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# A New Species of *Hemidactylus* Goldfuss, 1820 (Reptilia: Gekkonidae) from Sri Lanka with Redescription of *H. hunae* Deraniyagala, 1937

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Abstract: We describe a large gecko of genus *Hemidactylus* from the southern face peneplain foothills of the Central Highlands of Sri Lanka. It closely resembles *Hemidactylus hunae* Deraniyagala 1937 but is distinguished by adult males reaching 121.2 mm snout–vent length; presence of 11 or 12 supralabials at the midorbit position; dorsal scalation of homogeneous granules intermixed with large, conical, carinate tubercles that form 12–14 irregularly arranged longitudinal rows at midbody; dorsal furrow distinct with a narrow space between medial parasagittal rows; 3 or 4 pairs of postmentals; no spine-like tubercles on nape; ventrals in 36–39 rows at midbody; 21–24 femoral pores on each side separated medially by 5–7 nonpored enlarged scales; scales on posterior thigh granular, not enlarged; lamellae divided, 12 or 13 below the fourth toe; tail segmented with whorls of lateral tubercles, with each whorl consisting of 6 enlarged, conical, carinate tubercles; median row enlarged and broad; single postcloacal tubercle (spur) on each side; and body dorsum with a series of black edged bright saddles from occiput to tail tip. Additionally, we provide a redescription for *H. hunae* based on its adult female holotype.

**Key words:** Biogeography; Cryptic species; Ecology; Gecko; Natural history; Taxonomy

The gekkonid genus *Hemidactylus* Goldfuss 1820 currently consists of 165 species (Ceríaco et al. 2020; Šmíd et al. 2020; Uetz et al. 2021) and is one of the most species-rich gekkonid lizard genera distributed throughout the tropics and subtropics of Asia, the Pacific, Africa, Mediterranean Europe, and northern South America (Kluge 1969). The tropical Asian radiation of Indian *Hemidactylus* consists of four major clades, namely, *prashadi*, *flaviviridis*, *brookii*, and *frenatus*, and some species of *Hemidactylus platyurus* (Lajmi et al. 2018). Of these, the *prashadi* clade mostly encompasses the tuberculated large-bodied *Hemidactylus* in India and Sri Lanka (Bansal and Karanth 2010; Lajmi and Karanth 2020), and within this clade, there are six subclades, as follows: *Hemidactylus triedrus* (Daudin 1802); *Hemidactylus maculatus* Duméril and Bibron 1836; *Hemidactylus depressus* Gray 1842 plus *Hemidactylus scabriceps* (Annandale 1906); *Hemidactylus graniticolus* Agarwal, Giri and Bauer 2011; *Hemidactylus acanthopholis* Mirza and Sanap 2014; and *Hemidactylus sushilduttai* Giri, Bauer, Mohaptra, Srinivasulu and Agarwal 2017 (Agarwal et al. 2019).

The *H. maculatus* morphological species complex is composed of the following 10 species: *H. maculatus* Duméril and Bibron 1836; *Hemidactylus hunae* Deraniyagala 1937; *H. graniticolus*; *H. acanthopholis*; *Hemidactylus kangerensis* Mirza, Bhosale and Patil 2017; *H. sushilduttai*; *Hemidactylus paaragowli* Srikanthan, Swamy, Mohan and Pal 2018; *Hemidactylus siva* Srinivasulu, Srinivasulu and Kumar 2018; *Hemidactylus vanam* Chaitanya, Lajmi and Giri 2018; and *Hemidactylus kolliensis* Agarwal, Bauer, Giri and Khandekar 2019. This complex has members of large-sized geckos in the Indian subcontinent. The species *H. maculatus* was described by Duméril and Bibron (1836) based on several specimens from India, the Philippines, and Mauritius and is a type series. According to Duméril and Bibron (1836), the larger-bodied specimens of the type series were from Bombay (=Mumbai, West India) and the smaller specimens were from Bengal to Pondicherry (East India), the Philippines, and Mauritius (see Amarasinghe et al. 2009: 96 for the English translation). Guibé (1954) recognized that the original type series is composed of both *H. maculatus* and *Hemidactylus brookii* Gray 1845. Smith (1935) restricted the type locality of the species to Bombay, and Amarasinghe et al. (2009: 85) considered the largest specimens collected from Bombay as syntypes for this species. The subsequent authors considered this a widely distributed species across the Western Ghats of Gujarat, Maharashtra, Kerala, Tamil Nadu (Smith 1935; Tikader and Sharma 1992; Das 2002; Sharma 2002; Agarwal et al. 2011), Madhya Pradesh (Sanyal and Dasgupta 1990; Ingle 2003), and Andhra Pradesh (McCann 1945) until Javed et al. (2011) highlighted the divergent populations of *H. maculatus* sensu lato.

Deraniyagala (1937) described a subspecies, *H. maculatus hunae*, based on a single specimen (NHMUK 1946.8.23.77) collected from Okanda, Eastern Province of Ceylon (=Sri Lanka), restricting this subspecies to Sri Lanka and South India including Malabar, Tinnevelly, Salem, and Madras, whereas *H. maculatus maculatus* was restricted to northern India. Later Amarasinghe et al. (2009: 85) presumed that the subspecies may be specifically distinct, and Bauer et al. (2010) confirmed the identity of *H. hunae* as a distinct species and also revealed the phylogenetic relationship between *H. maculatus* and *H. hunae*. Agarwal et al. (2011) recognized the *H. maculatus* population in southern Karnataka and northern Tamil Nadu (including Salem, fide Deraniyagala 1937) as a distinct species and named it *H.*

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*graniticolus*, while the rest of the Indian populations were assigned to *H. maculatus*. After the works of Bansal and Karanth (2010), Bauer et al. (2010), and Agarwal et al. (2011), *H. maculatus* is considered endemic to India, whereas *H. hunae* is considered endemic to Sri Lanka. Mirza and Sanap (2014) recognized the population near the southernmost tip of India as representing a new species and named it *H. acanthopholis*. Mirza et al. (2017) and Giri et al. (2017) found two species from northern Eastern Ghats and named them *H. kangerensis* and *H. sushilduttai*, respectively. Srikanthan et al. (2018) discovered another new species from the southern Western Ghats and named it *H. paaragowli*. Chaitanya et al. (2018) and Srinivasulu et al. (2018) found two more species in southern India and named them *H. vanam* and *H. siva*, respectively. Finally, Agarwal et al. (2019) discovered another distinct species, namely, *H. kolliensis*, from South India.

Recent phylogenetic studies revealed that *H. maculatus* belongs to a separate subclade, *H. maculatus*, whereas *H. hunae* has a distinct lineage allied to the Eastern Ghats subclade *H. sushilduttai*, nested within the Indian radiation (Agarwal et al. 2019), and it also showed that *H. hunae* occurred from the Early to the Middle Miocene compared to other recent lineages (Lajmi et al. 2018, 2019). We compared different populations of *H. hunae* in Sri Lanka and examined the morphology of available specimens to ascertain whether there had been any speciation events of this single Sri Lankan member of this species complex. This rare species has been reported from several locations within Sri Lanka (Taylor 1953; Senaratne 1995; de Silva et al. 2004a; Wickramasinghe and Somaweera 2008; Somaweera and Somaweera 2009). Karunarathna and Kumarasinghe (2011) provided a detailed note on its distribution and restricted the species to the southeastern dry zone of the island. While conducting herpetofaunal surveys across the island, we collected two specimens of a large *Hemidactylus*, which superficially resembled *H. hunae*, from Duwili Ella, a low-elevation, intermediate forest situated at the southern face peneplain foothills of the Central Highlands of Sri Lanka. A detailed comparison with all other large-sized geckos similar to *H. hunae* and other species of the *H. maculatus* species complex confirmed the distinctiveness of the specimens we found from Duwili Ella; thus, here, it is described as a new species. It is of interest to note that Deraniyagala (1937) used a female as a holotype to describe *H. hunae* (NHMUK 1946.8.23.77), and here, we redescribe it comprehensively. We additionally provide characteristics for *H. hunae* based on an adult male specimen observed (not collected) from the type locality Okanda in eastern Sri Lanka.

## Materials and Methods

We collected the type by hand, photographed and euthanized the specimens with sodium pentobarbital, fixed the specimens in 10% buffered formalin for 24 h, washed them in running water, and stored them in 70% ethanol. We compared specimens of the new species to specimens and descriptions of all congeners (see Appendix for additional specimens examined). When diagnosing and describing the new species, we scored specimens for the same morphological and morphometric characters used in recent descriptions of the *H. maculatus* species complex (e.g., Agarwal et al. 2011, 2019; Mirza and Sanap 2014; Giri et al. 2017; Mirza et al. 2017; Chaitanya et al. 2018; Srinivasulu et al. 2018). We examined specimens from the Natural History Museum, London, UK (NHMUK) and the National Museum of Sri Lanka, Colombo Sri Lanka (NMSL). Museum acronyms are those of Uetz et al. (2019).

