly U-shaped endosoma with the secondary gonopore appearing as a twisted circle and with an apical spine.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: Schuh (1984) hypothesized that this species is closely related to S. *ecnomioides* and *S. ecnomiscos* based on the expanded dorsal-medial margin of the left paramere, a feature which is found nowhere else in Leucophoropterini.

HOLOTYPE: **PAPUA NEW GUINEA: Morobe Prov.:** Mt. Kaindi, 2400 m., January 27, 1963, MV light, J. Sedlacek. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **MALAYSIA: Pahang: *Cameron Highlands Co.:*** Mt. Brichang, 4.51472°N 101.38355°E, 1807 m, 02 Jan 1959 - 07 Jan 1959, L. W. Quate, Paratype, 1♂ (00196106) (AMNH). **PAPUA NEW GUINEA: Morobe Province:** 16km SW of Wau, 7.45893°S 146.63596°E, 2706 m, 31 May 1962, J. L. Gressitt, Light Trap, Paratype, 1♂ (00321165) (BPBM). Mount Kaindi, 7.35°S 146.683°E, 2400 m, 08 Jun 1962 - 09 Jun 1962, J. Sedlacek, Light Trap, Paratype, 1♂ (00321163) (BPBM); 27

Jan 1963, J. Sedlacek, Paratype, 1♂ (00095333) (AMNH), Light Trap, Paratype, 5♂ (00321158 - 00321162) (BPBM). Mount Kaindi, 7.35°S 146.6833°E, 2360 m, 27 Jan 1963, J. Sedlacek, Paratype, 1♂ (00196107) (AMNH); 18 Sep 1972, G.G.E. Scudder, Paratype, 1♂ (00196108) (AMNH). Wau, 7.3333°S 146.71667°E, 1200 m, 17 Jan 1963 - 20 Jan 1963, J. Sedlacek, Light Trap, Paratype, 1♂ (00321164) (BPBM).

Sejanus ecnomiscos Schuh

Sejanus ecnomiscos Schuh, 1984: 164, figs 498, 536, 546-548 (diag., descr., disc., n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by the nearly castaneous coloration, the presence of two white spots on the anterior margin of the cuneus, the dorsally expanded dorso-medial area of the left paramere, the horse-collar-shaped secondary gonopore, and the apex of the endosoma terminating in a long, sinuous spine.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: Schuh (1984) hypothesized that this species is closely related to *S. ecnomioides* and *S. ecnomios* based on the expanded dorsal-medial margin of the left paramere. However, *S. ecnomiscos* is unique by having a horse-collar-shaped secondary gonopore subapically and a long tapering spine at the apex of the endosoma parallel to the main body, attribues that are absent in the other two taxa.

HOLOTYPE: **PHILIPPINE ISLANDS: Mindanao:** Misamis Oriental, Mt. Pomalihi, 21 km W of Gingoog City, 800 - 1000 m., October 9, 1965, light trap, H. M. Torrevillas. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PHILIPPINES: Camarines Sur:** Mt. Isarog, Pili, 13.70805°N 123.75083°E, 800 m, 28 Apr 1965, H. M. Torrevillas, Light Trap, Paratype, 3♂ (00321195 - 00321197) (BPBM). **Mindano:** Mis. Or., Mt. Pomalihi, 21 km W. Gingoog City, 8.81118°N 124.92327°E, 859 m, 15 Sep 1965, H. M. Torrevillas, Light Trap, Paratype, 1♂ (00321192) (BPBM); 06 Oct 1965, H. M. Torrevillas, Light Trap, Paratype, 1♂ (00321193) (BPBM); 07 Oct 1965, H. M. Torrevillas, Light Trap, Paratype, 1♂ (00321191) (BPBM); 09 Oct 1965, H. M. Torrevillas, Light Trap, Paratype, 1♂ (00321194) (BPBM); 11 Oct 1965, H. M. Torrevillas, Paratype, 3♂ (00196109 - 00196111) (AMNH).

Sejanus elongatus Schuh

Sejanus elongatus Schuh, 1984: 165, figs 499, 522, 529-533 (diag., descr., disc., n. sp., diag., descr., DV, MG, figs. head-pronotum).

DIAGNOSIS: Recognized by the relatively elongate body form, the overall castaneous coloration of the body and hemelytra, the hemelytra with white lateral markings on the corium adjacent to the median of the clavus, the white coloration of the basal length of antennal segment three, the yellowish first antennal segment, the single white spot on the interior anterior margin of the cuneus, and the serrated membrane on the apical half of the endosoma.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Indonesia, Papua New Guinea.

DISCUSSION: *Sejanus elongatus* is unique in having the lateral white patches adjacent to the clavus, which are not present in any of the other species of *Sejanus*. A serrated membrane on the endosoma is also found in *Sejanus brittoni, Sejanus palumae* and *Sejanus melas*.

HOLOTYPE: **INDONESIA: West Irian:** Wisselmeren, Itouda, Kamo Valley, 1500 m., August 12, 1955, light trap, J. L. Gressitt. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **INDONESIA: Irian Jaya:** Swart Val.: Karubaka, 3.6°S 138.4667°E, 1500 m, 09 Nov 1958, J. L. Gressitt, 1♂ (00095334) (AMNH). Swart Val. Karubaka, 1550 m, 16 Nov 1958, J. L. Gressitt, Paratype, 1♂ (00321178) (BPBM). **Papua:** ***Kamo-Debei Division Co.:*** Wisselmeren, 1700 m, 13 Aug 1955, J. L. Gressitt, Paratype, 1♂ (00321177) (BPBM). ***Paniai Division Co.:*** Wesselmeren: Tage Lake, 3.95561°S 136.30057°E, 1777 m, 04 Aug 1955, J. L. Gressitt, Paratype, 1♂ (00321175) (BPBM). Bokondini, 40km N of Baliem Val., 3.88589°S 138.8471°E, 2325 m, 16 Nov 1961 - 23 Nov 1961, L. W. Quate, Paratype, 1♂ (00321176) (BPBM). **PAPUA NEW GUINEA: Western Province:** Star Mts. Sibil Val., 5.04823°S 140.97958°E, 1245 m, 18 Oct 1961 - 08 Nov 1961, S. Quate & L. Quate, Paratype, 2♂ (00196112, 00196113) (AMNH), Paratype, 3♂ (00321172 - 00321174) (BPBM).

Sejanus funerellus Schuh

Sejanus funerellus Schuh, 1984: 170, figs 498, 551, 567-569 (diag., descr., disc., n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by its relatively small size and ovoid shape, the overall castaneous coloration without white pigmentation on the corium or cuneus, the yellowish first antennal segment, basal half of the second antennal segment and the pro and meso-tibiae, and the male endosoma with a ovoid secondary gonopore.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: Schuh (1984) stated that *Sejanus funerellus* is similar in size and coloration to type species *Sejanus funereus* and *Sejanus funeroides*, but is distinguished from the two based on the dimensions and the shape of the secondary gonopore.

HOLOTYPE: **PHILIPPINE ISLANDS: Negros Island:** Camp Lookout, Dumaguete, May 20, 1961, T.C. Schneirla and A. Reyes. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PHILIPPINES: Negros Oriental:** Dumaguete, Camp Lookout, 9.3103°N 123.3081°E, 06 Feb 1961, T. Schneirla & A. Reyes, Paratype, 1♂ (00196134) (AMNH); 15 Feb 1961 - 14 Apr 1961, T. Schneirla & A. Reyes, Paratype, 10♂ (00196120 - 00196121, 00196123 - 00196128, 00196132 - 00196133) (AMNH); 20 Mar 1961, T. Schneirla & A. Reyes, Paratype, 1♂ (00196129) (AMNH); 03 May 1961, T. Schneirla & A. Reyes, 1♂ (00196137) (AMNH); 20 May 1961, T. Schneirla & A. Reyes, Paratype, 3♂ (00196130, 00196135 - 00196136) (AMNH); 22 May 1961, T.

Schneirla & A. Reyes, Paratype, 2♂ (00196119, 00196131) (AMNH); 25 May 1961, T. Schneirla & A. Reyes, Paratype, 1♂ (00196122) (AMNH).

Sejanus funereus Distant

Sejanus funereus Distant, 1910: 21 (n.sp.); Carvalho: 1958: 141 (cat.); Schuh: 1984: 170, figs 552, 564-566 (diag., DV, MG).

DIAGNOSIS: Recognized by its relatively small size and ovoid shape, the overall castaneous coloration with two confluent white spots on the anterior margin of the cuneus, the yellow first antennal segment, first one-third to one-half of the second antennal segment, apices of all femora, all tibiae and tarsi, and the apex of the endosoma with two lateral thickenings and no visible secondary gonopore.

DESCRIPTION: See Distant (1910) and Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: South India, Sri Lanka.

DISCUSSION: This is the type species of *Sejanus,* and though the external morphology of most Indo-Pacific, Oriental and Palearctic *Sejanus* spp. is nearly identical, other species differ in the shape of the apex of the male endosoma and parameres. *Sejanus funereus* has one of the most simplified forms of the male endosoma, being a simple C-shaped tube with no visible secondary gonopore, whereas most species have the secondary gonopore visible and have various elaborations on the morphology of the apex (e.g. *Sejanus ecnomiscos*).

HOLOTYPE: **SRI LANKA:** Ceylon, E. E. Green, Holotype, 1♂ (00085515) (BMNH). [not examined].

SPECIMENS EXAMINED: **INDIA: Tamil Nadu:** Anamalai Hills, Cinchona, 10.06666°N 76.91666°E, 1067 m, Apr 1956, P.S. Nathan, 1♂ (00095337) (AMNH). **SRI LANKA: Central Prov.:** Elkaduwa, Hunas Falls Hotel, 7.40194°N 80.68972°E, 747 m, 28 Mar 1999, T.J. Henry & A. Wijisekara, *Lantana camara* (Verbenaceae), 1♀ (00301019) (USNM). Sri Lankan Agric. Res. Sta. Sita Eliya (3km SE of Nuwara Eliya), 22 Mar 1999, T.J. Henry & A. Wijisekara, *Mangifera indica* (Anacardiaceae), 1♀ (00271661) (USNM). **Southern Province:** Kanneliya, 6.22579°N 80.38323°E, 61 m, 15 Oct 1976 - 17 Oct 1976, G. F. Hevel, R. E. Dietz, S. Karunaratne, D. W. Balasooriya, 1♂ (00271664) (USNM).

Sejanus howardae Carvalho and Gross

Figures (3-4, 3-23: I-K)

Sejanus howardae Carvalho and Gross 1982: 16, fig. 98 (n. sp., descr., disc., DV)

DIAGNOSIS: Similar in color pattern to *Sejanus funereus* and *Sejanus pricillianus* in being completely brown, lacking a transverse fascia, and having two white spots on the anterior margin of the cuneus. However, the completely light hind-tibiae and the shape of the apex of the male endosoma in *S. howardae* clearly differentiates *S.howardae* from the other two species.

REDESCRIPTION: *Male*: Macropterous, small, elongate and parallel-sided. Total length 2.03-2.23mm, width across pronotum 0.77- 0.90, width across widest part of wings 0.94- 0.99. COLORATION: Eyes deep red to purple. Labium brown. First antennal segment gold, second antennal segment gold basally and dark distally for at least one fourth of the total length of the segment, third and forth antennal segments gold. Thorax: Pronotum, scutellum and thorax dark brown. All coxae dark brown. Pro-femora dark brown basally, gold distally, meso and meta-femora predominantly dark brown with weak paling to reddish at margin with tibiae. All tibiae completely gold, meta-tibiae with parallel rows of dark spicules. Tarsomeres gold. Hemelytra completely brown. Anterior margin of cuneus with two lateral white spots with a reddish tinge at the margin with the cuneal fracture. Membrane light brown with medial lightening, lacking pigmentation on the wing veins. Abdomen dark brown. STRUCTURE: Frons convex, clypeus exerted and visible in the dorsal view of the head. Vertex flat, the posterior margin flat, wider than the width of one eye. Eyes distinctly removed from dorsal surface of vertex in anterior view, occupying the entire height of the head in lateral view, the posterior margin partially obscuring the anterior of the pronotum. Labium just passing the apex of the meta-coxae. Second antennal segment over one and one-tenth times longer than width of head. Hind femora less than one and one-fourth times longer than pro and meso-femora.

GENITALIA: Pygophore: Relatively small and lacking elaborations, occupying about one-fourth length of abdomen, ventral margin sloping upwards towards apex.

Endosoma: Small, slender, C-shaped, composed of two straps united by a smooth membrane and twisting medially, apex spine-like, twisted and reflexed. Secondary gonopore small, horse-collar shaped, located subapically on endosoma (Fig. 3-23: I).

Phallotheca: Fairly small, L-shaped, apex broadly tapering toward a point (Fig. 3-23: K). Right Paramere: Small, parallel-sided, apex in the form of a spine-like process, nearly identical to *S. palumae*. Left Paramere: Left paramere small, posterior process relatively slender, with a straight dorsal margin, directed dorsally, relatively elongate compared to the anterior process or relatively short and closer in size to anterior process, and with sensory pits; anterior process stout but without sensory pits on interior margin (Fig. 3-23: J).

Female: Macropterous, small, rounded with convex lateral margins. Total length 2.55-2.62mm, width across pronotum 0.95-1.02, width across widest part of wings 1.08-1.19. STRUCTURE: Vertex taking over half of the total width of the head, over one and a half times as wide as the width of one eye. Second antennal segment one and one-firth times wider than the total width of the head. COLORATION: Same coloration pattern as males.

HOSTS: Unknown, collected at lights.

DISTRIBUTION: Queensland.

DISCUSSION: *Sejanus howardae* shares similarities in size, coloration, and possessing a smooth membrane over the endosoma like most of the *Sejanus* taxa from the Indo-Pacific. The other two strictly Australian *Sejanus* species, *S. palumae* and *S. brittoni*, both of which are present in Eastern and Southern Australia, have several unique characters such as the reddish coloration and serrated membrane on the endosoma that indicate that they are likely derived members of the genus unlike *S. howardae*.

HOLOTYPE: **AUSTRALIA: Queensland**: Paluma Dam, 30-31.xii.1964, H.A. Rose 1♂ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: AUSTRALIA: Australian Capital Territory:** Canberra, 35.33333°S 149.16666°E, 26 Aug 1990, T. J. Henry, 1♂ (00271757) (USNM). **Queensland:** 7.5km S. Henrietta Crk; Palmerston Nat. Forest; 28km S of Millaa Millaa, 17.51666°S 145.61666°E, 01 Sep 1990, T. J. Henry, 1♂ (00271754), 2♀ (00271755, 00271756) (USNM). Iron Range, Cape York Peninsula, 12.7°S 143.3°E, 24 Jun 1948 - 26 Jun 1948, G. M. Tate, 2♀ (00318926, 00318927) (BPBM). Iron Range, east bank of East Claudie River, 12.8333°S 143.35°E, 15 m, 25 Jun 1948, G. M. Tate, 4♀ (00318919 - 00318921, 00318932) (BPBM). Iron Range Airport, Gordon Strip, N.Q., 5mi S. of Iron Range, 12.78787°S 143.30701°E, 24 m, 10 Jun 1948, G. M. Tate, 1♀ (00318933) (BPBM), 1♂ (00246699), 1♀ (00246701) (TAMU). Kuranda, 16.81722°S 145.635°E, 370 m, 04 Sep 1990, T. J. Henry, 2♂ (00271751, 00271758), 1♀ (00271750) (USNM). Kuranda, 16.81722°S 145.635°E, 200 m, 13 Mar 1956, J. L. Gressitt, Light Trap, 1♂ (00318918), 2♀ (00318916, 00318917) (BPBM). Mission Beach, 17.52°S 146.05°E, 20 m, 12 Nov 1990, W. F. Chamberlain, 1♂ (00246700) (TAMU). S. of Ravenshoe, Evelyn Tableland, 17.75532°S 145.50337°E, 350 m, 10 Mar 1956, J. L. & M. Gressit, Light Trap, 1♂ (00318935) (BPBM). Tozer Range, Cape York Peninsula, 12.7833°S 143.2167°E, 122 m, 01 Jul 1948 - 05 Jul 1948, G. M. Tate, 1♂ (00318924), 1♀ (00318925) (BPBM). Tully Falls, 17.783°S 145.567°E, 900 m, 10 Mar 1956, J. L. Gressitt, 2♂ (00318913, 00318915)

(BPBM). W by S of Black Mt., 26.41879°S 152.85422°E, 225 m, 26 Apr 1981, D. H. Colless, 1♂ (00168827) (ANIC).

Sejanus interruptus (Reuter)

Sthenarus interruptus Reuter, 1906: 79 (n. sp.); Carvalho: 1958: 145 (cat.).

Sejanus interruptus: Kerzhner and Schuh 1995: 5 (n.comb).

DIAGNOSIS: Recognized by the completely dark coloration, the distally golden pro, meso and meta-femora, the completely yellow hind tibiae and tarsi, the yellow first antennal segment and third antennal segment, the lighter brown coloration for the basal half of the second antennal segment, and the two white spots on the anterior margin of the cuneus.

DESCRIPTION: See Reuter (1906)

HOSTS: Unknown.

DISTRIBUTION: China

DISCUSSION: I was able to view images of a male syntype of this species. The coloration, the shape of the head, and the weakly convex lateral margins of the corium confirm that it belongs in *Sejanus*.

HOLOTYPE: **CHINA: Sichuan Prov.:**[Fubyankho River, Between Fubyan and Shintyan], 31.28668°N 102.47937°E, 2716 m, 05 Aug 1893, Potanin,1♂ (ZISP). [not examined].

Sejanus isarog Schuh

Sejanus isarog Schuh, 1984: 174, figs 498, 572, 583-585 (diag., descr., disc., n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by the castaneous coloration, the two large white spots on the anterior margin of the cuneus that are fused along the midline and almost forming a white band, the yellowish third and fourth antennal segments, the distal portion of the pro-femora, pro and meso-tibiae, and all tarsi, and the tube-like endosoma with an almost triangular-shaped secondary gonopore.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: The secondary gonopore in *Sejanus isarog* is very similar in shape to that of *Sejanus neofunereus*, but the external morphology, particularly the coloration of the anterior margin of the cuneus, clearly separates the two species.

HOLOTYPE: **PHILIPPINE ISLANDS: Luzon:** Camarines Sur, Mt. Isarog, Pili, 800 m, April 20, 1965, light trap, H. M. Torrevillas. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PHILIPPINES: Albay Province:** Mt. Mayon, 16 km NW of Lagaspi, 13.25666°N 123.685°E, 900 m, 10 May 1962, H. M. Torrevillas, Paratype, 1♂ (00196402) (AMNH). Mt. Mayon, 16 km NW of Lagaspi, 13.25666°N 123.685°E, 1200 m, 12 May 1962, H. M. Torrevillas, Paratype, 1♂ (00196401) (AMNH). Mt. Mayon, 16km NW of Lagaspi, 13.25666°N 123.685°E, 800 m, 08 May 1962, H. M. Torrevillas, Light Trap, Paratype, 1♂ (00095341) (AMNH). **Angeles City:**

Camp Lookout, Dumaguete, Negros Island, 9.3°N 123.3°E, 396 m, 28 May 1961, T. Schneirla & A. Reyes, 1♂ (00196403) (AMNH).

Sejanus juglandis Yasunga

Sejanus juglandis Yasunaga, 2001: 123, figs 3, 8 (diag., descr., disc., biol., DV, MG).

DIAGNOSIS: This species is recognized by its large size, the completely dark brown hemelytron and body without any white spots or a white band on the apical margin of the cuneus, the apically golden femora, and the C-shaped endosoma with spicules subapical to the secondary gonopore.

DESCRIPTION: See Yasunaga (2001).

HOSTS: Juglandaceae.

DISTRIBUTION: Japan, Russia.

DISCUSSION: I was able to examine a series of specimens identified by Dr. Fedor Konstantiniov from Russia of this species and confirmed their identification based on the male genitalia and large size. Most specimens were later used for molecular data after but not associated with USI numbers. One female specimen was retained as a voucher for the series and was affixed with the USI listed in the Specimens Examined section.

HOLOTYPE: **JAPAN: Hokkaido:** Ishikari, Mt. Teine, Sapporo C., 28.vii.1998, S. Gotoh & M. Yasunaga, ex *Juglans ailantifolia* (Juglandaceae), 1♂ (HUES) [not examined].

SPECIMENS EXAMINED: **RUSSIAN FEDERATION: Primorsky Terr.:** Gornotaezhnoe, 43.65°N 132.15°E, 13 Aug 2006, F. Konstantinov, 1♀ (00195991) (AMNH).

Sejanus luzonicus Schuh

Sejanus luzonicus Schuh, 1984: 174, figs 498, 586, 589-591 (diag., descr., disc., n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by the dark brown coloration, the two separate white spots on the anterior margin of the cuneus, the reddish yellow coloration of antennal segments one, three and four, the yellow basal one-half of antennal segment two, all femora distally, and all tibiae and tarsi, the small size, ovoid shape, the reflexed anterior margin of the endosoma apex and the partially visible secondary gonopore.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: The reflexed shape of the endosomal apex in *Sejanus luzonicus* is unique compared to most of the other *Sejanus* species, in which the apex is nearly straight or curved laterally relative to the main body of the endosoma.

HOLOTYPE: **PHILIPPINE ISLANDS: Luzon:** Camarines Sur, Mt. Isarog, Pili, 800-900 m, April 21, 1965, light trap, H. M. Torrevillas. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PHILIPPINES: Camarines Sur:** Mt. Isarog, Pili, 13.65°N 123.3833°E, 700 m, 13 Apr 1965, H. M. Torrevillas, Light Trap, Paratype, 2♂ (00095342, 00095342) (AMNH).

Sejanus macer Schuh

Sejanus macer Schuh, 1984: 177, figs 499, 587, 592-594 (diag., descr., disc., n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by the elongate body form, the nearly parallel-sided lateral margins, the completely dark castaneous coloration of the body and hemelytron including antennal segment one, all trochanters, all femora excluding the extreme apices adjacent to the tibiae, and meta-tibiae, the single white spot on the interior anterior margin of the cuneus, the spine-like processes at the apex of the endosoma, and the semi-circular shaped secondary gonopore.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Indonesia, Papua New Guinea.

DISCUSSION: Schuh (1984) noted that *Sejanus macer* is nearly identical in body form to *Sejanus elongatus*, however the form of the male genitalia and the lack of white patches on the corium of *S. macer* separate the two taxa.

HOLOTYPE: **INDONESIA: West Irian:** Sururai village area, W shore of Lake Anggi Gitta, 1850 m., July 31, 1957, D. E. Hardy 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: unknown:** Irai R. area, N. of L. Anggi Giji, 1850 m, 25 Jul 1957, D. E. Hardy, Paratype, 1♂ (00196404) (AMNH); 31 Jul 1957, D. E. Hardy, Paratype, 1♂ (00095343) (AMNH).

Sejanus melas Schuh

Sejanus melas Schuh, 1984: 177, figs 499, 588, 595-597 (diag., descr., disc., n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by the relatively large size, the broad body with convex lateral margins, the completely castaneous coloration of the body and hemelytron, the completely dark cuneus lacking white pigmentation, the semi-circular secondary gonopore, and the serrated surface of the distal one-half of the endosoma.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: This taxon is relatively wide for its length, and is unusual in that the femora (excluding the extreme distal margin of the fore femora) are completely dark castaneous to black.

HOLOTYPE: **PAPUA NEW GUINEA: Madag Prov.:** Finisterre Mountains, Moro Crater, 5500 feet., October 30-November 15, 1964, M. E. Bachus, 1♂ (BMNH). [not examined].

Sejanus niveoarcuatus (Reuter)

Sthenarus niveoarcuatus Reuter, 1906: 79; Carvalho: 1958: 146 (cat.).

Sejanus niveoarcuatus: Kerzhner and Schuh 1995: 5 (n.comb).

DIAGNOSIS: see generic diagnosis.

DESCRIPTION: See Reuter (1906).

HOSTS: Unknown.

DISTRIBUTION: China.

DISCUSSION: I was not able to examine specimens of this species, nor images of the holotype. At least one syntype has been located for this taxon in the Zoological Institute of Saint Petersburg and recorded in the PBI database.

SYNTYPE: **CHINA: Sichuan Prov.:** [Tachzhin'kho River Valley], 22 Jul 1893, Potanin, 1♀ (00229457) (ZISP). [not examined].

Sejanus neofunereus Schuh

Sejanus neofunereus, Schuh, 1984: 178, figs 498, 598, 601-603 (diag., descr., disc., DV, MG); Schuh: 1995 (cat.); Kerzhner and Josifov: 1999: 423 (cat.); Yasunaga: 2001: 123 (diag., DV, MG).

DIAGNOSIS: This species is recognized by its small size, ovoid shape, the two white spots on the anterior margin of the cuneus, the dark brown coloration, the first antennal segment, proximal portion of the second antennal segment, and all tibiae and tarsi nearly white, and the blunt apex of the endosoma with a triangular-shaped secondary gonopore.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown; Yasunaga (2001) states found on evergreens.

DISTRIBUTION: Japan, Russia, China and Philippines.

HOLOTYPE: **PHILIPINE ISLANDS: Leyte:** Abuyog, 35 mi. S. of Tacloban, July 5-8, 1961, Philippine Islands National Museum and American Museum of Natural History Expeditions. 1♂ (AMNH).

SPECIMENS EXAMINED: **HONG KONG: New Territories:** Tai Po Kau, 22.4333°N 114.1833°E, 222 m, 01 Jun 1964, Lee Kit Ming and Hui Wai Ming, Light Trap, Paratype, 2♂ (00321101, 00321104) (BPBM); 10 Jun 1964, W.J. Voss and Wai Ming Hui, Light Trap, Paratype, 1♂ (00321102) (BPBM); 03 Jul 1964 - 04 Jul 1964, W.J. Voss and Wai Ming Hui, Light Trap, Paratype, 1♂ (00321103) (BPBM). Pok Ful Lam, 22.26434°N 114.12855°E, 41 m, 29 May 1964 - 30 May 1964, J. L. Gressitt, Light Trap, Paratype, 1♂ (00321108) (BPBM); 30 May 1964 - 31 May 1964, J. L. Gressitt, Light Trap, Paratype, 1♂ (00321105) (BPBM); 31 May 1964, J. L. Gressitt, Light Trap, Paratype, 2♂ (00321106, 00321107) (BPBM). **PHILIPPINES: Angeles City:** Camp Lookout, Dumaguete, Negros Island, 9.3°N 123.3°E, 396 m, 15 Feb 1961 - 15 Apr 1961, T. Schneirla & A. Reyes, Paratype, 1♂ (00196409) (AMNH); 17 May 1961, T. Schneirla & A. Reyes, Paratype, 1♂ (00196408) (AMNH). **Isabela:** San Mariano, 20 Apr 1961 - 10 May 1961, P. I. Natl. Mus. & AMNH Expedition, Paratype, 2♂ (00196406, 00196407) (AMNH). **Leyete:** Dagami, 14 mi SW of Tacloban, 18 Jul 1961, P. I. Natl. Mus. & AMNH Expedition, Paratype, 1♂ (00196405) (AMNH). **TAIWAN: Nantou:** ***Ren-ai Township Co.:*** Huei-Sun For. Rec. Area, 5km NE of Meiyuan, 24.0667°N 120.9833°E, 733 m, 10 Jul 1992 - 11 Jul 1992, T. J. Henry and A. G Wheeler, Jr., 1♂ (00271695) (USNM).

Sejanus palumae Carvalho and Gross

Figures (3-4, 3-6)

Sejanus palumae Carvalho and Gross 1982: 18, figs. 19-21, 100 (n. sp., descr., disc., DV, MG)

Sejanus rosei Carvalho and Gross 1982: 19, fig. 101 (n. sp., descr., disc., DV) – NEW SYNONYMY.

Sejanus rosei obscurior Carvalho and Gross 1982: 20 (n. ssp., descr.); Schuh: 2008 (synonymized with *Sejanus rosei*).

DIAGNOSIS: Similar in coloration to *Sejanus brittoni* but with a more dark brown coloration of the hemelytron, the absence of a transverse fascia across the median of the claval suture in males, less pronounced white cuneal pigmentation, the presence of a narrow yellowish-white band along the dorsal-lateral surface of the metepisternum, only half of the second antennal segment gold basally in males, the lack of red pigmentation on the veins in the membrane, and the primarily yellow femora in both males in females. Type specimens of *Sejanus rosei* are identical to females of *S. palumae* and therefore the taxon synonymized under *S. palumae*.

REDESCRIPTION: *Male*: Macropterous, small, elongate and parallel-sided. Total length 2.47-3.12mm, width across pronotum 0.85- 0.96, width across widest part of wings 0.99-1.24. COLORATION: Eyes deep red to purple. Labium light brown with medial segments a lighter gold color. First antennal segment gold, second antennal segment gold basally and dark distally for at least one half of the total length of the segment, third antennal segment gold basally for first one-third of the total length, fourth segment completely dark brown. Dorso-lateral margin of metepisternum and scent gland with a narrow band of whitish-yellow pigmentation. All coxae, pro and meso femora, and tibiae completely gold. Meta-femora gold basally, light-brown distally. Tibiae gold, meta-tibiae with parallel rows of dark spicules. Basal tarsomeres gold, darkening distally to brown in last segments. Hemelytra light red to dark red with a partial, faint gold transverse fascia across the median of the clavus just posterior to the posterior apex of the scutellum. Anterior margin of cuneus with one lateral faint white spot and the anterior margin transparent and reddish next to the cuneal fracture, the remainder of the cuneus dark red. Membrane light brown with medial lightening, wing veins without pigmentation. Abdomen dark red. STRUCTURE: Frons convex, clypeus exerted and visible in the dorsal view of the head. Vertex flat, the posterior margin flat, wider than the width of one eye. Eyes distinctly removed from dorsal surface of vertex in anterior view, occupying the entire height of the head in lateral view, the posterior margin partially obscuring the anterior of the pronotum. Labium just reaching the apex of the meta-coxae. Second antennal segment over one and one third times longer than width of head. Hind femora approximately one and one-third times longer than pro and meso-femora, all femora weakly flattened dorso-ventrally. GENITALIA: Pygophore: Relatively small and lacking elaborations, occupying about one-fifth the total length of the abdomen, ventral margin sloping upwards towards apex. Endosoma: Relatively small, slender, twisted, C-shaped, composed of a fused tube, with a serrated membrane on the dorsal margin that is continuous along the surface and extends past the apex of the endosoma, terminating at median of apex. Secondary gonopore small, horse-collar shaped, located at apex of endosoma (Fig. 3-23: F). Phallotheca: Of phyline type, fairly small, L-shaped, apex gently tapering toward a point (Fig. 3-23: H). Right Paramere: Paramere moderately sized, smaller than left paramere, parallel-sided with a tapering, pointed apex (Fig. 3:23: E). Left Paramere: Left paramere moderately sized; posterior process slender, with sensory pits, and gently curving ventrally, relatively short and closer in size to anterior process; anterior process stout but without sensory pits on interior margin (Fig 3-23: G).

Female: Macropterous, small, rounded with convex lateral margins. Total length 2.55-2.62mm, width across pronotum 0.95-1.02, width across widest part of wings 1.08-1.19. STRUCTURE: Width of vertex nearly half the total width of the head, over one and a half times the width of one eye. Second antennal segment one and one-fifth times the total width of the head. COLORATION: Same coloration pattern as males with the following exceptions: hemelytron darker and browner in coloration, the hind femora are sometimes distally a gold brown color and females possess a complete transverse fascia.

HOSTS: Unknown. Collected at lights.

DISTRIBUTION: Queensland.

DISCUSSION: *Sejanus brittoni* and *Sejanus palumae* appear to be closely related based on overall coloration and in characters of the male genitalia. Both species have a serrated membrane along the dorso and medial margin of the endosoma which was not documented in the original description; however, *S. brittoni* differs from *S. palumae* in that the serrated membrane extends around the apical margin of the endosoma, whereas it terminates pre-apically in *S. palumae*. Further, both species have females with a transverse fascia which is not usually present in the males, and which is absent in all the other species of *Sejanus*. Based on the original description and examination of the holotypes of *Sejanus rosei rosei* Carvalho and Gross and *Sejanus rosei obscurior* Carvalho and Gross, both species represent females of *Sejanus palumae* Carvalho and Gross, and therefore are treated as junior synonyms.

HOLOTYPE: **AUSTRALIA: Queensland**: Paluma Dam, 30-31.xii.1964, H.A. Rose 1♂ (QM).

SPECIMENS EXAMINED: **AUSTRALIA: Queensland:** Dunbulla State Forest 1.1km along Robson Creek track NW of Dunbulla Forest Drive, 17.11666°S 145.9°E, 25 Apr 1998, G. Cassis, 4♂ (00371854 - 00371857), 9♀ (00371858 - 00371866) (AM). Mt. Lewis, 11.3 km along Mt. Lewis Road, 16.59194°S 145.27083°E, 30 Apr 1998, G. Cassis, 2♀ (00371870, 00371871) (AM). Tully Falls, 17.783°S 145.567°E, 900 m, 10 Mar 1956, J. L. Gressitt, Light Trap, 2♂ (00318928, 00318929) (BPBM).

Sejanus potanini (Reuter)

Sthenarus potanini Reuter, 1906: 77 (n.sp.) Kerzhner: 1988a: 76 (n. comb.); Kerzhner: 1988b: 851 (key); Schuh : 1995: 246 (cat.) ; Todo & Yasunaga: 1996: 43 (list); Kerzhner & Josifov: 1999: 423 (cat.); Yasunaga: 2001: 121, figs 1, 2 and 7 (diag., descr., disc., biol., DV, MG).

DIAGNOSIS: This species is recognized by its large size, the completely dark brown hemelytron and body without any white spots or a white band on the apical margin of the cuneus, the apically golden femora, and the C-shaped endosoma with spicules subapical to the secondary gonopore.

DESCRIPTION: See Reuter (1906) or Kerzhner (1988b).

HOSTS: Broad-leafed trees (Betulaceae, Salicaceae).

DISTRIBUTION: Eastern Russia, China, Japan.

DISCUSSION: I was able to examine a series of specimens identified by Dr. Fedor Konstantiniov from Russia of this species and confirmed their identification based on the male genitalia and large size. Most specimens were later used for molecular data after but not associated with USI numbers. One male and one female specimen were retained as vouchers for the series and were affixed with the USI listed in the Specimens Examined section.

HOLOTYPE: **CHINA: Sichuan Prov.:** [Between Matyagi and Taopin], 28 Aug 1853, Potanin, Holotype, 1♀ (00229422) (ZISP) [not examined]

SPECIMENS EXAMINED: **RUSSIAN FEDERATION: Primorsky Terr.:** Lazovsky Nat Res., 06 Aug 2006, F. Konstantinov, 1♂ (00195678) (AMNH). Vostok Bay, 42.87583°N 132.74306°E, 08 Aug 2006, F. Konstantinov, 1♀ (00195682) (AMNH)

Sejanus pricillianus (Distant)

Idiatella pricillianus Distant, 1910 :20. (descr., n.sp.)

Sejanus pricillianus: Carvalho: 1958: 141 (cat.); Schuh: 1984: 180 (diag., descr.).

DIAGNOSIS: Recognized by the small size, the castaneous coloration, the cuneus with two large white spots along the anterior margin, the yellowish pro-coxae, trochanters, and pro and meso-femora, and the white first antennal segment.

DESCRIPTION: See Schuh (1984) for a detailed redescription.

HOSTS: Unknown.

DISTRIBUTION: India, Sri Lanka.

DISCUSSION: Schuh (1984) investigated the British Museum (Natural History) type collection and was only able to find one male specimen from West Bengal, not the holotype which was listed as being deposited there. Schuh did not designate this specimen as a lectotype (Schuh 1984. I was able to examine several specimens of this taxon from the United States National Collection (USNM) identified by J.C. M. Carvalho and images of one of the type-series specimens taken by Dr. Michael Schwartz. However, I was not able to dissect the male genitalia of the USNM due to their teneral state.

HOLOTYPE: **INDIA: Jharkhand [Bengal]:** Paresnath, 4000-5000 feet, Annandale. 1♂ (BMNH). [not examined].

SPECIMENS EXAMINED: **SRI LANKA: Central Prov.:** Kandy, 7.3016°N 80.6476°E, 498 m, 25 Mar 1971, P. & P. Spangler, 2♂ (00271702, 00271759), 1♂ (00271700) (USNM).

Sejanus serrulatus Schuh

Sejanus serrulatus Schuh, 1984: 181, figs 500, 600, 607-609 (diag., descr., disc., n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by the castaneous coloration, the two white spots on the anterior surface of the cuneus, the dorsal surface of the hemelytron having short sericeous setae in addition to short and recumbent simple setae, and the serrated dorsal and lateral margins of the endosoma with a semi-circular secondary gonopore.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea, Indonesia.

DISCUSSION: *Sejanus serrulatus* is closely related to *Sejanus brittoni* and *Sejanus palumae*, both of which have a serrated membrane on the endosoma that appears almost as a separate lobe on the dorsal surface. However, *S. serrulatus* is easily separated by the much darker coloration and the presence of the short, sericeous setae.

HOLOTYPE: **PAPUA NEW GUINEA: Morobe Prov.:** Wau, August 11, 1972, MV light, G.G. E. Scudder. 1♂ (BMNH). [not examined].

SPECIMENS EXAMINED: **INDONESIA: Irian Jaya:** Swart Val. Karubaka, 1550 m, 10 Nov 1958, J. L. Gressitt, Light Trap, Paratype, 1♂ (00321151) (BPBM). **Papua:** Bokondini, 40km N of Baliem Val., 3.88589°S 138.8471°E, 2325 m, 05 Nov 1961 - 11 Nov 1961, S. Quate & L. Quate, Light Trap, Paratype, 1♂ (00321143) (BPBM). **PAPUA NEW GUINEA: Central Province:** Mt. Dayman, Maneau Range, 9.81683°S

149.29001°E, 877 m, 30 Jun 1953 - 13 Jul 1953, G. M. Tate, Paratype, 1♂ (00196413) (AMNH). **East Sepik Province:** Wum, 3.51667°S 142°E, 450 m, 17 Jul 1955, J. L. Gressitt, Paratype, 1♂ (00321149) (BPBM). **Madang Province:** Finisterre Range, Saidor: Matoko, 5.25392°S 145.41516°E, 124 m, 29 Aug 1958 - 05 Sep 1958, W. W. Brandt, Paratype, 2♂ (00196411, 00196412) (AMNH). **Morobe Province:** Wau, 7.33333°S 146.71667°E, 14 Aug 1972, G. G. E. Scudder, Paratype, 1♂ (00321147) (BPBM); 11 Sep 1972, G. G. E. Scudder, Paratype, 1♂ (00321148) (BPBM). Wau, 7.3333°S 146.71667°E, 1100 m, 14 Aug 1972, G. G. E. Scudder, Paratype, 1♂ (00095345) (AMNH). **Western Highlands:** Korop, 1300 m, 12 Jul 1955, J. L. Gressitt, Light Trap, Paratype, 1♂ (00321150) (BPBM). **unknown:** Eliptamin Valley, 1980 m, 16 Aug 1959 - 30 Aug 1959, W. W. Brandt, Light Trap, Paratype, 1♂ (00321146) (BPBM); 01 Sep 1959 - 15 Sep 1959, W. W. Brandt, Paratype, 1♂ (00196410) (AMNH). Tsenga, Upper Jimmi Valley., 1200 m, 13 Jul 1955, J. L. Gressitt, Light Trap, Paratype, 1♂ (00321145) (BPBM); 14 Jul 1955, J. L. Gressitt, Light Trap, Paratype, 1♂ (00321144) (BPBM).

Sejanus sinuosus Schuh

Sejanus sinuosus Schuh, 1984: 182, figs 500, 610, 622-624 (diag., descr., disc., n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by the completely dark to castaneous coloration with the cuneus lacking any white pigmentation, the elongate body form with nearly parallel-sided lateral margins, the relatively small head and eyes, the posterior process of the left paramere without sensory pits, and the endosoma being S-shaped, split into two overlapping straps at the apex, and without a visible secondary gonopore.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: *Sejanus sinuosus* is one of the only species of *Sejanus* with an S-shaped, narrow endosoma (Schuh 1984: Fig. 622). However, the overall dark coloration, the small size, and the presence of only simple setae, unite this species with the majority of the taxa in this genus.

HOLOTYPE: **PAPUA NEW GUINEA: Morobe Prov.:** Mindik, 1200-1600 m, September 1968, N.L.K. Krauss. 1♂ (BMNH). [not examined].

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: East New Britain Province:** Vunabakan, 10km E. of Keravat., 4.34835°S 152.0956°E, 180 m, 16 Nov 1959 - 20 Nov 1959, T. C. Maa, Paratype, 4♂ (00321099, 00321118 - 00321120) (BPBM). **Eastern Highlands:** Moife, 6.44437°S 145.48958°E, 2100 m, 07 Oct 1959 - 14 Oct 1959, T. C. Maa, Paratype, 3♂ (00196414 - 00196416) (AMNH), Paratype, 4♂ (00321121 - 00321124) (BPBM). Moife, 15km NW of Okapa, 6.43206°S 145.49581°E, 2100 m, 07 Oct 1959 - 14 Oct 1959, T. C. Maa, Paratype, 2♂ (00321116, 00321117) (BPBM). Tapo (Tapu), 3km NW of Kainantu, 6.233°S 145.833°E, 1650 m, 22 Oct 1959, T.C. Maa, Paratype, 1♂ (00095346), Paratype, 1♂ (00196417) (AMNH), Paratype, 3♂ (00321098, 00321125 - 00321126) (BPBM).

Sejanus spiculatus Schuh

Sejanus spiculatus Schuh, 1984: 183, figs 500, 611, 625-627(diag., descr., disc., n. sp., diag., descr., DV, MG).

DIAGNOSIS: Recognized by the light brown hemelytron with a partial white transverse fascia across the majority of the clavus posterior to the scutellum, the two separate white spots on the anterior of the cuneus, the light-colored legs, and the presence of two spicules on the medial surface of the endosoma.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea

Discussion: The presence of a partial transverse fascia in *Sejanus spiculatus* is similar to the condition seen in *Sejanus brittoni* and *Sejanus palumae*, but the former taxon can easily be distinguished by the presence of the two spicules on the lateral margins of the endosoma and the more strongly convex lateral corial margins.

HOLOTYPE: **PAPUA NEW GUINEA: Western Highlands Prov.:** Taenga, Upper Jimmy Valley, 1200 m, July 14, 1955, J. L. Gressit. 1♂ (BMNH). [not examined].

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: Western Highlands:** Korop, 1300 m, 12 Jul 1955, J. L. Gressitt, Light Trap, Paratype, 1♂ (00321153) (BPBM). **unknown:** Karop, Upper Jimmi, 6.433°S 145.083°E, 1300 m, 12 Jul 1955, J. L. Gressitt, Light Trap, Paratype, 1♂ (00095347) (AMNH). Tsenga, Upper Jimmi Valley., 1200 m, 15 Jul 1955, J. L. Gressitt, Light Trap, Paratype, 1♂ (00321152) (BPBM).

Sejanus umi Schuh

Sejanus umi Schuh, 1984: 186, figs 500, 612 – 621 (diag., descr., disc., n. sp., diag., descr., DV, MG, SEM).

DIAGNOSIS: Recognized by the black dorsum and yellowish ventral surface of the head, the prosternal xyphus, and the appendages, the lateral surface of the eyes that are parallel to the anterior margin of the pronotum, the relatively flat dorsal surface of the hemelytron relative to the rest of the body, and the secondary gonopore being reduced to two subapical, lateral processes.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: This species is unique in having the yellowish coloration on the venter, whereas in all other *Sejanus* species the dorsal and ventral surfaces of the head, pronotum and thorax are unicolorous.

HOLOTYPE: **PAPUA NEW GUINEA: Morobe Prov.:** Umi river, Markham Valley, 480 m., November 23, 1959, L. J. Brass 1♂ (AMNH).

SPECIMENS EXAMINED: **INDONESIA: Papua:** Central Mountains, Archbold Lake, 3.41°S 138.53°E, 760 m, 26 Nov 1961 - 03 Dec 1961, S. Quate & L. Quate, Light Trap, Paratype, 1♂ (00321114) (BPBM). **PAPUA NEW GUINEA: Morobe Province:** No.14, Umi River, Markham Valley, 6.45746°S 146.47425°E, 480 m, 17 Nov 1959, L. J. Brass, Paratype, 1♂ (00196418) (AMNH); 20 Nov 1959, L. J. Brass, Paratype, 1♂ (00196419) (AMNH); 23 Nov 1959, L. J. Brass, 1♂ (00196420) (AMNH). Wau, 7.33333°S 146.71667°E, 11 Aug 1972, G. G. E. Scudder, Light Trap, Paratype, 1♂ (00321113) (BPBM). **Sandaun aka West Sepik Province:** Torricelli Mits, Mokai Village, 3.3667°S 141.9667°E, 750 m, 08 Dec 1958 - 15 Dec 1958, W. W. Brandt, Paratype, 1♂ (00321115) (BPBM). **Western Highlands:** Korop, 1300 m, 12 Jul 1955, J. L. Gressitt, 1♂ (00196423) (AMNH). **unknown:** Biniguni, Gwariu River, 150 m, 27 Jul 1953 - 14 Aug 1973, G. M. Tate, Paratype, 2♂ (00196421, 00196422) (AMNH). Karop, Upper Jimmi, 6.433°S 145.083°E, 1300 m, 12 Jul 1955, J. L. Gressitt, Light Trap, Paratype, 2♂ (00321111, 00321112) (BPBM).

Solomonomimus Schuh

Solomonomimus Schuh, 1984: 221 (n. gen., descr., disc.)

TYPE SPECIES: *Solomonomimus roroni* Schuh by original designation.

DIAGNOSIS: Recognized by the flattened pronotal collar, the distinctly shiny head, pronotum, scutellum, the large eyes occupy the entire height of the head in lateral view, the weakly swollen posterior portion of the pronotum that is weakly convex in lateral view and completely obscuring the mesoscutum in dorsal view, the finely punctate and hemelytron that is nearly parallel-sided, the presence of a lateral-posterior swelling on the corium anterior to the cuneal fracture forming a lobe-like process, the posterior area of the cuneus being a darker coloration than the rest of the hemelytron, the broad and parallel-sided abdomen, and the first abdominal sternite broader than long.

Female: Unknown.

HOSTS: Unknown.

DISTRIBUTION: Solomon Islands.

DISCUSSION: This genus is very similar externally to *Ctypomiris* Schuh due to the weak medial constriction and nearly parallel-sided lateral margins of the hemelytron, the nearly rectangular head (especially *Ctypomiris kokure*), and the partial transverse fascia. However, *Ctypomiris* has a distinctive male endosoma with the apex bearing several spine-like processes, which do not occur in *Solomonomimus*. Further, the clypeus is flush with the frons in lateral view for *Solomonomimus,* whereas in both species of *Ctypomiris* the clypeus extends past the frons in lateral view and is visible dorsally.

Solomonomimus roroni Schuh

Solomonomimus roroni Schuh, 1984: 222, figs 715, 718, 726, 727 (n. sp., diag., descr., DV, figs. head-pronotum).

DIAGNOSIS: Recognized by the characters in the generic diagnosis.

DESCRIPTION: See Schuh (1984)

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: I was able to view one paratype of this species, however I did not dissect the male genitalia due to the fragility of the specimen.

HOLOTYPE: **SOLOMON ISLANDS: Guadalcanal:** Roroni, 35 km E. of Honiara, 10 m, 09 May 1964, R. Straatman, Light Trap, 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **SOLOMON ISLANDS: Guadalcanal:** Roroni, 35 km E. of Honiara, 9.45°S 160.23333°E, 10 m, 09 May 1964, R. Straatman, Light Trap, Paratype, 1♂ (00318876) (BPBM).

Transeleucophoroptera, new genus

TYPE SPECIES: *Transeleucophoroptera philippinensis* (Schuh).

DIAGNOSIS: Recognized by the lack of a pronotal collar, elongate body form, the dark brown coloration with a complete white transverse fascia, the white anterior margin of the cuneus and dark brown posterior coloration that is the same coloration as the hemelytron, the punctation on the apex of the clavus and parts of the corium, narrow eyes that dominate the lateral height of the of the head and take up two-thirds of the total width of the head, the posterior margin of the eyes partially obscuring the anterior margin of the pronotum, the relatively narrow compared to the width of the head with the posterior margin of the pronotum being nearly equal in width to the width of the head, the dorsally flat pronotum, the elongate and round hind femora, and the medially constricted hemelytron.

FEMALE: Unknown.

ETYMOLOGY: From the Latin *trans*, intermediate, to represent the intermediary body form between the *Ctypomiris* Group and the *Gulacapsus* Group, and *Leucophoroptera* for the genus of original placement of the two included species; feminine.

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands.

DISCUSSION: *Transeleucophoroptera* is erected to accommodate the Philippine species *Leucophoroptera philippinensis*, which is not closely related to Australian type species *Leucophoroptera quadrimaculata*. *Transeleucophoroptera philippinensis* is by the presence of punctation on the hemelytron and the posterior area of the cuneus being continuous in coloration with the majority of the hemelytron. This taxon is also unique within Leucophoropterini because it both the dark brown and white coloration pattern and elongate head like many members of the *Gulacapsus* Group, but also the hemelytral punctation of most members of the *Ctypomiris* Group. The male genitalia also differ from all other Leucophoropterini, being nearly J-shaped and with a weakly developed semi-ovoid secondary gonopore that extends basally for one-forth of the total length of the endosoma (Schuh 1984: Fig. 493). In almost all other Leucophoropterini the endosoma is clearly S-shaped and the secondary gonopore is either weakly sclerotized, horse-collar shaped, or absent (although see *Sejanus*), and if present never extends so far into the body of the endosoma.

Transeleucophoroptera philippinensis (Schuh), new combination.

Leucophoroptera philippinensis Schuh, 1984: 146, figs. 475, 478, 480-488, 491-495 (n. sp., diag., descr., DV, figs. head-pronotum, MG, SEM).

DIAGNOSIS: Recognized by the characters in the generic diagnosis.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Philippine Islands, Negros Island.

HOLOTYPE: **PHILIPPINE ISLANDS: Negros Island**: Camp Lookout, Dumaguete, May 20, 1961, T. C. Schneirla and A. Reyes, 1♂ (AMNH).

SPECIMENS EXAMINED: **PHILIPPINES: Angeles City:** Camp Lookout, Dumaguete, Negros Island, 9.3°N 123.3°E, 396 m, 17 May 1961, T. Schneirla & A. Reyes, Paratype, 1♂ (00095329) (AMNH). **Leyete:** Abuyog, 35 mi. S or Tacloban, 10.75°N 125.0167°E, 09 Jul 1961, P.I. National Museum, Paratype, 1♂ (00196077) (AMNH). **Misamis Oriental: *nont Co.:*** Gingoog, 8.82327°N 125.1024°E, 7 m, 12 May 1961, H. M. Torrevillas, Light Trap, Paratype, 1♂ (00318872) (BPBM). **Negros Oriental:** Dumaguete, Camp Lookout, 9.3103°N 123.3081°E, 20 May 1961, T. Schneirla & A. Reyes, 1♂ (00196080), Paratype, 1♂ (00196079) (AMNH); 24 May 1961, T. Schneirla & A. Reyes, Paratype, 1♂ (00196078) (AMNH).

Trichocephalocapsus Schuh

Trichocephalocapsus Schuh 1984: pp 239 (n. gen., diag., descr.).

TYPE SPECIES: *Trichocephalocapsus albofasciatus* Schuh by original designation.

DIAGNOSIS: Recognized by the large size, the weakly neck-like area behind the eyes with the eyes strongly exerted from the anterior margin of the pronotum, the elongate head dorsoventrally with over one half of the total height of the head below the eyes, the elongate flat gula that is not keel-like, the long and dark setae on the gula and gena, the narrow labrum, the broad and flat pronotal collar, the posterior portion of the pronotum swollen and with a convex dorsal surface, the white lateral margins of the medially constricted hemelytron, and the dark basally light distally wing membrane.

FEMALE: Macropterous, similar to males.

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea.

DISCUSSION: This genus is easily identified by the characters in the diagnosis, with the head shape particularly distinctive, the eyes far removed from the anterior margin of the pronotum, the neck-like shape of the back of the head, and the long flat gula, characters that are absent from all other genera of Leucophoropterini.

Trichocephalocapsus albofasciatus Schuh

Trichocephalocapsus albofasciatus Schuh 1984: 243, figs. 785, 786, 788-799 (n. sp., diag., descr., DV, figs. head-pronotum, MG, SEM).

DIAGNOSIS: Recognized by the brown to castaneous coloration, the basally light cuneus, the male genitalia, the transverse fascia formed mostly by reflective patches and setae, and the light distal coloration of the tarsomeres.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Western New Guinea [Indonesia].

DISCUSSION: I was not able to examine the holotype of this species, but based on the characters in the diagnosis and the distinctive hemelytral coloration, it is unique.

HOLOTYPE: **INDONESIA: West Irian:** Swart Val, Karubaka, 1400m., November 17-21, 1958, J.L. Gressitt. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **INDONESIA: Irian Jaya:** Cyclops Mountains, Ifar, 2.6°S 140.61°E, 300 m, 21 Jun 1959, T.C. Maa, Paratype, 1♂ (00318866) (BPBM). Swart Val.:Karubaka, 3.6°S 138.4667°E, 1450 m, 17 Nov 1958, J. L. Gressitt, Paratype, 1♂ (00095348) (AMNH), Paratype, 1♂ (00318865) (BPBM). Swart Valley, 3.6°S 138.46667°E, 1400 m, 21 Nov 1958, J. L. Gressitt, Paratype, 1♂ (00318863) (BPBM). Swart Valley.: W. Side, 1800 m, 19 Nov 1958, J. L. Gressitt, Paratype, 1♂ (00318864) (BPBM). **Papua:** Swart Valley: Karubaka, 3.74417°S 138.32166°E, 1400 m, 21 Nov 1958, J. L. Gressitt, 1♂ (00196086), Paratype, 1♂ (00196085) (AMNH).

Trichocephalocapsus immaculatus Schuh

Trichocephalocapsus immaculatus Schuh 1984: 244, figs. 785, 787 (n. sp., diag., descr., DV).

DIAGNOSIS: Recognized by the yellow-white transverse fascia, the unicolorous cuneus, the completely dark tibiae, and the more strongly elevated posterior portion of the pronotum.

DESCRIPTION: See Schuh (1984).

HOSTS: Unknown.

DISTRIBUTION: Indonesia, Papua New Guinea.

DISCUSSION: I was not able to examine the holotype of this species, but the the original description and illustrations indicate that it is a different species than *T.*

albisignatus. Two recently collected female specimens from Papua New Guinea were identified as belonging to this species.

HOLOTYPE: **INDONESIA: West Irian:** Cyclops Mountains, Ifar, 300 m., June 21, 1959, T.C. Maa. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **INDONESIA: Irian Jaya:** Cyclops Mountains, Ifar, 2.6°S 140.61°E, 300 m, 21 Jun 1959, T.C. Maa, Paratype, 1♂ (00318866) (BPBM). **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 03 Jul 1996, O. Missa, 1♀ (00302078) (ISNB); 24 Jul 1996, O. Missa, 1♀ (00302079) (ISNB).

Waterhouseana Carvalho

Figures (3-7, 3-24)

Waterhouseana Carvalho 1973: 4 (n. gen., descr., disc.)

TYPE SPECIES: *Waterhouseana illustris* Carvalho by original designation.

DIAGNOSIS: Recognized by the medially constricted pronotum that forms an hour-glass shape in dorsal view and with the posterior portion swollen, convex in lateral view, and completely obscuring the mesoscutum in dorsal view, the wide and flat face with the gena and gula covered with dense black setae, the presence of a flat pronotal collar, the punctate and flat hemelytron with a strong medial constriction, the lateral posterior margins of the hemelytron expanded into a lobe-like process anterior and dorsal to the cuneal fracture, the R+M vein terminating at the median of the hemelytron, the lateral posterior margins with a transparent area on the corium, the petiolate abdomen with the second abdominal segment longer than wide and lighter in coloration than the remaining dark brown segments of the abdomen, the dorsal spine-like process on the pygophore, and the laterally compressed hind-tibiae.

