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A new species of bent-toed gecko (*Cyrtodactylus*: Gekkonidae) from Seram Island, Indonesia

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Abstract

A new species of *Cyrtodacylus* is described from the island of Seram, Maluku Province, Indonesia. *Cyrtodactylus nuaulu* **sp. nov.** can be distinguished from other described *Cyrtodactylus* by the combination of moderate size, dorsal colouration consisting of relatively few large dark brown blotches, presence of a precloacal groove and whorls of dentate tubercles extending the length of the tail. The new species is the fourth reptile currently known only from Seram and surrounding islands, and the herpetofauna of this area appears to include a small but biogeographically significant endemic component.

Key words: *Cyrtodactylus,* Gekkonidae, Maluku, Wallacea

Introduction

With over 100 recognised species, *Cyrtodactylus* is the most speciose genus of gekkonid lizards (Hayden *et al.* 2008; Uetz & Hallerman 2009). However, it is clear that diversity is still underestimated and new species are being described from across the range of the genus at a rapid rate (e.g. Bauer 2003; Batuwita & Bahir 2005; Rösler *et al.* 2007; Ngo & Bauer 2008; see Uetz & Hallerman 2009 for the most complete list of recent descriptions). While many new species are morphologically similar to known forms and can only be differentiated with careful morphological analysis (Batuwita & Bahir 2005), others are highly distinctive and difficult to confuse with any known species (Kraus 2007; Hayden *et al.* 2008; Linkem *et al.* 2008).

The Indonesian Maluku Islands lie to the east of Wallace's Line in a region known as Wallacea, at the interchange of the Asian and Australian biogeographic zones. The herpetofauna of these islands is poorly documented, with few recent targeted surveys (Edgar & Lilley 1993). Currently, the known *Cyrtodactylus* fauna of the Maluku Islands is depauperate, with just two recognised species *C. halmahericus* (Mertens) and *C. deveti* (Brongersma). The former is a relatively small mottled species known from across the archipelago (Hayden *et al.* 2008; Iskandar pers obs.). The latter is very poorly known and apparently restricted to the northern island of Halmahera. While conducting field research on the southern Maluku Island of Seram in the 1980's two of the authors (PE & RL) collected a small series of a distinctive *Cyrtodactylus* that is readily distinguished from all congeners, both from Maluku and elsewhere in the range of the genus. This species is described herein.

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Materials and methods

Two of the authors (PE and RL) and a team of volunteers conducted surveys in what is now recognised as Manusela National Park between the 26th July and the 6th December, 1987. Collection protocols included pitfall trapping and timed nocturnal and diurnal visual searches. Specimens were fixed in 10% formalin and stored in 60% alcohol. Survey methodologies are outlined in further detail in Edgar and Lilley (1993).

The following measurements were taken with digital callipers to the nearest 0.1 mm and largely follow Kraus (2007); snout-vent length from the tip of the snout to the anterior edge of the cloaca (SVL), tail length from the posterior edge of the vent to the tip of the tail (TL), trunk length from posterior axilla to anterior groin (TrL), distance from anterior edge of nares to eye (EN), head length from tip of snout to anterior margin of ear opening (HL), maximum head width (HW), maximum head depth (HH), forearm length from base of palm to elbow (FA), crus length from base of heel to knee (CS), transverse diameter of eye (EYE) and transverse diameter of ear (EAR). We counted left and right supra (SUPR) and infralabials (INFR), dorsal tubercle rows at the midpoint of body (DTR), tubercles in lateral fold (LTTUB), ventrals at midpoint of body (VENT), subdigital lamellae (LAM) under 1st and 4th toes on right and left sides, precloacal pores when present (PORES) and postcloacal tubercles (PATUB). Comparative material from the following institutions was examined; Australian Museum (AMS), South Australian Museum (SAMA), Western Australian Museum (WAM) and Museum Zoologicum Bogoriense (MZB). Specimens examined are given in Appendix 1. Further comparative data was taken from De Rooij 1915, Brongersma 1934 and Rösler *et al.* 2007.

