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Three new species of day geckos (Reptilia: Gekkonidae: *Cnemaspis* Strauch, 1887) from isolated granite cave habitats in Sri Lanka

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***Abstract.*—Three new day gecko species of the genus *Cnemaspis* Strauch, 1887 are described from three isolated granite cave habitats with rock walls in Bambaragala (Ratnapura District), Dimbulagala (Polonnaruwa District), and Mandaramnuwara (Nuwara-Eliya District) in Sri Lanka based on morphometric and meristic characters. All of these new species are assigned to the *kandiana* clade based on morphology. These species are small (28–35 mm SVL) in size and may be differentiated from all other Sri Lankan congeners by a suite of distinct morphometric and meristic characters. Each of these species described herein are categorized as Critically Endangered (CR) under IUCN Red List criteria. At the microhabitat scale, they are restricted to wet, cool, and shady granite caves and rock outcrops in isolated forested areas with limited anthropogenic disturbance. Further, these habitats are located in all three main bioclimatic zones (wet, intermediate, dry) and all three geographic peneplains (first, second, third) of Sri Lanka. Due to their restricted distributions (as point endemics), the habitats of these specialist species are vulnerable to fragmentation, edge effects, and anthropogenic activities. Therefore, these isolated forest patches in Sri Lanka are in need of special conservation attention and management.**

Keywords. Climate condition, endangered species, habitat specialist, isolated forest, point endemic, range restriction, systematics, taxonomy

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Introduction

Taxonomic descriptions and phylogenetic revisions in the past decade have rapidly increased the number of day gecko species recognized in the genus *Cnemaspis*, bringing the global species richness to more than 155 (Karunarathna et al. 2019a,b; Uetz et al. 2019a). Consequently, *Cnemaspis* ranks as the second most diverse gecko genus in the world, next to *Cyrtodactylus* (Grismer et al. 2014; Uetz et al. 2019a). However, extensive molecular phylogenetic analyses have questioned the monophyly of *Cnemaspis* which is represented by three geographically disjunct groups from South Asia, Tropical Africa, and Southeast Asia (Gamble et al. 2012; Py-

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ron et al. 2013a; Zheng and Wiens 2016). *Cnemaspis* geckos are diminutive, slender-bodied geckos that possess prominent forward and upwardly-directed eyes with round pupils, broad flattened heads, and elongate slender digits that are bent at an angle with entire subdigital lamellae (Vidanapathirana et al. 2014; Wood et al. 2017; Karunarathna et al. 2019a). These geckos are adapted for a scansorial mode of life, with most being rupicolous, while a few are arboreal or ground-dwelling with crepuscular behavior (Das 2005). They appear to be microhabitat specialists with occupancy limited to shaded surfaces of rocks, caves, trees, abandoned buildings, buildings associated with caves, wattle and daub houses, and rock walls within suitable habitats where the cryptic morphology and body coloration help them camouflage with their surroundings (Smith 1935; Karunarathna et al. 2019b).

Much like continental south Asia, as well as the Indo-Malayan realm, the species richness of *Cnemaspis* in Sri Lanka has grown rapidly by at least eight-fold, from four to 33 species (Deraniyagala 1953; Manamendra-Arachchi et al. 2007; Wicramasinghe and Munindradasa 2007; Karunaratha and Ukuwela 2019). As such, *Cnemaspis* has become the most diverse gecko genus on the island, with 100% endemism. Through molecular phylogenetic analyses of mitochondrial and nuclear DNA, Agarwal et al. (2017) demonstrated the presence of two distinct *Cnemaspis* clades in Sri Lanka (*kandiana* and *podihuna*), and indicated the presence of cryptic diversity within four species (*C. alwisi* Wickramasinghe and Munidradasa 2007; *C. kumarasinghei* Wickramasinghe and Munidradasa 2007; *C. latha* Manamendra-Arachchi, Batuwita, and Pethiyagoda 2007, and *C. podihuna* Deraniyagala 1944). The aforementioned studies emphasized the need for detailed studies on *Cnemaspis* taxonomy using a combination of both morphological characteristics and molecular phylogenetics. As indicated by recent studies in Sri Lanka, the faunistic surveys of under-explored habitats followed by rigorous phylogenetic analyses will further augment the species richness of *Cnemaspis* (Bauer et al. 2007; Agarwal et al. 2017; Karunarathna et al. 2019b). In light of this, we conducted field excursions in various isolated localities in Sri Lanka. Here, we describe three new *Cnemaspis* species (based on morphometric and meristic characters) discovered from three such sites which span all three bioclimatic zones and geological peneplains of Sri Lanka.

Materials and Methods

Field sampling and specimens. Field surveys across 122 different locations in Sri Lanka covered several geographic areas (e.g., dry zone, intermediate zone, and wet zone). At each location, gecko species found were surveyed and documented with special attention on the focal genus. On average, 12 surveyor-hours per location were devoted to the survey. Museum acronyms follow Sabaj (2016) and Uetz et al. (2019b). The type materials discussed in this paper are deposited in the National Museum of Sri Lanka (NMSL), Colombo, Sri Lanka. Specimens were caught by hand and were photographed in life. They were euthanized using halothane and fixed in 10% formaldehyde for two days, washed in water, and then transferred to 70% ethanol for long-term storage. Tail tips were collected as tissue samples before fixation and were stored in 95% ethanol under relatively cool conditions (20–25 °C). For comparison, 424 *Cnemaspis* specimens (catalogued and uncatalogued) representing all recognized Sri Lankan species were examined, including all type specimens housed at the National Museum, Sri Lanka (NMSL), The Natural History Museum, London (BMNH), and in the private collections of Anslem de Silva (ADS) and Aaron Bauer (AMB), which had been deposited in the NMSL. Specimens that formerly belonged to the Wildlife Heritage Trust (WHT) collection and bear WHT numbers are currently deposited in the NMSL, catalogued under their original numbers. Specimens in this study were collected during a survey of lizards in Sri Lanka under permit numbers WL/3/2/1/14/12 and WL/3/2/42/18 (a and b), issued by the Department of Wildlife Conservation, and under permit numbers FRC/5 and FRC/6, issued by the Forest Department of Sri Lanka. Additional information on the morphology and natural history of Sri Lankan *Cnemaspis* species was extracted from the relevant literature (Bauer et al. 2007; Manamendra-Arachchi et al. 2007; Wickramasinghe and Munindradasa 2007; Vidanapathirana et al. 2014; Wickramasinghe et al. 2016; Batuwita and Udugampala 2017; Agarwal et al. 2017; Batuwita et al. 2019; Karunarathna et al. 2019a,b; de Silva et al. 2019). Assignment of unidentified specimens to the three new species was based on their morphometric and meristic characters (Tables 1–9), color patterns, and geographic isolation (Fig. 1; Table 10). The new species described in the present paper are completely new and have not been included in previous phylogenies of the genus (see Agarwal et al. 2017; Karunarathna et al. 2019b).

Morphometric characters. Forty morphometric measurements were taken using a Mitutoyo digital Vernier calliper (to the nearest 0.1 mm), and detailed observations of scales and other structures were made through Leica Wild M3Z and Leica EZ4 dissecting microscopes. The following symmetrical morphometric characters were taken on the left side of the body: eye diameter (ED), horizontal diameter of eye ball; orbital diameter (OD), greatest diameter of orbit; eye to nostril length (EN), distance between anteriormost point of orbit and posterior border of nostril; snout length (ES), distance between anteriormost point of orbit and tip of snout; snout to nostril length (SN), distance between tip of snout and anteriormost point of nostril; nostril width (NW), maximum horizontal width of nostrils; eye to ear distance (EE), distance between posterior border of eye and anteriormost point of ear opening; snout to axilla distance (SA), distance between axilla and tip of snout;

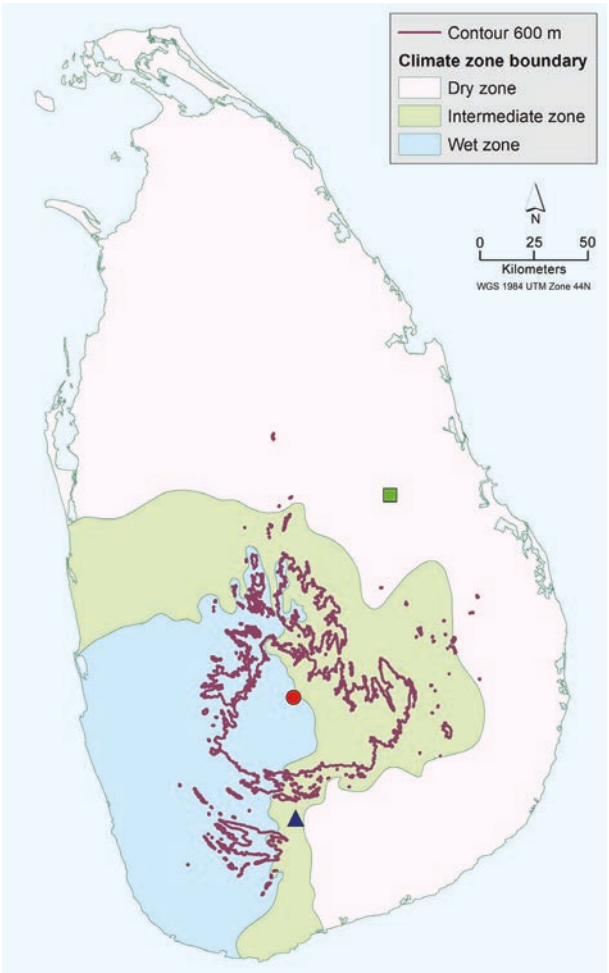

Fig. 1. Currently known distribution of *Cnemaspis dissanayakai* **sp. nov.** (square) from Dimbulagala; *Cnemaspis kawminiae* **sp. nov.** (circle) from Mandaramnuwara; and *Cnemaspis kotagamai* **sp. nov.** (triangle) from Bambaragala, Sri Lanka.

ear length (EL), maximum length of ear opening; interorbital width (IO), shortest distance between left and right supraciliary scale rows; inter-ear distance (IE), distance across head between the two ear openings; head length (HL), distance between posterior edge of mandible and tip of snout; head width (HW), maximum width of head between the ears and the orbits; head depth (HD), maximum height of head at the level of the eye; jaw length (JL), distance between tip of snout and corner of mouth; internarial distance (IN), smallest distance between inner margins of nostrils; snout to ear distance (SED), distance between tip of snout and anteriormost point of ear; upper-arm length (UAL), distance between axilla and the angle of the elbow; lower-arm length (LAL), distance from elbow to wrist with palm flexed; palm length (PAL), distance between wrist (carpus) and tip of longest finger excluding the claw; length of digits I–V of manus (DLM), distance between juncture of the basal phalanx with the adjacent digit and the tip of the digit, excluding the claw; snout-vent length (SVL) distance between tip of snout and anterior margin of vent; trunk length (TRL), distance between axilla and groin; trunk width (TW), maximum width of body; trunk depth (TD), maximum depth of body; femur length (FEL), distance between groin and knee; tibia length (TBL), distance from knee to heel with ankle dorsiflexed; heel length (HEL), distance between ankle (tarsus) and tip of longest toe (excluding the claw) with both foot and tibia flexed; length of pedal digits I–V (DLP), distance between juncture of the basal phalanx with the adjacent digit and the digit tip, excluding the claw; tail length (TAL), distance between anterior margin of the vent and tail tip; tail base depth (TBD), maximum height of tail base; tail base width (TBW), widest point of tail base.

Meristic characters. Thirty discrete characters were observed and recorded using Leica Wild M3Z and Leica EZ4 dissecting microscopes on both the left (L) and the right (R) sides of the body (reported in the form L/R): number of supralabials (SUP) and infralabials (INF) between the first labial scale and corner of mouth; number of interorbital scales (INOS), between left and right supraciliary scale rows; number of postmentals (PM) bounded by chin scales, 1st infralabial on the left and right and the mental; number of chin scales (CHS), scales touching medial edge of infralabials and mental between juncture of 1st and 2nd infralabials on the left and right; number of supranasal (SUN) scales between nares; presence of the postnasal (PON) scales posterior to naris; presence of the internasal (INT) scale between supranasals; number of supraciliary scales (SUS) above eye; number of scales between eye and tympanum (BET) from posteriormost point of orbit to anteriormost point of tympanum; number of canthal scales (CAS), number of scales from posteriormost point of naris to anteriormost point of orbit; total lamellae on manus I–V (SLM) counted from first proximal enlarged scansor greater than twice width of the largest palm scale, to distalmost lamella at tip of digits; number of dorsal paravertebral granules (PG) between pelvic and pectoral limb insertion points along a straight line immediately left of vertebral column; number of midbody scales (MBS) from the center of mid-dorsal row diagonally towards the ventral scales; number of midventral scales (MVS) from the first scale posterior to the mental to last scale anterior to vent; number of belly scales (BLS) across venter between the lowest rows of granular dorsal scales; total lamellae on pes I–V (SLP), counted from first proximal enlarged scansor greater than twice the width of the largest heel scale, to distalmost lamella at tip of digits; number of precloacal pores (PCP) anterior to the cloaca; number of femoral pores (FP) present on femur; numbers of non-pored proximal femoral scales (PFS) counted from proximal ends of femoral pore rows to precloacal pores; numbers of non-pored distal femoral scales (DFS) counted from distal ends of femoral pore rows to knee; interfemoral scales (IFS) number of non-pored scales between femoral pores on both femurs. Additional evaluations included the texture [keeled (KD) or smooth (SM)] of the ventral scales, the

texture [heterogeneous (HET) or homogeneous (HOM)] of the dorsal scales, the number of spinous scales on the flanks (FLSP), and characteristics such as appearance of the caudal scales (except in specimens with regenerated tails). Coloration was determined from digital images of living specimens and also from direct observations in the field.

Distribution and natural history. The new species described herein were collected during field surveys conducted in various habitats (e.g., dry mixed semi-evergreen forest and tropical wet-evergreen) of Sri Lanka (Fig. 1; Table 10). During these surveys, behavioral and other aspects of natural history of the focal species were observed through opportunistic and non-systematic means. The ambient and substrate temperatures were measured using a standard thermometer and an N19 Q1370 infrared thermometer (Dick Smith Electronics, Shanghai, China), respectively. The relative humidity and light intensity were measured with a QM 1594 multifunction environment meter (Digitek Instruments Co., Ltd., Hong Kong, China). To record elevation and georeference species locations, an eTrex® 10 GPS (Garmin) was used. Sex was determined by the presence in males (M) or absence in female (F) of hemipenal bulges, and precloacal and femoral pores. The conservation status of each new species was evaluated using the 2001 IUCN Red List Categories and Criteria version 3.1 (IUCN 2012).

