

**A New Insular Species of Skink of The Genus *Sphenomorphus* Strauch 1887 (Squamata: Scincidae) from Pulau Perhentian Besar, Terengganu, Peninsular Malaysia**

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**Abstrak:** Satu spesies cicak (skink) kepulauan yang bersaiz kecil, *Sphenomorphus perhentianensis* sp. nov. dari Pulau Perhentian Besar dari Kepulauan Perhentian, Semenanjung Malaysia telah dibincangkan. Spesies ini dibezakan daripada kesemua 36 spesies Sundaland lain daripada spesies *Sphenomorphus* berpandukan sifat-sifat unik dari segi morfologi dan warna. Ciri-ciri unik ini termasuk ukuran snout–vent sebanyak 30.0 mm, 29 garisan sisik midbody, sisik berjalur dorsal yang licin, 65 paravertebrals, 61 ventrals, 4 supraoculars, parietals bersentuhan dengan supraocular paling-belakang, 1 sisik superciliary yang menonjol di tengah, 2 loreals, 6 supralabials dan infralabials, 10 lamellae di bawah jari keempat, subdigital lamellae yang licin, sisk preanal yang dibesarkan, tiada jalur badan, satu jalur dorsolateral yang berwarna coklat yang berlanjutan melepasi axilla, satu jalur dorsolateral yang berwarna putih-kuning pada tengkuk dan bahagian badan yang paling hadapan, dan tiada jalur postorbital yang berwarna putih-kuning. Penemuan kedua reptilia endemik di Kepulauan Perhentian menunjukkan biodiversiti herpetofauna yang tidak diketahui di dalamnya. Kajian tambahan akan menerangkan dua spesies lain daripada Kepulauan Perhentian.

**Kata kunci:** Kepulauan Perhentian, Pulau Perhentian Besar, Malaysia, Scincidae, *Sphenomorphus perhentianensis*

**Abstract:** A new species of small, insular, forest floor skink, *Sphenomorphus perhentianensis* sp. nov., is described from Pulau Perhentian Besar of the Perhentian Archipelago, Peninsular Malaysia. This species is differentiated from all other 36 Sundaland species of *Sphenomorphus* based on a unique collection of morphological and colour pattern characteristics. These unique characteristics include a snout-vent length of 30.0 mm, 29 midbody scale rows, smooth as opposed to striated dorsal scales, 65 paravertebrals, 61 ventrals, 4 supraoculars, parietals contacting the posterior-most supraocular, 1 medially projecting superciliary scale, 2 loreals, 6 supralabials and infralabials, 10 lamellae beneath the fourth toe, smooth subdigital lamellae, enlarged preanal scales, no body bands, a dark brown, diffuse, dorsolateral stripe extending to just past the axilla, a cream coloured dorsolateral stripe on the nape and anterior-most portion of the body, and no cream coloured postorbital stripe. The discovery of a second endemic reptile in the Perhentian Archipelago underscores the unrealized biodiversity of its herpetofauna. Additional works will describe two additional species from the Perhentian Archipelago.

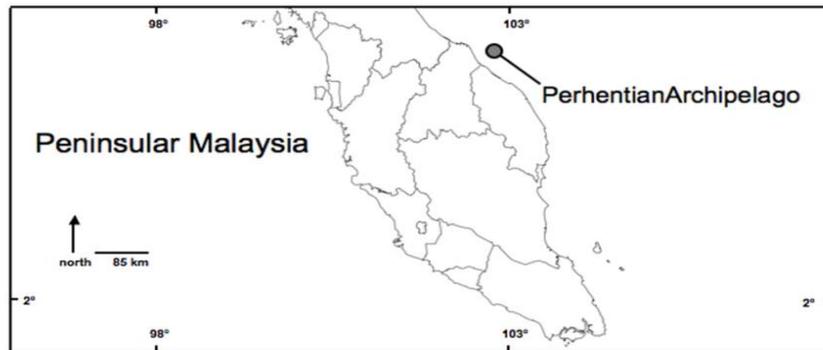
**Keywords:** Perhentian Archipelago, Pulau Perhentian Besar, Malaysia, Scincidae, *Sphenomorphus perhentianensis*