Systematics

***Cyrtodactylus nuaulu* sp. nov.**
Figures 1–2

Holotype: MZB lace 2326 (F-num S80) adult male, 26/08/87, ~50m asl, Solea (2°51' S, 129° 39' E), Manusela National Park, central Seram Island, Maluku Province, Indonesia, collected by P. Edgar and R. Lilley.

Paratypes: MZB lace 2325 (F-num S52) adult male, 20/10/87, MZB lace 2327 (F-num S152) adult female, 13/09/87 with same locality and collector details as holotype; MZB lace 2328 (F-num S203) adult female 20/10/87 and MZB lace 2329 (F-num S227) juvenile 29/10/87 from Waikawa, Manusela National Park, 3 km from Saunulu Village, inland from Japutih (3°17' S 129°31' E) southern Seram Island, Maluku Province, Indonesia.

Diagnosis. *Cyrtodactylus nuaulu* **sp. nov.** can be distinguished from all other Melanesian and Wallacean *Cyrtodactylus* by the following unique combination of character states: moderate size (SVL up to 88.5mm); relatively slender body with robust head (HW/SVL 0.187–0.195); deep precloacal groove with low number of pores (6); femoral pores absent; subcaudal scales granular, not transversely enlarged; small dentate tubercles over the dorsum and along the lateral fold; whorls of prominent dentate tubercles extending to the tip of the tail; and dorsal colouration consisting of relatively few large indistinct transverse and/or longitudinal dark brown blotches.

Description of holotype. A moderately large (81.7 SVL mm) and slender gecko. Head long (HL/SVL 0.253), moderately wide (HW/HL 0.744) and distinct from neck. Snout tapering to relatively blunt tip in dorsal profile, relatively long (longer than eye diameter), loreal region weakly inflated, interorbital region and top of snout strongly concave, canthus rostralis smoothly rounded. Eyes very large with vertical pupil. Supracillaries extending from anterior-ventral to posterior-dorsal edge of eye, longest at the anterior-dorsal corner. Ear opening small, dorso-ventrally flattened, and oriented at 45 degrees to apex of rictus with dorsal edge posteriormost, bordered by small indistinct ventral skinfold.