Statistical analyses of morphometric characteristics. Principal Component Analyses (PCA) were performed with the conventional singular value decomposition method using variance-covariance stricture as the cross-products matrix to extract 10 principal components (package: PCAMethods, function:pca; Stacklies et al. 2007). The species used for these analyses are: *Cnemaspis dissanayakai* **sp. nov.**, *Cnemaspis ingerorum*, *Cnemaspis kallima*, *Cnemaspis kawminiae* **sp. nov.**, *Cnemaspis kotagamai* **sp. nov.**, *Cnemaspis kumarasinghei, Cnemaspis latha*, and *Cnemaspis gotaimbarai* groups due to their close resemblances. All morphometric measurements of the three new species were normalized to the snout-vent length (SVL). The matrix containing original morphometric variables were Pareto scaled (square-root unit variance) and centered. Subsequently, pairwise ordination plots were generated for the first four principal components (PC), which explained nearly 80% of the cumulative variance, where each individual PC accounted for at least 8% of the overall variance. To visualize species separation in the ordination space, convex hulls were placed around PC scores corresponding to each species (Wickham 2016). In addition, PC loadings were examined against each of the selected PC axes to understand the relationships between the original morphometric variables and the PC axes. This examination also revealed which morphometric variables were most distinct among the different species. In addition to the collective analyses of the eight aforementioned congenerics, three separate PCAs were run which focused on three species groups based on their close morphological resemblances: (1) *Cnemaspis kotagamai* **sp. nov.**, *Cnemaspis ingerorum,* and *Cnemaspis kallima*; (2) *Cnemaspis dissanayakai* **sp. nov.**, *Cnemaspis latha,* and *Cnemaspis kumarasinghei*; and (3) *Cnemaspis kawminiae* **sp. nov.**, *Cnemaspis gotaimbarai,* and *Cnemaspis kumarasinghei*. The aforementioned analyses used statistical program *R* (R Core Team 2019) and RStudio integrated development environment (R Studio Team 2018). Ordination plots were produced using the following statistical applications and *R* packages: PAST version 3.14 and ggplot2 (Hammer et al. 2001).

Results

Analyses of morphometric data for all eight species. The PCA resulted in 10 PCs that accounted for 98% of the variability of the original morphometric variables; among these, PC 1–4 (35.64%, 19.48%, 14.35%, and 8.70%, respectively) cumulatively explained 78% of the overall variability (Fig. 2). Trunk and upper-arm lengths had greater loadings on PC1 while tail length, orbital diameter, snout-to-nostril length, and the lengths of the 4th and 5th pestal digits had greater loadings on PC2. Heel length, snout-to-axilla length, eye diameter, inner-ear distance, eye-to-nostril distance, trunk width, and length of the 4th finger had higher loadings on PC3; whereas trunk

Table 1. Principal component scores and corresponding species.

Species	Average scores for principal components					
	PC1	PC2	PC3	PC4	PC5	PC6
C. kotagamai	0.31	0.52	0.31	0.12	0.16	0.00
C. dissanayakai	-0.50	0.20	0.17	-0.22	0.01	-0.10
C. kawminiae	0.40	-0.05	-0.23	-0.27	0.13	0.34
C. kumarasinghei	0.12	-0.28	0.09	-0.02	0.25	-0.21
C. gotaimbarai	0.44	-0.47	0.20	0.06	-0.20	-0.06
C. ingerorum	0.15	0.24	-0.63	0.10	-0.09	-0.19
C. latha	-0.60	-0.03	0.025	0.37	-0.03	0.17
C. kallima	-0.33	-0.13	0.07	-0.14	-0.23	0.03

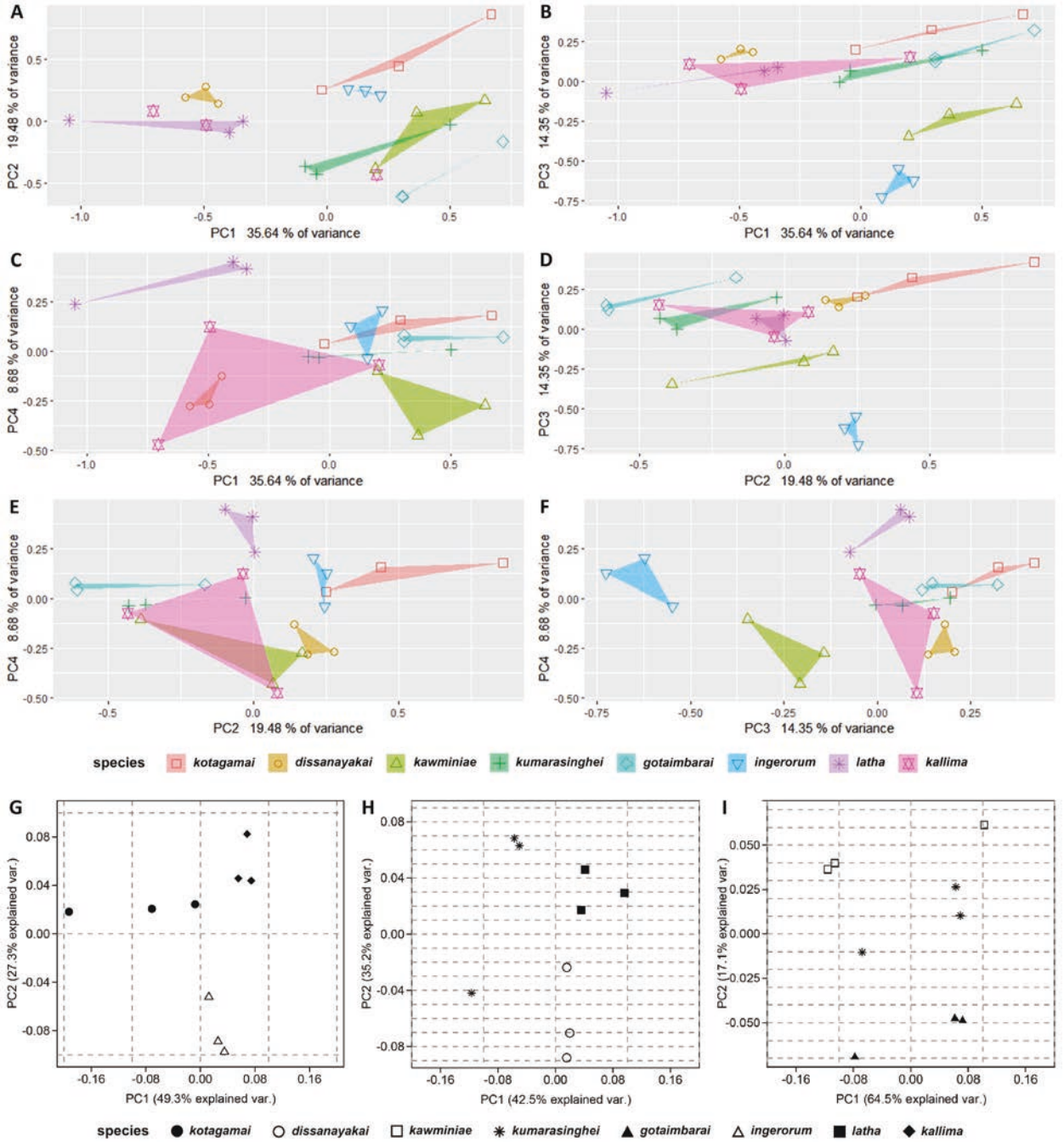

Fig. 2. (A-F) PCA Ordination plots for multivariate morphometric analyses (all pairwise ordination plots for PC1 through PC4 are shown), **(G)** Scatter plot of PCA between *Cnemaspis kotagamai* **sp. nov.** (filled circles), *Cnemaspis ingerorum* (triangles), and *Cnemaspis kallima* (filled diamonds), **(H)** Scatter plot of PCA between *Cnemaspis dissanayakai* **sp. nov.** (circles), *Cnemaspis latha* (filled squares), and *Cnemaspis kumarasinghei* (stars), **(I)** Scatter plot of PCA between *Cnemaspis kawminiae* **sp. nov.** (squares), *Cnemaspis gotaimbarai* (filled triangles), and *Cnemaspis kumarasinghei* (stars).

and tail lengths had higher loadings on PC4 (Tables 1–2). The ordination for PC1 and PC2 provided the strongest evidence for morphometric-based species separation—expect for *Cnemaspis kawminiae, C. kumarasinghei*, *C. kallima,* and *C. latha*, whose separation was most evident in ordination between PC1 and PC4 (Fig. 2). In addition, PC1 and PC3 supported separation of species based on morphometrics relatively well.

Analyses of morphometric data for separate species groups. PCA of morphometric measurements of *Cnemaspis kotagamai* **sp. nov.**, *Cnemaspis ingerorum,* and *Cnemaspis kallima* indicated the presence of three well separated species (Fig. 2). *Cnemaspis kotagamai* **sp. nov.** and *Cnemaspis kallima* were clearly separated from the PC2 axis, while *Cnemaspis ingerorum* and *Cnemaspis kallima* were seprated along PC1. The PC1 and PC2 axes

Table 2. Morphometric variables and corresponding PC loadings.

Measurements	PC1	PC2	PC3	PC4
ED	-0.14	0.02	0.15	0.00
OD	-0.22	0.21	0.06	-0.03
EN	-0.01	-0.14	0.16	-0.04
ES	-0.08	-0.05	-0.12	-0.19
SN	-0.13	0.18	0.03	0.06
NW	0.02	0.04	-0.07	-0.04
EE	-0.10	-0.05	0.03	-0.10
SA	-0.15	-0.40	0.18	-0.15
EL	-0.08	0.14	-0.02	-0.13
IO	-0.22	0.05	0.07	0.06
IE	-0.20	0.02	0.15	-0.03
HL	-0.18	-0.18	0.05	-0.27
HW	-0.16	-0.11	-0.13	0.04
HD	0.08	-0.14	-0.24	-0.07
JL	-0.20	-0.10	-0.17	0.06
IN	-0.16	0.11	0.05	0.03
SED	-0.23	0.08	-0.01	0.12
UAL	-0.29	-0.07	0.03	0.15
LAL	-0.15	-0.26	-0.03	0.18
PAL	-0.04	0.07	-0.28	-0.13
DLM -1	-0.06	-0.02	-0.03	-0.27
DLM-2	-0.01	-0.06	0.00	-0.22
DLM-3	-0.10	-0.03	0.08	-0.17
DLM-4	-0.15	-0.06	0.14	-0.18
DLM-5	-0.17	0.02	0.12	-0.06
TRL	0.22	-0.13	-0.25	-0.48
TW	-0.22	0.11	0.14	-0.15
TD	-0.16	0.11	0.10	-0.09
FEL	-0.16	-0.07	0.05	-0.13
TBL	-0.20	-0.03	-0.11	-0.17
HEL	-0.01	0.06	-0.48	0.22
DLP-1	-0.04	0.07	-0.31	-0.14
DLP-2	-0.24	0.13	-0.20	-0.10
DLP-3	-0.19	-0.03	-0.15	-0.11
DLP-4	-0.19	0.16	-0.24	0.04
DLP-5	-0.22	0.21	-0.20	-0.02
TAL	-0.15	-0.62	-0.20	0.24
TBW	-0.14	-0.03	-0.01	0.22
TBD	-0.11	0.05	0.01	0.21

Table 3. Morphometric data of holotype and two paratypes of *Cnemaspis kotagamai* **sp. nov.** from Bambaragala, Ratnapura District, Sri Lanka.

Measurements	NMSL 2019.15.01	NMSL 2019.15.02	NMSL 2019.15.03
	Holotype (Male)	Paratype (Male)	Paratype (Female)
SVL	29.8	31.1	32.6
TRL	12.6	12.3	12.5
TW	5.4	5.3	5.4
TD	3.4	3.4	3.4
TAL	33.5	33.8	31.1
TBW	3.3	3.1	2.9
TBD	2.9	2.9	2.7
ED	1.9	1.9	1.8
OD	3.2	3.3	3.1
EN	2.8	2.8	2.7
ES	3.6	3.5	3.4
SN	1.6	1.6	1.6
NW	0.2	0.3	0.2
EE	2.5	2.5	2.3
SA	12.9	12.7	11.8
EL	0.8	0.7	0.7
IO	3.6	3.6	3.2
IE	3.8	3.7	3.8
HL	8.3	8.3	8.2
HW	4.5	4.4	4.5
HD	2.8	2.6	2.7
JL	4.9	4.8	4.9
IN	1.6	1.6	1.4
SED	8.7	8.6	8.7
UAL	3.8	3.7	3.7
LAL	3.4	3.3	3.5
PAL	3.2	3.2	3.2
DLM (i)	1.4	1.4	1.3
DLM (ii)	1.9	1.8	1.8
DLM (iii)	2.5	2.5	2.6
DLM (iv)	2.9	2.7	2.8
DLM (v)	2.3	2.3	2.3
FEL	5.8	5.8	5.7
TBL	5.2	5.1	4.9
HEL	4.8	4.5	4.7
DLP (i)	1.2	1.2	1.2
DLP (ii)	2.1	1.9	2.1
DLP (iii)	2.9	2.8	2.7
DLP (iv)	3.8	3.9	3.7
DLP (v)	3.5	3.3	3.5

Fig. 3. Holotype male of *Cnemaspis kotagamai* **sp. nov.** (NMSL 2018.15.01). **(A)** Dorsal head, **(B)** lateral head, **(C)** ventral head, **(D)** heterogeneous dorsal scales, **(E)** scales on lateral surface of trunk, **(F)** smooth ventral scales, **(G)** cloacal characters with precloacal pores and femoral pores, **(H)** lamellae on manus, **(I)** lamellae on pes, **(J)** keeled dorsal scalation of tail, **(K)** lateral side of tail, and **(L)** very small smooth subcaudals. *Photos: Suranjan Karunarathna*.

explained 49.5% and 27.3% of the observed variation, respectively. Analysis of morphometric measurements of *Cnemaspis dissanayakai* **sp. nov.**, *Cnemaspis latha,* and *Cnemaspis kumarasinghei* similarly indicated the presence of three well separated species (Fig. 2). *Cnemaspis dissanayakai* **sp. nov.** and *Cnemaspis kumarasinghei* were well separated in the PC1 axis while the former was clearly separated from *Cnemaspis latha* in the PC2 axis. The PC1 and PC2 axes explained 42.5% and 32.5% of the observed variation, respectively. PCA analysis of the morphometric measurements of *Cnemaspis kawminiae* **sp. nov.**, *Cnemaspis gotaimbarai,* and *Cnemaspis kuma-*

Fig. 4. Holotype male of *Cnemaspis kotagamai* **sp. nov.** (NMSL 2018.07.01) in life *in-situ* in Bambaragala. **(A)** Dorsal view of the full body, and **(B)** ventral view with scattered yellow coloration. *Photos: Suranjan Karunarathna*.

rasinghei indicated the presence of three well separated species (Fig. 2). *Cnemaspis kawminiae* **sp. nov.** was clearly separated from *Cnemaspis gotaimbarai* along the PC2 axis, while it was distinguished from *C. kumarasinghei* also in the PC2 axis. The PC1 and PC2 axes explained 64.5% and 17.1% of the observed variation, respectively.

Systematics

***Cnemaspis kotagamai* sp. nov.** Karunarathna, de Silva, Botejue, Surasinghe, Wickramasinghe, Ukuwela & Bauer
Kotagama's Day Gecko (English)
Kotagamage Diva-seri Hoona (Sinhala)
Kotagamavin Pahalpalli (Tamil)
Figs. 3–5; Tables 3–4

urn:lsid:zoobank.org:act:35801F43-7148-4590-BE38-421AC8905646

Holotype. NMSL 2019.15.01, adult male, 29.8 mm SVL (Fig. 3), collected from a granite cave Bambaragala, Pallebedda, Ratnapura District, Sabaragamu Province, Sri Lanka (6.512978°N, 80.750306°E, WGS1984; elevation 127 m; around 1100 hrs) on 18 January 2019 by Suranjan Karunarathna and Anslem de Silva.