With a Mitutoyo digital caliper to the nearest 0.1 mm under a Leica Wild M3Z dissecting microscope on the left-hand side of the body, we measured snout–vent length (SVL; from tip of snout to anterior margin of vent), tail length (from the posterior margin of vent to the tip of tail), brachium length (on the dorsal surface from the axilla to the inflection of the flexed elbow), forearm (antebrachium) length (on the dorsal surface from the posterior margin of the elbow while flexed to the inflection of the flexed wrist), thigh length (from the anterior margin of the hind limb at its insertion point on the body to the knee while flexed), tibia (crus) length (from the posterior surface of the knee while flexed to the base of the heel), axilla–groin (trunk) length (from the posterior margin of the forelimb at its insertion point on the body to the anterior margin of the hind limb at its insertion point on the body), body width (maximum width of the body), tail width (maximum width of the tail), head length (from posterior edge of mandible to tip of snout), head width (maximum width of head at the angle of the jaws), head depth (height; maximum height of the head, from the occiput to the underside of the jaws), eye (orbit) diameter (the greatest horizontal diameter of the orbit), eye–ear length (from posterior border of orbit to anterior border of tympanum), snout length (from anterior border of orbit to tip of snout), eye–nostril length (from anterior border of orbit to middle of nostril), interorbital distance (shortest distance between the left and right supraciliary scale rows), ear length (greatest horizontal diameter of tympanum), internarial distance (shortest distance between dorsal margins of nostrils), eye–mandible length (from posterior border of orbit to posterior tip of mandible), palm length (from wrist [carpus] to distal tip of longest finger), foot length (from heel to tip of longest toe), and finger and toe lengths (from tip of claw to the nearest fork).

Most of our meristic data are self-explanatory; however, as additional characters, we counted supralabial and infralabial scales from below the middle of the orbit to the rostral and mental scales, respectively. We counted subdigital lamellae on Toe I and IV from the base of the first phalanx to the claw. We counted the number of longitudinal ventral scale rows and number of dorsal tubercle rows at midbody. We evaluated the size and number of postmental scales contacting the mental (primary), secondary, tertiary, and quaternary postmentals; the texture and the arrangement of body scales and tuberculation; the relative size and morphology of the subcaudal scales; the number of postcloacal tubercles (spur) on each side of the tail base; and body color pattern characteristics. We checked the sex of the specimens by observing hemipenal bulges and femoral pores in males. To examine the smaller characters such as keeling in the ventrals, following Amarasinghe et al. (2015), we applied the reversible stain methylene blue in 70% ethanol.

## Results

Here we present diagnostic morphometric and meristic data taken for the type specimens (Table 1). Statistically informative tests could not be performed due to the small sample size of the new species and its congeners. Nonetheless, interspecific comparisons revealed a suite of characters that distinguish the new species from its congeners (Table 2). In the diagnosis and comparisons sections, we summarize these differences.

## Systematics

### *Hemidactylus* ***kimbulae*** **sp. nov.**
(Tables 1, 2; Figs. 1, 2, 4)

**Holotype.**—Adult male (NMSL 2020.08.01; field number DMSSK 2020.12.01) near Duwili Ella (6°39′42.80″N, 80°51′58.51″E, datum = WGS84 in all cases; 310 m above sea level), Kalthota, Badulla District, Uva Province, Sri Lanka, collected on 4 October 2019 by S. Karunarathna.

**Paratype.**—An adult male (NMSL 2020.08.02; field number DMSSK 2020.12.02) with the same data as the holotype.

**Diagnosis.**—The following combination of characters distinguishes *Hemidactylus kimbulae* sp. nov. from all other congeners: adult males reach 121.2 mm SVL; dorsal scalation of small homogeneous, carinate, granules intermixed with large, conical, carinate tubercles that form 12–14 irregularly arranged longitudinal rows at midbody; dorsal and lateral tubercles equal sized; dorsal furrow distinct with narrow nontubercular space middorsally; 3 or 4 pairs of postmentals, secondary pair 2/3 of the primary pair; throat scales granular; no spine-like tubercles on nape; ventrals larger than dorsals, smooth, elongate, and bluntly pointed, with 36–39 rows at midbody; 11 or 12 supralabials at midorbit position; 21–24 of femoral pores on each side separated medially by 5–7 nonpored enlarged scales; scales on posterior thigh granular, not enlarged; lamellae divided, 9 or 10 subdigital lamellae below the first, and 12 or 13 below the fourth toe; dorsal scales on tail granular, carinate, imbricate; tail segmented with whorls of lateral tubercles, each whorl consisting of 6 enlarged, conical, carinate tubercles separated from one another by 1 to 3 small scales; each whorl separated from its neighbor by about 8–10 scale rows; subcaudal scales at base pointed and enlarged; median row enlarged and broad; single postcloacal tubercle (spur) on each side; body dorsum with a series of black edged bright saddles from occiput to tail tip. These differences are summarized for close congeners of the *H. maculatus* species complex (see Table 2) and for all members of the *H. prashadi* clade (see comparison below).

**Comparisons.**—*Hemidactylus kimbulae* sp. nov. is morphologically very similar to *H. hunae* (characters in parentheses), but it can be distinguished from this species by having dorsal scalation of homogeneous granules (heterogeneous) at midbody; narrow space between medial parasagittal rows (wide); postmentals, 3 or 4 pairs (2 pairs); ventrals elongate and bluntly pointed (shorten and circular), femoral pores 21–24 (26–28) on each side; dorsal scales on tail imbricate (juxtaposed); single postcloacal spur (2) on each side; body dorsum with a series of bright and black edged (pale and usually no edged) saddles.

The new species is also similar to the other congeners of the *H. maculatus* species complex (see Table 2); however, it differs from them by having 12 supralabials at the midorbit position (8–11 in all other members), no prominent spine-like tubercles on nape (prominent in *H. kangerensis*, *H. sushilduttai*, and *H. kolliensis*), 3 or 4 pairs of postmentals (2 in all other members; *H. siva* rarely has 3), dorsal scalation of homogeneous granules (*H. graniticolus*, *H. kangerensis*, *H. paaragowli*, *H. vanam*, *H. siva*, and *H. kolliensis* have heterogeneous granules), conical-shaped enlarged dorsal tubercles (*H. maculatus*, *H. acanthopholis*, *H. kangerensis*, and *H. sushilduttai* have trihedral tubercles), ventral scales in 36–39 rows (*H. kangerensis*, *H. sushilduttai*, *H. siva*, and *H. kolliensis* have 27–34 rows), 21–24 femoral pores (10–12 in *H. paaragowli*, 16–19 in *H. maculatus* and *H. siva*, and 17–22 in *H. vanam*) separated by 5–7 interfemoral scales (*H. acanthopholis* has 12–14 and *H. vanam* has 10 or 11 interfemoral pores), enlarged dorsal tubercles arranged irregularly in 12–14 rows (22–24 in *H. paaragowli*, and 17–19 in *H. vanam*).

*Hemidactylus kimbulae* sp. nov. can be also distinguished from other members of the *prashadi* group by the presence of dorsal scalation of homogeneous granules (heterogeneous in *Hemidactylus yajurvedi* Murthy, Bauer, Lajmi, et al. 2015), enlarged dorsal tubercles (no dorsal tubercles in *Hemidactylus giganteus* Stoliczka 1871) arranged irregularly in 12–14 rows (18–20 in *Hemidactylus aaronbaueri* Giri 2008; 13–19 in *H. depressus* and *Hemidactylus pieresii* Kelaart 1852 arranged fairly regularly), and 21–24 femoral pores (19 in *H. aaronbaueri*; 15–19 in *H. depressus*; 10–12 in *Hemidactylus hemchandrai* Dandge and Tiple 2015 and *H. yajurvedi*; 17–20 in *H. pieresii* and *H. prashadi* Smith 1935; 11–15 in *Hemidactylus sahgali* Mirza, Gowande, Patil, Ambekar and Patel 2018; 7–9 in *H. triedrus*; 7 or 8 in *Hemidactylus whitakeri* Mirza, Gowande, Patil, Ambekar and Patel 2018). Unlike the new species, *H. scabriceps* has homogenous dorsal pholidosis of imbricate scales and no enlarged tubercles.

**Description of holotype and variation.**—The holotype is generally in good condition except for minor damages to the skin on the right side of the flank and on the dorsal tail base. The body and tail are fixed in a bent curled position. There is a fold of skin on the neck, occiput, and throat that is an artifact of preservation. Characters of the holotype are followed, when appropriate, by those of the paratype in parenthesis.