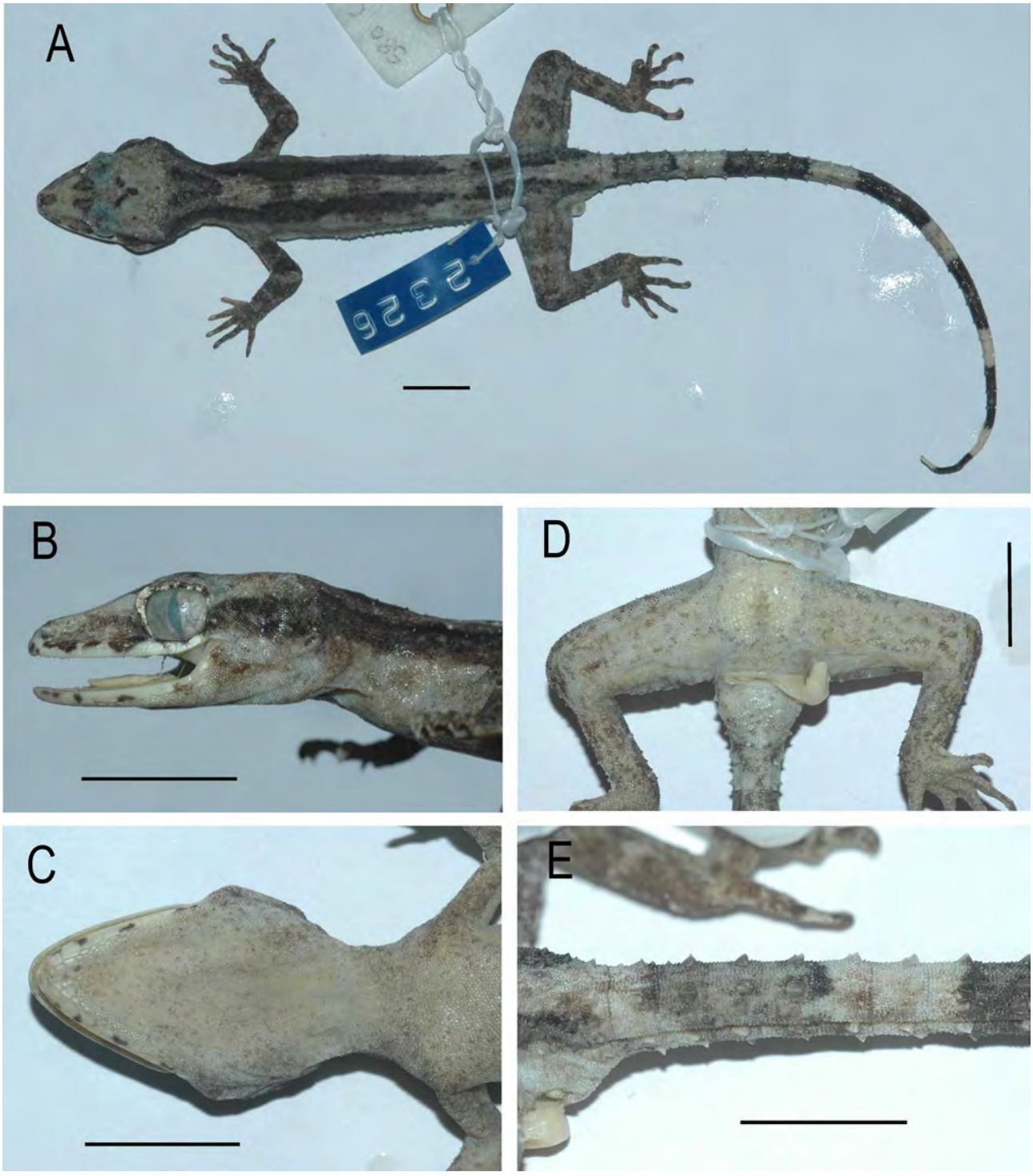

FIGURE 1. Details of holotype (MZB lace 2326) of *Cyrtodactylus nuaulu* **sp. nov.** A) dorsal view of whole animal B) lateral view of head and neck C) ventral view of head and neck D) ventral view of cloacal region and E) anterior section of tail showing whorls of enlarged dentate tubercles and lateral groove. Scale = 10 mm.

Rostral approximately twice as wide as high, with short medial suture, widest at the ventral edge of the nares, bordered dorsally by right supranasal, larger rounded internasal, and damaged left supranasal. Nares bordered by first supralabial, rostral, first supranasal (point contact only) and series of three elongate postnasals. Supralabials: 10 on right lip and 11 on left, 7 or 8 to midpoint of eye, supralabials anterior to eye

much broader than high and bordered dorsally by a single series of variably sized enlarged scales. Head scales small and granular, temporal and nuchal scales smaller than those on snout, scattered small conical tubercles on temporal and nuchal regions. Infralabials to rictus: 9 on right, 10 on left, all much broader than high, bordered by several rows of enlarged scales grading into small and granular gular scales. Mental triangular, approximately as wide as long, bordered by first infralabials and two diamond-shaped postmentals in contact for approximately 50% of their length.

FIGURE 2. Dorsal view of type series of *Cyrtodactylus nuaulu* **sp. nov.** From left to right MZB lace 2325, MZB lace 2326 (holotype), MZB lace 2327, MZB lace 2328, MZB lace 2329. Scale = 20 mm.

Body elongate (TrL/SVL 0.494) with moderately distinct ventrolateral folds. Moderately tuberculate, lateral fold with distinct dentate tubercles separated from each other by 2–6 granules, posterior tubercles closer together. Dorsum with approximately fourteen rows (including lateral fold) of dentate tubercles. Dorsal scales small and granular. Ventral scales much larger than dorsal scales, increasing in size medially, arranged in approximately 51 rows at midpoint of body. Prominent raised straight precloacal groove surrounded by several rows of enlarged ventral scales, largest scales at base of groove containing 3 precloacal pores on each side. Distinctly enlarged rows of femoral scales absent.