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## INTRODUCTION

*Sphenomorphus* Fitzinger 1843 is an unwieldy, paraphyletic group (Myers & Donnelly 1991; Reeder 2003) with a wide variety of adaptive types comprising at least 135 species (Brown & Alcalá 1980; Greer 1974, 1977, 1979, 1989; Grismer 2006a; Grismer 2007, 2008; Grismer et al. 2007; Manthey & Grossmann 1997; Lim 1998). These species range from India eastward through continental Asia and the Philippines and southward through the Indo-Australian Archipelago onto islands in the western Pacific. At least three species occur in México and Central America (Greer 1974; Myers & Donnelly 1991). On the Malay Peninsular and the islands east to Wallace's Line (i.e., Sundaland), *Sphenomorphus* is moderately diverse with at least 36 species (De Rooij 1915; Grismer 2006a; Grismer 2007, 2008; Grismer et al. 2007; Lim 1998; Inger et al. 2001; Iskandar 1994; Malkmus et al. 2002; Manthey & Grossmann 1997; Taylor 1963). Some of these are long-limbed, colourful, diurnal, terrestrial, and scansorial species whose foraging and basking behaviours make them conspicuous components of the ecosystems they inhabit. Others, however, are small, brownish, nondescript, secretive, leaf-litter specialists with short limbs, elongate bodies and long tails whose lifestyles leave them poorly understood and rarely seen. Many of these latter species are montane and insular endemics. In most cases, they are known only from the holotype or by fewer than four specimens (e.g., *S. butleri* [Boulenger 1912], *S. bukitensis* [Grismer 2007], *S. cameronicus* [Smith 1924], *S. cophias* [Boulenger 1908], *S. crassa* [Inger et al. 2001], *S. ishaki* [Grismer 2006a], *S. langkawiensis* [Grismer 2008], *S. puncticentralis* [Iskandar 1994], *S. sibuensis* [Grismer 2006a], and *S. tanahtinggi* [Inger et al. 2001]). Their secretive nature and microhabitat specialization make them particularly difficult to collect. Therefore, it is not unreasonable for these species to lack descriptive material based on a large series of specimens. In this paper, we report an additional small, secretive, insular, forest floor skink from the Perhentian Archipelago (Fig. 1). It is ascribed to the genus *Sphenomorphus* because it lacks supranasal scales, has a deeply sunk tympanum, five digits on both limbs, fewer than 30 subdigital lamellae on the fourth toe, two rows of supradigital scales on the fourth toe, inner preanal scales overlapping the outer preanal scales, and lower eyelids composed of multiple small scales (Lim 1998; Taylor 1963). Additionally, it has a unique suite of character states involving scale morphology and colour pattern that clearly differentiate it from all other Sundaland congeners. This is the first species of the small forest floor group of *Sphenomorphus* reported from northeastern Peninsular Malaysia. Therefore, it belongs to the new species described here.



**Figure 1:** Location of the Perhentian Archipelago and Pulau Perhentian Besar, Terengganu, Peninsular Malaysia.

## MATERIALS AND METHODS

Scale terminology follows Grismer (2006a, 2007, 2008) and Lim (1998). Snout-vent length (SVL) was measured from the tip of the rostral scale to the vent. Tail length (TailL) was measured from the tip of the tail (original or regenerated) to the vent. Axilla-groin length (Ax-GnL) was measured from the posterior margin of the forelimb insertion to the anterior margin of the hind limb insertion. Head length (HeadL) was measured from the anterior margin of the ear opening to the tip of the rostral scale. Head width (HeadW) was measured as the widest portion of the temporal region. Snout to forelimb length (Sn-ForeL) was measured from the anterior margin of the forelimb insertion to the tip of the rostral scale. Midbody scale rows were counted as the number of longitudinal scale rows encircling the body at a point midway between the limb insertions. Paravertebral scale rows were counted as the number of scales in a line from the parietal scales to a point on the dorsum opposite the vent. The ventral scale rows were counted as a row of scales between the postmentals and the anal plate. Other standard counts include supraoculars, suboculars, loreals, supralabials, infralabials, and lamellae beneath the fourth toe. Additional characteristics examined were the degree of contact between the parietals and supraoculars, enlargement of posterior superciliary scales, degree of contact between the prefrontal scales, presence or absence of enlarged preanal scales, texture of subdigital lamellae, and degree of overlap of adpressed limbs. Colour pattern characters examined were the degree of dark, dorsolateral striping and the presence or absence of well-defined, white, dorsolateral and/or postorbital stripes. Data on the type specimen of *S. perhentianensis* is shown in Table 1.