Paratypes. NMSL 2019.15.02, adult male, 31.1 mm SVL, and NMSL 2019.15.03, adult female, 32.6 mm SVL, collected from a granite cave in Bambaragala, Pallebedda, Ratnapura District, Sabaragamuwa Province, Sri Lanka (6.517261°N, 80.752692°E, WGS1984; elevation 132 m; around 1200 hrs) on 18 January 2019 by Suranjan Karunarathna and Anslem de Silva.

Diagnosis. *Cnemaspis kotagamai* **sp. nov.** may be readily distinguished from its Sri Lankan congeners by a combination of the following morphological and meristic characteristics as well as color patterns: maximum SVL 32.6 mm; dorsum with heterogeneous, smooth intermixed with weakly keeled granular scales; 2/2 supranasals, one internasal, 2/2 postnasals; 3–4 enlarged postmentals; postmentals bounded by 5–6 chin scales; chin, gular, pectoral, and abdominal scales smooth, subimbricate; 21–22 belly scales across midbody; 6–7 well-devel-

Table 4. Meristic data of holotype and two paratypes of *Cnemaspis kotagamai* **sp. nov.** from Bambaragala, Ratnapura District, Sri Lanka.

Counts	NMSL 2019.15.01	NMSL 2019.15.02	NMSL 2019.15.03
	Holotype (Male)	Paratype (Male)	Paratype (Female)
FLSP (L/R)	6/7	6/6	7/7
SUP (L/R)	8/8	8/8	7/8
INF (L/R)	7/7	8/7	7/7
INOS	31	29	31
PM	4	4	3
CHS	6	5	6
SUN (L/R)	2/2	2/2	2/2
PON (L/R)	2/2	2/2	2/2
INT	1	1	1
SUS (L/R)	12/12	14/13	12/12
BET (L/R)	22/22	21/19	21/22
CAS (L/R)	11/10	11/10	10/10
TLM (i) (L/R)	9/9	10/9	10/10
TLM (ii) (L/R)	12/12	12/11	12/12
TLM (iii) (L/R)	14/14	14/13	13/13
TLM (iv) (L/R)	15/15	14/14	14/13
TLM (v) (L/R)	12/12	11/12	12/12
PG	114	119	116
MBS	84	79	81
MVS	134	137	131
BLS	21	21	22
TLP (i) (L/R)	9/9	8/9	8/8
TLP (ii) (L/R)	14/14	13/14	14/14
TLP (iii) (L/R)	16/16	16/16	15/16
TLP (iv) (L/R)	17/17	17/18	18/17
TLP (v) (L/R)	16/16	15/15	16/15
PCP	1	1	-
FP (L/R)	5/5	4/4	-
PFS (L/R)	12/13	11/12	-
DFS (L/R)	2/2	4/6	-

oped tubercles on posterior flank; 114–119 paravertebral granules linearly arranged; one precloacal pore, 4–5 femoral pores in males, separated by 11–13 unpored proximal femoral scales, 2–6 unpored distal femoral scales; 131–137 ventral scales; 79–84 midbody scales; subcaudals smooth, median row comprising an irregular series of diamond-shaped, small scales; 7–8 supralabials; 7–8 infralabials; 13–15 total lamellae on 4th digit of manus, and 17–18 total lamellae on 4th digit of pes.

Comparisons with other Sri Lankan species. Among species of the *C. kandiana* clade *sensu* Agarwal et al. (2017), *Cnemaspis kotagamai* **sp. nov.** differs by having heterogeneous (*versus* homogeneous) dorsal scales from *C. amith* Manamendra-Arachchi et al. 2007, *C. gotaimbarai* Karunarathna et al. 2019b, *C. kumarasinghei* Wickramasinghe and Munindradasa 2007, *C. latha* Manamendra-Arachchi et al. 2007, and *C. nandimithrai* Karunarathna et al. 2019b; it can also be diagnosed from *C. butewai* Karunarathna et al. 2019b, *C. kandiana* (Kelaart, 1852), *C. kivulegedarai* Karunarathna et al. 2019b, *C. menikay* Manamendra-Arachchi et al. 2007, *C. pava* Manamendra-Arachchi et al. 2007, *C. pulchra* Manamendra-Arachchi et al. 2007, *C. retigalensis* Wickramasinghe and Munindradasa 2007, *C. samanalensis* Wickramasinghe and Munindradasa 2007, *C. silvula* Manamendra-Arachchi et al. 2007, *C. tropidogaster* (Boulenger, 1885), and *C. upendrai* Manamendra-Arachchi et al. 2007 by having smooth (*versus* keeled) pectoral scales. The new species differs from *C. kallima* Manamendra-Arachchi et al. 2007 by having more midbody scales (79–84 *versus* 67–74), presence of more paravertebral granules (114–119 *versus* 99–107), by having fewer precloacal pores (1 *versus* 3–4), and having fewer tubercles on the posterior flank (6–7 *versus* 12–15). It differs from *C. ingerorum* Batuwita et al. 2019 by having more ventral scales (131–137 *versus* 88–95) and more paravertebral granules (114–119 *versus* 93–101).

Among species of the *C. podihuna* clade *sensu* Agarwal et al. (2017), *Cnemaspis kotagamai* **sp. nov.** differs by the absence of clearly enlarged, hexagonal or subhexagonal subcaudal scales from the following species: *C. alwisi* Wickramasinghe and Munindradasa 2007, *C. anslemi* Karunarathna and Ukuwela 2019, *C. gemunu* Bauer et al. 2007, *C. godagedarai* de Silva et al. 2019, *C. hitihami* Karunarathna et al. 2019b, *C. kandambyi* Batuwita and Udugampala 2017, *C. kohukumburai* Karunarathna et al. 2019b, *C. molligodai* Wickramasinghe and Munindradasa 2007, *C. nilgala* Karunarathna et al. 2019, *C. phillipsi* Manamendra-Arachchi et al. 2007, *C. podihuna* Deraniyagala, 1944, *C. punctata* Manamendra-Arachchi et al. 2007, *C. rajakarunai* Wickramasinghe et al. 2016, *C. rammalensis* Vidanapathirana et al. 2014, and *C. scalpensis* (Ferguson 1877).

Description of Holotype (NMSL 2019.15.01). An adult male, 29.8 mm SVL and 33.5 mm TAL. Body slender, relatively long (TRL/SVL ratio 42.2%). Head relatively small (HL/SVL ratio 28.0% and HL/TRL ratio 66.2%), narrow (HW/SVL ratio 15.3% and HW/HL ratio 54.6%), depressed (HD/SVL ratio 9.5% and HD/HL ratio 33.9%), and distinct from neck. Snout relatively long (ES/HW ratio 78.4% and ES/HL ratio 42.8%), less than twice eye diameter (ED/ES ratio 52.5%), more than half length of jaw (ES/JL ratio 72.1%), snout slightly concave in lateral view; eye relatively small (ED/HL ratio 22.5%), larger than the ear (EL/ED ratio 44.4%), pupil rounded; orbit length greater than eye to ear distance (OD/EE ratio 127.8%) and length of IV digit of manus (OD/DLM IV ratio 111.8%); supraocular ridges moderately developed; ear opening small (EL/HL ratio 10.0%), deep, taller than

Fig. 5. General habitat of *Cnemaspis kotagamai* **sp. nov.** at Bambaragala isolated forest hill, Ratnapura District, Sri Lanka. **(A)** Rock outcrop habitat, **(B)** abandoned cave building, and **(C)** deep and tall granite tunnel. *Photos: Madhava Botejue*.

wide, larger than nostrils; two rows of scales separate orbit from supralabials; interorbital distance is greater than snout length (IO/ES ratio 101.7%), shorter than head length (IO/HL ratio 43.5%); eye to nostril distance greater than the eye to ear distance (EN/EE ratio 109.5%).

Dorsal surface of the trunk with smooth scales intermixed with weakly keeled heterogeneous granules, 114 paravertebral granules; 134 midventral scales, smooth; 84 midbody scales; 6/7 weakly developed tubercles on the flanks; ventrolateral scales irregular, enlarged; granules on snout smooth and raised, larger than those on interorbital and occipital regions; canthus rostralis nearly absent, 11/10 smooth oval scales from eye to nostril; scales of the interorbital region circular and smooth; tubercles present both on the sides of the neck and around the ear; ear opening vertically oval, slanting from anterodorsal to posteroventral, 22/22 scales between anterior margin of the ear opening and the posterior margin of the eye. Supralabials 8/8, infralabials 7/7, becoming smaller towards the gape. Rostral scale wider than long, partially divided (80%) by a median groove, contact with first supralabial. Nostrils separated by 2/2 enlarged supranasals with one internasal; no enlarged scales behind the supranasals. Nostrils oval, dorsolaterally orientated, not in contact with first supralabials; 2/2 postnasals, smooth, larger than nostrils, partially in contact with first supralabial.

Mental sub-rhomboid in shape, as wide as long, posteriorly in contact with four enlarged postmentals (smaller than mental, and larger than chin scales); postmentals in contact and bordered posteriorly by six unkeeled chin scales (smaller than nostrils), in contact with the 1st infralabial; ventral scales smaller than chin scales. Smooth, rounded, juxtaposed scales on the chin and the gular region; pectoral and abdominal scales smooth, subimbricate to imbricate towards precloacal region, abdominal scales slightly larger than dorsals; 21 belly scales across venter; smooth scales around vent and base of tail, subimbricate; one precloacal pore; 5/5 femoral pores; 12/13 unpored proximal femoral scales on each side; 2/2 enlarged distal femoral scales. Regenerated tail of holotype a little longer than the snout-vent length (TAL/SVL ratio 112.7%); hemipenal bulge greatly swollen (TBW 3.3 mm), heterogeneous scales on the dorsal aspect of the tail directed backwards, spine-like tubercles present at the base of tail; tail with 4–5 enlarged flattened obtuse scales forming whorls; a large, blunt post-cloacal spur on each side, dorsoventrally flattened and narrow; subcaudals smooth and small, subrhomboidal, arranged in a single median series.

Forelimbs very short, slender (LAL/SVL ratio 11.4% and UAL/SVL ratio 12.7%); hind limbs long, tibia shorter than femur (TBL/SVL ratio 17.3% and FEL/SVL ratio

19.4%). Anterior surface of upper arm with keeled and less imbricate scales; dorsal, posterior, and ventral surface smooth, scales of the anterior surface twice as large as those of the other surfaces; anterior and dorsal surfaces of lower arm with keeled and less imbricate scales, ventral and posterior surfaces with unkeeled imbricate scales, scales on the anterior surface of upper arm and lower arm twice the size of those of other aspects. Scales on dorsal and ventral surfaces of femur smooth, those on anterior and posterior surfaces keeled, scales on the ventral surface twice the size of those of other aspects. Dorsal, anterior, and posterior surfaces of tibia with keeled and weakly imbricate scales, ventral surface with smooth, subimbricate scales, scales of the ventral surface twice as large as those on other aspects. Dorsal and ventral surfaces of manus and pes with keeled granules; dorsal surfaces of digits with granular scales. Digits elongate and slender with inflected distal phalanges, all bearing slightly recurved claws. Subdigital lamellae entire (except divided at first interphalangial joint), unnotched; total lamellae on manus (left/right): digit I (9/9), digit II (12/12), digit III (14/14), digit IV (15/15), digit V (12/12); total lamellae on pes (left/right): digit I (9/9), digit II (14/14), digit III (16/16), digit IV (17/17), digit V (16/16); interdigital webbing absent; relative length of left manual digits: I (1.4 mm), II (1.9 mm), V (2.3 mm), III (2.5 mm), IV (2.9 mm); relative length of left pedal digits: I (1.2 mm), II (2.1 mm), III (2.9 mm), V (3.5 mm), IV (3.8 mm).

Variation of the type series. The SVL of adult specimens in the type series of *Cnemaspis kotagamai* **sp. nov.** (n = 3) ranges from 29.8 to 32.6 mm; interorbital scales 29–31; supraciliaries above the eye 12–14; scales from eye to tympanum 19–22; canthal scales 10–11; tubercles on posterior flank 6–7; chin scales 5–6; ventral scales 131–137 (Tables 3–4); midbody scales 79–84; paravertebral granules 114–119; belly scales across venter 21–22; femoral pores in males 4–5; unpored proximal femoral scales in males 11–13; unpored distal femoral scales in males 2–6; total lamellae on digit of the manus: digit I (9–10), digit II (11–12), digit III (13–14), digit IV (13–15), digit V (11–12); total lamellae on digit of the pes: digit I (8–9), digit II (13–14), digit III (15–16), digit IV (17–18), digit V (15–16).

Color of living specimens. Dorsum of head, body, and limbs generally brown; one broad, yellow vertebral stripe running form occiput to tail (Fig. 4); five irregular blackish-brown paravertebral blotches present; occipital area with a 'W'-shaped dark marking. Tail dark brown dorsally, with 11 faded black cross-bands; pupil circular and black with the surrounding margins yellow and orange, supraciliaries yellowish; two black postorbital stripes on each side; an oblique black line between the eye and nostril on either side; supralabials and infralabials yellowish with tiny black spots; chin and gular scales dirty white, without dark spots; pectoral, abdominal, cloacal, and subcaudal scales immaculate cream; dorsum of limbs with faded black patches; manus and pes alternating black and cream-white crossbands.

Color of preserved specimens. Dorsally blackish-brown with five distinct dark, irregular brown blotches (Fig. 3); supralabials and infralabials dirty white; chin and gular scales grey; ventral surface uniformly dirty white in color, with some scales on thigh, tail base, and arms with dark brown margins.

Etymology. The specific epithet is an eponym Latinized (*kotagamai*) in the masculine genitive singular, honoring prominent Sri Lankan scientist (ornithologist), Sarath Wimalabandara Kotagama (Emeritus Professor of the University of Colombo) for his valuable contributions towards biodiversity conservation and management in Sri Lanka.

Distribution and natural history. The type locality, Bambaragala forest (6.509086–6.522369°N and 80.742731–80.759386°E; Ratnapura District, Sabaragamuwa Province), is located in the lowland (southern intermediate bioclimatic zone) where tropical moist semi-evergreen forests comprise the dominant vegetation type (Gunatileke and Gunatileke 1990). The forest acreage is ~50 ha and relatively isolated by anthropogenically-altered flat lands. Bambaragala lies at an elevation of 110–178 m asl. The mean annual rainfall of 1,500–2,000 mm is received mainly during the southwest monsoon (May–September), while the mean annual temperature is 27.8–29.6 °C. Bambaragala is rich in granite rock caves with over 30 identified caves. *Cnemaspis kotagamai* **sp. nov.** appeared to be a very rare species in Bambaragala, as only five individuals were recorded during the survey. This species was located in a granite cave on vertical surfaces, 4 m in height, within the forested area (Fig. 5). The microhabitat of *C. kotagamai* **sp. nov.** was poorly illuminated (light intensity: 385–469 Lux), relatively moist (relative humidity: 71–88%), canopy-shaded (canopy cover: 65–80%), and relatively cool (ambient temperature: 29.8–31.3 °C and substrate temperature: 27.8–28.6 °C). The new species was sympatric with several other gecko species: *Gehyra mutilata, Hemidactylus depressus, H. frenatus,* and *H. parvimaculatus*. No eggs were observed.

