

The taxonomic status of the Black-shouldered Nightjar *Caprimulgus nigriscapularis* Reichenow, 1893

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SUMMARY.—The current status of Black-shouldered Nightjar *Caprimulgus nigriscapularis* is based on relatively minor differences in voice and plumage from Fiery-necked Nightjar *C. pectoralis*. These differences are considered by some authorities to be no more than geographic or individual variation. Presented here are mensural data, previously largely overlooked, comparing *C. nigriscapularis* with the four races of *C. pectoralis*. The mean values of five key characters show clinal variation. Analyses of variance carried out on nine other key characters (in wing, tail, head and foot) reveal that, except for wing length, the null hypothesis, linking *C. nigriscapularis* with *C. p. shelleyi*, *C. p. feroidus*, *C. p. crepusculans* and *C. p. pectoralis*, cannot be rejected. Consequently, the conclusion is that the two current species are conspecific, Black-shouldered Nightjar being the northern race of Fiery-necked Nightjar.

Black-shouldered Nightjar *Caprimulgus nigriscapularis* was described as a new species by Reichenow (1893) and included in his *Die Vögel Afrikas* (Reichenow 1902–03), which also recognised South African Nightjar *C. pectoralis* Cuvier, 1816, and Fiery-necked Nightjar *C. feroidus* Sharpe, 1875, as species, while treating Shelley's Nightjar *C. shelleyi* Bocage, 1879, as a race of Fiery-necked Nightjar. Sclater (1924) retained *C. pectoralis*, *C. feroidus* and *C. nigriscapularis* as species in his standard work *Systema avium Aethiopicarum* but made no mention of *C. shelleyi*.

Chapin (1932) noted that 'Pairs of species distinct enough to be granted separate binomials by most systematists, and which are still mainly separated by the forest belt, at least in western Africa, include *C. nigriscapularis* and *C. feroidus*.' Grant & Mackworth-Praed (1937) decided that 'As *C. nigriscapularis* has the same general colour appearance and the same amount of white in the tail of males as *C. feroidus* it must be placed as a race of that species.' Chapin (1939) went further, treating *feroidus* and *nigriscapularis* as conspecific with *C. pectoralis*, on the basis of similarities in plumage and song. Mackworth-Praed & Grant (1957, under Addenda and Corrigenda) accepted this arrangement, as did White (1965).

Chappuis (1981) found that *nigriscapularis* and *feroidus* have very stereotyped song phrases throughout their distribution, with significant and constant differences separating them. He felt that, in the absence of sympatry, the status of superspecies should be preferred to that of race, since it is possible that the song differences may be insufficient to prevent hybridisation should they come together again. Fry (1988), in a major review of the skull morphology, song characteristics and systematics in general of African nightjars, concluded that *C. nigriscapularis* is a species, separable from *C. pectoralis*, based mainly on vocal differences.

In *The birds of Africa* Fry & Harwin (1988) distinguished *C. nigriscapularis* specifically from *C. pectoralis* on the basis of evidently constant song differences, but also provided a suite of plumage characters to separate them in the hand. Louette (1990) tested the colour criteria proposed in *The birds of Africa* on Zaïre (now Democratic Republic of the Congo = DRC) material in the Royal Museum for Central Africa (Tervuren, Belgium) and found that

none holds true. Dowsett & Dowsett-Lemaire (1993), contrary to Chappuis (1981) and Fry & Harwin (1988), believed that the voices of *C. nigriscapularis* and *C. pectoralis* are sufficiently alike to point to them being conspecific. They felt that Fry and Harwin had overlooked the natural geographic variation in voice *within* each form, which is at least as great as that *between* the two forms (italics mine). See also below under Discussion.

