

Sangihe Scops Owl *Otus collari*, sp. nov.

Holotype. Staatliches Naturhistorisches Museum, Braunschweig (SNMB), female, from "Sangir" (exact locality not given, but the island is centred at 3°35'N, 125°32'E), collected 2 January 1887 by Dr C. Platen, no. 6968; specimen "a" of Blasius (1888).

Diagnosis. A drab brownish, rather small, yellow-eyed scops owl with a horn-brown bill, long narrow wings, a rather long tail, and small pale feet and claws, the latter tipped darker (Plate 4). The ear tufts are medium-length with buff spots, black streaks, and elliptical tips; the pale supercilium is rather short; the face shows little contrast, the darkest part being between eye and bill; the upperparts have dark shaft streaks and are prominently spotted buff; the scapular spots are pale buff on the outer web with triangular black tips; the underparts have prominent but mostly fine black shaft-streaking and a finely vermiculated base pattern; the flight feathers are banded dark brown and buff, but the tertials are not prominently banded; the tail has narrow irregular dark buff bands and wider dark brown bands; and the tarsal feathering ends just above the tarsal joint in front and meets around the rear.

Otus collari is close to certain *Otus manadensis* (Plate 4, $n=100+$), especially to immatures, but relative to *manadensis* even from a single locality, the degree of variability among the six individuals examined of *collari* is much reduced. On the head, the facial disk of *collari* is paler and contrasts less with rest of face, there is a definite dark-barred area on the rictal bristles between eye and bill, the whitish supercilium is somewhat less obvious and ends above the bill, and the streaks on the crown are usually narrower and contrast more strongly with the paler brown base colour. On the upperparts, *collari* is slightly more coarsely vermiculated, with generally shorter, more diffuse, less obvious blackish shaft streaks, the upper wing coverts are plainer and less pale-spotted, and the scapulars have pale buffy outer webs with relatively larger triangular black tips. The underparts have a finer, sketchier background pattern with less definite, reduced cross-barring, most of it stippled rather than solid, the band interstices are drab, stippled brown, and have reduced contrast, while most of the streaks on the underparts are longer and narrower, and the pale spots on the underparts are usually smaller, buffier, more regular, and less conspicuous. The wings of *Otus collari* are longer than for *manadensis*, but they are considerably narrower due to the inner primaries being shorter and emarginations of the outer primaries being more proximal, even when corrected for size (log data divided by log wing length; Table 1), and its primaries show reduced contrast due to the pale bands being buffy and the dark bands being browner and less blackish. The tail of *collari* is slightly longer (Table 1) and the toes and claws relatively weaker than in *manadensis*. There is very limited overlap in each of these plumage and mensural characters with the extremely variable *manadensis*, (in which no more than a few of these features occur together in the same individual), and in combination they give *collari* a more uniform, drabber appearance than for adult *manadensis*.

See under "Remarks" for additional morphological distinctions from other related taxa.

Otus collari is vocally readily diagnosed by its clear, mainly downslurred, fluty, liquid, relatively high-pitched, long whistle; see under "Voice" for details.

Distribution. The new species is apparently widespread on Sangihe. In southern Sangihe, *collari* has been reported from the upper slopes of Mt. Sahendaruman (3°31'N, 125°32'E; F. G. Rozendaal, *in litt.* 1998), the southwest coast at Manganitu (3°35'N, 125°31'E, RMNH 84653) and Mt. Sahengbalira (3°31'N, 125°31'E, Riley 1997b); on the west-central coast, from near Tahuna (3°37'N, 125°29'E; Riley 1997b); and in northern Sangihe, from the northeast coast at Tabukan (=Tabukanlama, 3°41'N, 125°33'E, Meyer 1884), and from areas around Telawid, on the lower slopes of Mt. Awu (3°43'N, 125°24'E, Riley 1997a, FRL).