Female: Similar to males but smaller in size, with a wider vertex, the anterior margin of the eyes continuous with the angle of the vertex, shorter wings, and the second antennal segment shorter and more club-like than males.

HOSTS: Unknown.

DISTRIBUTION: Papua New Guinea, Indonesia.

DISCUSSION: This genus is one of the most bizarre members of the Leucophoropterini and the easiest to identify due to the characteristics of the head and the pronotum. Previously this genus was only known from type species *W. illustris*, however recent collecting efforts in Papua New Guinea have uncovered a new species, *Waterhouseana delicate,* that is smaller in size than *W. illustris* and lacks the patch of dark brown setae on the hemelytron posterior to the apex of the clavus.

Waterhouseana delicate, new species

Figures (3-7, 3-24)

DIAGNOSIS: Recognized by the small size, and the lack of dark setae on the surface of the hemelytron posterior to the apex of the clavus as found in *W. illustris*.

DESCRIPTION: *Male*: Macropterous, small, medially constricted. Total length 2.73-2.77mm, width across pronotum 0.71-0.72, width across widest part of wings 0.74. COLORATION: Castaneous and dark brown. Head: Castaneous. Eyes silver to dark purple. Labium golden. First antennal segment golden ventrally dark brown anteriorly, second antennal segment brown with medial lightening for middle one-third of length, third antennal segment golden basally and dark distally to completely golden, fourth segment brown. Thorax: Pronotum, scutellum and thorax castaneous to dark brown. Dorso-lateral margin of metepisternum and scent gland continuous in coloration with thoracic pleura. *Legs:* All coxae light brown, pro-coxae sometimes a more golden brown. All femora castaneous to brown with the ventral surface a lighter golden color, all tibiae are basally dark brown to castaneous, distally golden, with the meta-tibiae with parallel rows of dark spicules and long, obvious golden setae. Basal tarsomeres golden, distal segments dark brown. *Hemelytra:* Primarily castaneous to dark brown with anterior of the corium castaneous to golden brown, clavus castaneous with medial area darker brown, transparent areas on lateral-posterior margins adjacent to apex of clavus with a dark posterior margin that transverses the entirety of the wing, white patch along medial margin of corium posterior to the clavus and anterior the wing membrane surrounded with a dark brown margin, apex of the lateral corial margins anterior to the cuneus with a thin dark brown margin and medially golden brown. The anterior lateral margin of the cuneus is white for nearly one-fourth the total area of the cuneus, the posterior coloration is dark brown. Membrane light brown with wing veins lacking pigmentation. Abdomen: First abdominal sternites yellowish with a dark posterior margin, the second abdominal sternite white to transparent, remaining segments dark brown.

SURFACE AND VESTITURE: Dorsal surface of body and eyes covered with long, erect light brown setae. Head, pronotum and scutellum distinctly shiny. Hemelytron punctate also covered with long erect light brown setae but also includes long, erect black setae evenly distributed over the surface of the wings. Genae, gula and ventral surface of the head with long, dense black setae. Reflective patches present on clavus and cuneus.

STRUCTURE: Head: Wide, flat, lateral margins including eyes obscuring the anterior margin of the pronotum in lateral view. Clypeus flush with the anterior margin of the frons in lateral view, not visible in dorsal view. Vertex convex, the posterior margin shelf-like, width nearly equal to three-fourths the width of one compound eye. Dorsal margin of the eyes continuous with the vertex, height nearly encompassing the total height of the head, the vertex visible in lateral view. Antennal segment one inverted-coke-bottle shaped, length surpassing apex of head. Antennal segment two long and equal to in diameter to antennal segment one, increasing in diameter distally toward segment three. Length of antennal segment two nearly one and one-fifth times the width of the head. Antennal segments three and four slender and less than half the length of segment two. Apex of the first labial segment subapical to the posterior margin of the head, the apex of segment surpassing apex of pro-coxa. Thorax: Pronotum longer than wide with a medial constriction forming an hour-glass appearance in lateral view, the posterior portion swollen dorsally and appearing strongly convex in lateral view. Narrow and flat pronotal collar present. Mesoscutum hidden by the posterior margin of the pronotum, scutellum swollen anteriorly to posterior margin of the pronotum. Scent-gland taking up approximately one-forth the total area of the metepimeron. *Legs:* moderate length, slender with meta-femora wider in diameter subapically to joint with meta-tibiae and appearing knee-like. Claws of moderate length and width, pulvilli taking up less than half of claw length and small. Parempodia parallel and hair-like. *Hemelytra*: Lateral margins strongly medially constricted, dorsally flat. Lateral margins anterior to the cuneal fracture swollen, forming a lobe-like process. Cuneus triangular with the interior margin with membrane weakly convex, total length greater than one-third the total length of the wing membrane, the cuneal fracture angled anteromesially, the lateral margins weakly swollen along the margin occupied by the white pigmentation. <u>Abdomen:</u> narrow anteriorly, widening posteriorly, petiolate. First abdominal sternite longer than wide.

GENITALIA (Fig. 3-24): <u>Pygophore:</u> Relatively small with a spine-like process on the dorsal-posterior margin, occupying about one-fifth length of abdomen, ventral margin weakly sloping upwards towards apex. <u>Endosoma:</u> Minute, slender, twisted, S-shaped, composed of two sclerotized straps, fused into a tube toward base and separating toward the apex, unified by membrane. Secondary gonopore small, horse-collar shaped, located at apex of endosoma (Fig. 3-24:A). <u>Phallotheca:</u> Small, L- shaped, apex gently tapering toward a point and directed ventrally (Fig. 3-24: D). <u>Right Paramere:</u> Paramere small, elongate and parallel sided, nearly equal in size with left paramere, apex rounded (Fig. 3-14:B). <u>Left Paramere:</u> Small; posterior process slender and strongly curving ventrally, with sensory pits, relatively elongate compared to the anterior process; anterior process stout, dorsal surface nearly reaching to the dorsal margin of the posterior process. Dorso-medial margin between the anterior and posterior processes medially convex (Fig. 3-24: C).

Female: Unknown.

ETYMOLOGY: Named for its delicate, small size.

HOSTS: Unknown, collected by canopy fogging.

DISTRIBUTION: Papua New Guinea.

HOLOTYPE: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 22 Jun 1995, O. Missa, 1♂ (00302020) (ISNB).

PARATYPES: **PAPUA NEW GUINEA: Madang Province:** Baiteta, 5.017°S 145.75°E, 12 May 1993, O. Missa, 1♂ (00302021) (ISNB); 1995, O. Missa, 2♂ (00302017, 00302018) (ISNB); 27 Jun 1995, O. Missa, 1♂ (00302022) (ISNB); 26 Apr 1996, O. Missa, 1♂ (00302019) (ISNB).

Waterhouseana illustris Carvalho

Waterhouseana illustris Carvalho, 1973: 5, figs. 8, 9 (n. sp., descr., hab., DV, fig. head); Schuh: 1984: 224, figs. 728-743 (Diag., DV, figs. head-pronotum, MG, hab.)

DIAGNOSIS: Recognized by the generic diagnosis, its large size, and the patch of dark setae posterior to the apex of the clavus.

DESCRIPTION: See Carvalho (1973) and Schuh (1984).

HOSTS: Unknown, collected by light traps and canopy fogging.

DISTRIBUTION: Papua New Guinea, Indonesia.

SPECIMENS EXAMINED: **INDONESIA: Irian Jaya:** Nabire, S. Geelvink Bay, 3.3667°S 135.4833°E, 10 m, 14 Sep 1962, H. Holtmann, Light Trap, 1♀ (00318942) (BPBM); 03 Oct 1962, H. Holtmann, 1♂ (00196087) (AMNH). **PAPUA NEW**

GUINEA: Madang Province: Baiteta, 5.017°S 145.75°E, 22 Jun 1995, O. Missa, 1♂ (00302130) (ISNB); 06 Jun 1996, O. Missa, Light Trap, 1♂ (00302123) (ISNB). **Morobe Province:** Nadzab, 6.55°S 146.7°E, 129 m, 20 May 1955 - 22 May 1955, E. O. Wilson, 1♀ (00095360) (AMNH). **Sandaun aka West Sepik Province:** Maprik, 150 m, 29 Dec 1959 - 17 Jan 1960, T. C. Maa, 2♂ (00321074, 00321075) (BPBM). **unknown:** Bainyik, 3.6667°S 143.05°E, 13 Dec 1963, D. K. McAlpine, 1♂ (00393646) (ANIC).

Taxa Removed from Leucophoropterini

Dilatops Weirauch

Dilatops Weirauch, 2006, pp. 227-232. (n. gen., descr., disc.).

DISCUSSION: Weirauch placed *Dilatops* in Leucophoropterini based on its similarity to the leucophoropterine genus *Lasiolabops* Poppius of Africa and the Indo-Pacific, which also has stylate eyes and feeds on *Ficus* (Moraceae), but noted that it does not have most of the characters considered synapomorphies for the tribe (Weirauch 2006). Weirauch did suggest that the ridges on the claw could be a synapomorphy with Leucophoropterini (Fig. 17 of Weirauch 2006C), but the presence of claw ridges in other tribes and taxa (Fig. 34 of *Pilophorus sp.* in Schuh 1984) suggests that this is likely not the case. Further, in my analysis of the Phylinae, *Dilatops* is sister-group to the remaining Phylinae excluding the Hallodapini + Auricillocorini (Node 5: Chapter II) rather than a member of Leucophoropterini (Node 28: Chapter II), and is therefore moved into the Phylini pending further revision of the tribes of Phylinae.

Karoocapsus Schuh

Karoocapsus Schuh, 1974, pp. 123 (n. gen., descr., disc., key to spp.)

DISCUSSION: *Karoocapsus* Schuh was one of the first genera assigned to the Leucophoropterini based on the shared synapomorphies of a relatively small pygophore, and simple male genitalia (Schuh 1974). However, based on my analysis of the subfamily (Chapter II), *Karoocapsus* groups with *Tytthus* Poppius and several genera usually assigned to the Phylini (*Karoocapsus* Group, Node 23: Chapter II), this group being more closely related to the Pilophorini than Leucophoropterini (Chapter II). Therefore *Karoocapsus* is transferred Leucophoropterini to Phylini.

Lasiolabops Poppius

Lasiolabops Poppius, 1914, pp. 26-27 (n. gen.); Carvalho: 1958: 53 (cat.); Schuh: 1984: 137 (diag., disc.).

DISCUSSION: *Dilatops* Weirauch was placed in Leucophoropterini primarily due to its similarity to the African species of *Lasiolabops* (Weirauch 2006), which also has stalked eyes and lack a pronotal collar. Recently, convincing evidence has shown the two lineages also share several other potential synapomorphies (Cassis and Weirauch 2008: Table 1). The exclusion of *Dilatops* from Leucophoropterini in this study (Chapter II) brings into question whether *Lasiolabops* should also be excluded. *Lasiolabops* Poppius was originally described from Africa as a monotypic genus (type species: *L. obscurus* Poppius). It was placed in the Phylini by Carvalho (1958). Schuh (1984) described three new species of *Lasiolabops* from Papua New Guinea and Indonesia

(*Lasiolabops kokoda* Schuh, *L. cosmopolites* Schuh, and *L. irianicus* Schuh) which share scale-like setae (Schuh 1984: figs 463-466 in Schuh 1984) and stalked eyes (Schuh 1984: Fig. 461) with *Lasiolabops obscurus*. Schuh moved *Lasiolabops* into Leucophoropterini because the Indo-Pacific species of *Lasiolabops* grouped with the leucophoropterine genera in his phylogenetic analysis (Schuh 1984). Potential synapomorphies uniting *Lasiolabops* with Leucophoropterini are a relatively small genital capsule, a C to J-shaped endosoma, and a weakly sclerotized secondary gonopore (Schuh 1984). However, these characters are also present in *Dilatops* Weirauch (Weirauch 2006). *Dilatops* was found to not belong to the Leucophoropterini (Chapter II). Therefore, given that *Dilatops* Weirauch and *Lasiolabops* Poppius share several unique synapomorphies, and my transfer of *Dilatops* out of Leucophoropterini (Chapter II), I am also moving *Lasiolabops* out of the Leucophoropterini and back into a broadly conceived Phylini.

Myrmicopsella Poppius.

Myrmicopsella Poppius 1914: 37 (n. gen.); Schuh: 1974: 36 (disc. of tribal placement);

DISCUSSION: *Myrmicopsella,* a monotypic genus based on a female holotype from Madagascar (*Myrmicopsella nitidipenne* Poppius), was placed in Leucophoropterini by Schuh (1974) due to its ant-mimicking habitus being similar to Leucophoropterini. Schuh (1984) also stated that it looked most similar to *Karoocapsus* from Southern Africa, which I have determined is not a leucophoropterine (Chapter II). Based on images of the holotype and illustrations from the original description (Poppius

1914: Plate 2, Fig. 2), the females also have the posterior margin of the hemelytron subapical to the posterior margin of the abdomen much like members of the *Karoocapsus* Group (e.g. *Karoocapsus middelburgensis* Schuh, Menard 2010), whereas in all female Leucophoropterini the posterior margin of the wing reaches the posterior margin of the abdomen. Based on the apparent relationship of *Myrmicopsella* to *Karoocapsus*, which is no longer in Leucophoropterini, I am placing *Myrmicopsella* in a broadly conceived Phylini.

Porophoroptera Carvalho and Gross

Porophoroptera Carvalho and Gross 1982: 51 (n. gen., descr., disc.)

DISCUSSION: The monotypic genus *Porophoroptera elegans* Carvalho and Gross was described from Australia by Carvalho and Gross (1982), and placed in the *Leucophoroptera* Group (Leucophoropterini) based on it being putatively ant-mimetic. The overall habitus and coloration of *Porophoroptera* is similar to many of the genera included in Leucophoropterini, but there are several unique abdominal and genitalic features that suggest that it does not belong to the tribe. First, the endosoma is unique, being flat and box-shaped (Carvalho and Gross 1982: Fig. 82) rather than elongate or tubular. Second, the pygophore is relatively large compared to the Leucophoropterini, taking up at least one-third the total length of the abdomen. Lastly, both males and females have small, white sclerotized structures extending dorsally from the dorso-lateral margins of the second abdominal sternites which have thus far not been found in any other Miridae. For these reasons it is unlikely that *Porophoroptera* belongs to the Leucophoropterini and it is therefore tentatively placed in Phylini.

Tytthus Fieber

Tytthus Fieber 1864: 82 (n. gen.)

DISCUSSION: *Tytthus* Fieber was placed in the Leucophoropterini by Schuh (1974) based on the shared synapomorphies of a relatively small pygophore, and simple male genitalia. However, based on my analysis of the subfamily (Chapter II), *Tytthus* instead falls in a separate lineage with *Karoocapsus* Poppius and several Phylini genera (*Karoocapsus* Group, Node 23: Chapter II). *Tytthus* is therefore moved out of Leucophoropterini and into Phylini.

Species Moved Into Other Genera in Phylini

Sejanus unicolor Carvalho and Gross

Sejanus unicolor unicolor Carvalho and Gross, 1982: 14, figs. 10-12, 97 (n. sp., descr., DV, MG)

Sejanus unicolor webbi Carvalho and Gross, 1982: 14, figs 13-15 (n. sp., descr., MG)

DISCUSSION: Carvalho and Gross described two subspecies of *Sejanus unicolor*: *Sejanus unicolor unicolor* and *Sejanus unicolor webbi*. Both have been synonymized by Schuh and Weirauch (2010) into *Xiphoidellus unicolor* (Carvalho and Gross) based on the following characters: the coiled endosoma with a single apical spine (Carvalho and Gross 1982: figs 10, 13; Weirauch and Schuh, 2010: in press); the right paramere with a long spine at the apex (Carvalho and Gross 1982: figure 12, 15); and the completely brown coloration. *Xiphoidellus* Schuh and Weirauch is placed in Phylini.

Species Incertae Sedis

Sejanus biniguni Schuh

Sejanus biniguni Schuh 1984: 157, figs. 499, 504, 508, 517-519 (n. sp., diag., descr., DV, MG)

DISCUSSION: Schuh (1984) stated that he included several species within *Sejanus* until our knowledge of the fauna of the Indo-Pacific matures, acknowledging that they may belong to other lineages despite similar genitalic and claw characters. *Sejanus biniguni* from Papua New Guinea is one of those taxa, and based on the results of the subfamily analysis (Chapter II) the species has a combination of several characters that make its placement within *Sejanus* and Leucophoropterini questionable. First, the left paramere is unlike any Leucophoropterini, with the posterior process bent down at an angle from the base (Schuh 1984: Fig. 518), whereas all Leucophoropterini have the posterior process straight. Second, while the endosoma is C-shaped with a horse-collar shaped secondary gonopore, it possesses spicules surrounding the secondary gonopore, while all Leucophoropterini do not have any elaborations around the secondary gonopore. Lastly, the coloration is unlike *Sejanus, Ausejanus,* and all other Leucophoropterini; *Sejanus biniguni* Schuh is primarily yellow with faint red longitudinal stripes on the pronotum and scutellum and has pigmentation in the form of spots on the hind femora and at the bases of the tibial spines (Schuh 1984), whereas in all Leucophoropterini the head, thorax, and often the appendages are either dark brown or red and have unicolorous hind femoral and hind tibial coloration (though see *Sejanus luteoelytratus* for an exception).

DISTRIBUTION: Papua New Guinea

HOLOTYPE: Biniguni, Gwariu River, 150 m, 27 Jul 1953 -14 Aug 1973, G. M. Tate, 1♂ (AMNH).

SPECIMENS EXAMINED: **PAPUA NEW GUINEA: unknown:** Biniguni, Gwariu River, 150 m, 27 Jul 1953 -14 Aug 1973, G. M. Tate, 1♂ (00196098), Paratype, 7♂ (00196091 - 00196097) (AMNH).

Sejanus fasciatus Carvalho and Gross

Sejanus fasciatus Carvalho and Gross 1982: 34, figs. 56-58, 114 (n. sp., descr., disc., DV, MG).

DISCUSSION: This species does not belong in Leucophoropterini based on the following characters: the male endosoma is not C, J or S-shaped (Carvalho and Gross 1982: Fig. 56), but tubular and twisted like many Hallodapini; all antennal segments are slender and narrower than the first antennal segment, whereas in Leucophoropterini they are as wide if not wider than the first antennal segment; and the contrasting white of the basal half of the cuneus extends past the fracture and into the corium, which is only present in *Pseudohallodapocoris promeceops* Schuh and *Sejanus ansevata* Schuh, both of which have other characters that clearly place them in Leucophoropterini.

DISTRIBUTION: South Australia, Northern Territory, and Western Australia.

HOLOTYPE: **AUSTRALIA: South Australia:** to light, nr Victory Well, Everard Park Station, 3.xi.1970, G.Gross (*sic* G. Cross) 1♂(SAMA).

SPECIMENS EXAMINED: **AUSTRALIA: Northern Territory:** 17km NNW Alice Springs, 23.55°S 135.83333°E, 08 Nov 1979, G.S. Medvedev, 1♀ (00229523) (ZISP). Katherina River, 14.5°S 132.25°E, 12 Nov 1979 -13 Nov 1979, V. Ph. Zaitsev, 2♀ (00229525, 00229526) (ZISP). Katherine River, 25km NE Katherine, 03 Oct 1977, G. F. Gross & J. A. Forrest, 1♂ (00169071) (SAMA). Tennant Creek, 19.55°S 134.23°E, 10 Oct 1979, G.S. Medvedev, 1♀ (00229524) (ZISP); 10 Nov 1979, Zaitzev, 1♀ (00229522) (ZISP). The Gorge WH. bet. Hatches Creek and Elkedra, 07 Oct 1977, J. A. Forrest, 1♂ (00169072) (SAMA). Yuendumu, 22.258°S 131.797°E, Feb 1968, Unknown, Paratype, 1♀ (00169267) (SAMA). **South Australia:** Cadelga Homestead, 26.08949°S 140.4106°E, 150 m, 04 Nov 1998, Schuh, Cassis, Silveira, 2♂ (00195625, 00195626), 1♀ (00195627) *Eucalyptus camaldulensis* Dehnh. (Myrtaceae), 3♀ (00274804 - 00274806) (AM). near Victory Well, Everard Pk. Stn, 27.054°S 132.506°E, 31 Oct 1970, E. Matthews & G. F. Gross, 1♂ (00169070) (SAMA). **Western Australia:** Palm Springs 38 rd km SE Halls Creek, 18.42305°S 127.84583°E, 11 Jun 1998, J. Oswald, 2♂ (00370669, 00370670) (TAMU).

Sejanus fijiensis Schuh

Sejanus fijiensis Schuh 1984: 166, figs. 550, 553-555, 561-563 (n. sp., diag., descr., disc., DV, MG, SEM).

DISCUSSION: Schuh (1984) included this species in *Sejanus,* though he stated that it may in fact be an independent linage based on it possessing the following characters inconsistent with other *Sejanus* species and Leucophoropterini in general: the distinctly ovoid body-form of the male, whereas all other *Sejanus*, *Ausejanus*, and other Leucophoropterini species have straight to medially-constricted lateral margins of the hemelytron; the weak punctation over the entirety of the hemelytron which is absent in all *Sejanus* and *Ausejanus* spp. and only present as strongly punctate in the *Ctypomiris* clade; the relatively large endosoma that, while S-shaped, is far larger than in most Leucophoropterini (Schuh 1984: Fig. 561); and the anterior process of the left paramere splayed out and pointing in a different direction from the posterior process (Schuh 1984: Fig. 562), which is found elsewhere found primarily in Pilophorini and the Phylini genera *Decomia* Poppius (e.g. *Decomia dialeptos* Schuh, Schuh 1984: Fig. 1093), and *Pseudosthenarus* Poppius (e.g. *Pseudosthenarus rozeni* Schuh, Schuh 1974: Fig. 306) rather than in Leucophoropterini where all members have both processes pointing in the same direction (e.g. *Sejanus funereus*, Schuh 1984: Fig. 565, though see *Sejanus ecnomios* for one exception). Based on this combination of these characters I do not consider *Sejanus fijiensis* a member of *Sejanus* or Leucophoropterini.

HOSTS: Unknown.

DISTRIBUTION: Fiji.

HOLOTYPE: **FIJI: Viti Levu**: Nandarivatu, 3000 feet, September 3, 1938, beating shrubbery, E. C. Zimmerman collector; 1♂ (BPBM).

SPECIMENS EXAMINED: **FIJI: Moala:** Vunuka, 18.60138°S 179.88311°E, 153 m, 23 Aug 1938, E. C. Zimmerman, Paratype, 1♀ (00321168) (BPBM). **Ovalau:** Andubangda, 17.69196°S 178.79145°E, 45 m, 15 Aug 1938, E. C. Zimmerman, Paratype, 1♀ (00321169) (BPBM). **Vanua Mbalavu:** Bavatu, 16 Aug 1938, E. C. Zimmerman, Paratype, 1♀ (00321170) (BPBM). **Viti Levu:** ***Nandarivatu Co.:*** Nandarivatu, 17.56423°S 177.96079°E, 653 m, 02 Sep 1938, E. C. Zimmerman, Paratype, 1♂ (00321167) (BPBM). Rdg W of Vatuthere, Nandarivatu, 17.56423°S 177.96079°E, 653 m, 08 Sep 1938, E. C. Zimmerman, Paratype, 1♂ (00321166) (BPBM). **Western Division:** Nandarivatu, Viti Lavu Island, 17.566°S 177.966°E, 670 m, 01 Nov 1938, E. C. Zimmerman, Paratype, 1♀ (00095336) (AMNH); 02 Nov 1938, E. C. Zimmerman, Paratype, 1♂ (00196114) (AMNH); 03 Nov 1938, E. C. Zimmerman, 1♂ (00095335) (AMNH).

Sejanus hongkong Schuh

Sejanus hongkong Schuh 1984: 173, figs. 556-560, 571, 573-579 (n. sp., diag., descr., DV, figs. head-pronotum, MG).

DISCUSSION: Schuh (1984) speculated that *Sejanus hongkong* may later be found to be an independent lineage from *Sejanus* once more information was gathered. Based on the results of my subfamily analysis I believe that the following combination of characters confirm that it not a member of Leucophoropterini: the left paramere has the anterior and posterior processes of equal length, with the anterior process relatively thick (Schuh 1984: Fig. 578); the overall shape of the left paramere is more similar to many

Hallodapini (e.g. *Hallodapus albofasciatus* (Motschulsky), Schuh 1984: Fig. 385) than Leucophoropterini (e.g. *Sejanus funereus*, Schuh 1984: Fig. 565); the extremely narrow apex of the phallotheca is more similar to members of the *Karoocapsus* group (e.g. *Karoocapsus middelburgensis* Schuh in Schuh 1974: fig. 204) than most Leucophoropterini with triangular-shaped apices of the phallotheca (*Pseudoleucophoroptera ifar* Schuh, Schuh 1984: fig. 767); the sericeous setae on the dorsum (Schuh 1984: Fig. 571), which are not present in any Leucophoropterini with the exception of possibly *Arafuramiris*, which possesses long, thick setae restricted to the clavus and not across the head and pronotum; and the dark spots on the bases of the spines of the hind-tibiae, which is not present in any Leucophoropterini.

HOSTS: Unknown, collected in light traps.

Distribution: China: Hong Kong.

Holotype: **[CHINA]: Hong Kong: N.T.**, Taipokau, September 18, 1965, light trap, Lee Kit Ming and Jui Wai Ming collectors. 1♂ (BPBM).

Specimens Examined: **CHINA**: **HONG KONG: New Territories:** Castle Peak, 22.39975°N 113.96669°E, 44 m, 06 Aug 1964 -13 Aug 1964, W.J. Voss and Wai Ming Hui, Paratype, 1♂ (00321142) (BPBM). Tai Po Kau, 22.4333°N 114.1833°E, 222 m, 01 Jun 1964, Lee Kit Ming and Hui Wai Ming, Light Trap, Paratype, 1♂ (00196394) (AMNH), Light Trap, Paratype, 1♂ (00321129), 1♀ (00321130) (BPBM); 05 Jun 1964, W.J. Voss and Wai Ming Hui, Light Trap, Paratype, 2♀ (00196397, 00196399) (AMNH), Paratype, 1♂ (00321138) (BPBM); 06 Jun 1964, W.J. Voss and Wai Ming Hui, Paratype, 2♂ (00321136, 00321137) (BPBM); 10 Jun 1964, W.J. Voss and Wai

Ming Hui, Light Trap, Paratype, 1♂ (00321139) (BPBM); 16 Jun 1964, W.J. Voss and Wai Ming Hui, Light Trap, Paratype, 1♀ (00095340) (AMNH), Light Trap, Paratype, 1♂ (00321140), 1♀ (00321141) (BPBM); 20 Jun 1964, W.J. Voss and Wai Ming Hui, Light Trap, Paratype, 1♀ (00196398) (AMNH); 30 Jun 1964, W.J. Voss and Wai Ming Hui, Light Trap, Paratype, 1♂ (00196395) (AMNH), Paratype, 1♂ (00321128) (BPBM); 02 Jul 1964 - 06 Jul 1964, Lee Kit Ming and Hui Wai Ming, Light Trap, Paratype, 2♂ (00321131, 00321132) (BPBM); 03 Jul 1964 - 04 Jul 1964, W.J. Voss and Wai Ming Hui, Light Trap, 1♀ (00196400), Paratype, 2♂ (00095339, 00196393) (AMNH), Light Trap, Paratype, 2♂ (00321133, 00321135), 1♀ (00321134) (BPBM); 01 Sep 1965, Lee Kit Ming and Hui Wai Ming, Paratype, 1♂ (00321127) (BPBM); 02 Sep 1965, Lee Kit Ming and Hui Wai Ming, Light Trap, Paratype, 1♂ (00196396) (AMNH); 18 Sep 1965, Lee Kit Ming and Hui Wai Ming, Light Trap, Paratype, 1♂ (00196392) (AMNH).

Sejanus leai Carvalho and Gross

Sejanus leai Carvalho and Gross, 1982: 26, figs. 34-36, 108 (n. sp., descr., DV, MG).

DISCUSSION: I was was able to view images of the holotype and the genitalia of this species. The overall dark brown coloration lacking any white pigmentation along the anterior margin of the cuneus, the lack of a partial or complete transverse fascia, and the relatively large, twisted male endosoma with a spine-like process on the apex of the endosoma are not like any Leucophoropterini. Though *Ausejanus mcdonaldi* and several species of *Sejanus* are also nearly completely dark brown in coloration, they have a small, S-shaped or a C-shaped endosoma without an apical spine. If there is an apical spine in Leucophoropterini (e.g. *Sejanus ecnomiscos*), they have some form of white pigmentation on the anterior margin of the cuneus. *Sejanus leai* does not possess either combination of these characters; therefore I am placing the taxa in incertae sedis until addional characters can confirm its generic or tribal placement.

Sejanus novecaledonicus Schuh

Sejanus novecaledonicus Schuh 1984: 180, figs., 500, 604-606 (n. sp., diag., descr., DV, MG, host).

DISCUSSION: *Sejanus novecaledonicus* is the most atypical species placed in *Sejanus* by Schuh (1984), and I do not consider it a member of Leucophoropterini based on the following characters: the left paramere has the anterior and posterior process pointing in opposite directions (Schuh 1984: figure 605), much more like members of *Decomia* (e.g. *Decomia microgonoporos* Schuh, Schuh 1984: Fig. 1145) than *Sejanus* and most other Leucophoropterini and the completely yellow background coloration with small, scattered, bright red spots, a condition not present in any other Leucophoropterini which, if unicolorous, are usually dark brown without any spots on the body or hind-tibiae (e.g. *Sejanus* sensu strictu).

HOSTS: *Casuarina collina* Poiss. ex Pancher & Sebert (Casuarinaceae)

DISTRIBUTION: New Caledonia

HOLOTYPE: **NEW CALEDONIA**: Ouano Beach, November 13, 1958, C.R. Joyce. 1♂ (BPBM). [not examined].

SPECIMENS EXAMINED: **NEW CALEDONIA: Province Sud:** Nouméa, 22.2667°S 166.45°E, 1 m, Aug 1940, F. X. Williams, *Casuarina collina* (Casuarinaceae), Paratype, 1♀ (00321109) (BPBM). **unknown:** ***n/a Co.:*** Plum, 22.27282°S 166.60867°E, 150 m, 23 Mar 1968 -25 Mar 1968, J. L. Gressitt, Light Trap, Paratype, 1♀ (00321110) (BPBM).

Sejanus occidentalis Carvalho and Gross

Sejanus occidentalis Carvalho and Gross 1982: 31, figs. 46-48 (n. sp., descr., disc., MG); Schuh: 1984: 154 (disc. generic placement).

DISCUSSION: Several characters in this taxon suggest that it is not a member of Leucophoropterini: the endosoma is relatively large despite the overall body size being equivalent to many *Sejanus* or *Ausejanus* species (personal observation); the pygophore is also relatively large, taking up half the length of the abdomen; and the apex of the endosoma has multiple spicules and spines that are unlike any of the other Leucophoropterini (Carvalho and Gross 1982: Fig. 46).

HOSTS: Unknown.

DISTRIBUTION: Western and South Australia.

HOLOTYPE: **AUSTRALIA: Western Australia:** Bunbury, 33.32711°S 115.63699°E, 01 Oct 1958 -20 Oct 1958, A Snell, Holotype, 1♂ (00393290)

SPECIMENS EXAMINED: **AUSTRALIA: South Australia:** Bordertown, 36.43499°S 140.73857°E, 92 m, 22 Oct 1963, J. H. Sedlacek, 1♂ (00318934)

(BPBM).**Western Australia:** Bunbury, 33.32711°S 115.63699°E, 01 Oct 1958 -20 Oct 1958, A Snell, Paratype, 1♂ (00393291) (AM).

Sejanus ruber Carvalho and Gross

Sejanus ruber Carvalho and Gross 1982: 12, figs. 4-6, 95 (n. sp., descr., DV, MG); Schuh: 1984: 154 (disc. generic placement).

DISCUSSION: The unique coloration and form of the male genitalia suggest that this species is not a member of Leucophoropterini. The male genitalia have the following combination of characters: the posterior strap of the male endosoma is separated from the anterior strap at the apex, forming a long spine much longer than in any Leucophoropterini; the endosoma is relatively large compared to the small, simplified endosoma of most Leucophoropterini; the secondary gonopore is almost medial (Carvalho and Gross 1982: Fig. 4) rather than subapical; and the left paramere has a medial expansion (Carvalho and Gross 1982: figure 45) that is consistent with the medial expansions of the *Polyozus* group (Weirauch 2007). The coloration pattern of *Sejanus ruber* is also unique based on the following: the predominant head and thoracic coloration is white, whereas in all *Sejanus* and *Ausejanus* species the head and thoracic coloration is dark brown or sometimes red (e.g. *Sejanus neboissi*); and the hind femur has several spines with dark pigmented bases, which is otherwise present only in *Sejanus luteoelytratus*.

HOSTS: Unknown

DISTRIBUTION: Northeast Queensland.

HOLOTYPE: **AUSTRALIA: Queensland:** Jubilee Rd, 6km (4 miles) NE of Innisfail, in rainforest at light, 4.xi.1966, E. Britton, 1♂(ANIC).

Sejanus rubricatus Carvalho and Gross

Sejanus rubricatus Carvalho and Gross 1982: 13, figs. 7-9, 96 (n. sp., descr., DV, MG); Schuh: 1984: 154 (disc. generic placement).

DISCUSSION: I was able to view images of the type in addition to the original description. Based on these observations *Sejanus rubricatus*, like *Sejanus ruber,* has several characters that make its inclusion in Leucophoropterini questionable: the endosoma is not C, J or S-shaped like Leucophoropterini but twisted (Carvalho and Gross 1982: Fig. 7); the secondary gonopore is in a medial location like some *Campylomma* spp. (e.g. *Campylomma papuana* Schuh, Schuh 1984: Fig. 1013); the apex of the endosoma in the original illustration of *Sejanus rubricatus* (Carvalho and Gross, 1982: fig 7) roughly corresponds to the anterior and posterior blades of *Campylomma* drawn as one structure; the overall coloration is primarily white to beige for the pronotum, antennae, and thorax, which is consistent with the coloration of most *Campylomma* species, in contrast to the red, dark brown, or light brown coloration of most Leucophoropterini.

HOSTS: Unknown.

DISTRIBUTION: Queensland.

HOLOTYPE: **AUSTRALIA: Queensland**: Split Rock, 14km S. of Laura, 23-26.vi.1975, G.B. Monteith 1♂ (QM).

Sejanus trivinosus Carvalho and Gross:

Sejanus trivinosus Carvalho and Gross 1982: 10, fig. 93 (n. sp., descr., DV)

DISCUSSION: This species was described based on one female specimen from Victoria, Australia. I was unable to examine the type specimen, but based on the original description and illustrations of the type I could not with confidence confirm it is a leucophoropterine. In the original description the body and wings are described as being yellowish-white to pale brownish, with yellowish-orange markings on the head and dark reddish-orange markings on the mesoscutum, posterior margins of the hemelytra, clavus, and anterior margins of the cuneus (Carvalho and Gross 1982: Fig. 93). This color pattern is more consistent with the Australian *Polyozus* group of Weirauch (2007: figs 1-2) than with any *Sejanus* or *Ausejanus* spp., which are almost always mostly dark red, dark brown or light brown. Until male specimens are associated with the female holotype, and the genitalia are examined, generic and tribal placement of *Sejanus trivinosus* cannot be confidently addressed.

HOSTS: Unknown.

DISTRIBUTION: Victoria.

HOLOTYPE: **AUSTRALIA: Victoria:** Dartmouth Survey, Six Mile Creek, locality GA, 12.iv.1973, 1 ♀(NM) [not examined]

CHAPTER V

SUMMATION

This work herein accomplishes the following goals towards the revision of the tribe Leucophoropterini, as well as lends insights into the eventual revision of the subfamiliy Phylinae. First, the subfamily Phylinae was found to be monophyletic, with the sister-group relationship with the Orthotylinae being supported. The tribe Leucophoropterini was found to be polyphyletic, as well as other Phylinae tribes Phylini and Hallodapini.

The Leucophoropterini is therefore revised to be the monophyletic lineage including type genus *Leucophoroptera* Poppius, and is united based on the simple S-shaped endosoma, the possession of anterior sclerite on the anterior margin of the vestibulum, and the presence of a transverse fascia on the hemelytron. Genera *Dilatops, Karoocapsus,* and *Tytthus* are found to be not-related to the Leucophoropterini in Chapter II and are removed from the tribe. The Leucophoropterini is found to be sister-group to a lineage containing *Tuxedo* and *Pseudophylus*, which were then used as outgroups for the generic-level revision of the tribe in Chapter III.

In the Chapter III analysis the Leucophoropterini was found to be monophyletic, as well as most of the genera proposed by Schuh (1984). However, type genus *Leucophoroptera, Sejanus*, and *Pseudoleucophoroptera* are found to be polyphyletic and are revised accordingly. Chapter IV includes the taxonomic revisions to maintain the monophyly of these genera as proposed by Chapters II and III, as well as descriptions of new genera and species of Leucophoropterini. It is hoped that by addressing a revision of the Leucophoropterini in this manner for the dissertation has provided a well-rounded framework for future work in the tribe, and hopefully one day the subfamily Phylinae.

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APPENDIX 1

Genbank accession numbers for taxa not sequenced by author.

Taxon name	Genbank Accession numbers
Polymerus castilleja*	AY252610.1, AY252869.1, AY252388.1, AY253110.1
Cyphopelta modesta	AY252605.1, AY252863.1, AY252356.1, AY253089.1
Deraeocoris mutatus*	AY252852.1, AY252376.1, AY253080.1, AY252578.1
Coquillettia sp.	AY253106.1, AY252865.1, AY252607.1
Teleorhinus sp.	AY252611.1, AY252832.1, AY252357.1, AY253079.1
Hallodapus sp.	AY252407.1, AY252887.1
Pilophorus discretus	AY252581.1, AY252838.1, AY252363.1, AY253083.1
Pilophorus gracilis	AY252726.1, AY252254.1, AY252988.1
Pilophorus uhleri	AY252533.1, AY252760.1, AY252287.1, AY253015.1
Pilophorus piceicola	AY252543.1, AY252770.1, AY253025.1
Larinocerus balius*	AY252571.1, AY252813.1, AY252339.1, AY253063.1
Atractotomus acaciae	AY252586.1, AY252844.1, AY252369.1, AY253088.1
Amblytylus nasutus	AY252489.1, AY252717.1, AY252245.1, AY252982.1
Chlamydatus becki	AY252824.1, AY252349.1, AY253071.1
Oligotylus purshiae	AY252835.1, AY252360.1, AY253081.1
Oligotylus ceanothi	AY252573.1, AY252825.1, AY252350.1, AY253072.1
Oligotylus cercocarpicola	AY252826.1, AY252351.1, AY253073.1
Criocoris saliens	AY252601.1, AY252708.1, AY252236.1, AY253101.1
Europiella artemisiae	AY252538.1, AY252765.1, AY252292.1, AY253020.1
Megalopsallus humeralis	AY252820.1, AY252346.1, AY253068.1
Megalopsallus froeschneri	EU683155.1, AY252788.1, AY252313.1, AY253041.1
Megalopsallus pallipes	AY252555.1, AY252789.1, AY252314.1, AY253042.1
Plagiognathus chrysanthemi	AY252480.1, AY252709.1, AY252237.1, AY252975.1
Plagiognathus politus	AY252540.1, AY252756.1, AY252294.1, AY253012.1
Phyllopidea picta	AY252822.1, AY253069.1
Rhinacloa forticornis	AY252552.1, AY252805.1, AY252330.1, AY253055.1
Psallovius piceicola	AY252542.1, AY252769.1, AY252296.1, AY253024.1
Semium hirtum	EU683210.1, AY252658.1, AY252144.1, AY252921.1
Phymatopsallus sp.	AY252565.1, AY252801.1, AY252335.1, AY253059.1

APPENDIX 2

Morphological characters and character states used in the parsimony analysis. CI and RI values for characters based on one equally most-parsimonious tree are shown in [brackets], respectively. All characters are unordered.

COLOR AND PIGMENTATION:

[1] <u>Coloration of majority of hemelytron:</u> (0) castaneous; (1) dark brown to black; (2) red to burgundy; (3) golden to light brown. [CI: 0.158, RI: 0.644]. The greatest variation in color patterns across Leucophoropterini is in the hemelytron, appendages, and antennal segments. The predominant color of at least half of the hemelytron in Leucophoropterini is either castaneous (e.g. most *Ctypomiris* clade taxa); dark brown to black (e.g. most *Sejanus* sensu strictu, *Gulacapsus* clade); red to burgundy (e.g. *Sejanus meridionalis* Carvalho and Gross, Fig 2-6 B); or golden to light brown (e.g. *Sejanus luteoelytratus* Carvalho and Gross, *Solomonomimus roroni* Schuh).

[2] <u>Coloration of head, thorax, pronotum and scutellum:</u> (0) dark brown; (1) castaneous; (2) red to burgundy. [CI: 0.222, RI: 0.720]. Almost all Leucophoropterini have the head, thorax, pronotum, and scutellum either dark brown (e.g. *Leucophoroptera quadrimaculata*), or castaneous (e.g. *Arafuramiris*). However, at least two species of *Ausejanus* MS (e.g. *Sejanus neboissi* and *Leucophoroptera macrozonata* Carvalho and Gross) have those portions of the body burgundy to dark red.

[3] Anterior of hemelytra with contrasting-colored fascia: (0) absent; (1) partial fascia; (2) complete fascia. [CI: 0.105, RI: 0.653]. Most Leucophoropterini and the outgroup *Tuxedo* (Schuh 2004: fig 1) have a transverse fascia of a contrasting, lighter color or transparent area crossing the anterior portion of the hemelytron. This can either be complete, spanning the entire width of the hemelytron (e.g. *Collessicoris bellissimus* Carvalho and Gross, Fig 2-6 A); only be present on part of the hemelytron (e.g. *Leucophoroptera quadrimaculata*, Fig 2-5 B); or absent altogether (e.g. most *Sejanus* sensu strictu).

[4] Partial fascia: (0) limited mostly to clavus or claval suture; (1) limited mostly to corium. [CI: 0.250, RI: 0.000]. If the taxon has a partial transverse hemelytron, it is usually restricted to either one of two parts on the wing: the contrasting pigmentation is limited mostly to the clavus or claval suture (e.g. *Sejanus brittoni* Carvalho and Gross); or limited mostly to the corium (e.g. *Leucophoroptera quadrimaculata*, Fig 2-5: B).

[5] Fascia composition: (0) contrasting color; (1) transparent area. [CI: 0.143, RI: 0.739]. The transverse fascia, if present, is composed of either a contrasting, lighter color (e.g. white in *Sejanus meridionalis*, yellow in *Sejanus neboissi* Carvalho and Gross) or is transparent, lacking any pigmentation (e.g. *Collessicoris bellissimus*, Fig 2-6 A).

[6] Distinctly opaque, white fascia pigmentation: (0) absent; (1) present. [CI: 0.143, RI: 0.455]. In several members of the *Ausejanus* MS group (e.g. *Sejanus meridionalis*, Fig 2-6 CB) there is distinct white pigmentation in the transverse

fascia, which is absent in most Leucophoropterini.

[7] Dark posterior margin of transverse fascia: (0) absent; (1) present. [CI: 0.250, RI: 0.885]. In addition to a transverse lighter fascia, many Leucophoropterini in the *Ctypomiris* and *Gulacapsus* clades have a thin, dark line along the posterior margin of transverse fascia (e.g. *Collessicoris bellissimus* and *Leucophoroptera fasciatipennis*, Fig 2-6 A and C, respectively), which is absent in all *Sejanus*, *Ausejanus* MS species (e.g. *Sejanus meridionalis*, Fig 2-6B), and the outgroup *Tuxedo*.

[8] Contrasting colored claval suture: (0) no color difference; (1) white area below claval suture. [CI: 0.167, RI: 0.833]. Several members of the *Ctypomiris* clade have a contrasting, white patch below the claval suture (e.g. *Ctypomiris brendae* Schuh, Schuh 1984: fig 700), whereas in most Leucophoropterini this patch is absent.

[9] Transparent areas on posterior, lateral margins of corium: (0) absent; (1) present. [CI: 0.167, RI: 0.808]. Many of the taxa in the *Ctypomiris* clade and some of the Australian Leucophoropterini (e.g. *Collessicoris bellissimus*, Fig 2-6 A) have transparent areas on the posterior, lateral margins of corium that are absent in all other Leucophoropterini.

[10] Contrasting-colored corial margins: (0) corial margins contiguous in coloration with corium; (1) corial margins white, unlike corium. [CI: 1.000, RI: 1.000]. *Trichocephalocapsus* Schuh is unique among the Leucophoropterini in having the lateral corial margins lightly colored, contrasting with the remaining dark areas of the wing (e.g. *Trichocephalocapsus albofasciatus* Schuh, Schuh 1984:

figs 786). All other Leucophoropterini have the corial margins contiguous in color with the corium.

[11] Contrasting colored cuneal color area: (0) Cuneus unicolorous, no contrasting band or spots of color; (1) one spot of contrasting color; (2) two spots of contrasting color; (3) two spots partially fused of contrasting color; (4) <1/2 cuneus stripe of contrasting color; (5) >1/2 cuneus stripe of contrasting color. [CI: 0.227, RI: 0.575]. Most Leucophoropterini have at least some contrasting pigmentation or color (usually white) along the anterior margins of the cuneus parallel to the fracture with the corium. This can take the form of a single spot of contrasting color (e.g. *Sejanus elongatus* Schuh, Schuh 1984: fig 522); two separate spots of contrasting color (e.g. *Sejanus brassi* Schuh, Schuh 1984: fig 520); two partially fused spots of contrasting color (e.g. *Sejanus ecnomioides* Schuh, Schuh 1984: fig 534); a white stripe taking up less than 1/2 the area of the cuneus on the anterior margin (e.g. *Sejanus albisignatus*, Schuh 1984: fig 502; *Collessicoris bellissimus*, Fig 2-6 A); or a white stripe taking more than 1/2 the area of the cuneus (e.g. *Pseudohallodapocoris kokoda* Schuh, Schuh 1984: fig 763).

[12] Contrasting color of cuneus expands anteriorly past fracture onto corium (0) color limited to cuneus; (1) color extends into corium. [CI: 0.500, RI: 0.000]. At least one taxon within Leucophoropterini, *Pseudoleucophoroptera mamai* Schuh, has a white band of contrasting color on the cuneus, extending past the fracture onto the corium (Schuh 1984: fig 773). Most Leucophoropterini, if they posses contrasting coloration on the anterior margin of the cuneus do not have this

coloration extending past the fracture.

[13] Cuneal posterior color: (0) same color as hemelytra; (1) darker coloration than hemelytra. [CI: 0.200, RI: 0.833]. Most members of the *Ctypomiris* clade (e.g. *Waterhouseana* Carvalho, *Papuamimus* Schuh, *Arafuramiris* Schuh) have the posterior margin of the cuneus more darkly colored than the rest of the hemelytron, usually a dark brown (e.g. *Arafuramiris gressitti* Schuh, Schuh 1984: fig 680). The remaining Leucophoropterini have the posterior margin of the cuneus the same color as the majority of the hemelytron.

[14] Vein pigmentation: (0) absent; (1) present. [CI: 0.067, RI: 0.562]. Several Leucophoropterini have darker or contrasting pigmentation on the veins of the membrane, usually dark brown or red (e.g. *Sejanus meridionalis*, Fig 2-6 B); though most do not.

[15] Color of 1st antennal segment: (0) light; (1) light basally, dark apically; (2) dark basally, light apically; (3) dark. [CI: 0.111, RI: 0.538]. The coloration of the first antennal segment is noted in species descriptions in Leucophoropterini but has not been consistently tested at the generic level.

[16] Color of 2nd antennal segment: (0) light; (1) light basally, dark distally; (2) dark basally, light apically; (3) medially light, dark at distal joints; (4) dark. [CI: 0.211, R: 0.694]. The coloration of the second antennal segment is used frequently for keying out species within Leucophoropterini (e.g. *Sejanus* spp. Carvalho and Gross, 1982; *Arafuramiris*, Schuh 1984; *Sejanus* spp., Yasunaga 2001), and is coded in this study for potential phylogenetic signal among the

genera.

[17] Color of 3rd antennal segment: (0) light; (1) light basally, dark apically; (2) dark. [CI: 0.077, RI: 0.538]. Coloration of the third antennal segment has also been used for species-level differentiation (*Sejanus* spp., Schuh 1984), though less commonly than second antennal segment coloration.

[18] Color of 4th antennal segment: (0) light; (1) light basally, dark apically; (2) dark basally, light apically; (3) dark. [CI: 0.231, RI: 0.444]. The coloration of the fourth antennal segment is also noted in species descriptions in Leucophoropterini (when still present), but has not been consistently tested at the generic level.

[19] Contrasting color on the dorso-lateral margin of the mesepimeron and scent gland: (0) absent (1) weakly pigmented on margin (<1/4th of margin white); (2) strongly pigmented white (at least 1/4 of margin white); (3) scent gland completely white; (4) white pigmentation concentrated on a projection on dorso-lateral margin. [CI: 0.200, RI: 0.590]. A character that was noted in several original descriptions by Schuh (1984) and subsequently documented for many of Leucophoropterini of Carvalho and Gross (1982) is a contrasting white margin along the dark-colored dorso-lateral margin of the episternum and/or the scent gland. It is not present in many of Leucophoropterini (e.g. *Sejanus neboissi*, *Ctypomiris* Schuh), but if present it can be relatively weakly pigmented along the margin (<1/4th of margin white) or strongly pigmented white (at least 1/4 of margin white) pigmented. *Biromiris* Schuh is unique in having a white

pigmentation concentrated on an "ear-like" projection on the dorso-lateral margin (Schuh 1984), and several species of *Abuyogocoris* (e.g. *Abuyogocoris calian* Schuh, Schuh 1984) have the scent gland completely white.

[20] Fore-coxae coloration: (0) light; (1) mostly light with dark areas apically; (2) mostly dark with lighter areas apically; (3) dark. [CI: 0.107, RI: 0.500]. The coloration of the coxae varies among Leucophoropterini and has been used for species-level characterization, though not for higher level delineation. Many members of the Gulacapsus clade (e.g. *Blesingia gularis*) also have the fore-coxae a different coloration (lighter) than the rest of the coxae and therefore each set of coxae were coded separately.

[21] Mid-coxae coloration: (0) light; (1) mostly light with dark areas apically; (2) mostly dark with lighter areas apically; (3) dark. [CI: 0.136, RI: 0.683]

[22] Hind-coxae coloration: (0) light; (1) mostly light with dark areas apically; (2) mostly dark with lighter areas apically; (3) dark. [CI: 0.130, RI: 0.692]

[23] Fore-femur color: (0) light; (1) dark basally, light apically; (2) light basally, dark apically; (3) dark. [CI: 0.120, RI: 0.551]. Femora coloration is used frequently in Leucophoropterini species-level differentiation (Schuh 1984, Yasunaga 2001), and is included in this analysis for potential phylogenetic information at the tribal level. Each set of femora are coded separately since many Leucophoropterini have the hind-femora a different color than the fore and mid-coxae (e.g. *Sejanus albisignatus, Sejanus funereous*)

[24] Mid-femur color: (0) light; (1) light basally, dark apically; (2) light apically, dark

basally; (3) dark. [CI: 0.176, RI: 0.641]

[25] Hind-femur color: (0) light; (1) light basally, dark apically; (2) dark basally, light apically; (3) dark. [CI: 0.188, RI: 0.519]

[26] Fore and mid-tibia coloration: (0) light; (1) light basally, dark distally; (2) dark basally, light distally; (3) dark. [CI: 0.125, RI: 0.632]. The coloration of the fore and mid-tibia in Leucophoropterini is used for species-level differentiation in some genera (e.g. *Sejanus*) but has not been investigated at the generic level.

[27] Hind-tibia coloration: (0) light; (1) light basally, dark distally; (2) dark basally, light distally; (3) dark. [CI: 0.103, RI: 0.559]. The hind tibia in most Leucophoropterini differs in coloration patterns than the other tibiae, and is coded separately from the fore and mid-tibiae completely light in coloration.

[28] Dorso-ventral variation in coloration of appendages: (0) absent; (1) dorsal surface of femora and tibia darker than ventral surface. [CI: 0.167, RI: 0.737]. In several taxa (e.g. *Arafuramiris*) the dorsal surface of the appendages is darker than the ventral surface; creating potential ambiguity in coding depending on which angle the appendages were viewed. In cases where this was observed, color was coded based on the ventral surface only.

[29] Vestiture setae-socket coloration (0) absent; (1) distinctly dark. [CI: 0.333, RI: 0.875]. Most of the members of the *Ctypomiris* clade with punctation on the surface of their hemelytra also have pigmentation at the base of the setae inserted within these pits [1] (e.g. *Ctypomiris*); while for the majority of Leucophoropterini the bases of the setae are not distinctly colored [0].

[30] Light-colored stripe on abdomen: (0) absent; (1) contrasting transparent or light-colored stripe distal from thorax. [CI: 0.167, RI: 0.783]

VESTITURE AND SURFACE TEXTURE:

[31] Surface texture of head and pronotum: (0) matte or with slight texture; (1) distinctly polished, shiny. [CI: 0.200, RI: 0.852]. In most Leucophoropterini the surface of the head and pronotum is weakly shiny to dull; whereas *Abuyogocoris* Schuh and several other taxa in the *Ctypomiris* clade have a distinctly shiny, polished surface in comparison (Schuh 1984).

[32] Hemelytral shine: (0) distinctly dull, matted; (1) shiny. [CI: 0.250, RI: 0.929]. Several genera of Leucophoropterini, primarily in the *Ctypomiris* clade (e.g. *Papuamimus*, *Ctypomiris*) have the surface of the hemelytron distinctly dull in appearance, almost matte (e.g. *Collessicoris bellissimus*, Fig 2-6 A); whereas most Leucophoropterini have a relatively shiny surface to the hemelytron (e.g. *Sejanus meridionalis*, Fig 2-6 B).

[33] Hemelytra punctation: (0) absent; (1) distinctly punctured. [CI: 0.333, RI: 0.909]. Most Leucophoropterini (and Phylinae) do not have a punctate hemelytron; however almost all members of the *Ctypomiris* clade (Schuh 1984) and *Leucophoroptera philippinensis* Schuh (Schuh 1984: fig 487) have at least one area with punctation associated with patches of setae.

[34] Reflective patches on hemelytra: (0) absent; (1) present. [CI: 0.500, RI: 0.979]. Several members of the Pilophorini as well as Leucophoropterini possess

reflective patches on hemelytron. This character appears to be a modification of the surface of the hemelytron, giving a matte appearance by reflecting light back and making the area appear white or silvery depending on the angle at which the patch is viewed (*Collessicoris bellissimus*, Fig 2-6 A). This character is present in almost all Leucophoropterini with the exception of *Sejanus* and *Ausejanus* MS, where it appears to be absent (e.g. *Sejanus meridionalis*, Fig 2-6 B).

[35] <u>Reflective patch location on hemelytra</u>: (0) present across majority of hemelytral surface, not appearing to be restricted to anterior or posterior margins (1) next to or confluent with anterior corial fascia; (2) restricted to medial-posterior portion of hemelytra. [CI: 0.286, RI: 0.667]. If a reflective patch is present on the surface of the hemelytron, it can either cover the majority of the hemelytral surface (e.g. *Ctypomiris*), be adjacent to or confluent with an anterior corial fascia (e.g. *Pseudohallodapocoris wau* Schuh, Schuh 1984: fig 764), or be restricted to the postero-medial portion of the hemelytron (*Collessicoris bellissimus*, Fig 2-6 A).