Clancey's (1994) review of the two austral races of *C. pectoralis* found that *fervidus* was composite, requiring that three subspecies be recognised, *fervidus*, *shelleyi* and a new form, which he named *crepusculans*. Cleere (1995) re-examined the entire Fiery-necked Nightjar group and recognised two species, separated mainly by vocal differences, namely *C. pectoralis*, with four subspecies (*pectoralis*, *fervidus*, *shelleyi* and *crepusculans*), and monotypic *C. nigriscapularis*. This arrangement was adopted in both major monographs of the Caprimulgiformes (Cleere 1998, Holyoak 2001). However, Cleere (1998) noted that some authorities consider the two species to be conspecific, and Holyoak (2001: 35) explained that he provisionally treated as species a few controversial forms, such as *C. nigriscapularis*, in order to present all relevant data separately from those pertaining to their close allies, rather than from any conviction that they deserve species rank.

Cleere (1995) suggested that the ranges of the two species may well overlap in parts of central and southern DRC. However, this was based on a misidentification by Chapin of a single female specimen from Matadi (Dowsett-Lemaire & Dowsett *in litt.* 2013). Both monographs (Cleere 1998, Holyoak 2001) treated their distributions as allopatric. There is a possible overlap in Rwanda, where Anderson (2012) found and photographed a *pectoralis* north-west of a probable *nigriscapularis*. The latter is a rufous morph and difficult to identify with certainty.

My examination of the relevant plumage descriptions and / or voice sonograms published by Fry (1988), Fry & Harwin (1988), Dowsett & Dowsett-Lemaire (1993), Cleere (1995, 1998) and Holyoak (2001) leads me to question whether the noted differences are sufficient to warrant specific status for *nigriscapularis*, or whether they merely represent geographic and / or individual variation within *C. pectoralis*. Presented here are mensural data that I believe help to resolve the problem.

Methods

Key characters (Jackson 2000) were measured on 145 specimens of the five forms involved: 43 *C. pectoralis pectoralis*, 42 *C. p. crepusculans*, six *C. p. fervidus*, 42 *C. p. shelleyi* and 12 *C. nigriscapularis*, listed south to north (for details of specimens see Appendix). Females, juveniles, feathers in moult and damaged characters were excluded. The data therefore refer to sound characters on full-grown males alone.

The lengths of the five outer primaries (pp10–6) were measured by sliding a stopped ruler under the closed wing until the stop met the bend of the wing, pressing the primaries flat against the ruler and then reading the five measurements. The position of the wingbar (an isolated white or buff patch about halfway along the feather) was measured on p9 by taking the distance from the tip of the primary to the centre of the patch on the inner web. The extent of the emargination on the leading edge of p9 was measured from the tip of the primary to the point of flexure in the reverse curve, i. e. the neutral point between the inner and outer curves (as illustrated in Jackson 1986).

The length of the inner rectrix (r1) was measured from the skin at the base of the calamus to the tip of the feather. The calamus was exposed by parting the uppertail-coverts so that the base was located visually, not by feel. The distance from the tip of r1 to the tip of r5 was measured with the tail in the closed position and the difference was then applied

to the length of r1 to derive the length of r5. All rectrix lengths are therefore relative to the base of r1. The pale apical patches on r4 and r5 were measured by taking the maximum dimension parallel to the rachis.

The length of the tomium was measured in a straight line from the tip of the bill to the inside angle of the gape and the width of the gape was measured across the bill from gape flange to gape flange. Tomium \times gape provided an approximate mouth size.

The length of the tarsometatarsus was measured posteriorly from the intertarsal joint to the base of the last complete scale before the divergence of the toes. The length of the middle toe (t3) was measured from the base of the last complete scale on the tarsus to the tip of the pectinated claw. Tarsometatarsus + t3 provided the overall length of the foot.

Characters showing clinal variation were set aside. The remaining characters were each subjected to an analysis of variance (ANOVA one-way classification) to test, with a probability of 0.05, the null hypothesis that the five forms represent either a single population or five populations with equal means.

Results

Clinal variation.—Four characters (one each on wing, tail, head and foot) show clinal variation, with mensural means decreasing from south to north (Table 1): the ratio of two primaries in the wing formula (p10 / p7); wing / tail ratio (p9 / r1); relative mouth size (tomium \times gape) and overall foot length (tarsometatarsus + middle toe). Song durations also appear to decrease clinally south to north (see below).