Forelimbs relatively elongate (FA/SVL 0.158), hindlimbs much more robust than forelimbs (CS/SVL 0.191). Lateral and dorsal surfaces of limbs with rows of dentate tubercles. Digits long and well developed, inflected at basal interphalageal joints; subdigital lamellae smooth, rounded, undivided and expanded proximal to joint inflection; large recurved claws sheathed by a dorsal and ventral scale. Slight basal webbing between digits II–IV on both manus and pes; lamellae on digits I /IV of manus 8/15R 10/15L and pes 12/17R 9/15L.

Tail original, long and slender, tapering to point with distinct lateral groove extending approximately two thirds its length. Caudal scales granular, increasing in size ventrally, numerous rows of prominent dentate tubercles extending along all surfaces of tail for its full length, including 2 ventral rows. Hemipenal bulge swollen and prominent, left hemipenis everted, two enlarged postcloacal tubercles present at base of tail.

Colouration. Dorsal ground colour light brownish grey with extensive fine brown flecking; a pair of almost continuous (broken just anterior to the hindlimbs) dark brown dorsolateral streaks extend from behind the eye to base of the tail; 2 darkish brown transverse blotches between the fore and hindlimbs. Nuchal region light brown with dark brown V-shaped blotch. Lateral regions light grey with small amounts of dark brown pigmentation forming indistinct scattered blotches and a faint discontinuous brown ventro-lateral stripe between fore and hindlimbs, strongest anteriorly and becoming very indistinct posteriorly. Venter grey with scattered light brown speckling, densest between the forelimbs.

Head light grey dorsally, bordering relatively sharply against brown nuchal region, three small dark brown blotches forming Y-shape just posterior to orbital, additional dark brown longitudinal blotches medial to both eyes, above the rostrum and along the dorsal edge of the off-white supralabials. Supracillaries off-white and dark brown. Broad indistinct lateral band extends from orbital, above ear, and joins dorsolateral bands on the body. Infralabials off-white with scattered small dark brown blotches, ventral surface of lower jaw yellowish-grey with scattered indistinct greyish-brown flecking.

Limbs dorsally light greyish brown with wide indistinct dark brown bands; bands on hindlimbs much lighter than forelimbs; digits mottled light and dark brown, with off-white bands proximal to claws. Ventrally limbs and digits greyish yellow with extensive brown speckling and blotching, especially on the crus. Tail with six wide dark brown bands and six (including tail tip) narrower light greyish to off-white bands; posteriormost dark bands slightly broken up by small amounts of light grey mottling.

Variation. Comparative mensural and meristic data for the holotype and paratypes is given in Table 1. While broadly consistent, the colouration of the adult types shows significant differences (Fig. 2). All adult paratypes possess three dark to very dark brown transverse bands or blotches between the fore and hindlimbs (versus two in the holotype). The shape and definition of these marking also varies considerably; the holotype is the only specimen with dark dorsolateral stripes that extend to the legs, on other specimens these stripes tend to be lighter and at most extend to the midpoint of the body. The extent and darkness of other dorsal marking also varies, although all specimens possess a dark nuchal V- or Y-shape and at least some dark mottling or blotches between the eyes. The base dorsal colour of MZB lace 2328 is more brownish than grey. All types have at least some brown mottling on the ventral and lateral surfaces, however the density and extent of pigmentation again varies (the venter of MZB lace 2335 is particularly densely flecked).

On the two adult individuals with original tails the number of bands varies from five to six (dark bands) to four to five (light bands); the tip of the original tail is dark in one of the paratypes (MZB lace 2325) as opposed to light in the holotype (MZB lace 2326). MZB lace 2327 has an almost complete original tail (1.5cm regrown at the tip) which was broken at collection, with five light and five dark bands. Approximately 60% of the tail on paratype MZB lace 2328 is original with three off white bands and two greyish brown bands; the regrown section is yellowish off-white with extensive brown pigmentation, no tubercles and uniform scalation.

MZB lace 2329 is a recently hatched juvenile, with original tail that was broken at collection and a circular patch of skin missing from around the left ear. The dorsal pattern on this specimen is simplified relative to the adult types and consists of two brown longitudinal dorsolateral streaks, a dark brown nuchal blotch and small brown blotch at the midpoint of the hindlegs. The lateral and ventral regions are also relatively plain with less brown pigmentation than the other types.