All measurements were made with Mitutoyo digital calipers to the nearest 0.1 mm. Scale counts were made on the right side of the body with a Nikon SMZ 1500 dissecting microscope. Sex and adulthood was determined by gonadal examination. Enlarged gonads were considered evidence of adulthood.

Preserved material examined is listed in the appendix. Abbreviations for institutions are as follows: BM – British Museum (Natural History), London, England; LSUHC – La Sierra University Herpetological Collection, La Sierra University, Riverside, California, U.S.A.; LSUDPC – La Sierra University Digital Photo Collection, La Sierra University, Riverside, California, U.S.A.; ZRC – Zoological Reference Collection in the Raffles Museum of Biodiversity Research, National University of Singapore, Singapore.

Information on some characteristics was also taken from Bacon (1967), Boulenger (1887, 1902, 1909, 1912), Brongersma (1942), De Rooij (1915), Inger and Hosmer (1965), Inger *et al.* (2001), Iskandar (1994), Lim (1998), Malkmus *et al.* (2002), Manthey and Grossman (1997), Taylor (1963), and Smith (1930).

**Table 1:** Data on the type specimen of *Sphenomorphus perhentianensis*.

	LSUHC 8705
sex	m
snout-vent length (SVL)	30.0
tail length (TL)	39.1
axial-groin length (Ax-GnL)	16.9
head length (Headl)	5.7
head width (HeadW)	4.1
snout to forelimb (Sn-ForeL)	11
midbody scale rows	29
paravertebral scale rows	65
ventral scale rows	61
supraoculars	4
parietals contacting supracular	1
supraciliaries	1 pro
prefrontals in contact	1
lorealis	2
supralabials	6
infralabials	6
4 <sup>th</sup> toe lamellae	10
lamellae texture	smooth
overlap of limbs	0
dark dorsolateral stripe	0

Note: 0 = absence of character state; 1 = presence of character state; pro = projecting dorsomedially

## SYSTEMATICS

### *Sphenomorphus perhentianensis* sp. nov.



**Figure 2:** Holotype of *Sphenomorphus perhentianensis* (LSUHC 8075) from Pulau Perhentian Besar, Terengganu, Peninsular Malaysia.

#### **Holotype**

The adult male (LSUHC 8075) was collected on October 18<sup>th</sup>, 2007 by Perry L. Wood Jr. on Pulau Perhentian Besar on the trail behind Water Colours Resort (05°54.054 N, 102°44.343 E), Terengganu, Peninsular Malaysia.

#### **Diagnosis**

*Sphenomorphus perhentianensis* is differentiated from all other species of Sundaland and Malay Peninsula *Sphenomorphus* because it is small SVL (30.0mm) and having 29 midbody scale rows, smooth as opposed to striated dorsal scales, 65 paravertebrals, 61 ventrals, four supraoculars, parietals contacting the posterior-most supraocular, one medially projecting superciliary scale, two loreals, six supralabials and infralabials, ten lamellae beneath the fourth toe, smooth subdigital lamellae, enlarged preanal scales, no body bands, a dark brown, diffuse, dorsolateral stripe extending to just past the axilla, a cream coloured dorsolateral stripe on the nape and anterior-most portion of the body, and no cream coloured postorbital stripe. Table 2 shows the distribution of these character states across all 36 species.

**Table 2:** Selected scale counts, mensural and color pattern characteristics of the species of *Sphenomorphus* from the Sundaland.