Conservation status. Application of the IUCN Red List criteria indicates that *C. kotagamai* **sp. nov.** is Critically Endangered (CR), due to having an area of occupancy (AOO) <10 km^2 (four locations, 0.13 km^2 in total assuming a 100 m radius around the georeferenced location) and an extent of occurrence (EOO) <100 km^2 (0.37 km^2) in Sabaragamuwa Province [Applicable criteria B2-b (iii)].

Remarks. *Cnemaspis kotagamai* **sp. nov.** most closely resembles *C. ingerorum* (southern dry zone, ~85 m asl) and *C. kallima* (northern wet zone, ~600 m asl) morphologically, the type localities of these species are separated by ~63 km (Sandagala in Tissamaharamaya) and ~115 km (Gammaduwa in Matale) straight line distances from

Fig. 6. Holotype male of *Cnemaspis dissanayakai* **sp. nov.** (NMSL 2018.20.01). **(A)** Dorsal head, **(B)** lateral head, **(C)** ventral head, **(D)** homogeneous dorsal scales, **(E)** scales on lateral surface of trunk, **(F)** smooth ventral scales, **(G)** cloacal characters with precloacal pores and femoral pores, **(H)** lamellae on manus, **(I)** lamellae on pes, **(J)** smooth dorsal scalation of tail, **(K)** lateral side of tail, and **(L)** very small smooth subcaudals. *Photos: Suranjan Karunarathna*.

Bambaragala in Pallebedda (Fig. 1). Also see the comparison with other species for more details.

***Cnemaspis dissanayakai* sp. nov.** Karunarathna, de Silva, Madawala, Karunarathna, Wickramasinghe, Ukuwela & Bauer
Dissanayaka's Day Gecko (English)
Dissanayakage Diva-seri Hoona (Sinhala)
Dissanayakavin Pahalpalli (Tamil)
Figs. 6–8; Tables 5–6

urn:lsid:zoobank.org:act:7ABF9B28-7D04-4296-BDB5-ECEA07B1F965

Holotype. NMSL 2019.20.01, adult male, 28.6 mm SVL

Table 5. Morphometric data of holotype and two paratypes of *Cnemaspis dissanayakai* **sp. nov.** from Dimbulagala, Polonnaruwa District, Sri Lanka.

Measurements	NMSL 2019.20.01	NMSL 2019.20.02	NMSL 2019.20.03
	Holotype (Male)	Paratype (Male)	Paratype (Female)
SVL	28.6	28.2	29.4
TRL	11.1	11.2	11.0
TW	5.5	5.4	5.7
TD	3.6	3.4	3.5
TAL	31.1	31.2	34.4
TBW	2.5	2.7	2.8
TBD	2.2	2.3	2.2
ED	1.9	1.9	1.9
OD	3.3	3.1	3.1
EN	2.4	2.4	2.3
ES	3.6	3.7	3.6
SN	1.3	1.4	1.4
NW	0.2	0.2	0.2
EE	2.5	2.7	2.5
SA	13.1	12.9	12.8
EL	0.8	0.8	0.9
IO	3.6	3.6	3.7
IE	3.8	3.7	3.9
HL	9.0	8.9	8.9
HW	4.3	4.5	4.4
HD	2.4	2.5	2.5
JL	5.5	5.6	5.6
IN	1.6	1.6	1.6
SED	8.1	8.2	8.2
UAL	4.6	4.6	4.6
LAL	4.2	4.2	4.2
PAL	3.2	3.2	3.3
DLM (i)	1.6	1.6	1.7
DLM (ii)	1.8	1.8	1.9
DLM (iii)	2.8	2.7	2.7
DLM (iv)	3.3	3.2	3.4
DLM (v)	2.5	2.4	2.6
FEL	5.6	5.6	5.6
TBL	5.7	5.7	5.5
HEL	3.9	3.8	3.8
DLP (i)	1.5	1.5	1.5
DLP (ii)	3.2	3.2	3.3
DLP (iii)	3.6	3.6	3.7
DLP (iv)	4.1	4.1	4.2
DLP (v)	3.9	3.8	3.7

Table 6. Meristic data of holotype and two paratypes of *Cnemaspis dissanayakai* **sp. nov.** from Dimbulagala, Polonnaruwa District, Sri Lanka.

Counts	NMSL 2019.20.01	NMSL 2019.20.02	NMSL 2019.20.03
	Holotype (Male)	Paratype (Male)	Paratype (Female)
FLSP (L/R)	7/6	7/7	6/6
SUP (L/R)	7/7	7/7	7/7
INF (L/R)	7/7	7/7	7/7
INOS	31	29	29
PM	3	3	3
CHS	7	6	6
SUN (L/R)	2/2	2/2	2/2
PON (L/R)	1/1	1/1	1/1
INT	1	1	1
SUS (L/R)	16/16	16/17	16/15
BET (L/R)	22/23	21/21	21/22
CAS (L/R)	11/12	11/11	11/11
TLM (i) (L/R)	10/10	10/10	10/10
TLM (ii) (L/R)	13/12	12/12	12/12
TLM (iii) (L/R)	13/13	12/13	12/12
TLM (iv) (L/R)	22/21	21/21	21/21
TLM (v) (L/R)	14/14	13/14	14/13
PG	105	107	105
MBS	98	94	95
MVS	118	120	119
BLS	17	17	19
TLP (i) (L/R)	8/8	8/9	8/8
TLP (ii) (L/R)	13/14	13/13	13/13
TLP (iii) (L/R)	16/16	16/15	16/16
TLP (iv) (L/R)	22/21	21-21	21/21
TLP (v) (L/R)	17/16	17/17	17/17
PCP	2	2	-
FP (L/R)	5/4	4/4	-
PFS (L/R)	10/10	11/10	-
DFS (L/R)	7/5	7/7	-

(Fig. 6), collected from a large granite cave in the shaded forest of Dimbulagala, Polonnaruwa District, North-Central Province, Sri Lanka (7.872931°N, 81.135569°E, WGS1984; elevation 129 m; around 1600 hrs) on 12 July 2018 by Suranjan Karunarathna and Anslem de Silva.

Paratypes. NMSL 2019.20.02, adult female, 29.4 mm SVL, and NMSL 2019.20.03, adult male, 28.2 mm SVL, collected from moss covered granite cave in Dimbulagala, Polonnaruwa District, North-Central Province, Sri Lanka (7.851358°N, 81.141675°E, WGS1984; elevation 135 m; around 1200 hrs) on 12 July 2018 by Suranjan Karunarathna and Anslem de Silva.

Diagnosis. *Cnemaspis dissanayakai* **sp. nov.**, may be readily distinguished from its Sri Lankan congeners by a combination of the following morphological and meristic characteristics: maximum SVL 29.4 mm; dorsum with homogeneous, subconical granular scales; one internasal, 2/2 supranasals, 1/1 postnasals; 29–31 interorbital scales; 15–17 supraciliaries, 11–12 canthal scales, 21–23 eye to tympanum scales; three enlarged postmentals; postmentals bounded by 6–7 chin scales; chin with smooth granules, gular, pectoral, and abdominal scales smooth, subimbricate; 17 belly scales across the venter; 6–7 well developed tubercles on posterior flank; 105–107 linearly arranged paravertebral granules; two precloacal pores, 4–5 femoral pores on each side in males separated by 10–11 unpored proximal femoral scales, 5–7 unpored distal femoral scales; 118–120 ventral scales; 94–98 midbody scales; subcaudals smooth, median row small, in an irregular series of diamond-shaped scales; 7/7 supralabials; 7/7 infralabials; 21–22 total lamellae on 4th digit of manus, and 21–22 total lamellae on 4th digit of pes.

Comparisons with other Sri Lankan species. Among species of the *C. kandiana* clade *sensu* Agarwal et al. (2017), *Cnemaspis dissanayakai* **sp. nov.** differs from *C. butewai*, *C. ingerorum*, *C. kallima, C. kandiana, C. kivulegedarai, C. kotagamai* **sp. nov.**, *C. menikay, C. pava, C. pulchra, C. retigalensis, C. samanalensis, C. silvula, C. tropidogaster,* and *C. upendrai* by having homogeneous (*versus* heterogeneous) dorsal scales; from *C. amith* by having smooth (*versus* keeled) pectoral scales; from *C. kumarasinghei*, *C. latha,* and *C. nandimithrai* by having more paravertebral granules (105–107 *versus* 61–68, 72–79, and 95–99, respectively), and from by having more total lamellae on digit IV of manus and digit IV of pes (21–22 *versus* 16–18, 17–18, and 19–20, respectively); from *C. gotaimbarai* by having fewer paravertebral granules (86–92 *versus* 117–121), fewer ventral scales (107–114 *versus* 129–138), and fewer total lamellae on digit IV of manus and digit IV of pes (15–16 *versus* 19–20).

Among species of the *C. podihuna* clade *sensu* Agarwal et al. (2017), *Cnemaspis dissanayakai* **sp. nov.** differs by the absence of clearly enlarged, hexagonal or subhexagonal subcaudal scales from the following species: *C. alwisi*, *C. anslemi*, *C. gemunu*, *C. hitihami*, *C. kandambyi, C. kohukumburai, C. molligodai, C. nilgala*, *C. phillipsi, C. podihuna, C. punctata*, *C. rajakarunai*, *C. rammalensis,* and *C. scalpensis*.

Description of Holotype (NMSL 2019.20.01). An adult male, 28.6 mm SVL, and 31.1 mm TAL. Body slender, relatively short (TRL/SVL ratio 38.8%). Head relatively long (HL/SVL ratio 31.5% and HL/TRL ratio 81.1%), very narrow (HW/SVL ratio 15.1% and HW/HL ratio 48.0%), depressed (HD/SVL ratio 8.2% and HD/HL ratio 26.2%), and distinct from neck. Snout relatively long (ES/HW ratio 82.2% and ES/HL ratio 39.5%), less than twice eye diameter (ED/ES ratio 52.8%), more than half length of jaw (ES/JL ratio 65.2%), snout slightly concave in lateral view; eye relatively small (ED/HL ratio 20.8%), twice as large as the ear (EL/ED ratio 43.6%), pupil rounded; orbit length greater than eye to ear distance (OD/EE ratio 131.0%) and also shorter than length of IV digit of manus (OD/DLM IV ratio 99.7%); supraocular ridges not prominent; ear opening very small (EL/HL ratio 9.1%), deep, taller than wide, larger than nostrils; two rows of scales separate orbit from supralabials; interorbital distance slightly shorter than snout length (IO/ES ratio 99.7%), less than half of head length (IO/HL ratio 39.4%); eye to nostril distance slightly shorter than the eye to ear distance (EN/EE ratio 95.2%).

Dorsal surface of trunk with homogeneous, subconical granules; 105 paravertebral granules; 118 mid-ventral scales, smooth; 98 midbody scales; 7/6 well developed tubercles on flanks; ventrolateral scales not enlarged; granules on snout strongly keeled, larger than those on interorbital and occipital regions; canthus rostralis nearly absent, 11/12 smooth round scales from eye to nostril; scales of the interorbital region oval and smooth; 2/2 small and blunt tubercles present on sides of neck, and around ear; ear opening vertically oval, backward slanted, 22/23 scales between anterior margin of ear opening and posterior margin of eye. Supralabials 7/7, infralabials 7/7, becoming smaller towards the gape. Rostral scale wider than long, partially divided (70%) by a median groove, in contact with first supralabial. Nostrils separated by 2/2 enlarged supranasals with one internasal; no enlarged scales behind supranasals. Nostrils oval, dorsolaterally orientated, not in contact with first supralabials; 1/1 postnasals, smooth, larger than nostrils, partially in contact with first supralabial.

Mental subtriangular, as wide as long, posteriorly in contact with three enlarged postmentals (smaller than mental, and larger than chin scales); postmentals in contact and bordered posteriorly by seven smooth chin scales (smaller than nostrils), in contact only with 1st infralabials; ventral scales smaller than chin scales; smooth, rounded, juxtaposed scales on the chin and gular region; pectoral and abdominal scales smooth, subimbricate to imbricate towards precloacal region, abdominal scales slightly larger than dorsals; 17 belly scales across venter; scales around vent and base of tail smooth, subimbricate; two precloacal pores; 5/4 femoral pores; 10/10 unpored proximal femoral scales on each side; 7/5 enlarged distal femoral scales. Original tail of holotype longer than snout-vent length (TAL/SVL ratio 108.7%); tail base greatly swollen (TBW 2.5 mm), heterogeneous scales on dorsum of the tail directed backwards, spine-like tubercles along tail; tail with 4–6 enlarged flattened obtuse scales forming whorls; a small, blunt post-cloacal spur on each side, dorsoventrally flattened and narrow; median series of smooth, irregular, oval to rhomboid subcaudals.

Forelimbs moderately short, slender (LAL/SVL ratio 14.7% and UAL/SVL ratio 15.9%); hind limbs long,

tibia barely longer than the femur (TBL/SVL ratio 19.7% and FEL/SVL ratio 19.6%). Dorsal, anterior, and posterior surfaces of upper arm and lower arm with keeled and less imbricate scales than ventrals, ventral surfaces smooth, less imbricate scales than ventrals, scales of the anterior surface twice as large as those of the other surfaces. Scales on dorsal, posterior, and ventral surfaces of femur smooth and granular, anterior surface with keeled subimbricate scales, anterior surface twice as large as those of the other aspects; dorsal, anterior and posterior surfaces of tibia with keeled and subimbricate scales, ventral scales smooth, subimbricate, twice as large as those of the other limb surfaces. Manus and the pes with keeled granules dorsally and ventrally; dorsum of digits with granular scales; digits elongate and slender with inflected distal phalanges, all bearing slightly recurved claws. Subdigital lamellae entire (except divided at first interphalangial joint), unnotched; total lamellae on manus (left/right): digit I (10/10), digit II (13/12), digit III (13/13), digit IV (22/21), digit V (14/14); total lamellae on pes (left/right): digit I (8/8), digit II (13/14), digit III (16/16), digit IV (22/21), digit V (17/16); interdigital webbing absent; relative length of digits of left manus: I (1.6 mm), II (1.8 mm), V (2.5 mm), III (2.8 mm), IV (3.3 mm); relative length of digits of left pes: I (1.5 mm), II (3.2 mm), III (3.6 mm), V (3.9 mm), IV (4.1 mm).

Variation of the type series. The SVL of adult specimens in the type series of *Cnemaspis dissanayakai* **sp. nov.** (*n* = 3) ranges from 28.2 to 29.4 mm; interorbital scales 29–31; supraciliaries above the eye 15–17; scales from eye to tympanum 21–23; canthal scales 11–12; tubercles on posterior flank 6–7; chin scales 6–7; ventral scales 118–120; midbody scales 94–98; paravertebral granules 105–107 (Tables 5–6); belly scales across venter 17–19; femoral pores 4–5; unpored proximal femorals 10–11; unpored distal femoral scales 5–7; total lamellae on digit of the manus: digit I (8–9), digit II (13–14), digit III (15–16), digit IV (21–22); total lamellae on digit of the pes: digit I (8–9), digit II (13–14), digit III (15–16), digit IV (21–22), digit V (16–17).