Comparisons. The whorls of dentate tubercles extending to the tip of the original tail readily distinguish C. *nuaulu* **sp. nov.** from its two recognised Moluccan congeners; *C. deveti* and *C. halmahericus*. *Cyrtodactylus deveti* can be further distinguished by its more robust build, absence of a precloacal groove, possession of several rows of enlarged femoral scales, and much larger ventral caudal scales. *Cyrtodactylus halmahericus*, collected both sympatrically and on other Moluccan islands, are smaller (<74mm), have a long continuous series of precloacal and femoral pores (21–26), have at most a few small spines and tubercles on the anterior portion of tail only, lack enlarged ventrolateral tubercles at any point on the tail and have a dorsal body pattern consisting of more than three transverse dark brown bands or series of blotches.

TABLE 1. Measurements (in mm) and scale counts for the type series of *Cyrtodactylus nuaulu* **sp. nov.**

	MZB2326 holotype	MZB2325 paratype	MZB2327 paratype	MZB2328 paratype	MZB2329 paratype
Sex	m	m	f	f	juv
SVL	81.7	86.3	88.4	76.9	35.7
TL	106.0	107.0	101.0	78.5	41.0
Original tail	100%	100%	85%	60%	100%
Regrown tail	na	na	15%	40%	na
TrL	38.1	42.6	43.9	37.4	16.5
HL	21.6	21.9	23.3	20.3	10.1
HW	15.8	16.2	17.0	14.6	7.0
HH	9.9	9.9	11.0	8.4	4.2
EYE	4.8	5.5	5.4	4.9	2.8
FA	13.3	13.6	14.1	13.4	7.2
EN	7.4	7.9	8.5	7.1	3.7
IN	2.6	2.7	3.0	2.4	1.4
EAR	1.3	1.9	2.1	1.3	na
CS	15.6	16.5	16.4	15.4	7.0
SUPR(R)	10	12	12	11	12
SUPR(L)	11	11	11	11	12
INFR(R)	9	9	10	10	10
INFR(L)	10	9	10	10	9
POMEN	2	2	2	2	2
DTR	13–14	14	14	13–14	15–16
LTTUBR	25	26	28	23	20
LTTUBL	25	26	26	22	21
VENT	51	48	55	49	na
LAM1R	9	11	10	11	11
LAM1L	12	11	11	11	12
LAM4R	15	19	18	20	18
LAM4L	17	20	19	19	19
PORES	6	6	0	0	na
PATUB	2	2	2	2	1

Populations of small *Cyrtodactylus* ascribed to *C. papuensis* (Brongersma) from New Guinea and surrounding islands, lack enlarged tubercles on the tail and dorsum, are smaller (<70mm), and often have a distinct dorsal pattern including dark cross-bands. The new species can be distinguished from all other Melanesian *Cyrtodactylus* by the presence of a precloacal groove. It can be further distinguished from the only other Melanesian species with enlarged tubercles along the tail, *Cyrtodactylus serratus* Kraus, (and related members of the *C. loriae* and *C. louisiadensis* species groups sensu Rösler *et al.* 2007) by its relatively small size and very small ventral caudal scales.

Cyrtodactylus darmandvillei (Weber) from the Lesser Sundas lacks a precloacal groove, is much more robust and has much larger trihedral tubercles across the dorsum (see figure in De Rooji 1915). *Cyrtodactylus wetariensis* (Dunn), also from the lesser Sundas, is smaller <70mm, possesses large trihedral dorsal tubercles

and has 12–13 femoral pores on each hindlimb (Dunn 1927). *Cyrtodactylus spinosus* Linkem *et al.* from Sulawesi has long thin spines along the lateral fold, on the tail and on the postantefemoral region of the hindlimbs (Linkem *et al.* 2008). Other Indonesian *Cyrtodactylus* from islands to the west and north of Seram lack rings of enlarged tubercles extending the full length of the tail. Of the most geographically proximate species, *C. marmoratus* (Gray) (Java) and *C. fumosus* (Müller) (Java and Sulawesi) can be distinguished by possessing a femoral pore series, while *C. jellesmae* (Boulenger) and *C. wallacei* Hayden *et al.* from Sulawesi lack a precloacal groove; all these species also have far more extensive and darker transverse banding or blotching across the dorsum (Hayden *et al.* 2008).