Description of the holotype. Colour comparisons were made under fluorescent light. Capitalised colour names and the first numbers in parentheses are from Smithe (1975); Munsell (1977) colour matches are also presented, in which the first number and letters represent the hue (but are interpretable only with reference to Munsell charts), the next increasing value or lightness, and the last increasing chroma or saturation. The holotype was directly compared with 11 *manadensis* assembled at the National Museum of Natural History, USNM, the two Leiden specimens with 25 *manadensis* at NNM, and the Dresden specimen with 19 *manadensis* at MTD; all four Sangihe specimens were compared with photographs of specimens of all taxa. For the holotype, colorimetric readings (using a Minolta CR-221 Chromameter) were taken of certain relatively solid colour plumage areas larger than 3 mm in diameter. Three sequential measurements were taken and summary statistics instrumentally calculated, then summary statistics were calculated for three independent sets of the above, with the colorimeter repositioned between each triad of measurements. Values are given in terms of the opponent colour coordinate system (*L*, *a*, *b*; Graves 1997), in which higher values of *L* show increasing lightness (0–100), higher positive *a* values increasing redness (vs. greener for lower negative values), and higher positive *b* values increasing yellowness (vs. bluer for lower negative values), as calculated by the colorimeter. Primaries are numbered from outer to inner, so P1 is the outermost primary.

Feathers of centre of forecrown through nape with prominent pointed blackish shaft-streaks up to c. 5 mm wide, each streak bordered on both sides by spots of Pale Pinkish Buff (121D; Munsell 7.5YR 8/4), distalmost spots up to c. 3 mm in diameter, more proximal and semiconcealed spots up to c. 4 mm; streaks on hindcrown and nape narrowest. Base colour of forecrown through nape Cinnamon-Brown (33; $L=39.0 \pm 8.1$, $a=8.1 \pm 0.4$, $b=19.2 \pm 1.3$), finely vermiculated blackish overall. Supercilia short and not very conspicuous, extending only from base of eartufts to above bill, formed of small feathers that are whitish to pale buffy on outer webs and parts of inner webs, most with black tips and/or edges. Eartufts prominent, longest feather c. 29 mm long and c. 9 mm wide, feathers fresh, each strongly tapering

toward elliptical tip, and vermiculated Cinnamon-Brown on distal half of outer web, with a black shaft streak up to c. 3 mm wide with Pale Pinkish Buff spots up to c. 3 mm wide along the outer edge of the streak, inner web and medial portion of outer web mostly Pale Pinkish Buff ($L=53.9 \pm 2.2$, $a=6.3 \pm 0.6$, $b=23.6 \pm 0.5$). Rictal bristles up to c. 20 mm long, mainly blackish, with barred bases of Pale Pinkish Buff (bars up to c. 2 mm wide) alternating with Vandyke Brown (221) bars up to c. 2.5 mm wide; these feathers form the darkest region of the face. Feathers just above eye Raw Sienna (136; Munsell 5YR 5/6), feathers just to the rear of and below eye slightly paler, auriculars with fine, vague concentric bands, broader and darker laterally, pale bands of auriculars Pale Pinkish Buff (219) and up to c. 2 mm wide, dark bands Sepia (219; Munsell 5YR 3/2) and up to c. 1 mm wide, medial auriculars have extended distal barbs up to c. 4 mm long, while lateral auriculars mostly lack extensions. Chin and throat mostly Pale Pinkish Buff ($L=59.0 \pm 0.8$, $a=4.0 \pm 0.8$, $b=20.6 \pm 2.0$), chin slightly paler, more caudal feathers with fine Hair Brown (119A) barring and a few very small Hair Brown shaft streaks. Facial disk with incomplete, narrow, inconspicuous blackish border, heaviest at sides of throat, and bordered at rear by a poorly-defined Pale Pinkish Buff band.