Analysis of variance.—An ANOVA was carried out on each of nine characters (Table 2); three on the wing, four on the tail, one on the head and one on the foot. The result for wing length (p9) ($F_{4, 131} = 13.89$, $P = 1.79E-09$, Table 2a) was the only one requiring that the null hypothesis be rejected. It could not be rejected by the results for the other eight characters: percentage emargination on p9 ($F_{4, 131} = 1.79$, $P = 0.135$, Table 2b); position of wingbar in relation to emargination ($F_{4, 132} = 1.90$, $P = 0.115$, Table 2c); length of inner rectrix r1 ($F_{4, 106} = 1.99$, $P = 0.102$, Table 2d); length of outer rectrix r5 ($F_{4, 117} = 2.25$, $P = 0.068$, Table 2e); length of patch on outer rectrix ($F_{4, 130} = 0.64$, $P = 0.634$, Table 2f); length of patch on r4 ($F_{4, 129} = 0.33$, $P = 0.855$, Table 2g); length of tomium ($F_{4, 132} = 2.06$, $P = 0.090$, Table 2h) and the ratio tarsometatarsus to middle toe (%) ($F_{4, 140} = 0.63$, $P = 0.639$, Table 2i).

TABLE 1

Mensural characters showing latitudinal clinal variation in five Afrotropical nightjars, with measurement means decreasing from South African Nightjar *Caprimulgus pectoralis pectoralis* in the south, through Clancey's Nightjar *C. p. crepusculans*, Fiery-necked Nightjar *C. p. fervidus* and Shelley's Nightjar *C. p. shelleyi* to Black-shouldered Nightjar *C. nigriscapularis* in the north. P10 is the outer primary, r1 the inner rectrix. Mouth = tomium \times gape. Foot = tarsometatarsus + middle toe (t3). The sample sizes are shown in brackets after the means.

Taxon	p10 / p7	p9 / r1	Mouth (mm ²)	Foot (mm)
<i>pectoralis</i>	1.007 (40)	1.347 (30)	814 (35)	39.79 (43)
<i>crepusculans</i>	1.005 (40)	1.334 (33)	807 (41)	38.17 (42)
<i>fervidus</i>	0.994 (06)	1.329 (06)	756 (06)	37.67 (06)
<i>shelleyi</i>	0.991 (34)	1.328 (29)	753 (39)	37.64 (42)
<i>nigriscapularis</i>	0.954 (09)	1.246 (09)	740 (11)	35.67 (12)

TABLE 2

Results of ANOVA to test, with probability of 0.05, the null hypothesis that the five nightjars (as in Table 1) represent either a single population or five populations with equal means. Degrees of freedom (*df*) between groups (upper) and within groups (lower) are shown. *F* is the calculated *F* statistic, *F crit* the critical value that must be exceeded by *F* in order to reject the null hypothesis. *F* values less than *F crit* are marked with an asterisk (*).

Taxon (<i>n</i>)	Mean	<i>df</i>	<i>F</i>	<i>P</i> -value	<i>F crit</i>
(a) Length of p9 (mm):					
<i>pectoralis</i> (41)	163.1	4	13.894	1.79E-09	2.441
<i>crepusculans</i> (41)	160.2	131			
<i>fervidus</i> (6)	165.8				
<i>shelleyi</i> (36)	163.6				
<i>nigriscapularis</i> (12)	152.8				
(b) Emargination on p9 (%):					
<i>pectoralis</i> (41)	41.6	4	1.790*	0.135	2.441
<i>crepusculans</i> (41)	42.4	131			
<i>fervidus</i> (6)	42.1				
<i>shelleyi</i> (36)	42.2				
<i>nigriscapularis</i> (12)	42.0				
(c) Relationship of wingbar to emargination (E-WB) on inner web of p9 (mm):					
<i>pectoralis</i> (41)	4.7	4	1.898*	0.115	2.440
<i>crepusculans</i> (41)	5.4	132			
<i>fervidus</i> (6)	4.2				
<i>shelleyi</i> (37)	5.4				
<i>nigriscapularis</i> (12)	6.2				
(d) Length of inner rectrix r1 (mm):					
<i>pectoralis</i> (31)	121.6	4	1.987*	0.102	2.457
<i>crepusculans</i> (34)	120.0	106			
<i>fervidus</i> (6)	124.8				
<i>shelleyi</i> (31)	123.0				
<i>nigriscapularis</i> (9)	122.2				
(e) Length of outer rectrix r5 (mm):					
<i>pectoralis</i> (37)	120.7	4	2.249*	0.068	2.449
<i>crepusculans</i> (34)	117.4	117			
<i>fervidus</i> (6)	121.3				
<i>shelleyi</i> (35)	120.4				
<i>nigriscapularis</i> (10)	118.3				
(f) Length of apical patch on r5 (mm):					
<i>pectoralis</i> (40)	45.0	4	0.641*	0.634	2.441
<i>crepusculans</i> (39)	43.9	130			
<i>fervidus</i> (6)	45.8				
<i>shelleyi</i> (38)	44.5				
<i>nigriscapularis</i> (12)	45.1				
(g) Length of apical patch on r4 (mm):					
<i>pectoralis</i> (39)	44.7	4	0.333*	0.855	2.442
<i>crepusculans</i> (40)	44.0	129			
<i>fervidus</i> (6)	44.2				