Distribution and Natural History. *Cyrtodactylus nuaulu* **sp. nov.** is only known from two localities in lowland rainforest from the island of Seram. The forest around the type locality was dominated by *Eucalyptus deglupta* and *Shorea* sp. All adult types were collected by hand at night between 50–200cm above the ground, head down on trees and vines. The juvenile paratype was collected in a pit-trap at night. Other geckos collected in sympatry or near sympatry were *Cyrtodactylus halmahericus*, a probably undescribed small (<41mm) *Nactus sp.* (listed as *Cyrtodactylus pelagicus* in Edgar & Lilley 1993) and *Gehyra mutilata*. Both collection localities are in Manusela National Park, which at the time of collection, was being threatened by illegal logging and conversion of forest to gardens.

Eytmology. Named in honour of the Nuaulu people of south Seram.

TABLE 2. Diagnostic comparisons of *Cyrtodactylus nuaulu* against congeners from eastern Indonesia, 0 indicates absence of character, 1 indicates presence. Characters states are modified from Linkem *et al.* 2008. 1) lateral tubercles extending to tip of tail 2) enlarged subcaudals 3) precloacal pores present 4) enlarged precloacal scales present 5) precloacal pores contained within a deep precloacal groove 6) femoral and preclocal pores in continuous series 7) femoral pores present 8) dorsal coluration either banded (8) blotched (9) striped (10) or relatively plain with few scattered markings (11). Character states are based on examination of specimens in Appendix 1 in addition to data from Linkem *et al.* 2008 and Dunn 1927.

Taxon	SVL	1	2	3	4	5	6	7	8	9	10	11
nuaulu	77–88	1	0	1	1	1	0	0	0	1	1	0
aaroni	70–86.5	0	1	1	1	0	0	1	1	0	0	0
darmandvillei	85	1	1	1	1	0	0	1	0	0	0	1
deveti	79–91	0	1	1	1	0	1	1	0	0	0	0
fumosus	76	0	0	1	1	1	0/1	1	0	1	0	0
halmahericus	<74	0	0	1	1	1	1	1	1	1	0	0
irianjayaensis	147–163	0	1	1	1	0	1	1	0	1	0	0
jellesmae	63–75	0	0	0	0	0	0	0	0	1	0	0
laevigatus	38–47	0	0	0	0	0	0	0	0	1	0	0
mimikanus	95	0	1	1	1	0	0	1	1	0	0	0
papuensis	61–65	0	0	1	1	1	0	0	0	1	0	0
sermowaiensis	68–93.5	0	0	0	0	0	0	0	0	1	0	0
spinosus	70–83	1	0	1	1	1	0	1	1	0	0	0
wallacei	92–114	?	?	0	1	0	0	0	0	1	0	0
wetariensis	70	1	?	1	1?	0	0	1	0	0	0	1
zugi	136–159	0	1	1	1	0	1	1	0	1	0	0

Discussion

Cyrtodactylus nuaulu **sp. nov.** shows a combination of morphological characters that is very distinctive and does not strongly suggest a close relationship with any described *Cyrtodactylus*. While biogeographic studies

and field surveys have found that the mammal, bird and frog fauna of Seram have a strong Melanesian influence (Edgar & Lilley 1993; Helgen 2003), most Melanesian *Cyrtodactylus* lack a precloacal groove, possess obvious femoral pores and have a relatively robust build. We tentatively suggest that *Cyrtodactylus nuaulu* **sp. nov.** is most likely to be allied to a number of smaller bodied, relatively gracile taxa with precloacal grooves distributed both to the west (*C.* cf *marmoratus*) and east (*C. halmahericus, C. papuensis*) of Wallace's Line. Nonetheless, we emphasise that the distinctive morphology of this species makes this association tenuous at best.