Background colour and pattern of hindneck, mantle, inner scapulars, and back similar to that of forecrown (mantle colour, $L=29.3 \pm 0.3$, $a=7.4 \pm 0.2$, $b=14.0 \pm 0.3$), with a few short blackish shaft-streaks with prominent Pale Pinkish Buff spots on either side of shaft streaks (up to c. 4 mm wide); on hindneck spots more profuse and streaks smaller. Rump and uppertail coverts appear darker ($L=29.2 \pm 0.8$, $a=7.2 \pm 0.9$, $b=13.9 \pm 1.5$) due to lack of buff spots, shaft streaks are smaller and more obscure, and feathers are more distinctly barred dark. Outer scapulars have the outer webs and a smaller area on the centre of the inner web Pale Pinkish Buff ($L=53.5 \pm 1.4$, $a=3.8 \pm 0.8$, $b=19.7 \pm 1.1$) with triangular blackish tips, c. 3 mm long on smallest, uppermost pale scapular, and c. 5 mm long on largest, lowest scapular; the two largest pale scapulars also have blackish shaft streaks up to c. 1.5 mm wide.

On the lesser coverts, the vermiculated background colour appears similar to but plainer than the mantle ($L=33.6 \pm 1.9$, $a=6.8 \pm 0.2$, $b=14.9 \pm 1.1$) due to lack of large pale buff spots, but most feathers have narrow (c. 2 mm wide) Clay Color (123B; 7.5YR 7/8) bands and c. 1 mm blackish shaft streaks. The base colour of all upperwing coverts is similar (greater coverts: $L=28.9 \pm 1.0$, $a=6.2 \pm 0.3$, $b=10.6 \pm 0.6$) but the markings are progressively heavier distally, and there are large (c. 5 mm) Pale Pinkish Buff ($L=51.2 \pm 0.8$, $a=4.5 \pm 0.7$, $b=17.2 \pm 0.6$) spots to either side of the shaft streaks of the greater coverts. The tertials are relatively paler ($L=41.4 \pm 1.4$, $a=5.9 \pm 0.4$, $b=14.6 \pm 1.2$) than rest of upperparts, irregularly and vaguely banded, and heavily vermiculated.

Banding of the secondaries is more definite and regular, with most darker bands c. 5.5 mm wide and Cinnamon-Brown ($L=37.4 \pm 1.0$, $a=6.4 \pm 0.5$, $b=15.0 \pm 1.2$) and paler bands c. 2.5 mm wide and Sayal Brown (223C, Munsell 7.5YR 6/6). The banding of the upper surfaces of the primaries is better defined, most of the dark bands on the outer

webs of P3 are c. 7 mm wide and Raw Umber (223; $L=31.2 \pm 1.3$, $a=6.0 \pm 0.7$, $b=12.4 \pm 0.7$) and the pale bands (of which there are 9.5) are c. 5.5 mm wide, and darker than Pale Pinkish Buff ($L=47.2 \pm 1.9$, $a=8.9 \pm 0.2$, $b=21.4 \pm 1.0$). The bands are narrower on P1, the dark bands c. 5 mm wide ($L=26.7 \pm 3.6$, $a=6.5 \pm 0.6$, $b=11.6 \pm 1.9$), the pale bands c. 3 mm wide, and there are 8.5 pale bands on the outer web of P1. Most of the dark bands are finely outlined by narrow darker bands, the pale bands typically narrowly abut the shaft, and pale bands are vague on the inner webs. The tips of the primaries are paler, scarcely banded, and very finely vermiculated, with a dark shaft streak.

On the underwing, the secondary coverts are Pale Pinkish Buff, the proximal primary coverts vermiculated brown, and the distal primary coverts Vandyke Brown (221) with Pale Pinkish Buff distal halves, forming a distinct dark patch near the bend of the wing. The under-surfaces of the primaries are Glaucous (79; $L=37.6 \pm 0.1$, $a=3.9 \pm 0.2$, $b=9.7 \pm 0.2$) with Pale Pinkish Buff bands. The axillaries are paler than Pale Pinkish Buff, with dark brown subterminal spots c. 3 mm long.