	<i>langkawiensis</i>	<i>aesculeticola</i>	<i>anomalopus</i>	<i>bukitensis</i>	<i>butleri</i>	<i>buttikoferi</i>	<i>cameronicus</i>	<i>cophias</i>	<i>crassa</i>	<i>cyanolaemus</i>	<i>florensis</i>	<i>haasi</i>	<i>halleri</i>	<i>indicus</i>
snout-vent length	36–37	40–43	70	40.5–44	34–44	35	70	37	82	60	71	57	48–52	75–80
midbody scale rows	34–37	26–32	38–39	31–33	31–33	24	38	24	32	40	40–50	41–42	33–41	34–36
dorsal scales striated	0	0	0	0	0	0	0	0	0	0	1	0	0	0
paravertebral scale rows	60–72	—	71	73–74	66–67	—	69	56	—	67–75	—	—	—	73
ventral scale rows	70–72	60–68	—	61–74	62–63	—	—	—	72	78–93	—	93–98	63–73	84–87
supraoculars	4	4	5	4	4	4	4	4	4	6	6–7	6	4	4
parietals contact supraocular	1	1	1	1.00	1	1	1	1	1	1	—	1	0	1
supraciliaries	1 pro	1 pro	1 pro	2 pro	2 pro	—	1 pro	—	—	2 pro	—	—	—	2 pro
prefrontals in contact	1	0	1	1	1	1	0	0	0	1	1	0, 1	1	0
loreal	2	2	2	2	1,2	—	2	2	2	3	2	2	2	2

Note: 0 = absence of character state; 1 = presence of character state; pro = projecting dorsomedially  
 — indicates character state could not be examined due to inaccessibility of specimens or its description in the literature.  
 The data from asterisked species were taken from the literature.

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**Table 2:** (continued)

	<i>langkawiensis</i>	<i>aesculeicola</i>	<i>anomolopus</i>	<i>bukitensis</i>	<i>butleri</i>	<i>buttikoferi</i>	<i>cameronicus</i>	<i>cophias</i>	<i>crassa</i>	<i>cyanolaemus</i>	<i>florensis</i>	<i>haasi</i>	<i>halleri</i>	<i>indicus</i>
supralabials	6	6	7	6	6	—	7	7	7	7	—	7	—	7
infralabials	5–6	5	6–7	5	5–6	—	5	7	7	6	—	6	—	7
4th toe lamellae	11–12	6–10	16–17	12–13	12–13	21–23	20–21	9	18–19	18	27–29	16–18	10–15	17–19
lamellae texture	keeled	—	—	keeled	smooth	smooth	—	—	—	keeled	smooth	smooth	—	Keeled
enlarged preanal scales	1	0	1	0	1	1	1	1	1	1	1	1	0	1
body banded	0	0	1	0	0	—	0	0	0	0	0	0	0	0
dark dorsolateral stripe	1	0	0	faint	1	1	1	1	1	1	1	0	1	1
light postorbital stripe	1	0	0	0	0	—	0	0	0	0	0	0	0	0
light dorsolateral stripe	1	0	0	0	0	0	0	0	0	0	0	0	0	0
sample size	2	*	*	2	5	*	*	*	*	9	*	*	*	2

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Table 2: (continued)

	<i>ishaki</i>	<i>kinabaluensis</i>	<i>maculicollis</i>	<i>malayanus</i>	<i>modiglianii</i>	<i>multisquamatus</i>	<i>murudensis</i>	<i>necopinatus</i>	<i>praesignis</i>	<i>puncticentralis</i>	<i>sabanus</i>	<i>sanctus</i>	<i>scotophilus</i>	<i>shelfordi</i>
snout-vent length	38–41	45–58	47	52–60	41	69	50.4	39	110	45	58	40–45	50	67
midbody scale rows	30–32	32–38	35–36	32–33	32	42–49	34	28–32	26–28	29	38–42	32–34	28–31	23–34
dorsal scales striated	0	0	0	0	—	1	0	0	0	1	1	1	0	0
paravertebral scale rows	68–73	80–89	79	76–80	—	74–78	71	63–75	66–67	64	84–95	71	67–74	—
ventral scale rows	60–70	73–91	84	74	—	83–101	74	—	73	—	71–91	—	—	—
supraoculars	4	5–6	7	4	4	6–7	6	4	4	5	6, 7	5	5	4
parietals contact supraocular	1	1	1	1, 0	1	1	1	1	1	1	1	1	1	1
supraciliaries	2 pro	1 pro	1 pro	1 pro	—	2 pro	2 pro	—	1 pro	—	1 pro	2 pro	2 pro	—
prefrontals in contact	1	1, 0	0	1	1	1	1	0, 1	1	1	1, 0	1	1, 0	1
loreal	2	1	1	2	—	3	2	2	2	2	1	2	2	—
supralabials	6	7	6	7	—	6–8	6	—	7	7	7	7	7	—
infralabials	5	7	6	7–8	—	5	7	—	7	7	5–7	6	6	—