Color of living specimens. Dorsum of the head, body, and limbs generally dull brown, varying from light maroon to light brown, five faded and irregular 'W'-shaped brown markings on the trunk; 4–5 cream vertebral blotches (Fig. 7); an oblique black line between eye and nostrils on either side, two straight, dark brown postorbital stripes

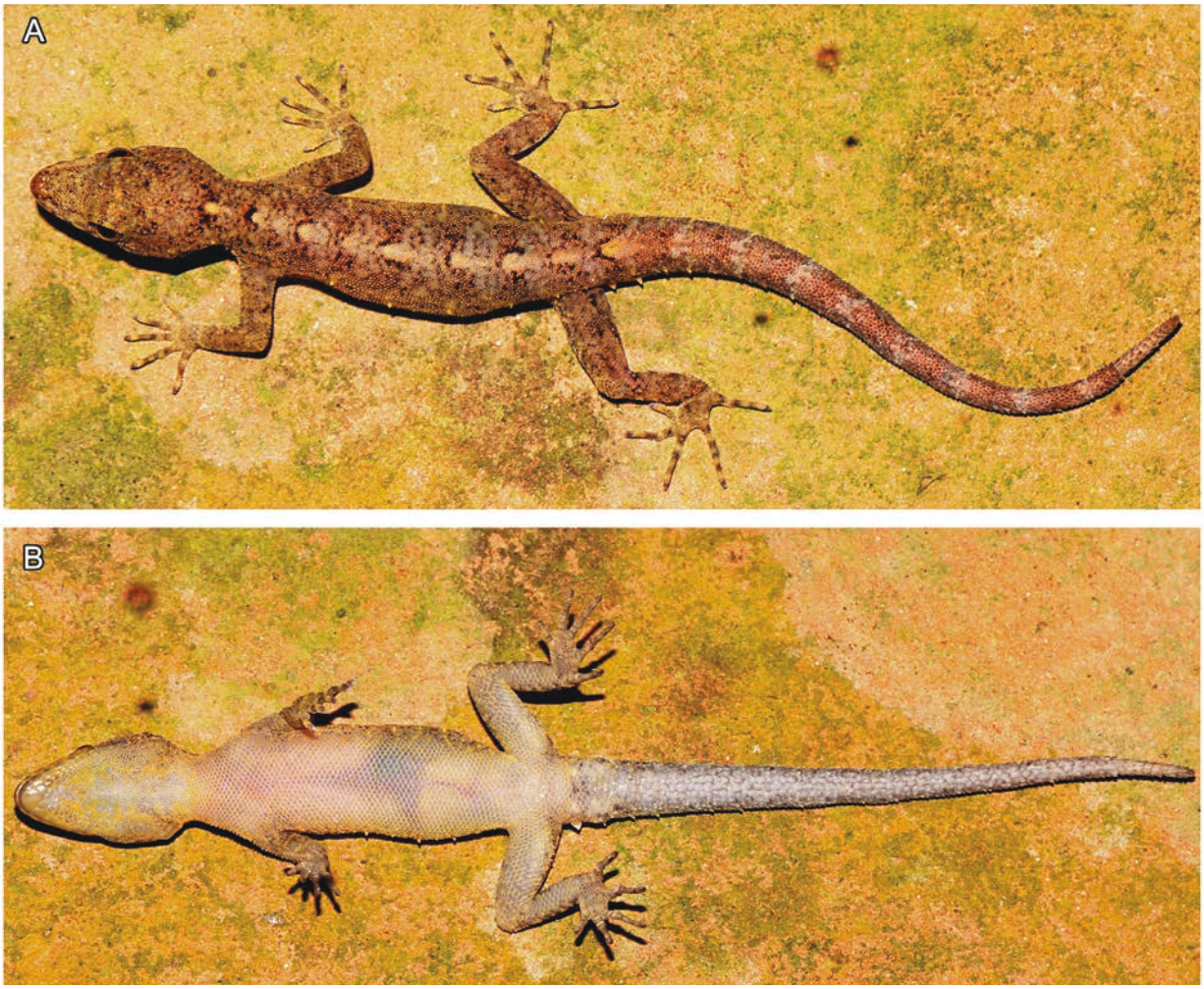

Fig. 7. Holotype male of *Cnemaspis dissanayakai* **sp. nov.** (NMSL 2018.20.01) in life *in-situ* in Dimbulagala. **(A)** Dorsal view of the full body, and **(B)** ventral view with dirty white coloration. *Photos: Suranjan Karunarathna*.

Fig. 8. General habitat of *Cnemaspis dissanayakai* **sp. nov.** at Dimbulagala isolated hill forest, Polonnaruwa District, Sri Lanka. **(A)** Complete view of the mountain, **(B)** abandoned ancient cave building in Kosgahaulpatha, and **(C)** deep and tall granite tunnel. *Photos: Madhava Botejue and Ashan Geeganage*.

extend from eyes posteroventrally, and a faded spot present in the occipital area. Tail grey-pink dorsally, with 5–7 irregular faded brown cross-bands; pupil is circular and black with the surrounding orange, with supraciliaries being light brownish; supralabials dirty whitish dusted with black; infralabials greyish dusted with black; midgular scales are yellowish; pectoral, abdominal, cloacal, and subcaudal scales white without markings; dorsum of limbs with irregular brown patches and lines; manus and pes with black and cream cross white stripes on dorsum.

Color of preserved specimens. Dorsum dark brown with grey, faded indistinct irregular brown markings; vertebral blotches cream. Venter dirty white with some scales on throat, abdomen, thigh, tail base, and arms with dark brown margins (Fig. 6).

Etymology. The specific epithet is an eponym Latinized (*dissanayakai*) in the masculine genitive singular, honoring Dissanayaka Mudiyanselage Karunarathna (born in Nilgala, Bibila) – father of the first author (Suranjan Karunarathna) for his encouragement, financial support for research, and for allowing SK to pursue his interest in wildlife.

Distribution and natural history. The type locality, Dimbulagala (7.843919–7.876344°N, 81.105603–81.156442°E), situated in the Polonnaruwa District, North Central Province (northeast dry bioclimatic zone) of Sri Lanka, supports tropical dry-mixed evergreen forests (Gunatileke and Gunatileke 1990), and is ~1,000 ha in size. The mean annual rainfall of 1,500–2,000 mm is received mainly during the northeast monsoon (November–February). The mean annual temperature of the area is 28.9–30.2 °C, and its elevation range is 120–250 m asl. According to preliminary investigations, *Cnemaspis dissanayakai* **sp. nov.** appeared to be very rare in Dimbulagala. The survey of 35 ha recorded two (± 0.1) geckos per surveyor-hour of effort. This species was restricted to rocky surfaces and granite caves in shaded forested areas, and old abandoned buildings inside the forest (Fig. 8). These microhabitats were well-shaded (light intensity: 594–648 Lux), relatively humid (relative humidity: 65–90%), and moderately warm (ambient temperature: 30.2–31.9 °C and substrate temperature 27.5–28.6 °C). The new species was observed to occur in sympatry with the following gecko species: *Calodactylodes illingworthorum, Gehyra mutilata*, *Hemidactylus depressus, H. frenatus*, *H. hunae, H. parvimaculatus,* and *H. triedrus*. Older and newly laid eggs were observed in granite rock crevices, usually laid in clusters of three. The eggs were pure white in color and almost spherical in shape (mean diameter 4.9 ± 0.02 mm), with a slightly flattened side attached to the rocky substrate.

Fig. 9. Holotype male of *Cnemaspis kawminiae* **sp. nov.** (NMSL 2018.18.01). **(A)** Dorsal head, **(B)** lateral head, **(C)** ventral head, **(D)** homogeneous dorsal scales, **(E)** scales on lateral surface of trunk, **(F)** smooth ventral scales, **(G)** cloacal characters with precloacal pores and femoral pores, **(H)** lamellae on manus, **(I)** lamellae on pes, **(J)** smooth dorsal scalation of tail, **(K)** lateral side of tail, and **(L)** very small subcaudals. *Photos: Suranjan Karunarathna*.

Conservation status. Application of the IUCN Red List criteria indicates that *C. dissanayakai* **sp. nov.** is Critically Endangered (CR) due to having an area of occupancy (AOO) <10 km^2 (four locations, 0.13 km^2 in total assuming a 100 m radius around the georeferenced location) and an extent of occurrence (EOO) <100 km^2 (4.08 km^2) in North Central Province [Applicable criteria B2-b (iii)].

Remarks. *Cnemaspis dissanayakai* **sp. nov.** most closely resembles *C. kumarasinghei* (east intermediate zone) and *C. latha* (southern intermediate zone) morphologically. The type localities of these species are separated by ~105 km (Maragala in Monaragala, ~500 m asl) and ~90 km (Bandarawela in Badulla, ~700 m asl) straight line distances from Dimbulagala in Polonnaruwa (Fig. 1). Also see the comparison with other species for more details.

Table 7. Morphometric data of holotype and two paratypes of *Cnemaspis kawminiae* **sp. nov.** from Mandaramnuwara, Nuwara-Eliya District, Sri Lanka.

Measurements	NMSL 2019.18.01	NMSL 2019.18.02	NMSL 2019.18.03
	Holotype (Male)	Paratype (Male)	Paratype (Female)
SVL	33.7	33.2	35.6
TRL	16.4	14.9	16.2
TW	5.5	5.4	5.4
TD	3.4	3.2	3.3
TAL	36.1	42.7	38.0
TBW	3.4	3.4	3.2
TBD	2.9	2.8	2.7
ED	1.5	1.5	1.4
OD	3.1	2.9	2.9
EN	3.1	3.2	3.1
ES	4.3	4.5	4.8
SN	1.2	1.3	1.7
NW	0.3	0.3	0.3
EE	3.2	3.2	3.2
SA	14.9	14.8	14.9
EL	0.9	0.9	0.9
IO	2.9	2.9	2.9
IE	3.7	3.7	3.5
HL	9.9	9.4	10.4
HW	5.5	5.3	5.2
HD	3.8	3.6	3.6
JL	5.9	5.8	5.8
IN	1.3	1.3	1.3
SED	8.3	8.2	8.0
UAL	4.5	4.3	4.3
LAL	4.5	4.5	4.5
PAL	4.6	4.2	4.2
DLM (i)	2.1	2.2	2.2
DLM (ii)	2.5	2.5	2.6
DLM (iii)	2.6	2.7	2.6
DLM (iv)	3.0	2.9	3.0
DLM (v)	2.2	2.2	2.2
FEL	6.5	6.3	6.5
TBL	6.1	6.1	6.1
HEL	5.3	5.8	6.1
DLP (i)	2.1	2.1	2.1
DLP (ii)	3.0	2.9	3.0
DLP (iii)	3.5	3.5	3.5
DLP (iv)	3.8	3.8	3.8
DLP (v)	3.6	3.8	3.6

Table 8. Meristic data of holotype and two paratypes of *Cnemaspis kawminiae* **sp. nov.** from Mandaramnuwara, Nuwara-Eliya District, Sri Lanka.

Counts	NMSL 2019.18.01	NMSL 2019.18.02	NMSL 2019.18.03
	Holotype (Male)	Paratype (Male)	Paratype (Female)
FLSP (L/R)	8/7	7/7	8/7
SUP (L/R)	8/8	8/8	8/7
INF (L/R)	7/7	8/7	7/7
INOS	21	20	22
PM	3	3	3
CHS	5	5	5
SUN (L/R)	2/2	2/2	2/2
PON (L/R)	2/2	2/2	2/2
INT	1	1	1
SUS (L/R)	10/10	10/10	10/9
BET (L/R)	22/20	21/21	22/20
CAS (L/R)	10/11	10/10	10/10
TLM (i) (L/R)	10/9	10/9	10/10
TLM (ii) (L/R)	13/13	12/12	13/12
TLM (iii) (L/R)	14/13	14/14	14/14
TLM (iv) (L/R)	15/14	15/15	14/14
TLM (v) (L/R)	13/14	14/14	14/13
PG	89	92	86
MBS	78	76	76
MVS	107	108	114
BLS	21	17	19
TLP (i) (L/R)	9/9	10/9	10/10
TLP (ii) (L/R)	12/13	12/12	12/12
TLP (iii) (L/R)	16/15	16/16	15/15
TLP (iv) (L/R)	16/16	15/16	15/16
TLP (v) (L/R)	14/14	14/15	15/15
PCP	2	2	-
FP (L/R)	4/4	4/4	-
PFS (L/R)	12/11	12/13	-
DFS (L/R)	7/6	7/7	-

***Cnemaspis kawminiae* sp. nov.** Karunarathna, de Silva, Gabadage, Karunarathna, Wickramasinghe, Ukuwela & Bauer
Kawmini's Day Gecko (English)
Kawminige Divaseri Hoona (Sinhala)
Kawminivin Pahalpalli (Tamil)
Figs. 9–11; Tables 7–8

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Holotype. NMSL 2019.18.01, adult male, 33.7 mm SVL (Fig. 9), collected from a moss-covered granite wall in Mandaramnuwara, bordering Pidurutalagala Mountain range, Nuwara-Eliya District, Central Province, Sri

Lanka (7.033558°N, 80.798794°E, WGS1984; elevation 1,600 m asl, around 1100 hrs) on 14 December 2018 by Suranjan Karunarathna and Anslem de Silva.

Paratypes. NMSL 2019.18.02, adult male, 33.2 mm SVL and NMSL 2019.18.03, adult female, 35.2 mm SVL, collected from a small granite cave Mandaramnuwara, bordering Pidurutalagala Mountain, Nuwara-Eliya District, Central Province, Sri Lanka (7.020600°N, 80.788639°E, WGS1984; elevation 1,658 m asl, around 1400 hrs) collected on 14 December 2018 by Suranjan Karunarathna and Anslem de Silva.

Diagnosis. *Cnemaspis kawminiae* **sp. nov.**, may be readily distinguished from its Sri Lankan congeners by a combination of the following morphological and meristic characteristics: maximum SVL 35.2 mm; dorsum with homogeneous flat granular scales; one internasal, 2/2 supranasals and 2/2 postnasals; 20–22 interorbital scales; 9–10 supraciliaries, 10–11 canthal scales, 20–22 eye to tympanum scales; three enlarged postmentals; postmentals bounded by five chin scales; chin with smooth and round granules, gular, pectoral, and abdominal scales smooth, subimbricate; 17–21 belly scales across the venter; 7–8 weakly developed tubercles on posterior flank; 86–92 linearly arranged paravertebral granules; two precloacal pores in males, 4/4 femoral pores on each side in males separated by 11–13 unpored proximal femoral scales, 6–7 unpored distal femoral scales; 107–114 ventral scales; 76–78 midbody scales; subcaudals smooth, median row small, in an irregular series of sub-rhomboid shaped scales; 7–8 supralabials; 7–8 infralabials; 14–15 total lamellae on 4th digit of manus, and 15–16 total lamellae on 4th digit of pes.