The overall aspect of the underparts below the throat is very finely vermiculated dull brown, with the breast darker, and with prominent but mostly narrow blackish shaft streaks. The background colour of the breast is closest to Mikado Brown (121C; $L=42.9 \pm 2.9$, $a=7.7 \pm 1.1$, $b=19.8 \pm 2.4$), while the background colour of the lower underparts is distinctly paler ($L=56.5 \pm 2.4$, $a=4.7 \pm 0.4$, $b=18.7 \pm 0.8$). Each major feather of the underparts has a long dark shaft streak up to c. 3.5 mm wide but usually much narrower, two bands of Cinnamon-Drab (219C) finely outlined with blackish stippling, one terminal band up to c. 5 mm wide, separated from the other Cinnamon-Drab band (up to c. 3.5 mm wide) by a whitish band ($L=69.0 \pm 2.1$, $a=3.2 \pm 0.6$, $b=17.2 \pm 1.1$) up to c. 2.5 mm wide. More proximally, there is a wider, usually concealed whitish band, and a pale rufous band ($L=54.0 \pm 2.5$, $a=9.3 \pm 1.2$, $b=26.4 \pm 1.2$). The undertail coverts and feathers around the vent are relatively uniform and paler than Pale Pinkish Buff, each of the longer feathers with an irregular dark brownish subterminal mark.

The uppertail surface is very irregularly but rather prominently banded, with most dark bands c. 5 mm wide ($L=35.2 \pm 0.4$, $a=5.2 \pm 0.1$, $b=11.4 \pm 0.1$) and pale Tawny Olive (223D) bands c. 3 mm wide.

The tarsi are densely feathered to just above the distal joint, the feathering is complete around rear of tarsus, most being unmarked and paler than Yellow Ocher (123C; $L=62.3 \pm 1.0$, $a=5.3 \pm 0.4$, $b=26.2 \pm 0.5$), the upper side with sparse short fine dark brown streaks. The toes and claws are relatively small and weak, and the claws have pale bases and dark tips.

Specimens. 1) Holotype. 2-4) Paratypes: 2) National Museum of Natural History, Leiden (NNM), RMNH Kat. No. 16 (listed by Sharpe 1875 as *manadensis* No. 15, but this number is crossed out on the label), adult female (according to the label but a male according to Schlegel 1873), from "Sangir-Isl.", collected 10 January 1866 by C. P. Hoedt; 3) Staatliches Museum für Tierkunde, Dresden (MTD) No. C2446, adult of unknown sex, from Tabukan, collected in 1871 by A. B. Meyer, No. 8254 [although Meyer (1879) acknowledged failing

TABLE 1

Mean ± s.d., *n* for measurements (mm) of relevant *Otus* taxa, and raw measurements for each specimen of *Otus collari* (in this order: holotype, RMNH 84653, RMNH Kat. No. 16, MTD C2446). Measurements by Blasius (1888) for holotype of *collari* and missing specimen are given in brackets. Shortfalls of each primary tip measurement from wingpoint of longest feathers (P1 S=shortfall of outermost primary, etc.); wing notches and emarginations measured from tips of individual feathers (wing feather measurements for *staoensis* approximate due to damage). Tarsal feathering measured from tip of distalmost feather to joint of phalanges 1-2, digit three. Significant differences (two-sample *t*-test, unequal variances) of each taxon from *collari*: * = $P \leq 0.05$; ** = $P \leq 0.01$; *** = $P \leq 0.001$. For primary shortfall, emargination, and notch measurements, significance tests were done on log-transformed data divided by log wing length; untransformed data are presented here. Due to small samples, significance tests were not done for *staoensis*, *mendini*, *kalidupa*, or *sulaensis*.