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**Table 2:** (continued)

	<i>ishaki</i>	<i>kinabaluensis</i>	<i>maculicollis</i>	<i>malayanus</i>	<i>modiglianii</i>	<i>multisquamatus</i>	<i>murudensis</i>	<i>necopinatus</i>	<i>praesignis</i>	<i>puncticentralis</i>	<i>sabanus</i>	<i>sanctus</i>	<i>scotophilus</i>	<i>shelfordi</i>
4th toe lamellae	11	15–17	18–23	12–13	15	16–23	17	11–15	20–26	25	18–22	26–27	22–23	28–29
lamellae texture	keeled	smooth	smooth	keeled	—	smooth	smooth	—	smooth	smooth	keeled	—	—	smooth
enlarged preanal scales	1	1	1	1	1	1	1	1	1	1	1	1	1	1
body banded	0	0	0	0	0	0	0	0	0	0	0	0	0	0
dark dorsolateral stripe	faint	1	0	0,1	1	0	1	1	0	1	0	0	1	1
light postorbital stripe	1	0	0	0,1	—	0	0	0	0	0	0	0	0	0
light dorsolateral stripe	0	—	0	0	0	0	0	0	0	0	0	0	0	0
sample size	3	3	*	1	*	4	1	*	3	*	8	*	51	*

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**Table 2:** (continued)

	<i>sibuensis</i>	<i>stellatus</i>	<i>tanahinggi</i>	<i>temmincki</i>	<i>tenuiculus</i>	<i>tersus</i>	<i>vanheurni</i>	<i>perhentianensis</i>
snout-vent length	juv	80	48–64	56	46	90–92	64	30
midbody scale rows	29	24	40–42	30–37	26	34–36	31	29
dorsal scales striated	0	0	0	0	0	0	0	0
paravertebral scale rows	58	60–63	76–79	68–80	57	—	81	65
ventral scale rows	52	—	—	62–72	68	—	—	61
supraoculars	4	4	5	4	4	4	4	4
parietals contact supraocular	1	1	1	1	1	—	—	1
supraciliaries	2 pro	1 pro	0	1 pro	—	—	—	1 pro
prefrontals in contact	1	1, 0	1, 0	0, 1	0	1	0	1
loreal	1	2	4	2	—	3	2	2
supralabials	6	7	8–9	6	7	7	6	6

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**Table 2:** (continued)

	<i>sibuensis</i>	<i>stellatus</i>	<i>tanahtinggi</i>	<i>temmincki</i>	<i>tenuiculus</i>	<i>tersus</i>	<i>vanheurni</i>	<i>perhentianensis</i>
infralabials	5	7	7	4–5	6	7	—	6
4th toe lamellae	9	18–23	16–17	9–11	21–24	18–19	14–15	10
lamellae texture	keeled	—	keeled	smooth	smooth	—	smooth	smooth
enlarged preanal scales	1	1	1	0	1	1	1	1
body banded	0	0	0	0	0	0	0	0
dark dorsolateral stripe	1	0	1	1	1	0	0	0
light postorbital stripe	0	0	0	0	0	0	0	0
light dorsolateral stripe	1	0	0	0	0	0	0	0
sample size	2	*	*	5	*	*	*	1

