

A new species of scops-owl from Sri Lanka

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On 27 February 1995, DHW first heard and made a tape-recording of an unfamiliar owl-like vocalisation at night in Kitulgala Proposed Reserve (P.R.), a rainforest in the wet zone of Sri Lanka. Over the next six years at this site and at Sinharaja Forest Reserve (F.R.), a large rainforest, DHW several times heard this mysterious call, which did not match that of any known Sri Lankan owl, but he was unsuccessful in observing its author. DHW played the tape-recording to other naturalists in Sri Lanka, only one of whom indicated he had heard the same call, but this person had assumed it was an arboreal amphibian. After comparing it with recordings of vocalisations of many Asian owls (in Marshall 1978 and White 1984), DHW believed that the unknown Sri Lankan vocalisation was most similar to that of the Reddish Scops-owl *Otus rufescens*, a species from the Malay Peninsula and Greater Sundas. In late 2000, DHW sent a tape-recording of the mysterious call to PCR, who agreed that the call sounded like an owl but that it did not match any of the species known to occur in Sri Lanka, and was most like *O. rufescens*. The possibility of a new species of owl in a country as well known ornithologically as Sri Lanka (where the last new bird species was described as long ago as 1868) seemed very remote. However, scops-owls are notoriously easily overlooked and some species are cryptically similar.

Eventually, at Sinharaja F.R. on 23 January 2001, DHW was successful in observing well for several minutes a bird in the act of giving this call, and he was also able to show the bird to E. L. Hagen. It was a very small rufous earless owl, quite unlike any other on the island or anywhere in South Asia. DHW then visited Kitulgala P.R. with colleagues, including wildlife photographer Chandima Kahandawala, who on 11 February 2001 obtained numerous excellent photographs of an individual bird from many different angles. From these photographs, we confirmed that the owl is strikingly distinct in numerous characters from any other Sri Lankan species. Among other scops-owls, it appears most similar overall to *O. rufescens*, and yet shows numerous differences from even that species. Although no ear-tufts are visible in life, we initially believed (but could not confirm) that it belonged to the genus *Otus* based on its overall appearance and vocalisations, an opinion that has been borne out by further study (detailed below). When we were certain that it was a new species, a press release resulted in numerous articles in various media, and preliminary papers on the discovery of the owl were published (e.g. Warakagoda 2001a–e).

A study was launched by DHW and colleagues, under the auspices of the Department of Wildlife Conservation (DWLC) and Forest Department (FD) of Sri Lanka, to investigate the status, distribution, biology, ecology and taxonomy of the new owl. Explorations were carried out in rainforests (all such forests in Sri Lanka



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b



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d

Plate. Serendib Scops-owl *Otus thilohoffmanni*, new species (a and c) and Reddish Scops-owl *Otus rufescens* (b and d). Original painting by Dr P. Samaraweera.

being in its wet zone), lower montane forests and montane forests of the wet zone, and moist semi-evergreen and riverine forests of the intermediate (climatic) zone. On 4 August 2001 a male of the species was mist-netted (Fig. 1; see also Appendix) in Morapitiya-Runakanda P.R. for further studies of the taxon's external morphology. It was photographed, ringed, and released at the exact site of capture. Biometrics, descriptions and photographs of this individual were sent to PCR for further comparative studies. Incidentally, this individual was relocated 2.5 years later in apparent good health at the same locality.

Searches at museums with significant holdings of Sri Lankan birds revealed no overlooked specimens of this taxon that could be used as the basis for a scientific description. Given the distinctiveness of the owl, we believe it is unlikely that any such misidentified specimens exist. Therefore it was essential to collect a specimen of the new owl, but we were reluctant to do so at this stage because its population and conservation status were unknown. By May 2002 the results of our project showed that the new owl occurred in at least five different forests, and at least 24 individuals had been detected. Permission to collect a specimen to be designated the type was then applied for and granted by the DWLC and FD. DHW and colleagues obtained the specimen in November 2002 at Morapitiya-Runakanda P.R., a site they had found to hold one of the larger populations known by then. For this distinctive new species, we propose the name:

Serendib Scops-owl *Otus thilohoffmanni*, sp. nov.