Comparisons with other Sri Lankan species. Among species of the *C. kandiana* clade *sensu* Agarwal et al. (2017), *Cnemaspis kawminiae* **sp. nov.** differs from *C. butewai*, *C. ingerorum*, *C. kallima, C. kandiana, C. kivulegedarai, C. kotagamai* **sp. nov.**, *C. menikay, C. pava, C. pulchra, C. retigalensis, C. samanalensis, C. silvula, C. tropidogaster,* and *C. upendrai* by having homogeneous (*versus* heterogeneous) dorsal scales; from *C. amith* by having smooth (*versus* keeled) pectoral scales; from *C. gotaimbarai*, *C. kumarasinghei,* and *C. dissanayakai* **sp. nov.** by having fewer ventral scales (107–114 *versus* 129–138, 120–134 and 118–120, respectively), and also from *C. kumarasinghei* and *C. dissanayakai* **sp. nov.** by having fewer midbody scales (76–78 *versus* 87–94 and 94–98, respectively), from *C. gotaimbarai* by having fewer paravertebral granules (86–92 *versus* 117–121); from *C. latha* by having more paravertebral granules (86–92 *versus* 72–79), and more belly scales (17–21 *versus* 13–15); from *C. nandimithrai* by having fewer belly scales (17–21 *versus* 25–27) and by having fewer total lamellae on digit IV of pes (15–16 *versus* 19–20).

The new species, *Cnemaspis kawminiae* **sp. nov.**, also clearly differs from the following species of the *C. podihuna* clade *sensu* Agarwal et al. (2017): *C. alwisi*, *C. anslemi*, *C. gemunu*, *C. godagedarai*, *C. hitihami*, *C. kandambyi*, *C. kohukumburai*, *C. molligodai*, *C. nilgala*, *C. phillipsi, C. podihuna*, *C. punctata*, *C. rajakarunai*, *C. rammalensis*, and *C. scalpensis* by the absence (*versus* presence) of clearly enlarged, hexagonal or subhexagonal subcaudal scales.

Description of Holotype (NMSL 2019.18.01). An adult male, 33.7 mm SVL, and 36.1 mm TAL. Body slender, relatively long (TRL/SVL ratio 48.7%). Head relatively small (HL/SVL ratio 29.4% and HL/TRL ratio 60.4%), relatively broad (HW/SVL ratio 16.4% and HW/HL ratio 55.6%), weakly depressed (HD/SVL ratio 11.2% and HD/HL ratio 38.1%), and distinct from neck. Snout relatively short (ES/HW ratio 78.4% and ES/HL ratio 43.6%), slightly less than three times eye diameter (ED/ES ratio 34.4%), more than half length of jaw (ES/JL ratio 73.3%), snout slightly concave in lateral view; eye very small (ED/HL ratio 15.0%), larger than ear (EL/ED ratio 59.7%), pupil rounded; orbit length slightly smaller than eye to ear distance (OD/EE ratio 97.2%) and longer than length of IV digit of manus (OD/DLM IV ratio 105.4%); supraocular ridges weakly prominent; ear opening very small (EL/HL ratio 9.0%), deep, taller than wide, larger than nostrils; two rows of scales separate orbit from supralabials; interorbital distance less than snout length (IO/ES ratio 67.7%), head length three times longer than interorbital distance (IO/HL ratio 29.5%); eye to nostril distance subequal to eye to ear distance (EN/EE ratio 98.1%).

Dorsal surface of trunk with homogeneous, flat granular and smooth scales; 112 paravertebral granules; 149 midventral scales, keeled; 69 midbody scales; 6/6 well developed tubercles on flanks; ventrolateral scales irregularly enlarged; granules on snout strongly keeled, larger than those on interorbital and occipital regions; canthus rostralis nearly absent, 9/10 smooth round scales from eye to nostril; scales of the interorbital region oval and smooth; small and blunt tubercles present on sides of neck, and around ear; ear opening vertically oval, slanting from anterodorsal to posteroventral, 20/19 scales between anterior margin of ear opening and the posterior margin of eye. Supralabials 8/7, infralabials 7/7, becoming smaller towards the gape. Rostral scale wider than long, partially divided (90%) by a median groove, in contact with first supralabial. Nostrils separated by 2/2 enlarged supranasals with one internasal, 2/2 postnasals; no enlarged scales behind supranasals. Nostrils oval, dorsolaterally orientated, not in contact with first supralabials.

Mental subtriangular, as wide as long, posteriorly in contact with three enlarged postmentals (smaller than mental, and lager than chin scales); postmentals in contact and bordered posteriorly by five smooth chin scales

(smaller than nostrils), in contact only with 1st and 2nd infralabials; ventral scales smaller than chin scales. Smooth, oval, juxtaposed scales on the chin and gular region; pectoral and abdominal scales smooth, subimbricate to imbricate towards precloacal region, abdominal scales slightly larger than dorsals; 21 belly scales across venter; scales around vent and base of tail smooth, subimbricate; two precloacal pores; 4/4 femoral pores; 12/11 unpored proximal femoral scales on each side; 7/6 enlarged distal femoral scales. Original tail of holotype longer than snout-vent length (TAL/SVL ratio 106.9%); hemipenial bulge greatly swollen (TBW 3.4 mm), homogeneous scales on dorsum of the tail directed backwards, spine-like tubercles along tail; tail with 4–5 enlarged flattened obtuse scales forming whorls; a large, blunt postcloacal spur on each side, dorsoventrally flattened and narrow; a single median series of smooth, irregular, oval to rhomboid subcaudals.

Forelimbs very short, slender (LAL/SVL ratio 13.3% and UAL/SVL ratio 13.3%), upper arm and lower arm equal in size; hind limbs long, tibia slightly shorter than femur (TBL/SVL ratio 18.0% and FEL/SVL ratio 19.3%). Dorsal, anterior, and posterior surfaces of upper arm and lower arm with keeled and less imbricate scales than ventral scales, ventral surfaces with smooth scales, scales of the anterior surface twice as large as those of the other aspects. Scales on anterior and posterior surfaces of femur keeled, dorsal and ventral scales smooth, ventral scales twice as large as those of the other limb surfaces. Scales on dorsal, anterior, and posterior surfaces of tibia keeled, ventral scales smooth, anterior scales twice as large as those of the other limb surfaces. Manus and pes with smooth granules dorsally and ventrally; dorsum of digits with conical granular smooth scales. Digits elongate and slender with inflected distal phalanges, all bearing slightly recurved claws. Subdigital lamellae entire (except divided at first interphalangial joint), unnotched; total lamellae on manus (left/right): digit I (10/9), digit II (13/13), digit III (14/13), digit IV (15/14), digit V (13/14); total lamellae on pes (left/right): digit I (9/9), digit II (12/13), digit III (16/15), digit IV (16/16), digit V (14/14); interdigital webbing absent; relative length of left manual digits: I (2.1 mm), V (2.2 mm), II (2.5 mm), III (2.6 mm), IV (3.0 mm); relative length of left pedal digits: I (2.1 mm), II (3.0 mm), III (3.5 mm), V (3.6 mm), IV (3.8 mm).

Variation of the type series. The SVL of adult specimens in the type series of *Cnemaspis kawminiae* **sp. nov.** (n = 3) ranges from 33.2 to 35.6 mm; interorbital scales 20–22; scales from eye to tympanum 20–22; canthal scales 10–11; supraciliaries 9–10; tubercles on posterior flank 7–8; ventral scales 107–114 (Tables 7–8); midbody scales 76–78, paravertebral granules 86–92, belly scales across venter 17–21; unpored proximal femorals 11–13 in males, unpored distal femoral scales 6–7 in males; total lamellae on digit of the manus: digit I (9–10), digit II (12–13), digit III (13–14), digit IV (14–15), digit V (13–14); total lamellae on digit of the pes: digit I (9–10), digit II (12–13), digit III (15–16), digit IV (15–16), digit V (14–15).

Color of living specimens. Dorsal body, limb, and tail generally light grey to brown, with an oblique black line in the interorbital area, also between eye and nostril; a wide 'W'-shaped, black patch on the occipital area with two median cream-white spots; four scattered, double 'W'-shaped brownish markings on the dorsum of the trunk with tiny irregular stripes, and ten grey brownish blotches along the tail (Fig. 10). Lateral side of limbs and body grey-brown with scattered black spots, and cream colored lateral conical tubercles on tail and trunk. Three straight, dark brown postorbital stripes-downwards and upwards; supraciliaries and nasals greyish brown. Pupil circular and black with the surrounding scales yellowish brown, supralabials and infralabials with a median cream spot. Ventral surfaces of head, body, and limbs beige to cream, but gular area covered in tiny black spots; ventral surface of tail cream colored.

Color of preserved specimens. Dorsum cinnamon brown, with faded double 'W'-shaped patches on dorsum; irregular tiny brown dots on head; faded brown line between eye and nostrils on both sides, and three brown postorbital stripes on either side (Fig. 9); venter dirty white with some scales on throat, abdomen, thigh, tail base, and arms with dark brown dots.

Etymology. The specific epithet is an eponym Latinized (*kawminiae*) in the feminine genitive singular, honoring Hadunneththi Kawmini Mendis – mother of the first author (Suranjan Karunarathna) for her unconditional love, generous support, and financial support for research.

Distribution and natural history. The type locality, Mandaramnuwara (7.020103–7.039953°N and 80.768794–80.807014°E) in the east wet bioclimatic zone is located at the northern part of Pidurutalagala mountain range (Fig. 11). This area supports tropical montane forest vegetation (Gunatilleke and Gunatilleke 1990) with wet evergreen forest. The core study area was ~300 ha in size, at an elevation range ~1,400–1,800 m asl and annual temperature of 27.4–28.9 °C. *Cnemaspis kawminiae* **sp. nov.** was not abundant in the study area as only five (±0.1) geckos per surveyor-hour were found in Mandaramnuwara, This species was found on moss covered boulders and rock surfaces in forested areas and well-shaded home gardens with ample woody tree cover (light intensity: 486–592 Lux); as well as rock walls and rock crevices along roads. These habitats were very wet and cool (ambient temperature: 24.2–26.5 °C, substrate temperature: 26.7–28.3 °C, canopy cover: 70–85% and relative humidity: 74–92%). The mean annual rainfall of 3,000–4,000 mm is received mainly during the southwest

Fig. 10. Holotype male of *Cnemaspis kawminiae* **sp. nov.** (NMSL 2018.18.01) in life *in-situ*. **(A)** Dorsal view of the full body, and **(B)** dorsolateral view with labial coloration. *Photos: Madhava Botejue*.

monsoon (May–September). A total of 26 females, 11 males, and eight juveniles of this species were observed from twelve sites in the Mandaramnuwara area. During July to September, hatchlings, juveniles, and gravid females carrying one or two eggs were observed. Eggs were pure white (mean diameter 5.2 ± 0.02 mm), and almost completely round in shape with a slightly flattened side which was often the side attached to the substrate or between the eggs.

Conservation status. Application of the IUCN Red List criteria indicates that *C. kawminiae* **sp. nov.** is Critically Endangered (CR) due to having an area of occupancy (AOO) <10 km^2 (four locations, 0.13 km^2 in total assuming a 100 m radius around the georeferenced location) and an extent of occurrence (EOO) <100 km^2 (2.32 km^2) in Central Province [Applicable criteria B2-b (iii)].

Remarks. *Cnemaspis kawminiae* **sp. nov.** most closely resembles *C. kumarasinghei* (east intermediate zone) and *C. gotaimbarai* (northeast dry zone) morphologically. The type localities of these species are separated by ~80 km (Maragala in Monaragala, ~500 m asl) and ~44 km (Kokagala in Padiyathalawa, ~300 m asl) straight line distances from Mandaramnuwara (~1,500 m asl) in Nuwara-Eliya District (Fig. 1). Also see the comparison with other species for more details.

Discussion

The recent renaissance in the taxonomy and systematics of genus *Cnemaspis* has led to a notable increase in species richness, particularly from south and south-eastern Asia, including the Indo-Malayan mainland as well as Indian-oceanic and south-pacific islands (Iskandar et al. 2017; Riyanto et al. 2017; Wood et al. 2017; Karunara-

Fig. 11. General habitats of *Cnemaspis kawminiae* **sp. nov.** at Mandaramnuwara, Nuwara-Eliya District, Sri Lanka. **(A)** Complete view of the granite hill at roadside, **(B)** small granite cave close to the stream, and **(C)** granite rock wall along the road. *Photos: Madhava Botejue*.

thna et al. 2019b; Uetz et al. 2019a). With over 160 species, *Cnemaspis* is considered the second-most speciose gecko genus in the world, after *Cyrtodactylus* (Grismer et al. 2014; Present paper). With the inclusion of the three new species described here, species richness of *Cnemaspis*, the most species-rich reptile genus of Sri Lanka, rises to 36 (13 species described in year 2019). Similar phylogenetic radiations with high degrees of endemism via complex evolutionary processes have been documented for snakes, other Gekkonid squamates, and amphibians of Sri Lanka (Bauer et al. 2010; Pyron et al. 2013b; Meegaskumbura et al. 2019). Our study further bolsters the notion that Sri Lanka is a hotspot for reptile diversity and endemism (Bossuyt et al. 2004). Since all three currently described members of this genus are endemic to the island, *Cnemaspis* exhibits the greatest degree of genus-level endemism in Sri Lanka. Sri Lankan *Cnemaspis* species represent two distinct evolutionary lineages, the *kandiana* and *podihuna* clades (Agarwal et al. 2017; Karunarathna et al. 2019b).

The three new species described in this paper have not been included in any previous phylogenies of the genus (Bauer et al. 2007; Agarwal et al. 2017; Karunarathna et al. 2019b). All of these new species (*C. dissanayakai* **sp. nov.**, *C. kawminiae* **sp. nov.**, and *C. kotagamai* **sp. nov.**) were assigned to the *C. kandiana* clade based on the presence of small and irregularly shaped subcaudal scales (see Karunarathna and Ukuwela 2019). However, more in-depth phylogenetic studies are necessary to confirm the placement of these three new species within this clade and subgroups (Table 9). Hence, we strongly recommend broader and more robust molecular phylogenetic studies on *Cnemaspis* species, as well as on other gecko species, to identify the true richness within the island. Almost all Sri Lankan *Cnemaspis* species are found within relatively cool, moist habitats (ambient temperature: 24.2–32.3 °C; substrate temperature: 25.2–28.7 °C; relative humidity: 68–92%), with relatively high levels of canopy cover and high-profile mature trees, and shady (canopy cover: 60–90%; light intensity: 385–821 Lux) environments with tall large trees (Karunarathna et al. 2019b). Moreover, all of these new species were found in granite caves or in association with rocky substrates. Such aspects of natural history and microhabitat selec-

Table 9. Key characters of 36 currently known *Cnemaspis* species in Sri Lanka. Abbreviations: mm – Millimeters, SVL – Maximum Snout to vent length, SUB – Subcaudals, SUP – Supralabials, INF – Infralabials, PG – Paravertebral granules, IFS – Interfemoral scales, FLSP – Flank spines, PCP – Precloacal pores, FP – Femoral pores, HET – Heterogeneous, HOM – Homogeneous, KD – Keeled, SM – Smooth.