An adult male, 121.2 mm SVL (103.4 mm); head moderately large, short, its length 32.3% of SVL (31.9%); elongate, narrow, head width 69.1% of head length (70.6%) and 22.3% of SVL (22.5%), not strongly depressed; head depth 50.0% of head length, distinct from neck; snout elongate, its length 42.6% of head length (43.9%) and greater than eye diameter; eye diameter 52.7% of snout length (53.8%); scales on snout, canthus rostralis, interorbital feebly carinate, granular and bluntly pointed, 2–4 times larger than those on interorbital and occipital region; interorbital region relatively broad; interorbital distance 38.0% of head length (31.5%); occipital region has intermixed enlarged, smooth or feebly carinate, rounded or bluntly pointed tubercles, which are 2–5 larger than adjacent granules; eye small, its diameter 22.4% of head length (23.6%), pupil vertically slit with crenulated margins; supraciliaries small, pointed, those at

TABLE 1.—Meristic and mensural character states of the members of the *Hemidactylus maculatus* species complex (measurements are in mm).[a]

| Character | *H. kimbulae* sp. nov. ($n$ = 2) Holotype NMSL 2020.08.01 | *H. kimbulae* sp. nov. ($n$ = 2) Paratype NMSL 2020.08.02 | *H. hunae* ($n$ = 5) Holotype NHMUK 1946.8.23.77 | *H. hunae* ($n$ = 5) Other ($n$ = 4) this study | *H. maculatus* ($n$ = 9) This study | *H. graniticolus* ($n$ = 12) Agarwal et al. (2011) | *H. acanthopholis* ($n$ = 5) Mirza and Sanap (2014) | *H. kangerensis* ($n$ = 6) Mirza et al. (2017) | *H. sushilduttai* ($n$ = 7) Giri et al. (2017) | *H. paaragowli* ($n$ = 6) Srikanthan et al. (2018) | *H. siva* ($n$ = 6) Srinivasulu et al. (2018) | *H. vanam* ($n$ = 11) Chaitanya et al. (2018) | *H. kolliensis* ($n$ = 1) Agarwal et al. (2019) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Snout–vent length | 121.2 | 103.4 | 107.0 | 111.8–125.5 | 56.9–116.0 | 76.5–108.5 | 79.8–108.6 | 64.0–95.0 | 54.7–105.0 | 76.2–124.4 | 74.5–104.7 | 61.4–112.2 | 79.5 |
| Axilla–groin length | 48.8 | 47.8 | 44.9 | 68.1–73.2 | 24.8–56.5 | 31.6–47.5 | 30.3–46.7 | 24.7–42.3 | 22.5–44.3 | 29.7–55.7 | 29.8–47.5 | 27.3–50.2 | 31.6 |
| Body width | 28.9 | 23.6 | 27.1 | — | 11.9–26.2 | 16.4–25.5 | 14.7–25.7 | 12.3–26.0 | 11.5–25.6 | 13.3–25.4 | 14.2–31.1 | 12.6–27.6 | 17.8 |
| Tail length | 127.3 | 107.5 | 114.6 | 128.5 | 67.0–133.0 | 85.0–107.8 | 58.4–114.3 | 77.5–163.0 | 57.3–125 | 111–154.2 | 77.9–117.5 | — | 33.0 |
| Tail width | 17.6 | 13.9 | 15.6 | 13.8–16.2 | 4.8–18.0 | 8.2–14.6 | 8.0–12.4 | 7.4–15.4 | 6.0–15.1 | 7.1–12.5 | 8.4–15.0 | 6.8–15.7 | 9.7 |
| Head length | 39.2 | 33.0 | 31.3 | 31.9–35.0 | 19.5–38.6 | 22.5–30.6 | 18.0–29.6 | 15.9–25.5 | 17.0–30.1 | 21.2–33.4 | 23.2–31.5 | 18.7–32.0 | 21.3 |
| Head width | 27.1 | 23.3 | 22.7 | 23.1–24.9 | 12.6–28.9 | 16.4–22.9 | 15.1–25.5 | 12.4–21.0 | 11.7–22.4 | 15.1–25.1 | 14.6–21.6 | 12.2–23.5 | 16.5 |
| Head depth | 19.6 | 16.5 | 13.8 | 13.5–14.1 | 8.7–16.6 | 8.7–13.5 | 8.6–15.3 | 6.3–12.8 | 7.0–13.6 | 7.2–14.5 | 8.6–13.4 | 7.0–14.5 | 10.0 |
| Eye diameter | 8.8 | 7.8 | 7.0 | 7.7–8.5 | 4.3–7.5 | 4.1–7.1 | 5.0–6.9 | 4.3–5.8 | 3.8–6.2 | 4.9–6.9 | 4.9–6.6 | 4.7–7.5 | 5.0 |
| Snout length | 16.7 | 14.5 | 11.8 | 12.9–14.0 | 7.3–12.8 | 9.1–12.9 | 9.4–13.3 | 7.0–12.0 | 7.6–12.3 | 9.1–14.6 | 9.4–13.1 | 8.1–13.1 | 9.8 |
| Eye–nostril length | 12.8 | 10.7 | 9.1 | 9.9–11.0 | 5.5–11.4 | 7.6–10.5 | 7.2–12.0 | 2.0–9.6 | 6.1–9.7 | 7.2–11.2 | 7.6–10.6 | 6.5–10.8 | 7.4 |
| Eye–mandible length | 19.6 | 17.5 | 12.7 | — | 8.1–16.5 | — | — | — | — | — | — | — | — |
| Eye–ear length | 9.7 | 9.5 | 8.9 | 8.2–9.4 | 5.3–11.9 | 6.2–8.7 | 5.0–9.3 | 3.9–8.6 | 4.6–9.0 | 7.5–10.5 | 5.5–8.0 | 4.5–9.3 | 6.0 |
| Ear length | 5.7 | 3.4 | 3.4 | 3.9–5.0 | 1.0–4.2 | 2.4–3.3 | 2.5–3.5 | 1.7–2.7 | 1.5–3.2 | 1.9–3.3 | 1.6–2.2 | 2.0–3.7 | 2.2 |
| Interorbital distance | 14.9 | 10.4 | 11.8 | 5.0–6.1 | 5.4–11.9 | 6.6–10.7 | 7.2–9.4 | 5.7–9.5 | 6.1–10.0 | 6.0–10.2 | 7.1–11.3 | 6.8–11.2 | 4.1 |
| Internarial distance | 5.3 | 5.5 | 4.6 | 2.8–3.5 | 2.3–4.7 | 2.4–3.0 | 2.1–3.0 | 1.9–2.7 | 1.8–2.9 | 2.9–4.0 | 2.2–3.0 | 1.5–2.6 | 2.4 |
| Brachium length | 24.1 | 20.3 | 13.7 | — | 7.9–18.3 | — | — | — | — | — | — | — | — |
| Forearm length | 21.1 | 18.1 | 18.2 | 17.4–19.5 | 8.6–18.0 | 11.4–16.0 | 11.9–16.4 | 8.4–13.0 | 8.5–14.8 | 11.3–16.9 | 11.5–16.5 | 9.5–17.6 | 11.9 |
| Thigh length | 24.8 | 21.2 | 20.5 | — | 11.6–22.1 | — | — | — | — | — | — | — | — |
| Tibia length | 22.1 | 20.4 | 19.8 | 18.7–21.5 | 10.0–19.5 | 12.3–17.8 | 14.0–21.2 | 11.4–15.6 | 9.9–16.5 | 13.3–20.7 | 14.1–19.2 | 11.6–20.7 | 13.5 |
| Supralabials (midorbit) | 12 | 12 | 9/10 | 9–11 | 8–10 | 8–11 | 8–10 | — | 8–10 | 8–10 | — | 9–11 | 8 |
| Infralabials | 9 / 8 | 9 / 9 | 9/10 | 8–10 | 9–11 | 8–11 | 8, 9 | 9–11 | 8–10 | 9–10 | 10–14 | 9–14 | 10 |
| Postmental pairs | 4, 3 | 3 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2, 3 | 2 | 2 |
| Dorsal tubercle rows | 12–14 | 12–14 | 14–16 | 14–16 | 18–20 | 16–18 | 18–20 | 18–20 | 16–18 | 22–24 | 16 | 17–19 | 16 |
| Ventral scale rows | 36 | 39 | 42 | 40–43 | 30–38 | 40–46 | 35–40 | 28–30 | 30–33 | 33–39 | 27–30 | 36–39 | 29 |
| Femoral pores (L/R) | 21 / 23 | 24 / 23 | — | 26–28 | 16–19 | 23–28 | 19–21 | 18–21 | 21–24 | 10–12 | 17, 18 | 17–22 | 21 |
| Interfemoral scales | 5 | 7 | — | 7–9 | 6–9 | 1–3 | 12–14 | 4 | 4 | 16–18 | 5 | 10, 11 | 2 |
| Lamellae on Toe IV | 12 | 13 / 12 | 11 | 11, 12 | 12, 13 | 12–14 | 11, 12 | 11–13 | 11–13 | 10–12 | 13–15 | 10–12 | 11 |
| Postcloacal spur pairs | 1 | 1 | 2 | 2 | 2 | 2 | 2 | 3 | 0 | 3 | 3 | — | 2 |

[a] — = unknown; source publication stated for characters obtained; for other accession data see Appendix.

TABLE 2.—Diagnostic characters differentiating *Hemidactylus kimbulae* sp. nov. from congeners of the *H. maculatus* species complex.[a]