[36] <u>Meta-femoral fringe on ventral surface</u>: (0) absent; (1) present. [CI: 0.500, RI: 0.938]. Schuh (1984) noted that several Leucophoropterini in the *Gulacapsus* group have a distinct meta-femoral "fringe" of setae on the ventral surface (e.g. *Gulacapsus*, Schuh 1984: fig 753).

[37] <u>Interocular setae</u>: (0) short, not obvious; (1) long, obvious. [CI: 0.167, RI: 0.615]. At least two genera within Leucophoropterini are unique in having the inter-ocular setae relatively long and projecting beyond the surface of the eye (e.g. *Papuamimus maai* Schuh, Schuh 1984: fig 724; *Pseudohallodapocoris* Schuh,

Schuh 1984); whereas for most taxa these setae are relatively short and not project beyond the margin of the eye (e.g. *Solomonomimus roroni*, Schuh 1984: fig 726).

[38] Facial setae: (0) sparse, relatively short setae; (1) dense, long setae, dispersed evenly along face; (2) dominantly on ventral-posterior space of head. [CI: 0.667, RI: 0.667]. Schuh (1984) documented two genera within Leucophoropterini with conspicuous dense, long setae on the head [1]: *Waterhouseana* (Schuh 1984: figs. 739-740) and *Trichocephalocapsus* (Schuh 1984, figs. 795-796). This is in contrast to the sparse, relatively short setae of most Leucophoropterini and Miridae (e.g. *Ctypomiris kokure*, Schuh 1984: figs 707-708). In *Trichocephalocapsus* the setae are evenly dispersed along the face (Schuh 1984, figs. 795-796); whereas in *Waterhouseana* Carvalho the setae are restricted to a patch on the posteroventral surface of the head (Schuh 1984: figs. 739-740).

[39] Vestiture of hemelytra: (0) simple setae only; (1) short, golden or silver reflecting setae; (2) short or long, sericeous setae; (3) long, erect setae; (4) scale-like setae. [CI: 0.500, RI: 0.940]. In addition to simple, hair-like setae, Schuh (1984) documented several other forms of setae on the surface of the hemelytron. For most members of *Sejanus* and *Ausejanus* MS the hemelytron is clothed only in simple setae. However, in some Leucophoropterini there can be short, golden or silver reflecting setae (e.g. *Collessicoris bellissimus*, Fig 2-6 A; *Leucophoroptera fasciatipennis*, Fig 2-6 C); short or long, sericeous setae (e.g. *Arafuramiris*, Schuh 1984: figs 673-675); or long, erect setae (e.g. *Abuyogocoris calian*, Schuh

1984). Scale-like setae are present in the Pilophorini outgroups (see Chapter II, character 5 for discussion of scale-like setae).

[40] Hemelytral setal location: (0) evenly scattered setae; (1) evenly scattered setae and setae in defined patches. [CI: 0.167, RI: 0.848]. In most Leucophoropterini hemelytral setae are evenly distributed across the surface [0]. However, in at least two genera (*Arafuramiris*, *Waterhouseana* Carvalho) and many of the taxa in the Gulacapsus group there are additional discrete patches of more dense setae.

[41] Patterning of setal patches: (0) patch of long, sericeous setae focused on clavus; (1) patch of contrasting, longer setae below claval suture; (2) comprising a partial transverse fascia on the anterior and posterior lateral margins of the hemelytron. [CI: 1.000, RI: 1.000]. To further differentiate the dense setae patches, their specific location on the hemelytron was coded. In *Arafuramiris* there is a dense patch of setae on the clavus (e.g. *Arafuramiris*, Schuh 1984: figs 673-675; in *Waterhouseana* there is a patch of contrasting, longer setae below the claval suture (*Waterhouseana illustris* Carvalho, Schuh 1984: fig 730a-b); while in the pilophorine outgroups patches of scale-like setae are associated with the partial or complete transverse fascia on the anterior and posterior lateral margins of hemelytra (e.g. *Pilophorus alstoni*, Schuh 1984: fig 129).

HEAD AND THORACIC STRUCTURES:

[42] Position of eyes relative to anterior margin of pronotum when viewed laterally: (0) eyes partially obscure anterior of pronotum; (1) posterior margin of eyes parallel

to anterior margin of pronotum; (2) eyes strongly exerted from anterior margin of pronotum. [CI: 0.333, RI: 0.750]. The position and morphology of the head relative to the pronotum varies widely across Leucophoropterini. In several taxa the eyes overlap the anterior margin of the pronotum when viewed laterally (*Pseudoleucophoroptera promeceops* Schuh, Schuh 1984: fig 781); in others the eyes that are parallel to the anterior margin of the pronotum (*Gulacapsus*, Schuh 1984: figs 755, 757); or far removed (*Trichocephalocapsus albofasciatus*, Schuh 1984: fig 796).

[43] Eye in lateral view: (0) less than 1/2 height of head; (1) greater than 1/2+ height of face; (2) entire. [CI: 0.133, RI: 0.409]. Most Leucophoropterini have eyes that take up either the entire height of the head when viewed laterally or at least half of the entire height. In other taxa (e.g. *Trichocephalocapsus albofasciatus*, Schuh 1984: fig 796) the eyes are small relative to the head and take up less than one half the head height.

[44] Eye shape relative to vertex in anterior view: (0) eyes flush with vertex; (1) eyes distinctly removed or bulging from vertex. [CI: 0.062, RI: 0.643]. The shape of the eyes and their position relative to the vertex were found to vary among Leucophoropterini. In most taxa the eyes are distinctly removed or bulging from the vertex when viewed anteriorly (e.g. *Trichocephalocapsus albofasciatus*, Schuh 1984: fig 796). A few taxa, however, have the eyes flush with vertex (e.g. *Ctypomiris brendae*, Schuh 1984: fig 701).

[45] Vertex in lateral view: (0) vertex visible; (1) vertex not visible, obscured by anterior

margin of eyes. [CI: 0.167, RI: 0.167]. The visibility of the vertex when the head is viewed laterally differs among Leucophoropterini depending on the position of the eyes. The vertex is obscured in taxa with eyes that are situated relatively high on the head (e.g. *Arafuramiris*; *Biromiris enarotadi*, Schuh 1984: fig 691). In most Leucophoropterini, however, the vertex is visible and not obscured by the dorsal margin of the eyes (e.g. *Sejanus elongatus*, Schuh 1984: fig 533; *Ctypomiris brendae*, Schuh 1984: fig 702).

[46] <u>Height of head below eyes in lateral view</u>: (0) less than 1/3 of total height; (1) greater than or equal to 1/3 of total height. [CI: 0.100, RI; 0.667]. In many putatively ant-mimetic Miridae the area of the head below the eyes is relatively expanded and elongate, presumably to mimic mandibulate mouth parts (e.g. *Gulacapsus*, Schuh 1984; McGiver and Stonedahl, 1993). The area of the head below the eyes was therefore coded as occupying less than one-third the total height of the head, or greater than or equal to one-third of total height.

[47] <u>Posterior margin of vertex</u>: (0) upturned margin; (1) shelf-like; (2) flat; (3) declining. [CI: 0.150, RI: 0.595]. Schuh (1984) found that the shape of the posterior margin of the vertex was phylogenetically informative within Phylinae (this was used in Chapter II as character 18). The same character states are used in this study, with the following addition: in several members of the *Ctypomiris* clade (e.g. *Arafuramiris*) the posterior margin of the vertex is not contiguous, and the medial portion is raised vertically with upright lateral margins, forming a shelf (e.g. *Arafuramiris queenslandi* MS, Fig 2-4 A). Most Leucophoropterini

have either an upturned (e.g. *Waterhouseana* Carvalho, Schuh 1984) or declining [3] (e.g. *Abuyogocoris*, Schuh 1984) posterior margin, with some taxa (e.g. *Solomonomimus roroni*, Schuh 1984) having a flat margin.

[48] Vertex shape: (0) concave; (1) flat; (2) convex; (3) ridged. [CI: 0.120, RI: 0.522]. The overall shape of the vertex relative to the head and eyes can take on four states within Leucophoropterini: concave (e.g. *Gulacapsus moresbyana* Schuh, Schuh 1984), flat [1] (e.g. *Arafuramiris*, Schuh 1984), convex (e.g. *Trichocephalocapsus*, Schuh 1984), or ridged (e.g. *Collessicoris bellissimus* Carvalho, Fig 2-5 A).

[49] Relative width of vertex: (0) Vertex < 1/3 width of head; (1) 1/2>Vertex >1/3 width of head; (2) Vertex >1/2. [CI: 0.083, RI: 0.290]. The width of the head (based on the distance between the lateral margins of the eyes when viewed dorsally) relative to the width of the vertex is a useful character for estimating the area of the head occupied by the eyes. The majority of Leucophoropterini have relatively wide eyes, with the vertex encompassing less than one-third the total width of the head (e.g. *Pseudoleucophoroptera promeceops*, Schuh 1984: fig 780); or intermediate width eyes, with the vertex taking up less than half but greater than one-third the width of the head (e.g. *Sejanus elongatus*, Schuh 1984: fig 532). Only two taxa (*Collessicoris bellissimus* and *Johnstonsani missani* MS) have relatively narrow eyes with the vertex constituting greater than half the width of the head.

[50] Visibility of frons and clypeus in dorsal view: (0) clypeus flush with frons; only

frons visible in dorsal view; (1) clypeus exerted; clypeus visible in dorsal view. [CI: 0.059, RI: 0.568]. When the head is viewed dorsally, the visibility of the clypeus relative to the frons varies across taxa. In some taxa the clypeus is flush with the frons and not visible when viewed from above, whereas in others the clypeus is exerted relative to the frons, and is visible in dorsal view.

[51] <u>Cyberial muscle attachments</u>: (0) cyberial muscle attachment ridges visible; (1) cyberium muscle ridges not visible. [CI: 0.071, RI: 0.235]. The presence of visible ridges where the cibarial muscles attach to the head has been observed in several Leucophoropterini (e.g. *Arafuramiris*). The ridges are either coded as present or absent as in Chapter II.

[52] <u>1st labial segment length</u>: (0) not extending past head; (1) extending past head. [CI: 0.091, RI: 0.545]. The first labial segment of the mouthparts varies in length across Leucophoropterini, with most taxa having the posterior margin of the segment surpassing the posterior margin of the head and terminating near the anterior of the pronotum. However, in some taxa where the head is ventrally enlarged (e.g. *Gulacapsus*, *Trichocephalocapsus*), the posterior margin of the first labial segment doesn't extend beyond the head (e.g. *Trichocephalocapsus albofasciatus*, Schuh 1984: fig 796).

[53] <u>Total labial length</u>: (0) apex extending to fore-coxae; (1) apex extending to mid-coxae; (2) apex extending to hind-coxae; (3) apex extending past hind-coxae. [CI: 0.088, RI: 0.404]. Total labial length is often reported in species and generic level descriptions in Phylinae and Leucophoropterini, and was coded for possible

phylogenetic information within the tribe. Length of the labium was calculated relative to the coxae; where the apex can extend to the fore-coxa, the mid-coxa, the hind-coxa, or past the hind-coxa.

[54] Labrum morphology: (0) slender, sinuous; (1) laterally flattened, height thinner than first labial segment; (2) wider than 1st labial segment, laterally flattened. [CI: 0.250, RI: 0.000]. The majority of Phylinae have a slender labrum that covers the base of the labium when at rest [0]. However, there are several taxa with the labrum laterally compressed, its width less than that of the first labial segment (e.g. *Gulacapsus novoguinensis* Schuh, Schuh 1984: fig. 757); or laterally compressed but thicker than 1st labial segment (e.g. *Gulacapsus moresbyana*, Schuh 1984: fig 755). This may function to increase the appearance of an “ant-like” head when viewed laterally.

[55] Gula morphology: (0) short, flat; (1) elongate, flat; (2) elongate, keel-like; (3) short, with a transverse roll ("double chin"). [CI: 0.600, RI: 0.833]. Schuh (1984) found that the morphology of the gula is phylogenetically informative for several genera in Leucophoropterini (e.g. *Biromiris*, Schuh 1984). Most Leucophoropterini have a short, flat gula if visible. However, *Blesingia gularis* Carvalho and Gross has an elongate, flat gula; *Gulacapsus* has the gula modified into a “keel-like” structure (Schuh 1984); and Indo-Pacific taxa of *Biromiris* has a short gula with a transverse roll ("double chin", Schuh 1984).

[56] Shape of 2nd antennal segment: (0) width equal to weakly widening towards apex of second antennal segment, not club-like; (1) apex of second segment distinctly

thicker than majority of the width of the segment, club-like. [CI: 0.111, RI: 0.529]. Characters associated with the second antennal segment structure have phylogenetic information in Leucophoropterini, while first antennal segment structure is consistent across the included taxa (Schuh 1984, Chapter II). Antennal segment two in most Leucophoropterini is equal in width across its length to weakly expanding towards its apex, but not clubbed. However, in at least one taxon (*Arafuramiris queenslandi* MS, Fig 2-4: A) the apex of second segment is distinctly swollen and club-like.

[57] <u>Curvature of antennal segment 2</u>: (0) straight; (1) curved. [CI: 0.200, RI: 0.913]. Schuh (1984) coded the curvature of the second antennal segment and found it to be phylogenetically informative within the Indo-Pacific Phylinae and Leucophoropterini. Most Phylinae and Leucophoropterini have the second antennal segment nearly straight (e.g. *Sejanus ecnomios*, Schuh 1984: fig 535) whereas several members of the *Gulacapsus* clade have a distinct medial curve (e.g. *Trichocephalocapsus albofasciatus*, Schuh 1984: fig 786).

[58] <u>Length of antennal segment 2</u>: (0) less than twice the distance of the width of the head; (1) equal to or longer than twice the width of the head. [CI: 0.333; RI: 0.000]. Two genera (*Pseudoleucophoroptera*, *Johnstonsani missani MS)* within Leucophoropterini that have relatively long antennae compared to the rest of the tribe, with the length equal to or longer than twice the width of the head. Most Leucophoropterini have antennae shorter than twice the width of the head.

[59] <u>Shape of 3rd and 4th antennal segments</u>: (0) straight; (1) terete. [CI: 0.500, RI:

0.667]. One genus within Leucophoropterini, *Biromiris*, has the third and fourth antennal segments terete-shaped (Schuh 1984), whereas for all other Leucophoropterini these segments are consistently linear.

[60] Pronotal collar: (0) absent; (1) present, relatively narrow, depressed and sometimes weakly reflexed anteriorly; (2) broad, flattened collar, never depressed or reflexed anteriorly. [CI: 0.400, RI: 0.932]. A pronotal collar has been observed for at least two tribes within the Phylinae: Hallodapini and Leucophoropterini (Schuh 1984, Chapter II). Within Leucophoropterini the collar can be absent (e.g. *Sejanus*, *Leucophoroptera*) or present. If a pronotal collar is present, it is observed bearing the following states (Schuh 1984): relatively narrow, depressed and sometimes weakly reflexed anteriorly (e.g. *Biromiris*, Schuh 1984); or broad, never depressed or reflexed anteriorly (e.g. *Trichocephalocapsus*, Schuh 1984).

[61] Pronotal carina in lateral view: (0) present; (1) absent. [CI: 0.500, RI: 0.750]. Schuh (1984) found that all members of *Biromiris* have a carina along the antero-lateral margins of the pronotum (e.g. *Biromiris enarotadi*, Schuh 1984: fig 691), which has also been observed in at least two new taxa (Chapter IV). In all other Leucophoropterini it is absent.

[62] Shape of the pronotum in lateral view: (0) posterior portion not elevated or swollen; (1) posterior portion elevated and swollen. [CI: 0.200, RI: 0.875]. Several members of the *Ctypomiris* clade have the pronotum swollen and elevated, forming a hump-back appearance when viewed laterally (e.g. *Arafuramiris gressitti* Schuh, Schuh 1984: fig 685), whereas most Leucophoropterini have a

relatively flat pronotum relative to the body when viewed laterally (*Pseudoleucophoroptera promeceops*, Schuh 1984: fig 781).

[63] Shape of pronotum in dorsal view: (0) lateral angles of pronotum contiguous, not obviously narrowed compared to posterior portion of pronotum, trapezoidal-shaped; (1) narrowed, with obvious difference between lateral pronotal angles of anterior and posterior portions of pronotum, bell-shaped; (2) wide at anterior margin, narrowing to a constriction between anterior and posterior portions of the pronotum, hour-glass shaped. [CI: 0.250, RI: 0.750]. Several genera of Leucophoropterini have a narrowing of the anterior, lateral margins of the pronotum relative to the posterior lateral margins, forming a bell-shape when viewed dorsally (e.g. *Arafuramiris queenslandi*, Figure 2-4 A). However, most members of the *Gulacapsus* Group and all members of *Ausejanus* MS, *Leucophoroptera* and *Sejanus* sensu strictu taxa have the angle of the lateral margins of the pronotum contiguous, forming a trapezoidal-shaped pronotum (e.g. Leucophoroptera quadrimaculata, Figure 2-5 B). *Waterhouseana* is unique in having the pronotum wide at the anterior margin, before narrowing laterally to a medial constriction (*Waterhouseana delicatus* MS, Figure 2-5 C).

[64] Demarcation or constriction of pronotum: (0) no demarcation; (1) weak indentation; (2) constricted. [CI: 0.222, RI: 0.731]. The dorsal surface of the pronotum also may have a demarcation between the anterior and posterior portions. A majority of Leucophoropterini do not have a demarcation [0], but some taxa (e.g. *Arafuramiris gressitti*, Schuh 1984: fig 685) have an indentation or a constriction

dorso-ventrally between the anterior and posterior (e.g. *Waterhouseana illustris*, Schuh 1984: fig 740).

[65] Shape of posterior pronotal margin in dorsal view: (0) convex; (1) straight to slightly concave; (2) concave. [CI: 0.222, RI: 0.667]. The posterior margin of the pronotum was coded with the following states in Leucophoropterini: distinctly convex, with the medial portion curving inwards towards the anterior (e.g. *Trichocephalocapsus albofasciatus*, Schuh 1984: fig 786); straight to weakly concave (e.g. *Sejanus, Ausejanus* MS); or concave (*Papuamimus irianicus* Schuh, Schuh 1984: fig 720).

[66] Visibility of mesoscutum in dorsal view: (0) exposed; (1) not exposed. [CI: 0.333, RI: 0.926]. Schuh (1984) found that several taxa within Auricillocorini (=Hallodapini, Chapter II) and Leucophoropterini (e.g. *Papuamimus*, Schuh 1984) have the mesoscutum obscured by the posterior margin of the pronotum, whereas for most Phylinae and Leucophoropterini it is exposed.

[67] Scutellum sculpture: (0) scutellum flat to weakly transversely rounded; (1) protruding medially; (2) swollen, with anterior margin protruding to posterior margin of pronotum. [CI: 0.286, RI: 0.667]. The scutellum in most Phylinae and Leucophoropterini is flat to weakly convex. However, in *Biromiris* there is a medial projection [1] (Schuh 1984) and in *Arafuramiris* and *Waterhouseana* the anterior portion of the scutellum is expanded dorsally, meeting the underside of the posterior margin of the pronotum (e.g. *Arafuramiris dreikikir* Schuh, Schuh 1984: fig 683; *Waterhouseana delicatus*, Fig 2-5 C).

[68] Size of scent gland: (0) >1/2 total area of mesepisternum; (1) greater than one third of total area of scent gland but less than ½ area; (2) scent gland is less than one third total area mesepisternum. [CI: 0.118, RI: 0.286]. In Leucophoropterini the scent gland can be relatively large and occupy over one half the total area of the mesepisternum; be medium-sized and occupy less than half but greater than a third of the area, or be relatively small and occupy less than one third the total area.

[69] Extension of R+M vein: (0) R+M complete, almost reaches cuneal fracture; (1) R+M reduced, only present on anterior half of hemelytra. [CI: 0.333, RI: 0.867]. Schuh (1984) observed that the R+M vein in several members of the *Ctypomiris* clade is only present on the anterior half of the hemelytron (e.g. *Papuamimus*, Schuh 1984); whereas for other Leucophoropterini the R+M is complete, almost reaching the cuneal fracture.

[70] Hemelytral shape in lateral view: (0) transversely rounded; (1) flat. [CI: 0.333, RI: 0.913]. Most of the genera within the *Ctypomiris* clade have hemelytra that lay flat across the thorax and abdomen (e.g. *Papuamimus, Arafuramiris, Waterhouseana*; Schuh 1984), whereas for most other Leucophoropterini and Phylinae the lateral margins of the hemelytra are transversely rounded and partially cover the abdomen and thorax when viewed laterally (Chapter II).

[71] Corial margins in dorsal view: (0) convex or nearly straight; (1) narrowed anteriorly, widening posteriorly; (2) constricted medially. [CI: 0.167, RI: 0.815]. The lateral margins of the corium when viewed dorsally in Leucophoropterini

have been found to be phylogenetically useful (Schuh 1984). All *Sejanus* and *Ausejanus* MS species have convex or parallel-sided lateral margins, where as most members of the *Gulacapsus* clade have corial margins that are narrow anteriorly, wideningn posteriorly (e.g. *Gulacapsus*, Schuh 1984). The *Ctypomiris* clade has several genera with corial margins that are constricted medially (e.g. *Papuamimus*, Schuh 1984).

[72] <u>Thickening of lateral margin of corium, anterior to cuneal fracture: </u>(0) absent; (1) present; swelling formed into a "lobe" over fracture. [CI: 0.167, RI: 0.839]. Schuh (1984) observed a swelling along the lateral margin of corium, forming a lobe anterior to the cuneal fracture. This was not documented in Carvalho and Gross (1982) for the Australian Leucophoropterini, though it is in fact present in at least one taxon (*Collessicoris bellissimus*). Most Leucophoropterini and Phylinae do not have this lobe-like thickening.

[73] <u>Air-space on anterior, lateral margin of cuneus</u>: (0) absent; (1) present. [CI: 0.500, RI: 0.500]. In all of the *Arafuramiris* species from Australia and one species of *Papuamimus* there is what appears to be an air pocket in the anterior, lateral margin of cuneus (e.g. *Arafuramiris queenslandi* MS, 2-5 A) that is not present in any of the Indo-Pacific species or other Leucophoropterini.

[74] <u>Length of cuneus</u>: (0) less than or equal to 1/3 the total length of the membrane; (1) longer than 1/3 the total length of the membrane. [CI: 0.125; RI: 0.811]. Several taxa in Leucophoropterini have a relatively short cuneus that is equal to or less than one-third the total length of the wing membrane, including most of the

Sejanus species from the Indo-Pacific (though see *Sejanus elongatus*, Schuh 1984), and some of the species in the *Ctypomiris* clade (e.g. *Abuyogocoris*, Schuh 1984) and the *Gulacapsus* clade (e.g. *Pseudoleucophoroptera promeceops*, Schuh 1984). However, for most species in the tribe and all of the species in the *Ausejanus* MS Group the cuneus is longer than one-third the total length of the membrane.

[75] <u>Cuneus lateral margin thickening</u>: (0) absent; (1) thickened on anterior portion of margin for less than half of length; (2) thickened on anterior, lateral margin for greater or equal to half the length of cuneus. [CI: 0.133, RI: 0.618]. In some Leucophoropterini there is a thickening along the length of the lateral margin of the cuneus, extending for at most half of the anterior lateral margin of the cuneus (e.g. *Sejanus mcdonaldi* Carvalho and Gross) or thickened for greater or equal to half the length of cuneus (e.g. *Leucophoroptera fasciatipennis*, Fig 2-6 C). This thickening can also be absent in some taxa (e.g. *Gulacapsus*).

[76] <u>Cuneal fracture margin thickening:</u> (0) absent; (1) partially thickened; (2) thickened along entire fracture. [CI: 0.095, RI: 0.596]. In addition to having a thickening along the lateral margin of the cuneus, some Leucophoropterini have a thickening along the cuneal fracture. This is observed as being partially thickened along the fracture closest to the lateral margins (e.g. *Sejanus mcdonaldi*, Chapter IV); or thickened along the entire fracture from where it originates near the claval suture to the lateral margins of the corium (*Arafuramiris queenslandi* MS, Fig 2-4 A). It also is absent in several members

of the *Gulacapsus* clade and *Abuyogocoris*.

[77] Lateral margins of cuneus in dorsal view: (0) straight to weakly convex; the lateral margins not continuous with the lateral margins of the cuneus; (1) distinctly convex, the lateral margins not continuous with the lateral margins of the corium. [CI: 0.200, RI: 0.636]. The lateral margins of the cuneus in most Phylinae and Leucophoropterini are straight to weakly convex (e.g. *Leucophoroptera quadrimaculata*, Fig 2-5 B). However, in some taxa (e.g. *Leucophoroptera fasciatipennis, Arafuramiris*) the lateral margins are concave and inset within fractured lateral margins (e.g. *Arafuramiris queenslandi* MS, Fig 2-5 A).

[78] Cuneal fracture angle: (0) angle of cuneus and lateral margin obtuse; (1) angle of cuneal fracture and lateral margin approximately 90 degrees. [CI: 0.200, RI: 0.750]. The angle of the fracture of the cuneus relative to the lateral margins of the corium is obtuse in most Leucophoropterini and Phylinae, but in some members of the *Ctypomiris* clade the fracture forms an angle close to 90 degrees (e.g. *Arafuramiris*).

[79] Cuneal deflection in lateral view: (0) shallow to deep; (1) obsolete. [CI: 0.333, RI: 0.000]. Most Phylinae and Leucophoropterini have the cuneus deflecting down from the cuneal fracture shallowly to deeply; however in some taxa the deflection is obsolete, and the cuneus maintains the same angle as the hemelytron (e.g. *Gulacapsus nongugl* Schuh, Schuh 1984).

[80] Shape of margin and cuneus: (0) straight; (1) angled medially into area of cuneus, forming a moon or boomerang-shaped cuneus. [CI: 0.667, RI: 0.750]. In

Trichocephalocapsus the margin of the cuneus and membrane is angled medially into the area of the cuneus, forming a crescent or boomerang shape. In the remainder of the Leucophoropterini the margin is straight.

[81] Shape of hind-femora: (0) elongate, slender; (1) medium length, flat; (2) short, flat; (3) slender, swollen at joint with metatibia. [CI: 0.231, RI: 0.836]. The shape of the hind femur is phylogenetically informative in Phylinae (Chapter II), and was re-examined within Leucophoropterini. The hind femur is elongate, slender, and not dorso-ventrally flattened in *Pseudohallodapocoris* (Schuh 1984); intermediate in length, dorso-ventrally flattened in *Ausejanus* MS; short, dorso-laterally flattened in *Sejanus* sensu strictu taxa (Schuh 1984; Yasunaga 2001); or elongate, slender basally and swollen distally at the joint with the metatibia, not dorso-ventrally flattened (e.g. *Papuamimus*, Schuh 1984).

[82] Shape of hind-tibiae: (0) more or less rounded; (1) laterally compressed. [CI: 0.167, RI: 0.722]. Several Leucophoropterini have laterally compressed hind tibiae (Schuh 1984), but this has not been coded previously in the Australian Leucophoropterini. Most Phylinae and the majority of the taxa in Leucophoropterini have the hind-tibiae more or less rounded in diameter.

[83] Shape of parempodia: (0) lyriform; (1) setiform. [CI: 1.000, RI: 1.000]. All taxa within the Leucophoropterini have setiform parempodia, whereas Pilophorini outgroups *Hypseloecus munroi* and *Pilophorus alstoni* have lyriform parempodia (Chapter II).

MALE ABDOMEN AND GENITALIA

[84] Shape of male abdomen: (0) constricted past thorax, widening towards genital capsule; (1) parallel-sided. [CI: 0.111, RI: 0.714]. The majority of Leucophoropterini have the lateral margins of the male abdomen straight and parallel-sided, whereas in some genera in the *Ctypomiris* clade (e.g. *Waterhouseana illustris*, Schuh 1984: fig 732) the abdomen is constricted past the thorax, widening towards the pygophore.

[85] Width of second abdominal segment: (0) wider than long; (1) longer than wide. [CI: 0.250, RI: 0.800]. Schuh (1984) coded the shape of the second abdominal segment in male Leucophoropterini, but this was not described in the Australian Leucophoropterini by Carvalho and Gross (1982). In the Leucophoropterini the second abdominal segment can be wider than long (most Phylinae and Leucophoropterini); or longer than wide (e.g. *Arafuramiris*, Schuh 1984).

[86] Elaborations on genital capsule: (0) no elaborations; (1) tubercules on ventral side of genital capsule; (2) short spine-like protuberance postero-ventrally; (3) peg-like setae present. [CI: 0.333, RI: 0.571]. Several taxa in Leucophoropterini have elaborations or additional structures on the pygophore, such as tubercules on ventral surface (e.g. *Austrodapus nitens* MS); or a short spine-like protuberance postero-ventrally (e.g. *Waterhouseana illustris*, Schuh 1984: figs 733-34). Outgroup *Tuxedo* has peg-like setae on the pygophore (Schuh 2004: fig 5-H). Most Leucophoropterini have no elaborations [0].

[87] Size of genital capsule relative to the abdomen: (0) < 1/3 length of abdomen; (1)

1/2>length of abdomen>1/3. [CI: 0.167, RI: 0.444]. One of the hypothesized synapomorphies for Leucophoropterini is the relatively small genital capsule (Schuh 1974, 1984). In Chapter II at least two taxa previously within Leucophoropterini (*Karoocapsus*, *Tytthus*), which also have a relatively small pygophore (Schuh 1974, 1984; Chapter II), were found to belong to the *Karoocapsus* Group, raising uncertainty over this character's utility in defining Leucophoropterini. No Leucophoropterini have a pygophore encompassing more than half the length of the abdomen, although there appear to be two distinct size categories: taxa with the pygophore occupying less than 1/3 the total length of abdomen (e.g. *Waterhouseana illustris*, Schuh 1984: fig 732); or occupying more than 1/3 the total length but less than 1/2 (e.g. *Sejanus melas* Schuh, Schuh 1984)

[88] <u>Endosoma composition</u>: (0) fused tube; (1) two straps, united at apex ; (2) two straps with straps separated at apex. [CI: 0.250, RI: 0.739]. All Phylinae have a rigid endosoma without an expandable membrane (Schuh 1974, Chapter II). The rigid endosoma can take on two states in Leucophoropterini: it can either be comprised of two separate sclerotized straps united by a membrane (e.g. *Sejanus ansevata* Schuh, Schuh 1984: fig 524, or have the two straps fused into a tubular endosoma (e.g. *Sejanus funereus*, Schuh 1984: fig 564). If the endosoma is composed of two straps, in some taxa the apex of the endosoma is split into two or more processes (e.g. *Arafuramiris biakanus* Schuh, Schuh 1984: fig 676)

[89] <u>Posterior strap</u>: (0) apex does not go past base of secondary gonopore; (1) apex past the base of the secondary gonopore. [CI: 0.500, RI: 0.000]. In the taxa with the

apex of the endosoma split into two straps, (e.g. *Arafuramiris*) the length of the posterior strap can vary. In some taxa the apex of the posterior strap does not surpass the base of secondary gonopore [0] (e.g. *Arafuramiris oswaldi* MS); whereas in others the apex extends beyond the base of the secondary gonopore (e.g. *Arafuramiris biakanus*, Schuh 1984: fig 676).

[90] <u>Shape of endosoma</u>: (0) endosoma C-or J-shaped; (1) endosoma sigmoid. [CI: 0.200, RI: 0.840]. One of the proposed synapomorphies for Leucophoropterini is the shape of the endosoma: a small, simple endosoma that is C, J, or S-shaped (Chapter II). Endosoma shape is coded here to investigate its phylogenetic contribution in identifying generic relationships, especially with respect to the Australian fauna. This was coded as follows: the endosoma appearing C or J-shaped (e.g. outgroup *Tuxedo*, Schuh 2004; *Sejanus funereus*, Schuh 1984: fig 564); or the endosoma appearing sigmoid and S-shaped (e.g. *Waterhouseana illustris*, Schuh 1984: fig 741).

[91] <u>Dentations/serrations on the membrane of the endosoma</u>: (0) absent (1) present. [CI: 0.200, RI: 0.200]. At least two taxa within *Sejanus* (e.g. *Sejanus serrulatus* Schuh, *Sejanus brittoni*) have the membrane of the endosoma with a serrated edge or with dentations along the margin (e.g. *Sejanus serrulatus*, Schuh 1984: fig 607). In most Leucophoropterini the membrane of the endosoma is smooth.

[92] <u>Shape of secondary gonopore</u>: (0) not visible (1) sclerotized, horse-collar shaped and sometimes folded over itself; (2) weakly sclerotized, amorphous; (3) a semi-circular opening. [CI: 0.150, RI: 0.564]. The shape of the secondary gonopore

within Leucophoropterini shows variation among the genera, with most genera having a sclerotized, horse-collar shaped or folded secondary gonopore (e.g. *Arafuramiris biakanus*, Schuh 1984: fig 676); or a weakly sclerotized, amorphous secondary gonopore (e.g. *Sejanus albisignatus*, Schuh 1984: fig 511). *Sejanus* has several taxa (e.g. *Sejanus funereus*, Schuh 1984: fig 564) in which the secondary gonopore is not easily visible. Pilophorini outgroups *Pilophorus* and *Hypseloecus* have a semi-circular opening for the secondary gonopore (Schuh 1984).

[93] <u>Additional hook-like process at endosoma apex beyond secondary gonopore</u>: (0) absent; (1) present, less than or equal to length of secondary gonopore; (2) present, longer than secondary gonopore. [CI: 1.000, RI: 1.000]. Several taxa in outgroup *Tuxedo* Schuh have a hook-like sclerite at the apex of the endosoma, behind the secondary gonopore (e.g. *Tuxedo cruralis* Schuh, Schuh 2004: fig 2) which is less than or equal to the length of the secondary gonopore. *Ctypomiris* appears to have a similar modification at the apex of the endosoma consisting of a hook-like extension that is longer than the secondary gonopore (e.g. *Ctypomiris brendae*, Schuh 1984: fig 703; *Ctypomiris kokure*, Schuh 1984: fig 706). This structure is absent absent for all other Leucophoropterini observed.

[94] <u>Spine(s) at apex of endosoma</u>: (0) present; (1) absent. [CI: 0.167, RI: 0.667]. Most Leucophoropterini have a rounded apex of the endosoma without any narrow apical projections or spines (e.g. *Sejanus neofunereus* Schuh, Schuh 1984: fig 601). However, in *Papuamimus* at least one taxon (e.g. *Papuamimus irianicus*,

Schuh 1984: fig 721) has the apex narrowed into a spine.

[95] Shape of phallotheca: (0) C-shaped; (1) L-shaped; (2) apex and anterior-half perpendicular to base to slightly angled. [CI: 0.091, RI: 0.375]. Schuh (1984) coded the shape of the phallotheca and found it to be informative within Leucophoropterini and Phylinae, and the shape is here further investigated at the generic level within Leucophoropterini. The overall shape of the phallotheca can be C-shaped (e.g. *Sejanus funereus*, Schuh 1984: fig 566); L-shaped (e.g. *Papuamimus irianicus*, Schuh 1984: fig 723); or the apex and anterior-half of the phallotheca can be perpendicular to the base to slightly angled (e.g. Pilophorini outgroups, Chapter II).

[96] Ridges or folds on Phallotheca: (0) smooth surface, without ridges or folds; (1) ridges on surface; (2) multiple lobes, folds. [CI: 0.154, RI: 0.083]. Most Leucophoropterini have a phallotheca with a smooth surface, without ridges or folds. However some taxa such as *Papuamimus* (e.g. *Papuamimus irianicus*, Schuh 1984: fig 723) have ridges on its surface [1]. Pilophorini outgroups *Hypseloecus* and *Pilophorus* have multiple lobes or folds on the phallotheca [2] (e.g. *Pilophorus alstoni*, Schuh 1984: fig 137).

[97] Size of the left paramere size relative to the right paramere: (0) left paramere larger; (1) both parameres approximately equivalent in size. [CI: 0.167, RI: 0.444]. Carvalho and Gross (1982) stated that a synapomorphy for the Australian Leucophoropterini is the possession of a left paramere much larger than the right. However, within the Indo-Pacific Leucophoropterini and subsequent

reinvestigation of the taxa of Carvalho and Gross (1982), this is not true for all Leucophoropterini. As a consequence, the relative sizes of the parameres are recoded with the following states: left paramere larger; or both parameres approximately equivalent in size. No taxa were observed with the right paramere larger than the left paramere.

[98] <u>Shape of the right-paramere</u>: (0) feather-shaped; (1) leaf shaped. [CI: 0.250, RI: 0.500]. With Leucophoropterini and outgroup *Tuxedo* Schuh there are two general forms for the right paramere: feather-shaped, relatively long and parallel-sided main body (e.g. *Tuxedo*, Schuh 2004: fig 2); or leaf-shaped, with a rounded main body (e.g. Pilophorini outgroups).

[99] <u>Curvature of the medial area in the left paramere</u>: (0) area rounded; (1) area flat on the dorso-posterior margin. [CI: 0.091, RI: 0.474]. The main body of the left paramere in some Leucophoropterini has the dorso-medial margin between the anterior and posterior processes flattened, forming the appearance of an angular posterior-dorsal margin (e.g. *Pseudohallodapocoris ifar*, Schuh 1984: fig 766), whereas for most Leucophoropterini the area is rounded (e.g. *Sejanus isarog* Schuh, Schuh 1984: fig 584).

[100] <u>Curvature of the left paramere posterior process</u>: (0) straight; (1) curved downward; (2) curved upward. [CI: 0.095, RI: 0.578]. The curvature of the posterior process in the left paramere is coded for the first time in Leucophoropterini, and can be either straight relative to the main body and base of the left paramere (e.g. *Sejanus funereus*, Schuh 1984: fig 565); curved

downward (e.g. *Ctypomiris brendae*, Schuh 1984: fig 705); or curved upward (e.g. *Sejanus spiculatus* Schuh, Schuh 1984: fig 626).

[101] Width of posterior process in left paramere: (0) margins narrow, with a medial concavity; (1) posterior process margins contiguously narrow, straight; (2) apex of posterior process relatively wide for majority of length. [CI: 0.125, RI: 0.702]. There is significant variation in the width of the posterior process on the left paramere within Leucophoropterini, with *Ausejanus* MS (e.g. *Sejanus albisignatus*, Schuh 1984: fig 513) having the lateral margins narrow, with a medial concavity; or taxa with the posterior process margins completely narrow, straight (e.g. *Sejanus elongatus*, Schuh 1984: fig 530); or the apex of posterior process relatively wide for the majority of its length (e.g. *Pseudohallodapocoris ifar*, Schuh 1984: fig 765).

[102] Relative size of left paramere processes: (0) posterior process longer; (1) both processes of equivalent size. [CI: 0.200, RI: 0.333]. Almost all Leucophoropterini have both the posterior process of the left paramere significantly longer than the anterior process (e.g. *Pseudohallodapocoris ifar*, Schuh 1984: fig 765). However, at least one species of *Ausejanus* MS has both processes of equivalent size (e.g. *Ausejanus minutatus* MS, Chapter IV).

[103] Shape of the anterior process of the left paramere: (0) points same direction is posterior process; (1) points alternate/opposite direction. [CI: 0.250, RI: 0.500]. Almost all Leucophoropterini have the anterior and posterior processes of the left paramere pointing in the same direction [0] (e.g. *Sejanus elongatus* Schuh, Schuh

1984: fig 530). However, *Abuyogocoris tawitawi* Schuh is unique in having the processes pointing in opposite directions, with the anterior process reversed [1] (Schuh 1984: fig 660), much like the pilophorine outgroups (e.g. *Pilophorus alstoni*, Schuh 1984: fig 138).

[104] <u>Pits on left paramere processes</u>: (0) absent; (1) pits on posterior process; (2) pits on anterior and posterior process. [CI: 0.667, RI: 0.750]. Within the Phylinae most taxa have pits on the posterior process of the left paramere (Chapter II). However, there is at least one taxon without these pits (e.g. *Sejanus ecnomioides*, Schuh 1984: fig 548) or with pits on both the anterior and posterior processes (e.g. *Sejanus palumae* Carvalho and Gross).

[105] <u>Centrally expanded portions of the left paramere</u>: (0) absent; (1) present. [CI: 1.000, RI: 1.000] At least two species of *Sejanus* (e.g. *Sejanus ecnomios*, *Sejanus ecnomioides*) have the left paramere with centrally expanded region (e.g. *Sejanus ecnomioides* 1984: fig 548), whereas for all other Leucophoropterini it is absent.

FEMALE COLOR AND PIGMENTATION:

[106] <u>Anterior of hemelytra with contrasting-colored fascia</u>: (0) absent; (1) partial fascia; (2) complete fascia. [CI: 0.200, RI: 0.667]. Female Leucophoropterini may or may not have a fascia on the anterior portion of the hemelytra as in the males of the same species, and thus were coded separately for this character.

[107] <u>Transparent areas on posterior, lateral margins of corium:</u> (0) absent; (1) present. [CI: 0.200, RI: 0.667]. Most Leucophoropterini with transparent areas on the

postero-lateral margins of corium in males also have these in females, while in females of other taxa it is absent (e.g. *Aitkenia*).

[108] Composition of contrasting-colored area of cuneus: (0) Cuneus unicolorous, no contrasting band or spots of color; (1) one spot of contrasting color; (2) two spots of contrasting color; (3) two spots partially fused of contrasting color; (4) <1/2 cuneus stripe of contrasting color; (5) >1/2 cuneus stripe of contrasting color. [CI: 0.263, RI: 0.500]. Sexual dimorphism in the area of the cuneus occupied by a contrasting colored area necessitated coding females and males separately for this character, with females in general having more of the area of the cuneus white than males (if present).

[109] Color of 1st antennal segment: (0) light; (1) light basally, dark distally; (2) dark. [CI: 0.133, RI: 0.536]. The color of the antennal segments shows variation between males and females in Leucophoropterini (e.g. *Sejanus*, Yasunaga 2001), and as a result the same color characters and states as in males are coded separately for females (Characters 15-18).

[110] Color of 2nd antennal segment: (0) light; (1) light basally, dark distally; (2) dark basally, light distally; (3) medially light, dark at distal joints; (4) dark. [CI: 0.200, RI: 0.500]

[111] Color of 3rd antennal segment: (0) light; (1) light basally, dark distally; (2) dark basally, light distally (3) dark. [CI: 0.100, RI: 0.455]

[112] Color of 4th antennal segment: (0) light; (1) light basally, dark distally; (2) dark basally, light distally; (3) dark. [CI: 0.182, RI: 0.250]

[113] Coloration of mid-femur: (0) light; (1) light basally, dark distally; (2) dark basally, light distally; (3) dark. [CI: 0.188, RI: 0.552]. The mid femora were observed to show sexual dimorphism in some of the taxa in Leucophoropterini (e.g. *Ausejanus* MS), and as a result many of the same characters and states are coded separately for males and females (Character 24 in males).

[114] Coloration of hind-femur: (0) light; (1) light basally, dark distally; (2) dark. [CI: 0.286, RI: 0.286] The hind femora were observed to show sexual dimorphism in some of the taxa in Leucophoropterini (e.g. *Ausejanus* MS), and as a result many of the same characters and states are coded separately for males and females (Characters 25 in males).

[115] Coloration of abdomen: (0) same color as thorax; (1) different color. [CI: 0.167, RI: 0.167]. In most Leucophoropterini the abdomen bears the same coloration as the thorax in females. However, in *Sejanus femoralis* Carvalho and Gross the females have a distinctly yellowish-white abdomen compared to their dark thorax and head (Carvalho and Gross, 1982).

FEMALE BODY STRUCTURE:

[116] Position of eyes relative to anterior margin of pronotum in lateral views: (0) eyes partially obscure anterior of pronotum; (1) posterior margin of eyes parallel to anterior margin of pronotum; (2) eyes strongly exerted from posterior margin of pronotum. [CI: 0.400, RI: 0.400]. The position of and size of the eyes can differ between males and females, and therefore were coded separately in the males

(Character 43).

[117] Eye occupancy in lateral view: (0) greater than 1/2+ height of face; (1) less than 1/2 height of head. [CI: 0.500, RI: 0.800]. The position of and size of the eyes can differ between males and females, and therefore were coded separately in the males (Character 44).

[118] Relative width of vertex: (0) Vertex < 1/3 width of head; (1) 1/2>Vertex >1/3 width of head; (2) Vertex >1/2 width of head. [CI: 0.182, RI: 0.571]. The position of and size of the eyes can differ between males and females, and therefore were coded separately in the males (Character 50).

[119] Dorsal view of frons and clypeus: (0) clypeus flush with frons, clypeus not visible in dorsal view; (1) clypeus exerted, visible in dorsal view. [CI: 0.143, RI: 0.625]. In addition to sexual dimorphism in the size and position of the eyes, females in *Ausejanus* MS (e.g. *Ausejanus tiramisu* MS) and *Leucophoroptera* have the clypeus exerted and visible in the dorsal view, whereas males do not. In other taxa the clypeus is flush with the frons and not visible.

[120] Shape of second antennal segment: (0) approximately equal diameter across length, weakly thicker distally than anteriorly; (1) "club" shaped, significantly narrower width at base of antennal segment than distally, where rounded. [CI: 0.250, RI: 0.812]. Females in at least two genera (e.g. *Papuamimus*, *Arafuramiris*) have a differently shaped second antennal segment than the males, often in the form of a club (e.g. *Blesingia gularis*) rather than a segment of approximately equal diameter across its length as in males. In other taxa females

have the same antennal segment shape as their male counterparts.

[121] Shape of pronotum in dorsal view: (0) lateral margins angled at nearly a 45 degree angle from anterior margin of pronotum; trapezoidal-shaped pronotum; (1) lateral margins less than 45 degree angle to the anterior margin; box-shaped pronotum; (2) defined anterior and posterior portion, with the latter constricted; bell-shaped pronotum; (3) medially constricted; hour-glass shaped pronotum. [CI: 0.429, RI: 0.765]. Female Leucophoropterini can have different shapes of the pronotum compared to males of the same taxon (e.g. *Collessicoris*) and thus were coded separately.

[122] Visibility of mesoscutum in dorsal view: (0) mesoscutum exposed; (1) hidden. [CI: 0.333, RI: 0.882]. Visibility of the mesoscutum is sexually dimorphic among Phylinae (Chapter II) and in females the mesoscutum is either be visible (e.g. *Sejanus*) or hidden by the pronotum (e.g. *Collessicoris bellissimus*: Fig 2-6: A).

[123] Lateral margins of cuneus in dorsal view: (0) nearly straight; (1) distinctly rounded, forming a half-circle. [CI: 1.000, RI: 1.000]. The lateral margin of cuneus can be distinctly rounded in females in taxa in which males have a straight margin (e.g. *Sejanus brittoni*). Therefore this character is coded separately for males and females. Most female Leucophoropterini have the lateral margins of the cuneus nearly straight as in males.

[124] Cuneal fracture angle: (0) angle of cuneus between cuneal fracture and lateral margin obtuse; (1) angle of cuneus between cuneal facture and lateral margin close to 90 degrees. [CI: 0.083, RI: 0.522]. The angle of the cuneal fracture in

females can be different than males (usually being more perpendicular to the corial margin), and is coded separately.

[125] Cuneal deflection in lateral view: (0) shallow to deep; (1) obsolete. [CI: 0.200, RI: 0.200]. There is also sexual dimorphism in the deflection of the cuneus, thus female cuneal deflection with respect to the corium was coded separately.

[126] Corial margin in dorsal view: (0) convex/rounded; (1) straight to narrowed anteriorly, wider distally; (2) constricted medially. [CI: 0.200, RI: 0.733]. The shape of the corial margin in female Leucophoropterini corresponds to the males in most cases, but there are taxa (e.g. *Sejanus brittoni*) where the female corial margins are different in shape. As a result, females were coded separately for this character: the lateral margins of the corium convex or rounded (e.g. *Sejanus brittoni* Carvalho and Gross); straight to narrowed anteriorly, wider distally (e.g. *Ausejanus* MS and most members of the *Gulacapsus* clade); or constricted medially (members of the *Ctypomiris* clade).

FEMALE ABDOMEN AND GENITALIA:

[127] Ovipositor spine: (0) absent; (1) small, notch-shaped at median of ovipositor; (2) large, protruding spine at median of ovipositor. [CI: 0.182, RI: 0.591]. Several female Leucophoropterini have modifications on the ovipositor, either in the form of a small notch distal of the median (e.g. *Waterhouseana illustris*); or a large, protruding spine at the median (e.g. *Collessicoris bellissimus*, 2-4 B). Most, however, have a straight ovipositor with no modifications.

[128] Ovipositor position relative to abdomen: (0) parallel to abdomen; (1) angled upwards. [CI: 0.200, RI: 0.636]. In female Leucophoropterini with abdomens constricted anteriorly and angled ventrally towards the posterior (presumably to appear more antlike) the ovipositor is also angled upwards (e.g. *Papuamimus*). However, most Leucophoropterini females have the ovipositor parallel to the abdomen.

[129] Vestibular gonopophyses shape: (0) triangular; (1) half-circle; (2) asymmetrical. [CI: 0.500, RI: 0.333]. Leucophoropterini females are observed having the vestibular gonopophyses always separated, and can be found with the following shapes (for a more detailed discussion of this structure see Chapter II, characters 104-105): triangular (e.g. structure demarked “As” in *Ausejanus irisae* MS, Chapter II: Fig 1-12 B); or half-circle (e.g. *Sejanus juglandis* Yasunaga). The vestibular gonopophyses are asymmetrical in the pilophorine outgroups (Chapter II).

[130] Vestibular gonopophyses size relative to width of ramus: (0) at most half the width of the ramus; (1) width at most twice the ramus width. [CI: 1.000, RI: 1.000]. In most Leucophoropterini the vestibular gonopophyses are small, at most half the width of the ramus (e.g. structure demarcated “Vg” in *Ausejanus irisae* MS, Chapter II: fig 1-11 B). However, in at least on genus (e.g. *Arafuramiris queenslandi* MS, Chapter IV: Fig) the width of the gonopophyses is at most twice the width of the ramus.

[131] Sclerotized rings: (0) ring fused; (1) open, weakly sclerotized; (2) thickly

sclerotized. [CI: 1.000, RI: 1.000]. The sclerotized rings are observed with the following two states within Leucophoropterini: the ring margins fused together [0] (e.g. *Gulacapsus novoguinensis*); or the rings open, weakly sclerotized (most Leucophoropterini females). The pilophorine outgroups have the rings thickly sclerotized.

[132] Sclerite on anterior wall of vestibulum: (0) central sclerite; (1) no central sclerite. [CI: 0.333, RI: 0.818]. Female *Ausejanus* MS species are observed having an additional sclerite on anterior wall of vestibulum (see Chapter II, character 108; e.g. "as" in *Ausejanus irisae* MS, Chapter II: fig 1-11B), while it is absent in most of the genera of Leucophoropterini.

[133] Ventral sack: (0) partially sclerotized; sclerotized area adjacent to gonopophyses; (1) absent. [CI: 0.500, RI: 0.500]. The ventral sack (Chapter II, character 110) is absent in Leucophoropterini, but is present as a partially sclerotized area adjacent to gonopophyses in outgroups *Tuxedo* and the pilophorines (Chapter II).

[134] Sclerotized margin between dorsal and ventral labiate plates: (0) membranous; (1) sclerotized margins. [CI: 0.200, RI: 0.200]. The majority of Leucophoropterini females sampled have a sclerotized margin between the dorsal and ventral labiate plates (e.g. "Ds" in *Ausejanus irisae* MS, Chapter II: fig 1-12 B). However, at least one species (e.g. *Sejanus brittoni*) has the area completely membranous.

[135] Dorsal labiate plate: (0) membranous; (1) dorsal plate has sclerotized plates. [CI: 1.000, RI: 1.000]. In several Leucophoropterini females have the dorsal labiate plate completely membranous [0] (e.g. *Gulacapsus*). However, in some taxa (e.g.

Ausejanus irisae MS, Chapter II: fig 1-12 B) the dorsal labiate plate possesses sclerotized plates (see Chapter II character 112 for discussion of sclerotized plate presence and morphologies).

[136] Posterior wall median sclerite: (0) invagination; (1) flat; (2) projection(s). [CI: 0.500, RI: 0.714]. The posterior wall in Leucophoropterini can show the following morphologies when viewed from the posterior: flat, without any invaginations or projections (e.g. *Ausejanus irisae* MS, Chapter II: fig A); or with a medial invagination (e.g. *Sejanus vividus* Carvalho and Gross, Chapter II: fig 1-12 D). The pilophorine outgroups have a projection along the posterior margin (Chapter II).

[137] Base of ovipositor: (0) rounded; (1) extension(s) to posterior wall. [CI: 0.500, RI: 0.667]. Outgroup *Tuxedo* has the base of ovipositor extending to the posterior wall, while in all Leucophoropterini the base of the ovipositor is distinctly rounded and does not extend dorsally to the posterior wall.

APPENDIX 3

Figure 1-1. Hypothesized subfamily relationships within Miridae, modified from Schuh (1974).

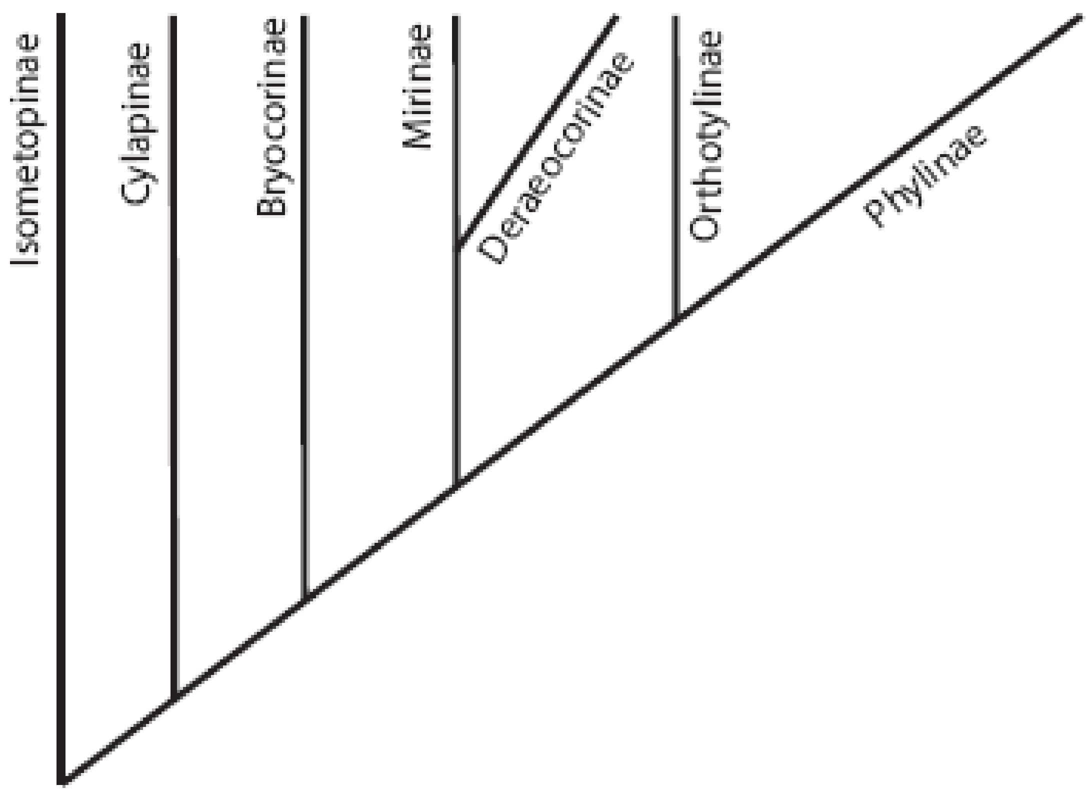

Isometopinae
Cylapinae
Bryocorinae
Mirinae
Deraeocorinae
Orthotylinae
Phylinae

Figure 1-2. Hypothesized tribal relationships within Phylinae with a focus on taxa from the Indo-Pacific, modified from Schuh (1984).

