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# A NEW SPECIES OF *Lankascincus* GREER, 1991 (REPTILIA: SCINCIDAE) FROM THE RAKWANA HILLS OF SRI LANKA

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#### Abstract

A new species of the endemic scincid lizard genus *Lankascincus* from the Rakwana hills of Sri Lanka, is described. The new species is distinguished from its congeners by possessing the following combination of characters: maximum SVL less than 35.0 mm, prefrontals in broad contact, seven supralabials, last supralabial scale split, 24 mid-body scale rows, 46–48 paravertebrals, 49–51 ventrals, 13–16 lamellae on fourth toe, and a conspicuous dark brown band from snout to mid-tail, gradually fading posteriad. The number of palpebral scales around eye is used as a meristic character in the genus *Lankascincus* for the first time.

Key words: Central highlands, rainforest, Ristella, South Asia, systematics, taxonomy

### Introduction

The endemic Sri Lankan lizard genus Lankascincus Greer, 1991, is a widespread and an abundant group of litter skinks distributed throughout the island. In describing this new genus, Greer (1991) recognized six species, of which three were new: L. deraniyagalae, L. taylori, and L. gansi. The remaining three were new combinations previously allocated to Sphenomorphus: L. taprobanensis (Kelaart, 1854), L. fallax (Peters, 1860), and L. deignani (Taylor, 1950). Lankascincus fallax, which is also the most abundant and widely distributed member of the genus, was designated the type species (Greer 1991).

Four more species were added in 2007: two from the central highlands (*Lankascincus*  *munindradasai* Wickramasinghe, Rodrigo, Dayawansa *et al.*, 2007, and *L. sripadensis* Wickramasinghe, Rodrigo, Dayawansa *et al.*, 2007), along with *L. greeri* Batuwita & Pethiyagoda, 2007, and *L. dorsicatenatus* (Deraniyagala, 1953), the latter a new combination following the rediscovery of a paratype from the long-lost type series (Batuwita & Pethiyagoda 2007).

The most recent comprehensive taxonomic review of *Lankascincus* by Batuwita (2019) recognized nine species [including the new combination *Lankascincus megalops* (Annandale, 1906), previously allocated to *Sphenomorphus*], while synonymising *L. deraniyagalae* with *L. fallax*, and *L. munindradasai* with *L. taprobanensis*. These small-sized, slender, terrestrial skinks are most closely related to the Indian genus *Ristella* Gray, 1839. Greer (1991) drew attention to the resemblance of the two genera, while Austin *et al.* (2004), based on molecular evidence, identified them as belonging to a distinct lineage. The molecular phylogeny of Pyron *et al.* (2013) showed *Ristella* to be the sister-group of *Lankascincus*, while Hedges (2014) included the two genera in a new family, Ristellidae, supported both by molecular and morphological evidence, and identifying a suite of familial autapomorphies.

Here we describe a further new species of *Lankascincus*, based on a series of specimens from the Rakwana hills, which were collected from Southern Province of Sri Lanka.

### Material and methods

During field surveys carried out in 2007, we observed a *Lankascincus* population in Enasalwatte, Rakwana hills (Fig. 1). Four specimens were collected from this locality. These were photographed in life using a Canon EOS 40D, Canon 100mm F/2.8 IS USM macro lens, and Canon 580EX II Flash Lite. A tail snipping from the holotype were fixed in 96% ethanol for future DNA analysis. The entire series was euthanized prior to fixing in 15% formalin and subsequently transferred to 75% ethyl alcohol after one day.

The specimens were deposited in the National Museum of Sri Lanka, Colombo, Sri Lanka (NMSL) and the National Wildlife Research and Training Centre, Department of Wildlife Conservation, Girithale, Sri Lanka Institutional abbreviations: (DWC). Field Museum of Natural History, Chicago, USA (FMNH); Wildlife Heritage Trust, Sri Lanka (WHT); the Natural History Museum, London (BMNH); Smithsonian Institution National Museum of Natural History, Washington DC, USA (USNM): and the NMSL and DWC. Museum acronyms are those of Uetz et al. (2019).