Species	SVL (mm)	Dorsal	Gular	Pectoral	Abdomen	SUB	SUP	INF	Ventrals	Belly	Midbody	PG	IFS	FLSP	PCP	FP	Lamellae 4th finger	Lamellae 4th toe
Clade (1) *Cnemaspis kandiana* (subcaudals small)																		
Group (1) – *tropidogaster*																		
C. pava	32.4	HET	KD	KD	KD	Small	7–8	6–7	139–145	22–25	64–75	83–98	–	9–11	2–4	4–5	16–17	18–19
C. pulchra	34.2	HET	KD	KD	KD	Small	7–8	7–8	120–135	24–27	67–73	94–103	–	5–7	3–4	4–6	15–17	17–20
C. samanalensis	37.5	HET	KD	KD	KD	Small	8–10	8–9	128–144	19–20	61–67	64–72	–	5–6	3–4	3–5	16–17	18–20
C. silvula	28.6	HET	KD	KD	KD	Small	7–8	7–8	132–139	19–21	73–81	102–113	–	10–15	3–4	4–5	15–16	18–19
C. tropidogaster	31.7	HET	KD	KD	KD	Small	7–8	7–8	132–146	21–25	92–98	99–106	–	5–7	3–4	4–5	16–17	18–19
C. upendrai	35.2	HET	KD	KD	KD	Small	7–8	7–8	112–128	16–25	69–74	97–102	–	13–15	2–3	4–5	17–18	17–21
Group (2) – *kandiana*																		
C. butewai	31.8	HET	KD	SM	SM	Small	8	7–8	125–128	23–25	92–98	134–138	–	5–6	3–5	5	16	17–18
C. ingerorum	26.9	HET	SM	SM	SM	Small	7	7	88–95	17–21	62–69	93–101	–	7–9	2	5	13–16	17–18
C. kallima	35.1	HET	SM	SM	SM	Small	7–8	7–8	131–138	19–23	67–74	99–107	–	12–15	3–4	4–5	16–18	18–20
C. kivulegedarai	31.2	HET	SM	SM	SM	Small	7	6–7	109–114	19	69–76	131–133	–	4–5	2	4–5	14	15
C. kotagamai **sp. nov.**	29.8	HET	SM	SM	SM	Small	7–8	7–8	131–137	21–22	79–84	114–119	–	6–7	1	4–5	13–15	17–18
C. kandiana	34.6	HET	KD	SM	SM	Small	8–9	7–8	119–138	19–20	68–75	86–99	–	5–7	2–4	3–4	12–14	18–20
C. menikay	28.0	HET	KD	SM	SM	Small	7–9	7–8	124–138	20–26	71–79	83–98	–	13–15	1–2	3–4	14–15	15–17
C. retigalensis	30.8	HET	KD	SM	SM	Small	7–8	7–8	121–128	16–20	69–77	82–86	–	4–5	1	3–4	14–15	16–20
Group (3) – *amith*																		
C. amith	33.0	HOM	KD	SM	SM	Small	7–8	7	123–131	19–21	67–74	79–84	–	4–5	3	3	16–17	18–19
Group (4) – *kumarasinghei*																		
C. dissanayakai **sp. nov.**	29.4	HOM	SM	SM	SM	Small	7	7	118–120	17–19	94–98	105–107	–	6–7	2	4–5	21–22	21–22
C. gotaimbarai	33.7	HOM	SM	SM	SM	Small	7–8	8–9	129–138	23–25	72–79	117–121	–	5–6	2–4	3	16–17	19–20
C. kawminiae **sp. nov.**	35.6	HOM	SM	SM	SM	Small	7–8	7–8	107–114	17–21	76–78	86–92	–	7–8	2	4	14–15	15–16
C. kumarasinghei	31.6	HOM	SM	SM	SM	Small	7–8	7–8	120–134	17–21	87–94	61–68	–	7–9	2–3	3–5	15–16	16–18
C. latha	30.4	HOM	SM	SM	SM	Small	7–8	7–8	109–115	13–15	69–73	72–79	–	5–7	2–3	4–5	15–17	17–18

Table 9 (continued). Key characters of 36 currently known *Cnemaspis* species in Sri Lanka. Abbreviations: mm – Millimeters, SVL – Maximum Snout to vent length, SUB – Subcaudals, SUP – Supralabials, INF – Infralabials, PG – Paravertebral granules, IFS – Interfemoral scales, FLSP – Flank spines, PCP – Precloacal pores, FP – Femoral pores, HET – Heterogeneous, HOM – Homogeneous, KD – Keeled, SM – Smooth.

C. nandimithrai	31.7	HOM	SM	SM	SM	Small	5–6	6	108–112	25–27	87–89	95–99	–	3–4	2–4	2–4	12–13	19–20
Clade (2) *Cnemaspis podihuna* (subcaudals large)																		
Group (1) – *scalpensis*																		
C. alwisi	40.4	HOM	SM	SM	SM	Enlarged	8–10	7–9	145–153	27–31	71–78	89–97	18–19	4–5	–	7–9	15–17	17–21
C. anslemi	34.4	HOM	SM	SM	SM	Enlarged	8–9	8–9	111–117	19–21	87–91	118–122	9–10	3–4	–	14–15	16–17	20–21
C. godagedarai	35.5	HOM	SM	SM	SM	Enlarged	7–8	7–8	133–137	21–23	98–102	101–106	8	5–6	–	12–13	17–18	20–21
C. gemunu	34.0	HOM	SM	SM	SM	Enlarged	8–10	7–8	112–118	13–16	74–87	79–93	10–12	7–8	–	11–14	15–17	18–19
C. hitihami	41.7	HOM	SM	SM	SM	Enlarged	8–9	7–9	132–135	21	96–99	143–149	24–26	4–5	–	5–10	18–19	21–22
C. kohukumburai	34.5	HOM	SM	SM	SM	Enlarged	8–9	7–8	131–134	23	81–88	150–159	25	7–8	–	6–9	21–22	23–25
C. nilgala	32.9	HOM	SM	SM	SM	Enlarged	7–8	6–7	122–129	17–19	71–78	179–187	14–15	3–4	–	7–9	17	17–18
C. phillipsi	36.6	HOM	SM	SM	SM	Enlarged	8–9	8–9	128–143	18–25	76–91	86–93	11–14	4–6	–	15–16	16–19	17–19
C. punctata	39.9	HOM	SM	SM	SM	Enlarged	7–10	7–9	129–137	20–29	71–78	83–91	25–27	11–13	–	5–7	17–18	17–23
C. rajakarunai	40.2	HOM	SM	SM	SM	Enlarged	8–9	9–11	146–186	26–29	69–74	81–85	20–22	5–6	–	7–8	16–20	19–22
C. rammalensis	53.8	HOM	SM	SM	SM	Enlarged	8–10	8–9	186–207	25–28	119–131	94–96	19–24	4–5	–	14–16	22–23	22–23
C. scalpensis	36.6	HOM	SM	SM	SM	Enlarged	7–9	7–8	120–131	17–19	81–89	102–112	8–12	9–11	–	13–15	17–18	19–21
Group (2) – *podihuna*																		
C. kandambyi	23.6	HOM	SM	SM	SM	Enlarged	7–8	7–8	128–137	16–17	71–77	85–92	–	4–5	3–4	5–6	11–14	19–20
C. molligodai	29.0	HOM	SM	SM	SM	Enlarged	8–10	7–8	127–135	15–19	73–82	76–83	–	5–7	4–5	8–9	15–18	19–23
C. podihuna	24.7	HOM	SM	SM	SM	Enlarged	7–9	6–8	111–118	15–19	79–83	102–106	–	4–6	3–4	3–6	14–15	18–19

tion of these new species are comparable to other congeners, which imply niche conservatism among divergent lineages.

The bulk of these rupicolous geckos are restricted to cool, moist, shady granite caves and rock walls or under granite boulders. According to our findings these geckos prefer narrow (~3–4 mm), long (~100–400 mm), and deep (~20–180 mm) crevices as refugia and oviposition sites. In several surveyed locations with granite caves, we were unable to find *Cnemaspis* species due to the lack of tall shady trees and adequately cool temperatures (substrate temperature: 25.2–28.7°C). A majority (66.7%) of *Cnemaspis* species are restricted to the wet bioclimatic zones of Sri Lanka and are point-endemic microhabitat specialists where distribution ranges are limited to <100 km^2. The restricted distribution could be an artifact of the limited availability of caves and similar microenvironments with granite or rock-based substrates. The high species richness in Sri Lanka may be accounted by the possibility of multiple, independent colonization events from the Indian mainland with subsequent, geographically-isolated *in-situ* speciation. The majority of the Indian *Cnemaspis* species have not been comparatively analyzed alongside the Sri Lankan species (Agarwal et al. 2017; Karunarathna et al. 2019b). The three new species described here are recorded from isolated locations in wet, intermediate, and dry bioclimatic zones of Sri Lanka. Of these, *C. kawminiae* **sp. nov.** is described from the wet zone montane region; *C. kotagamai* **sp. nov.** is described from the intermediate zone lowland; and *C. dissanayakai* **sp. nov.** is described from the dry zone lowland (Table 10). The record of *C. kawminiae* **sp. nov.** from Mandaramnuwara is noteworthy, as this is a high-altitude location nestled in the central highlands (1,400–1,800 m

Fig. 12. Threats to the isolated hill forests and *Cnemaspis* species in study areas in Sri Lanka. **(A)** Illegal forest clearing, **(B)** firewood collection for tea factory, **(C)** granite mining activities, **(D)** agricultural fields in slopy areas, **(E)** tea plantation and highly crowded anthropogenic habitat, and **(F)** a landslide in mountain areas. *Photos: Suranjan Karunarathna and Madhava Botejue*.

asl), making this the 4th species in the genus found at an elevation above 1,000 m asl.

Bambaragala and Dimbulagala are isolated residual mountains and rock outcrops embedded within a forest and features granite caves incorporated with historical Buddhist monasteries, whereas Mandaramnuwara is a mixture of forested areas and rural human habitation. All these habitats are susceptible to human-induced habitat degradation, including clear cutting and timber felling, forest fragmentation, granite mining, tea cultivation (Fig. 12), rubber cultivation, vegetable farming, invasive species, human settlements, road and other infrastructure development, and waste disposal (see Karunarathna et al. 2017). Bambaragala, situated in Ratnapura District of Sabaragamuwa Province, is the most vulnerable habitat as it is a small forested rock outcrop (~50 ha) located amidst a rapidly urbanizing landscape; where a part of the rock outcrop is currently undergoing mining, making *C. kotagamai* **sp. nov.** the most endangered amongst these new species. However, many such habitats are somewhat protected due to the presence of Buddhist monasteries which serve as refugia for reptiles and other faunal groups, and it is imperative to conserve these habitats to protect the island's unique biodiversity (Amarasinghe et al. 2016; Edirisinghe et al. 2018; Karunarathna et al. 2019a). Sri Lanka's tropical humid wet zone is

Table 10. Distribution and ecological data of the three new *Cnemaspis* species from Sri Lanka. Abbreviations: m – meters; ha – hectares; mm – millimeters; Lux – light intensity; CR – Critically Endangered.

Species	Bioclimatic area	District	Coordinates		Elevation	Area size	Forest type	Microhabitat	Rainfall (mm)	Annual temperature	Ambient temperature	Substrate temperature	Light intensity (Lux)	Relative humidity	Canopy cover	Conservation status (IUCN)
			N	E												
C. kotagamai **sp. nov.**	Intermediate zone	Ratnapura	6.512978	80.750306	127 m	50 ha	Semievergreen	Granite cave	1,500–2,000	27.8–29.6 °C	29.8 °C	28.1 °C	469	83%	80%	CR
			6.517261	80.752692	132 m			Granite cave			30.6 °C	28.6 °C	385	88%	65%	
			6.520786	80.748225	122 m			Old building			29.6 °C	27.8 °C	448	79%	65%	
			6.510536	80.746783	139 m			Granite cave			31.3 °C	28.4 °C	455	71%	70%	
C. dissanayakai **sp. nov.**	Dry zone	Polonnaruwa	7.872931	81.135569	129 m	1,000 ha	Dry mixed evergreen	Granite cave	1,500–2,000	28.9–30.2 °C	31.4 °C	27.9 °C	648	85%	70%	CR
			7.851358	81.141675	135 m			Granite cave			30.7 °C	28.2°C	594	75%	75%	
			7.860200	81.114836	126 m			Old building			30.2 °C	28.6 °C	617	80%	65%	
			7.850547	81.127831	131 m			Old building			31.9 °C	27.5 °C	625	70%	90%	
C. kawminiae **sp. nov.**	Wet zone	Nuwara-Eliya	7.033558	80.798794	1,600 m	300 ha	Wet evergreen	Granite wall	3,000–4,000	27.4–28.9 °C	25.8 °C	27.9 °C	592	74%	70%	CR
			7.020600	80.788639	1,658 m			Granite cave			26.5 °C	26.7 °C	566	83%	75%	
			7.034775	80.783497	1,574 m			Granite wall			26.1 °C	27.5 °C	486	92%	85%	
			7.028314	80.773903	1,592 m			Granite wall			24.2 °C	28.3 °C	578	87%	80%	

globally recognized for its exceptionally high biodiversity and endemism (Bossuyt et al. 2004). Nonetheless, the new species reported here and in previous studies on the same genus continue to illustrate the undocumented diversity of *Cnemaspis* that also occurs within the dry and intermediate bioclimatic zones (Batuwita et al. 2019; Karunarathna et al. 2019b).

Most of the *Cnemaspis* species from the dry and intermediate climatic zones of Sri Lanka are, however, restricted to small isolated habitats scattered over the lowlands (Batuwita et al. 2019; Karunarathna et al. 2019a,b). The presence of granitic caves and the humid forest cover surrounding the caves seem to serve as ideal refugia for these geckos with narrow, specialized ecological niches. It is very likely that future studies on the biogeography of *Cnemaspis* in Sri Lanka will highlight the importance of these isolated habitats in generating and maintaining the diversity of these unique groups of geckos in the island (Karunarathna and Amarasinghe 2011; Amarasinghe et al. 2016). At the same time, it is important to note that the point endemic species described here, which are highly sensitive to changes in the habitat, would be severely affected by habitat degradation. Hence, past and present studies have emphasized the importance of conserving such isolated habitats throughout the country (Karunarathna and Amarasinghe 2013; Gabadage et al. 2018). Though traditional conservation strategies usually target extensive natural habitats to maximize biodiversity conservation, our studies indicate that these small isolated habitats also deserve the immediate attention of conservation authorities. Thus, we believe our findings on these geckos and their granite cave and rock-associated habitats add a new dimension to the biodiversity conservation of Sri Lanka.

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Suranjan Karunarathna began his scientific exploration of biodiversity with the Young Zoologists' Association of Sri Lanka (YZA) in early 2000, and led the society in 2007 as the President. Suranjan earned his Masters of Environmental Management from University of Colombo, Sri Lanka, in 2017. As a wildlife researcher, he studies herpetofaunal ecology and taxonomy, and also promotes science-based conservation awareness on the importance of biodiversity and its conservation among the Sri Lankan community. Suranjan is an active member of several specialist groups of IUCN/SSC, and has served as an expert committee member of the IUCN Global and National Red List development programs since 2004.