Holotype National Museum, Colombo, no. 381, female, from Morapitiya-Runakanda Proposed Reserve (06°29'N, 80°18'E, 100 m a.s.l.), Sri Lanka, collected 9 November 2002 by Deepal H. Warakagoda, Kithsiri Gunawardena, Nanda Senanayake, Udaya Sirivardana and Niran M. C. Caldera. The type specimen was prepared as a full skin and partial skeleton (the skull minus the bill was retained with the skeleton), and tissue samples were preserved from liver, breast muscle and blood.

Diagnosis A small, short-tailed, rather uniformly rufescent scops-owl with eye colour ranging from yellow to orange (according to sex), lacking apparent ear-tufts, with a weakly defined facial disk, and with weak tarsi feathered for less than half their length (Plate, Fig. 1).

The upperparts are almost uniformly rufous marked overall with small, short blackish chevrons, spots and/or bars, but lacking white spots, and the scapular spots are obsolete; the wings and tail have rufous outer webs and mostly blackish inner webs, with broad, evenly spaced, rather weak rufous and blackish bands; the underparts are somewhat paler rufous than the upperparts and fairly uniformly sprinkled with blackish triangular spots; the central belly and undertail-coverts are paler and unspotted. The head is rounded and fairly uniformly rufescent, with white supercilia (conspicuous to weak in live birds according to facial expression); no ear-

tufts; bar-like chevrons on the central crown; a uniform, slightly darker rufous facial disk, devoid of markings and lacking a dark facial disk border; feathers around base of bill concolorous with those of facial disk. The large eyes have yellow to orange irides, with a striking black outer ring. The orange of the iris is concentrated especially in the sides and lower part of the iris, shading to yellow in the rest of the iris. In males the orange is pronounced, the area apparently growing larger with age and eventually covering the whole iris; in the females the iris is entirely or largely yellow with much less orange than in the male. The inner eyelids are black, whilst the bare orbital ring is narrow and pinkish. The cere is fleshy pink and not strongly demarcated from the bill, which is ivory-white in live birds and notably long, narrow and relatively straight for its genus. In live birds, the tarsi and toes are pinkish white, the claws ivory white, all becoming pinker post-mortem. The tarsi, toes and claws are strikingly thin and delicate, the toes appear long, and the claws are relatively straight; less than the proximal half of the tarsi is feathered. In normal postures in life, the wingtips fall slightly beyond the tail tip.

In overall coloration, *Otus thilohoffmanni* resembles several other species, in particular *O. rufescens*, Sokoke Scops-owl *O. ireneae* (rufous morph), Sandy Scops-owl *O. icterorhynchus*, Pemba Scops-owl *O. pembaensis* (rufous morph), Mountain Scops-owl *O. spilocephalus* (rufous morph of races from the central Himalayas through south-east Asia), Flores Scops-owl *O. alfredi*, and White-fronted Scops-owl *O. sagittatus*. Among Sri Lankan species, the only species with which *thilohoffmanni* could be confused is the Sri Lankan race of Oriental Scops-owl *Otus sunia leggei* in the rufous morph.

Otus thilohoffmanni differs from *ireneae* (rufous morph) in its pale (vs. dark) bill and claws; lack of ear-tufts (vs. short but distinct ear-tufts); more profuse rictal and other facial bristles, and less defined facial disk; darker, less bright rufous overall coloration; lack of black streaks on the forehead and upperparts; much weaker, more rufous wing banding; blackish inner portions of remiges and rectrices; lack of weak fine dark barring below; and mostly unfeathered tarsi (vs. feathered to toes). It differs from *icterorhynchus* in lacking ear-tufts (vs. having long, prominent, upstanding ear-tufts), having almost uniform forehead and crown (vs. 'frosted' white forehead and crown-sides), having longer facial bristles and less distinct facial disk rim, lacking white diamond-shaped spots above, lacking prominent white scapulars with black tips, lacking prominent white banding on wings, having more and larger black spots on underparts, and lacking white spotting on breast and white barring on lower underparts.