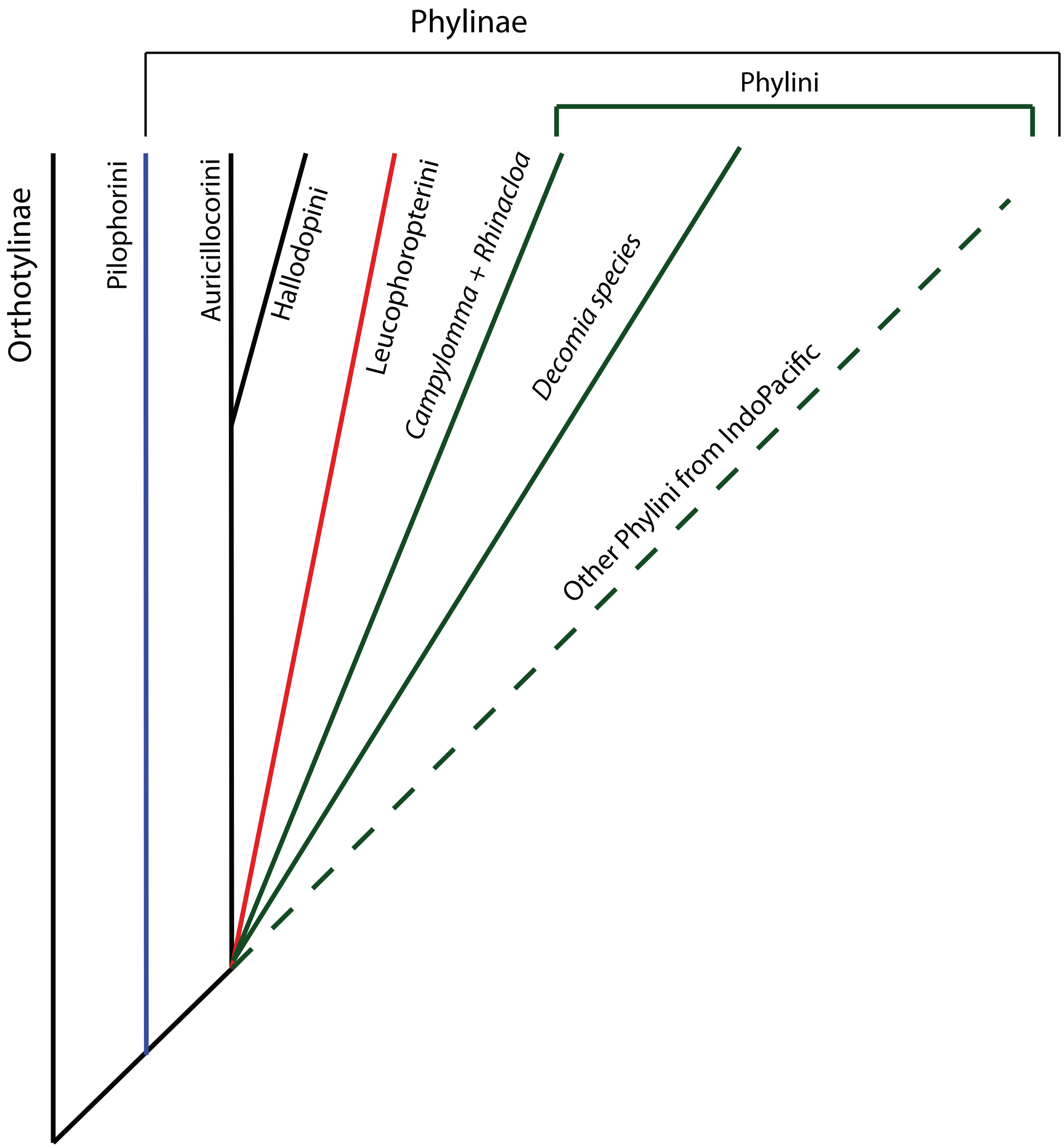

Phylinae
Phylini
Orthotylinae
Pilophorini
Auricillocorini
Hallodopini
Leucophoropterini
Campylomma + Rhinacloa
Decomia species
Other Phylini from IndoPacific

Figure 1-3. Diagrams of morphological character states used in analysis. A-E: Dorsal views of head and thorax of selected taxa, A: *Dilatops fici* Weirauch, male. B: *Coquilletia alpina* (Polhemus and Polhemus), male. C: *Macrotylus intermedius* (Van Duzee), male. D: *Pilophorus juniperi* Knight, male. E: *Sejanus albisignatus* (Knight), male. F-I: Lateral views of head, thorax and coxae of selected taxa. F: *Pilophorus maculata* (Schuh), male. G: *Cleotomiris schneirlai* Schuh, male .
H: *Sejanus elongatus* Schuh, male. I: *Hallodapus* near *pseudosimilis*, male. J-K: Frontal views of selected taxa. J: *Pygovepres vaccinicola* (Knight). K: *Phallospinophylus setosus* Weirauch. L-Q: Dorsal habitus figures of thoracic, abdominal and hemelytral characters of selected taxa. L: *Pilophorus juniperi* Knight, male. M: *Coquillettia alpina* (Polhemus and Polhemus), male. N: *Tytthus chinensis* (Stal), male. O: *Karoocapsus middelburgensis* Schuh, female. P: *Schuhistes lekkersingia* Menard, female. Numbers associated with structures indicate morphological character states in Table 1-2. (Figures F-I modified from Schuh 1984, Figures J-K modified from Weirauch 2006B. Remaining figures drawn by author).

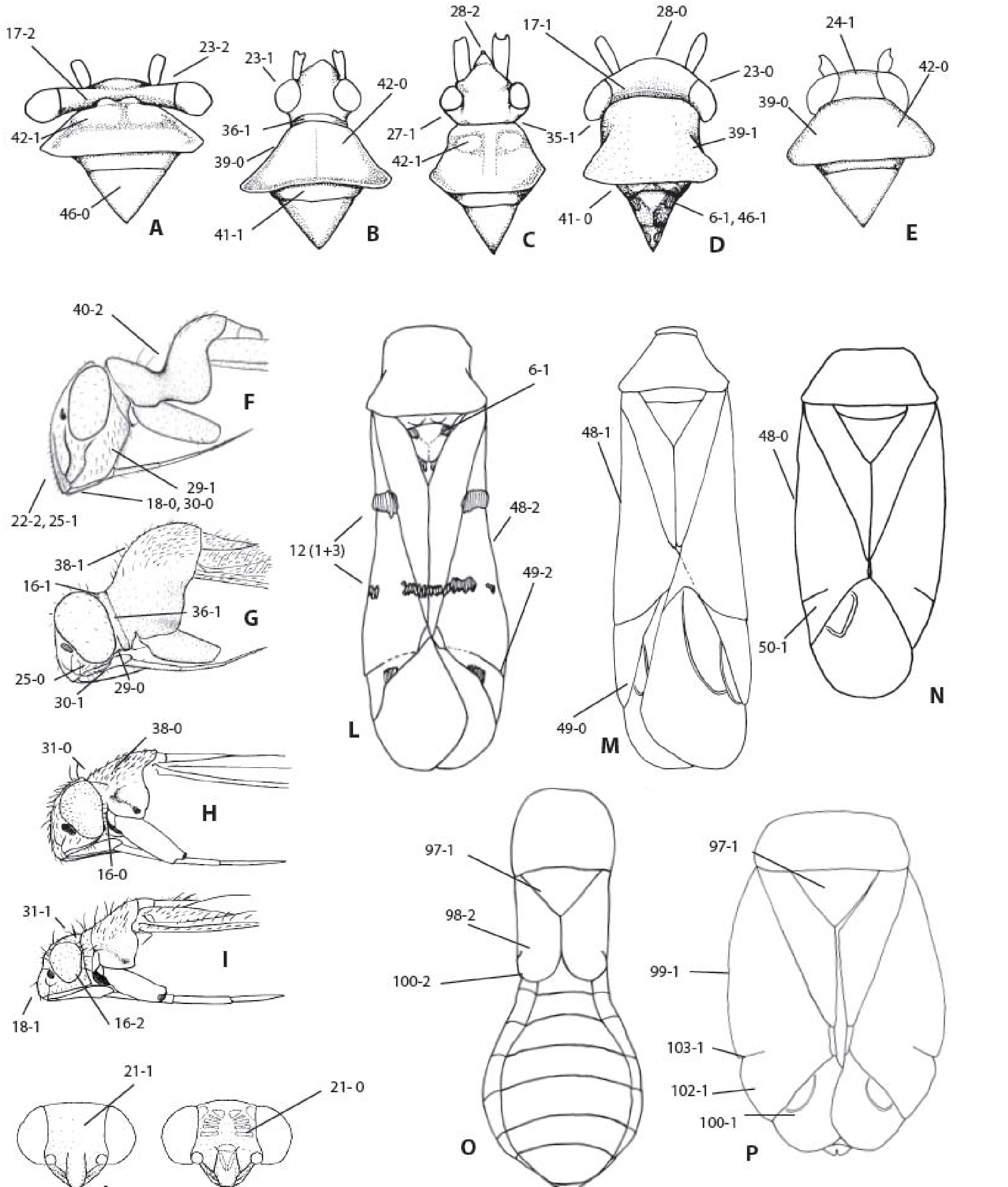

17-2
23-2
42-1
46-0
A
23-1
42-0
36-1
39-0
41-1
B
28-2
27-1
35-1
42-1
C
17-1
28-0
23-0
39-1
41- 0
6-1, 46-1
D
24-1
42-0
39-0
E
40-2
F
29-1
18-0, 30-0
22-2, 25-1
38-1
16-1
36-1
G
25-0
30-1
29-0
31-0
38-0
H
16-0
31-1
I
18-1
16-2
21-1
21- 0
J
K
6-1
12 (1+3)
48-2
49-2
L
48-1
49-0
M
48-0
50-1
N
97-1
98-2
100-2
O
97-1
99-1
103-1
102-1
100-1
P

Figure 1-4. Part of strict consensus tree of sixteen most parsimonious trees from parsimony analysis. Bootstrap values were calculated for all nodes with 100 replications using a traditional search and demarcated in blue on nodes with >50% support. Bremer support was calculated for major nodes in red, with selected nodes analyzed for Partition Bremer support (Table 1-5). Nodes consistent among all three trees are demarked with yellow circles, nodes unique to one particular analysis in blue. Nodes shared between two of the analyses but not all three are demarked by pink (RAxML and MrBayes) or green (RAxML and TNT). The consistency index (CI) and retention index (RI), excluding uninformative characters are 0.2577 and 0.7423, respectively, with 1952 parsimony-informative characters.

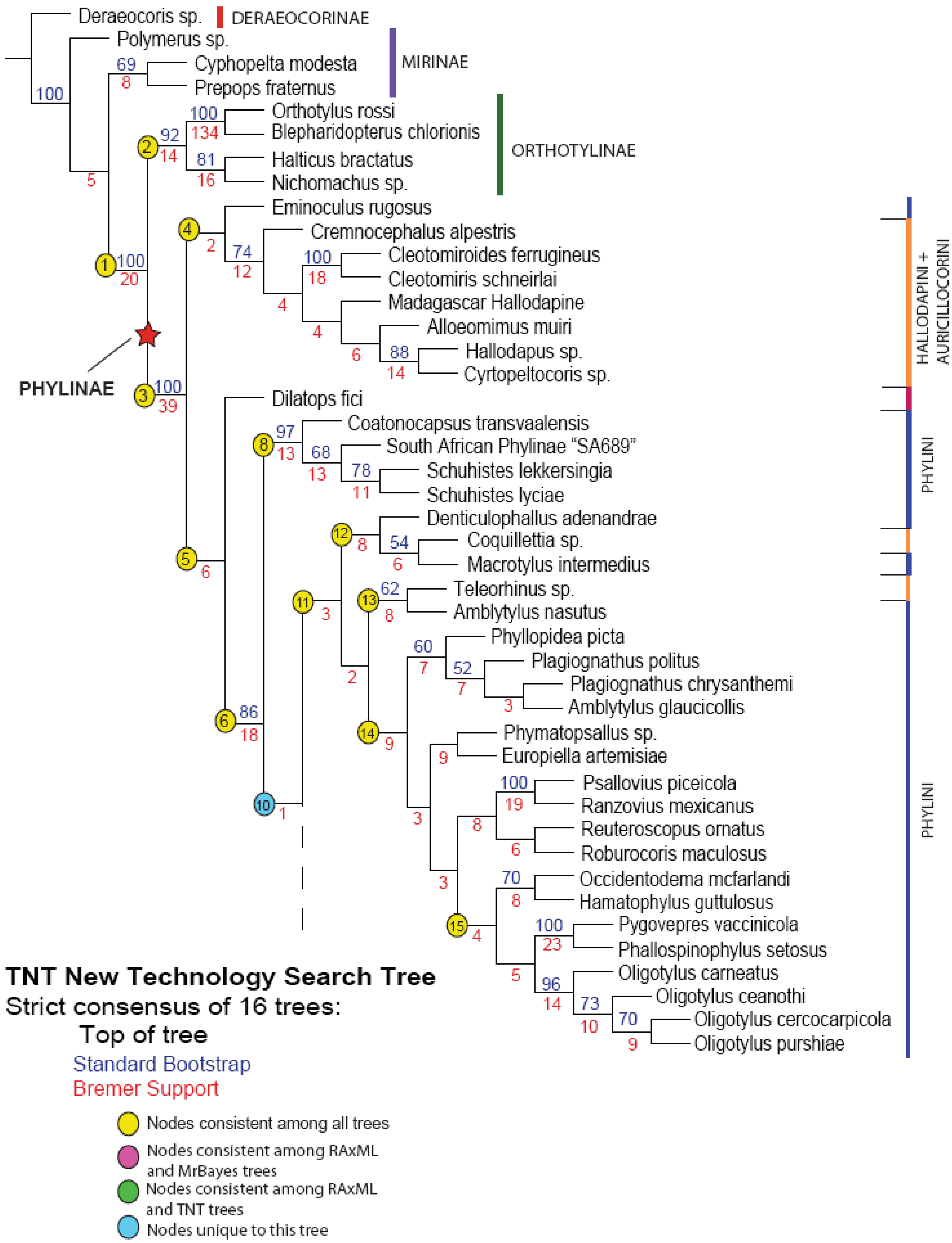
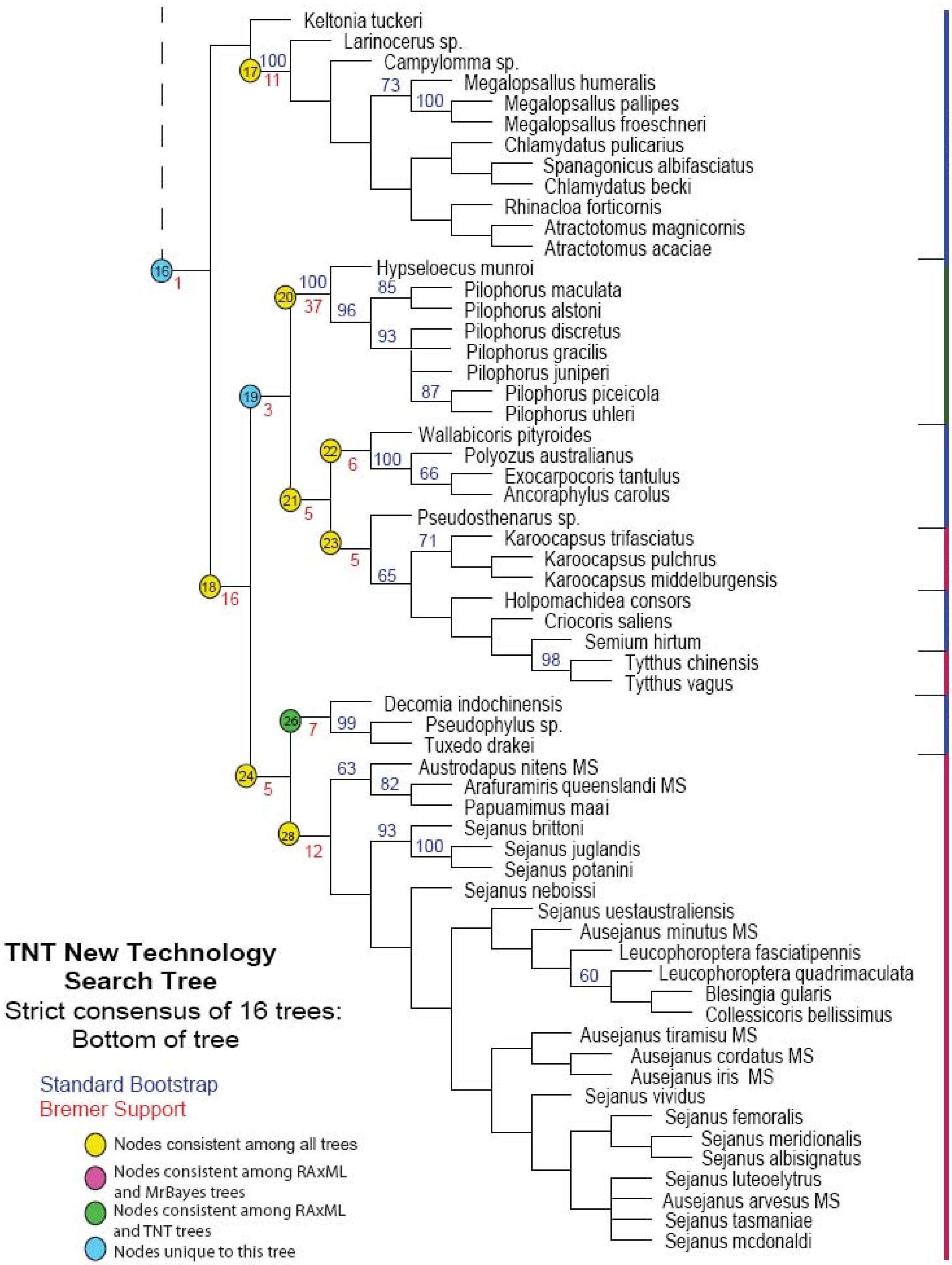

Deraeocoris sp.
DERAEOCORINAE
Polymerus sp.
Cyphopelta modesta
Prepops fraternus
MIRINAE
Orthotylus rossi
Blepharidopterus chlorionis
Halticus bractatus
Nichomachus sp.
ORTHOTYLINAE
Eminoculus rugosus
Cremnocephalus alpestris
Cleotomiroides ferrugineus
Cleotomiris schneirlai
Madagascar Hallodapine
Alloeomimus muiri
Hallodapus sp.
Cyrtopeltocoris sp.
HALLODAPINI + AURICILLOCORINI
PHYLINAE
Dilatops fici
Coatonocapsus transvaalensis
South African Phylinae "SA689"
Schuhistes lekkersingia
Schuhistes lyciae
PHYLINI
Denticulophallus adenandrae
Coquillettia sp.
Macrotylus intermedius
Teleorhinus sp.
Amblytylus nasutus
Phyllopidea picta
Plagiognathus politus
Plagiognathus chrysanthemi
Amblytylus glaucicollis
Phymatopsallus sp.
Europiella artemisiae
Psallovius piceicola
Ranzovius mexicanus
Reuteroscopus ornatus
Roburocoris maculosus
Occidentodema mcfarlandi
Hamatophylus guttulosus
Pygovepres vaccinicola
Phallospinophylus setosus
Oligotylus carneatus
Oligotylus ceanothi
Oligotylus cercocarpicola
Oligotylus purshiae
PHYLINI
TNT New Technology Search Tree
Strict consensus of 16 trees:
Top of tree
Standard Bootstrap
Bremer Support
Nodes consistent among all trees
Nodes consistent among RAxML and MrBayes trees
Nodes consistent among RAxML and TNT trees
Nodes unique to this tree

Figure 1-5. Part of strict consensus tree of sixteen most parsimonious trees from parsimony analysis. Bootstrap values were calculated for all nodes with 100 replications using a traditional search and demarcated in blue on nodes with >50% support. Bremer support was calculated for major nodes in red, with selected nodes analyzed for Partitioned Bremer support (Table 1-5). Nodes consistent among all three trees are demarked with yellow circles, nodes unique to one particular analysis in blue. Nodes shared between two of the analyses but not all three are demarked by pink (RAxML and MrBayes) or green (RAxML and TNT). The consistency index (CI) and retention index (RI), excluding uninformative characters are 0.2577 and 0.7423, respectively, with 1952 parsimony-informative characters.



Keltonia tuckeri
Larinocerus sp.
Campylomma sp.
Megalopsallus humeralis
Megalopsallus pallipes
Megalopsallus froeschneri
Chlamydatus pulicarius
Spanagonicus albifasciatus
Chlamydatus becki
Rhinacloa forticornis
Atractotomus magnicornis
Atractotomus acaciae
Hypseloecus munroi
Pilophorus maculata
Pilophorus alstoni
Pilophorus discretus
Pilophorus gracilis
Pilophorus juniperi
Pilophorus piceicola
Pilophorus uhleri
Wallabicoris pityroides
Polyozus australianus
Exocarpocoris tantulus
Ancoraphylus carolus
Pseudosthenarus sp.
Karoocapsus trifasciatus
Karoocapsus pulchrus
Karoocapsus middelburgensis
Holpomachidea consors
Criocoris saliens
Semium hirtum
Tytthus chinensis
Tytthus vagus
Decomia indochinensis
Pseudophylus sp.
Tuxedo drakei
Austrodapus nitens MS
Arafuramiris queenslandi MS
Papuamimus maai
Sejanus brittoni
Sejanus juglandis
Sejanus potanini
Sejanus neboissi
Sejanus uestaustraliensis
Ausejanus minutus MS
Leucophoroptera fasciatipennis
Leucophoroptera quadrimaculata
Blesingia gularis
Collessicoris bellissimus
Ausejanus tiramisu MS
Ausejanus cordatus MS
Ausejanus iris MS
Sejanus vividus
Sejanus femoralis
Sejanus meridionalis
Sejanus albisignatus
Sejanus luteoelytrus
Ausejanus arvesus MS
Sejanus tasmaniae
Sejanus mcdonaldi
PHYLINI
PILOPHORINI
LEUCOPHOROPTERINI+PHYLINI
LEUCOPHOROPTERINI
TNT New Technology Search Tree
Strict consensus of 16 trees: Bottom of tree
Standard Bootstrap
Bremer Support
Nodes consistent among all trees
Nodes consistent among RAxML and MrBayes trees
Nodes consistent among RAxML and TNT trees
Nodes unique to this tree

Figure 1-6. Part of MrBayes 50% majority consensus tree of 30,000 trees. Posterior probability values were calculated for all nodes and demarcated in blue on nodes with >50% support. Nodes consistent among all three trees are demarked with yellow circles, nodes unique to that particular analysis in blue. Nodes shared between two of the analyses but not all three are demarked by pink (RAxML and MrBayes) or green (RAxML and TNT).

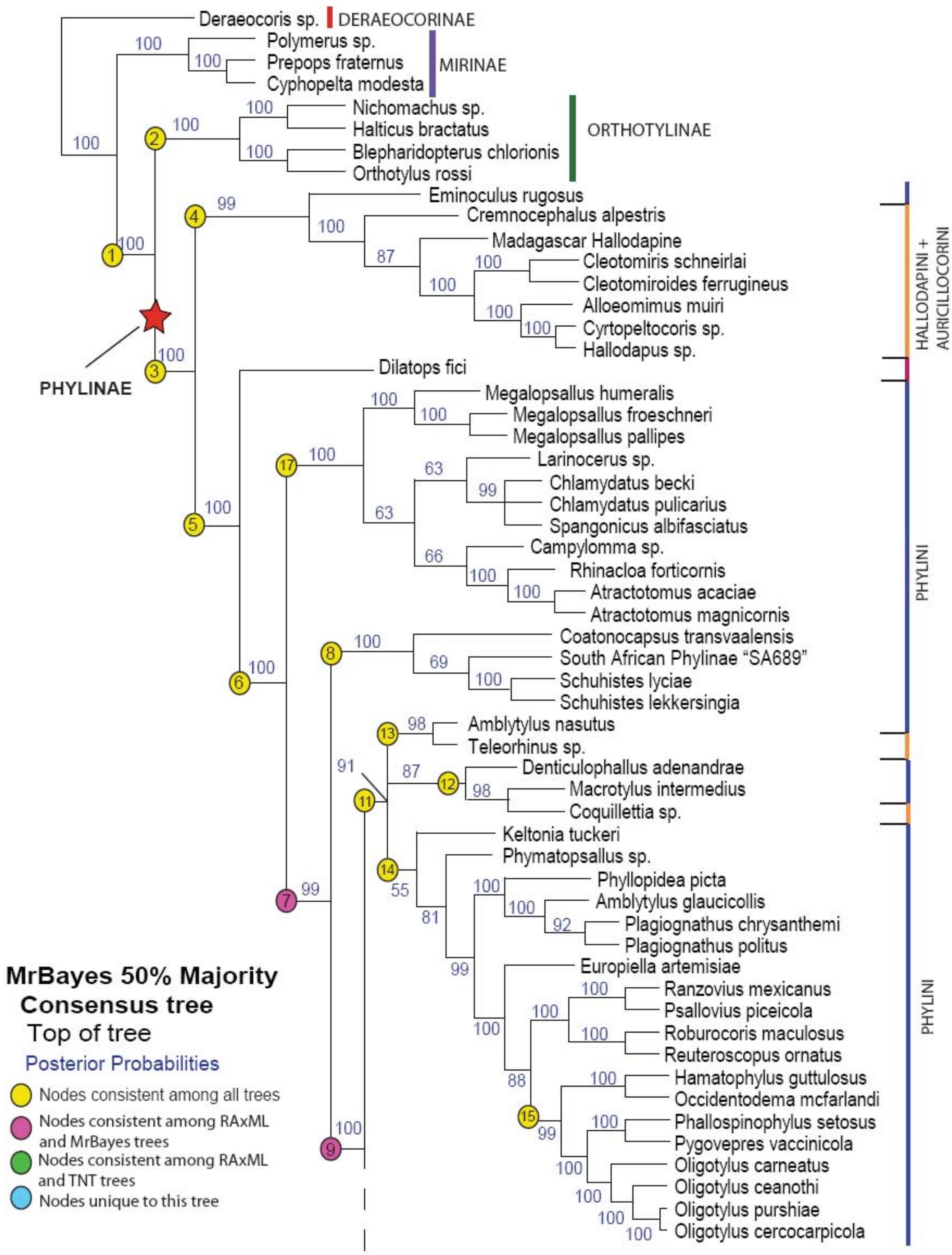

Deraeocoris sp.
DERAEOCORINAE
Polymerus sp.
Prepops fraternus
Cyphopelta modesta
MIRINAE
Nichomachus sp.
Halticus bractatus
Blepharidopterus chlorionis
Orthotylus rossi
ORTHOTYLINAE
Eminoculus rugosus
Cremnocephalus alpestris
Madagascar Hallodapine
Cleotomiris schneirlai
Cleotomiroides ferrugineus
Alloeomimus muiri
Cyrtopeltocoris sp.
Hallodapus sp.
HALLODAPINI + AURICILLOCORINI
PHYLINAE
Dilatops fici
Megalopsallus humeralis
Megalopsallus froeschneri
Megalopsallus pallipes
Larinocerus sp.
Chlamydatus becki
Chlamydatus pulicarius
Spangonicus albifasciatus
Campylomma sp.
Rhinacloa forticornis
Atractotomus acaciae
Atractotomus magnicornis
PHYLINI
Coatonocapsus transvaalensis
South African Phylinae "SA689"
Schuhistes lyciae
Schuhistes lekkersingia
Amblytylus nasutus
Teleorhinus sp.
Denticulophallus adenandrae
Macrotylus intermedius
Coquillettia sp.
Keltonia tuckeri
Phymatopsallus sp.
Phyllopidea picta
Amblytylus glaucicollis
Plagiognathus chrysanthemi
Plagiognathus politus
Europiella artemisiae
Ranzovius mexicanus
Psallovius piceicola
Roburocoris maculosus
Reuteroscopus ornatus
Hamatophylus guttulosus
Occidentodema mcfarlandi
Phallospinophylus setosus
Pygovepres vaccinicola
Oligotylus carneatus
Oligotylus ceanothi
Oligotylus purshiae
Oligotylus cercocarpicola
PHYLINI
MrBayes 50% Majority
Consensus tree
Top of tree
Posterior Probabilities
Nodes consistent among all trees
Nodes consistent among RAxML and MrBayes trees
Nodes consistent among RAxML and TNT trees
Nodes unique to this tree

Figure 1-7. Part of MrBayes 50% majority consensus tree of 30,000 trees. Posterior probability values were calculated for all nodes and demarcated in blue on nodes with >50% support. Nodes consistent among all three trees are demarked with yellow circles, nodes unique to that particular analysis in blue. Nodes shared between two of the analyses but not all three are demarked by pink (RAxML and MrBayes) or green (RAxML and TNT).

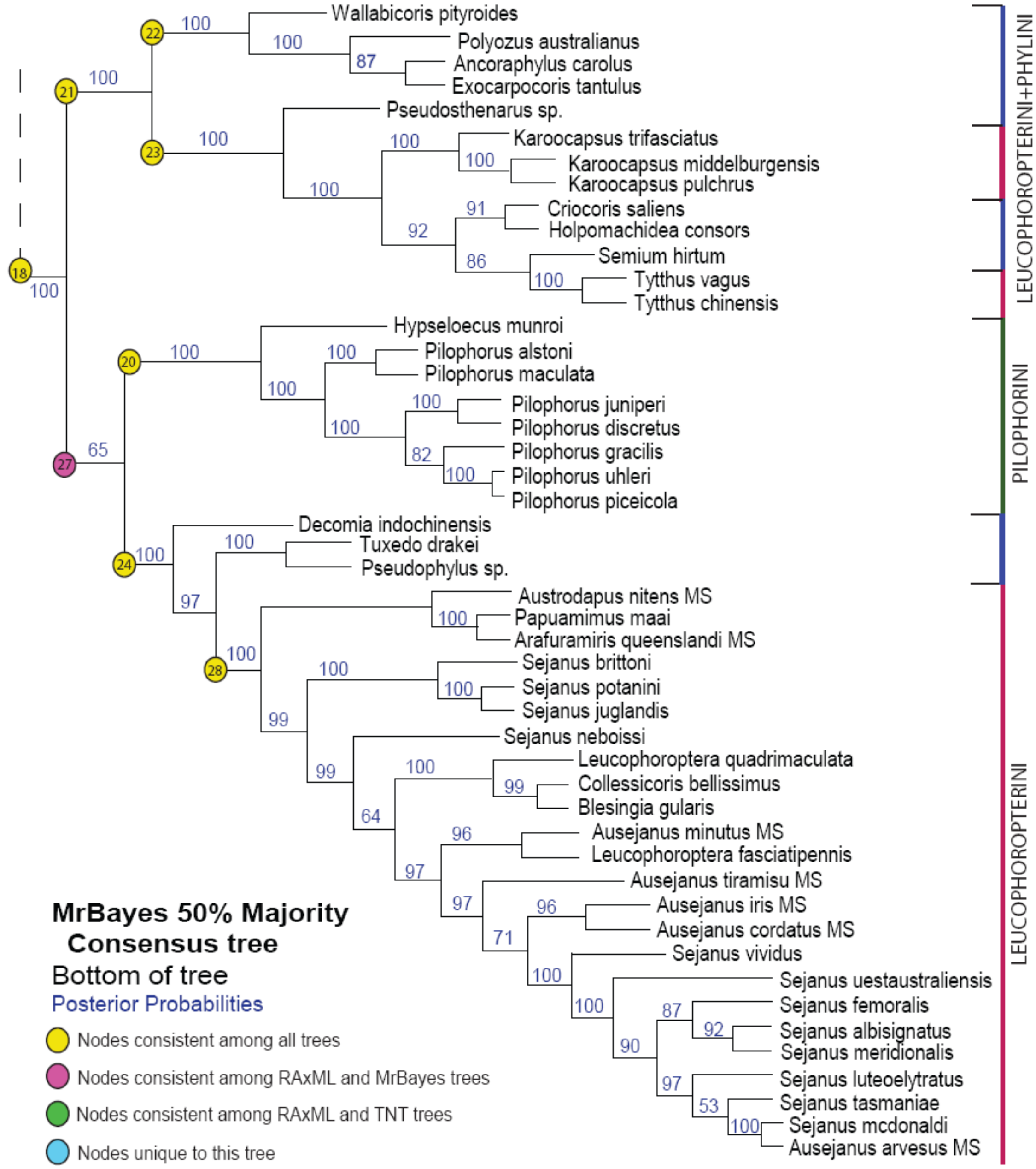

Wallabicoris pityroides
Polyozus australianus
Ancoraphylus carolus
Exocarpocoris tantulus
Pseudosthenarus sp.
Karoocapsus trifasciatus
Karoocapsus middelburgensis
Karoocapsus pulchrus
Criocoris saliens
Holpomachidea consors
Semium hirtum
Tytthus vagus
Tytthus chinensis
Hypseloecus munroi
Pilophorus alstoni
Pilophorus maculata
Pilophorus juniperi
Pilophorus discretus
Pilophorus gracilis
Pilophorus uhleri
Pilophorus piceicola
Decomia indochinensis
Tuxedo drakei
Pseudophylus sp.
Austrodapus nitens MS
Papuamimus maai
Arafuramiris queenslandi MS
Sejanus brittoni
Sejanus potanini
Sejanus juglandis
Sejanus neboissi
Leucophoroptera quadrimaculata
Collessicoris bellissimus
Blesingia gularis
Ausejanus minutus MS
Leucophoroptera fasciatipennis
Ausejanus tiramisu MS
Ausejanus iris MS
Ausejanus cordatus MS
Sejanus vividus
Sejanus uestaustraliensis
Sejanus femoralis
Sejanus albisignatus
Sejanus meridionalis
Sejanus luteoelytratus
Sejanus tasmaniae
Sejanus mcdonaldi
Ausejanus arvesus MS
LEUCOPHOROPTERINI+PHYLINI
PILOPHORINI
LEUCOPHOROPTERINI
MrBayes 50% Majority
Consensus tree
Bottom of tree
Posterior Probabilities
Nodes consistent among all trees
Nodes consistent among RAxML and MrBayes trees
Nodes consistent among RAxML and TNT trees
Nodes unique to this tree

Figure 1-8. Part of best tree from maximum likelihood analysis. Rapid bootstrap support values were calculated for all nodes and demarcated in blue on nodes with >50% support. Branch lengths are below the branches in red. Nodes consistent among all three trees are demarked with yellow circles, nodes unique to that particular analysis in blue. Nodes shared between two of the analyses but not all three are demarked by pink (RAxML and MrBayes) or green (RAxML and TNT).

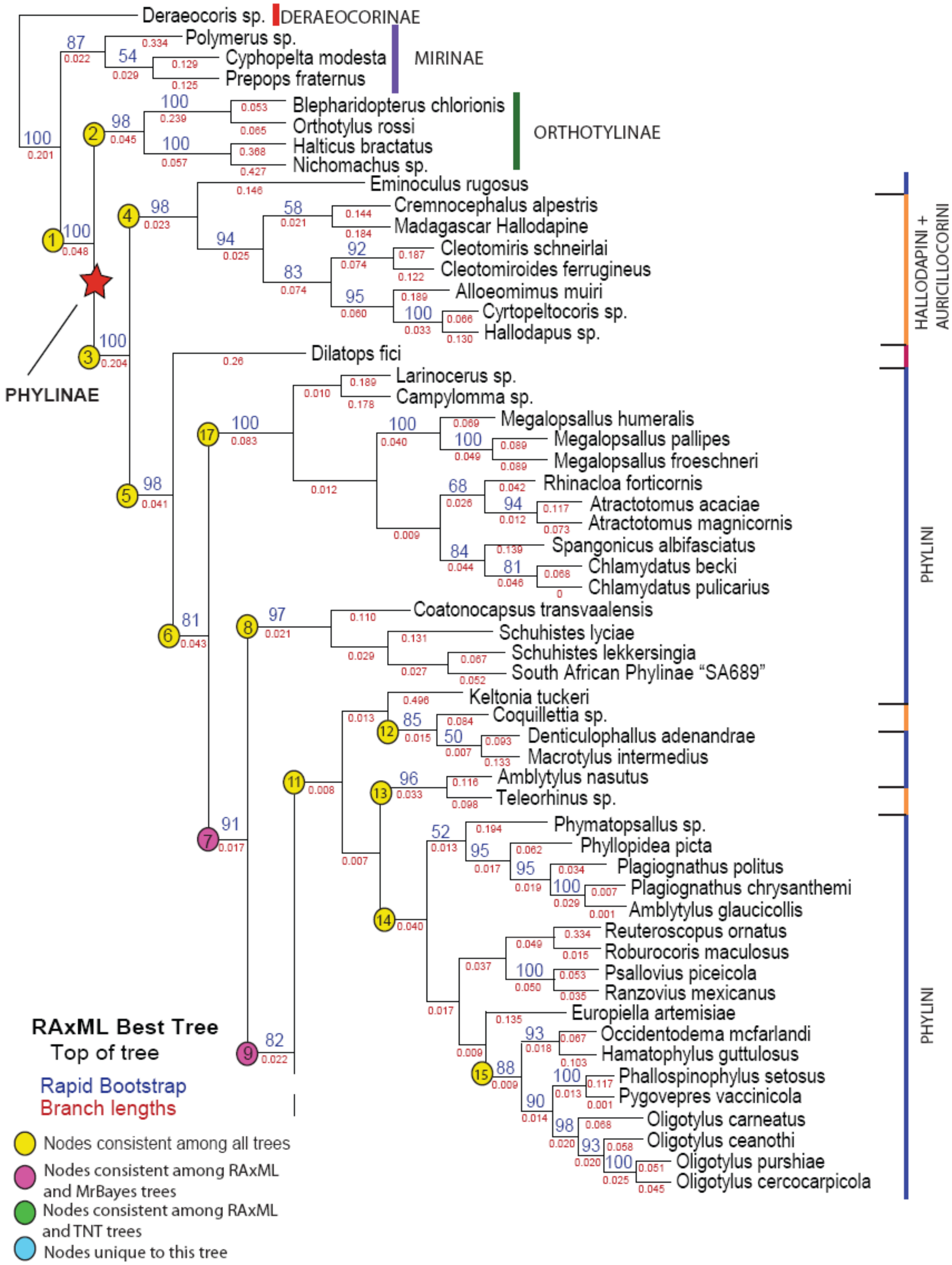
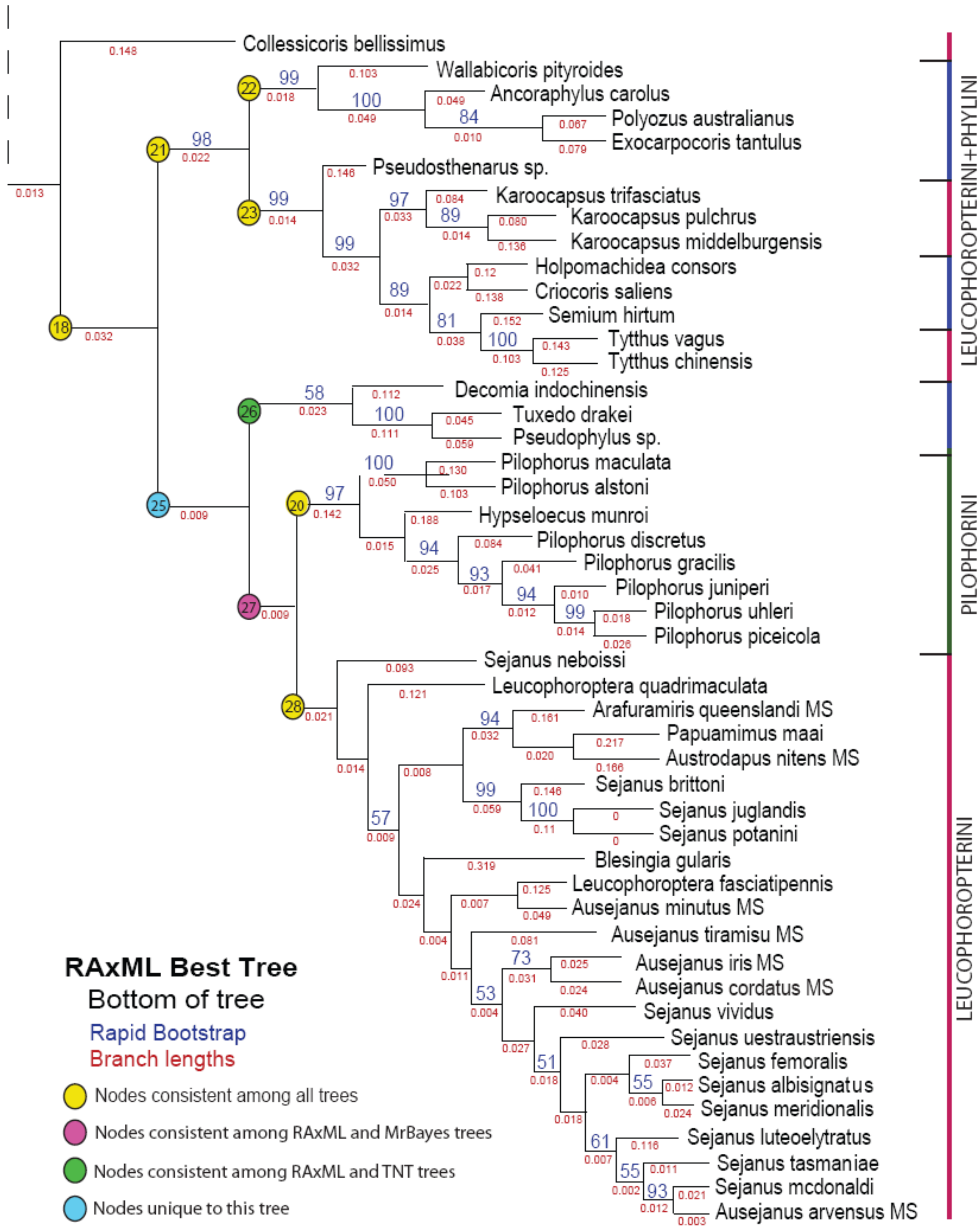
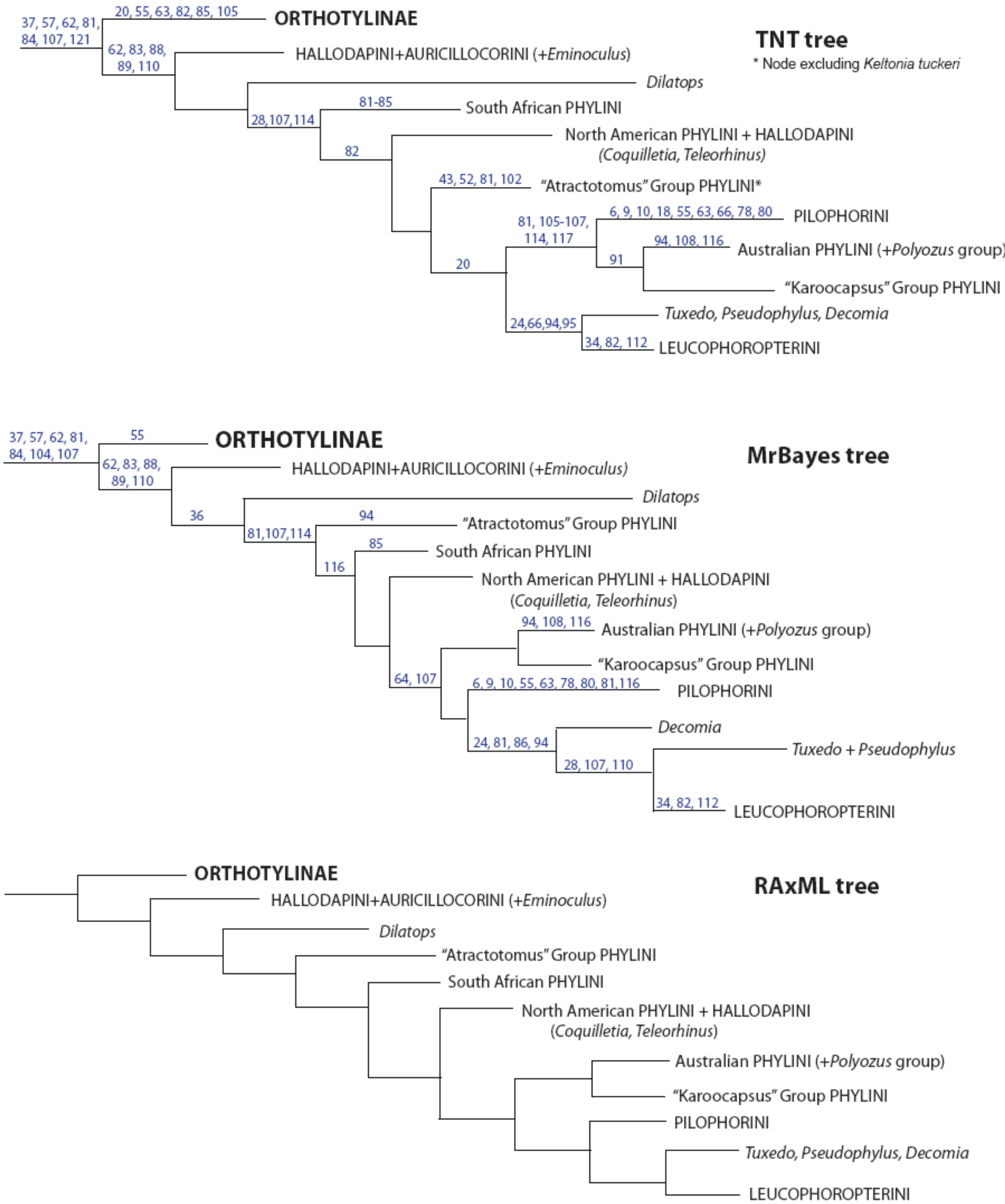

Deraeocoris sp.
DERAEOCORINAE
Polymerus sp.
Cyphopelta modesta
Prepops fraternus
MIRINAE
Blepharidopterus chlorionis
Orthotylus rossi
Halticus bractatus
Nichomachus sp.
ORTHOTYLINAE
PHYLINAE
Eminoculus rugosus
Cremnocephalus alpestris
Madagascar Hallodapine
Cleotomiris schneirlai
Cleotomiroides ferrugineus
Alloeomimus muiri
Cyrtopeltocoris sp.
Hallodapus sp.
HALLODAPINI + AURICILLOCORINI
Dilatops fici
Larinocerus sp.
Campylomma sp.
Megalopsallus humeralis
Megalopsallus pallipes
Megalopsallus froeschneri
Rhinacloa forticornis
Atractotomus acaciae
Atractotomus magnicornis
Spangonicus albifasciatus
Chlamydatus becki
Chlamydatus pulicarius
PHYLINI
Coatonocapsus transvaalensis
Schuhistes lyciae
Schuhistes lekkersingia
South African Phylinae "SA689"
Keltonia tuckeri
Coquillettia sp.
Denticulophallus adenandrae
Macrotylus intermedius
Amblytylus nasutus
Teleorhinus sp.
Phymatopsallus sp.
Phyllopidea picta
Plagiognathus politus
Plagiognathus chrysanthemi
Amblytylus glaucicollis
Reuteroscopus ornatus
Roburocoris maculosus
Psallovius piceicola
Ranzovius mexicanus
Europiella artemisiae
Occidentodema mcfarlandi
Hamatophylus guttulosus
Phallospinophylus setosus
Pygovepres vaccinicola
Oligotylus carneatus
Oligotylus ceanothi
Oligotylus purshiae
Oligotylus cercocarpicola
PHYLINI
RAxML Best Tree
Top of tree
Rapid Bootstrap
Branch lengths
Nodes consistent among all trees
Nodes consistent among RAxML and MrBayes trees
Nodes consistent among RAxML and TNT trees
Nodes unique to this tree

Figure 1-9. Part of best tree from maximum likelihood analysis. Rapid bootstrap support values were calculated for all nodes and demarcated in blue on nodes with >50% support. Branch lengths are below the branches in red. Nodes consistent among all three trees are demarked with yellow circles, nodes unique to that particular analysis in blue. Nodes shared between two of the analyses but not all three are demarked by pink (RAxML and MrBayes) or green (RAxML and TNT).



Collessicoris bellissimus
Wallabicoris pityroides
Ancoraphylus carolus
Polyozus australianus
Exocarpocoris tantulus
Pseudosthenarus sp.
Karoocapsus trifasciatus
Karoocapsus pulchrus
Karoocapsus middelburgensis
Holpomachidea consors
Criocoris saliens
Semium hirtum
Tytthus vagus
Tytthus chinensis
Decomia indochinensis
Tuxedo drakei
Pseudophylus sp.
Pilophorus maculata
Pilophorus alstoni
Hypseloecus munroi
Pilophorus discretus
Pilophorus gracilis
Pilophorus juniperi
Pilophorus uhleri
Pilophorus piceicola
Sejanus neboissi
Leucophoroptera quadrimaculata
Arafuramiris queenslandi MS
Papuamimus maai
Austrodapus nitens MS
Sejanus brittoni
Sejanus juglandis
Sejanus potanini
Blesingia gularis
Leucophoroptera fasciatipennis
Ausejanus minutus MS
Ausejanus tiramisu MS
Ausejanus iris MS
Ausejanus cordatus MS
Sejanus vividus
Sejanus uestraustriensis
Sejanus femoralis
Sejanus albisignatus
Sejanus meridionalis
Sejanus luteoelytratus
Sejanus tasmaniae
Sejanus mcdonaldi
Ausejanus arvensus MS
LEUCOPHOROPTERINI+PHYLINI
PILOPHORINI
LEUCOPHOROPTERINI
RAxML Best Tree
Bottom of tree
Rapid Bootstrap
Branch lengths
Nodes consistent among all trees
Nodes consistent among RAxML and MrBayes trees
Nodes consistent among RAxML and TNT trees
Nodes unique to this tree

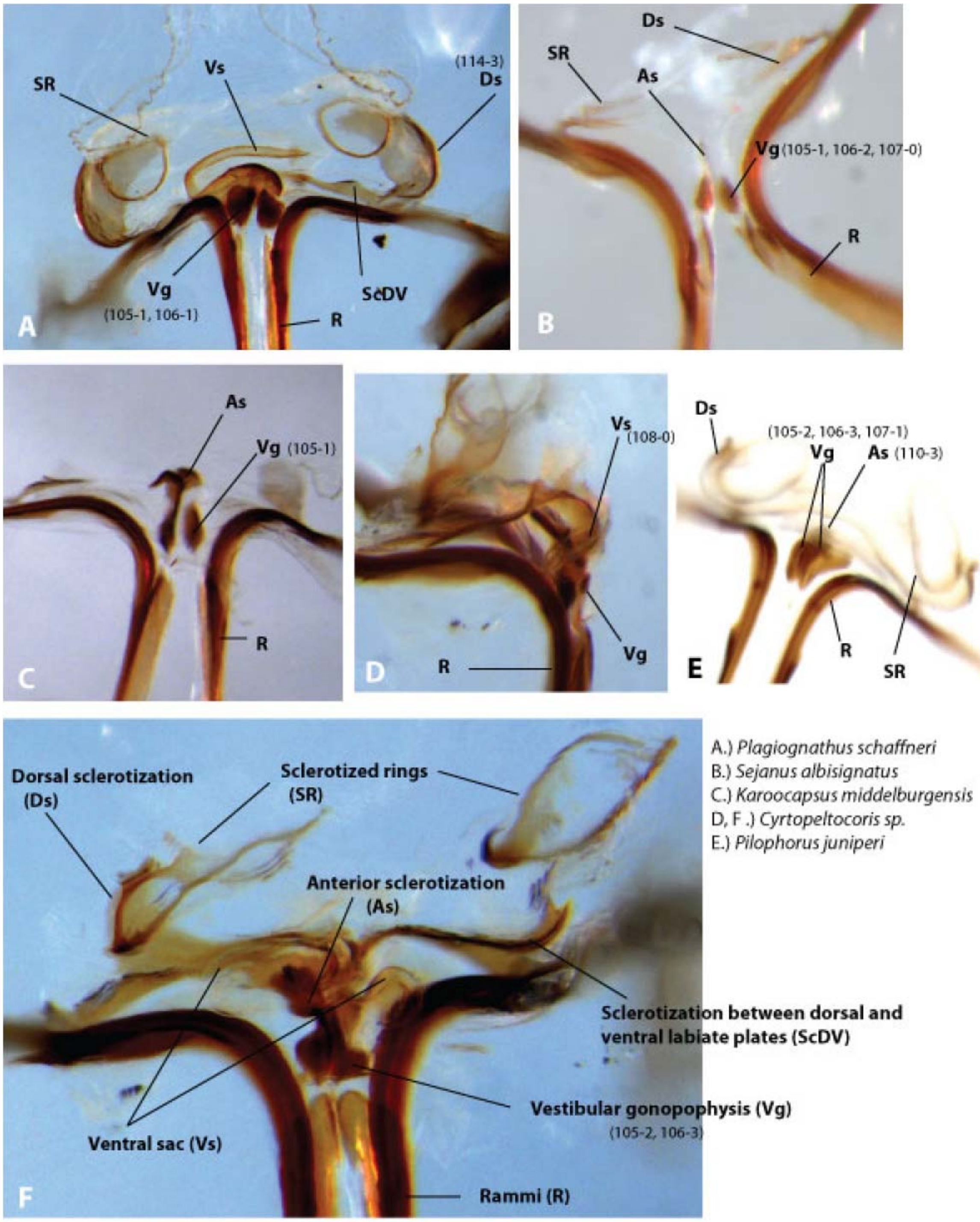
Figure 1-10. Diagrammatic versions of the parsimony consensus tree (A), MrBayes 50% majority tree (B), and the maximum Likelihood tree (C) with major nodes collapsed for comparison between analyses. Unambiguous state changes of morphological synapomorphies are optimized onto the major nodes in blue for parsimony and MrBayes analyses.



Unambiguous morphological character apomorphies for selected nodes

(RAxML Tree based on DNA only. Morphological character states mapped on nodes)

Figure 1-11. Anterior views of vestibulum in female Phylinae showing female characters used in analysis. Numbers associated with structures indicate represented morphological character states in Table 1-2. A: *Plagiognathus schaffneri* Schuh. B: *Sejanus albisignatus*. C: *Karoocapsus middelburgensis* Schuh. D: Lateral view of *Cyrtopeltocoris* sp. vestibulum. E: *Pilophorus juniperi* Knight. F: *Cyrtopeltocoris* sp., with structures and corresponding acronyms demarcated.



A.) *Plagiognathus schaffneri*
B.) *Sejanus albisignatus*
C.) *Karoocapsus middelburgensis*
D, F .) *Cyrtopeltocoris sp.*
E.) *Pilophorus juniperi*

Figure 1-12. Dorsal, posterior and lateral views of posterior wall and dorsal views of bursa copulatrix showing female characters used in analysis. Orientation of posterior wall relative to the head indicated with arrows next to corresponding figures. Numbers associated with structures indicate represented morphological character states in Table 1-2.A: Dorsal view of posterior wall in *Sejanus albisignatus*. B: Lateral view of posterior wall in *Cyrtopeltocoris sp*. C: Posterior view of posterior wall in *Lasiolabops obscurus* Poppius. D: Posterior view of posterior wall in *Sejanus albisignatus*. E: Dorsal view of bursa copulatrix in *Sejanus vividus* Carvalho and Gross. F: Dorsal view of bursa copulatrix in *Plagiognathus schaffneri* Schuh with structures and acronyms demarcated (see Figure 1-11 for SR, Ds, Vs and ScDV).