Seram and surrounding islands (especially Buru) are recognised areas of endemism for birds (Stattersfield *et al.* 1998) and mammals (Flannery 1995; Helgen 2003). With the description of *Cyrtodactylus nuaulu* **sp. nov.** (known only from Seram) four reptile species are known to be endemic to this region of the Maluku Islands. The other endemic and near endemic species (also found on the neighbouring small island of Ambon) are the recently described monitor *Varanus ceramboinensis* (Philipp *et al.* 1999), *Carlia leucotaenia* and *Calamaria ceramensis*. Not surprisingly given the biogeographic position of Seram, these endemics include representatives of both Australasian (*Carlia*) and Asian (*Calamaria*) groups. As with mammals and birds, it seems that the herpetofauna of Seram and surrounding islands includes a small but significant and biogeographically interesting endemic component. It would also seem likely that further taxonomic and survey work in Seram and surrounding islands will add to this total. In particular the neighbouring large island of Buru remains very poorly explored and should be a priority for further surveys.

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Literature cited

Batuwita, S. & Bahir, M.M. (2005) Description of five new species of *Cyrtodactylus* (Reptilia: Gekkonidae) from Sri Lanka. *Raffles Bulletin of Zoology.* Supp No. 12, 231–380.

Bauer, A.M. (2003) Descriptions of seven new *Cyrtodactylus* (Squamata: Gekkonidae) with a key to the species of Myanmar. *Proceedings of the California Academy of Sciences*, 54, 463–498.

Brongersma, L.D. (1934) Contributions to the Indo-Australian Herpetology. *Zoologische Mededelingen, Leiden*, 17, 161–251.

Dunn, E.R. (1927) Results of the Douglas Burden Expedition to the island of Komodo. III. Lizards from the East Indies. *American Museum Novitates*, 288.

De Rooij, N. (1915) *The Reptiles of the Indo-Australian Archipelago. I. Lacertilia, Chelonia and Emydosauria*. Leiden. Reprint A. Asher and Co. N.V. Vaals 1970.

Edgar, P. & Lilley, R. (1993) Herpetofauna survey of Manusela National Park. Chapter 8. *In*: Edwards, I.D., McDonald, A.A. & Proctor, J. (Eds). *Natural History of Seram.* Intercept Ltd, Hampshire, England, pp. 131–141.

Flannery, T.F. (2005) *The mammals of the south-west Pacific & Moluccan Islands.* Cornell University Press, Ithaca.

Hayden, C.J., Brown, R.M., Gillespie, G., Setiadi, M.I., Linkem, C.W., Iskandar, D.T., Umilaela, Bickford, D.P., Riyanto, A., Mumpuni & McGuire, J.A. (2008) A new species of bent-toed gecko *Cyrtodactylus* Gray, 1827 (Squamata: Gekkonidae) from the island of Sulawesi, Indonesia. *Herpetologica* 64, 109–120.

Helgen, K.M. (2003) A review of the rodent fauna of Seram, Moluccas, with the description of a new subspecies of

mosaic-tailed rat, *Melomys rufescens paveli*. *Journal of Zoology, London* 261, 165–172.
Kraus, F. (2007) A new species of *Cyrtodactylus* (Squamata: Gekkonidae) from western Papua New Guinea. *Zootaxa* 1425, 63–-68.
Linkem, C.W., McGuire, J.A., Hayden, C.J., Setiadi, M.I., Bickford, D.P. & Brown, R.M. (2008) A new species of bent-toe gecko (Gekkonidae: *Cyrtodactylus*) from Sulawesi Island, eastern Indonesia. *Herpetologica*, 64, 224–234.
Ngo, V.T. & Bauer, A.M. (2008) Descriptions of two new species of *Cyrtodactylus* Gray 1827 (Squamata: Gekkonidae) endemic to southern Vietnam. *Zootaxa*, 1715, 25–42.
Rösler, H., Günther, R. & Richards, S.J. (2007) Remarks on the morphology and taxonomy of geckos of the genus *Cyrtodactylus* Gray, 1827, occurring east of Wallacea, with description of two new species (Reptilia: Sauria: Gekkonidae). *Salamandra*, 43, 193–230.
Philipp, K. M, Böhme, W. & Ziegler, T. (1999) The identity of *Varanus indicus*: redefinition and description of a sibling species co-existing at the type locality (Sauria: Varanidae: *Varanus indicus* group). *Spixiana*, 22, 273–287.
Stattersfield, A.J., Corsby, M.J., Long, A.J. & Wege, D.C. (1998) Global directory of endemic bird areas. Cambridge UK: Birdlife International.
Uetz, P. & Hallerman, J. (2009) TIGR reptile database. www.reptile-database.org. (last accessed 4/5/2009)

Appendix 1. Material examined

Institutional abbreviations are given in materials and methods.