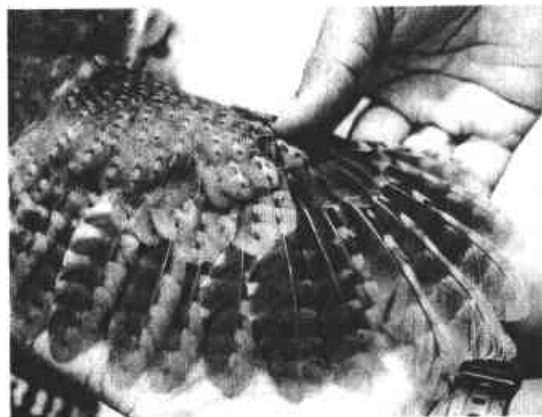
Differences from *pembaensis* (rufous morph) include the much smaller size of *thilohoffmanni*; lack of ear-tufts; lack of black border around facial rim; darker, more rufous, more uniform facial disk; near lack of pale scapular spots; lack of fine dark shaft-streaks and pale barring below; more distinctly barred uppertail surface, much smaller, pale bill; much less extensively feathered, weaker tarsi; and paler, weaker toes.



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d



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Fig. 1a–e. Photographs of male of *Otus thilohoffmanni* captured on 4 August 2001 in Morapitiya F.R. (a) face, (b) upperparts, (c) right upperwing, (d) right underwing, (e) underparts, tarsus and toes (Chandima Kahandawala).

Differences from *alfredi* include the orange eye of males (vs. yellow); paler, less orange-yellow bill; shorter facial bristles and more compact plumage texture (vs. long soft bristles and softer, fluffier overall plumage in *alfredi*); more uniformly rufous face (vs. prominent white-‘frosted’ forehead and supercilia and darker patch around eye in *alfredi*); presence of black chevrons on upperparts; lack of diamond-shaped spots on nape collar; obsolete scapular spots (vs. strong brown and white spots in *alfredi*); lack of white banding in wing; much more uniform underparts that lack the white patterning and vermiculation of *alfredi*; black spots below (lacking in *alfredi*); and much less heavily and extensively feathered tarsi.

Differences from *spilocephalus* (rufous morph of continental races) include lack of ear-tufts, near lack of scapular spots (white with black tips in *spilocephalus*), more uniformly rufous upperparts with narrow chevrons and other bar-like marks (vs. large dark brown spots on crown, distinct pale-spotted nape collar, and more irregularly barred upperparts in *spilocephalus*), much more uniformly coloured and patterned underparts (vs. mostly very finely vermiculated, with irregular white spots and chevrons below in *spilocephalus*, with more solid-coloured dark breast patches and white patches in centre of belly and vent, and a lack of black spots); tarsus much less heavily feathered (vs. nearly entirely feathered in continental races of *spilocephalus*).

From *sagittatus*, *thilohoffmanni* differs in its much smaller size (especially the much shorter tail); much plainer face pattern; dark eye patch; mostly whitish, finely vermiculated facial disk with prominent dark brown border; lack of ear-tufts; brighter, paler rufous upperparts (darker, more maroon-chestnut in *sagittatus*); lack of pale arrowhead-shaped marks on upperparts and presence of black chevrons above; near lack of scapular spots (buffy and irregularly marked but prominent in *sagittatus*); plainer underparts pattern lacking vermiculation on breast and with stronger blackish spotting below; and much less extensively feathered, much weaker tarsi. From *O. sunia leggei* (rufous morph), it differs in lacking the prominent ear-tufts, and in lacking dark streaking and white barring to the underparts.