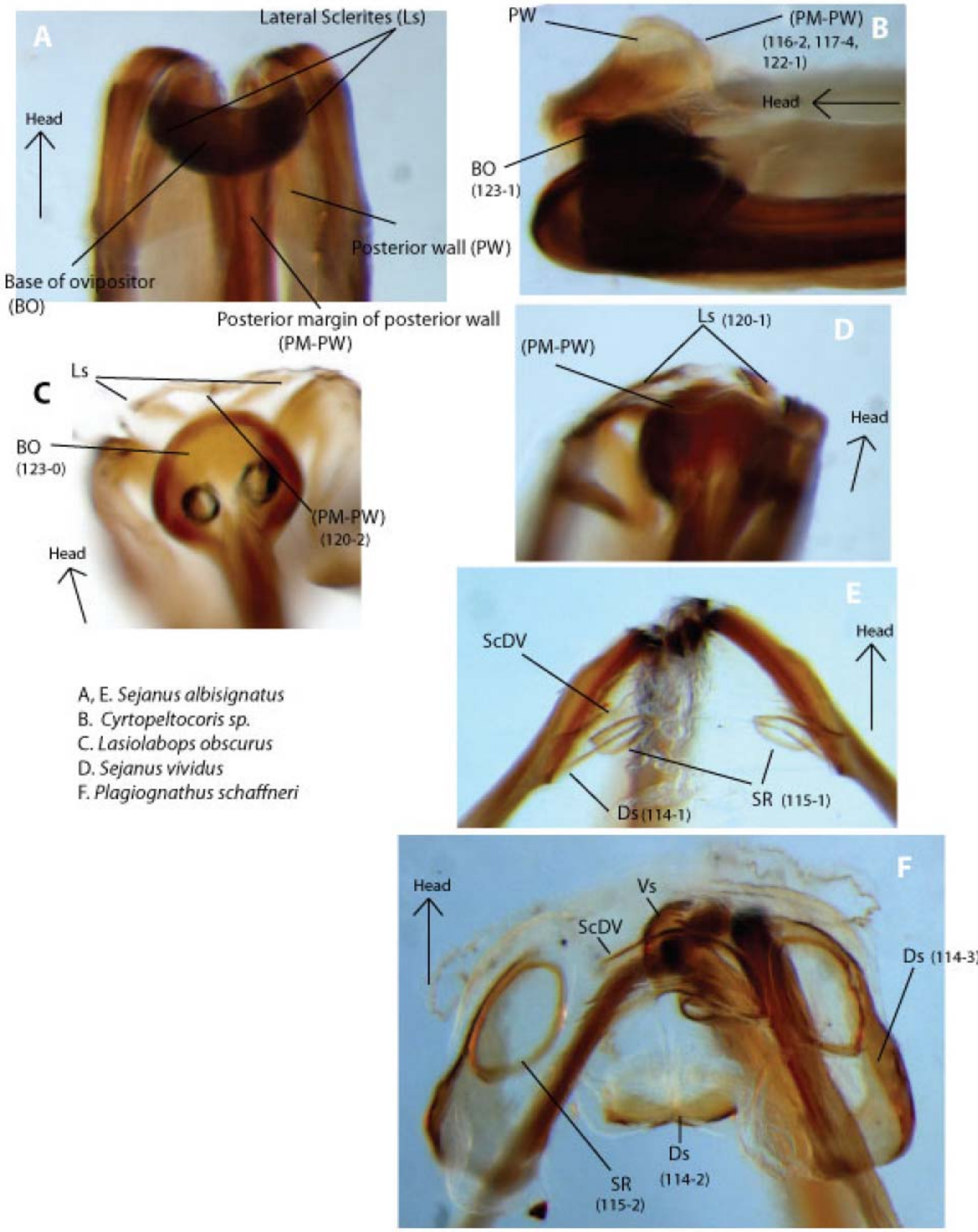
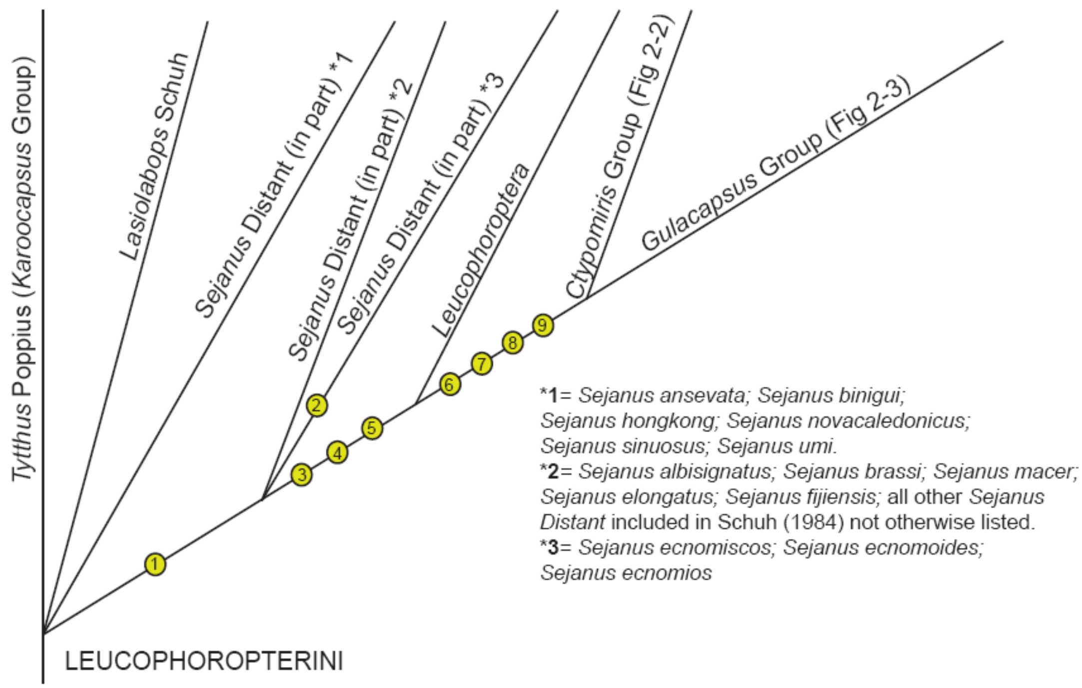

A
Lateral Sclerites (Ls)
Head
Posterior wall (PW)
Base of ovipositor
(BO)
Posterior margin of posterior wall
(PM-PW)
PW
(PM-PW)
(116-2, 117-4,
122-1)
B
Head
BO
(123-1)
C
Ls
BO
(123-0)
(PM-PW)
(120-2)
Head
D
Ls (120-1)
(PM-PW)
Head
E
Head
ScDV
SR (115-1)
Ds (114-1)
A, E. Sejanus albisignatus
B. Cyrtopeltocoris sp.
C. Lasiolabops obscurus
D. Sejanus vividus
F. Plagiognathus schaffneri
F
Head
Vs
ScDV
Ds (114-3)
Ds
(114-2)
SR
(115-2)

Figure 2-1. Phylogeny of Leucophopterini Schuh based on Schuh (1984). Node numbers correspond to numbering in Table 2-1.

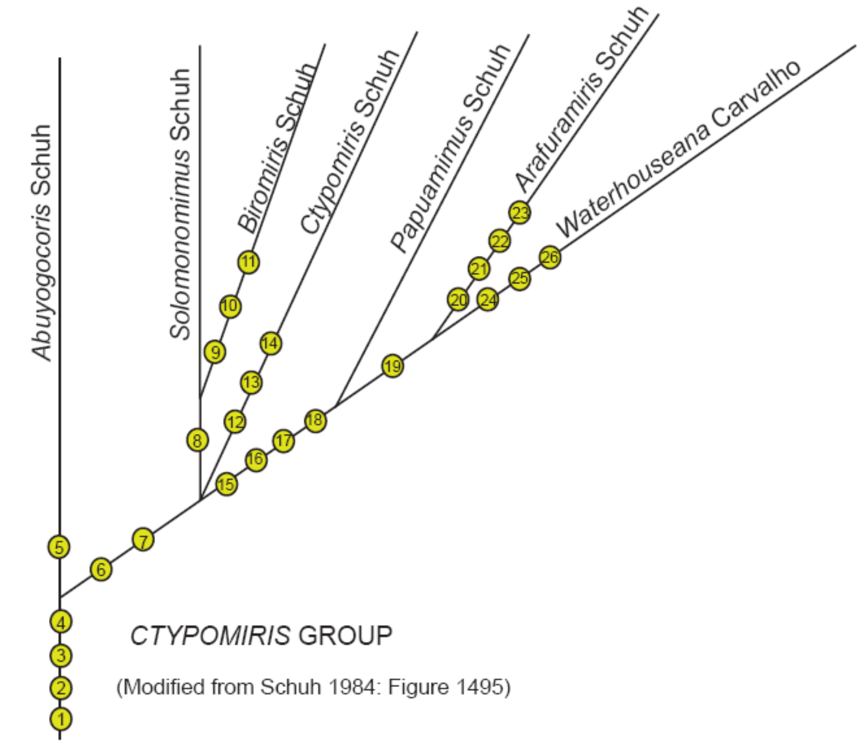


(Modified from Schuh 1984: Figure 1494)

Character synapomorphies proposed by Schuh (1984). Synapomorphies for *Tytthus* Poppius and *Lasiolabops* Poppius are excluded.

#	Character
1	Cuneus light basally, contrasting with remaining dark coloration.
2	Frontal portion of left paramere very strongly elevated and expanded.
3	Corium and sometimes including clavus with a white, contrasting fascia on hemelytra.
4	Lateral corial margins weakly sinuosus, [weakly constricted medially].
5	Metafemora conspicuously elongate, flattened, not bent or curving.
6	Antennal segment two curving.
7	Posterior pronotal lobe elevated and swollen.
8	Anterior pronotal margin in the form of a narrow, depressed, and sometimes reflexed anteriorly.
9	Evaporatory area of scent gland slightly protruding laterally.

Figure 2-2. Phylogeny of the *Ctypomiris* Group based on Schuh (1984). Node numbers correspond to numbering in Table 2-2.



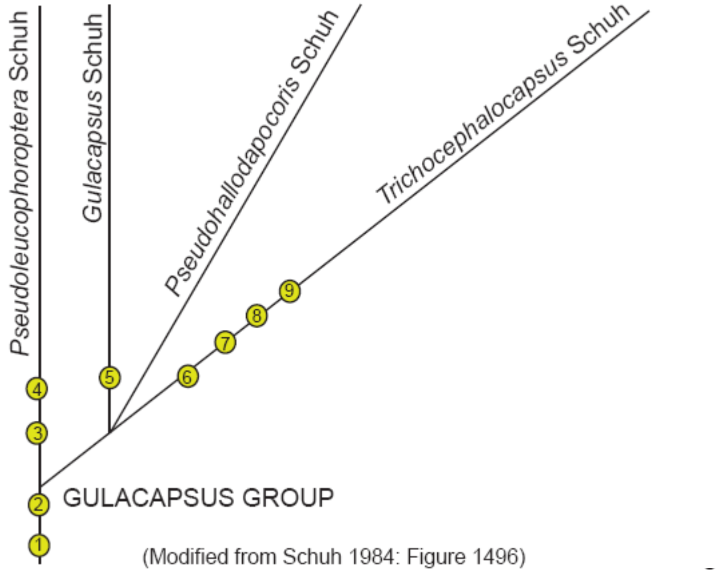
CTYPOMIRIS GROUP

(Modified from Schuh 1984: Figure 1495)

Character synapomorphies proposed by Schuh (1984)

#	Character
1	Head, pronotum, and scutellum highly polished and shining.
2	Hemelytra distinctly punctured.
3	Mesoscutum covered by pronotum.
4	Evaporatory area of scent gland slightly protruding laterally.
5	Metafemora elongate, slender, more or less cylindrical, usually curving, often swollen distally.
6	Corium and clavus highly polished and shining but not hyaline.
7	Hemelytra flat, not declining laterally.
8	Corium and cuneus swollen adjacent to cuneal fracture.
9	At least some hemelytral setae weakly to strongly lanceolate and erect.
10	Pronotum carinate laterally.
11	Antennal segments three and four weakly to strongly terete.
12	Hemelytra inpunctate.
13	Vesica with one or two sclerotized spine-like processes arising just below secondary gonopore.
14	Metafemora with a stridulatory plectrum on inner distal surface.
15	Humeral angles of pronotum shoulder-like.
16	Lateral corial margins strongly sinuous [constricted medially].
17	Exocorium greatly reduced on anterior one half of corium, costa obscured on dorsal view.
18	Abdominal segment two distinctly longer than wide.
19	Abdominal sternite two with striate areas lateroventrally.
20	Corium without transverse fascia.
21	Parempodia moderally fleshy and convergent apically.
22	Anterior pronotal lobe narrowed, more or less parallel-sided and distinct from posterior lobe.
23	Hemelytra always with a fascia-like arc of sericeous, appressed setae just posterior to scutellum.
24	Vestititure of dorsum always with some flattened, lanceolate, sericeous setae.
25	Head and or genae denselyovered with heavy, erect, dark setae.
26	Pronotum constricted mesially, often distinctly neck-like, anterior and posterior lobes separated.
27	Metathoracic scent gland not protruding laterally.

Figure 2-3. Phylogeny of the *Gulacapsus* Group based on Schuh (1984). Node numbers correspond to numbering in Table 2-3.



(Modified from Schuh 1984: Figure 1496)

Character synapomorphies proposed by Schuh (1984) mapped in Figure 2-3.

#	Character
1	Metafemora with a fringe of erect setae ventrally.
2	Eyes occupying less than two thirds the height of the head.
3	Posterior pronotal lobe not elevated or swollen.
4	Anterior pronotal margin finely reflexed, not in the form of a flattened pronotal collar.
5	Gula compressed laterally and keel-like.
6	Membrane of hemelytra dark basaly and light apically.
7	Head and or gena densely covered with heavy, erect, dark setae
8	Head strongly exerted, eyes distinctly removed from anterior pronotal margin.
9	Pronotum with broad, flattened anterior collar; never depressed or reflexed anteriorly.

Figure 2-4. Morphological characters used in the analysis. A: Male *Arafuramiris queenslandi* MS. B: Female *Collessicoris bellissimus* Carvalho and Gross abdomen, lateral view of ventral margin. C: male *Biromiris cassis* MS, lateral view. D: male *Waterhouseana illustris* Carvalho, lateral view. Numbers of character states correspond to Appendix 2.

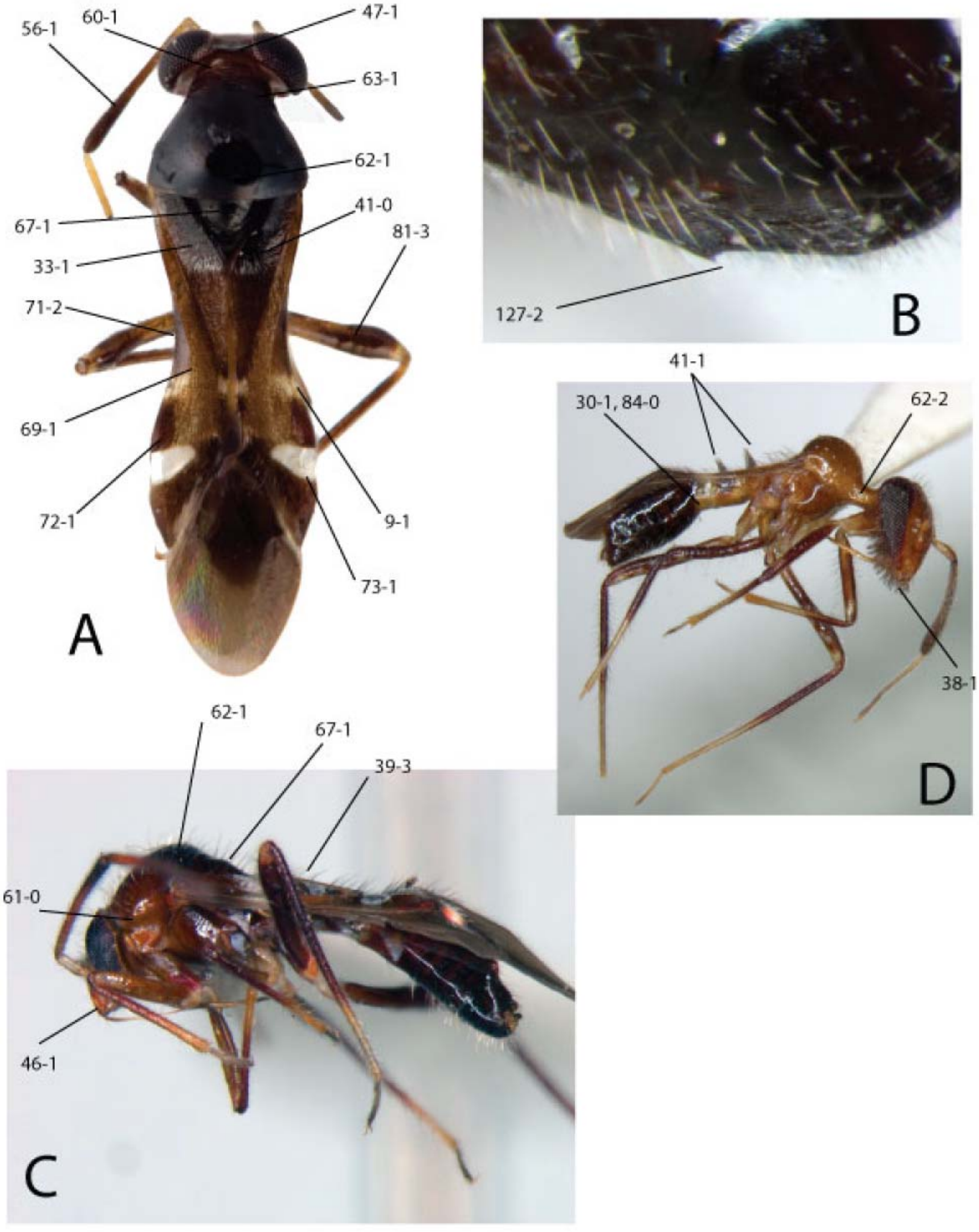

56-1
60-1
47-1
63-1
62-1
67-1
41-0
81-3
33-1
71-2
69-1
72-1
9-1
73-1
A
127-2
B
41-1
30-1, 84-0
62-2
38-1
D
62-1
67-1
39-3
61-0
46-1
C

Figure 2-5. Morphological characters used in the analysis. A: Female *Collessicoris bellissimus* Carvalho and Gross, dorsal view. B: Male *Leucophoroptera quadrimaculata*, dorsal view. C: Male *Waterhouseana delicate* MS, dorsal view. Numbers of character states correspond to Appendix 2.

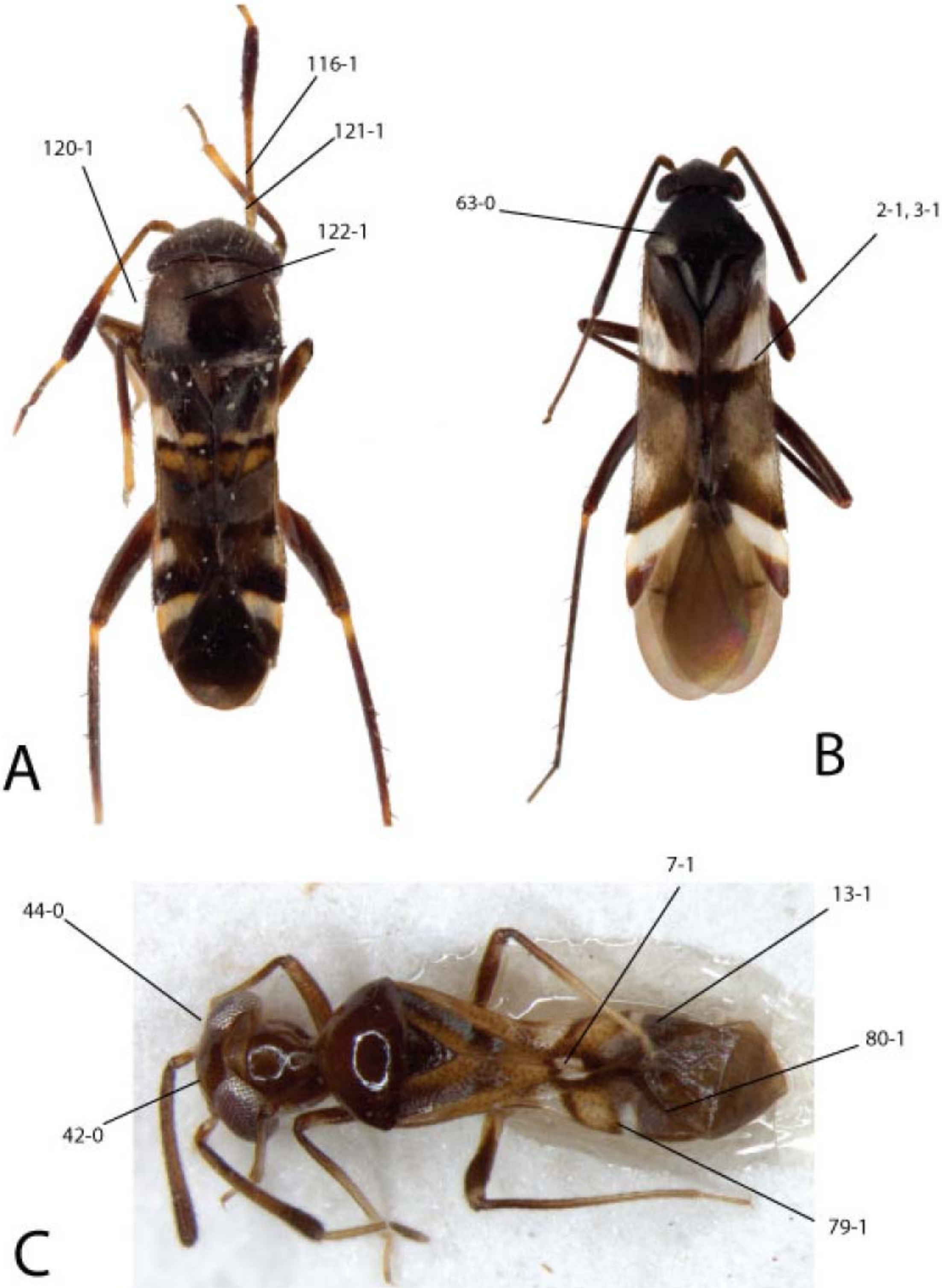

116-1
121-1
120-1
122-1
63-0
2-1, 3-1
A
B
7-1
13-1
44-0
80-1
42-0
79-1
C

Figure 2-6. Morphological characters used in the analysis. A: *Collessicoris bellissimus* Carvalho and Gross, close up of dorsal surface of hemelytra. B: female *Sejanus meridionalis* Carvalho and Gross, dorsal view. C: male *Leucophoroptera fasciatipennis* Poppius, dorsal view. Numbers of character states correspond to Appendix 2.

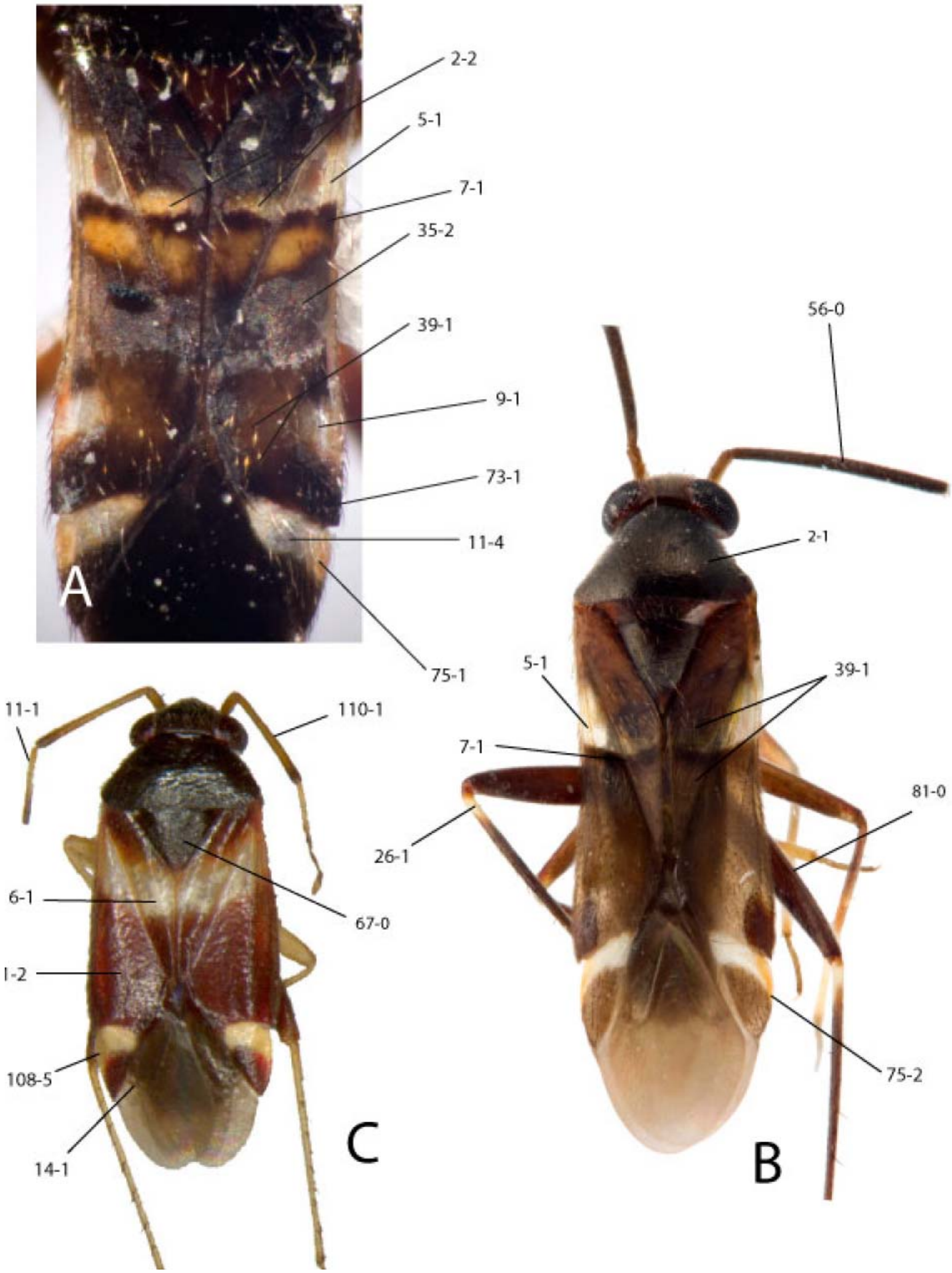

2-2
5-1
7-1
35-2
39-1
9-1
73-1
11-4
A
75-1
56-0
2-1
5-1
39-1
7-1
81-0
26-1
75-2
B
11-1
110-1
6-1
67-0
1-2
108-5
14-1
C

Figure 2-7. Strict-consensus tree of 144 most parsimonious trees. Symmetric re-sampling support values are calculated with a default P=33% and are mapped for nodes with greater than 50% support. Taxa with proposed name changes are indicated with color and horizontal bars.

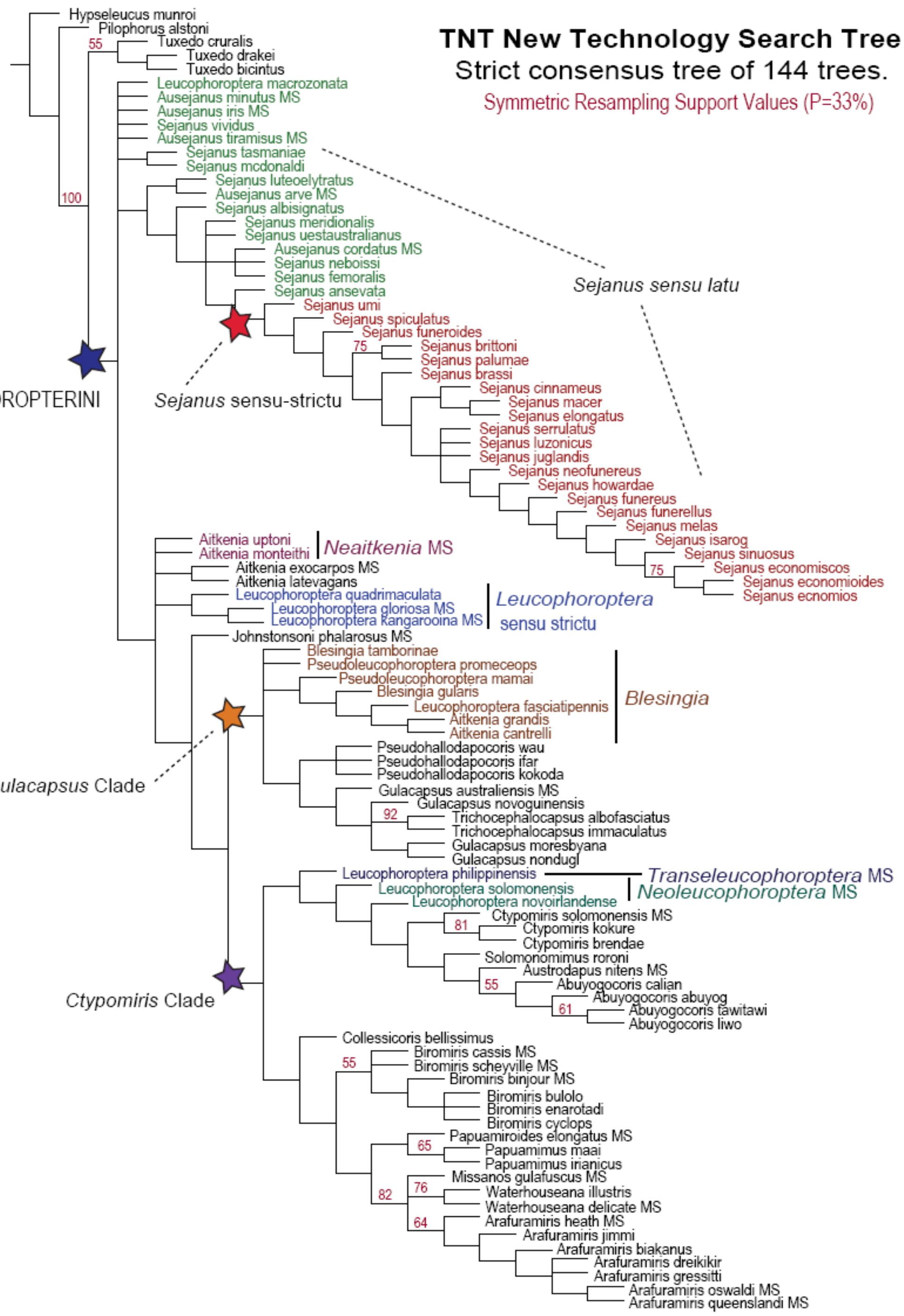

TNT New Technology Search Tree
Strict consensus tree of 144 trees.
Symmetric Resampling Support Values (P=33%)
Hypseleucus munroi
Pilophorus alstoni
Tuxedo cruralis
Tuxedo drakei
Tuxedo bicintus
Leucophoroptera macrozonata
Ausejanus minutus MS
Ausejanus iris MS
Sejanus vividus
Ausejanus tiramisus MS
Sejanus tasmaniae
Sejanus mcdonaldi
Sejanus luteoelytratus
Ausejanus arve MS
Sejanus albisignatus
Sejanus meridionalis
Sejanus uestaustralianus
Ausejanus cordatus MS
Sejanus neboissi
Sejanus femoralis
Sejanus ansevata
Sejanus sensu latu
Sejanus umi
Sejanus spiculatus
Sejanus funeroides
Sejanus brittoni
Sejanus palumae
Sejanus brassi
LEUCOPHOROPTERINI
Sejanus sensu-strictu
Sejanus cinnameus
Sejanus macer
Sejanus elongatus
Sejanus serrulatus
Sejanus luzonicus
Sejanus juglandis
Sejanus neofunereus
Sejanus howardae
Sejanus funereus
Sejanus funerellus
Sejanus melas
Sejanus isarog
Sejanus sinuosus
Sejanus economiscos
Sejanus economioides
Sejanus ecnomios
Aitkenia uptoni
Aitkenia monteithi
Neaitkenia MS
Aitkenia exocarpos MS
Aitkenia latevagans
Leucophoroptera quadrimaculata
Leucophoroptera gloriosa MS
Leucophoroptera kangarooina MS
Leucophoroptera sensu strictu
Johnstonsoni phalarosus MS
Blesingia tamborinae
Pseudoleucophoroptera promeceops
Pseudoleucophoroptera mamai
Blesingia gularis
Leucophoroptera fasciatipennis
Aitkenia grandis
Aitkenia cantrelli
Blesingia
Pseudohallodapocoris wau
Pseudohallodapocoris ifar
Pseudohallodapocoris kokoda
Gulacapsus Clade
Gulacapsus australiensis MS
Gulacapsus novoguinensis
Trichocephalocapsus albofasciatus
Trichocephalocapsus immaculatus
Gulacapsus moresbyana
Gulacapsus nondugl
Leucophoroptera philippinensis
Transeleucophoroptera MS
Leucophoroptera solomonensis
Leucophoroptera novoirlandense
Neoleucophoroptera MS
Ctypomiris solomonensis MS
Ctypomiris kokure
Ctypomiris brendae
Solomonomimus roroni
Austrodapus nitens MS
Abuyogocoris calian
Abuyogocoris abuyog
Abuyogocoris tawitawi
Abuyogocoris liwo
Ctypomiris Clade
Collessicoris bellissimus
Biromiris cassis MS
Biromiris scheyville MS
Biromiris binjour MS
Biromiris bulolo
Biromiris enarotadi
Biromiris cyclops
Papuamiroides elongatus MS
Papuamimus maai
Papuamimus irianicus
Missanos gulafuscus MS
Waterhouseana illustris
Waterhouseana delicate MS
Arafuramiris heath MS
Arafuramiris jimmi
Arafuramiris biakanus
Arafuramiris dreikikir
Arafuramiris gressitti
Arafuramiris oswaldi MS
Arafuramiris queenslandi MS

Figure 2-8. Resultant tree from the implied weighting analysis, with the constant of concavity (K) set to 3.00. Node numbers correspond with specific nodes discussed in text. Taxa with proposed name changes are indicated with color and horizontal bars.

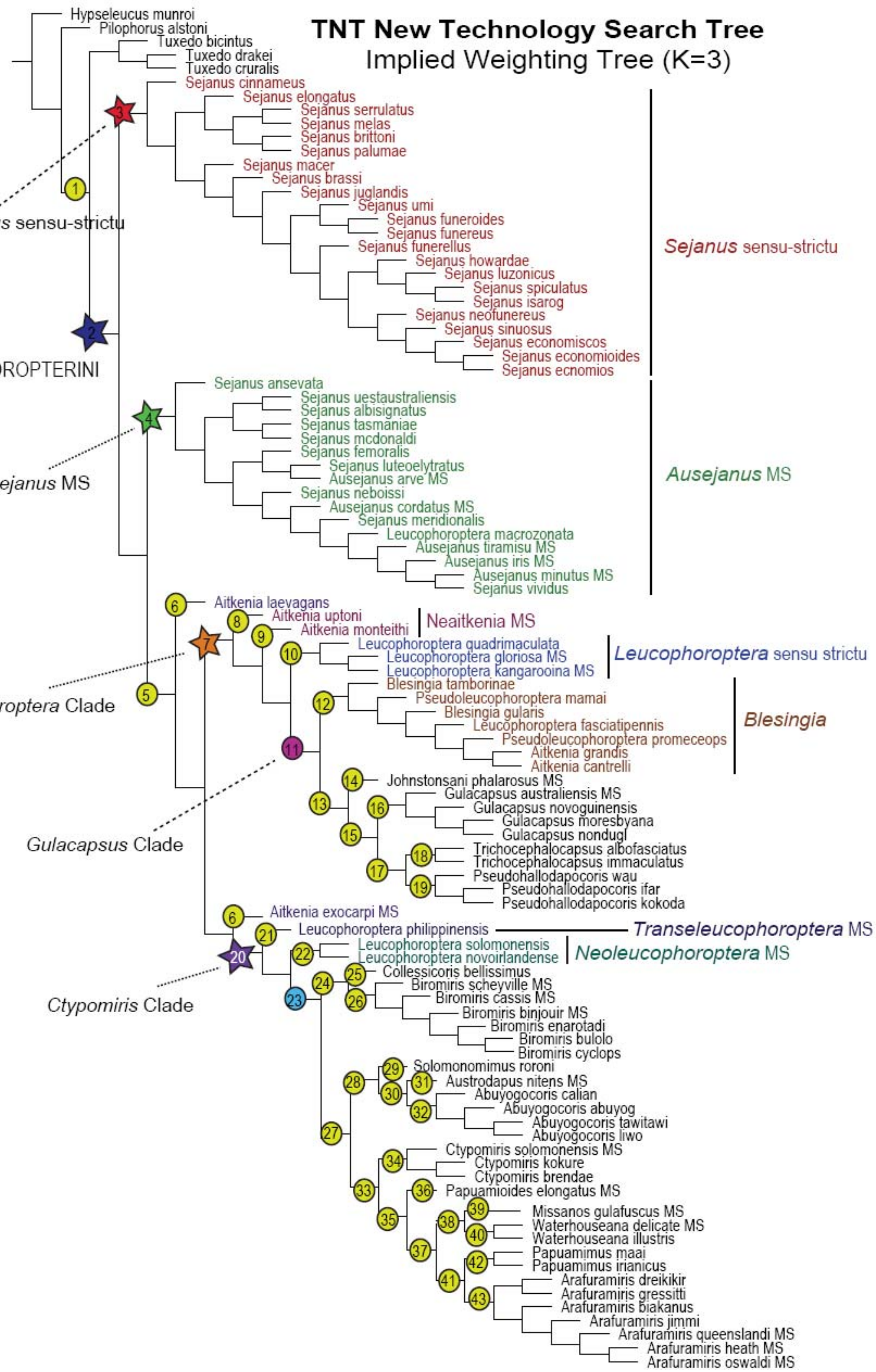

TNT New Technology Search Tree
Implied Weighting Tree (K=3)
Hypseleucus munroi
Pilophorus alstoni
Tuxedo bicintus
Tuxedo drakei
Tuxedo cruralis
Sejanus cinnameus
Sejanus elongatus
Sejanus serrulatus
Sejanus melas
Sejanus brittoni
Sejanus palumae
Sejanus macer
Sejanus brassi
Sejanus juglandis
Sejanus umi
Sejanus funeroides
Sejanus funereus
Sejanus funerellus
Sejanus howardae
Sejanus luzonicus
Sejanus spiculatus
Sejanus isarog
Sejanus neofunereus
Sejanus sinuosus
Sejanus economiscos
Sejanus economioides
Sejanus ecnomios
Sejanus sensu-strictu
LEUCOPHOROPTERINI
Sejanus ansevata
Sejanus uestaustraliensis
Sejanus albisignatus
Sejanus tasmaniae
Sejanus mcdonaldi
Sejanus femoralis
Sejanus luteoelytratus
Ausejanus arve MS
Sejanus neboissi
Ausejanus cordatus MS
Sejanus meridionalis
Leucophoroptera macrozonata
Ausejanus tiramisu MS
Ausejanus iris MS
Ausejanus minutus MS
Sejanus vividus
Ausejanus MS
Aitkenia laevagans
Aitkenia uptoni
Aitkenia monteithi
Neaitkenia MS
Leucophoroptera quadrimaculata
Leucophoroptera gloriosa MS
Leucophoroptera kangarooina MS
Leucophoroptera sensu strictu
Leucophoroptera Clade
Blesingia tamborinae
Pseudoleucophoroptera mamai
Blesingia gularis
Leucophoroptera fasciatipennis
Pseudoleucophoroptera promeceops
Aitkenia grandis
Aitkenia cantrelli
Blesingia
Johnstonsani phalarosus MS
Gulacapsus australiensis MS
Gulacapsus novoguinensis
Gulacapsus moresbyana
Gulacapsus nondugl
Trichocephalocapsus albofasciatus
Trichocephalocapsus immaculatus
Pseudohallodapocoris wau
Pseudohallodapocoris ifar
Pseudohallodapocoris kokoda
Gulacapsus Clade
Aitkenia exocarpi MS
Leucophoroptera philippinensis
Transeleucophoroptera MS
Leucophoroptera solomonensis
Leucophoroptera novoirlandense
Neoleucophoroptera MS
Ctypomiris Clade
Collessicoris bellissimus
Biromiris scheyville MS
Biromiris cassis MS
Biromiris binjouir MS
Biromiris enarotadi
Biromiris bulolo
Biromiris cyclops
Solomonomimus roroni
Austrodapus nitens MS
Abuyogocoris calian
Abuyogocoris abuyog
Abuyogocoris tawitawi
Abuyogocoris liwo
Ctypomiris solomonensis MS
Ctypomiris kokure
Ctypomiris brendae
Papuamioides elongatus MS
Missanos gulafuscus MS
Waterhouseana delicate MS
Waterhouseana illustris
Papuamimus maai
Papuamimus irianicus
Arafuramiris dreikikir
Arafuramiris gressitti
Arafuramiris biakanus
Arafuramiris jimmi
Arafuramiris queenslandi MS
Arafuramiris heath MS
Arafuramiris oswaldi MS

Figure 2-9. Diagram of major nodes discussed in text from the implied weighting tree. Character synapomorphies for the nodes are indicated in blue. *Blesingia* Carvalho and Gross represents the revised genus including *Blesingia tamborinea*, *Blesingia gularis*, *Leucophoroptera fasciatipennis*, *Aitkenia cantrelli*, and *Aitkenia grandis*.

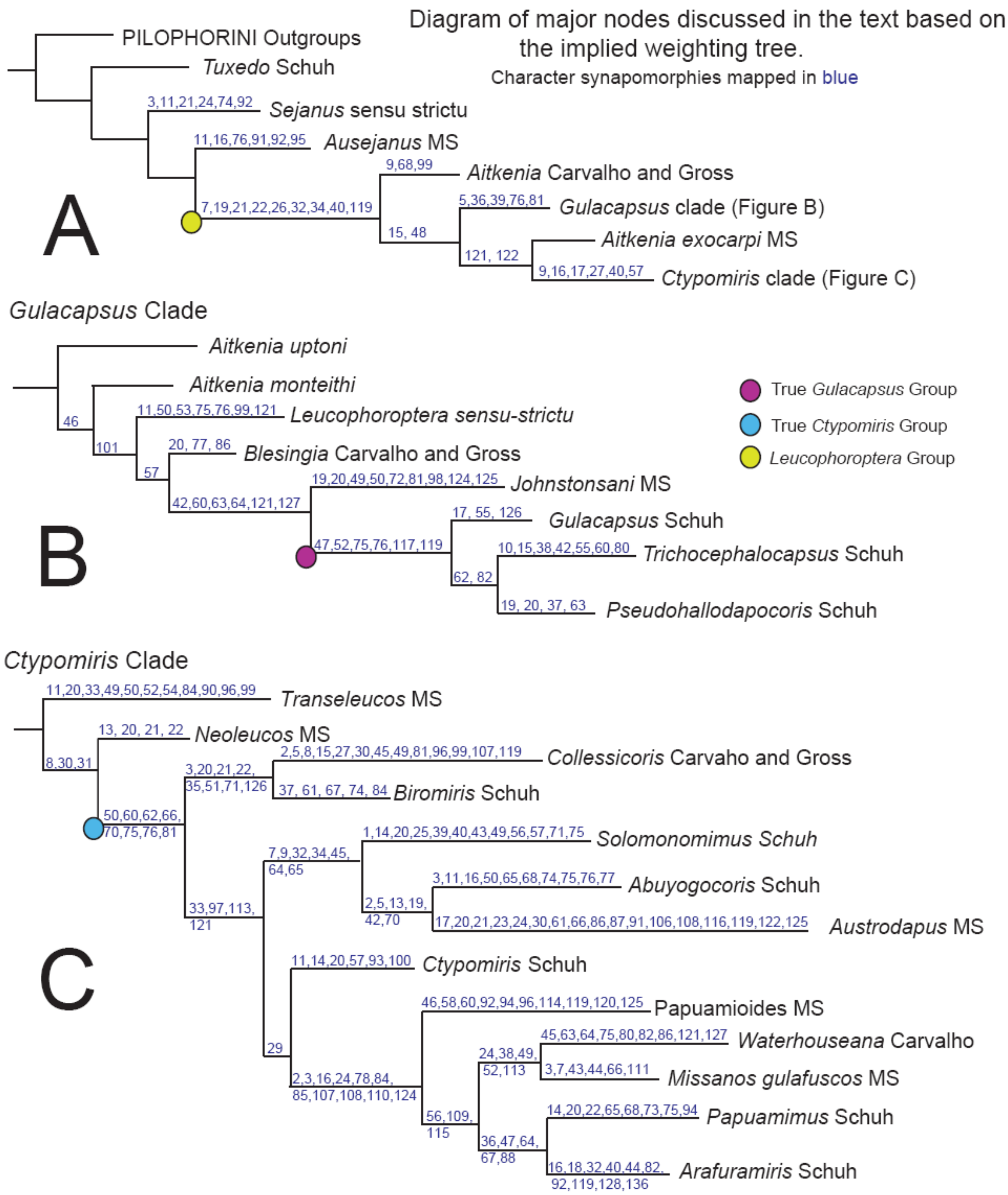


Diagram of major nodes discussed in the text based on the implied weighting tree.
Character synapomorphies mapped in blue
A
PILOPHORINI Outgroups
Tuxedo Schuh
3,11,21,24,74,92
Sejanus sensu strictu
11,16,76,91,92,95
Ausejanus MS
7,19,21,22,26,32,34,40,119
9,68,99
Aitkenia Carvalho and Gross
15, 48
5,36,39,76,81
Gulacapsus clade (Figure B)
121, 122
Aitkenia exocarpi MS
9,16,17,27,40,57
Ctypomiris clade (Figure C)
Gulacapsus Clade
B
Aitkenia uptoni
46
Aitkenia monteithi
101
11,50,53,75,76,99,121
Leucophoroptera sensu-strictu
57
20, 77, 86
Blesingia Carvalho and Gross
42,60,63,64,121,127
19,20,49,50,72,81,98,124,125
Johnstonsani MS
47,52,75,76,117,119
17, 55, 126
Gulacapsus Schuh
62, 82
10,15,38,42,55,60,80
Trichocephalocapsus Schuh
19, 20, 37, 63
Pseudohallodapocoris Schuh
True *Gulacapsus* Group
True *Ctypomiris* Group
Leucophoroptera Group
Ctypomiris Clade
C
11,20,33,49,50,52,54,84,90,96,99
Transeleucos MS
8,30,31
13, 20, 21, 22
Neoleucos MS
50,60,62,66, 70,75,76,81
3,20,21,22, 35,51,71,126
2,5,8,15,27,30,45,49,81,96,99,107,119
Collessicoris Carvaho and Gross
37, 61, 67, 74, 84
Biromiris Schuh
33,97,113, 121
7,9,32,34,45, 64,65
1,14,20,25,39,40,43,49,56,57,71,75
Solomonomimus Schuh
2,5,13,19, 42,70
3,11,16,50,65,68,74,75,76,77
Abuyogocoris Schuh
17,20,21,23,24,30,61,66,86,87,91,106,108,116,119,122,125
Austrodapus MS
29
11,14,20,57,93,100
Ctypomiris Schuh
2,3,16,24,78,84, 85,107,108,110,124
46,58,60,92,94,96,114,119,120,125
Papuamioides MS
56,109, 115
24,38,49, 52,113
45,63,64,75,80,82,86,121,127
Waterhouseana Carvalho
3,7,43,44,66,111
Missanos gulafuscos MS
36,47,64, 67,88
14,20,22,65,68,73,75,94
Papuamimus Schuh
16,18,32,40,44,82, 92,119,128,136
Arafuramiris Schuh

Figure 3-1. Dorsal habitus photos of species of *Ausejanus* spp.

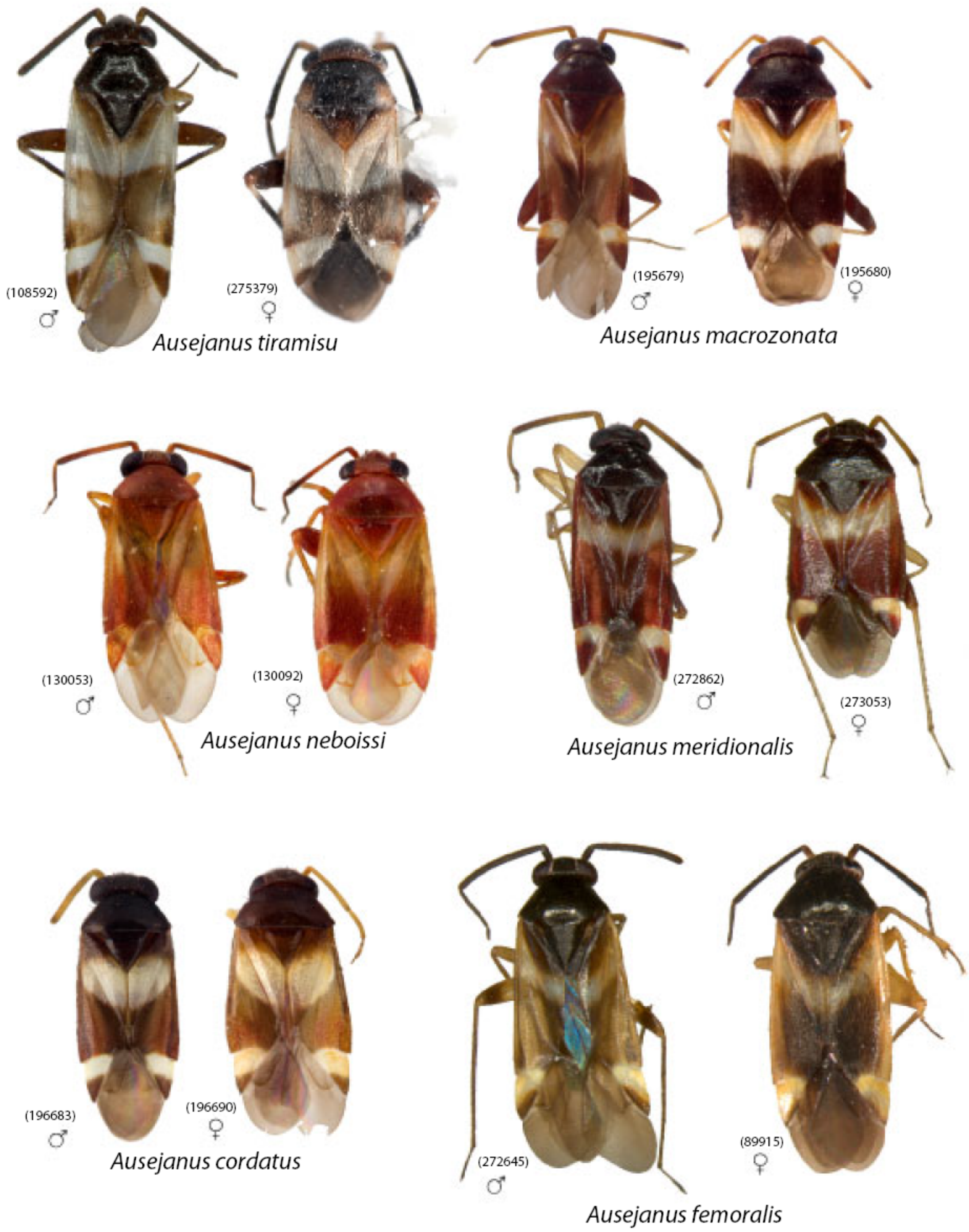

(108592)
♂
(275379)
♀
Ausejanus tiramisu
(195679)
♂
(195680)
♀
Ausejanus macrozonata
(130053)
♂
(130092)
♀
Ausejanus neboissi
(272862)
♂
(273053)
♀
Ausejanus meridionalis
(196683)
♂
(196690)
♀
Ausejanus cordatus
(272645)
♂
(89915)
♀
Ausejanus femoralis

Figure 3-2. Dorsal habitus photos of species of *Ausejanus* spp.

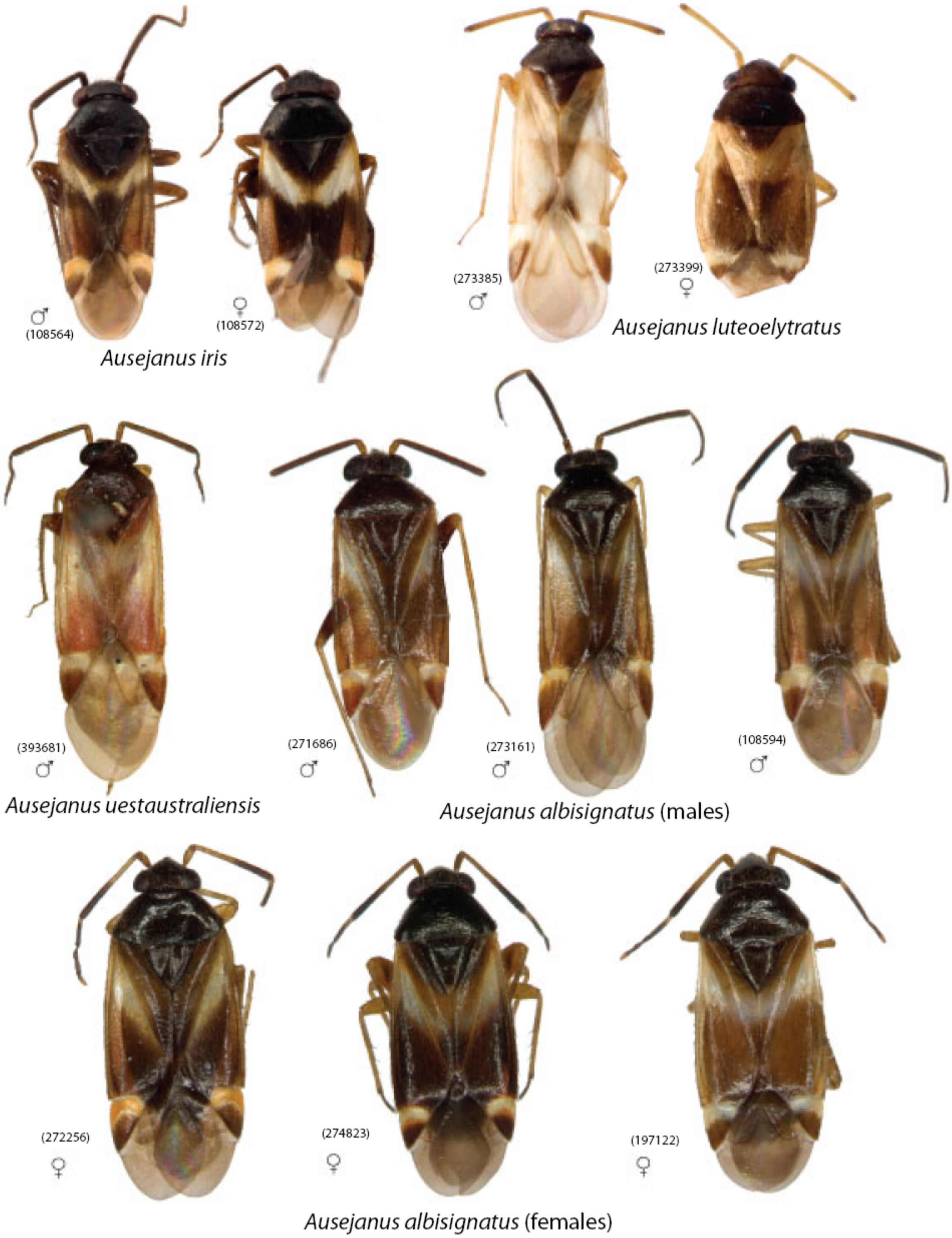

♂
(108564)
♀
(108572)
Ausejanus iris
(273385)
♂
(273399)
♀
Ausejanus luteoelytratus
(393681)
♂
Ausejanus uestaustraliensis
(271686)
♂
(273161)
♂
(108594)
♂
Ausejanus albisignatus (males)
(272256)
♀
(274823)
♀
(197122)
♀
Ausejanus albisignatus (females)

Figure 3-3. Dorsal habitus photos of species of *Ausejanus* spp.