Cyrtodactylus darmandvillei (Weber) MZB lace 2005, Indonesia, Komodo National Park, Loh Liang, MZB lace 5297 Indonesia, East Flores, Mt Egon.
Cyrtodactylus deveti (Brongersma) MZB lace 6036, Indonesia, west Halmahera, Weda Village, MZB 6037, Indonesia, Halmahera, Tosoa Village.
Cyrtodactylus halmahericus (Mertens) MZB lace 6086, Indonesia, Maluku Province, southern Ternate Island, Gambesi Village, MZB lace 6088, 6091–92, Indonesia, Maluku Province, Ternate Island, Faramadiahi Village, MZB lace 6095 Indonesia, Maluku Province, east Halmahera, 17km from Lolobato National Park, MZB lace 1899, Indonesia, Seram, Manusela National Park, Sasarata, MZB lace 2360, Indonesia, Seram, Kanike, MZB lace 2359, 2361, Indonesia, Seram, Solea, MZB lace 2362, 2363, Indonesia, Seram, Saunulu, Waikawa.
Cyrtodactylus irianjayaensis Rösler MZB lace 5765, Indonesia, Papua Barat, Salawati Island.
Cyrtodactylus cf *irianjayaensis* MZB lace 2297 (seven specimens) 2298 (five specimens), Indonesia, Papua Barat, Sorong (from dealers premises).
Cyrtodactylus jellesmae (Boulenger) MZB lace 4647–51, Indonesia, south-east Sulawesi, Pulau Buton, Sungai Ladungkula, Kakenauwe Village.
Cyrtodactylus loriae (Boulenger) SAMA R62635, Papua New Guinea, Kikori Basin, Darai Plateau, SAMA R62636 Papua New Guinea, Eastern Highlands Province, Crater Mountain Wildlife Management Area, Herowana Village, SAMA R62637 Papua New Guinea, Southern Highlands Province, Moro, SAMA R8305, 8369, WAM R67688–9, Papua New Guinea, Chimbu Province, Karimui Village.
Cyrtodactylus mimikanus (Boulenger) MZB lace 3561-3565 Indonesia, Papua Province, Cyclops Mountains, Yongsu, MZB lace 3565–6 Indonesia, Papua Province, Furu River, MZB lace 2303 (2 specimens) Indonesia, Papua Province, Wapoga River Basin , Siewa.
Cyrtodactylus novaeguineae (Schlegel) AMS 129290, Papua New Guinea, East Sepik Province, Maprik, AMS 119548–50, Papua New Guinea,West Sepik Province, Torricelli Mts, Wigote, MZB lace 5435–6, Indonesia, Papua Barat, Foja Mountains, Marina Valen Village.
Cyrtodactylus salomonensis Rösler, Richards & Günther SAMA R56879 (holotype), SAMA R56780 (paratype), Solomon Islands, Santa Isabel Island, Kolopakisa.
Cyrtodactylus sermowaiensis (de Rooji) SAMA R62653 Papua New Guinea, Ramu, Kurumbukari.
Cyrtodactylus tripartitus Kraus SAMA R62638–644, Papua New Guinea, Milne Bay Province, Misima Island, Misima Mine site.
Cyrtodactylus tuberculatus (Lucas & Frost) SAMA R12058, SAMA R14002 Australia, Cooktown.
Cyrtodactylus zugi Oliver, Tjaturadi, Mumpuni, Krey & Richards MZB lace 5574 (holotype), MZB lace 5573, 5575 paratypes, Indonesia, Papua Barat, south coast of Batanta Island, MZB lace 7310, Indonesia, Papua Barat, Batanta.