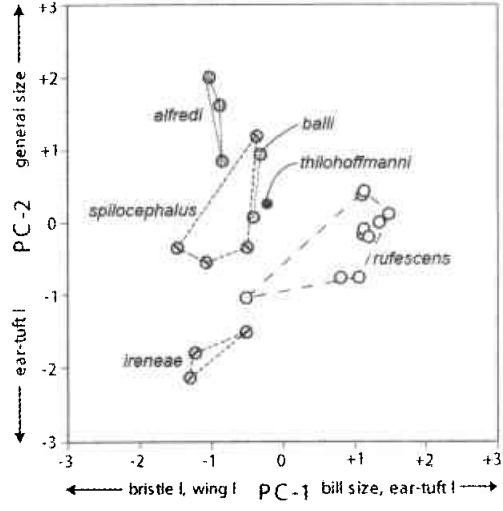
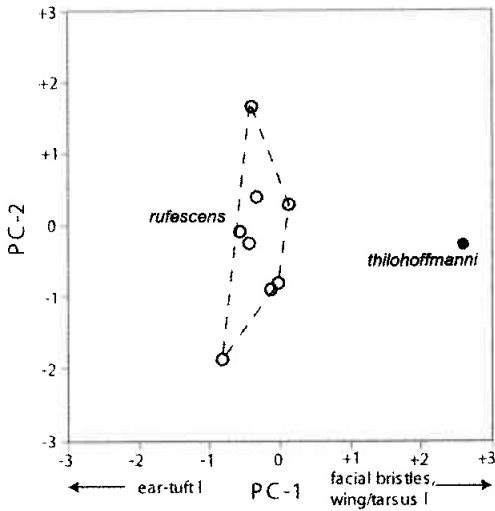
The only species that bears a sufficiently close resemblance to *O. thilohoffmanni* in external morphology to warrant detailed comparisons is *O. rufescens* of Malaysia and the Greater Sundas. The following results from direct comparisons by PCR of the type specimen of *thilohoffmanni* with 11 specimens of *O. rufescens* (one at USNM, four at AMNH, and six at BMNH [all acronyms are explained in the Acknowledgements]), and comparison with photos of ten adult specimens of *rufescens* at NNM and another at ZMA (*rufescens* is itself scarce in collections and few specimens exist beyond those examined in this study). Among the specimens of *rufescens* examined, only minor variation exists in colour and pattern, although it has been considered to have rufous and brown morphs (König *et al.* 1999). The type specimen of *thilohoffmanni* is very similar in colour and pattern to all ten living individuals of the species thus far observed by DHW and colleagues, and it seems most likely that the species lacks colour morphs. All other known scops-owls are more dissimilar in appearance to *thilohoffmanni* than are the above.

The bill of *thilohoffmanni* is markedly narrower, less arched, and appears longer and straighter near the tip than that of *rufescens*. The rectal bristles of *thilohoffmanni* are slightly to much longer than those of *rufescens*. The facial disk of *thilohoffmanni* lacks any hint of a dark rim and the feathers are uniform in colour throughout their length (vs. a moderately prominent dark rim to the facial disk, with the facial disk feathers palest immediately proximal to the dark rim in *rufescens*), thus *thilohoffmanni* has a much plainer, more uniform facial pattern than *rufescens*. The feathers of the facial disk rim of *thilohoffmanni* are softer and less stiffened, and diffuse-tipped with slightly lengthened shafts or auricular extensions (vs. stiffened, with straight, compact tips in *rufescens*). The pale supercilium and front of the forehead of *thilohoffmanni* are weaker, more rufescent, and more barred than in *rufescens* (which has very prominent whitish supercilia), and show less contrast with the crown colour and pattern. In *thilohoffmanni*, the feathers that would in other scops-owls be elongated as ear-tufts are essentially undifferentiated, being marked as for adjacent feathers (but perhaps slightly more heavily barred than surrounding feathers), soft and unstiffened, with rounded tips like the adjacent feathers (vs. rather long and pointed, stiff ear-tufts with specialised markings in *rufescens*).