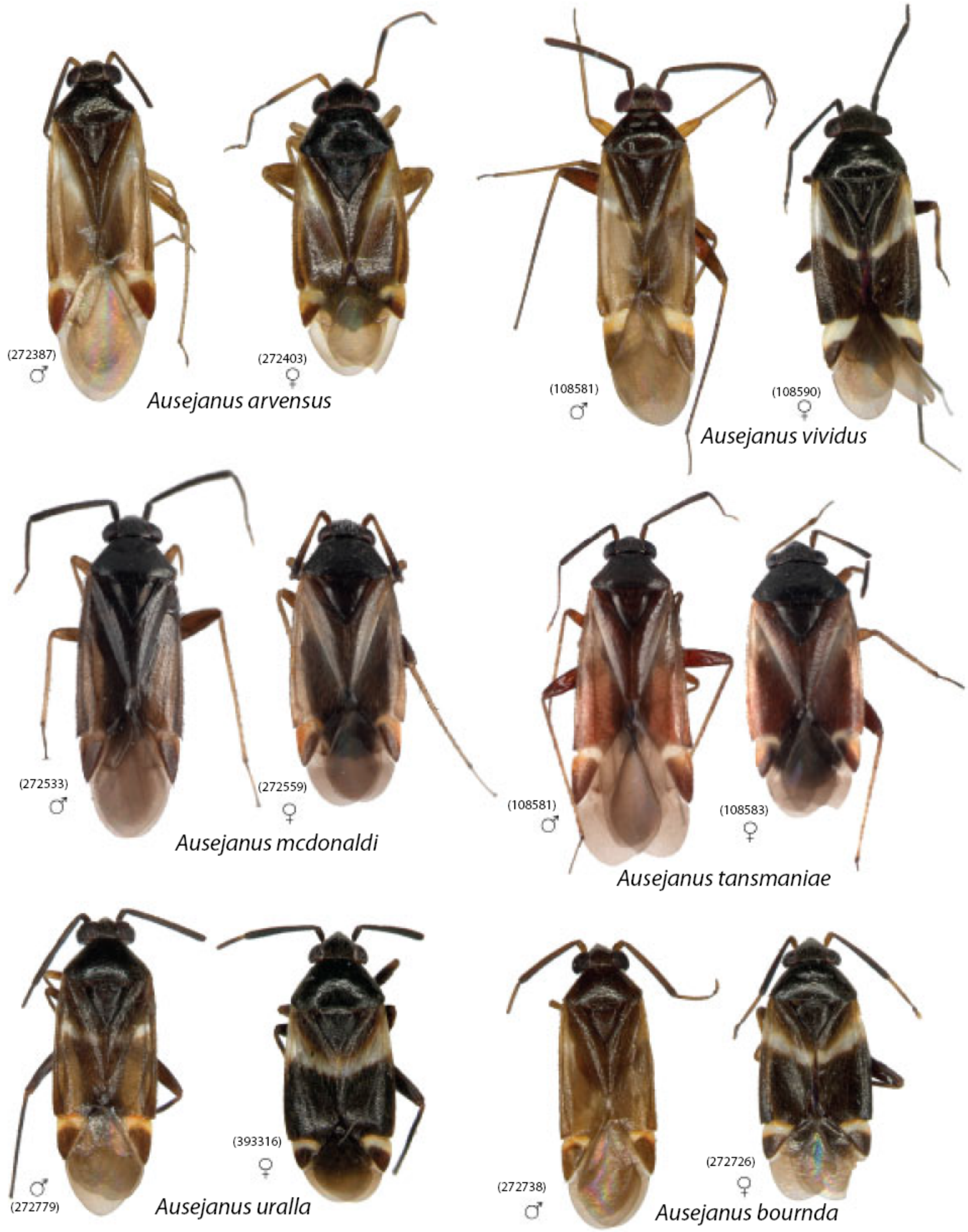

(272387)
♂
(272403)
♀
Ausejanus arvensus
(108581)
♂
(108590)
♀
Ausejanus vividus
(272533)
♂
(272559)
♀
Ausejanus mcdonaldi
(108581)
♂
(108583)
♀
Ausejanus tansmaniae
♂
(272779)
(393316)
♀
Ausejanus uralla
(272738)
♂
(272726)
♀
Ausejanus bournda

Figure 3-4. Dorsal habitus photos of species of *Ausejanus* spp., *Sejanus* spp. and *Leucophoroptera* spp.

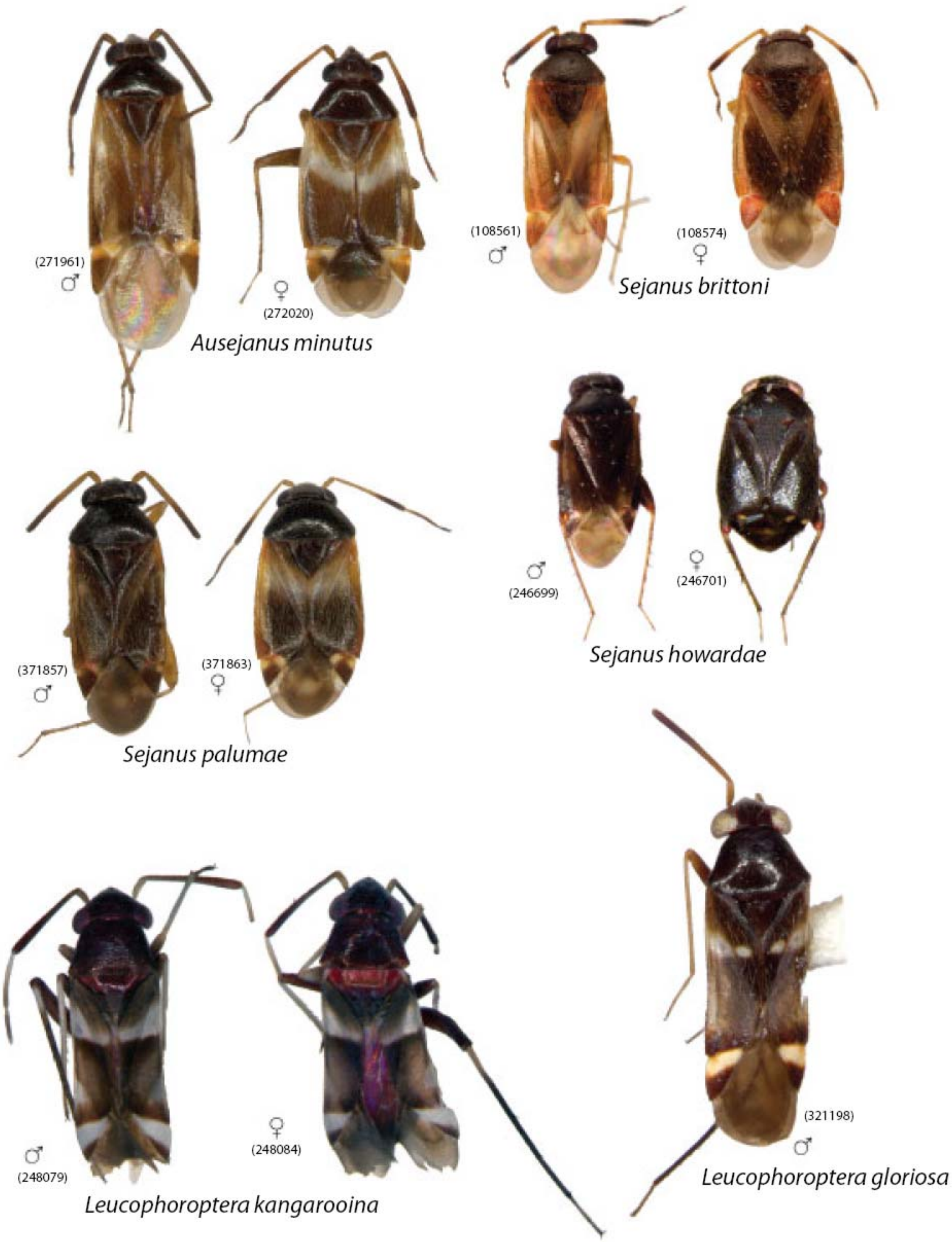

(271961)
♂
♀
(272020)
Ausejanus minutus
(108561)
♂
(108574)
♀
Sejanus brittoni
♂
(246699)
♀
(246701)
Sejanus howardae
(371857)
♂
(371863)
♀
Sejanus palumae
♂
(248079)
♀
(248084)
Leucophoroptera kangarooina
(321198)
♂
Leucophoroptera gloriosa

Figure 3-5. Dorsal habitus photos of species of *Leucophoroptera* spp. and *Blesingia* spp. Images of *Leucophoroptera caveda* and *Blesingia cantrelli* are of the holotypes. (Image of *L. caveda* is courtesy of the South Australian Museum, *B. cantrelli* from the Queensland Museum).

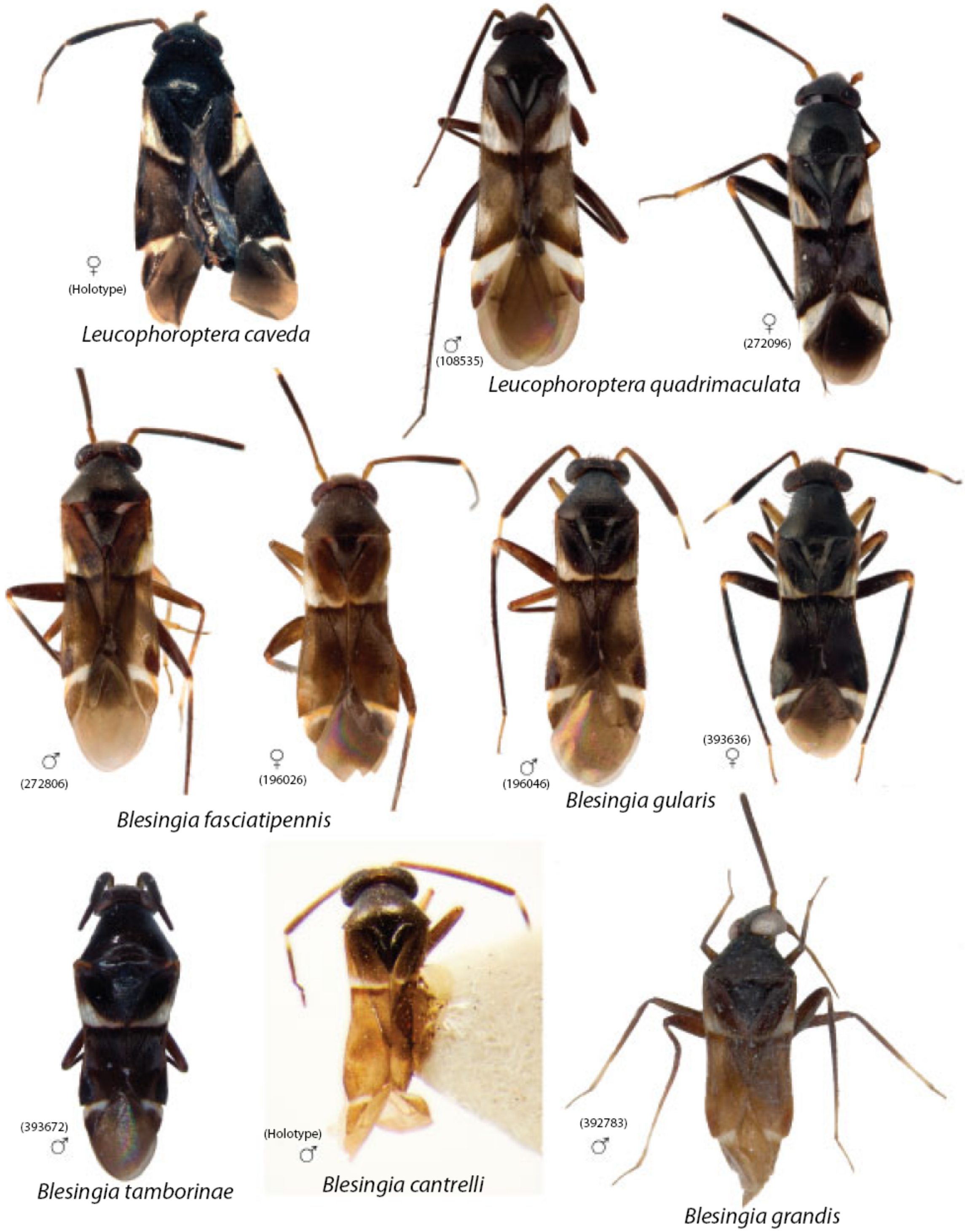
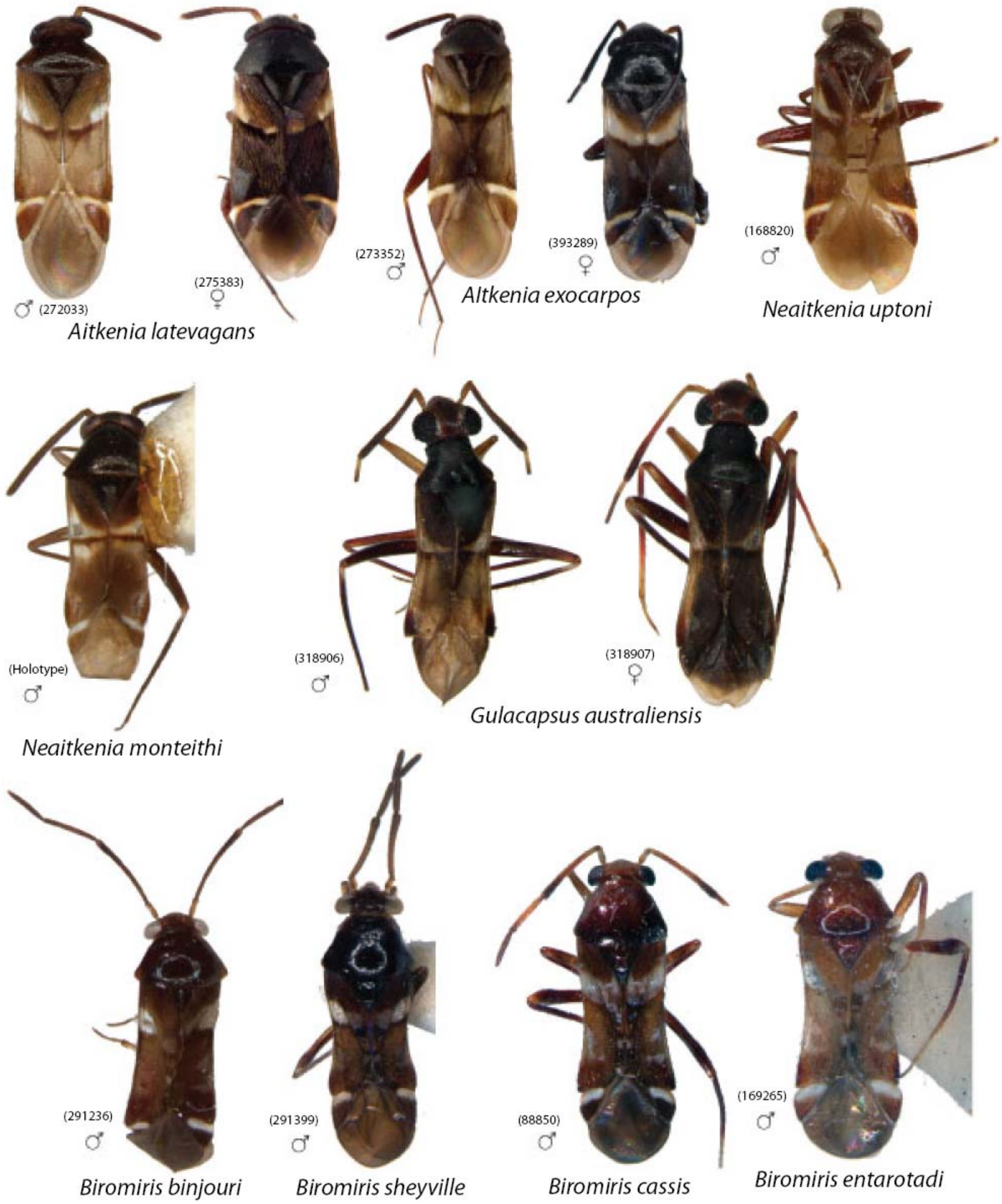

♀
(Holotype)
Leucophoroptera caveda
♂
(108535)
♀
(272096)
Leucophoroptera quadrimaculata
♂
(272806)
♀
(196026)
Blesingia fasciatipennis
♂
(196046)
(393636)
♀
Blesingia gularis
(393672)
♂
Blesingia tamborinae
(Holotype)
♂
Blesingia cantrelli
(392783)
♂
Blesingia grandis

Figure 3-6. Dorsal habitus photos of species of *Aitkenia* spp., *Neaitkenia* spp., *Gulacapsus spp*., and *Biromiris* spp.



♂ (272033)
(275383)
♀
Aitkenia latevagans
(273352)
♂
(393289)
♀
Altkenia exocarpos
(168820)
♂
Neaitkenia uptoni
(Holotype)
♂
Neaitkenia monteithi
(318906)
♂
(318907)
♀
Gulacapsus australiensis
(291236)
♂
Biromiris binjouri
(291399)
♂
Biromiris sheyville
(88850)
♂
Biromiris cassis
(169265)
♂
Biromiris entarotadi

Figure 3-7. Dorsal habitus photos of species of *Papuamiroides* spp., *Collessicoris* spp., *Arafuramiris* spp., *Waterhouseana* spp., and *Austrodapus* spp.

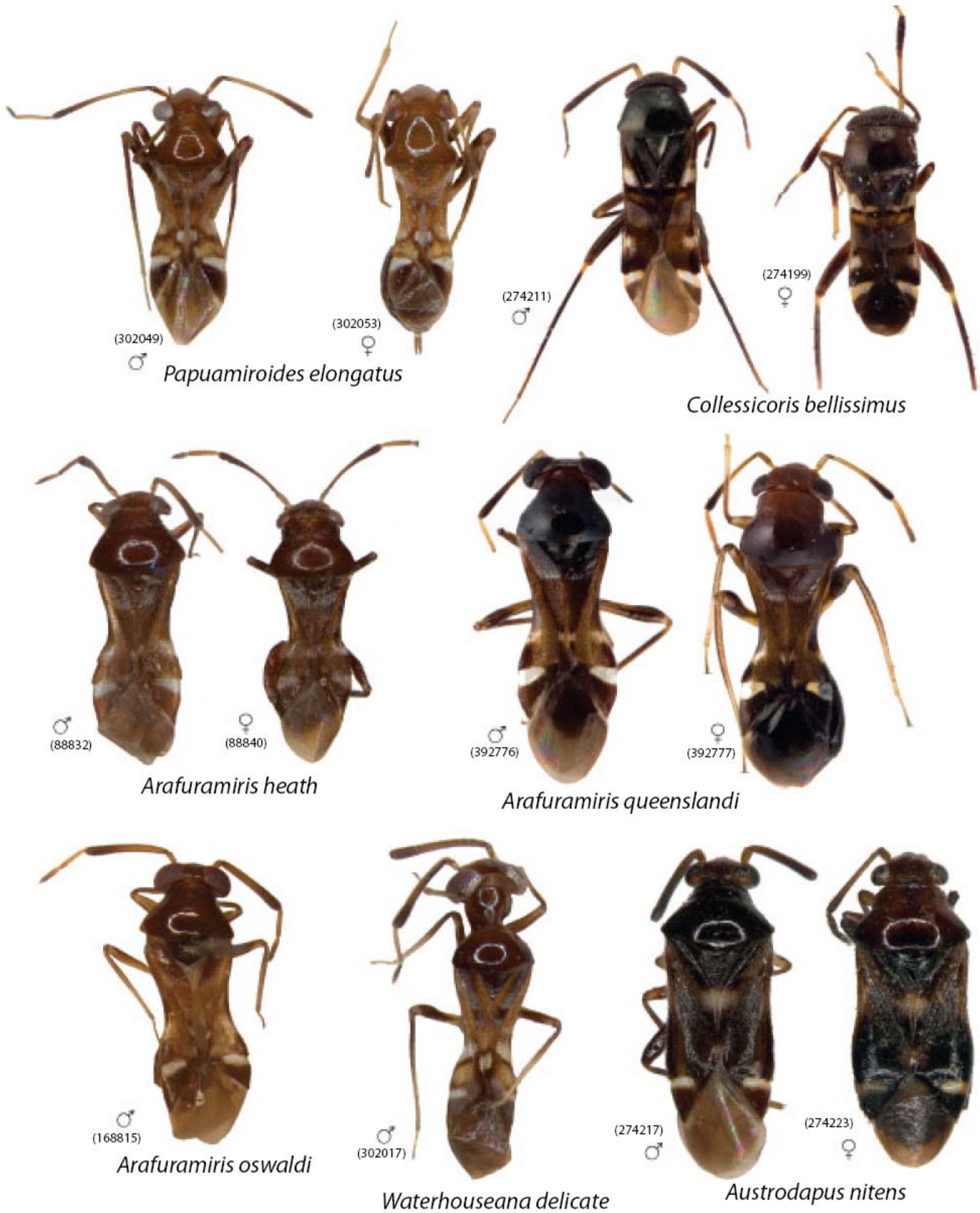

(302049)
♂
(302053)
♀
Papuamiroides elongatus
(274211)
♂
(274199)
♀
Collessicoris bellissimus
♂
(88832)
♀
(88840)
Arafuramiris heath
♂
(392776)
♀
(392777)
Arafuramiris queenslandi
♂
(168815)
Arafuramiris oswaldi
♂
(302017)
Waterhouseana delicate
(274217)
♂
(274223)
♀
Austrodapus nitens

Figure 3-8. Dorsal habitus photos of species of *Johnstonsoni* spp., *Ctypomiris* spp., and *Missanos* spp.

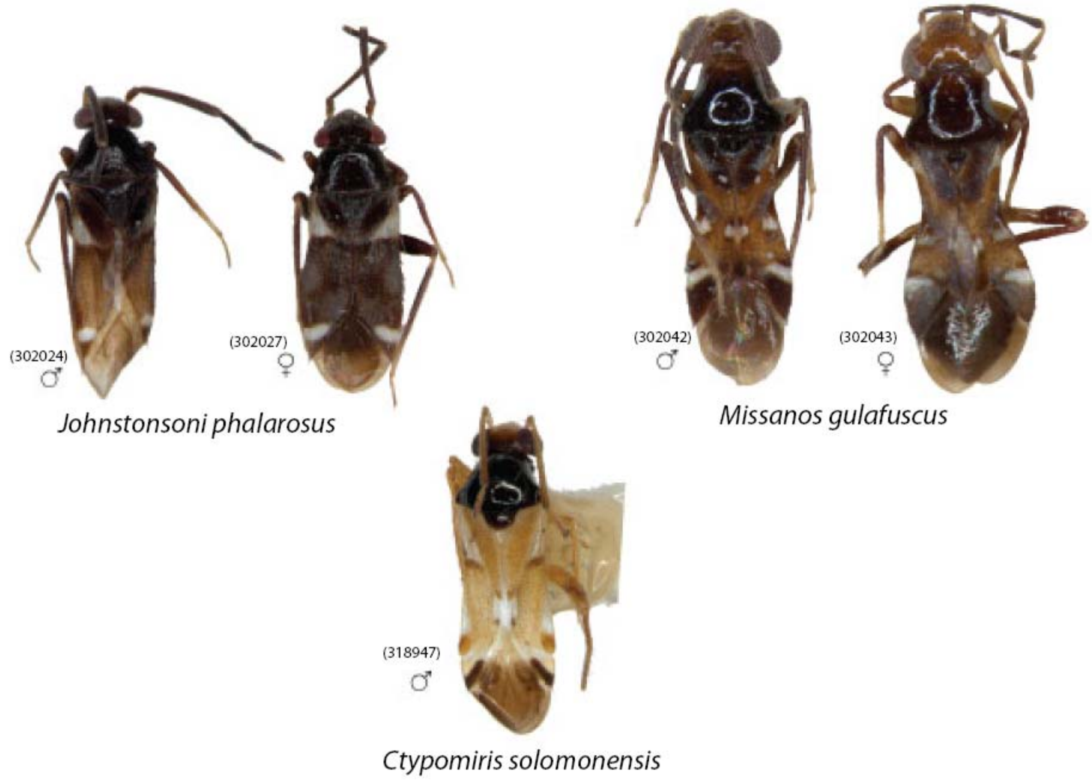
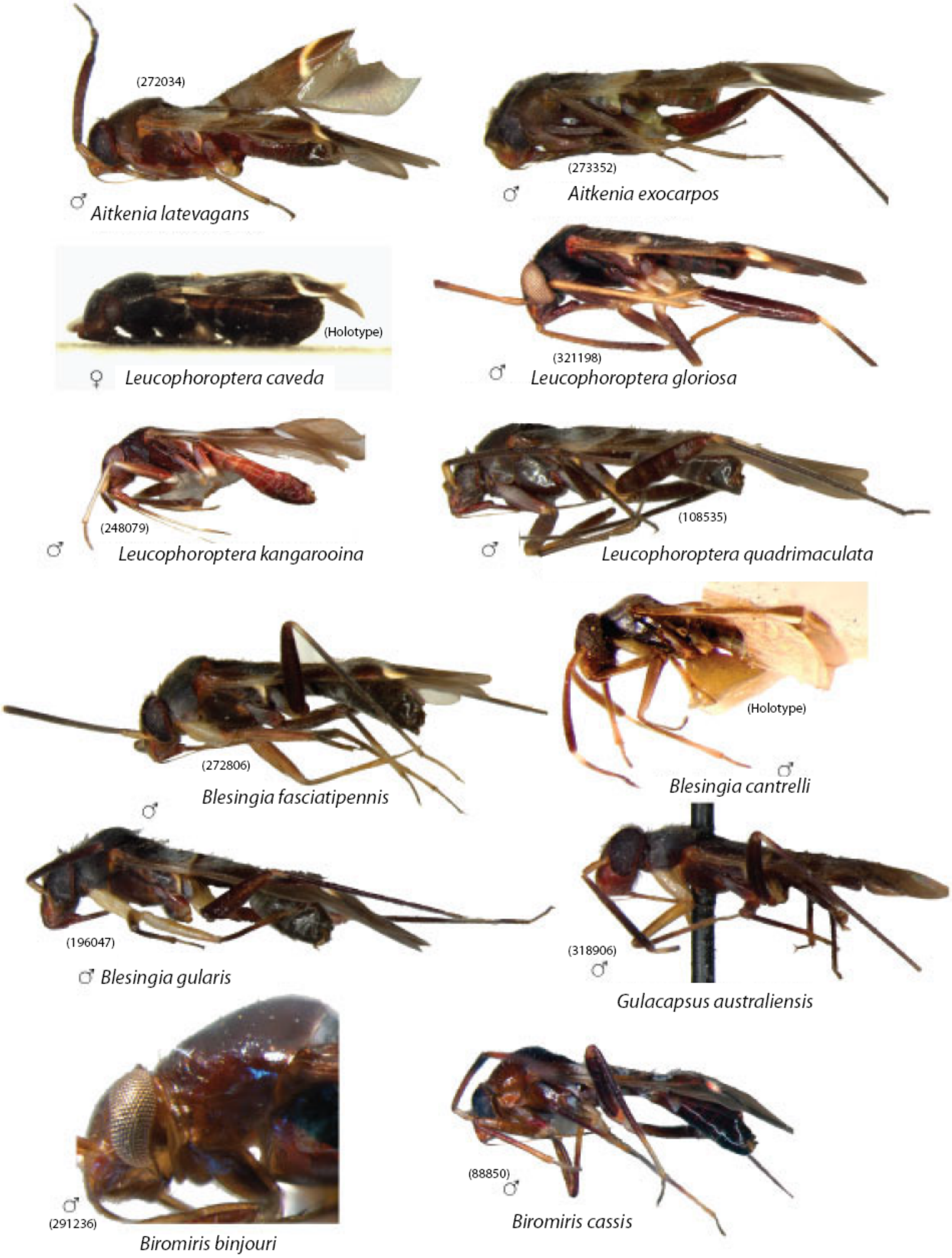

(302024)
♂
(302027)
♀
Johnstonsoni phalarosus
(302042)
♂
(302043)
♀
Missanos gulafuscus
(318947)
♂
Ctypomiris solomonensis

Figure 3-9. Lateral views of *Aitkenia* spp., *Leucophoroptera* spp., *Blesingia* spp., *Gulacapsus* spp., and *Biromiris* spp. Images of *Blesingia cantrelli* are of the holotype. (Image of *B. cantrelli* is courtesy of the Queensland Museum).



(272034)
♂ Aitkenia latevagans
(273352)
♂ Aitkenia exocarpos
(Holotype)
♀ Leucophoroptera caveda
(321198)
♂ Leucophoroptera gloriosa
(248079)
♂ Leucophoroptera kangarooina
(108535)
♂ Leucophoroptera quadrimaculata
(272806)
Blesingia fasciatipennis
♂
(Holotype)
♂
Blesingia cantrelli
(196047)
♂ Blesingia gularis
(318906)
♂
Gulacapsus australiensis
♂
(291236)
Biromiris binjouri
(88850)
♂
Biromiris cassis

Figure 3-10. Male genitalia of *Aitkenia spp*.

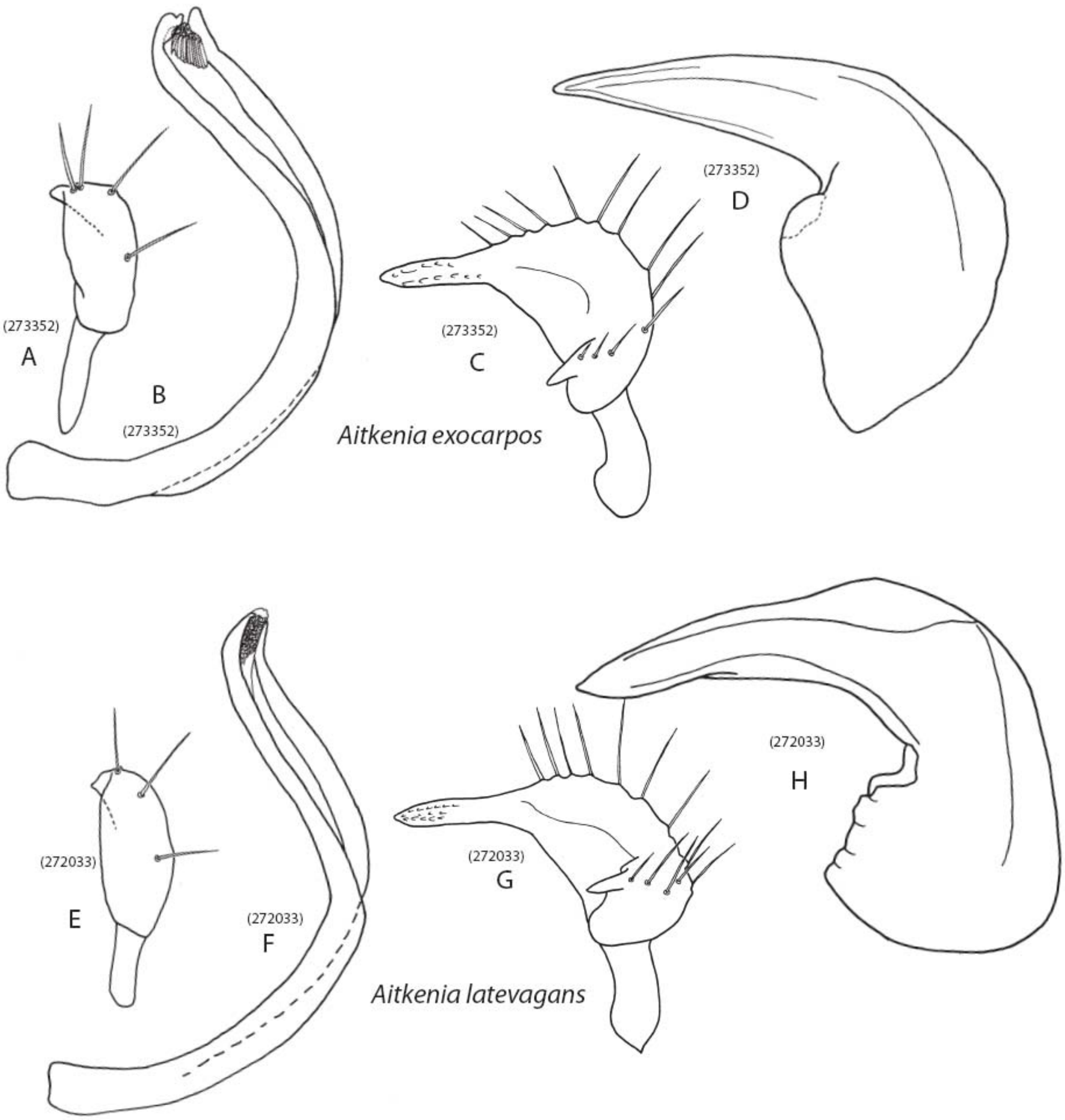
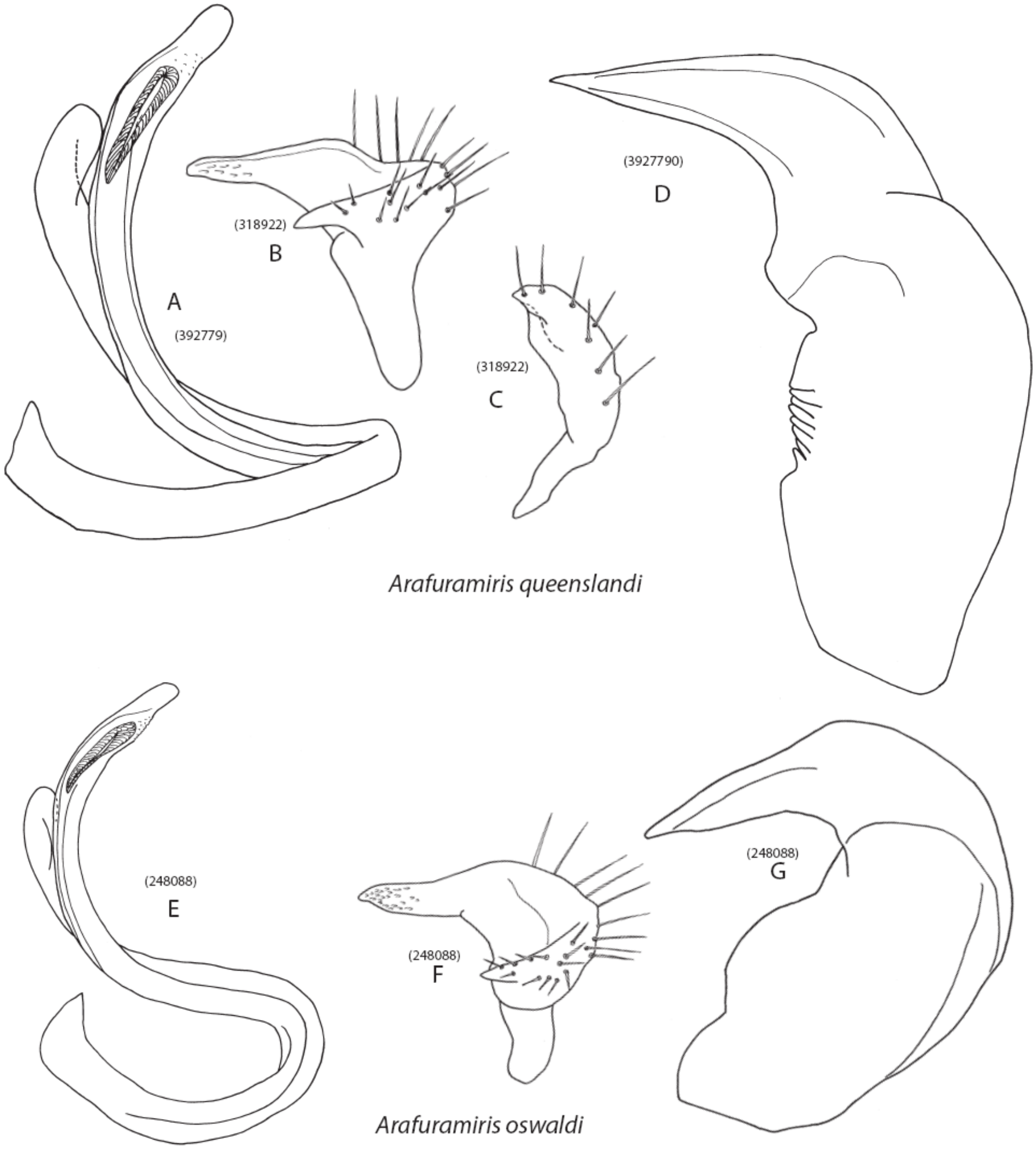

(273352)
A
B
(273352)
(273352)
C
(273352)
D
Aitkenia exocarpos
(272033)
E
(272033)
F
(272033)
G
(272033)
H
Aitkenia latevagans

Figure 3-11. Male genitalia of *Arafuramiris spp*.



Arafuramiris queenslandi

Arafuramiris oswaldi

Figure 3-12. Male genitalia of *Ausejanus spp*.

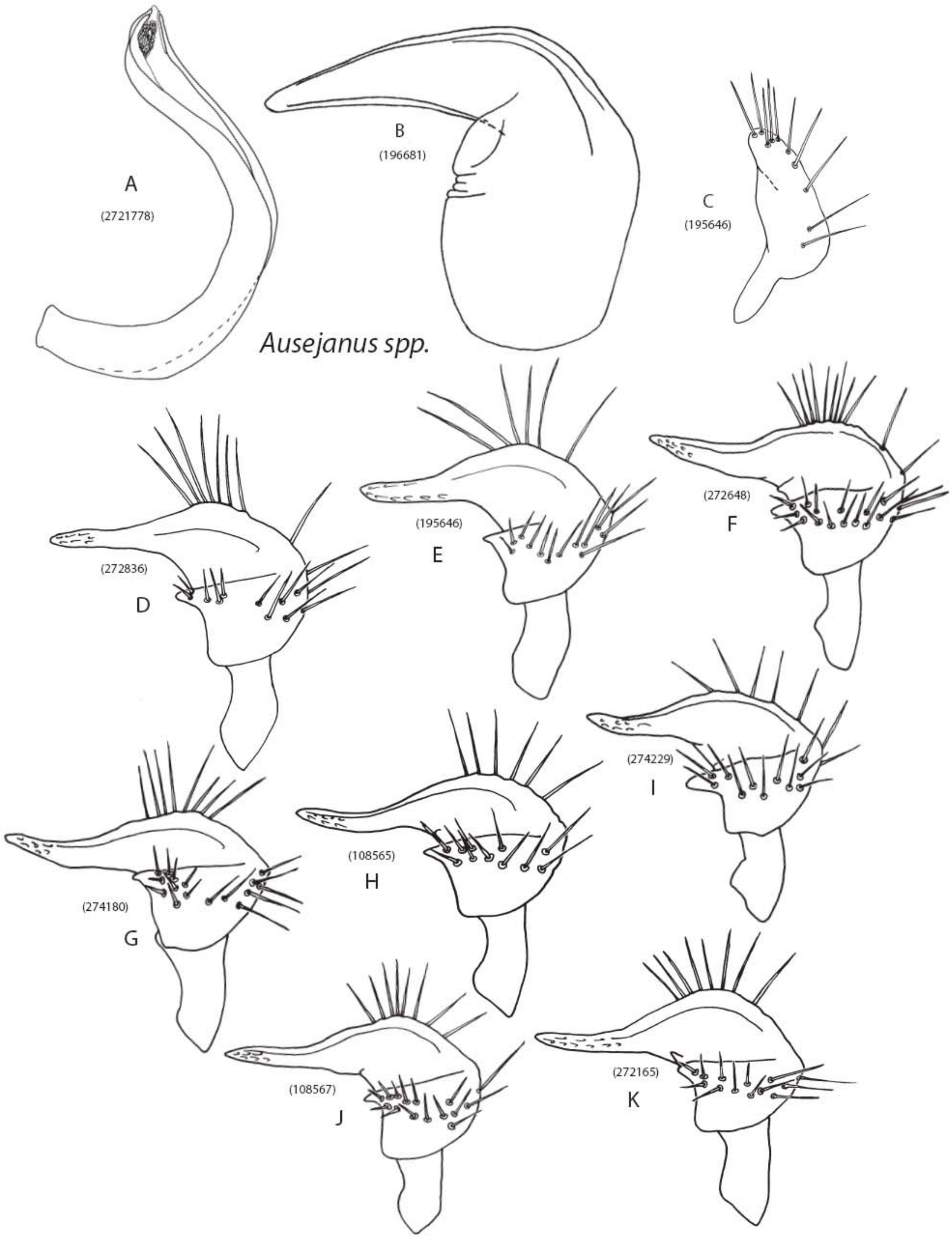

A
(2721778)
B
(196681)
C
(195646)
Ausejanus spp.
(272836)
D
(195646)
E
(272648)
F
(274229)
I
(274180)
G
(108565)
H
(108567)
J
(272165)
K

Figure 3-13. Male genitalia of *Ausejanus spp*.

Ausejanus spp. (continued)

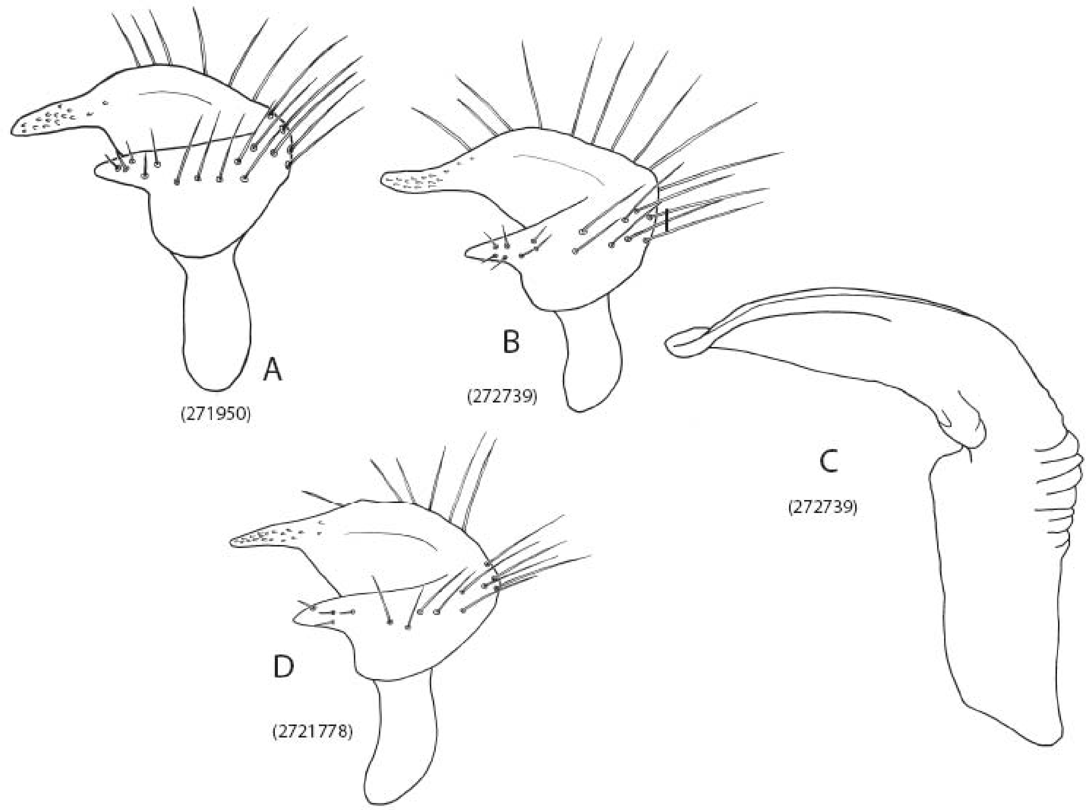


Figure 3-14. Male genitalia of *Austrodapus spp*.

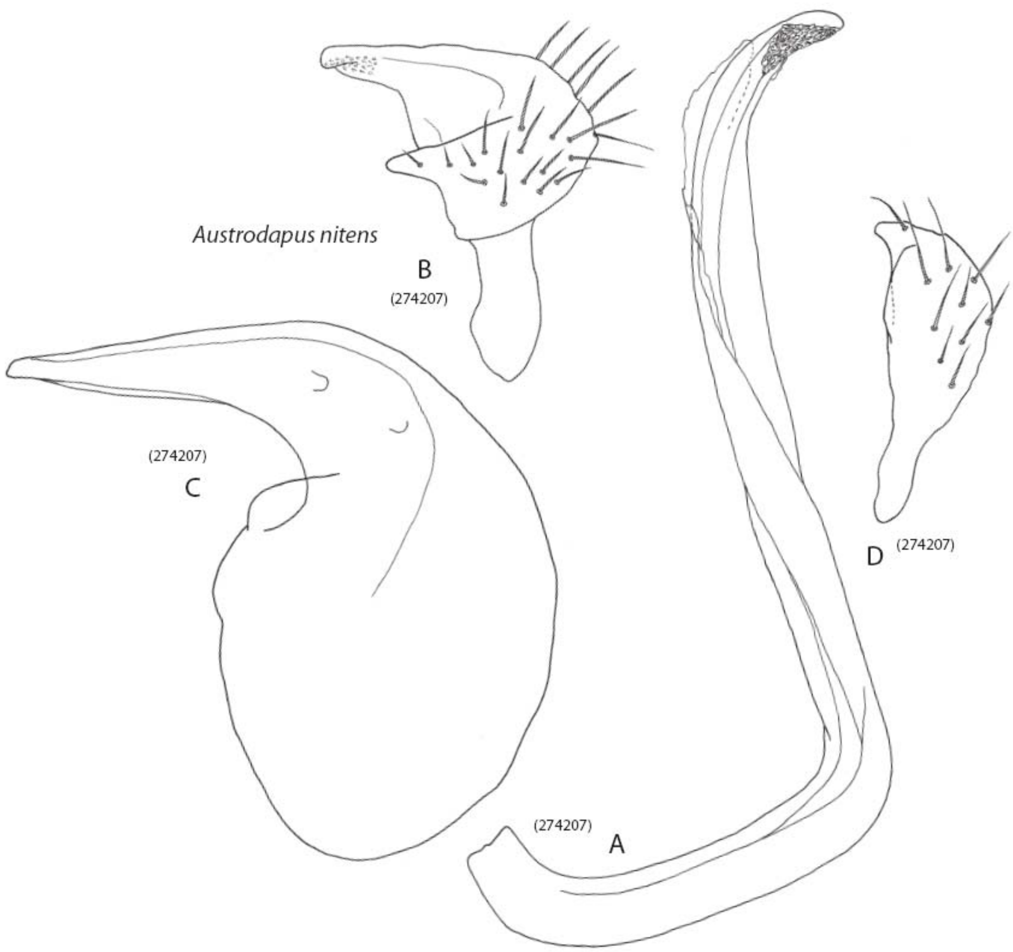
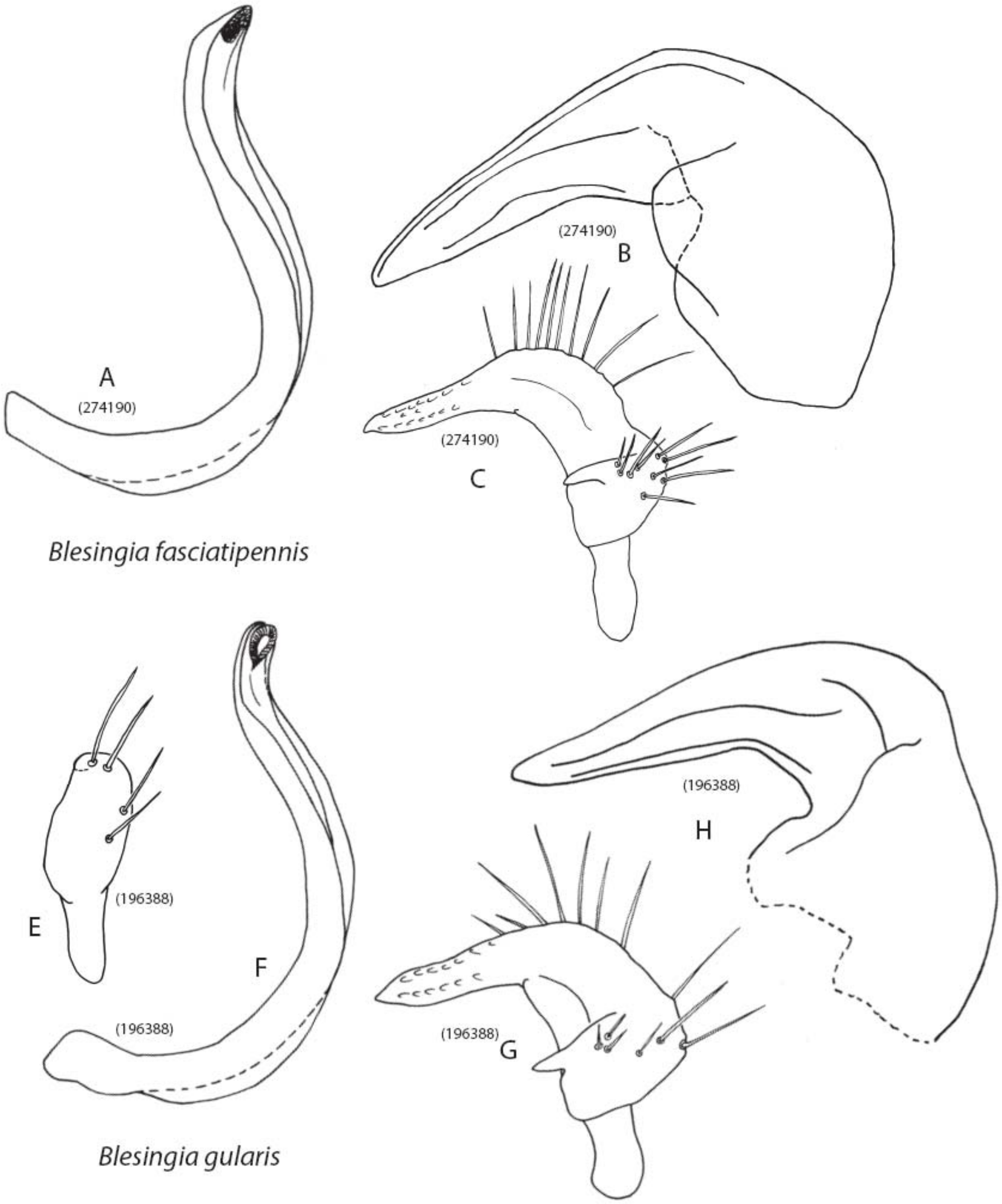

Austrodapus nitens
B
(274207)
(274207)
C
D
(274207)
(274207)
A

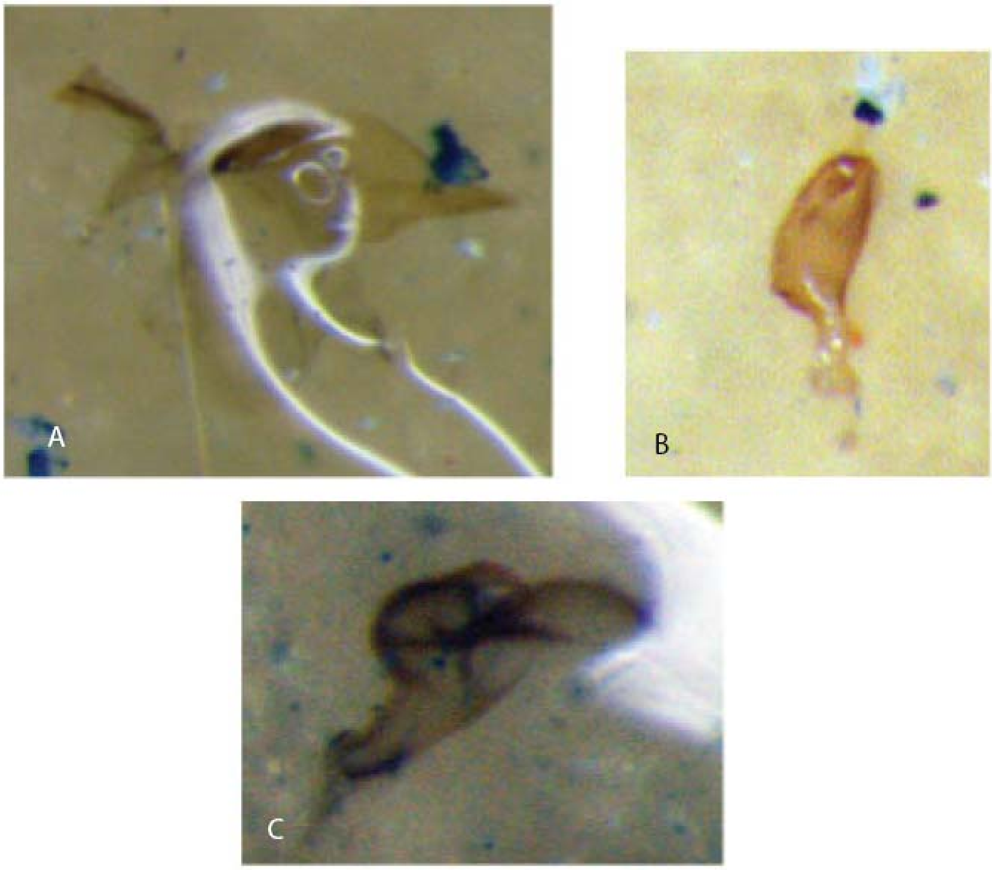
Figure 3-15. Male genitalia of *Blesingia spp*.



Blesingia fasciatipennis

Blesingia gularis

Figure 3-16. Images of male genitalia of *Blesingia tamborinea* glued to card with holotype.



Blesingia tamborinae

Figure 3-17. Male genitalia of *Collessicoris spp*.