### **Description of Holotype**

The holotype characteristics include the following: SVL 30.0 mm; TailL 39.0 mm (original); Ax-GnL 16.9 mm; HeadL 5.7 mm; HeadW 4.1 mm; Sn-ForeL 11.0 mm; rostrum much wider than high and in broad contact with the frontonasal; frontonasal wider than long; prefrontals are large and in broad contact; left prefrontal overlaps right; frontal elongated and diamond-shaped; frontal in contact with first two supraoculars; four supraoculars; frontoparietals in contact posterior to frontal; frontoparietals contact posterior portion of second, all of third and anterior one-half of fourth supraoculars; frontoparietals contact parietals and interparietal posteriorly; left frontoparietal overlaps right; interparietal diamond-shaped, large, projects slightly posteriorly; parietal eyespot in the posterior projection; parietals large, narrowly contacting posterior to interparietal; parietals contact posterior corner of fourth supraocular anteriorly; left parietal overlaps right; nuchal scales absent; nasals small, widely separated, trapezoidal; nuchal scales contact rostral anteriorly, frontonasal dorsally, first loreal posteriorly, and first supralabial ventrally; nostril in centre of nasal; supranasals absent; two similarly sized loreals taller than wide; two similarly sized preoculars in contact with posterior margin of second loreal; nine supraciliaries, posterior supraciliary elongate and projecting dorsomedially; two pretemporals, dorsal-most largest; five and six suboculars (R and L); suboculars contact dorsal margin of third, fourth, and fifth supralabials; six supralabials; third, fourth, and fifth supralabials below eye; two postsupralabials; two primary temporals; two secondary temporals; uppermost temporal not contacting parietals; series of small granular scales at posterior corner of eye; lower eyelid transparent, scaly, and without enlarged central window; mental twice as wide as long; single large, square postmental; postmental contacts first infralabial on each side; two enlarged chinshields following postmental and contacting medially; chinshields contacting first and second infralabials; six infralabials; external ear opening nearly equal to diameter of eye, obliquely oriented, subcircular, and lacking anterior lobules; tympanum recessed; body scales smooth, cycloid, imbricate; ventral scales same size as dorsal scales; 29 longitudinal scale rows around midbody; 65 paravertebral scale rows; 61 ventral scale rows; two enlarged, medial, preanal scales overlapping outer preanal scales; tail robust, cylindrical; subcaudal scales larger than dorsal caudal scales; limbs widely separated when adpressed; scales of dorsal surface slightly larger than those of ventral surface; palmar and plantar scales raised; scales of dorsal surfaces of digits in a single row; ten smooth, subdigital lamellae on fourth toe; first digit of manus not vestigial.

### **Colour in Life (Fig. 2)**

The ground colour of the dorsal surfaces of the body, limbs, and tail is light brown to dull orange. There is dark mottling on the dorsum. There is a distinct, cream coloured, dorsolateral stripe beginning in the nuchal region and extending posteriorly above the forelimb. This stripe becomes indistinct just beyond the axillary region. It is bordered below by a thick, dark brown stripe on the nape that breaks up into a thicker speckled pattern on the flanks. The top of the head is light brown with a diffuse, dark brown postorbital stripe. The labial scales are banded. The venter is cream-coloured and immaculate.

### Distribution

*S. perhentianensis* is known only from Pulau Perhentian Besar, Terengganu, Peninsular Malaysia. There is similar habitat on Pulau Perhentian Kecil, which is 0.5 km to the north. There also may be some smaller, satellite islands with similar habitats. It is possible that this species may occur in these locations as well.

### Natural History

The Perhentian Archipelago is composed of 11 relatively small islands lying 21 km off the east coast of the state of Terengganu (Fig. 1). The largest of these islands, Pulau Perhentian Besar (ca. 857 hectares), is a rugged, hilly island reaching 249 m a.s.l. The majority of the island is covered in primary lowland dipterocarp forest. Its granite bedrock is the source of extensive boulder outcrops that add significant habitat and microhabitat heterogeneity to the island's ecosystem, which in turn supports various saxicolous species. *S. perhentianensis* was found on the forest floor in a leaf litter of a lowland dipterocarp forest shortly after an afternoon rain shower.

### Etymology

The specific epithet *perhentianensis* is in reference to the Perhentian Archipelago. The suffix *ensis* is a derivation meaning "from" or "inhabiting." It renders the specific epithet an adjective that must be in grammatical accord with the gender of *Sphenomorphus*.