Observations were made using a Leica M50  $(\times 10-40)$  microscope, on the left side of the specimens. The following measurements were taken to the nearest 0.1 mm with a Mitutoyo digital calliper (each measurement was taken three times and the mean recorded): snout–vent length (SVL, from tip of snout to anterior margin of vent), head length (HL, from posterior edge of the retro-articular process of the mandible to tip of snout), head width (HW,

width of head at the temporo-mandibular articulation / angle of the jaws), head depth (HD, dorso-ventral distance between occiput and throat), snout length (ES, from anterior border of orbit to tip of snout), head width at front-eve (width of head at the anterior edge of the orbit), head width at back-eye (width of head at the posterior edge of the orbit), orbit diameter (ED, the greatest horizontal diameter of the orbit), nostril-snout length (from anterior border of nostril to tip of snout), internarial distance (shortest dorsal distance between inner margins of nares), eye-nostril length (from anterior border of orbit to the posterior border of nostril), tympanum-nostril length (from anterior border of tympanum to the posterior border of nostril), tympanum horizontal diameter (THD, greatest diameter of the horizontal tympanum), tympanum vertical diameter (greatest vertical diameter of the tympanum), tympanum-snout length (from anterior border of tympanum to tip of snout), tympanum-eye length (from posterior border of orbit to anterior border of tympanum). antebrachium length (on the dorsal surface from the posterior surface of the elbow while flexed 90 degree to the base of the palm), shank length (from the posterior surface of the knee while flexed 90 degree to the base of the heel), axillagroin length (AG, distance between axilla and groin), tail length (TAL, from tip of tail to posterior margin of vent), tail base width (TBW, greatest width at tail base), tail base depth (TBD, greatest depth at tail base), and total length (TL= SVL+TAL (from tip of snout to tip of tail).

Supralabial and infralabial scales were counted from the gape to the rostral and mental scales, respectively. Ventrals included all scales from the scale posterior to the postmental to the last scale bordering the vent, counted along the ventral midline; and subcaudals from the first scale bordering the vent up to the tail tip, along subcaudal midline. counted the Paravertebral scales were counted from the postparietal / nuchal to the level of the posterior margin of the thigh in a straight line immediately left of the vertebral column. Subdigital lamellae were counted from the first proximal enlarged lamella wider than the largest palm scale to the distal-most lamella at the base of the claw. Total number of longitudinal scale rows was counted around the midbody (AG/2, at half-length of axilla-groin length). Sex was determined by the throat colouration, and the presence or absence of hemipenes by illuminating the base of the tail.

## Plate 09



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Figure 1. (A) Distribution map showing the type locality (Rakwana range) and (B) forest fragmentation in the type locality of *Lankascincus merrill* sp. nov. due to the encroachments by tea plantations.

**Taxonomy** *Lankascincus merrill* sp. nov. (Figs. 1–5, Table 1)

**Holotype.** Adult male, NMSL 2011.01.01, SVL 34.9 mm, collected from Enasalwatte Estate, Sinharaja Division (Army Camp Forest), Rakwana Hills, Matara District, Southern Province, Sri Lanka (06°23' N, 080°36' E, alt. 1,040 m a.s.l.), by D.R. Vidanapathirana, N. Ranwella, and L.J.M. Wickramasinghe, on 25 November 2007.

**Paratypes** (*n*=3). Adult females, NMSL 2011.01.02, SVL 33.7 mm and DWC 2011.05.02, SVL 34.0 mm; adult male, DWC 2011.05.01, SVL 32.8 mm; same locality as holotype; collected by D.R. Vidanapathirana and L.J.M. Wickramasinghe, on 28 December 2007.

**Diagnosis**. *Lankascincus merrill* sp. nov. is distinguished from its congeners by possessing the following combination of characters: maximum SVL 32.8–34.9 mm; prefrontals in contact; seven supralabials, the last one split; 24 mid-body scale rows; 46–48 paravertebrals; 49–51 ventrals; 8–10 and 13–16 lamellae on fourth finger and fourth toe, respectively; and a conspicuous dark-brown band from snout to mid-tail, gradually fading posteriad.

**Description of holotype.** Male, head depressed (HD/HW ratio 0.71, HD/HL ratio 0.42), narrow (HW/HL ratio 0.59), distinct from neck; snout long (ES/HW ratio 0.55), greater than orbit diameter (ED/ES ratio 0.78); orbit wider than tympanum; ear aperture small (ED/THD ratio 4.2).