Taxon (<i>n</i>)	Mean	<i>df</i>	<i>F</i>	<i>P</i> -value	<i>F</i> crit
<i>shelleyi</i> (38)	44.5				
<i>nigriscapularis</i> (11)	45.4				
(h) Length of tomium (mm):					
<i>pectoralis</i> (39)	30.7	4	2.055*	0.090	2.440
<i>crepusculans</i> (41)	30.7	132			
<i>fervidus</i> (6)	30.5				
<i>shelleyi</i> (40)	30.1				
<i>nigriscapularis</i> (11)	29.5				
(i) Ratio of tarsometatarsus to middle toe (%):					
<i>pectoralis</i> (43)	69.5	4	0.634*	0.639	2.436
<i>crepusculans</i> (42)	70.8	140			
<i>fervidus</i> (6)	75.3				
<i>shelleyi</i> (42)	70.0				
<i>nigriscapularis</i> (12)	68.3				

Discussion

In the absence of published relevant molecular studies, more traditional methods must be used to re-examine the taxonomic status of Black-shouldered Nightjar, to resolve whether it is the northern race of Fiery-necked Nightjar, or differs sufficiently to warrant species status. Its current status as a species is based on vocal and morphological differences (Fry 1988, Cleere 1995) that are relatively minor.

Plumage differences.—Coloration in nightjars is extremely variable within species, sometimes geographically and very often individually, and such intraspecific variation is often greater than differences between species (Jackson 2000). Consequently, most nightjars are confusingly similar in appearance. For example, Fry (1988: 124) noted that some specimens of Sombre Nightjar *C. fraenatus* are 'indistinguishable in the smallest quantitative detail' from some specimens of the nominate race of *C. pectoralis* (italics Fry's).

Nightjar plumage patterns have evolved not as species-specific characters, but as camouflage for the bird at rest; as an adaptation to the general environment and the particular substrate upon which it roosts and nests. These plumage patterns, which may not accurately reflect historical relationships, are of minimal diagnostic value in devising identification keys; the pale patches in the wings and tails of some species do aid species identification, but are more useful in separating the sexes, males usually having larger, brighter patches than females (Jackson 2000).

Fry (1988: 105) commented that among African nightjars similarity of plumage is not a reliable criterion unless accompanied by a suite of derived characters and / or by more or less parapatric ranges. He noted (Fry 1988: 109) that *C. nigriscapularis* is darker than *C. pectoralis* and that in males the white spot on the inner web of p10 is vestigial in *C. nigriscapularis*. Fry & Harwin (1988) added that *C. nigriscapularis* differs from *C. pectoralis* in not having a small white mark near the corner of the mouth; in lacking a rufous morph, except perhaps in respect of crown colour (they apparently overlooked Benson & Colebrook-Robjent 1977—see below); in having darker underparts; and colour tones that differ to a greater or lesser degree over the rest of the plumage. However, as noted above, Louette (1990) found that none of the plumage criteria proposed by Fry & Harwin (1988) as diagnostic for *C. nigriscapularis* is true for DRC material that he examined.