Variable	<i>collari</i>	<i>mantanensis</i>	<i>staoensis</i>	<i>mendini</i>	<i>kalidupa</i>	<i>sulaensis</i>	<i>albiventris</i>	<i>tempestatris</i>	Moluccan <i>magicus</i> ¹	Philippine taxa ²	E. Indian Ocean taxa ³
Culmen (skull)	20.1 ± 0.9, 4; 19.6, 19.3, 20.3, 21.4	20.0 ± 0.8, 53	19.9	21.2 ± 0.4, 3	23.9 ± 0.6, 2	24.6 ± 1.3, 2	21.3 ± 0.9, 24	20.7 ± 0.9, 11	25.1 ± 1.1, 75***	22.7 ± 0.9, 25**	22.8 ± 1.9, 8**
Wing length	161.2 ± 3.4, 4; 160, 166, 161, 158 [162, 160]	151.4 ± 4.4, 57**	127	146.5 ± 4.1, 3	168.0 ± 0.2	167.0 ± 8.5, 2	155.9 ± 5.9, 20*	151.9 ± 4.6, 12**	175.6 ± 7.6, 78***	158.3 ± 8.6, 25	157.6 ± 9.5, 7
P1 S	38.7 ± 2.8, 4; 40.5, 38.1, 34.9, 41.2	36.7 ± 3.6, 50	28.2	37.4 ± 2.5, 3	38.7 ± 1.1, 2	37.4 ± 2.2, 2	35.5 ± 4.0, 19	38.7 ± 3.3, 12	39.9 ± 3.3, 47	40.4 ± 2.2, 19	36.2 ± 6.9, 6
P2 S	15.0 ± 1.7, 4; 14.7, 14.7, 13.3, 17.4	12.8 ± 2.2, 51	14.3	14.7 ± 0.6, 3	13.2 ± 1.5, 2	14.5 ± 1.3, 2	11.6 ± 1.7, 20*	13.6 ± 1.9, 12	15.4 ± 2.3, 48	14.8 ± 2.0, 19	11.8 ± 1.9, 7*
P3 S	5.7 ± 0.8, 4; 4.0, 4.4, 4.4, 4.8	3.0 ± 1.3, 50	6.0	4.0 ± 0.4, 3	0.1, 2	3.5 ± 0.2, 2	2.8 ± 1.2, 21*	3.9 ± 0.8, 12	4.4 ± 1.1, 50	3.3 ± 1.2, 17	2.0 ± 0.8, 7*
P4 S	0.0 ± 0.0, 4	0.0 ± 0.2, 51	0.0	0.0 ± 0.0, 3	0.0, 2	0.0 ± 0.0, 2	0.1 ± 0.3, 22	0.1 ± 0.3, 12	0.1 ± 0.3, 50	0.0 ± 0.0, 17	0.0 ± 0.0, 7
P5 S	3.5 ± 1.5, 3; 2.8, 5.2, -, 2.4	1.8 ± 1.1, 45	-	0.2 ± 0.3, 3	1.3 ± 0.3, 2	1.3 ± 0.1, 2	0.7 ± 1.0, 19	0.5 ± 0.7, 11*	1.4 ± 1.2, 47	1.9 ± 1.7, 14	3.1 ± 0.9, 7
P6 S	10.0 ± 1.2, 4; 9.1, 10.8, 11.3, 8.8	7.5 ± 1.6, 42**	8.5	5.0 ± 0.1, 3	6.9 ± 1.7, 2	6.3 ± 1.7, 2	6.7 ± 1.2, 18***	6.6 ± 1.6, 11**	6.7 ± 1.6, 41***	7.7 ± 2.5, 14*	11.6 ± 1.7, 7
P7 S	18.9 ± 1.7, 4; 17.3, 20.9, 19.7, 17.7	14.6 ± 2.0, 43**	15.1	11.9 ± 1.4, 3	14.1 ± 2.0, 2	14.7 ± 2.4, 3	14.8 ± 2.2, 18**	14.1 ± 1.8, 12***	14.0 ± 2.2, 39***	14.0 ± 2.4, 14**	19.9 ± 1.4, 7
P8 S	27.7 ± 1.6, 4; 26.7, 28.2, 29.7, 26.2	23.0 ± 2.4, 41**	20.3	18.8 ± 0.7, 3	21.8 ± 2.7, 2	21.4 ± 2.7, 2	22.1 ± 2.3, 16**	22.4 ± 2.0, 12***	22.3 ± 2.2, 40***	21.3 ± 2.7, 14***	26.3 ± 2.7, 6