Rostral shield large, posterior margin convex; no supranasal or postnasal scale; frontonasal in contact with anterior loreal laterally (fused on left side); prefrontals in posterior contact with loreal laterally. 1<sup>st</sup> supraciliary, supraocular and frontal posteriorly; frontal longer than frontonasal and prefrontal combined, shorter than frontoparietal and interparietal combined; supraoculars four, 2<sup>nd</sup> widest in transverse axis, 3<sup>rd</sup> longest in longitudinal axis, first two supraoculars in contact with frontal,  $3^{rd}$  in contact with frontoparietal, 4<sup>th</sup> in contact with frontoparietal, parietal, upper primary temporal and last supraciliaries; frontoparietals larger than interparietal; parietals large, touching each other behind interparietal, in contact with 4<sup>th</sup> supraocular and primary temporals anteriorly, upper secondary temporal and dorso-nuchal scales posteriorly; nasal non-fused; loreals two; anterior loreal touching prefrontal, frontonasal, nasal, 1<sup>st</sup> and 2<sup>nd</sup> supralabials, and posterior loreal; posterior loreal larger than anterior loreal, longer on longitudinal axis, touching prefrontal, anterior loreal, 2<sup>nd</sup> supralabial, two preoculars, and 1<sup>st</sup> supraciliary; preoculars two, lower preocular larger, touching upper preocular, posterior loreal, 2<sup>nd</sup> and 3<sup>rd</sup> supralabials, 1<sup>st</sup> subocular and palpebral scales; supraciliaries nine, placed between supraocular and upper palpebrals; upper palpebrals 17, placed between eye and supraciliary row; lower palpebrals 17, placed between eye and subocular row; suboculars ten, smaller than supralabials, touching 3<sup>rd</sup>-6<sup>th</sup> supralabials ventrally, lower postoculars and primary temporal scale posteriorly, last subocular touching lower and upper primary temporals, lower anterior and posterior postoculars; anterior postoculars two, upper one larger than lower; posterior postoculars three, larger than anterior postoculars, touching pretemporals and primary temporals; pretemporals two, lower one larger than upper, touching parietals, secondary temporals and primary temporals; primary temporals two, upper one larger, lower one touching 9<sup>th</sup> and 10<sup>th</sup> suboculars, 6<sup>th</sup> and 7<sup>th</sup> supralabials, upper one touching last uppersupralabial and secondary temporals; secondary temporals two, upper one longer than the lower, upper one touching parietal and upper tertiary temporal; tertiary temporals two, lower one larger, touching lower secondary temporal and upper posterior supralabials.

Supralabials 7, the last supralabial split, 5<sup>th</sup> at mid-orbit point; post-supralabials two; mental wider than postmental in transverse axis, shorter in longitudinal axis, touching 1<sup>st</sup> infralabial only; infralabials five, single post-infralabial; chinshields three pairs, first pair meeting in midline, first chinshield touching 1<sup>st</sup> and 2<sup>nd</sup> infralabials, second pair touching 2<sup>nd</sup> and 3<sup>rd</sup> infralabials, third pair separated from infralabial row by a single slender scale.

Body moderately elongate, body scales smooth; paravertebrals 47; ventrals 49; median preanals enlarged, outer preanals overlap inner preanals; fourth finger and fourth toe longer than others; fourth finger with nine smooth lamellae; fourth toe with 16 smooth lamellae; lamellae formulae for fingers and toes 4>3>5>2>1 and 4>3>5>2>1, scales of palm and foot elevated. Tail longer than body (TL/SVL ratio 1.4), round in cross section (TBD/TBW ratio 0.97); tail tip (23.5 mm) excised from original tail of 49.1 mm; subcaudals 75.

Variation. See Table 1.

**Colouration.** In life (Fig. 2A), body background light brown. Entire dorsum appearing striped due to irregular dark-brown markings on the light-brown background. Laterally a conspicuous dark-brown band from snout to mid-tail, gradually fading posteriad. Regions above and below this band golden brownish. Upper golden-brown region margined by a narrow dark-brown line dorsally. Lateral head and anterior body up to forelimb with white spots, irregularly arranged. Entire vent light brown, except throat and tail, which are darker; each scale on vent with a white spot, the spots connecting to give a striped appearance from neck to tip of tail.