| Character | *H. kimbulae* sp. nov. ($n = 2$) | Species of the *Hemidactylus maculatus* complex: *hunae* ($n = 5$) | *maculatus* ($n = 9$) | *graniticolus* ($n = 12$) | *acanthopholis* ($n = 5$) | *kangerensis* ($n = 6$) | *sushilduttai* ($n = 7$) | *paaragowli* ($n = 6$) | *siva* ($n = 6$) | *vanam* ($n = 11$) | *kolliensis* ($n = 1$) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Maximum SVL (mm) | 121.2 | 125.5 | 116.0 | 108.5 | 108.6 | 95.0 | 105.0 | 124.4 | 104.7 | 112.2 | 79.5 |
| No. of supralabials (midorbit position) | 11–12 | 9–11 | 8–10 | 8–11 | 8–10 | 10 | 8–10 | 8–10 | 10 | 9–11 | 8 |
| Large spine-like tubercles on nape | Absent | Absent | Absent | Absent | Absent | Present | Present | Absent | Absent | Absent | Present |
| No. of postmental pairs | 3 or 4 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 or 3 | 2 | 2 |
| Size of secondary postmental compared to the primary | 2/3 | 1/2 | 1/2 | 2/3 | 1/2 | 1/3 | 1/10 | 1/3 | 3/4 | 1/2 | 1/3 |
| Dorsal body scale arrangement | Homogeneous | Heterogeneous | Homogeneous | Heterogeneous | Homogeneous | Heterogeneous | Homogeneous | Heterogeneous | Heterogeneous | Heterogeneous | Heterogeneous |
| Enlarged dorsal tubercle shape | Conical | Conical | Trihedral | Conical | Trihedral | Trihedral | Trihedral | Trihedral | Conical | Conical | Conical |
| No. of dorsal tubercle rows | 12–14 | 14–16 | 20 | 16–18 | 18–20 | 18–20 | 16–18 | 22–24 | 16 | 17–19 | 15, 16 |
| Dorsal body tubercle arrangement | Irregular | Irregular | Fairly regular | Irregular | Fairly regular | Fairly regular | Fairly regular | Fairly regular | Irregular | Fairly regular | Fairly regular |
| Middorsal fold/furrow | Distinct | Distinct | Indistinct | Distinct | Distinct | Indistinct | Indistinct | Indistinct | Distinct | Indistinct | Distinct |
| No. of scales on the space between medial parasagittal rows of midbody tubercles | Narrow (5–8) | Wide (8–11) | Narrow (5–8) | Wide (8–12) | Narrow (5–8) | Narrow (3–6) | Narrow (3–8) | Wide (6–12) | Narrow (5–8) | Narrow (5–8) | Wide (8–12) |
| No. of ventral scale rows at midbody | 36–39 | 40–43 | 30–38 | 40–46 | 35–40 | 28–30 | 30–33 | 33–39 | 27–30 | 36–39 | 29–34 |
| Ventrolateral fold of the body | Invisible | Invisible | Visible | Visible | Visible | Invisible | Invisible | Visible | Invisible | Invisible | Invisible |
| Middorsal body color pattern | Dark-edged brown saddle shape with a white spot | Faded saddle shape, sometimes dark-edged | Three black spots | Brownish saddle shape | Brownish saddle shape | Dark-edged brown bands | Dark-edged white saddle shape | Dark-edged white saddle shape | Dark-edged brown saddle shape | Faded saddle shape | Faded saddle shape |
| No. of femoral pores | 21–24 | 26–28 | 16–19 | 23–28 | 19–21 | 18–21 | 21–24 | 10–12 | 17–18 | 17–22 | 21–25 |
| No. of interfemoral scales | 5–7 | 7–9 | 5–9 | 1–3 | 12–14 | 4 | 4 | 16–18 | 5 | 10–11 | 2, 3 |
| Scales on posterior edge of thigh | Granular | Granular | Enlarged conical tubercles | Granular | Enlarged conical tubercles | Enlarged scales | Enlarged conical tubercles | Enlarged conical tubercles | Granular | Enlarged conical tubercles | Enlarged scales |
| Lamellae on Toe IV | 12, 13 | 11, 12 | 12, 13 | 12, 13 | 11, 12 | 11, 12 | 11–13 | 10–12 | 13–15 | 10–12 | 10–12 |
| Dorsal scales on the tail | Imbricate | Juxtapose | Imbricate | Imbricate | Juxtapose | Juxtapose | Imbricate | — | Imbricate | Juxtapose | Imbricate |
| Enlarged tubercle in each whorl | 6 | 8 | 8 | 4 | 8 | 6–8 | 6–8 | — | 4 | 8–10 | 4–8 |
| Median subcaudal width compared to anterior portion of tail width (%) | 80 | 80 | 60 | — | 60 | 60 | 60 | 50 | 50 | — | 80 |
| Postcloacal spur pairs | 1 | 2 | 2 | 2 | 2 | 3 | 0 | 3 | 3 | — | 2 |

[a] — = unknown.

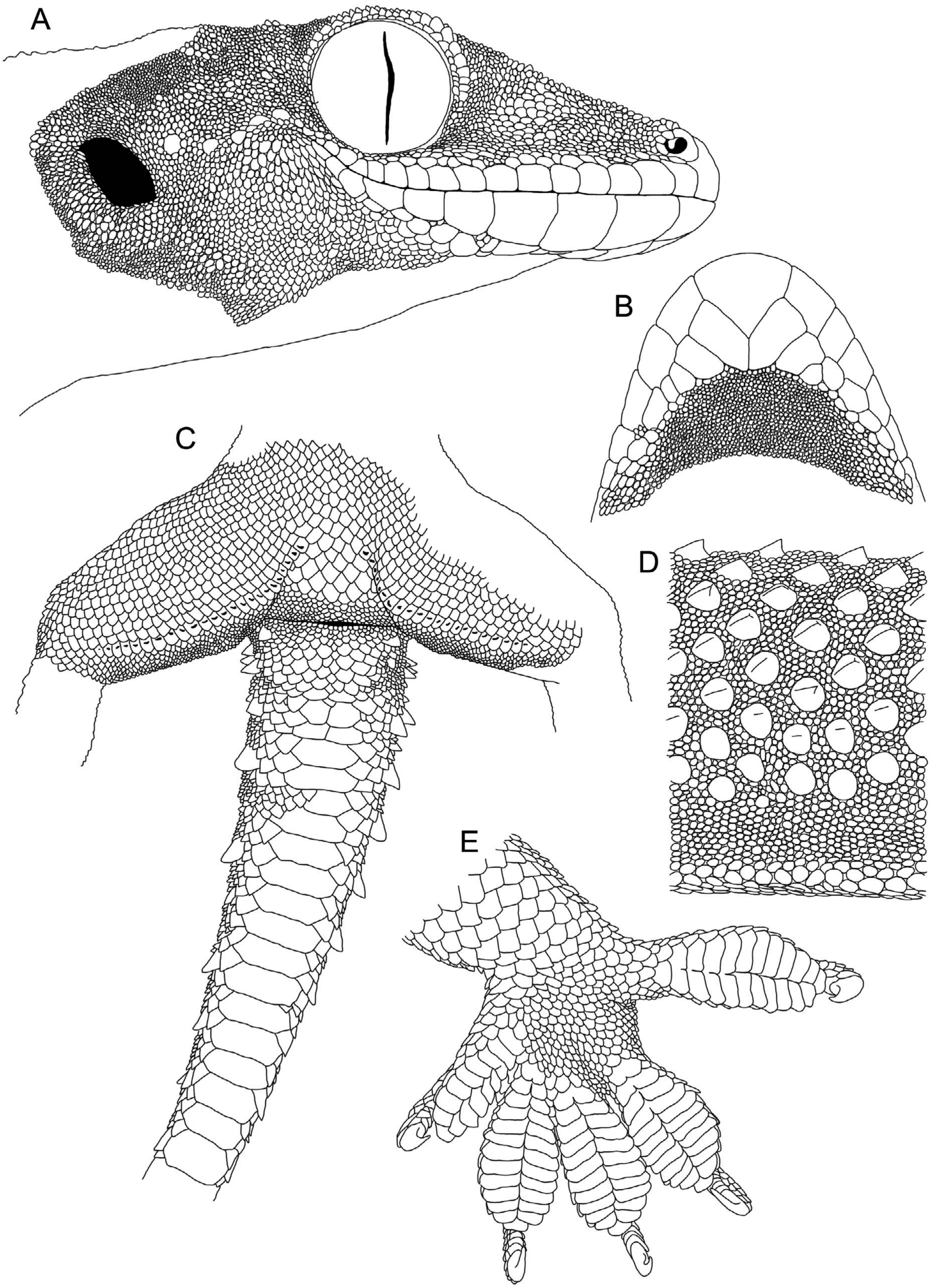


FIG. 1.—Head in lateral view (A), chin (B), thighs and tail in ventral view showing femoral pores, precloacal spurs, and subcaudal scales (C), midbody granules and tubercles in lateral view (D), and foot showing subdigital lamellae (E) of *Hemidactylus* ***kimbulae*** sp. nov. (NMSL 2020.08.01; holotype). Illustration by AATA (not to scale).


FIG. 2.—Adult male holotype of *Hemidactylus* ***kimbulae*** sp. nov. (A; NMSL 2020.08.01) and (B) habitat, rock walls of the Duwili Ella waterfall on the southern face peneplain foothills of the Central Highlands, Kalothota, Balangoda, Uva, Sri Lanka, elevation 310 m. Photos by S.K.