Cleere (1995) noted that *C. nigriscapularis* tends to have less streaking on the crown than the four races of *C. pectoralis*, affording it a rather pale-headed appearance; that the white

spots on the four outer primaries of the male are generally smaller than on *C. pectoralis*; and that the blackish-brown lesser coverts always contrast markedly with the rest of the coverts, hence the name Black-shouldered Nightjar. Dowsett-Lemaire & Dowsett (*in litt.* 2013) noted that, in non-rufous forms, the uppertail colour is grey in *pectoralis*, brown in *nigriscapularis*.

The plumage differences noted above are relatively minor, no greater than those used by Clancey (1994) to separate the four austral races of *C. pectoralis*, indicative of their significance at subspecific level. They do not support specific status for Black-shouldered Nightjar.

Vocal variation.—Nocturnal and crepuscular birds, such as nightjars, depend less on plumage patterns and more on voice for conspecific and individual recognition. Nightjars in song can readily be identified, each species having a highly characteristic song, which makes it easy to distinguish between species occurring sympatrically in a given area, such as, for example, southern Africa (Jackson 1986). From the sound-recordings on Ranft & Cleere (1998) it is evident that neither a musical ear nor a sound spectrograph is necessary to distinguish the songs of most Afrotropical nightjars, the differences being relatively substantial.

However, the allopatric Freckled *C. tristigma* and Nubian Nightjars *C. nubicus* (*C. n. tamaricus* alone: see Jackson 2002a) have remarkably similar songs, as do the allopatric Abyssinian *C. poliocephalus* and Montane Nightjars *C. ruwenzorii*, and the allopatric Fiery-necked and Black-shouldered Nightjars. Should any of these species-pairs occur sympatrically, it would be difficult for field workers to distinguish between their songs, as the differences are relatively minor. A further complication arises because there is geographic and individual variation in voice, as in any other characteristic, of each species. The songs of some *C. pectoralis* males in my Ranelia Farm (Cashel, Zimbabwe) study area (Jackson 1985) were sufficiently different for me to recognise them individually.

The song durations of *C. p. pectoralis* (1.7–1.8 seconds), *C. p. fervidus* (1.4–1.6 seconds) and *C. nigriscapularis* (1.4 seconds) (Fry 1988, Fry & Harwin 1988) appear to decrease clinally south to north. Songs are repeated every five seconds (*pectoralis*), four seconds (*fervidus*) or 5–8 seconds (*nigriscapularis*), while the monotonous whooting calls (see Jackson 2002b) are repeated regularly, for at least 22 seconds, at a rate of 22 per ten seconds (*pectoralis*), or for at least 12.5 seconds, at a rate of 41 per ten seconds (*nigriscapularis*) (Fry 1988, Fry & Harwin 1988). Cleere (1995) noted that the song of *C. pectoralis* registers within a frequency band range of 0.8–2.2 kHz, compared to 1.2–2.2 kHz for *C. nigriscapularis*; he also noted that the whooting calls of the latter are shorter and faster than in *C. pectoralis*.

Chappuis (1981) noted that significant and constant differences separate the songs of *C. (p.) nigriscapularis* and *C. (p.) fervidus*, but felt it possible that song differences may not be sufficient to prevent hybridisation should they meet. Dowsett & Dowsett-Lemaire (1993), after examining a number of sonograms, concluded that song differences between these two forms are no greater than the geographic variations within each form, and that the voices of *C. pectoralis* and *C. nigriscapularis* are sufficiently alike to suggest they are conspecific.

Measurements.—While song is of no diagnostic value if dealing with a bird in the hand or museum, measurements of key characters do usually provide reliable diagnoses. My dichotomous identification keys to the nightjars of Africa were based almost entirely on mensural characters, since plumage patterns are too variable (Jackson 1984, 2000).