After 13 years in preservative, colour slightly faded from dark brown to light brown, black to dark brown, and golden brown and light brown to off white. Ventral white spots indistinct.

Etymology. The specific epithet is a noun in apposition, honoring Mr. Merrill J. Fernando, founder of Dilmah and Dilmah Conservation, for his support of biodiversity conservation in Sri Lanka. Suggested vernacular names are මෙරිල්ගේ ලක්-හිකතලා (Merrillgé lak-hikanala), Merrillavin arené, and Merrill's Lanka-skink, in Sinhala, Tamil and English, respectively.

**Table 1.** Morphometric (in mm) and meristric character comparisons of holotype and paratypes of *Lankascincus* merrill sp. nov.

	Lankascincus merrill sp. nov.					
	male $(n=2)$		female ( <i>n</i> =2)			
Character	holotype	paratype	paratype	paratype	Mean±S	Range
	NMSL	DWC	NMSL	DWC	D	1101180
	2011.01.01	2011.05.01	2011.01.02	2011.05.02	22.0.00	22.9.24.0
snout–vent length (SVL)	34.9	32.8	33.7	34.0	33.9±0.9	32.8-34.9
head length (HL)	8.3	7.5	7.4	7.2	7.6±0.5	7.2-8.3
head width (HW)	4.9	4.7	4.7	4.5	4.7±0.2	4.5-4.9
head depth (HD)	3.5	3.1	3.3	3.0	3.2±0.2	3.0–3.5
snout length (ES)	2.7	2.4	2.4	2.5	$2.5\pm0.2$	2.4 - 2.7
head width at front-eye	2.7	2.3	2.5	2.4	$2.5\pm0.2$	2.3 - 2.7
head width at back-eye	3.9	3.6	3.7	3.8	$3.7 \pm 0.1$	3.6–3.9
orbit diameter (ED)	2.1	1.9	2.0	2.0	$2.0\pm0.1$	1.9–2.1
nostril-snout length	1.0	1.2	1.3	1.1	$1.1\pm0.1$	1.1–1.3
internarial distance	1.4	1.6	1.5	1.6	$1.5\pm0.1$	1.4–1.6
eye-nostril length	1.6	1.6	1.5	1.6	$1.6\pm0.0$	1.5 - 1.6
tympanum-nostril length	6.1	5.5	5.8	5.6	$5.8\pm0.3$	5.5-6.1
tympanum horizontal diameter	0.5	0.4	0.4	0.4	$0.4\pm0.0$	0.4-0.5
tympanum vertical diameter	0.5	0.5	0.7	0.5	$0.5\pm0.1$	0.5-0.7
tympanum-snout length	6.8	6.5	6.5	6.6	$6.6\pm0.1$	6.5-6.8
tympanum-eye length	4.6	4.4	4.4	4.3	$4.4\pm0.2$	4.3-4.6
antebrachium length	2.7	2.6	2.5	2.5	$2.6\pm0.1$	2.5 - 2.7
shank length	3.8	3.7	3.8	3.7	3.7±0.1	3.7-3.8
axilla-groin length (AG)	19.3	17.2	18.4	18.8	$18.4\pm0.9$	17.2-19.3
tail length (TAL)	49.1	51.2	49.9	45.9	49.0±2.3	45.9-51.2
tail base width (TBW)	4.1	3.5	4.0	3.8	3.9±0.3	3.5-4.1
tail base depth (TBD)	4.0	3.4	3.9	3.6	3.7±0.2	3.4-4.0
supralabials	7	7	7	7		7
supralabials at mid orbit	5	5	5	5		5
infralabials	5	5	5	5		5
paravertebrals	47	47	48	48		47, 48
scale rows at midbody	24	24	24	24		24
ventrals	49	50	50	51		49-51
subcaudals	75	84	82	79		75-84
lamellae on fingers I–V	4, 5, 8, 9,	4, 7, 8, 9,	4, 6, 7, 8,	4, 6, 8, 10,		
-	5 0 12	5 0 12	5 0 11	5 9 1 2		
lamellae on toes I-V	5, 9, 12, 16, 10	5, 9, 12, 14, 9	5, 9, 11, 13, 10	5, 8, 12, 14, 8		

## Plate 10



**Figure 2.** Full body of *Lankascincus merrill* sp. nov., **(A)** holotype (male, NMSL 2011.01.01) in dorsolateral view and **(B)** paratype (female, NMSL 2011.01.02) in dorsal view.