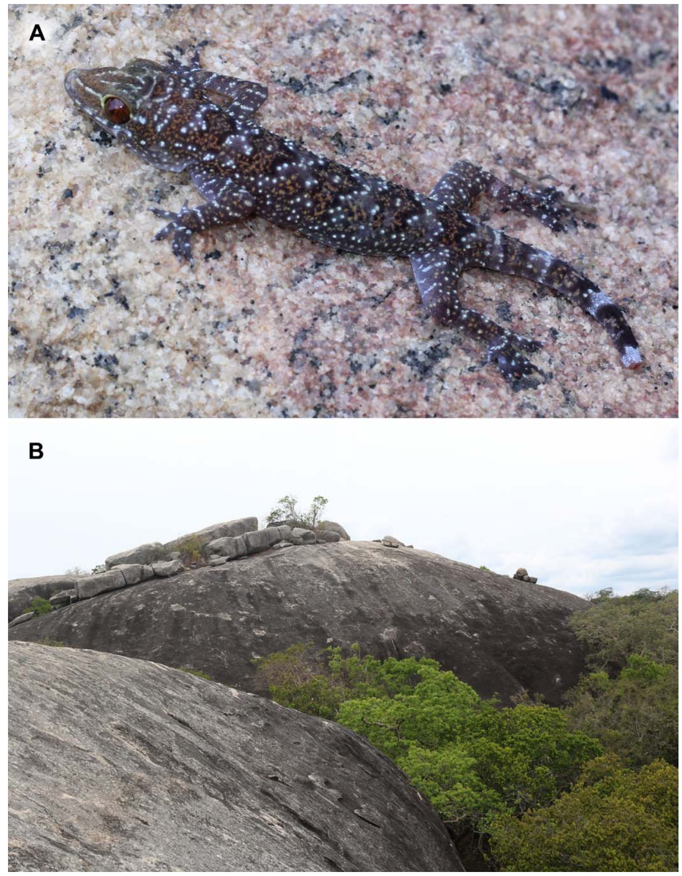


FIG. 3.—An adult male of *Hemidactylus hunae* (A; not collected; SVL = 128.5 mm) from the type locality (B) habitat, rock walls at Kudumbigala, near Okanda (type locality), Ampara District, Eastern Province, Sri Lanka, elevation 40 m. Photos by S.K. A color version of this figure is available online.

the anterior end of orbit slightly larger, posterior half with smaller spinose scales; diameter of eyes slightly shorter than eye to ear distance, eye diameter 90.7% of eye–ear distance (82.0%); ear opening shallow, oval. Rostral wider than deep, incompletely divided dorsally by weakly developed rostral groove, posteroventrally in contact with first supralabial, contacted posteriorly by nostril, 2 supranasals, and internasals; nostrils separated by 2 enlarged, subcircular supranasals; 2 small internasal scales between supranasals (3); nostrils subcircular, dorsally orientated; 2 and 3 postnasals on left and right respectively (2 on both sides), lowest larger, not in contact with first supralabial, separated by a small subnasal; loreal region slightly inflated and convex, canthus rostralis not prominent; 3 rows of scales separate orbit from supralabials at level of pupil; a single interrupted row of enlarged, elongate scales bordering supralabials; supralabials to the angle of jaw 14 (12) on left side and 15 (13) on right side, 12th at mid-orbit position (11th); infralabials to the angle of jaw 9 on left side, and 8 on right side (9 on both sides).

Mental subtriangular, elongate and shorten posteriorly to level of second supralabial, wider than long, posterolaterally in contact with 3 postmental scales longitudinally arranged on the left side, and 4 on the right side (three); primary postmental pair enlarged and elongate, same length as mental but size nearly 2/3 of it, in extensive contact with each other behind mental, and bordered by mental, first infralabial, secondary postmental, and 11 enlarged chin scales; secondary postmental pair half size of primary pair, and bordered by primary postmentals, first and second infralabials, tertiary postmental, and eleven enlarged chin scales; tertiary postmental pair half size of secondary pair, and bordered by secondary postmentals, second infralabial, quaternary postmental, and 11 enlarged chin scales, with those on the left side only having an enlarged subinfralabial in between second infralabial and tertiary postmental, also quaternary postmental is absent on left side; on the right side, quaternary postmental pair half size of tertiary pair, and bordered by tertiary postmentals, second infralabial, enlarged subinfralabial, and 2 enlarged chin scales; scales on throat granular and smooth, smaller than on the ventral body.

Body stout, short, axilla–groin length 40.3% of SVL (46.3%), with slightly distinct ventrolateral fold without denticulate scales; dorsal granules blunt or rounded, homogeneous, feebly carinate, intermixed with conical, strongly multicarinate, enlarged tubercles; dorsal tubercles prominent and randomly arranged, forming 14–16 longitudinal irregular rows extending from occiput onto the tail (12–14), no tubercles on upper and lower flanks; each enlarged tubercle about 10 to 15 times as large as granules separating them, largest surrounded by 15 to 20 granules, 2–6 granules

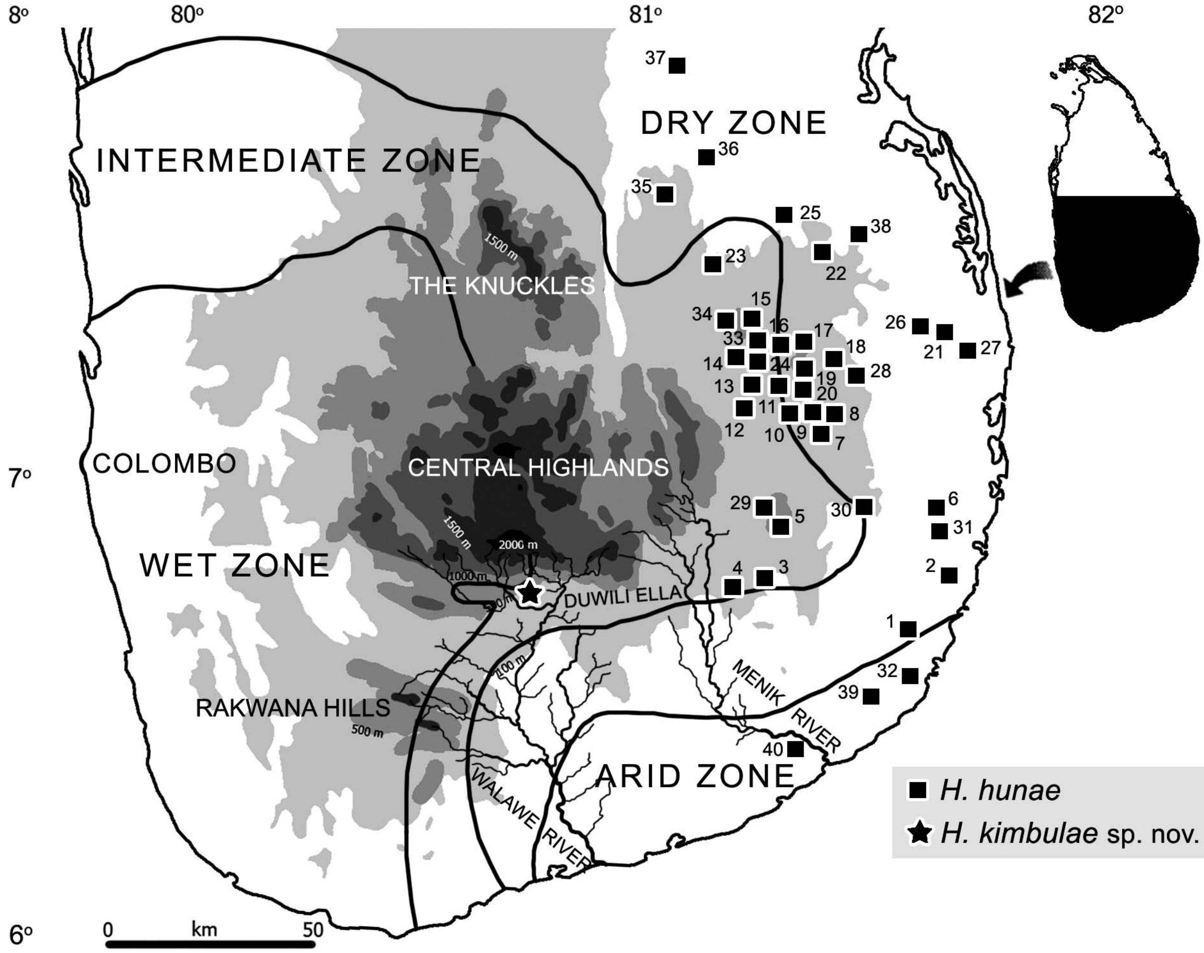


FIG. 4.—Current distribution pattern of *Hemidactylus* ***kimbulae*** sp. nov. (star) and *H. hunae* (squares), as follows: [1] Kudumbigala-Okanda (type locality), [2] Panama, [3] Maligathenna, [4] Rahathangala, [5] Maragalakanda, [6] Habuthagala, [7] Baduluwelakanda, [8] Hewamedillahela, [9] Dambadeniyahela, [10] Guruhela, [11] Bulupitiyahela, [12] Godigamuwahela, [13] Hamapolakanda-Totillaketiya, [14] Hangala, [15] Karandugala, [16] Yakunhela-Gal kotte, [17] Rathugala, [18] Beddegala, [19] Walasgalge-Bambarabeddegala, [20] Ulhela and Avalahela, [21] Buddangala, [22] Nuwaragala, [23] Kokagalakanda, [24] Nilgala, [25] Mahaoya, [26] Ampara, [27] Deegawapi, [28] Galoya, [29] Monaragala, [30] Siyabalanduwa, [31] Lahugala, [32] Kumana ([1–32] based on: Deraniyagala 1937; de Silva et al. 2004; Wickramasinghe and Somaweera 2008; Karunarathna and Kumarasinghe 2011; Karunarathna and Amarasinghe 2011b); [33] Hangalakanda, [34] Ekiriyankumbura, [35] Henanigala, [36] Maduruoya, [37] Dimbulagala, [38] Ethagala, [39] Kanabisogala, [40] Situlpawwa ([33–40] based on this study).

separate adjacent enlarged tubercles; enlarged tubercles similar in size except those on most medial parasagittal rows nearly 2/3rd the size of adjacent tubercle; shape of enlarged tubercles on back homogenous including those on flanks; no enlarged tubercles on nape except for 4 small and bluntly pointed supratympanic tubercles; tubercles on occipital and temporal region still smaller, bluntly pointed or rounded; dorsal granules at midbody smaller than ventrals at same level; pectoral and abdominal scales subequal in size, smooth, elongated, bluntly pointed, imbricate; slightly larger on femoral and largest on precloacal region; 36 (39) ventral scales across midbody; ventrolateral scales on trunk bluntly pointed or rounded and smooth, without enlarged tubercles; femoral scales enlarged and bearing tiny ellipse pores, 21 femoral pores on left thigh and 23 on right thigh (24 in left and 23 on right), with left and right series separated by a diastema of 5 unpored enlarged scales (7).