When identifying Afrotropical nightjar species in the hand, the single most useful character, with a low coefficient of variability, is the percentage emargination on p9 (Jackson 1984). My (Jackson 1993, 2002a, 2003) lack of support for the elevation of both *C. ruwenzorii* and *C. nigriscapularis* to full species status was based on the evidence provided by this character. The emargination percentages for *C. p. poliocephalus* ($n = 57$) and *C. p.*

ruwenzorii ($n = 39$) are 43.3 ± 1.5 (40.1–47.6) and 43.6 ± 1.4 (40.0–47.5), respectively (Jackson 2002a), suggesting that they are probably conspecific, a possibility that I am currently investigating. The mean value of the emargination ratio in *nigriscapularis* (42.0%) is exactly halfway between the lowest mean value (*pectoralis* 41.6%) and the highest mean value (*crepusculans* 42.4%) among races of *C. pectoralis* (Table 2), which suggests strongly that they too are probably conspecific.

Clinal variation in some measurements (Table 1) and in song and whooting duration (see above) tend to isolate *C. nigriscapularis* in the north, but despite this, the analysis of variance results (Table 2) show clearly that the null hypothesis linking *nigriscapularis* to the races of *C. pectoralis* cannot be rejected. This conclusion is supported by the evidence provided by body mass data (Jackson 2003), the mean values (g) of the races being 51.2 (*pectoralis*), 48.3 (*crepusculans*), 54.0 (*fervidus*), 49.8 (*shelleyi*) and 50.6 (*nigriscapularis*). The mean of *nigriscapularis* in the north does not differ significantly ($t = 0.1150$, $P > 0.1$) from the nominate race in the south, and matches well with other *C. pectoralis* races.

Sympatry.—Anderson (2012) presented photographic evidence of possible sympatry in the south-east corner of Rwanda, with a probable record of *C. nigriscapularis* near Rusumo on 13 December 2009, and a positive record of *C. pectoralis* near Kibungo, c.33 km to the north-west, on 21 August 2010. It is difficult to identify the former with certainty, despite the conspicuous blackish shoulders, because it is a rufous morph. According to Fry & Harwin (1988) *C. nigriscapularis* does not possess a rufous morph, except perhaps in respect of crown colour, while *C. pectoralis* does. However, they overlooked Benson & Colebrook-Robjent (1977), who noted that erythrisms may be frequent (but irregular) in *nigriscapularis*; ten adults in the Natural History Museum, Tring, all have some rufous in the tail, and half of them, including three from Uganda, have the crown, and / or throat and breast, rufous. One of the specimens they examined, from Sierra Leone, is illustrated in Anderson (2012). The rufous plumage of the Rusumo bird does not serve to identify it either way.

Amadon & Short (1992) define sympatric species as taxa that occur in the same area (range) at least in part and at least during the breeding season. The *C. nigriscapularis* breeding season in central Africa appears to cover all months except October–November, while the breeding season for *C. pectoralis* is August–December (Holyoak 2001). The dates of the Rwandan photographs appear marginal to the breeding season concerned. No evidence of breeding was found, and, since the records were eight months and 33 km apart, the two birds were not actually in the same area in the same breeding season, so it could be argued that there is no definite sympatry. Southern populations of *C. pectoralis* are partially migratory, performing regular post-breeding movements, sometimes in response to high rainfall (Clancey 1994, Vernon & Dean 2005), so the Kibungo *C. pectoralis* could have been an off-season wanderer.

Amadon & Short (1992: 22) stressed the importance of interbreeding between two taxa in determining that they belong to the same species. That *C. nigriscapularis* and *C. pectoralis* may already have come together, and hybridised, is suggested by four specimens (from Burundi, Rwanda and DRC) that Louette (1990; and *in litt.* to J. Anderson 2011—see Anderson 2012) considered to be intermediate.

Conclusion

Mayr *et al.* (1953) recommended that it is preferable to treat doubtful allopatric populations as subspecies. However, Prigogine (1985: 100) wrote 'I believe that it is useful to give species status to taxa, even when the real taxonomic rank (species or subspecies) is not fully demonstrated, with the object to draw the attention on a problem that needs more

investigation.’ This appears to be the current practice, and is the one followed by Holyoak (2001) in his monograph of the Caprimulgiformes.