## Plate 11



Figure 3. Anterior body of Lankascincus merrill sp. nov. holotype (NMSL 2011.01.01) in lateral view



Figure 4. *Lankascincus merrill* sp. nov. paratype (NMSL 2011.01.02) head in (A) lateral view, (B) dorsal view; and ventral view of the (C) palm, (D) foot; holotype (NMSL 2011.01.01) head in (E) ventral view; scale: 1 mm.



**Figure 5.** Head scalation and terminology in (**A**) dorsal and (**B**) lateral views of the holotype of *Lankascincus merrill* sp. nov. and (**C**) shows a close-up of palprebal scales around eye. 1°, primary temporal; 2°, secondary temporal; **3**°, tertiary temporal; **APO**, anterior postocular; **C**, chinshield; **F**, frontal; **FN**, frontonasal; **FPA**, frontoparietal; **IL**, infralabial; **IP**, interparietal; **L**, loreal; **LP**, lower palpebral; **M**, mental; **PA**, parietal; **PF**, prefrontal; **PIL**, post infralabial; **PM**, postmental; **PO**, preocular; **PPO**, posterior postocular; **PSL**, posterior supralabial; **PT**, pretemporal; **R**, rostral; **SB**, sublabial; **SBO**, subocular; **SC**, supraciliary; **SIL**, sublabial; **SL**, Supralabial; **SO**, supraocular; **UP**, upper palpebral; scale 1 mm.

**Sexual dichromaticism.** Based on the female paratype (NMSL 2011.01.02) in life (Fig. 2B), the dorsal and lateral body colour pattern the same as the male but with a darker tinge, where the conspicuous dark-brown line is black and all light-brown regions are dark brown. White spots entirely absent on body. The entire venter off-white, with no white spots.

Male Comparison. specimens of Lankascincus merrill sp. nov. superficially most closely resemble female L. fallax (Peters, 1860), sharing an overall similar body colouration and exhibiting a conspicuous dark-brown lateral band from snout to mid-tail. However, the new species differs from L. fallax in having two frontoparietals (vs one), the last supralabial split (vs single), and in being smaller: maximum SVL 35.0 mm (vs 40.0-44.0 mm). The new species has similar or overlapping scale counts with those of L. gansi. However, the new species differs from L. gansi in having 24 scale rows at midbody (vs 26-28); 79-84 subcaudals (vs 54-62); and a longer tail, TAL/SVL, 1.44 (vs shorter 1.11).

The new species differs from its congeners in having a smaller adult body size, with maximum SVL 35.0 mm (vs 40.0 mm), and it is further distinguished from Lankascincus deignani and L. greeri by having 24 scale rows at midbody (vs 26-28), last supralabial scale split (vs single), and 13–16 lamellae on fourth toe (vs 22); from L. dorsicatenatus and L. megalops by having 24 scale rows at midbody (vs 28), and 13-16 lamellae on fourth toe (vs 17–18); from L. sripadensis by the last supralabial split (vs single), 24 scale rows at midbody (vs 26), 46-48 paravertebrals (vs 56-58), 50-51 ventrals (vs 56-58), 13-16 lamellae on fourth toe (17–19); from *L. taprobanensis* by prefrontals in contact (vs widely separated), 7 supralabials with 5<sup>th</sup> at mid-orbit position and last supralabial split (vs 6 supralabials, 4<sup>th</sup> at mid-orbit position and last supralabial single), 46-48 paravertebrals (vs 57-62), 24 scale rows at midbody (vs 26-28), 50-51 ventrals (vs 56-58); and from L. taylori by having the last supralabial split (vssingle). 46-48 paravertebrals (vs 52-53), 24 scale rows at midbody (vs. 26-28), and 50-51 ventrals (vs 56-58).