### Comparisons

Table 2 clearly indicates that *S. perhentianensis* is well differentiated from all other Sundaland species, especially because its SVL is the smallest of all *Sphenomorphus* described to date. The main problem with any species description based solely on a single specimen is the inability to assess the range of intrapopulational variation that could overlap with other species, thus precluding the delimitation of discrete boundaries. However, many of the characteristics used in this analysis do not vary intraspecifically in the other Sundaland species. To hypothesize that this would not be the case in *S. perhentianensis* would lack foundation. Therefore, *S. perhentianensis* is differentiated from *S. florensis*, *S. multisquamatus*, *S. puncticentralis*, *S. sabanus*, and *S. sanctus* by having smooth as opposed to striated dorsal scales. *S. perhentianensis* differs from *S. hallieri* in having parietals that contact the supraoculars, as opposed to these scales not being in contact. It is differentiated from *S. bukitensis*, *S. butleri*, *S. cyanolaemus*, *S. indicus*, *S. ishaki*, *S. multisquamatus*, *S. murudensis*, *S. sanctus*, *S. scotophilus*, and *S. sibuensis* by having one as opposed to two posteriorly projecting superciliary scales. *S. perhentianensis* has two loreal scales. In contrast, *S. kinabaluensis*, *S. maculicollus* and *S. sabanus* have a single loreal, *S. cyanolaemus*, *S. multisquamatus* and *S. tarsus* have three loreals, and *S. tanahtinggi* has four loreals. The texture of the subdigital lamellae is smooth in *S. perhentianensis*. In contrast, it is keeled in *S. langkawiensis*, *S. bukitensis*, *S. cyanolaemus*, *S. indicus*, *S. ishaki*, *S. malayanus*, *S. sabanus*, *S. sibuensis* and *S. tanahtinggi*. *S.*

*perhentianensis* differs from *S. aesculeticola*, *S. bukitensis*, *S. hallieri* and *S. temmincki* in having enlarged as opposed to small preanal scales.

*S. perhentianensis* is closest morphologically and geographically to *S. butleri* of the Banjaran Bintang at Bukit Larut (Boulenger 1912), *S. malayanus* of the northern portion of the Banjaran Titiwangsa (Gunung Gerah and Temengor; the later population referred to as *S. cf. butleri* by Grismer et al. (2004) but reidentified here as *S. malayanus*), and *S. bukitensis* from Bukit Fraser (Grismer 2007). However, *S. perhentianensis* differs from *S. butleri* in having a smaller SVL (30.0 mm versus 34–44 mm), fewer midbody scales (29 versus 31–33), one as opposed to two projecting superciliary scales, fewer subdigital lamellae on the fourth toe (10 versus 12 or 13), and no dark, dorsolateral stripe. *S. perhentianensis* differs from *S. malayanus* in having a much smaller SVL (30.0 mm versus 52–60 mm), fewer midbody scale rows (29 versus 32 or 33), fewer paravertebral scale rows (65 versus 76–80), fewer ventral scale rows (61 versus 74), fewer subdigital lamellae on the fourth toe (10 versus 12 or 13), and smooth toe lamellae as opposed to keeled lamellae. *S. perhentianensis* differs from *S. bukitensis* in having a smaller SVL (30.0 mm versus 40.5–44 mm), fewer midbody scale rows (29 versus 31–33), fewer paravertebral scale rows (65 versus 73–74), one as opposed to two projecting superciliary scales, fewer subdigital lamellae on the fourth toe (10 versus 12 or 13), smooth toe lamellae as opposed to keeled lamellae, and no dark, dorsolateral stripe.

## DISCUSSION

The need for a phylogeny of the genus *Sphenomorphus* or at least the establishment of monophyletic subgroups likely masquerading under this generic name cannot be overstated. Despite attempts by several authors to partition *Sphenomorphus* into various groups and subgroups (Boulenger 1887; Brown & Alcalá 1980; Greer 1974; Inger & Hosmer 1965; Manthey & Grossmann 1997; Taylor 1922; Smith 1937), the monophyly of those groups has remained illusive. In the absence of such hypotheses, it is not possible to unequivocally determine to which species *S. perhentianensis* is most closely related and indeed this species is well differentiated from all other Sundaland taxa.

In an unpublished report on the vertebrates of the Perhentian Archipelago, Tamblyn (2005) reported the skink *Scincella reevesi* from three different localities with lowland dipterocarp forest on Pulau Perhentian Besar. However, all specimens were released and it was not indicated how the identifications were made. Although *S. reevesi* and *S. perhentianensis* are very similar in overall appearance, the nearest known locality for *S. reevesi* is western Thailand and it has not even been found on the Malay Peninsula (Ouboter 1986). Based on this, we presume Tamblyn (2005) collected *S. perhentianensis* and not *S. reevesi*.