Forelimbs moderately short; length of forearm 17.4% of SVL (17.5%); length of brachium 19.9% of SVL (19.6%); legs relatively long; length of tibia 18.2% of SVL (19.7%); thigh longer, its length 20.5% of SVL; dorsal granules on arm bluntly pointed and feebly carinate, heterogeneous, intermixed with densely packed enlarged tubercles; brachium with granular scales that are larger than granules on dorsum intermixed with much smaller tubercles; dorsal scales on forearm predominantly bearing much smaller, flattened, tubercles; scales on elbow are smaller, strongly keeled and conical; ventral scales on both brachium and forearm bluntly pointed and smooth, smaller than those on the ventral body; scales on the palm smooth, granular, rounded or bluntly pointed; dorsal granules on leg bluntly pointed and feebly carinate, intermixed with densely packed enlarged tubercles; thigh with granular scales that are slightly larger than granules on dorsum intermixed with much larger tubercles; dorsal scales on tibia heterogeneous, predominantly bearing much smaller, flattened, tubercles; scales on knee smooth, pointed, and enlarged, 8 to 10 times larger than adjacent granules; ventral scales on both thigh and tibia bluntly pointed and smooth, scales on tibia much more enlarged than those on the ventral side of the body, similar in size to the scales on precloacal area; scales on the foot smooth, granular, and bluntly pointed; digits moderately long, fourth finger 49.8% of forearm length (54.7%), fourth toe 52.0% of tibia length (47.1%), strongly clawed; all digits of manus and digits I–IV of pes indistinctly webbed; terminal phalanx of all digits curved, arising angularly from distal portion of expanded lamellar pad or scansor, half or more than half as long as associated toepad; lamellae beneath each toe in straight transverse series, divided except for first 2 basal scansors on Digit I and single distal on all digits and some single basal ones too; scansors from proximal most at least twice diameter of palmar scales to distalmost single scansor, namely, 11-12-12-11-12 in left manus (10-12-12-12-11), 11-12-12-11-12 in right manus (11-13-12-13-11), 10-13-12-12-13 in left pes (10-13-12-13-12), 10-13-13-12-12 in right pes (9-13-12-12-12); relative length of digits in mm are IV, 10.5 > V, 10.3 > III, 9.8 > II, 9.4 > I, 8.8 in left manus (V, 10.1 > IV, 9.9 > III, 9.8 > II, 8.3 > I, 6.3); V, 14.0 > IV, 11.5 > III, 11.3 > II, 10.9 > I, 8.2 in left pes (V, 10.4 > IV, 9.6 > III, 9.5 > II, 9.3 > I, 7.3).

Tail complete, length 127.3 mm (107.5 mm), distal half regenerated, depressed, flat beneath, verticillate, with well-defined median furrow; length of the tail slightly longer than SVL, tail length 105.0% of SVL (104.0%); dorsal scales on the tail subimbricate, pointed and strongly multicarinate, larger than granules on dorsum; original tail segmented with 9 whorls of tubercles, each whorl consisting of 6 conical, much enlarged, carinate tubercles separated from one another by 1 to 3 small scales; the lateral row on both sides slightly elongated, pointed and smooth; each whorl separated from its neighbor by about 8 to 10 scale rows; tail base swollen; a single, conical, postcloacal spur present on each side; ventral scales on tail base enlarged, imbricate, pointed, and smooth; median row of the subcaudal plates smooth, enlarged, broad, covering almost entire base of the tail with 2 rows of larger pointed, smooth, imbricate scales laterally.

**Coloration.**—In life, the holotype of *H. kimbulae* sp. nov. had a dorsal pattern of black-edged light ashy saddle-shaped markings on a grayish brown ground color; interspaces between each saddles whitish, forming X-shaped marks; middle of each saddle mark, white spot; irregular cream markings on dorsal head; enlarged tubercles within saddles black or dark brown, the rest white or cream; dark edged cream cross stripes on arm, including digits; dark-edged cream blotches on legs including digits; first saddle mark on the back between arms, second and third on midbody, fourth on hips, fifth on the tail base, sixth and seventh on the original tail, afterward not present on regenerated tail; white horizontal stripe starting from loreal region, cross the eye, toward occiput, disappear afterward; supralabials light ashy brown, below eye whitish; infralabials cream; white blotches on the temporal region mixing with dark brown, cream, yellow irregular markings; venter light ashy brown, toe pads whitish.

In preservative, the grayish brown ground color faded in to uniform gray; black edges of saddles remained the same. The ventral body and head mostly fading to cream medially and yellow on the chin.

**Etymology.**—The specific epithet is an invariable noun in apposition and refers to *kimbulae* (=crocodile) in Sinhalese language, which it is locally and widely known as *kimbul-hunae* (=crocodile-gecko) due to its large body size. Suggested vernacular names are "kimbul gal-huna" and crocodile rock-gecko in Sinhala and English, respectively.

**Distribution and natural history.**—The new species is point endemic, isolated to the Kalthota area. The *H. hunae* population recorded from Koslanda (elevation 700 m above sea level; Fig. 4) probably represents *H. kimbulae* sp. nov. The holotype and paratype were collected from a single locality on the southern face peneplain foothills of the Central Highlands that comprises tropical moist, semiever-green forest vegetation and scattered patches of savanna-type forests (see Gunatileke and Gunatileke 1990). This species is found only on the walls and in crevices inside rock caves within the patchy forested areas in the savanna ecosystem, but no rock caves were observed in the grassland habitat; it has also never been observed on rock walls outside the caves. The mean annual rainfall was measured at 2000 mm, received mainly during the southwestern monsoon (May–September), whereas the mean annual temperature was 29.4°C. We observed five adult individuals of the species from four pegmatite caves during a 2-d survey (four observers). All the caves were situated in a shady area (canopy cover = 25–40%) and were moist (humidity = 67–81%), poorly illuminated (light intensity = 356–492 Lux), and warm inside (substrate temperature = 27.1–28.4°C). Interestingly, we found three juveniles inside an abandoned building, on vertical surfaces about 2 m from the ground. The new species is sympatric with several other gecko species, as follows: *Cnemaspis lokugei* Karunarathna, de Silva, Gabadage et al. 2021; *H. depressus* Gray 1842; *H. frenatus* Duméril and Bibron 1836; *Hemidactylus leschenaultii* Duméril and Bibron 1836; *Hemidactylus parvimaculatus* Deraniyagala 1953; and *Gehyra mutilata* (Wiegmann 1834).

**Conservation status.**—The application of the International Union for Conservation of Nature (IUCN) Red List criteria (IUCN Standards and Petitions Subcommittee 2019) shows that the new species is restricted to a single locality with an area of occupancy (AOO) of 1.0–1.5 km$^2$ where eight individuals (five adults and three juveniles) were recorded from one location. Also, given the isolated distribution and the rapid forest fragmentation due to chena cultivation within this range, *H. kimbulae* sp. nov. can be considered a critically endangered species. The type locality lies within a protected area, the Duvili Ella Forest Reserve. However, the area outside this protected range is highly threatened by pegmatite exploitation for industrial use, probably for the production of glass and ceramic.

### *Hemidactylus* **hunae** Deraniyagala 1937
(Tables 1, 2; Figs. 3, 4)

*Hemidactylus maculatus hunae* Deraniyagala 1937; *Hemidactylus maculatus hunae*—Taylor 1953, Wermuth 1965, de Silva et al. 2004a, Ziesmann et al. 2007, Wickramasinghe and Somaweera 2008, Amarasinghe et al. 2009, Somaweera and Somaweera 2009, Karunarathna and Amarasinghe 2011a,b; *Hemidactylus hunae*—Bauer et al. 2010.

**Holotype.**—Adult female (NHMUK 1946.8.23.77) from Okanda (6°37′52″N, 81°46′00″E; 12 m above sea level), near Panama, Ampara District, Eastern Province, Sri Lanka, collected by P.E.P. Deraniyagala.

**Diagnosis.**—The following combination of characters distinguishes *H. hunae* from all other congeners: adult males reaching 125.5 mm SVL, adult females 124 mm SVL; dorsal scalation of small heterogeneous, carinate, granules intermixed with large, conical, carinate tubercles that form 14–16 irregularly arranged longitudinal rows at midbody; dorsal and lateral tubercles equal sized; dorsal furrow distinct with wider nontubercular space middorsally; 2 pairs of postmentals, secondary pair 1/2 of the primary pair; throat scales granular; no spine-like tubercles on nape; ventrals larger than dorsals, smooth, short, circular, with 40–43 rows at midbody; 9–11 supralabials at midorbit position; 26–28 femoral pores on each side separated medially by 7–9 nonpored enlarged scales; scales on posterior thigh granular, not enlarged; lamellae divided, 8 or 9 subdigital lamellae below the first and 11 or 12 below the fourth toe; dorsal scales on tail granular, carinate, juxtaposed; tail segmented with whorls of lateral tubercles, each whorl consisting of eight enlarged, conical, carinate tubercles separated from one another by one to three small scales; each whorl separated from its neighbor by about 8–10 scale rows; subcaudal scales at base bluntly pointed or rounded and enlarged; median row enlarged and broad; 2 postcloacal tubercles (spurs) on each side; body dorsum with a series of dark-edged faded saddles from occiput to tail base.