**Natural history.** *Lankascincus merrill* is diurnal, occurring in pairs, and can be commonly found in shady areas under thick leaf litter in drainage ditches and under rock crevices

in tea plantations, as well in forests with substantial canopy cover, beneath thick (~10 cm) leaf litter, and under logs. They were also seen basking on leaf litter, and on small rocks occurring among leaf litter, after a heavy shower of rain. They lay two eggs at a time, beneath leaf litter and under logs in forests.

### Discussion

The number of palpebral scales around the eye was used as a meristic character of genus *Lankascincus* for the first time. The term 'palpebral scale' was previously used by Neang *et al.* (2018) for skinks in the genus *Scincella* Mittleman, 1950. The family Ristellidae was defined by Hedges (2014), with a combination of diagnostic characters unique to both *Ristella* and *Lankascincus*, while pointing out that the former has retractile claws, unlike other skink genera, while noting "claw condition not yet determined in *Lankaskincus*". All members of *Lankascincus*, however, possess non-retractile claws and differ from *Ristella* also in possessing five fingers (vs 4).

Based on the four specimens measured by us, Lankascincus merrill sp. nov. has the smallest SVL among the species in the genus. The new species was found in the elevation range 950–1,100 m a.s.l., in the Rakwana hills. The species was found to be syntopic with both L. gansi and L. fallax. While both the new species and L. gansi are distributed in natural as well as disturbed forests, L. fallax is found only in disturbed areas near forest edges. Despite its widespread distribution, from the lowland wet zone to the sub-montane rain forests of the Central Highlands, Sinharaja, and the Rakwana massif, L. merrill is syntopic with L. gansi only in the Rakwana hills. Despite sharing similar habitat and characteristics, the new species is readily distinguished from L. fallax by its meristic characteristics and from L. gansi by its colouration.

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Appendix I. Other specimens examined

- Lankascincus deignani (4 ex.): Sri Lanka: USMN 120326 (holotype); Kekuna ella, Sinharaja forest: NMSL 2008.02.01–03.
- *L. dorsicatenatus* (3 ex.): Sri Lanka: Rammalkada: NMSL uncat. (paratype); Batatombelena: WHT 6619; Kottawa, Galle: NMSL uncat. (WHT).
- *L. fallax* (8 ex.): Sri Lanka: Kandahena Estate: WHT 1579; Puwakpitiya, Knuckles: WHT 2055; Awisawella Rest house: WHT 2207a–b; Kumaradola: WHT 6724; Punduloya: BMNH 95.7.23.28c (holotype of *L. deraniyagalae*), 95.7.23.28d–e (paratypes of *L. deraniyagalae*).
- L. gansi (8 ex.): Sri Lanka: Haycoch, Hiniduma: WHT 151; Morningside: WHT 1519, 6720; Sinharaja: WHT 2208, 6722; Dediyagala forest reserve: WHT 6664; Nawinna, Galle: WHT 6671; Koskulana, Panapola: WHT 6723.
- L. greeri (1 ex.): Sri Lanka: Kombala-Kottawa Forest Reserve: WHT 6524 (holotype).
- *L. sripadensis* (16 ex.): Sri Lanka: Sripada Sanctuary (Adam's peak): NMSL 2007.05.001 (holotype), 2007.05.002–003 (paratypes), WHT 7503; Nanuoya: FMNH 131355–131361; Dimbula Patana: WHT 6567; Agra Arboretam WHT 6631, 6686, 6726; Balangoda road, Bogawanthalawa: WHT 6739.
- *L. taprobanensis* (19 ex.): Sri Lanka: BMNH 1946.8.26.1 (syntype), 1946.8.3.20–21 (syntypes). Horton plains National Park: NMSL 2007.22.01–03, WHT 2014, 2096a–b, 2097a–b; Namunukula: WHT 1509; Thangamalai plains, Haputale: WHT 1927; Fishing Hut: WHT 2015a–d; Sripada Sanctuary (Adam's peak): NMSL 2007.21.01 (holotype of *L. munindradasai*), 2007.21.02 (paratype of *L. munindradasai*).
- *L. taylori* (10 ex.): Sri Lanka: BMNH 72.3.23.4a (holotype), 72.3.23.4b-c (paratypes), FMNH 1070310; Gammaduwa: 1973.3.15 (paratype); Meda Mahanuwara: FMNH 167018 and 167035 (paratypes); Gannoruwa, Kandy: NMSL 2007.2.3.01–03.

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