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Square-tailed Saw-wing *Psalidoprocne nitens* in the Democratic Republic of the Congo: identity and taxonomic status

by Lincoln D. C. Fishpool

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Summary.—The race *centralis* Neumann, 1904, of Square-tailed Saw-wing *Psalidoprocne nitens* is currently considered both to be poorly differentiated morphologically from the nominate subspecies and restricted to a limited area of north-eastern Democratic Republic of the Congo, being replaced elsewhere in the country by nominate *nitens*. Such views are mistaken. Study of specimens confirms assessments of earlier publications, in Dutch and French, that *centralis* occurs throughout the forest zone of northern and central DR Congo—to which region it is confined—whereas the nominate is known only from the coastal far west of the country. Moreover, the plumage of *centralis* is glossy dark bottle green, whereas that of nominate *nitens* is blackish with a dull oily green gloss. This difference was the justification for the initial recognition of *centralis* but has been almost entirely overlooked since the publication of the original description. Combined with the commonly reported contrast in throat colour and a previously unrecorded difference between the plumages of immatures, *centralis* is hence more distinct morphologically than previously appreciated. Further, a recent genetic analysis, involving samples from specimens shown by this study to have been *centralis*, demonstrated a divergence of *c.*4% from nominate *nitens*. In combination, these findings argue for the elevation of *centralis* to species rank.

Square-tailed Saw-wing *Psalidoprocne nitens* (Cassin, 1857) is a swallow of the African forest zone, occurring from Guinea in West Africa to north-eastern Democratic Republic of the Congo (hereafter DR Congo) and south to north-west Angola and far western DR Congo. The prevailing taxonomic treatment (e.g. Urban & Keith 1992, Turner 2004, 2020, Dickinson & Christidis 2014, del Hoyo & Collar 2016) is that this extensive range is occupied by the nominate subspecies (of which *nigra* Reichenow, 1921, is a synonym) except for north-eastern DR Congo, where it is replaced by *centralis* Neumann, 1904, from which it is considered separable only by a difference in throat colour. Such an assessment of *centralis* is, in fact, inaccurate in two important respects, a consequence, at least in part, of ignorance or oversight of earlier literature not in English. This paper seeks to highlight and correct these misapprehensions and to reassess the status of *centralis*, informed by the results of the molecular study by Barrow *et al*. (2016) and prompted by the outcome of a brief comparison of plumages by M. S. L. Mills and C. Cohen (pers. comm. 2019).

Neumann (1904) described *centralis* from specimens collected at Kitima, Ituri River, Ituri Province, north-east DR Congo. His succinct type description, in German, distinguished it from 'the generally monochrome and matt-glossy *Psalidoprocne nitens nitens* by a stronger green sheen on the back and underparts, and by a clear blue sheen on the wing-coverts and uppertail-coverts. The wings and tail feathers are also dark steel matt blue' (my translation).

However, doubt was soon cast on its validity by Ogilvie-Grant (1910: 410), who considered that a second specimen, from near Fort Beni, Semliki Valley, Nord-Kivu

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Province, DR Congo, was 'indistinguishable' from nominate material from Cameroon and Gabon. Gyldenstolpe (1924: 230–231), with four further specimens to hand, went a stage further and explicitly relegated *centralis* to a synonym, despite acknowledging that he did not have access to any material from West Africa. He considered that *centralis* was 'most probably based on immature specimens' of *nitens*. Although Sclater (1930: 587) did not go as far as synonymisation, he nonetheless viewed *centralis* as 'doubtfully separable' from the nominate.