Anslem de Silva M.Sc., D.Sc. (University of Peradeniya, Sri Lanka) started keeping reptiles at the early age of seven, and he has taught herpetology at the Rajarata University of Sri Lanka and mentored final-year veterinary students at University of Peradeniya. Anselm has conducted herpetofaunal surveys in most of the important ecosystems in the country, and has published more than 400 papers, of which nearly 60 are books or book chapters. Anslem had done yeoman service to the country and the region for more than 50 years. He is the Regional Chairman of the Crocodile Specialist Group for South Asia and Iran, Co-Chair of the Amphibian Specialist Group IUCN/SSC Sri Lanka. Anslem received the IUCN/SSC Sir Peter Scott Award for Conservation Merit in October 2019 – the first Sri Lankan to receive this prestigious award.

Madhava Botejue has been engaged in research on the biodiversity, ecology, distribution, behavior, taxonomy, and conservation of Sri Lankan fauna for the past 14 years, with a main focus on herpetofauna, avifauna, and mammals. Madhava has contributed to environmental protection through many community-based awareness programs on the importance of biodiversity and its conservation. He earned his B.Sc. degree in Natural Sciences from The Open University of Sri Lanka in 2009. Currently, he serves as an Environmental Officer at the Central Environmental Authority, Sri Lanka, a member of IUCN/SSC Crocodile Specialist Group, and an expert committee member of IUCN Global and National Red List development programs.

Dinesh Gabadage is a field biologist who began his wildlife interests in 1990 as a member of the Young Zoologists Association of Sri Lanka (YZA), and also in 1994 as a member of the Wildlife Heritage Trust of Sri Lanka (WHT). Dinesh is a dedicated researcher studying the biodiversity ecology, distribution, behavior, and taxonomy of herpetofauna, avifauna, and mammals in Sri Lanka; and he has conducted many community-based programs promoting wildlife conservation. He is also an expert committee member in the IUCN Global and National Red List development programs, and earned his Diplomas in Palaeo-biodiversity and Zooarchaeology from University of Kelaniya, Sri Lanka.

Lankani Somaratne, B.Sc. (University of Colombo, Sri Lanka), is a zoologist who started her career as an Assistant Director in the Zoology Division of the Department of National Museums five years ago. Lankani has engaged in re-cataloging and updating of the avifaunal, skink, amphibian, and ichthyological collections at the National Museum for the past five years. She has contributed to enhancing the knowledge on the museological aspects of Natural Specimen conservation for different communities. She is a member of the International Community of Museums (ICOM), representing Sri Lanka. Apart from zoological conservation, she is currently working on conservation project at the Dutch Museum, Sri Lanka.

Angelo Hettige began his interest in wildlife from a very young age. His interests began to grow as a member of the Young Zoologists Association of Sri Lanka (YZA) since the early 2000s, from the junior group continuing up to the senior group. Angelo has contributed to conservation through community awareness programs on the importance of reptiles and their conservation, and through numerous snake rescues. Currently, he is working in the snake anti-venom research project at the University of Peradeniya, Sri Lanka, and he wishes to continue his career studying herpetofauna and its conservation.

Nimantha Aberathna is a naturalist who began his career and wildlife interests in 2004 as a naturalist, and as a member of the Youth Exploration Society of Sri Lanka (YES) in 2009. He served as the President of the Research and Education Committee during 2015-2017. Nimantha holds a certificate of Wildlife Conservation and Management from the Open University of Sri Lanka. As a wildlife researcher, he is studying ichthyofauna and orchid ecology and taxonomy. He is also engaged in a captive breeding program for threatened species, and has been involved in many snake rescue events. Nimantha worked as a venom extractor for the snake anti-venom research project at the University of Peradeniya, Sri Lanka.

Majintha Madawala is a naturalist who began his career and wildlife interests in 1995 as a member of the Young Zoologists Association of Sri Lanka (YZA), and holds a Diploma in Biodiversity Management and Conservation from the University of Colombo, Sri Lanka. As a conservationist and a naturalist, he is engaged in numerous habitat restoration, snake rescue programs, and biodiversity research projects in Sri Lanka. Currently, Majintha is engaged in herpetofaunal research with the Victorian Herpetological Society in Australia. He is also an active member of the IUCN/SSC Crocodile Specialist Group and IUCN Global and National Red List development programs.

Gayan Edirisinghe began his studies on wildlife in 2000 when he became a member of the Young Zoologists Association of Sri Lanka (YZA), which laid a strong foundation for his interest in mammals. Gayan initiated his research career in 2005 with a study on small mammals. For the past ten years, he has been involved in many research projects on Sri Lankan fauna, mainly focusing on the diversity, distribution, ecology, behavior, and conservation of chiropterans. He has conducted awareness programs to educate the community on the importance of biodiversity and its conservation, and earned his Diplomas in Palaeo-biodiversity and Zoo-archaeology from University of Kelaniya, Sri Lanka.

Nirmala Perera has been a member of Young Zoologists' Association (YZA) since 1999, and he has conducted several awareness programs on biodiversity conservation through many different levels of the society. Nirmala also served as the secretary of the action committee of YZA, and he has worked actively on several environmental issues raised in Sri Lanka. He holds a Diploma in Biodiversity Management from the University of Colombo and worked as the snake biologist in the snake venom research project in the Faculty of Medicine, University of Colombo. He also worked as a Project Coordinator at Udawalawe Human-Elephant Conflict Program of the Born Free Foundation, Sri Lanka (2011–2014).

Sulakshana Wickramaarachchi is a hardware and software engineer by profession, but began his studies on wildlife conservation in 2006 as a member of the Young Zoologists' Association (YZA), and later served as a committee member of the Research Committee and as the Treasurer during 2011–2012. He is also engaged in captive breeding programs for threatened species and many snakes rescue missions. He also conducts awareness programs to promote the importance of snake fauna and its conservation among the Sri Lankan community. Also he worked as an assistant venom extractor of the snake venom research project in the Faculty of Medicine, University of Colombo.

Thilina Surasinghe is an Assistant Professor in the Department of Biological Sciences in Bridgewater State University, Mssachusetts, USA, and obtained his Ph.D. in Wildlife Biology at Clemson University, South Carolina, USA. Thilina is an ecologist; his academic training encompasses different aspects of biology, ecology, environmental sciences, and natural resources management. He is experienced in teaching undergraduates in biology, environmental sciences, and social sciences; and he takes part in projects on landscape-scale biodiversity assessments, Red List assessments, conservation planning, GIS based threat and GAP analyses, and EPA protocols.

Niranjan Karunarathna is a naturalist who loves traveling, camping, and hiking. He has been a member of Young Zoologists' Association (YZA) since 2006, has participated in many herpetological research projects and also has ongoing funded projects. Niranjan is also conducting wildlife photography, biodiversity conservation, and educational programs for the Sri Lankan community.

Mendis Wickramasinghe founded the Herpetological Foundation of Sri Lanka (HFS), to further pursue independent research on the herpetofauna of Sri Lanka, while providing a platform for young herpetologists to initiate research. With nearly 25 years of field research experience on the herpetofauna of Sri Lanka, his work has focused on taxonomic identification and biodiversity assessments of amphibians and reptiles, in an effort to increase awareness on the importance of conserving their habitats in Sri Lanka. As a result, he has been able to discover and describe 29 new species of amphibians and reptiles, and participated in the re-discovery of three "extinct" amphibian species.

Kanishka D.B. Ukuwela is currently a Senior Lecturer in Zoology at the Rajarata University of Sri Lanka. He holds a B.Sc. (Hons.) degree in Zoology from the University of Peradeniya, Sri Lanka and a Ph.D. in Evolutionary Biology from the University of Adelaide, Australia. His current research focuses on the origins, evolution, systematics, and conservation of the South Asian herpetofauna.

Aaron Bauer grew up collecting reptiles and amphibians in his native New York. He is the Gerald M. Lemole Endowed Professor of Integrative Biology at Villanova University in Pennsylvania, USA, and has been studying reptiles, especially geckos, for more than 35 years. Aaron has worked widely in Sri Lanka, India, southern Africa, Australia, and the South Pacific; and has described nearly 200 species of reptiles and written more than 750 publications. He is a former Secretary General of the World Congress of Herpetology, President of the Society for the Study of Amphibians and Reptiles, President of the Herpetologists' League, and Chairman of the Herpetological Association of Africa.

Appendix 1.

Comparative *Cnemaspis* materials examined from Sri Lanka

Cnemaspis alwisi: NMSL 2004.09.01 (holotype), NMSL 2004.09.02 (paratype), NMSL 2004.09.03 (paratype), WHT 5918, WHT 6518, WHT 6519, WHT 7336, WHT 7337, WHT 7338, WHT 7343, WHT 7344, WHT 7345, WHT 7346.

C. anslemi: NMSL 2019.14.01 (holotype), NMSL 2019.14.02 (paratype), NMSL 2019.14.03 (paratype).

C. amith: BMNH 63.3.19.1066A (holotype), BMNH 63.3.19.1066B (paratype), BMNH 63.3.19.1066C (paratype).

C. butewai: NMSL 2019.07.01 (holotype), NMSL 2019.07.02 (paratype), NMSL 2019.07.03 (paratype).

C. gemunu: AMB 7495 (holotype), AMB 7507 (paratype?), WHT 7221, WHT 7347, WHT 7348, NMSL 2006.11.01, NMSL 2006.11.02, NMSL 2006.11.03, NMSL 2006.11.04.

C. godagedarai: NMSL 2019.09.01 (holotype), NMSL 2019.16.01 (paratype), NMSL 2019.16.02 (paratype).

C. gotaimbarai: NMSL 2019.04.01 (holotype), NMSL 2019.04.02 (paratype), NMSL 2019.04.03 (paratype).

C. hitihami: NMSL 2019.06.01 (holotype), NMSL 2019.06.02 (paratype), NMSL 2019.06.03 (paratype).

C. ingerorum: WHT 7332 (holotype), WHT 7330 (paratype), WHT 7331 (paratype).

C. kallima: WHT 7245 (holotype), WHT 7222 (paratype), WHT 7227 (paratype), WHT 7228 (paratype), WHT 7229 (paratype), WHT 7230 (paratype), WHT 7239 (paratype), WHT 7249 (paratype), WHT 7251 (paratype), WHT 7252 (paratype), WHT 7253 (paratype), WHT 7254 (paratype), WHT 7255 (paratype).

C. kandambyi: WHT 9466 (holotype), WHT 9467 (paratype).

C. kandiana: BMNH 53.4.1.1 (lectotype), BMNH 80.2.2.119A (paralectotype), BMNH 80.2.2.119B (paralectotype), BMNH 80.2.2.119C (paralectotype), WHT 7212, WHT 7213, WHT 7267, WHT 7305, WHT 7307, WHT 7308, WHT 7310, WHT 7313, WHT 7319, WHT 7322.

C. kivulegedarai: NMSL 2019.08.01 (holotype), NMSL 2019.08.02 (paratype), NMSL 2019.08.03 (paratype).

C. kohukumburai: NMSL 2019.05.01 (holotype), NMSL 2019.05.02 (paratype), NMSL 2019.05.03 (paratype).

C. kumarasinghei: NMSL 2006.13.01 (holotype), NMSL 2006.13.02 (paratype).

C. latha: WHT 7214 (holotype).

C. menikay: WHT 7219 (holotype), WHT 7218 (paratype), WHT 7349 (paratype).

C. molligodai: NMSL 2006.14.01 (holotype), NMSL 2006.14.02 (paratype), NMSL 2006.14.03 (paratype), NMSL 2006.14.04 (paratype), NMSL 2006.14.05 (paratype).

C. nandimithrai: NMSL 2019.01.01 (holotype), NMSL 2019.01.02 (paratype), NMSL 2019.01.03 (paratype).

C. nilgala: NMSL 2018.07.01 (holotype), NMSL 2018.06.01 (paratype), NMSL 2018.06.02 (paratype), NMSL 2018.06.03 (paratype).

C. pava: WHT 7286 (holotype), WHT 7281 (paratype), WHT 7282 (paratype), WHT 7283 (paratype), WHT 7285 (paratype), WHT 7288 (paratype), WHT 7289 (paratype), WHT 7290 (paratype), WHT 7291 (paratype), WHT 7292 (paratype), WHT 7293 (paratype), WHT 7294 (paratype), WHT 7295 (paratype), WHT 7296 (paratype), WHT 7297 (paratype), WHT 7298 (paratype), WHT 7299 (paratype), WHT 7300 (paratype), WHT 7301 (paratype), WHT 7302 (paratype).

C. phillipsi: WHT 7248 (holotype), WHT 7236 (paratype), WHT 7237 (paratype), WHT 7238 (paratype).

C. podihuna: BMNH 1946.8.1.20 (holotype), NMSL 2006.10.02, NMSL 2006.10.03, NMSL 2006.10.04.

C. pulchra: WHT 7023 (holotype), WHT 1573a (paratype), WHT 7011 (paratype), WHT 7021 (paratype), WHT 7022 (paratype).

C. punctata: WHT 7256 (holotype), WHT 7223 (paratype), WHT 7226 (paratype), WHT 7243 (paratype), WHT 7244 (paratype).

C. rajakarunai: NMSL 2016.07.01 (holotype), DWC 2016.05.01 (paratype), DWC 2016.05.02 (paratype).

C. rammalensis: NMSL 2013.25.01 (holotype), DWC 2013.05.001.

C. retigalensis: NMSL 2006.12.01 (holotype), NMSL 2006.12.02 (paratype), NMSL 2006.12.03 (paratype), NMSL 2006.12.04 (paratype).

C. samanalensis: NMSL 2006.15.01 (holotype), NMSL 2006.15.02 (paratype), NMSL 2006.15.03 (paratype), NMSL 2006.15.04 (paratype), NMSL 2006.15.05 (paratype).

C. scalpensis: NMSL 2004.01.01 (neotype), NMSL 2004.02.01, NMSL 2004.03.01, NMSL 2004.04.01, WHT 7265, WHT 7268, WHT 7269, WHT 7274, WHT 7275, WHT 7276, WHT 7320.

C. silvula: WHT 7208 (holotype), WHT 7206 (paratype), WHT 7207 (paratype), WHT 7209 (paratype), WHT 7210 (paratype), WHT 7216 (paratype), WHT 7217 (paratype), WHT 7018, WHT 7027, WHT 7202, WHT 7203, WHT 7220, WHT 7354, WHT 7333.

C. tropidogater: BMNH 71.12.14.49 (lectotype), NMSL 5152, NMSL 5151, NMSL 5159, NMSL 5157, NMSL 5970, NMSL 5974.

C. upendrai: WHT 7189 (holotype), WHT 7184 (paratype), WHT 7187 (paratype), WHT 7188 (paratype), WHT 7181 (paratype), WHT 7182 (paratype), WHT 7183 (paratype), WHT 7185 (paratype), WHT 7190 (paratype), WHT 7191 (paratype), WHT 7192 (paratype), WHT 7193 (paratype), WHT 7194 (paratype), WHT 7195 (paratype), WHT 7196 (paratype), WHT 7197 (paratype), WHT 7260 (paratype).