P9 S	34.4 ± 1.8, 4; 32.8, 34.3, 37.0, 33.6	29.1 ± 2.5, 40**	27.3	24.3 ± 1.6, 3	28.0 ± 1.8, 2	29.0 ± 3.4, 2	29.1 ± 3.0, 16***	30.1 ± 2.4, 12*	29.6 ± 2.6, 39***	28.9 ± 2.4, 13***	32.1 ± 3.4, 6
P10 S	41.0 ± 1.6, 4; 39.6, 41.5, 43.0, 39.7	36.1 ± 2.5, 40*	36.9	29.9 ± 0.6, 3	33.2 ± 3.8, 2	34.2 ± 81.3 ± 1.8, 2	35.8 ± 7.5, 4	35.9 ± 70.2 ± 3.8, 12*	36.8 ± 8.6, 1 ± 3.3, 38***	37.1 ± 73.2 ± 7.3, 16	39.8 ± 76.2 ± 2.8, 4
P1 length	75.4 ± 3.2, 4; 76.0, 78.5, 76.2, 71.0	4.3, 52*	60.9	66.8 ± 4.6, 3	86.8 ± 58.4 ± 4.7	81.3 ± 59.8 ± 5.4, 2	75.4 ± 55.3 ± 3.8, 11	70.2 ± 55.4 ± 3.8, 11	86.1 ± 59.6 ± 4.0, 54***	73.2 ± 54.6 ± 2.1, 16***	8.6 ± 54.7 ± 4.9, 7
P2 emargination	59.3 ± 1.3, 4; 58.7, 60.4, 60.5, 57.8	54.7 ± 3.7, 54***	-	50.0 ± 5.0, 3	48.2 ± 4.2	48.2 ± 1.8, 2	42.2 ± 4.0, 21**	48.6 ± 3.8, 11	59.6 ± 4.0, 54***	54.6 ± 2.1, 16***	54.7 ± 4.9, 7
P3 emargination	56.3 ± 4.0, 3; 52.5, 56.0, -, 60.5	49.5 ± 3.4, 52	-	44.6 ± 3.2, 3	52.4 ± 5.7, 2	55.1 ± 5.1, 2	49.2 ± 3.7, 20	48.6 ± 3.7, 12	55.2 ± 3.1, 58	49.1 ± 2.2, 15	49.4 ± 6.6, 7
P3 notch	46.5 ± 1.5, 3; 47.8, 44.8, 46.8, -	41.9 ± 2.6, 32	-	2.6, 3	2.4, 2	0.1, 2	2.4, 19*	2.3, 10*	42.6 ± 3.2, 40*	2.4, 14	4.0, 5**
Tail length	74.2 ± 3.2, 4; 78.0, 74.6, 74.1, 70.1 [79, 72]	69.9 ± 3.5, 51*	57.1	65.0 ± 1.3, 3	82.0 ± 4.0, 2	75.8 ± 2.0, 2	72.9 ± 8.4, 1	74.3 ± 2.8, 12	84.1 ± 4.3, 71**	75.9 ± 3.9, 25	72.0 ± 8.4, 7
Tarsus length	27.4 ± 0.4, 3; 27.7, 27.6, 26.9, -, [26, 26]	27.0 ± 1.2, 54	26.8	26.7 ± 1.2, 3	0.0, 2	0.7, 2	1.5, 23	27.5 ± 1.6, 12	33.2 ± 1.8, 75***	32.3 ± 2.8, 25***	27.5 ± 2.3, 8
Tarsal feathering	3.7 ± 0.6, 3; 3.0, 3.8, -, 4.3	5.4 ± 2.3, 51*	4.5	14.9 ± 1.4, 3	1.8, 2	1.8, 2	1.3, 25*	4.7 ± 1.3, 12	9.9 ± 3.4, 72***	6.5 ± 1.5, 15***	7.5 ± 2.3, 8

¹*Otus magicus* (*n*=24), *bouruensis* (*n*=9), *obira* (*n*=1), *leucospilus* (*n*=24) and *morotensis* (*n*=21).
²*Otus mantanensis* *cuvensis* (*n*=3), *sibutuensis* (*n*=15, including *stereis*), *romblonis* (*n*=5) and *mantanensis* (*n*=2).
³*Otus enganensis* (*n*=4), *athus* (*n*=2), and *umbra* (*n*=2) combined due to small sample sizes.