Prigogine (1985: 93) also stated that ‘one has to be careful in giving too much weight to song differences as a taxonomical criterium ... and they must be evaluated critically and compared with other informations of taxonomic signification, especially for allopatric taxa.’ This is the approach that I have followed here by considering not only the differences in voice and plumage patterns, but also the available mensural data, which appear to have been largely overlooked by previous authors.

The minor vocal and plumage differences do not appear sufficient to support the elevation of *C. p. nigriscapularis* to species. The mensural data, in contrast, especially the analyses of variance, but also the emargination and body mass data, provide compelling evidence that *C. nigriscapularis* is no more than a subspecies of *C. pectoralis*. My conclusion, therefore, is that Black-shouldered Nightjar is the northern race of Fiery-necked Nightjar, a conclusion supported by the possible hybridisation between the two in Burundi, Rwanda and the DRC (Louette 1990).

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Appendix: Museum specimens of *Caprimulgus pectoralis* analysed.

Museum acronyms: ALBM = Albany Museum, Grahamstown (South Africa); AMNH = American Museum of Natural History, New York (USA); BMNH = Natural History Museum, Tring (UK); CMNH = Carnegie Museum of Natural History, Pittsburgh (USA); DURM = Durban Museum (South Africa); ELM = East London Museum (South Africa); FMNH = Field Museum of Natural History, Chicago (USA); KAFM = Kaffrarian Museum, King William's Town (South Africa); LACM = Los Angeles County Museum (USA); MNHN = Museum National d'Histoire Naturelle, Paris (France); NATM = Natal Museum, Pietermaritzburg (South Africa); NMW = Naturhistorisches Museum, Vienna (Austria); PEM = Port Elizabeth Museum (South Africa); RMCA = Royal Museum for Central Africa, Tervuren (Belgium); RMNH = Rijksmuseum van Natuurlijke Historie (Naturalis), Leiden (Netherlands); TMP = Transvaal Museum, Pretoria (South Africa); USNM = United States National Museum of Natural History, Washington DC (USA).

C. p. pectoralis ($n = 43$): ALBM no No. a, no No. b, 728, 733, 736, 1249, 2207, 2464, 4092; AMNH 633324, 633325, 633328; BMNH 1933.7.14.178, 52.3.8.6, 74.5.1.187, 90.12.16.58, 90.12.16.59; ELM 1866, 2816, 3222, 7950, 7958, 11352, 12764, 13115; KAFM B785, B786, B2902, B3544; MNHN 1858-393; PEM 1494/76, 1500/93, 1512/15; RMNH 5, 6; TMP 2662, 2760, 2800, 3268, 7775, 14660, 26278; USNM 163823.

C. p. crepusculans ($n = 42$): BMNH 1905.12.29.203, 1905.12.29.211, 1933.3.1.309–1933.3.1.311, 1933.7.14.179, 98.12.2.424; CMNH 148295; DURM 14502–14505, 16257, 16514, 19374, 20570, 23848, 29427; ELM 8128; FMNH 282662; NATM 2057, 2059, 2060, 2062, 2063, 2066; PEM 1484/31; RMNH 8; TMP 4706, 7794, 9001, 12702, 19065, 19796, 20083–20085, 27959, 27960, 35255; USNM 448384, 457818.

C. p. feroidus ($n = 6$): BMNH 1910.7.1.243; ELM 9635; FMNH 87253, 87254; LACM 63562; TMP 9213.

C. p. shelleyi ($n = 42$): AMNH 414149, 633338–633342, 633345, 633352, 633354, 633356–633358, 633360, 633361; BMNH 1932.5.10.730, 1935.10.9.104, 1935.5.11.2, 1939.2.25.484, 88.12.1.5; CMNH 109270, 109277, 147018; FMNH 100090, 205346, 220716, 224172, 224173, 262898; KAFM B2341; LACM 69601; MNHN 1947-416, 1957-70, 1958-395, 1965-1051; NMW 23510, 35060; RMCA 119359; TMP 28342, 28343; USNM 351690, 448213, 448214.

C. p. nigriscapularis ($n = 12$): AMNH 158705, 262374–262377, 633329, 633330; BMNH 1926.5.3.305, 1953.1.8; FMNH 194471, 298274; LACM 64152.