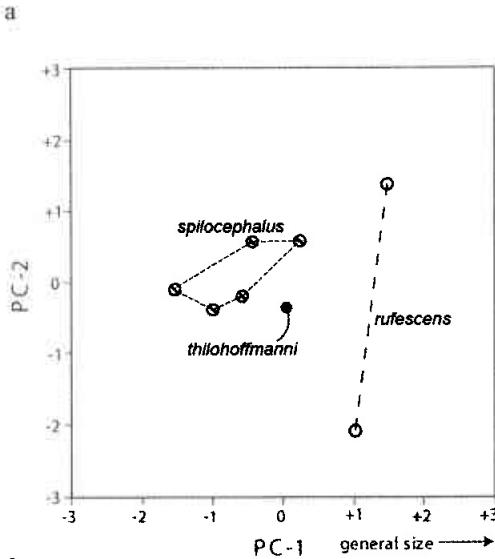
The feathers of the upperparts of *thilohoffmanni* entirely lack whitish subterminal triangles (vs. prominent and generally distributed whitish subterminal triangles from the crown to the rump in *rufescens*). The general colour of the upperparts is distinctly more uniform and more rufous above in *thilohoffmanni* than in *rufescens* (in which most specimens are dark warm brown above, although a few have more rufous-brown upperparts, and thus are intermediate in colour between typical *rufescens* and *thilohoffmanni*). The scapular spots present in almost all species of scops-owls (at least as adults) are obsolete in *thilohoffmanni*, in which the scapulars are only slightly paler rufous than the surrounding feathers, and are similarly marked to the surrounding feathers (vs. rufous-buff but fairly distinct and heavily marked scapular spots in *rufescens*).

The wings of *thilohoffmanni* have a great deal of black proximally and on the inner webs (vs. rufous-brown in *rufescens*), and the wing banding of *thilohoffmanni* is comprised of even-width, rather weak rufous-buff bands alternating with narrowly dark-outlined rufous bands (vs. moderately to boldly, broad-banded dark brown and narrower buff wing-bands in *rufescens*). The undersurface of the outer primaries of *thilohoffmanni* is blackish except for the outer webs and tips, whilst the bases of the inner primaries are more boldly banded (vs. the entire undersurface of the remiges being rather boldly banded with broad dark and narrow pale bands in *rufescens*). The primary-coverts and alula are blackish except at their very tips, and are markedly and contrastingly different from the surrounding feathers in *thilohoffmanni* (vs. coloration and banding similar to the surrounding feathers in *rufescens*).

The throat of *thilohoffmanni* is weakly marked, mostly with fine dark barring and only extremely fine dark streaking (vs. distinctly dark-streaked in *rufescens*). The ground colour of the underparts of *thilohoffmanni* is a somewhat colder, less



b



c

Fig. 2a–c. Graph of loadings for individual specimens from principal components analyses (PCAs) for (a) skin measurements for *Otus thilohoffmanni* and *O. rufescens* only; (b) skin measurements for *O. thilohoffmanni* and other related species; and (c) skeletal measurements for *O. thilohoffmanni* and two related species.

yellowish rufous than that of almost all specimens examined of *rufescens* (one specimen of *rufescens* had darker and browner underparts than the others, but these were still more ochraceous than *thilohoffmanni*). The feathers of the underparts of *thilohoffmanni* have very weak pale shaft-streaks (vs. usually fairly marked pale shaft-streaks in *rufescens*), and the dark subterminal spots of the underparts feathers are mostly shorter, less extensive proximally on the feather than in *rufescens* (which usually has large squared spots below, offset by slightly paler areas), with a stronger hint of a dark cross-bar near the tip. On the breast and lower throat some markings take the form of short bars or chevrons rather than spots.