**Description of holotype.**—The holotype is generally in good condition except minor damages to the skin and skull of the anterior parts of the head. An adult female, 107.0 mm SVL; head moderately large, short, its length 29.2% of SVL; elongate, narrow, head width 72.5% of head length and 21.2% of SVL, not strongly depressed; head depth 44.1% of head length, distinct from neck; snout elongate, its length 37.7% of head length and greater than eye diameter; eye diameter 59.3% of snout length; scales on snout, canthus rostralis, interorbital smooth, granular and rounded, 2–4 times larger than those on interorbital and occipital region; interorbital region relatively broad; interorbital distance 37.7% of head length; occipital region has intermixed enlarged, smooth, rounded tubercles, which are 2–5 larger than adjacent granules; eye small, its diameter 22.4% of head length, pupil vertically slit; supraciliaries small, bluntly pointed, those at the anterior end of orbit slightly larger, posterior half with smaller spinose scales; diameter of eyes slightly shorter than eye–ear distance, eye diameter 78.6% of eye–ear distance; ear-opening shallow, oval. Rostral wider than deep, incompletely divided dorsally by weakly developed rostral groove, posteroventrally in contact with first supralabial, contacted posteriorly by nostril, 2 supranasals, and an internasal; nostrils separated by 2 enlarged, subcircular supranasals; an internasal scale between supranasals; nostrils subcircular, dorsally orientated; loreal region slightly inflated, canthus rostralis not prominent; 4–5 rows of scales separate orbit from supralabials at level of pupil; a single interrupted row of enlarged, elongate scales bordering supralabials; supralabials to the angle of jaw 12 on both sides, 10th at midorbit position; infralabials to the angle of jaw 10 on left side, and 9 on right side.

Mental subtriangular, elongate and extended posteriorly to level of third supralabial, longer than wide, posterolaterally in contact with 2 pairs of postmentals on both sides; primary postmental pair enlarged and elongate, but shorter than mental and nearly half size of it, in extensive contact with each other behind mental, and bordered by mental, first infralabial, secondary post mental, and 6 nonenlarged chin scales; secondary postmental pair half size of primary pair, and bordered by primary postmentals, second infralabials, and 11 nonenlarged chin scales; scales on throat granular and smooth, smaller than on the ventral body.

Body stout, short, axilla–groin length 42.0% of SVL, no ventrolateral fold; dorsal granules blunt or rounded, heterogeneous, feebly carinate, intermixed with conical, feebly multicarinate with a prominent single longitudinal keel, enlarged tubercles; dorsal tubercles prominent and randomly arranged, forming 14–16 longitudinal irregular rows extending from occiput onto the tail, no tubercles on lower flanks; each enlarged tubercle about 8 to 10 times as large as granules separating them, largest surrounded by 12 to 15 granules, 2–8 granules separate adjacent enlarged tubercles; enlarged tubercles similar in size except those on most medial parasagittal rows nearly 2/3rd the size of adjacent tubercle; shape of enlarged tubercles on back heterogeneous including those on flanks; no enlarged tubercles on nape except four small and bluntly pointed supratympanic tubercles; tubercles on occipital and temporal region still smaller, bluntly pointed or rounded; dorsal granules at midbody smaller than ventrals at same level; abdominal scales slightly larger than pectoral scales in size, smooth, shortened, rounded, slightly imbricate; 42 ventral scales across midbody; ventrolateral scales on trunk bluntly pointed or rounded and smooth, without enlarged tubercles; femoral scales slightly enlarged and no pores (as a female).

Forelimbs moderately short; length of forearm 17.0% of SVL; length of brachium 12.9% of SVL; legs relatively long; length of tibia 18.5% of SVL; thigh longer, its length 19.1% of SVL; dorsal granules on arm bluntly pointed and feebly carinate, heterogeneous, intermixed with densely packed enlarged tubercles; brachium with granular scales which are larger than granules on dorsum intermixed with much smaller tubercles; dorsal scales on forearm predominantly bearing much smaller, flattened, tubercles; scales on elbow are smaller, strongly keeled and conical; ventral scales on both upper and lower arms bluntly pointed and smooth, smaller than those on the ventral body; scales on the palm smooth, granular, rounded or bluntly pointed; dorsal granules on leg bluntly pointed and feebly carinate, heterogeneous, intermixed with densely packed enlarged tubercles; thigh with granular scales that are slightly larger than granules on dorsum intermixed with much larger tubercles; dorsal scales on tibia predominantly bearing much smaller, flattened, tubercles; scales on knee are smooth, pointed, and enlarged, 8 to 10 times larger than adjacent granules; ventral scales on both thigh and tibia rounded and smooth, scales on tibia enlarged than those on the ventral body, similar in size to the scales on precloacal area; scales on the foot smooth, granular, and bluntly pointed; digits moderately long, strongly clawed; all digits of manus and digits I–IV of pes indistinctly webbed; terminal phalanx of all digits curved, arising angularly from distal portion of expanded lamellar pad or scansor, half or more than half as long as associated toepad; lamellae beneath each toe in straight transverse series, divided except for first two basal scansors on Digit I and single distal on all digits and some single basal ones too; scansors from proximal most at least twice diameter of palmar scales to distal-most single scansor, namely, 9-10-11-11-11 in left manus, 9-10-10-11-11 in right manus, 9-12-11-11-10 in left pes, 8-12-11-12-11 in right pes;

relative length of digits is IV > V > III > II > I in manus; V > IV > III > II > I in pes.

Tail complete, 114.6 mm, original, depressed, flat beneath, verticillate, with well-defined median furrow; length of the tail slightly longer than SVL, tail length 106.5% of SVL; dorsal scales on the tail juxtaposed, rounded and feebly multicarinate, larger than granules on dorsum; original tail segmented with around 20 whorls of tubercles, each whorl consisting of 8 conical, much enlarged, carinate tubercles separated from one another by 1 to 3 small scales; the lateral row on both sides slightly elongated, bluntly pointed and smooth; each whorl separated from its neighbor by about 8 to 10 scale rows; tail base swollen; 2, bluntly pointed, postcloacal spurs present on each side; ventral scales on tail base enlarged, slightly imbricate, rounded, and smooth; median row of the subcaudal plates smooth, enlarged, broad, covering almost entire base of the tail with 2 rows of larger bluntly pointed, smooth, slightly imbricate scales laterally.

**Coloration.**—After 83 yr in preservative, the holotype of *H. hunae* has a dorsal pattern of dark brown-edged light saddle-shaped markings on a grayish brown ground color; irregular dark markings on dorsal head; enlarged tubercles within the interrupted edge of saddles dark brown, the rest cream; dark-edged light brown cross stripes on arm, including digits; dark markings on thigh, cross stripes on tibia and digits; first saddle mark on the nape, second, third, and fourth on midbody, fifth on hips; no saddles on the tail, but dark brown cross stripes on each whorl; venter cream, toe pads light or dark brown.

The live coloration (based on live specimens, not collected) may vary from site to site (mostly due to camouflage) and also across age groups, sex, and mood, ranging from grayish purples to browns. The vertebral midline bears a series of W-shape stripes from vent to the tail, with stripes becoming more defined toward the tip. Usually the studded effect that is known as saddles evenly spaced.

**Distribution and natural history.**—The distribution of *H. hunae* is restricted to 100–400 m elevation above sea level in the southeastern and eastern Sri Lanka. During a 5 yr study (2003–2007), Karunarathna and Kumarasinghe (2011) recorded this species from 58 granite rock caves in 23 locations. In addition, de Silva et al. (2004a), Wickramasinghe and Somaweera (2008), and Karunarathna and Amarasinghe (2011a) also recorded this species from additional locations (Fig. 4). Karunarathna and Kumarasinghe (2011) measured a live individual with SVL of 128.5 mm (male), a record of the largest individual so far (Fig. 3, not collected), from the type locality. Most of the geckos had fixed themselves to dark cave walls, usually 2 m above the ground level. The largest female specimen found was SVL 124.0 mm (WHT 1813B) from the Kumaradola Group Monaragala, and Karunarathna and Kumarasinghe (2011) reported a female of SVL 112.4 mm (not collected) from the type locality. They also observed males, females, and juveniles in the same cave habitat. According to de Silva et al. (2004a), the highest abundance of this species recorded from Hamapolakanda-Totillaketiya was 11 individuals. In some of the locations, *H. hunae* is sympatric with *Calodactylodes illingworthorum* Deraniyagala 1953 and *H. frenatus*. In Nilgala, this species inhabits sympatrically with *C. illingworthorum* and *Cnemaspis nilgala* Karunarathna, Bauer, de Silva et al., 2019a, and in Maragala with *C. illingworthorum*, *Cnemaspis hitihamii* Karunarathna, Poyarkov, de Silva et al., 2019b and *Cnemaspis kumrasinghei* Wickramasinghe and Munindradasa, 2007 inside rock caves. However, de Silva et al. (2004a) noticed that the greatest populations of *H. hunae* were found in regions where there were few or no *C. illingworthorum*. Therefore, it seems these two species are rather syntopic than sympatric. However, we observed that *Cnemaspis* species are always sympatric with *H. hunae* in every rock cave.