This constitutes the first species of small, forest floor dwelling *Sphenomorphus* reported from northeastern Peninsular Malaysia. It is the fourth new species of insular *Sphenomorphus* from Peninsular Malaysia (Grismer

2006a, 2007, 2008). However, this is not surprising given the relatively unexplored nature of northwestern Peninsular Malaysia. In fact, the only systematic work done in this area was that of Dring (1979) on Gunung Lawit, Terengganu. Upsurges in island research are demonstrating that Malaysia's archipelagos are proving to be increasing sources of endemism (Grismer 2008; Grismer *et al.* 2006a, b).

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## APPENDIX

### Comparative Material

*Sphenomorphus bukitensis*

WEST MALAYSIA: Pahang, Fraser's Hill, ZRC 2.6245–46.

*Sphenomorphus butleri*

WEST MALAYSIA: Perak, Temengor Forest Reserve, LSUHC 5650, Bukit Larut, BM 1946.8.7–9; Pahang, Telon Valley, ZRC 2.5944.

*Sphenomorphus cyanolaemus*

EAST MALAYSIA: Sarawak, ZRC 2.5314–16; Lambir Hills, LSUHC 4079; Barham, ZRC 2.1625–29.

*Sphenomorphus indicus*

TAIWAN: Taitung, Daxi, Lalipaxi, ZRC 2.4796. THAILAND: Chonburi Khao Khieo Water Fall, ZRC 2.5366.

*Sphenomorphus ishaki*

WEST MALAYSIA: Pahang, Pulau Tioman, ZRC 2.6157–59.

*Sphenomorphus kinabaluensis*

EAST MALAYSIA: Sabah, Gunung Kinabalu, ZRC 2.1581–83.

*Sphenomorphus malayanum*

INDONESIA: Sumatra, Jambu, Danau, Kerinci, Gunung Tuju, ZRC 2.4619.

*Sphenomorphus multisquamatus*

EAST MALAYSIA: Sarawak, Gunung Gading, 2.50307; Lambir Hills, LSUHC 4080, 4094; Sabah, Sepilok Jungle Resort, LSUHC 6158.

*Sphenomorphus murudensis*

East Malaysia: Sarawak, Baram District, Kelabit Highlands, ZRC 2.5308.

*Sphenomorphus maculicollis*

East Malaysia: Sabah, Gunung Kinabalu, ZRC 2.1623.

*Sphenomorphus praesignis*

WEST MALAYSIA: Kedah, Pulau Singa Besar, DWNP 3023; Pahang, Cameron Highlands, Tanah Rata, ZRC 2.1841; Fraser's Hill, LSUHC 6480, 6483, 8058–59.

*Sphenomorphus sabanus*

EAST MALAYSIA: Sabah, Gunung Kinabalu, ZRC 2.1616–19, 2.1624, 2.1630.  
Sabah: Bettotan, ZRC 2.1620–22.

*Sphenomorphus sibuensis*

WEST MALAYSIA: Johor, Pulau Sibul, ZRC 2.6160–61.

*Sphenomorphus scotophilus*

WEST MALAYSIA: Johor, Pulau Aur, LSUHC 4728, 4702–03; Pulau Pemanggil, LSUHC 4461–62; Pahang, Pulau Tioman, LSUHC 3806, 3821, 3825, 3834, 3877, 4423–24, 4427, 4442, 4562, 4571, 4574, 4576, 4595, 4652–53, 5160, 5163–64, 5261, 5406, 5429, 5442, 5457, 5464, 5476, 5481, 5511, 6205, 6216, 6270; Pulau Tulai, LSUHC 5054, 6274; Seberang Perai, Pulau Pinang, LSUHC 6670–71, 6693–94; Selangor, Kepong, Forest Research Institute Malaysia, LSUHC 4392–94, 4398–99, 4400, 4815, 6516, 6541.

*Sphenomorphus temmincki*

EAST MALAYSIA: Indonesia, West Java, ZRC 2.1611–15.