The tail of *thilohoffmanni* is more rufous, with nearly equal-width dark and rufous bands (vs. dark brown in *rufescens* with narrow, widely spaced pale bars). The bases of the inner rectrices and most of the other rectrices of *thilohoffmanni* are largely black (vs. brown and like the rest of the tail in *rufescens*).

The tarsi of *thilohoffmanni* are less than half-feathered (vs. almost entirely feathered in *rufescens*). The podotheca (skin of the toes) of *thilohoffmanni* is smooth on its uppersurface, whilst that of *rufescens* is rougher and more heavily

TABLE 2

Results of factor analyses of external measurements of *O. thilohoffmanni* with (a) only *O. rufescens* (see Fig. 2a) and with (b) several other species (see Fig. 2b). Variable abbreviations as in Table 1.

Variable	a			b	
	PC 1 loadings	PC 2 loadings	PC 3 loadings	PC 1 loadings	PC 2 loadings
Culmen l from cere	-0.32	0.22	0.85	0.76	0.54
Maxillad at cere	-0.39	-0.78	0.46	0.74	0.34
Rictal bristle l	0.97	0.03	0.05	-0.75	0.62
Auricular l	0.83	-0.05	-0.02	---	---
Ear-tuft l	-0.65	0.70	0.06	0.77	0.26
Wing l	0.62	0.32	0.61	-0.47	0.8
Tail l	-0.12	0.95	-0.09	---	---
Tarsus l	0.65	0.23	0.11	---	---
Variance explained	3.15	2.19	1.35	2.50	1.59
Percent of variance explained	39.33	27.36	16.89	50.09	31.74
t-square for <i>thilohoffmanni</i>	6.86	---	---	0.09	---
Probability for <i>thilohoffmanni</i>	0.26	---	---	0.96	---

armoured. The general feather texture of *thilohoffmanni* is softer and fluffier (vs. stiffer and harsher in *rufescens*). In overall size and structure, *thilohoffmanni* is similar to *rufescens* (Table 1) but slightly smaller and more delicately built, with a longer wing, a longer but weaker tarsus, and a slightly longer digit 2 (the longest toe). In a principal components analysis (PCA) of external measures (Table 2a, Fig. 2a) in which only *thilohoffmanni* and *rufescens* were included, the two were separated on PC-1, which was primarily a contrast axis between longer facial bristles, wing length, and tarsus length vs. longer ear-tufts. PC-2 was significant but did not separate the two species, as specimens of *rufescens* showed wide variance on this axis. However, in a PCA that included external measures of several species of similar owls (Table 2b, Fig. 2b), *thilohoffmanni* was very similar both to continental *spilocephalus* and to *balli*, and separated only weakly from *alfredi* and *rufescens*. In this model, PC-1 was primarily a contrast axis between bill size and ear-tuft length vs. facial bristle length and wing length, and *thilohoffmanni* is essentially intermediate in these characters between *rufescens* vs. all the other included taxa.

In a PCA of skeletal measurements (Tables 3–4, Fig. 2c), *rufescens* is the largest species (though differences are slight), *spilocephalus* the smallest, and *thilohoffmanni* very like larger individuals of *spilocephalus*. Shape contrasts did not separate the species for the variables measured. Wing shape was measured as shortfalls of each primary from the longest primary in the folded wing (Fig. 3), and this showed that *thilohoffmanni* has a very similar wing shape to *rufescens*; the latter may have a slightly broader inner wing but the samples are too small to be certain. Based on a single specimen, *O. icterorhynchus* shows a similar wing shape to the above species. Members of the *O. magicus* superspecies (shown here are the Seychelles Scops-owl *O. insularis* and the Flores subspecies of Moluccan Scops-