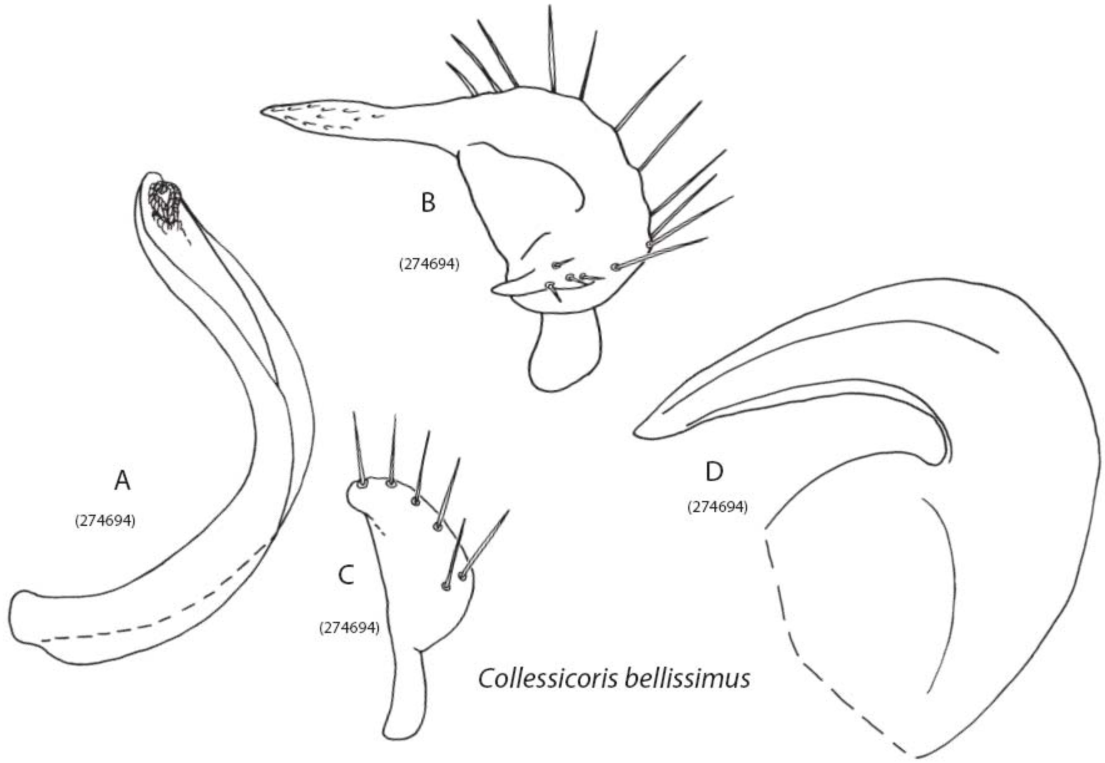
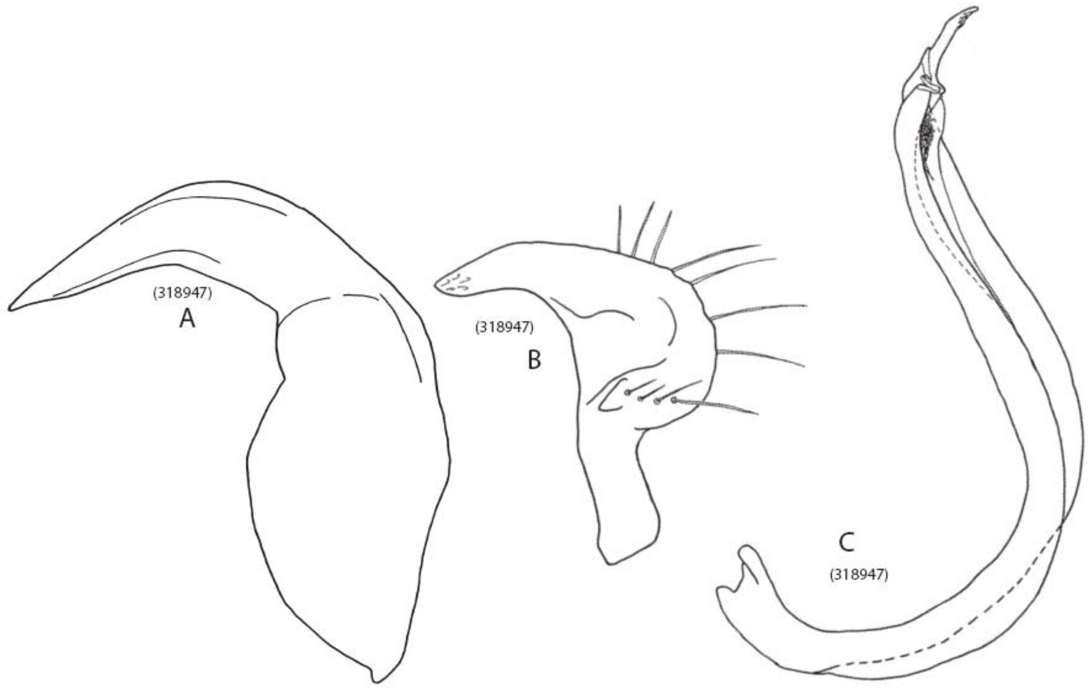

A
(274694)
B
(274694)
C
(274694)
D
(274694)
Collessicoris bellissimus

Figure 3-18. Male genitalia of *Ctypomiris solomonensis*.



Ctypomiris solomonensis

Figure 3-19. Male genitalia of *Gulacapsus australiensis*.

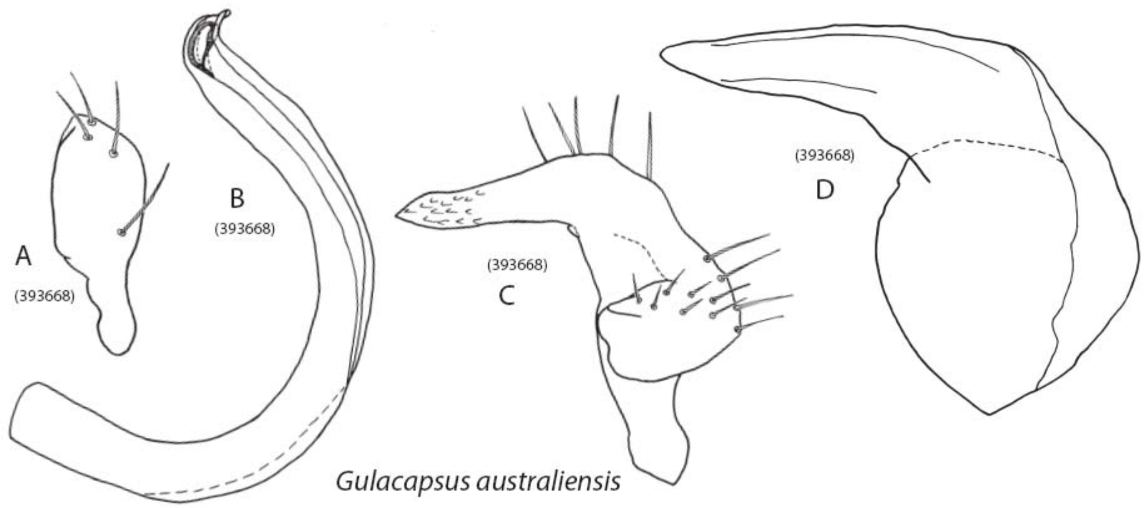
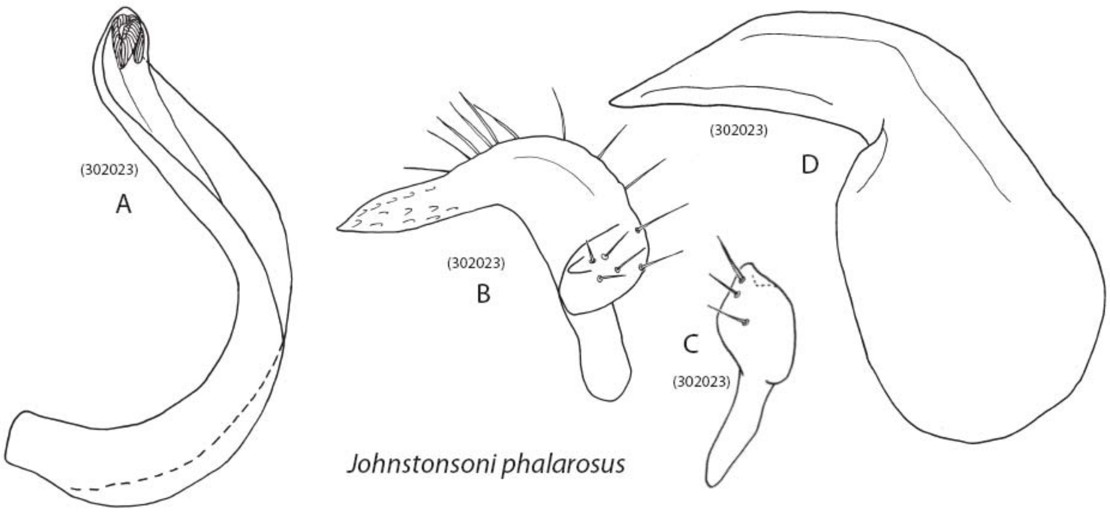
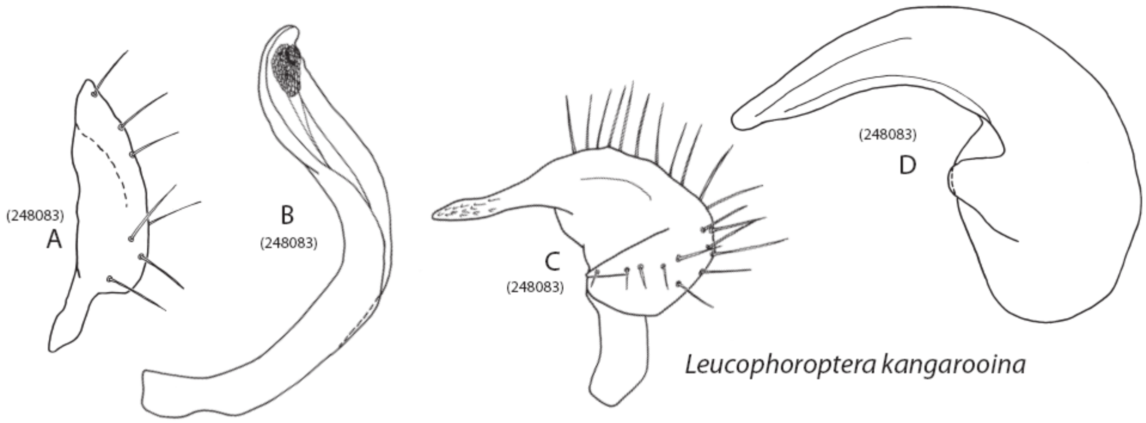

A
(393668)
B
(393668)
C
(393668)
D
(393668)
Gulacapsus australiensis

Figure 3-20. Male genitalia of *Johnstonsoni* spp.



Johnstonsoni phalarosus

Figure 3-21. Male genitalia of *Leucophoroptera* spp.


(248083)
A
B
(248083)
C
(248083)
(248083)
D
Leucophoroptera kangarooina

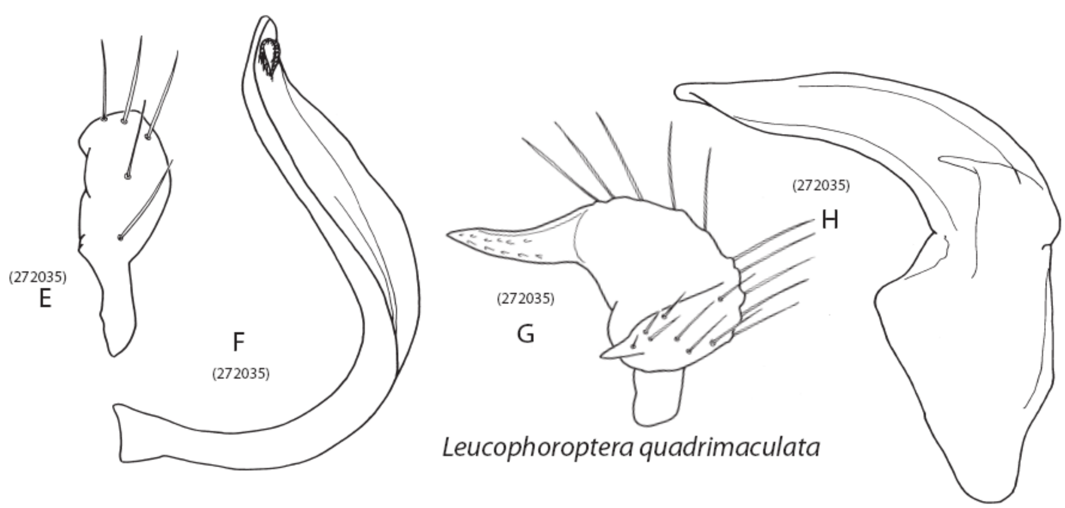
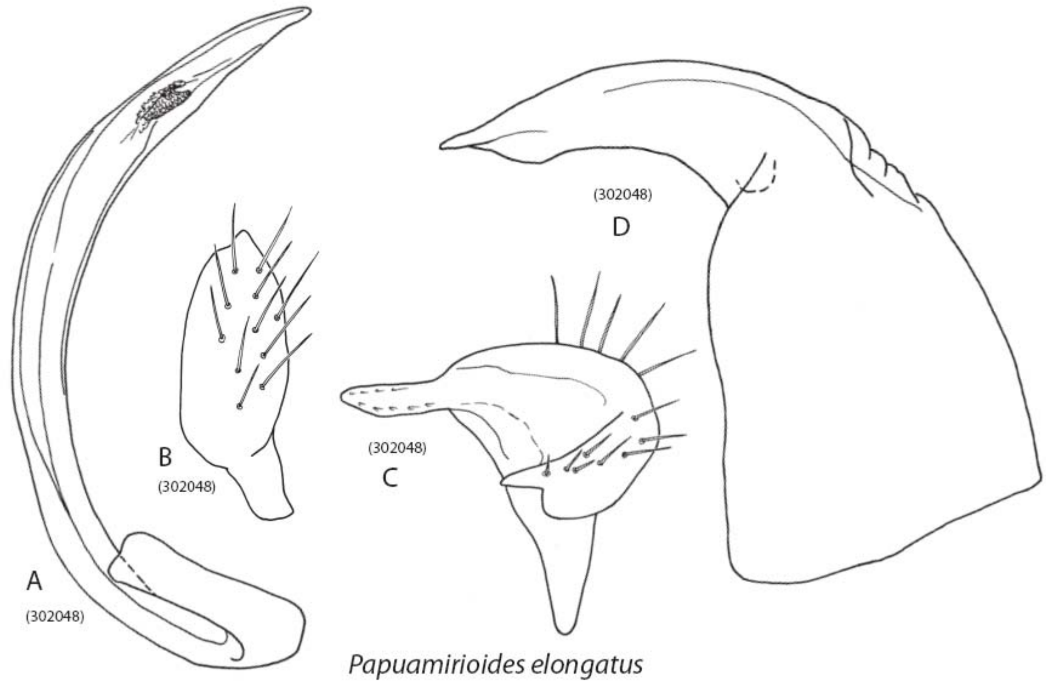
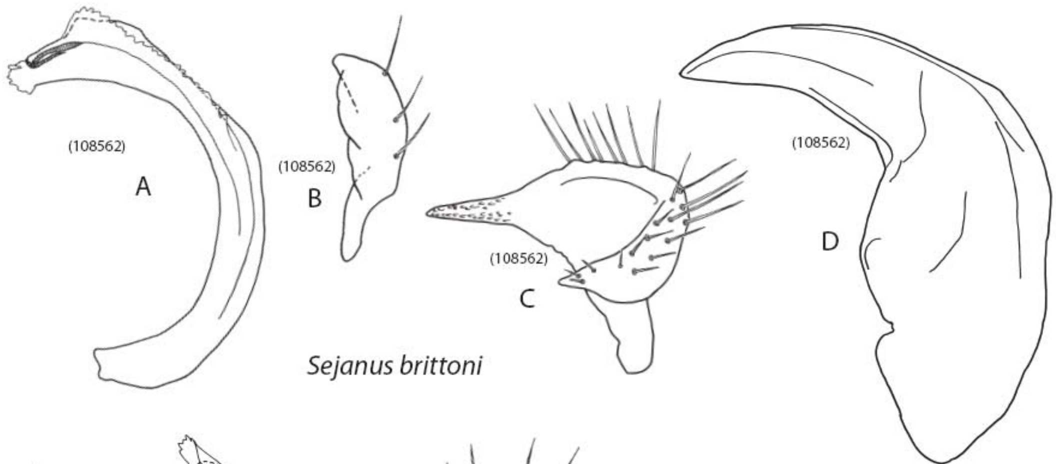

(272035)
E
F
(272035)
(272035)
G
(272035)
H
Leucophoroptera quadrimaculata

Figure 3-22. Male genitalia of *Papuamiroides* spp.

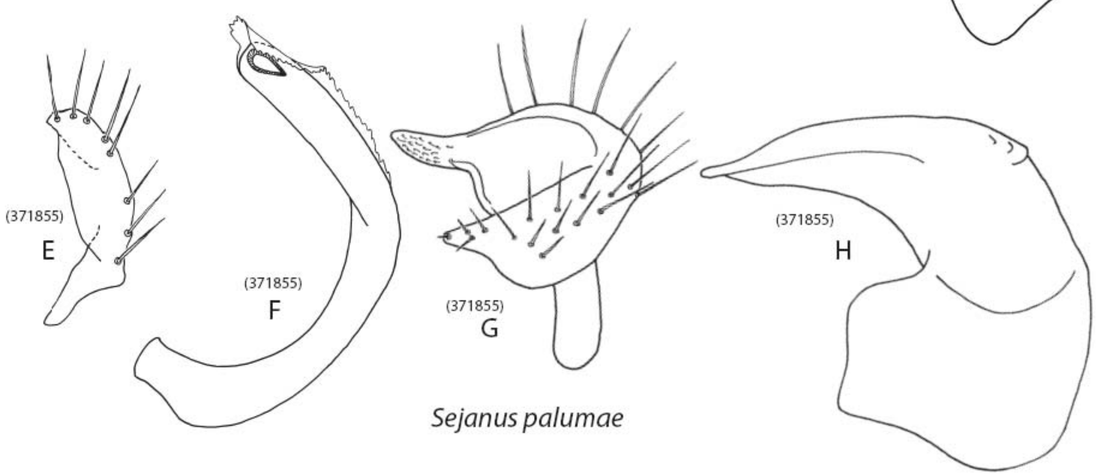


Papuamirioides elongatus

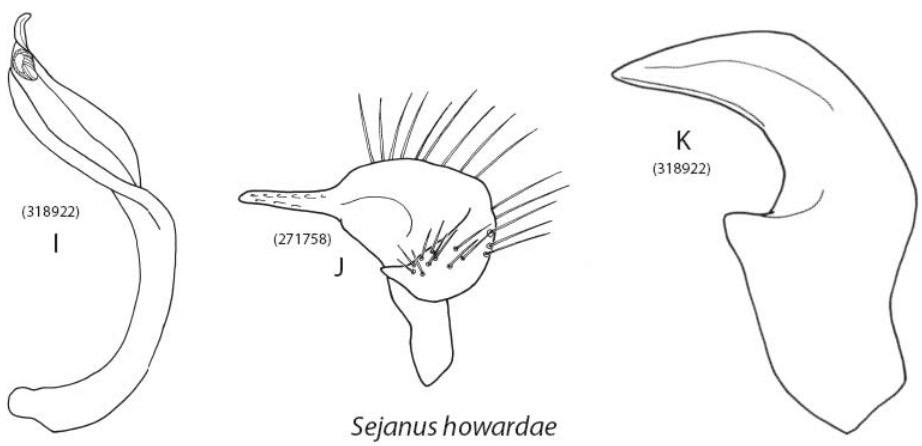
Figure 3-23. Male genitalia of *Sejanus* spp.



Sejanus brittoni

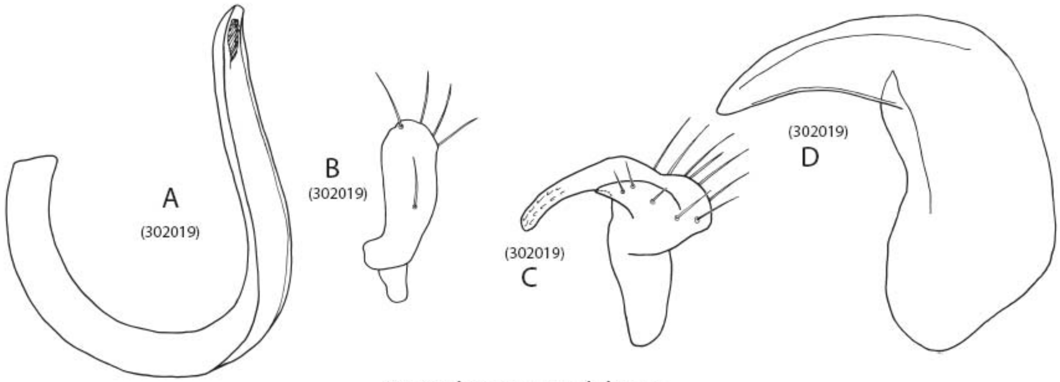


Sejanus palumae



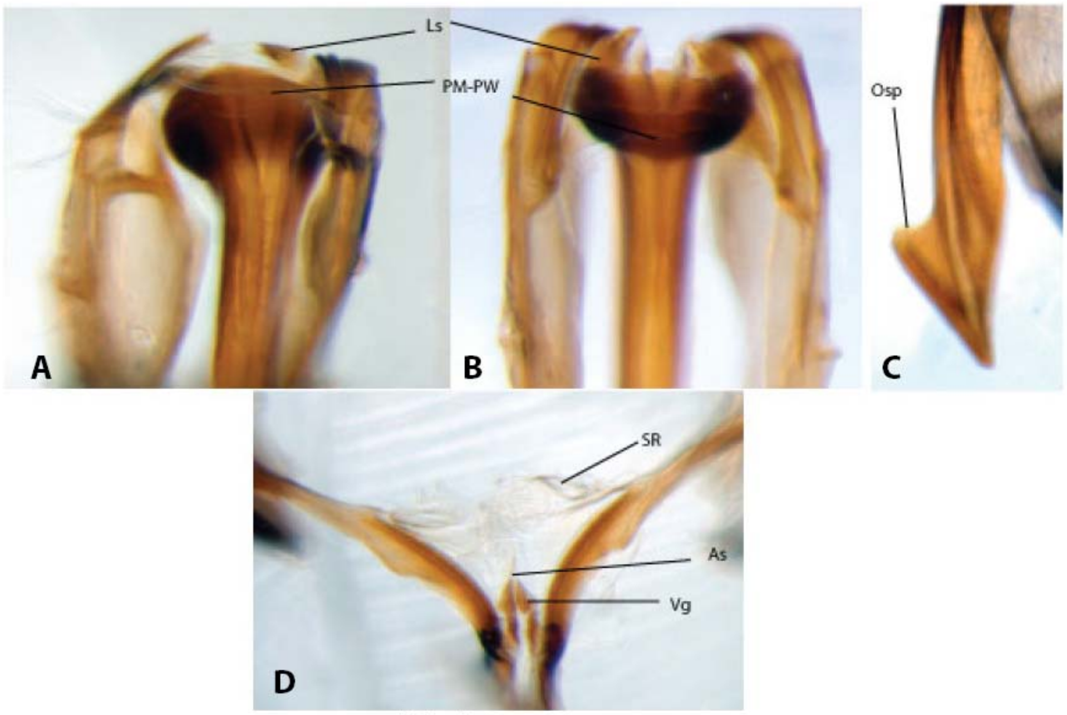
Sejanus howardae

Figure 3-24. Male genitalia of *Waterhouseana delicates*.

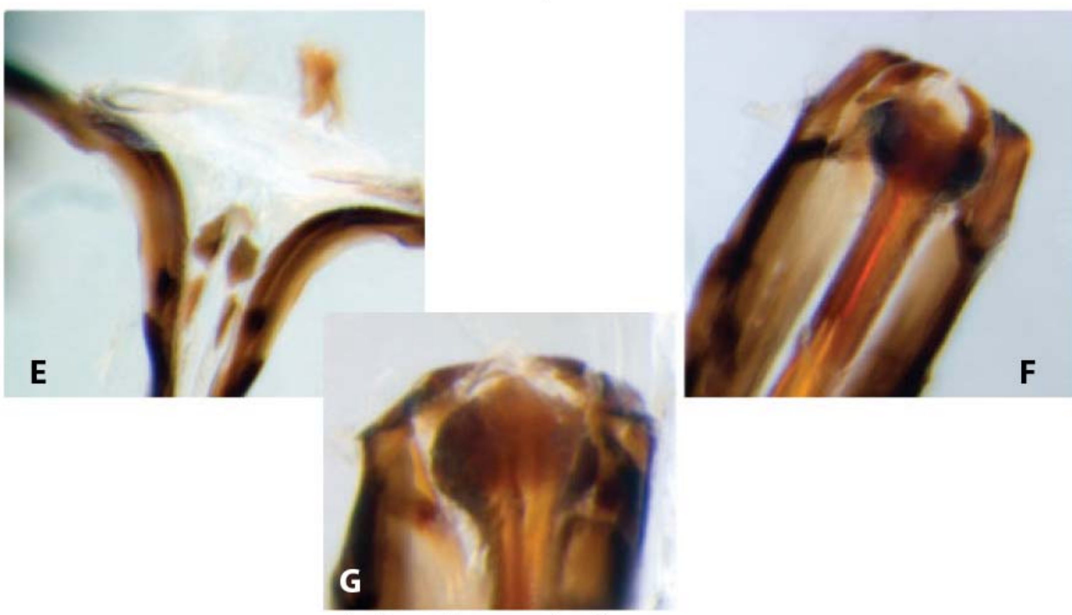


Waterhouseana delicate

Figure 3-25. Female genitalia of *Aitkenia* spp. and *Arafuramiris* spp. Ls= lateral sclerites; PM-PW= Posterior margin sclerite on the posterior wall; Osp= ovipositor spine; SR= sclerotized rings; As = anterior sclerite; Vg = vestibular gonopophysis.

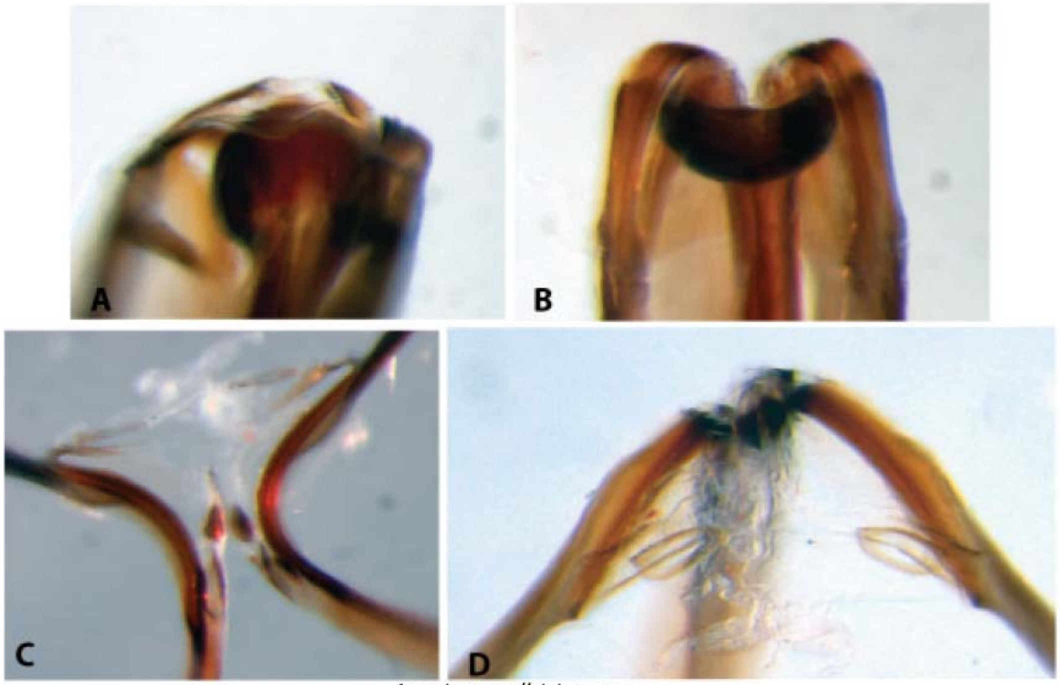


Aitkenia exocarpos (273340)

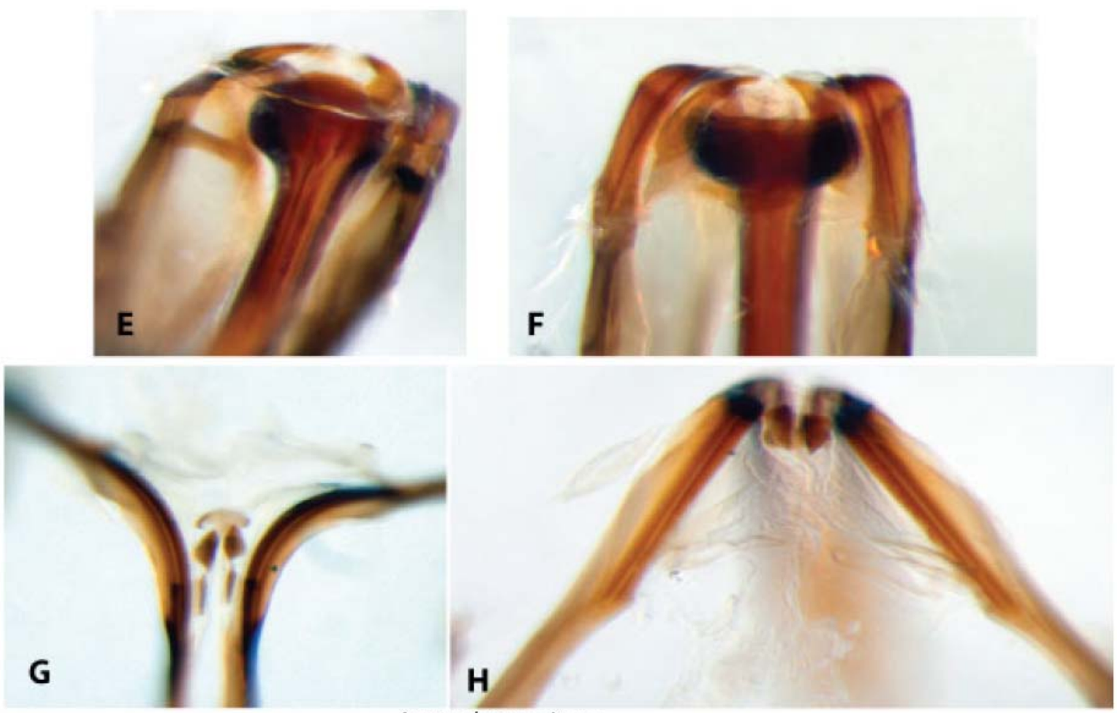


Arafuramiris queenslandi (392774)

Figure 3-26. Female genitalia of *Ausejanus* spp. and *Austrodapus* spp.

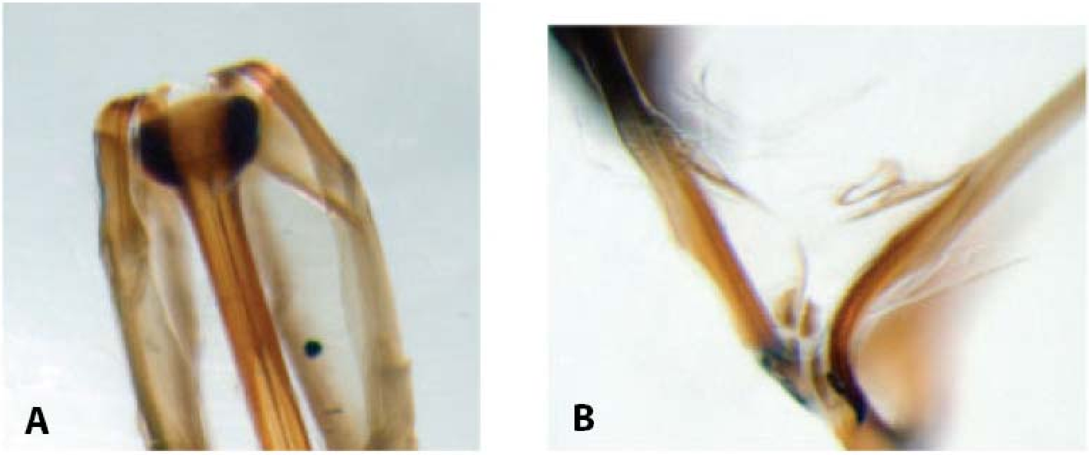


Ausejanus albisignatus (274240)

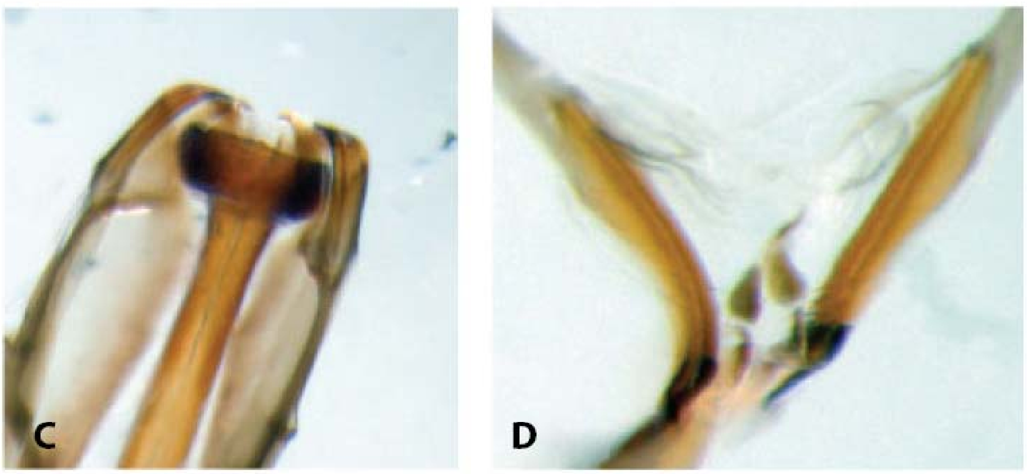


Austrodapus nitens (195989)

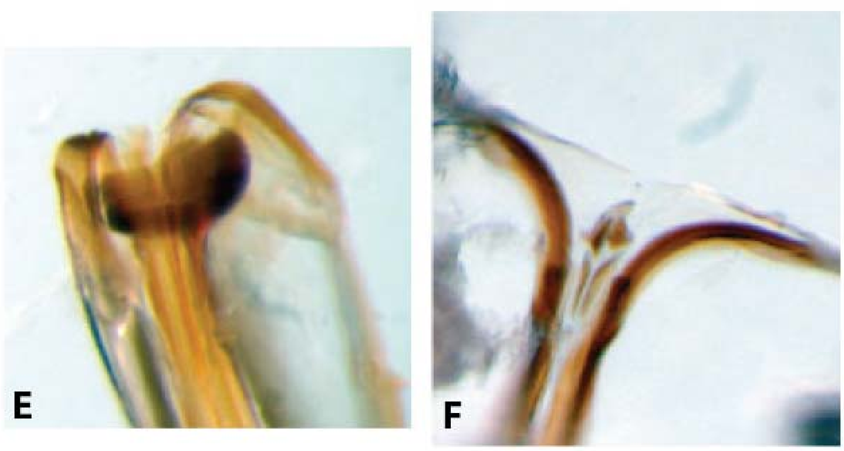
Figure 3-27. Female genitalia of *Blesingia* spp., *Collessicoris* spp., and *Leucophoroptera* spp.



Blesingia gularis (195389)



Collessicoris bellissimus (274693)



Leucophoroptera quadrimaculata (393264)

APPENDIX 4

Table 1-1. Taxa and character partitions used in the combined morphological and molecular phylogenetic analyses. Sequences obtained from Genbank are demarcated with an asterisk (*). Genbank accession numbers for newly sequenced taxa and taxa not sequenced by the author are listed in Appendix 1. Taxa new to science with informative characters but without available names are indicated with “MS”, whereas taxa identified to genus but not species are indicated with “sp.”.

Table 1-1. Taxa and character partitions used in phylogenetic analysis. Sequences obtained from Genbank are indicated with an *. Genbank accession numbers are listed in Appendix 1.

Taxon			Gene Region				
Subfamily	Tribe	Genus species	COII	16S	18S	28S	MORPH
Mirinae	Restheníni	Prepops fraternus	X	X	X	X	X
Mirinae	Mirini	Polymerus sp.*	X	X	X	X	X
Mirinae	Herdoniini	Cyphopelta modesta*	X	X	X	X	X
Deraeocorinae	Deraeocorini	Deraeocoris sp.*	X	X	X	X	X
Orthotylinae	Nichomachini	Nichomachus sp.	X	X	X	X	X
Orthotylinae	Halticini	Halticus bractatus	X	X	X	X	X
Orthotylinae	Orthotylini	Orthotylus rossi	X	X	X	X	X
Orthotylinae	Orthotylini	Blepharidopterus chlorionis	X	X	X	X	X
Phylinae	Hallodapini	Coquillettia sp.*	X			X	X
Phylinae	Hallodapini	Madagascar Hallodopine			X	X	X
Phylinae	Hallodapini	Teleorhinus sp.*	X	X	X	X	X
Phylinae	Hallodapini	Hallodapus sp.*		X	X		X
Phylinae	Hallodapini	Cremnocephalus alpestris	X	X	X	X	X
Phylinae	Hallodapini	Cyrtopeltocoris sp.	X	X	X	X	X
Phylinae	Hallodapini	Alloeomimus muiri	X	X	X	X	X
Phylinae	Auricillocorini	Cleotomiroides ferrugineus	X	X	X	X	X
Phylinae	Auricillocorini	Cleotomiris schneirlai		X	X		X
Phylinae	Pilophorini	Hypseloecus munroi	X	X	X	X	X
Phylinae	Pilophorini	Pilophorus maculata	X	X	X	X	X
Phylinae	Pilophorini	Pilophorus alstoni	X	X	X	X	X
Phylinae	Pilophorini	Pilophorus juniperi		X	X	X	X
Phylinae	Pilophorini	Pilophorus discretus*	X	X	X	X	X
Phylinae	Pilophorini	Pilophorus gracilis*	X	X	X		X
Phylinae	Pilophorini	Pilophorus uhleri*	X	X	X	X	X
Phylinae	Pilophorini	Pilophorus piceicola*	X	X		X	X
Phylinae	Leucophoropterini	Sejanus albisignatus	X	X	X	X	X
Phylinae	Leucophoropterini	Ausejanus tiramisu	X	X	X	X	X
Phylinae	Leucophoropterini	Sejanus mcdonaldi	X	X	X	X	X
Phylinae	Leucophoropterini	Sejanus tasmaniae	X	X	X	X	X
Phylinae	Leucophoropterini	Sejanus vividus	X	X	X	X	X
Phylinae	Leucophoropterini	Ausejanus arve	X	X	X		X
Phylinae	Leucophoropterini	Ausejanus iris			X	X	X
Phylinae	Leucophoropterini	Ausejanus minutus		X	X	X	X
Phylinae	Leucophoropterini	Sejanus femoralis		X	X	X	X
Phylinae	Leucophoropterini	Sejanus uestaustraliensis			X	X	X
Phylinae	Leucophoropterini	Sejanus neboissi	X		X	X	X
Phylinae	Leucophoropterini	Sejanus luteoelytrus		X	X	X	X
Phylinae	Leucophoropterini	Sejanus meridionalis	X	X	X		X
Phylinae	Leucophoropterini	Ausejanus cordatus		X	X	X	X
Phylinae	Leucophoropterini	Sejanus brittoni	X	X	X	X	X
Phylinae	Leucophoropterini	Sejanus juglandis		X			X
Phylinae	Leucophoropterini	Sejanus potanini	X	X	X	X	X
Phylinae	Leucophoropterini	Dilatops fici	X	X	X	X	X
Phylinae	Leucophoropterini	Karoocapsus trifasciatus		X	X	X	X
Phylinae	Leucophoropterini	Karoocapsus middelburgensis	X	X	X	X	X

Table 1-1. continued.

Taxon			Gene Region				
Subfamily	Tribe	Genus species	COII	16S	18S	28S	MORPH
Phylinae	Leucophoropterini	Karoocapsus pulchrus	X	X		X	X
Phylinae	Leucophoropterini	Papuamimus maii		X		X	X
Phylinae	Leucophoropterini	Arafuramiris dreikikir		X	X	X	X
Phylinae	Leucophoropterini	Leucophoroptera fasciatipennis		X	X		X
Phylinae	Leucophoropterini	Leucophoroptera quadrimaculata		X	X	X	X
Phylinae	Leucophoropterini	Blesingia gularis			X	X	X
Phylinae	Leucophoropterini	Collessicoris bellissimus		X	X		X
Phylinae	Leucophoropterini	Tytthus vagus		X	X	X	X
Phylinae	Leucophoropterini	Tytthus chinensis	X	X	X	X	X
Phylinae	Leucophoropterini	Abuyogocoris sp.	X	X	X	X	X
Phylinae	Phylini	Schuhistes lyciae	X	X	X	X	X
Phylinae	Phylini	Schuhistes lekkersingia		X	X	X	X
Phylinae	Phylini	Hamatophylus guttulosus	X	X	X	X	X
Phylinae	Phylini	Larinocerus sp.*	X	X	X	X	X
Phylinae	Phylini	Atractotomus acaciae*	X	X	X	X	X
Phylinae	Phylini	Atractotomus magnicornis			X	X	X
Phylinae	Phylini	Amblytylus nasutus*	X	X	X	X	X
Phylinae	Phylini	Amblytylus glaucicollis		X	X	X	X
Phylinae	Phylini	Chlamydatus becki*	X	X	X		X
Phylinae	Phylini	Chlamydatus pulicarius			X	X	X
Phylinae	Phylini	Oligotylus carneatus	X	X	X	X	X
Phylinae	Phylini	Oligotylus purshiae*	X	X	X		X
Phylinae	Phylini	Oligotylus ceanothi*	X	X	X	X	X
Phylinae	Phylini	Oligotylus cercocarpicola*	X	X	X		X
Phylinae	Phylini	Criocoris saliens*	X	X	X	X	X
Phylinae	Phylini	Europiella artemisiae*	X	X	X	X	X
Phylinae	Phylini	Megalopsallus humeralis*	X	X	X	X	X
Phylinae	Phylini	Megalopsallus froeschneri*	X	X	X	X	X
Phylinae	Phylini	Megalopsallus pallipes*	X	X	X		X
Phylinae	Phylini	Plagiognathus chrysanthemi*	X	X		X	X
Phylinae	Phylini	Plagiognathus politus*	X	X	X	X	X
Phylinae	Phylini	Phyllopidea picta*	X	X			X
Phylinae	Phylini	Rhinacloa forticornis*	X	X	X	X	X
Phylinae	Phylini	Tuxedo drakei	X	X	X	X	X
Phylinae	Phylini	Eminoculus rugosus		X	X	X	X
Phylinae	Phylini	Pseudosthenarus sp.	X	X	X	X	X
Phylinae	Phylini	Spanagonicus albifasciatus		X	X	X	X
Phylinae	Phylini	Keltonia tuckeri		X	X	X	X
Phylinae	Phylini	Holpomachidea consors	X		X	X	X
Phylinae	Phylini	Wallabicoris pityroides	X		X	X	X
Phylinae	Phylini	Ancoraphylus carolus	X	X	X	X	X
Phylinae	Phylini	Exocarpocoris tantulus	X		X	X	X
Phylinae	Phylini	Polyozus australianus	X	X	X	X	X
Phylinae	Phylini	Phallospinophylus setosus		X	X	X	X
Phylinae	Phylini	Pygovepres vaccinicola		X	X	X	X
Phylinae	Phylini	Ranzovius mexicanus	X	X	X	X	X
Phylinae	Phylini	Decomia indochinensis	X	X	X	X	X
Phylinae	Phylini	Roburocoris maculosus	X	X	X	X	X

Table 1-1. continued.

Taxon			Gene Region				
Subfamily	Tribe	Genus species	COII	16S	18S	28S	MORPH
Phylinae	Phylini	Reuteroscopus ornatus			X	X	X
Phylinae	Phylini	Occidentodema mcfarlandi	X	X	X	X	X
Phylinae	Phylini	Campylomma sp.	X	X	X	X	X
Phylinae	Phylini	Denticulophallus adenandrae	X	X	X	X	X
Phylinae	Phylini	Coatonocapsus transvaalensis	X		X	X	X
Phylinae	Phylini	"South African species 689"	X	X	X	X	X
Phylinae	Phylini	Macrotylus intermedius	X	X	X	X	X
Phylinae	Phylini	Psallovius piceicola*	X	X	X	X	X
Phylinae	Phylini	Semium hirtum*	X	X	X		X
Phylinae	Phylini	Phymatopsalus sp.*	X	X	X	X	X
Phylinae	Phylini	Pseudophylus sp.†		X	X	X	

Table 1-2. Morphological characters and character states used in the combined analysis. CI and RI values for the characters were calculated subsequently using PAUP 4.0 based on character state data optimized on the parsimony consensus tree and shown in [bold], respectively. All morphological characters are additive unless indicated with an *.

Table 1-2. Morphological characters and character states (characters are additive unless otherwise noted). CI and RI values for characters from the parsimony consensus-tree are shown in [brackets], respectively. All characters are ordered unless indicated with an asterisk (*) as unordered.

VESTITURE AND SURFACE TEXTURE.

[1] Hemelytra surface shine: (0) shiny; (1) matte. [CI: 0.071, RI: 0.316]
[2] Hemelytra transparency: (0) opaque to translucent; (1) transparent. [CI: 0.500, RI: 0.500]
[3] Hemelytra punctation: (0) absent; (1) present. [CI: 0.500, RI: 0.750]
[4]* Reflective or opalescent patches on the hemelytra: (0) no reflective or opalescent patches; (1) reflective patches; (2) opalescent patches. [CI: 0.286, RI: 0.667]
[5]* Dorsum setae: (0) scale-like; (1) simple; (2) sericeous. [CI: 0.667, RI: 0.000]
[6] Scutellum scales: (0) absent; (1) present. [CI: 0.143, RI: 0.538]
[7] Hemelytra setae distribution: (0) scattered; (1) banded/defined. [CI: 1.00, RI: 0/0]
[8] Setae position: (0) flat to weakly reflexed; (1) erect. [CI: 0.100, RI: 0.182]
[9] Patch of scales on thorax: (0) absent; (1) present, covering most of thorax; (2) preset, in patches. [CI: 0.182, RI: 0.571]
[10] Scales on abdomen: (0) absent; (1) present. [CI: 0.167, RI: 0.583]
[11] Abdomen scale distribution: (0) covering all abdominal segments; (1) in patches. [CI: 0.500, RI: 0.667]
[12] Contrasting setae patterning on hemelytra: (0) absent, hemelytra setae of one type; (1) transverse fascia of contrasting setae/scales; (2) setae/scales focused on corium; (3) setae/scales focused on clavus. [CI: 0.600, RI: 0.750]
[13] Black setae: (0) absent; (1) present. [CI: 0.333, RI: 0.000]
[14] Metafemora fringe: (0) absent; (1) present [CI: 1.000, RI: 0.000]
[15] Metafemora spicules on dorsal surface of metafemora: (0) absent; (1) present. [CI: 0.500, RI: 0.667]
[16]* Pronotal punctation: (0) smooth; (1) punctate; (2) rugulose. [CI: 0.118, RI: 0.000]

HEAD AND THORACIC STRUCTURES.

[17] Head shape when viewed laterally: (0) eyes partially obscure anterior of pronotum; (1) posterior margin of eyes parallel to anterior margin of pronotum; (2) eyes strongly exerted from anterior margin of pronotum. [CI: 0.080, RI: 0.425]
[18] Back of head: (0) upturned margin; (1) flat; (2) declining. [CI: 0.125, RI: 0.462]
[19] Mouthpart position: (0) mouthparts originating at of just before anterior margin of eyes; (1) mouthparts originating relatively far anteriorly from the frons and anterior margin of the eyes [CI: 0.167, RI: 0.167]
[20] Total labial length: (0) apex to fore-coxae; (1) apex to mid-coxae; (2) apex to hind-coxae; (3) apex past hind-coxae. [CI: 0.087, RI: 0.160]
[21] Labrum morphology: (0) slender, sinuous; (1) laterally flattened, height thinner than first labial segment. [CI: 0.100, RI: 0.250]
[22] Eye occupancy when head is viewed laterally: (0) entire; (1) greater than 1/2+ height of face; (2) less than 1/2 height of head. [CI: 0.333, RI: 0.000]
[23] Cyberial muscle attachments: (0) visible; (1) not visible. [CI: 0.059, RI: 0.143]
[24] Eye shape relative to vertex: (0) eyes flush with vertex; (1) eyes bulging/curved from vertex; (2) eyes stylate. [CI: 0.042, RI: 0.500]
[25] Relative width of vertex: (0) vertex less than 1/3 width of head; (1) vertex greater than 1/3 width of head but less than ½ width; (2) vertex greater than ½ head width. [CI: 0.250, RI: 0.500]
[26] Vertex shape: (0) concave; (1) flat; (2) convex; (3) ridged. [CI: 0.053, RI: 0.514]
[27] Longitudinal head view: (0) less than 1/3 of head below eyes; (1) greater than 1/3 of head below eyes. [CI: 0.125, RI: 0.176]
[28] Post-ocular region: (0) absent; (1) present. [CI: 0.088, RI: 0.326]
[29] Frons relative to clypeus: (0) frons rounded, clypeus not strongly exerted; (1) clypeus weakly exerted, not flush with frons; (2) clypeus projecting, frons obsolete [CI: 0.167, RI: 0.444]
[30] Gula: (0) flat; (1) rounded, bulging; (2) keel-like. [CI: 0.250, RI: 0.250]
[31] Maxillary plate extending to cover the 1st labial segment: (0) 1st labial segment uncovered; (1) extends to cover first labial segment [CI: 0.250, RI: 0.000]

Table 1-2. continued.

[32] Anterior pronotal margin morphology relative to posterior margin of vertex: (0) straight margin between back of vertex and pronotum; (1) vertex curves into anterior portion of pronotum. [CI: 0.059, RI: 0.059]
[33]* Antennal segment 1 morphology: (0) inverted bottle-shaped; (1) tubular; (2) cup-like; (3) propeller-blade-like. [CI: 0.286, RI: 0.167]
[34]* Antennal segment 2 morphology: (0) slender, almost same width as rest; (1) significantly thicker than the rest of segments; (2) club-like; (3) balloon/football-like. [CI: 0.167, RI: 0.605]
[35] Antennal segment 2 curvature: (0) straight; (1) curved. [CI: 0.125, RI: 0.125]
[36] Pronotal collar: (0) present; (1) absent. [CI: 0.125, RI: 0.650]
[37] Pronotal collar morphology: (0) rounded; (1) flat; (2) upturned anterior margin. [CI: 0.667, RI: 0.800]
[38] Pronotal carina: (0) present; (1) absent. [CI: 0.500, RI: 0.000]
[39] Prothorax elevation: (0) not elevated or swollen; (1) elevated and swollen. [CI: 0.167, RI: 0.444]
[40] Lateral margins of the anterior portion of pronotum: (0) contiguous, not obviously narrowed compared to posterior portion of pronotum; (1) narrowed, with obvious difference between lateral pronotal angles of anterior and posterior portions of pronotum. [CI: 0.143, RI: 0.250]
[41] Anterior and posterior pronotum demarcation: (0) no demarcation; (1) weakly demarcated; (2) constricted between anterior and posterior portions. [CI: 0.143, RI: 0.294]
[42] Posterior pronotal margin: (0) straight to weakly convex; (1) convex; (2) emarginate at the midline. [CI: 0.111, RI: 0.238]
[43] Calli: (0) Not visible; (1) weakly visible to prominent. [CI: 0.043, RI: 0.241]
[44] Humeral angles: (0) not elevated; (1) shoulder-like. [CI: 0.500, RI: 0.000]
[45] Scent gland size: (0) >1/2 total area of mesepisternum; (1) greater than one third of total area of scent gland but less than ½ area; (2) scent gland is less than one third total area mesepisternum; (3) obsolete. [CI: 0.115, RI: 0.207]
[46] Mesoscutum: (0) exposed; (1) hidden. [CI: 0.167, RI: 0.286]
[47] Scutellum: (0) flat to convex; (1) angled, elevated elaborations. [CI: 0.250, RI: 0.667]
[48] Hemelytra shape: (0) transversely rounded; (1) flat. [CI: 0.143, RI: 0.400]
[49] Corial margins: (0) convex or nearly straight; (1) weakly narrow at anterior margin of hemelytra, widening along posterior margin; (2) widened at anterior and posterior margin, with constriction medially. [CI: 0.133, RI: 0.480]
[50]* Cuneus angle: (0) elongate triangular; (1) isosceles/right angular; (2) boomerang. [CI: 0.200, RI: 0.500]
[51] Cuneal deflexion: (0) shallow to deep; (1) obsolete. [CI: 0.167, RI: 0.000]
[52]* Hind-femora shape: (0) elongate, slender; (1) medium length, flat; (2) short, flat; (3) slender, swollen at "knees"; (4) long, "fat". [CI: 0.174, RI: 0.537]
[53] Tibia: (0) more or less rounded; (1) laterally compressed. [CI: 1.000, RI: 1.000]
[54] Pulvilli: (0) absent; (1) ventral, small to medium sized; (2) large, covering majority of ventral surface of claw; (3) large, length of ventral surface of claw, attached only at base [CI: 0.300, RI: 0.650]
[55]* Parempodia: (0) setiform, weakly curving; (1) lyriform; (2) fleshy, divergent at tip; (3) fleshy, rod-like. [CI: 0.400, RI: 0.800]
[56]* Lyriform parempodia width: (0) slender, length significantly longer than width; (1) narrow toward claw, wider towards apex. [CI: 1.000, RI: 1.000]
[57] Claw hairs: (0) present; (1) absent. [CI: 0.500, RI: 0.750]

MALE ABDOMIN AND GENITALIA:

[58] Male abdomen: (0) constricted past thorax; (1) broad. [CI: 0.111, RI: 0.579]
[59]* Elaborations on pygophore: (0) tubercules on ventral side of pygophore; (1) patch of spines; (2) setae; (3) no elaborations. [CI: 0.273, RI: 0.000]
[60] Genital capsule size: (0) length of capsule less than 1/3 total length of abdomen; (1) length of capsule more than 1/3 total length of abdomen but less than ½ length; (2) length greater than 1/2 total length of abdomen. [CI: 0.069, RI: 0.526]
[61]* Genital capsule morphology: (0) generally tapered; (1) squared off at end; (2) keeled [CI: 0.500, RI: 0.600]

Table 1-2. continued.

[62] Endosoma composition: (0) dorsally membranous, expandable; (1) membranous, not expandable, and with multiple rigid spicules arising from base; (2) rigid, strap-like or tubular. [CI: 0.667, RI: 0.875]
[63] Rigid-type endosoma composition: (0) two straps; (1) fused tube. [CI: 0.062, RI: 0.583]
[64]* Rigid-type endosoma shape: (0) weakly-C or J-shaped; (1) sigmoid, S shaped; (2) coiled, wrapping over itself; (3) U shaped. [CI: 0.158, RI: 0.628]
[65]* Rigid-type endosoma membrane: (0) smooth, contiguous; (1) dentate central membrane; (2) no visible membrane. [CI: 0.333, RI: 0.429]
[66]* Secondary gonopore: (0) simple, semicircular opening; (1) no visible secondary gonopore; (2) sclerotized, horse-collar shaped; (3) weakly sclerotized; (4) sclerotized area/pad of spines. [CI: 0.143, RI: 0.520]
[67] Secondary sclerite on rigid-type endosoma: (0) absent; (1) present. [CI: 0.333, RI: 0.333]
[68] Spicules: (0) arising at or near base of endosoma; (1) arising from membrane medially on endosoma to subapical. [CI: 1.000, RI: 0/0]
[69] Rigid-type endosoma shaft spines: (0) absent; (1) present. [CI: 0.250, RI: 0.727]
[70] Notches on endosoma: (0) absent; (1) present. [CI: 0.333, RI: 0.500]
[71]* Rigid-type endosoma thickness: (0) at least 5 times longer than wide; thin, sinuous; (1) At most 3 times longer than wide; thick, stocky; (2) thin at base, expansive towards gonopore. [CI: 0.118, RI: 0.286]
[72] Rigid-type endosoma secondary-gonopore location: (0) near middle of endosoma; (1) apical to subapical. [CI: 0.062, RI: 0.605]
[73] Rigid-type endosoma apex morphology: (0) united structure; (1) split into two straps. [CI: 0.071, RI: 0.552]
[74] Rigid-type endosoma lateral arm: (0) absent; (1) present, below secondary gonopore; (2) present, arising at midpoint of secondary gonopore; (3) present, above 2ndary gonopore. [CI: 0.750, RI: 0.667]
[75] Dorsal apical process: (0) absent; (1) present. [CI: 0.500, 0.667]
[76] Joint of dorsal apical process: (0) absent; (1) spine; (2) feather-like process. [CI: 1.000, RI: 0/0]
[77] Field of micro-spicules subapically to apically of endosoma: (0) absent; (1) present. [CI: 0.250, RI: 0.250]
[78] Long, glass-like spicules above secondary gonopore: (0) absent; (1) present. [CI: 1.000, RI: 1.000]
[79] Phallotheca elaborations: (0) absent; (1) present, as a projection, "nose"; (2) present, as multiple lobes. [CI: 0.062, RI: 0.167]
[80]* Phallotheca shape: (0) apex generally triangular; (1) contiguously thin from base; (2) duck-head shaped; (3) trapezoidal; (4) simple tube. [CI: 0.167, RI: 0.524]
[81] Phallotheca curvature: (0) C-shaped; (1) L-shaped; (2) tip generally perpendicular to base to weakly angled. [CI: 0.100, RI: 0.514]
[82] Dorsal surface of phallotheca: (0) smooth surface; (1) ridges present. [CI: 0.074, RI: 0.561]
[83] Phallotheca attachment: (0) attached to pygophore; (1) attached to phallobase. [CI: 1.000, RI: 1.000]
[84]* Left paramere size relative to right paramere: (0) left paramere larger; (1) right paramere larger; (2) approximately equivalent in size. [CI: 0.077, RI: 0.442]
[85]* Right-paramere: (0) lanceolate, defined base; (1) leaf shaped, defined base; (2) paddle-shaped, defined base; (3) long, slender, no defined base; (4) slender with lateral expanding towards apex, no defined base. [CI: 0.148, RI: 0.425]
[86]* Left paramere posterior process curvature: (0) straight; (1) curved downward; (2) curved upward; (3) parallel to base of paramere. [CI: 0.115, RI: 0.439]
[87]* Left paramere process relative size: (0) posterior process longer; (1) anterior process longer; (2) both processes equivalent size. [CI: 0.222, RI: 0.500]
[88] Left paramere anterior process morphology: (0) points same direction is posterior process; (1) points alternate/opposite direction. [CI: 0.143, RI: 0.600]
[89] Pits on left paramere processes: (0) absent; (1) present on posterior process; (2) present on both major processes. [CI: 0.111, RI: 0.407]
[90]* Left paramere morphological elaborations: (0) absent; (1) projection at base of anterior process; (2) extra projection at dorso-posterior margin of anterior process; (3) projection on dorso-anterior margin of anterior process. [CI: 0.500, RI: 0.000]

Table 1-2. continued.