*Hemidactylus hunae* is a nocturnal gecko. According to Karunarathna and Kumarasinghe (2011), they are very active from 1600 to 2200 h but inactive from 2300 to 1500 h the next day. During the daytime, especially from 1100 to 1400 h, they lie motionless on the dark surface of granite caves. One early gravid female was caught by de Silva et al. (2004a), and it displayed an interesting behavior of moving toward the torch light; the usual response would be to freeze or move in the opposite direction to try and escape. No individuals were ever sighted on tree trunks. On rare occasions, in the daytime in secluded places, some individuals were sighted on clay walls. These hermitages were cool and situated in shady places due to closed forest and the many streams flowing close by. However, Karunarathna and Kumarasinghe (2011) found this species from only one rock cave at the type locality. In total, 92 individuals were recorded during their study and 63 of them were found in dark granite caves; 21 individuals were on cement mixed-clay walls and 8 in well-shaded anthills.

Most of the *H. hunae* individuals use anthills and granite caves to hunt prey. They mostly feed on insects, especially dipterans and spiders (de Silva et al. 2004a), whereas there are many records of its Indian congeners that prey on geckos, skinks, agamid lizards, small birds, and even small mammals (Daniel 2002). Karunarathna and Amarasinghe (2011b) reported that an *H. hunae* individual fed on a 50-mm-sized mole rat, *Bandicota bengalensis*. They observed the gecko dashing the prey on a granite rock wall in order to kill it. Although this species lives in caves, interactions with bats are unknown. Among fecal samples from three *H. hunae* individuals, only one was infected with a *Strongyloides* type parasite (de Silva et al. 2004b).

Out of the 58 caves surveyed by Karunarathna and Kumarasinghe (2011), only 5 caves were observed as egg-deposition sites where they counted 11 eggs in total (egg width = 8.2–8.7 mm, and length = 10.8–12.1 mm; mean = 8.4 × 11.5 mm). All eggs were found in dark granite caves enclosed within huge anthills; egg deposition sites were well protected from sunlight and rain. Although Deraniyagala (1953) reported *H. hunae* performs communal oviposition, Karunarathna and Kumarasinghe (2011) observed that only a single female enters the egg-deposition site at a time and lays one to three eggs. de Silva et al. (2004a) also stated that *H. hunae* individuals were not gathered in communal egg laying sites or attached the eggs to rocks, but they lay eggs in solitary pairs in leaf litter or rock crevices. They also discovered semi-submerged eggs in leaf litter in the rotting stump of a tree at Palamugala near Hangala (near Nilgala), was on the verge of hatching, and when touched, the *H. hunae* hatchling leaped out. They managed to keep the juvenile in captivity for several days until the body coloration matured to confirm its identity.

The veddas (the ancient aboriginal race in Sri Lanka) at Nilgala call this species "Kotakka" (fide de Silva et al. 2004a), and here, we suggest the vernacular names of "maha galhuna" and giant rock-gecko in Sinhala and English, respectively.

**Conservation.**—de Silva et al. (2004a) and Karunarathna and Kumarasinghe (2011) reported that the human impact on this species and its natural habitats has been high due to deforestation, the extension of paddy and chena (shifting) cultivations, exploitation of granite rock boulders, and human-made fires, as well as the killing of the geckos (especially by the tribal communities) due to their large and frightening size. The mythical belief that these geckos can bring sickness to their communities also does not help their survival. We observed the killing of this gecko on sight by locals in Nilgala numerous times. The application of the IUCN Red List criteria (IUCN Standards and Petitions Subcommittee 2019) shows that *H. hunae* is restricted to an AOO of 350 $km^2$ recorded from 40 localities within a 6000 $km^2$ extent of occurrence. Given the isolated distribution pattern and the rapid forest fragmentation accelerated by government development projects and high human population density within the range, *H. hunae* can be considered an endangered species. Most of the habitats, including the type locality, lie outside the protected areas, and all of those habitats are highly threatened by road constructions and expansions. Among the previously recorded localities, our observations during 2020 reveal that population sizes of the species in the following locations have been decreased to at least 50% within the last decade (2011–2020): Habuthagala, Baduluwelakanda, Hewamedillahela, Guruhela, Hamapolakanda, Hangala, Buddangala, Deegawapi, Siyabalanduwa, Lahugala, Hangalakanda, and Ekiriyankumbura.

## Discussion

Phylogeny and biogeography studies of *Hemidactylus* that is endemic to Indo-Sri Lankan areas reveal that diversification in this radiation began ~34.5 million years ago (Mya) in India, followed by 7 independent dispersal events from India to Sri Lanka (Lajmi et al. 2018; Lajmi and Karanth 2020). Two dispersal events occurred in the Early to Middle Miocene, leading to two species endemic to Sri Lanka, namely, *H. depressus* and *H. hunae*. Based on Lajmi et al. (2018), the divergence between the *H. hunae* and its sister taxon occurred 12.91 Mya (95% highest posterior density, 17.8–8.7 Mya). The dispersal events leading to present-day *H. hunae* occurred from the Early to the Middle Miocene, whereas the remaining five dispersal events that led to its range expansion were relatively recent and largely restricted to open semiarid habitats. Considering the strong morphological differences (e.g., dorsal granules heterogeneous vs. homogeneous) and biogeographical isolation, we believe the divergence of *H. kimbulae* sp. nov. from *H. hunae* also occurred much earlier. We identified only a single distinct population, described as a new species here, of *H. hunae* (sensu lato); likely, the inland radiation is higher than we assumed, as this species is found only on rock walls and in caves in isolated hilly forests scattered within the eastern dry face of the island.

Deraniyagala (1937) divided *H. maculatus* (sensu lato) into two forms (subspecies), as follows: as the Northern Indian form and the South Indian plus the Sri Lankan form. Among the diagnostic characters, he mostly concentrated on the size and shape of mental scale, visibility of ventrolateral fold, and size of posterolateral body tubercles. Actually, based on the currently known species of this complex, there are many similar characters described in Deraniyagala's (1937) analysis. Although we could not find a clear separation of morphological characters of northern and southern forms, we observed that there are two forms that have (1) fairly regularly arranged trihedral dorsal tubercles (e.g., *H. maculatus*, *H. acanthopholis*, *H. kangerensis*, *H. sushilduttai*, and *H. paaragowli*) and (2) irregularly arranged conical dorsal tubercles (e.g., *H. hunae*, *H. graniticolus*, *H. siva*, and *H. kimbulae*). Interestingly *H. vanam* and *H. kolliensis* have fairly regularly arranged conical tubercles. Probably the northern Indian forms (except *H. acanthopholis* and *H. paaragowli*) mostly have trihedral tubercles, and southern forms (including Sri Lanka) have conical tubercles.

The entire population of *H. hunae* (sensu lato) is geographically confined to the first and second lower peneplains on the southern face of the Central Highlands and is recorded only from locations between the Mahaweli River on the northern border and Menik River on the southern border (Fig. 4). Interestingly, we found a population from Sithulpawwa (in this study) situated near the left bank of the Menik River. However, the new species is isolated to a single location surrounded by the Walawe River Basin. The new species is probably isolated from the *H. hunae* form by the geographic barriers of the Menik and Walawe river basins. A study on stream sediment geochemistry of the Walawe River Basin identified that the basin has within it a boundary zone between two geologically different crustal blocks, which are marked by granulitic grade rocks and amphibolite grade rocks implicated for Gondwana mineralization (Chandrajith et al. 2000). Interestingly, the new species was found on the walls of the pegmatite (igneous) rock caves, whereas *H. hunae* was found on granite (metamorphic) rock caves. The western-most population of *H. hunae* probably dispersed from the ancestors of *H. hunae* that were isolated to this single locality and later evolved as a different species. A similar scenario has been observed for *Microhyla karunaratnei* (Amphibia: Microhylidae), which was also restricted to the same region as *H. kimbulae* sp. nov. and dispersed in the Late Miocene epoch. The type locality of the new species is surrounded by the central highland massif on the eastern and northern border and is situated in the second lower peneplain in elevation; it seems the species was unsuccessful in reaching the higher peneplains because it was not able to climb the steep cliffs of the central highlands. Based on morphological distinctness, we assume this western-most population of *H. hunae* (sensu lato), now *H. kimbulae* sp. nov., has been isolated for a considerable geological time period and evolved as a distinct species. Therefore, here, we suggest it would be interesting in a future study to investigate the data on speciation and dispersal with the support of phylogenetic studies.

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## Appendix

### Other Specimens Examined

*Hemidactylus acanthopholis*.—India: Tinnevelly: NHMUK 1946.8.23.68 (holotype), 1946.8.23.67, 69 (paratypes).

*Hemidactylus graniticolus*.—India: Salem: NHMUK 1946.8.23.70–75 (paratypes); Malabar: NHMUK 1946.8.23.76 (paratype).

*Hemidactylus hunae*.—Sri Lanka: Okanda: NHMUK 1946.8.23.77 (holotype); Kumaradola Group, Moneragala: WHT 1504a–b, 1813a–b.

*Hemidactylus kangerensis*.—India: Khamman: NHMUK 1874.11.11.1.

*Hemidactylus maculatus*.—India: Matharan: NHMUK 1869.8.28.15–17; Salsette, Bombay: NHMUK 1931.12.7.2–3; Bombay: 1956.1.11.41–43; Kanari Caves: NHMUK 1956.1.11.45; Deccan: NHMUK XXII.20a (holotype of *H. sykesi*).