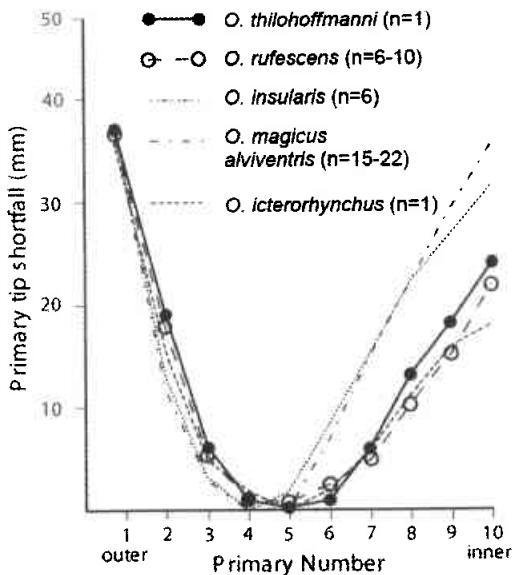


Fig. 3. Wing shape (as measured by shortfalls of each primary from folded wingtip) of type specimen of *Otus thilohoffmanni*, compared with *O. rufescens* and selected other species of scops-owls (mean values shown where $n > 1$). Data for *O. insularis* and *O. magicus albiventris* are from Rasmussen (1998).

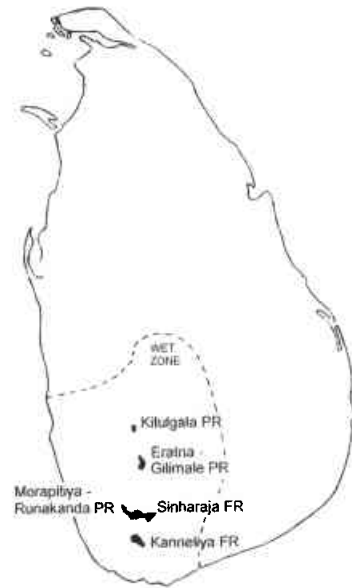


Fig. 4. Map of Sri Lanka, showing rainforest tracts from which *O. thilohoffmanni* has thus far been recorded. Dashed line shows inland limits of wet zone. Largest rainforest tract is divided into the western, smaller portion Morapitiya-Runakanda P.R. and the larger, more eastern portion Sinharaja F.R.

owl *O. magicus albiventris*) have markedly narrower inner wings (data for other taxa in Rasmussen 1998 and Lambert & Rasmussen 1998).

Distribution *Otus thilohoffmanni* is endemic to Sri Lanka. It has thus far been found only in lowland rainforests of the south-west quarter of the island within an altitudinal range of 30–530 m (Fig. 4). As of January 2004, the species had been detected in Kitulgala P.R. (06°59'N, 80°24'E, c.150 m a.s.l.), Sinharaja F.R. (06°25'N, 80°26'E, c.500 m a.s.l.), Morapitiya-Runakanda P.R. (06°29'N, 80°18'E, c.100 m a.s.l.), Kanneliya F.R. (06°11'N, 80°22'E, c.30 m a.s.l.) and Eratna-Gilimale P.R. (06°45'N, 80°26'E, c.100 m a.s.l.).

Description of the holotype (colours from Smithe 1975) Crown rounded, lacking differentiated ear-tufts, colour closest to Raw Sienna (136), each feather with several short, narrow Dark Grayish Brown (20) bars across centre. Forehead and supercilium Cinnamon (30) marked with similar short bars as for crown, the supercilium slightly paler than forehead. Circumorbital area and ear-coverts between Raw Sienna and Chestnut (32), with weak, narrow darker barring overall. Ear-covert feathers lack darker, compact distal ends (e.g. a well-formed facial disk border is lacking) and they also lack elongated feather shafts. Rictal bristles fairly long and abundant, and similar in colour to ear-coverts. Nape slightly paler than