[91] Left paramere with expanded portions in center of body: (0) absent; (1) present. [CI: 0.111, RI: 0.333]

FEMALE BODY STRUCTURE:

[92] Sexual dimorphism in second antennal segment: (0) shape similar to males; (1) different shape. [CI: 0.200, RI: 0.000]

[93] Eye placement on head when viewed laterally: (0) eyes obscuring anterior margin of pronotum; (1) eyes parallel to anterior margin of pronotum; (2) eyes strongly exerted from anterior margin. [CI: 0.100, RI: 0.400]

[94] Eye height: (0) greater than ½ height of head; (1) less than 1/2 height of head. [CI: 0.053, RI: 0.500]

[95] Relative width of vertex: (0) vertex less than 1/3 width head; (1) vertex width greater than 1/3 width of head but less than ½ width; (2) vertex greater than ½ width of head. [CI: 0.111, RI: 0.333]

[96] Frons relative to clypeus: (0) rounded, clypeus not exerted; (1) concave to weakly concave, clypeus exerted; (2) frons relatively obsolete, clypeus strongly exerted. [CI: 0.118, RI: 0.348]

[97] Mesoscutum: (0) exposed; (1) hidden. [CI: 0.143, RI: 0.143]

[98] Female wing size: (0) macropterous; (1) brachypterous; (2) micropterous; (3) apterous. [CI: 0.250, RI: 0.308]

[99] Corial margin: (0) convex/rounded; (1) margin straight; (2) concave/medially constricted. [CI: 0.077, RI: 0.429]

[100] Cuneus lateral margin: (0) straight to weakly convex; (1) rounded; (2) cuneus obsolete. [CI: 0.200, RI: 0.429]

[101] Cuneal fracture: (0) angled anteromesially; (1) perpendicular to corial margin. [CI: 1.000, RI: 0/0]

[102] Cuneus shape: (0) elongate triangular; (1) broadly triangular; (2) right triangle; (3) boomerang. [CI: 0.088, RI: 0.326]

[103] Cuneal deflection: (0) shallow to deep; (1) obsolete. [CI: 0.250, RI: 0.400]

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[104] Presence of sclertotized plates within the vestibulum: (0) absent; (1) two separated plates; (2) two interlocking plates. [CI: 0.167, RI: 0.583]

[105]* Vestibular plate shape: (0) mostly membranous, amorphous; (1) triangular; (2) semicircular; (3) asymmetrical; (4) rectangular. [CI: 0.167, RI: 0.474]

[106]* Vestibular plate size within the vestibulum: (0) at most half the width of the ramus; (1) width at most twice the ramus width. [CI: 0.071, RI: 0.458]

[107] Vestibulum wall: (0) flat; (1) projecting. [CI: 0.062, RI: 0.531]

[108]* Sclerite on anterior wall of vestibulum: (0) absent; (1) one central sclerite; (2) two asymmetrical sclerites. [CI: 0.133, RI: 0.690]

[109]* Central sclerite morphology: (0) thin, sclerotized plate; (1) T-shaped sclerotized plate; (2) broad, weakly sclerotized plate; (3) broad, thickly sclerotized plate. [CI: 0.429, RI: 0.692]

[110] Sclerotized ventral sack: (0) absent; (1) not easily visible, membranous; (2) partially sclerotized, with sclerotized area adjacent to gonapophysis; (3) easily visible, heavily sclerotized for entirety. [CI: 0.083, RI: 0.612]

[111] Sclerotized margin between dorsal labiate plate and ventral labiate plate: (0) absent, membranous; (1) present. [CI: 0.111, RI: 0.200]

[112] Dorsal labiate plate: (0) membranous; (1) Dorsal plate has sclerotized portions. [CI: 0.083, RI: 0.694]

[113]* Sclerotization of ventral labial plate: (0) thin strip on dorsum; (1) two lobes extending from rammi; (2) sclerotized plate(s) along the lateral margins; (3) lobes extending enveloping sclerotized rings. [CI: 0.250, RI: 0.182]

[114]* Sclerotized rings morphology: (0) ring fused; (1) open, weakly sclerotized; (2) thickly sclerotized; (3) very small, contorted [CI: 0.167, RI: 0.400]

[115]* Posterior wall posterior margin morphology: (0) medial invagination when viewed from the posterior; (1) flat when viewed from the posterior; (2) anterior projection(s) when viewed from the posterior. [CI: 0.087, RI: 0.500]

[116]* Posterior wall median membrane: (0) completely membranous; (1) central sclerite with surrounding membrane; (2) sclerotized anterior margin, membranous posterior; (3) membranous anteriorly, sclerotized posterior; (4) completely sclerotized. [CI: 0.114, RI: 0.456]

Table 1-2. continued.

[117]* Posterior wall median sclerite composition: (0) none; (1) 2 small sclerites; (2) one central sclerite; (3) one central sclerite fused to lateral plates. [CI: 0.107, RI: 0.390]

[118] Medial plate projections: (0) two symmetrical projections at median line of medial plate; (1) two asymmetrical projections at medial plate median; (2) one fused projection. [CI: 1.000, RI: 1.000]

[119] Posterior wall lateral interramal sclerites: (0) absent; (1) two lateral interramal sclerites; (2) two plates/sclerites fused to central sclerites. [CI: 0.125, RI: 0.440]

[120] Lateral plates: (0) flat; (1) posterior margin upward and reflexing. [CI: 0.500, RI: 0.500]

[121]* Anterior projections between lateral plates: (0) two lateral, symmetrical projections above ovipositor bulb; (1) one projection above ovipositor bulb; (2) multiple sclerotized plates. [CI: 0.500, RI: 0.667]

[122] Base of ovipositor: (0) rounded; (1) extension(s) to posterior wall. [CI: 0.053, RI: 0.250]

[123] Ovipositor position relative to abdomen: (0) parallel to abdomen; (1) angled upwards. [CI: 0.111, RI: 0.636]

Table 1-3. Primers used in this analysis to amplify the large mitochondrial ribosomal subunit (16S), large and small nuclear ribosomal subunits (28S, 18S), and segment containing the cytochrome oxidase subunit II (COII). Primers listed with “AMNH Section 9 lab” are universal stock primers developed in that lab.

Table 1-3. Primers used to amplify the large mitochondrial ribosomal subunit (16S), large and small nuclear ribosomal subunits (28S, 18S), and segment containing the cytochrome oxidase subunit II (COII)

*, New primers

Region	Primer Name	Primer Sequence	Author
COII	C1-J-279	CCW CGW CGW TAY TCW GAY TAT CC	Damgaard & Cognato 2006
	C2-N-3554	GTT CAT GAR TGW ARD ACA TC	Damgaard & Cognato 2006
16S	16SF_Pseudo1	GTG CAA AGG TAG CAT AAT C	Schuh *et al.* 2010
	16SR_Pseudo2	TCC GGT TTG AAC TCA GAT CAT	Schuh *et al.* 2010
18S	18s1F2*	ATG AAC CTT GAC GGC TCA GT	
	18s5R	CTT GGC AA TGC TTT CGC	Giribet *et al*. 1996
	18s3F	GTT CGA TTC CGG AGA GGG A	Giribet *et al*. 1996
	18sBI	GAG TCT CGT TCG TTA TCG GA	Whiting *et al.* 1997
	18sA2	ATG GTT GCA AAG CTG AAA C	Whiting *et al.* 1997
	18s9R	GAT CCT TCC GCA GGT TCA CCT AC	Giribet *et al*. 1996
28S	28sRD1A	CCC SCG TAA YTT AGG CAT AT	AMNH Section 9 Lab
	28sRD4B	CCT TGG TCC GTG TTT CAA GAC	AMNH Section 9 Lab
	28sRD3.2a	AGT ACG TGA AAC GCT TCA SGG GT	AMNH Section 9 Lab
	28sB	TCG GAA GGA ACC AGC TAC TA	Whiting *et al.* 1997
	28sA	GAC CCG TCT TGA AGC ACG	Whiting *et al.* 1997
	28sBout	CCC ACA GCG CCA CTT CTG CTT ACC	AMNH Section 9 Lab
	28sRD4.8b*	ACC TAT TCT CAA ACT CCA AAT AG	
	28sRD7B1	GAC TTC CCT TAC CTA CAT	AMNH Section 9 Lab

Table 1-4. Models of molecular evolution estimated by MrModeltest2.3 for the four molecular data partitions using the hLRTs and AIC estimates.

Table 1-4. Models estimated by MrModeltest for each molecular data partition based on the hLRTs and AIC criterion.

Gene	hLRT	hLRT2	hLRT3	hLRT4	AIC
16S	HKY+I+G	HKY+I+G	GTR+I+G	HKY+I+G	HKY+I+G
28S	GTR+I+G	GTR+I+G	GTR+I+G	GTR+I+G	GTR+I+G
18S	GTR+I+G	SYM+I+G	SYM+I+G	SYM+I+G	GTR+I+G
COI	GTR+I+G	GTR+I+G	GTR+I+G	GTR+I+G	GTR+I+G

Table 1-5. Model parameters estimated by RAxML during analyses. Proportion of invariable sites is demarked with “invar”.

Table 1-5. Maximum likelihood model parameters estimated in RAxML analysis

alpha	0.636478
invar	0.557252
Tree-Length	3.327331
rate a<->c	1.302433
rate a<->g	3.499583
rate a<->t	3.684355
rate c<->g	0.584148
rate c<->t	9.090574
rate g<->t	1

Table 1-6. Partitioned Bremer support for selected nodes on the parsimony consensus tree for each morphological and molecular data partition. Node numbers correspond to nodes demarcated on Figures 1-4 and 1-5. Total Bremer support is indicated in **bold** for those nodes.

Table 1-6. Partitioned Bremer Support for selected nodes on TNT New Technology consensus tree for each data partition.

Node	Morpho	COII	16S	18S	28S	**Total**
1	9	-2	-2	9	6	**20**
2	0	4	0	2	8	**14**
3	11	-1	18	5	6	**39**
4	0	2	-3	1	2	**2**
5	-1.33	-25.25	1.67	19.91	11	**6**
6	1	-2	-1	14	6	**18**
8	14	3	-19.25	9	6.25	**13**
10	2	-1	1	5	-6	**1**
12	3	-0.5	8.5	2.5	-5.5	**8**
13	2	-8	-3	8	9	**8**
14	-17	-5.67	10	-38	59.67	**9**
15	-0.33	0	5	1.33	-2	**4**
16	1	0.5	0	2.5	-3	**1**
17	3	-1	5	6	-2	**11**
18	8	3	-2	8	-1	**16**
19	8	-15	1	8	1	**3**
20	9.75	-1.42	1	29.55	-1.89	**0**
21	-9.5	-9	9.25	9	5.25	**5**
22	2	-9	-3	7	9	**6**
23	-9.5	-9	9.25	9	5.25	**5**
24	15.83	-6.33	-18.42	7.67	6.25	**5**
26	-2.2	-1.8	8.68	7.73	-5.42	**7**
28	8.5	0	-14.75	-4	22.25	**12**

Table 3-1. Measurements of newly described and redescribed Leucophoropterini. All measurements are average lengths in millimeters.

Table 3-1. Measurements of taxa. Values listed are in millimeters

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
						Aitkenia						
latevagans												
M (N=2)	**Mean**	**0.97**	**2.95**	**0.48**	**0.66**	**0.24**	**0.46**	**0.89**	**2.67**	**0.40**	**0.40**	**0.44**
	SD	0.04	0.04	0.00	0.01	0.00	0.00	0.01	0.07	n/a	0.00	0.01
	Range	0.05	0.05	0.00	0.02	0.00	0.00	0.01	0.10	0.00	0.00	0.02
	Min	0.94	2.92	0.48	0.65	0.24	0.46	0.89	2.62	0.40	0.40	0.43
	Max	0.99	2.97	0.48	0.67	0.24	0.46	0.90	2.72	0.40	0.40	0.44
F (N=10)	**Mean**	**1.03**	**2.85**	**0.53**	**0.68**	**0.35**	**0.48**	**0.91**	**0.88**	**0.37**	**0.43**	**0.36**
	SD	0.04	0.20	0.01	0.02	0.01	0.02	0.03	0.09	0.02	0.02	0.03
	Range	0.10	0.54	0.03	0.04	0.03	0.06	0.09	0.22	0.06	0.06	0.06
	Min	0.99	2.62	0.51	0.67	0.33	0.44	0.87	0.79	0.35	0.40	0.33
	Max	1.09	3.17	0.54	0.71	0.37	0.51	0.96	1.02	0.41	0.46	0.40
exocarpos												
M (N=1)	**Mean**	**0.99**	**2.97**	**0.52**	**0.71**	**0.33**	**0.48**	**0.84**	**0.89**	**0.40**	**0.40**	**0.46**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
F (N=10)	**Mean**	**0.97**	**2.70**	**0.58**	**0.78**	**0.43**	**0.50**	**0.89**	**0.87**	**0.35**	**0.40**	**0.34**
	SD	0.03	0.08	0.01	0.01	0.01	0.02	0.03	0.04	0.01	0.01	0.01
	Range	0.12	0.25	0.03	0.03	0.05	0.05	0.10	0.11	0.02	0.03	0.05
	Min	0.92	2.57	0.56	0.76	0.41	0.48	0.83	0.81	0.34	0.38	0.32
	Max	1.04	2.82	0.59	0.79	0.46	0.52	0.94	0.92	0.37	0.41	0.37
						Arafuramiris						
heath												
M (N=1)	**Mean**	**0.97**	**2.97**	**1.78**	**0.75**	**0.29**	**0.71**	**1.02**	**0.97**	**0.29**	**0.32**	**0.48**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
F (N=1)	**Mean**	**0.89**	**2.67**	**0.56**	**0.78**	**0.38**	**0.67**	**0.90**	**0.73**	**n/a**	**n/a**	**0.44**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
heath	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
oswaldi												
M (N=2)	**Mean**	**0.84**	**2.85**	**0.59**	**0.78**	**0.21**	**0.67**	**0.94**	**0.86**	**n/a**	**0.41**	**0.50**
	SD	0.07	0.04	0.02	0.02	0.02	0.00	0.00	0.04	-	-	0.01
	Range	0.10	0.05	0.03	0.03	0.02	0.00	0.00	0.06	-	-	0.02
	Min	0.79	2.82	0.57	0.76	0.20	0.67	0.94	0.83	-	0.41	0.49
	Max	0.89	2.87	0.60	0.79	0.22	0.67	0.94	0.89	-	0.41	0.51
queenslandi												
M (N=5)	**Mean**	**1.03**	**3.42**	**0.61**	**0.86**	**0.24**	**0.75**	**1.01**	**0.89**	**0.41**	**0.49**	**0.55**
	SD	0.03	0.15	0.01	0.02	0.02	0.01	0.04	0.03	0.04	0.04	0.03
	Range	0.10	0.50	0.05	0.06	0.05	0.05	0.14	0.11	0.11	0.13	0.11
	Min	0.99	3.22	0.59	0.83	0.22	0.73	0.94	0.84	0.33	0.43	0.51
	Max	1.09	3.71	0.63	0.89	0.27	0.78	1.08	0.95	0.44	0.56	0.62
F (N=5)	**Mean**	**0.93**	**3.00**	**0.60**	**0.79**	**0.41**	**0.76**	**0.95**	**0.76**	**0.36**	**0.43**	**0.52**
	SD	0.05	0.08	0.01	0.02	0.01	0.02	0.03	0.03	0.02	0.03	0.02
	Range	0.20	0.25	0.05	0.08	0.03	0.10	0.11	0.11	0.10	0.11	0.08
	Min	0.84	2.87	0.59	0.75	0.40	0.71	0.89	0.71	0.30	0.37	0.48
	Max	1.04	3.12	0.63	0.83	0.43	0.81	1.00	0.83	0.40	0.48	0.56
Ausejanus												
albisignatus												
M (N=51)	**Mean**	**1.21**	**3.56**	**0.53**	**0.73**	**0.23**	**0.50**	**1.01**	**1.05**	**0.46**	**0.49**	**0.55**
	SD	0.06	0.18	0.01	0.03	0.01	0.03	0.04	0.06	0.03	0.03	0.04
	Range	0.30	0.87	0.06	0.10	0.05	0.13	0.17	0.29	0.10	0.11	0.19
	Min	1.39	3.96	0.57	0.78	0.25	0.57	1.10	1.19	0.51	0.56	0.63
	Max	1.09	3.09	0.51	0.67	0.21	0.44	0.92	0.90	0.41	0.44	0.44
F (N=81)	**Mean**	**1.35**	**3.29**	**0.55**	**0.74**	**0.35**	**0.52**	**1.10**	**0.87**	**0.46**	**0.55**	**0.47**
	SD	0.10	0.17	0.02	0.03	0.02	0.02	0.06	0.05	0.02	0.03	0.03
	Range	0.45	0.74	0.08	0.12	0.08	0.10	0.32	0.29	0.11	0.21	0.13
	Min	1.09	2.92	0.51	0.67	0.30	0.46	0.90	0.73	0.40	0.41	0.40
	Max	1.53	3.66	0.59	0.79	0.38	0.56	1.22	1.02	0.51	0.62	0.52
arvensus												
M (N=10)	**Mean**	**1.29**	**3.75**	**0.51**	**0.70**	**0.26**	**0.47**	**0.98**	**0.88**	**0.45**	**0.49**	**0.64**

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
arvensus	SD	0.04	0.11	0.01	0.01	0.01	0.01	0.02	0.04	0.02	0.02	0.03
	Range	0.15	0.30	0.02	0.05	0.03	0.02	0.06	0.13	0.05	0.06	0.08
	Min	1.19	3.56	0.51	0.67	0.24	0.46	0.95	0.83	0.43	0.46	0.60
	Max	1.34	3.86	0.52	0.71	0.27	0.48	1.02	0.95	0.48	0.52	0.68
F (N=18)	**Mean**	**1.22**	**2.98**	**0.52**	**0.71**	**0.36**	**0.44**	**0.97**	**0.74**	**0.41**	**0.48**	**0.43**
	SD	0.05	0.07	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.01	0.02
	Range	0.20	0.20	0.03	0.04	0.02	0.05	0.07	0.08	0.06	0.05	0.06
	Min	1.09	2.77	0.51	0.68	0.33	0.41	0.92	0.70	0.38	0.46	0.38
	Max	1.29	3.07	0.54	0.73	0.37	0.46	1.00	0.78	0.44	0.51	0.46
bournda												
M (N=10)	**Mean**	**1.13**	**3.34**	**1.55**	**2.11**	**0.73**	**0.46**	**0.92**	**2.82**	**0.42**	**0.45**	**0.53**
	SD	0.04	0.12	0.02	0.03	0.02	0.02	0.01	0.14	0.02	0.01	0.02
	Range	0.10	0.30	0.05	0.05	0.05	0.03	0.03	0.30	0.05	0.03	0.05
	Min	1.09	3.22	1.53	2.08	0.69	0.44	0.90	2.67	0.40	0.44	0.51
	Max	1.19	3.51	1.58	2.13	0.74	0.48	0.94	2.97	0.44	0.48	0.56
F (N=18)	**Mean**	**1.19**	**2.85**	**0.50**	**0.64**	**0.32**	**0.43**	**0.91**	**0.77**	**0.37**	**0.43**	**0.40**
	SD	0.05	0.17	0.01	0.01	0.00	0.02	0.03	0.03	0.01	0.02	0.02
	Range	0.10	0.40	0.02	0.03	0.01	0.05	0.08	0.06	0.03	0.05	0.06
	Min	1.14	2.67	0.49	0.62	0.31	0.40	0.87	0.73	0.35	0.41	0.37
	Max	1.24	3.07	0.52	0.65	0.32	0.44	0.95	0.79	0.38	0.46	0.43
femoralis												
M (N=22)	**Mean**	**1.23**	**3.60**	**0.56**	**0.78**	**0.25**	**0.55**	**1.07**	**1.15**	**0.48**	**0.53**	**0.54**
	SD	0.04	0.11	0.01	0.02	0.01	0.02	0.04	0.04	0.02	0.02	0.02
	Range	0.15	0.47	0.03	0.06	0.04	0.06	0.16	0.17	0.10	0.06	0.10
	Min	1.14	3.32	0.54	0.75	0.24	0.51	0.97	1.05	0.43	0.48	0.48
	Max	1.29	3.79	0.57	0.80	0.28	0.57	1.13	1.22	0.52	0.54	0.57
F (N=30)	**Mean**	**1.33**	**3.36**	**0.57**	**0.78**	**0.35**	**0.57**	**1.15**	**0.93**	**0.49**	**0.58**	**0.48**
	SD	0.06	0.14	0.02	0.02	0.01	0.03	0.04	0.04	0.02	0.02	0.03
	Range	0.25	0.59	0.05	0.08	0.05	0.10	0.17	0.17	0.06	0.08	0.13
	Min	1.24	3.02	0.54	0.73	0.33	0.51	1.06	0.84	0.46	0.54	0.40
	Max	1.49	3.61	0.59	0.81	0.38	0.60	1.24	1.02	0.52	0.62	0.52
cordatus												
M (N=4)	**Mean**	**0.98**	**2.57**	**1.53**	**0.69**	**0.74**	**0.42**	**0.84**	**0.76**	**0.33**	**0.39**	**0.38**

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
cordatus	SD	0.08	0.21	0.08	0.04	0.04	0.04	0.07	0.07	0.03	0.04	0.05
	Range	0.20	0.50	0.17	0.09	0.10	0.08	0.17	0.16	0.06	0.10	0.11
	Min	0.89	2.38	1.46	0.66	0.69	0.40	0.76	0.68	0.30	0.35	0.33
	Max	1.09	2.87	1.63	0.75	0.79	0.48	0.94	0.84	0.37	0.44	0.44
F (N=2)	**Mean**	**1.14**	**2.62**	**0.52**	**0.68**	**0.35**	**0.44**	**0.93**	**0.67**	**0.35**	**0.41**	**0.41**
	SD	-	0.07	-	-	0.01	0.01	0.03	-	0.02	-	0.02
	Range	-	0.10	-	-	0.01	0.02	0.05	-	0.03	-	0.03
	Min	1.14	2.57	0.52	0.68	0.34	0.43	0.90	0.67	0.33	0.41	0.40
	Max	1.14	2.67	0.52	0.68	0.35	0.44	0.95	0.67	0.37	0.41	0.43
iris												
M (N=4)	**Mean**	**1.06**	**2.80**	**0.52**	**0.70**	**0.34**	**0.44**	**0.90**	**0.81**	**0.38**	**0.44**	**0.42**
	SD	0.03	0.15	0.01	-	0.00	0.01	0.02	0.02	0.00	0.01	0.02
	Range	0.05	0.30	0.02	-	0.01	0.02	0.03	0.05	0.00	0.02	0.03
	Min	1.04	2.67	0.51	0.70	0.33	0.43	0.89	0.78	0.38	0.43	0.41
	Max	1.09	2.97	0.53	0.70	0.34	0.44	0.92	0.83	0.39	0.44	0.43
F (N=1)	**Mean**	**1.09**	**2.48**	**0.51**	**0.68**	**0.36**	**0.35**	**0.92**	**0.68**	**0.32**	**0.43**	**0.35**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
luteoelytratus												
M (N=12)	**Mean**	**1.05**	**3.34**	**0.47**	**0.63**	**0.25**	**0.43**	**0.87**	**0.94**	**0.40**	**0.40**	**0.60**
	SD	0.03	0.09	0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.02	0.02
	Range	0.10	0.25	0.02	0.02	0.02	0.03	0.06	0.10	0.03	0.05	0.06
	Min	0.99	3.22	0.46	0.63	0.24	0.41	0.84	0.89	0.38	0.38	0.57
	Max	1.09	3.47	0.48	0.64	0.26	0.44	0.90	0.98	0.41	0.43	0.63
F (N=7)	**Mean**	**1.06**	**2.37**	**0.50**	**0.63**	**0.36**	**0.39**	**0.80**	**0.80**	**0.31**	**0.37**	**0.36**
	SD	0.02	0.05	0.01	0.01	0.01	0.01	0.03	0.02	0.01	0.01	0.01
	Range	0.05	0.12	0.02	0.02	0.02	0.03	0.08	0.08	0.02	0.02	0.02
	Min	1.04	2.30	0.49	0.63	0.35	0.37	0.76	0.76	0.30	0.36	0.35
	Max	1.09	2.43	0.51	0.65	0.37	0.40	0.84	0.84	0.32	0.38	0.37
macrozonata												
M (N=1)	**Mean**	**0.99**	**2.97**	**0.46**	**0.68**	**0.89**	**0.43**	**0.89**	**0.84**	**0.40**	**0.43**	**0.44**

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
macrozonata	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
F (N=2)	**Mean**	**1.05**	**2.55**	**0.48**	**0.67**	**0.35**	**0.42**	**0.87**	**0.73**	**0.35**	**0.40**	**0.35**
	SD	0.02	0.04	-	0.01	0.03	0.01	0.03	0.02	0.02	0.01	0.04
	Range	0.02	0.05	-	0.02	0.04	0.02	0.05	0.03	0.03	0.02	0.06
	Min	1.04	2.52	0.48	0.67	0.33	0.41	0.84	0.71	0.33	0.40	0.32
	Max	1.06	2.57	0.48	0.68	0.37	0.43	0.89	0.75	0.37	0.41	0.38
mcdonaldi												
M (N=32)	**Mean**	**1.24**	**3.58**	**0.54**	**0.71**	**0.29**	**0.51**	**1.01**	**0.95**	**0.45**	**0.50**	**0.53**
	SD	0.08	0.13	0.02	0.04	0.01	0.03	0.05	0.03	0.03	0.03	0.04
	Range	0.30	0.57	0.06	0.12	0.05	0.11	0.24	0.16	0.14	0.14	0.17
	Min	1.09	3.32	0.49	0.65	0.27	0.46	0.86	0.87	0.37	0.43	0.44
	Max	1.39	3.89	0.56	0.77	0.32	0.57	1.10	1.03	0.51	0.57	0.62
F (N=20)	**Mean**	**1.26**	**3.17**	**0.53**	**0.68**	**0.35**	**0.47**	**1.00**	**0.79**	**0.42**	**0.47**	**0.41**
	SD	0.08	0.10	0.01	0.01	0.01	0.02	0.04	0.04	0.02	0.02	0.03
	Range	0.25	0.40	0.05	0.06	0.03	0.06	0.13	0.14	0.06	0.10	0.10
	Min	1.14	2.97	0.51	0.63	0.33	0.43	0.94	0.73	0.38	0.41	0.37
	Max	1.39	3.37	0.56	0.70	0.37	0.49	1.06	0.87	0.44	0.51	0.48
meridionalis												
M (N=20)	**Mean**	**1.02**	**3.00**	**0.50**	**0.65**	**0.27**	**0.42**	**0.87**	**0.90**	**0.38**	**0.42**	**0.48**
	SD	0.05	0.13	0.01	0.01	0.01	0.01	0.03	0.03	0.02	0.02	0.02
	Range	0.17	0.47	0.02	0.03	0.03	0.05	0.08	0.13	0.06	0.06	0.05
	Min	0.94	2.72	0.49	0.63	0.25	0.40	0.84	0.83	0.33	0.38	0.46
	Max	1.11	3.19	0.52	0.67	0.29	0.44	0.92	0.95	0.40	0.44	0.51
F (N=20)	**Mean**	**1.09**	**2.63**	**0.51**	**0.67**	**0.34**	**0.41**	**0.91**	**0.72**	**0.36**	**0.44**	**0.40**
	SD	0.06	0.11	0.01	0.01	0.01	0.01	0.03	0.03	0.01	0.02	0.01
	Range	0.20	0.45	0.02	0.03	0.05	0.05	0.10	0.10	0.06	0.10	0.05
	Min	0.99	2.43	0.50	0.65	0.32	0.38	0.86	0.66	0.33	0.38	0.37
	Max	1.19	2.87	0.52	0.68	0.37	0.43	0.95	0.76	0.40	0.48	0.41
minutus												
M (N=12)	**Mean**	**1.12**	**3.11**	**0.47**	**0.61**	**0.22**	**0.40**	**0.85**	**0.85**	**0.39**	**0.42**	**0.49**

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
minutus	SD	0.04	0.14	0.01	0.01	0.01	0.01	0.02	0.06	0.01	0.02	0.03
	Range	0.15	0.45	0.04	0.04	0.03	0.05	0.08	0.24	0.05	0.05	0.08
	Min	1.04	2.87	0.44	0.59	0.21	0.38	0.81	0.75	0.37	0.40	0.44
	Max	1.19	3.32	0.48	0.63	0.24	0.43	0.89	0.98	0.41	0.44	0.52
F (N=30)	**Mean**	**1.10**	**2.67**	**0.48**	**0.60**	**0.30**	**0.39**	**0.87**	**0.72**	**0.36**	**0.43**	**0.39**
	SD	0.08	0.15	0.02	0.02	0.01	0.03	0.06	0.05	0.02	0.03	0.03
	Range	0.30	0.64	0.06	0.09	0.05	0.10	0.22	0.22	0.08	0.10	0.10
	Min	0.99	2.43	0.46	0.56	0.29	0.35	0.78	0.63	0.33	0.40	0.35
	Max	1.29	3.07	0.52	0.65	0.33	0.44	1.00	0.86	0.41	0.49	0.44
neboissi												
M (N=7)	**Mean**	**1.12**	**3.09**	**0.52**	**0.76**	**0.24**	**0.47**	**0.94**	**0.90**	**0.41**	**0.45**	**0.49**
	SD	0.06	0.07	0.01	0.01	0.01	0.02	0.03	0.04	0.02	0.02	0.01
	Range	0.20	0.20	0.02	0.02	0.02	0.05	0.10	0.11	0.05	0.05	0.03
	Min	1.04	3.02	0.51	0.75	0.23	0.44	0.90	0.84	0.40	0.43	0.48
	Max	1.24	3.22	0.52	0.77	0.25	0.49	1.00	0.95	0.44	0.48	0.51
F (N=10)	**Mean**	**1.29**	**3.09**	**0.54**	**0.74**	**0.36**	**0.48**	**1.05**	**0.86**	**0.41**	**0.50**	**0.47**
	SD	0.07	0.11	0.01	0.02	0.01	0.02	0.04	0.03	0.02	0.02	0.01
	Range	0.20	0.35	0.03	0.04	0.02	0.05	0.13	0.10	0.05	0.06	0.03
	Min	1.19	2.92	0.52	0.72	0.35	0.46	1.00	0.83	0.40	0.48	0.44
	Max	1.39	3.27	0.56	0.76	0.37	0.51	1.13	0.92	0.44	0.54	0.48
tasmaniae												
M (N=20)	**Mean**	**1.25**	**3.80**	**0.50**	**0.66**	**0.29**	**0.46**	**0.96**	**0.93**	**0.44**	**0.48**	**0.60**
	SD	0.08	0.13	0.01	0.02	0.01	0.01	0.03	0.04	0.02	0.02	0.03
	Range	0.35	0.50	0.05	0.06	0.03	0.03	0.08	0.14	0.08	0.09	0.10
	Min	1.01	3.56	0.48	0.63	0.27	0.44	0.92	0.86	0.38	0.44	0.56
	Max	1.36	4.06	0.52	0.70	0.30	0.48	1.00	1.00	0.46	0.53	0.65
F (N=10)	**Mean**	**1.26**	**3.23**	**0.51**	**0.66**	**0.35**	**0.44**	**0.98**	**0.81**	**0.40**	**0.49**	**0.45**
	SD	0.08	0.04	0.01	0.01	0.01	0.01	0.02	0.03	0.02	0.01	0.03
	Range	0.30	0.12	0.03	0.02	0.02	0.03	0.06	0.11	0.06	0.03	0.08
	Min	1.04	3.17	0.49	0.65	0.34	0.43	0.95	0.75	0.37	0.48	0.41
	Max	1.34	3.29	0.52	0.67	0.37	0.46	1.02	0.86	0.43	0.51	0.49
tiramisu												
M (N=40)	**Mean**	**1.02**	**2.98**	**0.50**	**0.68**	**0.33**	**0.42**	**0.88**	**0.88**	**0.39**	**0.41**	**0.51**

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
tiramisu	SD	0.05	0.14	0.01	0.02	0.01	0.02	0.03	0.05	0.02	0.02	0.03
	Range	0.20	0.69	0.06	0.08	0.03	0.08	0.14	0.16	0.11	0.08	0.11
	Min	0.89	2.57	0.46	0.63	0.32	0.37	0.81	0.79	0.32	0.38	0.44
	Max	1.09	3.27	0.52	0.71	0.35	0.44	0.95	0.95	0.43	0.46	0.56
F (N=35)	**Mean**	**1.03**	**2.56**	**0.53**	**0.71**	**0.39**	**0.41**	**0.86**	**0.77**	**0.34**	**0.40**	**0.38**
	SD	0.05	0.11	0.02	0.02	0.01	0.02	0.03	0.03	0.02	0.02	0.02
	Range	0.17	0.50	0.08	0.10	0.05	0.10	0.10	0.11	0.08	0.10	0.06
	Min	0.92	2.23	0.48	0.65	0.37	0.37	0.81	0.70	0.29	0.35	0.34
	Max	1.09	2.72	0.56	0.75	0.41	0.46	0.90	0.81	0.37	0.44	0.40
uestaustralianus												
M (N=1)	**Mean**	**1.24**	**3.81**	**0.51**	**0.68**	**0.24**	**0.49**	**0.92**	**0.89**	**0.35**	**0.48**	**0.63**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
uralla												
M (N=4)	**Mean**	**1.25**	**3.55**	**0.51**	**0.72**	**0.21**	**0.50**	**1.04**	**1.05**	**0.48**	**0.54**	**0.56**
	SD	0.02	0.05	0.01	0.01	0.01	0.02	0.02	0.05	0.02	0.03	0.02
	Range	0.05	0.10	0.02	0.02	0.02	0.03	0.03	0.10	0.03	0.06	0.03
	Min	1.24	3.51	0.51	0.71	0.21	0.48	1.03	1.02	0.46	0.51	0.54
	Max	1.29	3.61	0.52	0.73	0.22	0.51	1.06	1.11	0.49	0.57	0.57
F (N=6)	**Mean**	**1.24**	**2.92**	**0.54**	**0.68**	**0.33**	**0.50**	**1.05**	**0.84**	**0.44**	**0.51**	**0.45**
	SD	0.03	0.06	0.01	0.01	0.01	0.01	0.02	0.03	0.01	0.02	0.01
	Range	0.10	0.15	0.03	0.02	0.03	0.02	0.05	0.10	0.02	0.06	0.03
	Min	1.19	2.87	0.52	0.67	0.32	0.48	1.03	0.79	0.43	0.48	0.43
	Max	1.29	3.02	0.56	0.68	0.35	0.51	1.08	0.89	0.44	0.54	0.46
vividus												
M (N=40)	**Mean**	**1.26**	**3.95**	**0.54**	**0.72**	**0.22**	**0.50**	**1.00**	**1.10**	**0.48**	**0.49**	**0.66**
	SD	0.09	0.37	0.01	0.01	0.02	0.02	0.05	0.11	0.04	0.04	0.08
	Range	0.35	1.14	0.06	0.07	0.06	0.08	0.19	0.35	0.14	0.16	0.29
	Min	1.09	3.32	0.51	0.68	0.19	0.46	0.89	0.92	0.40	0.40	0.51
	Max	1.44	4.46	0.56	0.75	0.25	0.54	1.08	1.27	0.54	0.56	0.79
F (N=50)	**Mean**	**1.20**	**3.19**	**0.55**	**0.69**	**0.32**	**0.48**	**0.98**	**0.82**	**0.43**	**0.47**	**0.45**

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
vividus	SD	0.06	0.23	0.02	0.02	0.01	0.02	0.04	0.06	0.03	0.03	0.03
	Range	0.25	1.36	0.08	0.06	0.05	0.09	0.16	0.25	0.10	0.11	0.13
	Min	1.09	2.20	0.51	0.67	0.30	0.44	0.90	0.70	0.38	0.43	0.39
	Max	1.34	3.56	0.59	0.73	0.35	0.52	1.06	0.95	0.48	0.54	0.52
						Austrodapus						
nitens												
M (N=3)	**Mean**	**1.05**	**3.18**	**0.57**	**0.71**	**0.33**	**0.74**	**1.08**	**0.93**	**0.40**	**0.51**	**0.46**
	SD	0.01	0.10	0.01	0.03	0.00	0.02	0.02	0.06	0.03	0.01	0.04
	Range	0.02	0.20	0.02	0.06	0.01	0.05	0.05	0.11	0.05	0.02	0.08
	Min	1.04	3.07	0.56	0.67	0.33	0.71	1.06	0.89	0.38	0.51	0.43
	Max	1.06	3.27	0.57	0.73	0.33	0.76	1.11	1.00	0.43	0.52	0.51
F (N=3)	**Mean**	**1.17**	**3.20**	**0.59**	**0.73**	**0.40**	**0.75**	**1.12**	**0.91**	**0.41**	**0.52**	**0.44**
	SD	0.03	0.12	0.00	0.02	-	0.02	0.04	0.01	0.02	0.04	0.02
	Range	0.05	0.25	0.01	0.04	-	0.05	0.06	0.02	0.03	0.08	0.05
	Min	1.14	3.07	0.59	0.71	0.40	0.73	1.08	0.90	0.40	0.48	0.41
	Max	1.19	3.32	0.60	0.75	0.40	0.78	1.14	0.92	0.43	0.56	0.46
						Biromiris						
binjouri												
M (N=1)	**Mean**	**0.99**	**3.12**	**0.62**	**0.72**	**0.37**	**0.67**	**1.02**	**0.98**	**0.29**	**0.27**	**0.41**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
cassis												
M (N=1)	**Mean**	**1.04**	**3.22**	**0.62**	**0.74**	**0.37**	**0.73**	**1.03**	**0.89**	**0.38**	**0.41**	**0.44**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
enarotadi												
M (N=1)	**Mean**	**0.99**	**3.56**	**0.59**	**0.75**	**0.32**	**0.68**	**1.03**	**n/a**	**0.33**	**0.35**	**0.43**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
enarotadi	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
sheyville												
M (N=1)	**Mean**	**0.99**	**3.71**	**0.64**	**0.79**	**0.37**	**0.73**	**1.06**	**0.86**	**0.49**	**0.49**	**0.48**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
						Blesingia						
fasciatipennis												
M (N=4)	**Mean**	**1.06**	**3.51**	**0.66**	**0.76**	**0.66**	**0.58**	**0.98**	**1.21**	**0.46**	**0.48**	**0.44**
	SD	0.09	0.11	0.02	0.02	0.05	0.03	0.03	0.06	0.01	0.01	0.05
	Range	0.20	0.25	0.06	0.06	0.12	0.06	0.06	0.11	0.03	0.03	0.11
	Min	0.99	3.37	0.63	0.73	0.62	0.54	0.95	1.14	0.44	0.46	0.40
	Max	1.19	3.61	0.69	0.79	0.74	0.60	1.02	1.25	0.48	0.49	0.51
F (N=4)	**Mean**	**1.10**	**3.32**	**0.69**	**0.72**	**0.32**	**0.56**	**0.95**	**1.03**	**0.43**	**0.48**	**0.39**
	SD	0.08	0.22	0.03	0.03	0.02	0.02	0.01	0.04	0.02	0.02	0.03
	Range	0.17	0.50	0.07	0.06	0.03	0.05	0.03	0.08	0.05	0.05	0.07
	Min	1.01	3.07	0.66	0.70	0.30	0.54	0.93	0.98	0.41	0.46	0.35
	Max	1.19	3.56	0.73	0.76	0.33	0.59	0.96	1.06	0.46	0.51	0.42
gularis												
M (N=10)	**Mean**	**1.07**	**3.54**	**0.68**	**0.70**	**0.72**	**0.57**	**0.88**	**1.08**	**0.40**	**0.40**	**0.50**
	SD	0.04	0.15	0.01	0.01	0.02	0.02	0.02	0.05	0.02	0.02	0.02
	Range	0.12	0.45	0.02	0.03	0.05	0.06	0.08	0.14	0.07	0.05	0.05
	Min	1.01	3.32	0.67	0.67	0.69	0.54	0.83	1.02	0.36	0.37	0.48
	Max	1.14	3.76	0.69	0.71	0.74	0.60	0.91	1.16	0.43	0.41	0.52
F (N=10)	**Mean**	**1.00**	**3.10**	**0.77**	**0.74**	**0.32**	**0.58**	**0.84**	**0.89**	**0.37**	**0.38**	**0.36**
	SD	0.05	0.09	0.02	0.02	0.01	0.03	0.03	0.04	0.01	0.01	0.02
	Range	0.12	0.25	0.08	0.07	0.03	0.11	0.08	0.16	0.02	0.05	0.06
	Min	0.94	2.97	0.73	0.70	0.31	0.52	0.80	0.79	0.37	0.35	0.33
	Max	1.06	3.22	0.81	0.77	0.34	0.63	0.88	0.95	0.38	0.40	0.40
tamborinea												
M (N=1)	**Mean**	**1.09**	**3.12**	**0.65**	**0.71**	**0.27**	**0.65**	**0.98**	**1.00**	**0.43**	**0.49**	**0.37**

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
tamborinea	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
						Collessicoris						
bellissimus												
M (N=5)	**Mean**	**0.93**	**2.98**	**0.56**	**0.69**	**0.33**	**0.57**	**0.88**	**1.01**	**0.35**	**0.35**	**0.37**
	SD	0.01	0.06	0.00	0.01	0.00	0.01	0.00	0.03	0.02	0.01	0.01
	Range	0.02	0.15	0.01	0.02	0.01	0.02	0.01	0.06	0.03	0.02	0.03
	Min	0.92	2.92	0.56	0.68	0.33	0.56	0.88	0.98	0.33	0.35	0.35
	Max	0.94	3.07	0.56	0.70	0.33	0.57	0.89	1.05	0.37	0.37	0.38
F (N=5)	**Mean**	**0.86**	**2.82**	**0.64**	**0.82**	**0.48**	**0.61**	**0.86**	**0.94**	**0.27**	**0.32**	**0.32**
	SD	0.03	0.08	0.01	0.01	0.01	0.01	0.02	0.02	0.02	0.04	0.00
	Range	0.07	0.20	0.02	0.02	0.02	0.02	0.06	0.03	0.05	0.10	0.01
	Min	0.82	2.72	0.63	0.81	0.48	0.60	0.83	0.92	0.24	0.27	0.31
	Max	0.89	2.92	0.65	0.83	0.49	0.62	0.88	0.95	0.29	0.37	0.32
						Ctypomiris						
solomensis												
M (N=2)	**Mean**	**0.78**	**2.45**	**0.48**	**1.15**	**0.59**	**0.52**	**0.75**	**1.63**	**0.28**	**0.34**	**0.27**
	SD	0.02	0.11	0.01	0.82	0.43	0.01	0.02	1.12	0.01	0.01	-
	Range	0.02	0.15	0.02	1.16	0.61	0.01	0.03	1.58	0.02	0.02	-
	Min	0.77	2.38	0.48	0.57	0.29	0.52	0.73	0.84	0.27	0.33	0.27
	Max	0.79	2.52	0.49	1.73	0.89	0.52	0.76	2.43	0.29	0.35	0.27
						Gulacapsus						
australiensis												
M (N=1)	**Mean**	**0.89**	**3.32**	**0.73**	**0.68**	**0.16**	**0.56**	**0.75**	**1.10**	**0.40**	**0.40**	**0.40**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
F (N=1)	**Mean**	**0.92**	**3.02**	**0.79**	**0.67**	**0.24**	**0.52**	**0.76**	**1.02**	**0.37**	**0.35**	**0.33**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
australiensis	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
						Johnstonsoni						
phalarosus												
M (N=2)	**Mean**	**0.64**	**2.20**	**0.45**	**0.52**	**0.28**	**0.41**	**0.64**	**0.68**	**0.26**	**0.34**	**0.23**
	SD	-	0.04	0.01	0.01	-	-	0.01	-	0.01	0.03	0.01
	Range	-	0.05	0.02	0.01	-	-	0.02	-	0.02	0.05	0.02
	Min	0.64	2.18	0.44	0.52	0.28	0.41	0.63	0.68	0.25	0.32	0.22
	Max	0.64	2.23	0.46	0.52	0.28	0.41	0.65	0.68	0.27	0.37	0.24
F (N=3)	**Mean**	**0.71**	**2.23**	**0.47**	**0.52**	**0.30**	**0.46**	**0.64**	**0.58**	**0.24**	**0.28**	**0.24**
	SD	0.08	0.13	0.01	0.02	0.01	0.10	0.01	0.01	0.01	0.01	0.01
	Range	0.15	0.25	0.02	0.04	0.02	0.19	0.02	0.02	0.02	0.02	0.02
	Min	0.64	2.08	0.46	0.50	0.29	0.38	0.63	0.57	0.24	0.27	0.24
	Max	0.79	2.33	0.48	0.54	0.30	0.57	0.65	0.59	0.25	0.29	0.25
						Leucophoroptera						
gloriosa												
M (N=1)	**Mean**	**0.84**	**2.87**	**0.52**	**0.67**	**0.84**	**0.51**	**0.83**	**0.98**	**0.35**	**0.40**	**0.43**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
kangrooina												
M (N=4)	**Mean**	**0.88**	**2.70**	**0.53**	**0.61**	**0.89**	**0.44**	**0.71**	**2.77**	**0.31**	**0.33**	**0.35**
	SD	0.02	0.06	0.02	0.01	0.08	0.02	0.03	0.05	0.02	0.02	0.02
	Range	0.05	0.15	0.04	0.03	0.17	0.05	0.06	0.10	0.03	0.05	0.03
	Min	0.84	2.62	0.51	0.59	0.77	0.41	0.68	2.72	0.29	0.30	0.33
	Max	0.89	2.77	0.55	0.62	0.94	0.46	0.74	2.82	0.32	0.35	0.37
F (N=2)	**Mean**	**0.73**	**2.50**	**0.57**	**0.63**	**0.34**	**0.45**	**0.72**	**0.81**	**0.29**	**0.32**	**0.33**
	SD	0.02	0.04	-	0.02	-	0.01	0.01	-	0.01	-	0.01
	Range	0.02	0.05	-	0.02	-	0.02	0.02	-	0.01	-	0.02
	Min	0.72	2.48	0.57	0.62	0.34	0.44	0.71	0.81	0.29	0.32	0.32
	Max	0.74	2.52	0.57	0.64	0.34	0.46	0.73	0.81	0.29	0.32	0.33

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
quadrimaculata												
M (N=5)	**Mean**	**0.97**	**3.33**	**0.53**	**0.62**	**0.31**	**0.47**	**0.79**	**3.47**	**0.41**	**0.38**	**0.49**
	SD	0.03	0.22	0.01	0.01	0.01	0.02	0.03	0.18	0.02	0.03	0.04
	Range	0.05	0.52	0.02	0.03	0.02	0.05	0.06	0.35	0.05	0.06	0.08
	Min	0.94	3.07	0.52	0.60	0.30	0.44	0.76	3.27	0.38	0.35	0.46
	Max	0.99	3.59	0.54	0.63	0.32	0.49	0.83	3.61	0.43	0.41	0.54
F (N=5)	**Mean**	**0.79**	**2.67**	**0.51**	**0.66**	**0.37**	**0.46**	**0.76**	**0.99**	**0.32**	**0.35**	**0.34**
	SD	0.01	0.04	0.01	0.01	0.01	0.01	0.01	0.06	0.01	0.02	0.02
	Range	0.02	0.10	0.03	0.02	0.03	0.03	0.02	0.14	0.02	0.03	0.06
	Min	0.77	2.62	0.49	0.65	0.35	0.44	0.75	0.90	0.31	0.33	0.30
	Max	0.79	2.72	0.52	0.67	0.38	0.48	0.76	1.05	0.33	0.37	0.37
						Missanos						
gulafuscus												
M (N=1)	**Mean**	**0.69**	**2.62**	**0.56**	**0.72**	**0.19**	**0.57**	**0.75**	**0.65**	**0.29**	**0.32**	**0.37**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
F (N=1)	**Mean**	**0.74**	**2.48**	**0.56**	**0.69**	**0.33**	**0.53**	**0.70**	**0.54**	**0.21**	**0.19**	**0.40**
	SD	-	-	-	-	-	-	-	-	-	-	-
	Range	-	-	-	-	-	-	-	-	-	-	-
	Min	-	-	-	-	-	-	-	-	-	-	-
	Max	-	-	-	-	-	-	-	-	-	-	-
						Papuamiroides						
elongatus												
M (N=2)	**Mean**	**0.75**	**2.80**	**0.58**	**0.67**	**0.28**	**0.59**	**0.73**	**1.02**	**0.25**	**0.23**	**0.48**
	SD	0.02	0.04	0.01	0.03	0.01	0.02	0.02	0.02	0.03	0.03	-
	Range	0.02	0.05	0.02	0.04	0.02	0.03	0.03	0.03	0.05	0.05	-
	Min	0.74	2.77	0.57	0.65	0.27	0.57	0.71	1.00	0.22	0.21	0.48
	Max	0.77	2.82	0.59	0.69	0.29	0.60	0.75	1.03	0.27	0.25	0.48
F (N=2)	**Mean**	**0.72**	**2.57**	**0.62**	**0.66**	**0.35**	**0.56**	**0.65**	**0.88**	**0.22**	**0.19**	**0.44**
	SD	0.04	0.07	0.02	0.02	0.01	0.01	0.07	0.03	0.02	0.02	0.01
	Range	0.05	0.10	0.03	0.02	0.01	0.02	0.10	0.05	0.03	0.03	0.02

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
elongatus	Min	0.69	2.52	0.60	0.65	0.35	0.56	0.60	0.86	0.21	0.17	0.43
	Max	0.74	2.62	0.63	0.67	0.36	0.57	0.70	0.90	0.24	0.21	0.44
						Sejanus						
brittoni												
M (N=18)	**Mean**	**1.11**	**2.89**	**0.45**	**0.65**	**0.23**	**0.40**	**0.91**	**0.82**	**0.40**	**0.46**	**0.42**
	SD	0.07	0.17	0.01	0.02	0.01	0.02	0.04	0.03	0.02	0.02	0.04
	Range	0.25	0.64	0.03	0.06	0.04	0.06	0.14	0.13	0.08	0.08	0.13
	Min	0.99	2.48	0.43	0.60	0.20	0.37	0.82	0.75	0.35	0.41	0.33
	Max	1.24	3.12	0.46	0.67	0.24	0.43	0.96	0.87	0.43	0.49	0.46
F (N=13)	**Mean**	**1.20**	**2.53**	**0.47**	**0.63**	**0.31**	**0.40**	**0.96**	**0.69**	**0.40**	**0.49**	**0.39**
	SD	0.05	0.10	0.01	0.01	0.01	0.01	0.04	0.03	0.01	0.02	0.02
	Range	0.15	0.45	0.03	0.03	0.02	0.05	0.11	0.10	0.05	0.08	0.06
	Min	1.14	2.33	0.44	0.62	0.30	0.38	0.90	0.65	0.37	0.44	0.37
	Max	1.29	2.77	0.48	0.65	0.32	0.43	1.02	0.75	0.41	0.52	0.43
howardae												
M (N=3)	**Mean**	**0.97**	**2.16**	**0.45**	**0.66**	**0.21**	**0.40**	**0.85**	**0.75**	**0.37**	**0.46**	**0.29**
	SD	0.03	0.11	0.01	0.03	0.01	0.02	0.06	0.02	0.02	0.04	0.01
	Range	0.05	0.20	0.02	0.06	0.02	0.03	0.13	0.03	0.03	0.06	0.02
	Min	0.94	2.03	0.44	0.63	0.21	0.38	0.78	0.73	0.35	0.41	0.29
	Max	0.99	2.23	0.46	0.69	0.22	0.41	0.90	0.76	0.38	0.48	0.30
F (N=3)	**Mean**	**1.06**	**2.18**	**0.41**	**0.57**	**0.28**	**0.39**	**0.86**	**0.69**	**0.35**	**0.42**	**0.30**
	SD	0.02	0.13	0.02	0.00	0.01	0.01	0.02	0.01	0.02	0.02	0.03
	Range	0.05	0.25	0.03	0.01	0.02	0.02	0.03	0.02	0.03	0.05	0.05
	Min	1.04	2.08	0.40	0.56	0.27	0.38	0.84	0.68	0.33	0.40	0.29
	Max	1.09	2.33	0.43	0.57	0.29	0.40	0.87	0.70	0.37	0.44	0.33
palumae												
M (N=2)	**Mean**	**1.03**	**2.61**	**0.48**	**0.67**	**0.29**	**0.46**	**0.90**	**0.96**	**0.41**	**0.47**	**0.33**
	SD	0.02	0.02	-	0.01	-	-	0.01	0.01	-	0.01	-
	Range	0.02	0.02	-	0.01	-	-	0.02	0.02	-	0.02	-
	Min	1.01	2.60	0.48	0.67	0.29	0.46	0.89	0.95	0.41	0.46	0.33
	Max	1.04	2.62	0.48	0.67	0.29	0.46	0.90	0.97	0.41	0.48	0.33
F (N=3)	**Mean**	**1.15**	**2.58**	**0.48**	**0.66**	**0.32**	**0.48**	**0.99**	**0.78**	**0.40**	**0.49**	**0.36**
	SD	0.05	0.04	-	0.01	0.01	0.02	0.03	0.03	0.02	0.01	0.01

Table 3-1. continued.

Species		Total Width	Body Length	Height Head	Width Head	Width Vertex	Length Pronotum	Width Pronotum	Ant2 Length	Length scutellum	Width scutellum	Length Cuneus
palumae	Range	0.10	0.07	-	0.02	0.02	0.03	0.06	0.06	0.03	0.02	0.02
	Min	1.09	2.55	0.48	0.65	0.32	0.46	0.95	0.75	0.38	0.48	0.35
	Max	1.19	2.62	0.48	0.67	0.33	0.49	1.02	0.81	0.41	0.49	0.37
						Waterhouseana						
delicatas												
M (N=3)	**Mean**	**0.74**	**2.75**	**0.60**	**0.71**	**0.24**	**0.79**	**0.72**	**0.85**	**0.29**	**0.29**	**0.37**
	SD	-	0.04	0.01	0.01	0.02	0.01	0.01	0.01	-	0.04	-
	Range	-	0.05	0.02	0.02	0.02	0.02	0.01	0.02	-	0.06	-
	Min	0.74	2.72	0.59	0.70	0.23	0.78	0.71	0.84	0.29	0.25	0.37
	Max	0.74	2.77	0.60	0.71	0.25	0.79	0.72	0.86	0.29	0.32	0.37

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