The first person explicitly to endorse *centralis* as a valid taxon and to treat it in any detail appears to have been Chapin (1953: 776–778). Despite this, he made no mention of differences between the two forms in the colour and intensity of the gloss on the plumage, with the exception of the throat, which in nominate *nitens* was 'always dull gray-brown', whereas it was 'glossy black' in adult *centralis*. All subsequent descriptions of *centralis* appear to have relied solely upon Chapin's account. Thus, White (1961), Mackworth-Praed & Grant (1973), Turner & Rose (1989), Urban & Keith (1992) and Turner (2004, 2020) all stated the sole morphological discriminant to be throat colour—essentially, unglossed, grey-brown in nominate vs. blackish brown, slightly glossed green in *centralis*. Additionally, Mackworth-Praed & Grant (1973) reported that the subspecies differed in leg colour—dark grey to blackish in nominate, brown in *centralis*—but did not claim this to be a distinguishing feature.

The account by Chapin (1953) of the ranges of the two forms in DR Congo has been equally influential. He restricted the occurrence of *centralis* to 'northeastern Congo, eastward to the Semliki [River], but not yet known from west of Angu on the Uelle River or Stanleyville on the Congo [River]'. Of nominate *nitens*, he wrote that 'although…known from the Gaboon [= Gabon] and Landana [= Cabinda, Angola], the only exact locality for it in the Lower Congo is at Ganda Sundi'. The wording here, coupled with the more general statement that the species ranged 'from Sierra Leone to the Semliki Valley', seems to have led others to infer that nominate *nitens* extended across north-western and north-central DR Congo to meet *centralis* in the north-east of the country.

Thus, Mackworth-Praed & Grant (1973), Urban & Keith (1992), Turner (2004, 2020), Dickinson & Christidis (2014), del Hoyo & Collar (2016) and Gill *et al*. (2023) all also restrict the range of *centralis* to north-east DR Congo. Urban & Keith (1992) described its range as 'NE Zaire [= DR Congo] from Tshuapa to Semliki Valley' which is somewhat misleading since Tshuapa is in the central west of the country. It is possible that the mention of Tshuapa derived from Hall & Moreau (1970), whose map of *nitens* (races not distinguished) showed two localities in this province. With the exception of Mackworth-Praed & Grant (1973), who stated that *nitens* ranged only to 'the Lower Congo' and accordingly mapped the two forms as disjunct, these authors all correspondingly reported nominate *nitens* to be present across the remainder of northern DR Congo and, in the cases of Urban & Keith (1992), Turner (2004, 2020) and del Hoyo & Collar (2016), depicted their ranges as unbroken. By contrast, Turner & Rose (1989) reported *centralis* to be present in 'northern and eastern parts' of the country with *nitens* known only from the extreme west, as did Clements *et al*. (2022), who, while reporting the range of *centralis* to be 'Tshuapa to Semliki Valley', considered this to be 'n.w. D.R. Congo'.

In fact, as Schouteden (1955, 1957) made clear, first in Dutch and then in French, the only DR Congo records of nominate *nitens* were from the Mayumbe [= Mayombe], Kongo Central [= Bas-Congo, Lower Congo], in the coastal far west—the Ganda Sundi specimens mentioned by Chapin (1953)—while all other records across the main forest zone referred to *centralis*. Indeed, all subsequent material collected from these areas has also been identified as *centralis* (Schouteden 1961, 1962, 1963a,b, 1969, Prigogine 1971, 1978, 1984). The map in

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Schouteden (1955) showed *centralis* from two localities in Tshuapa (simplified from nine listed sites, all in close proximity) and was perhaps the source of the records shown by Hall & Moreau (1970).

One consequence of these misrepresentations of distribution in the current literature can be seen in the work of Barrow *et al*. (2016). Their genetic study of the genus *Psalidoprocne* included samples from four specimens of *nitens sensu lato*, one each from Côte d'Ivoire and Liberia and two from DR Congo. The authors stated that they were unable to obtain samples of *centralis*, which they thought, on the authority of Urban & Keith (1992) and Turner (2004), to be confined to the north-east of the country. They therefore attributed three of their samples to nominate *nitens*—the two from Upper Guinea and one from a locality in what was Equateur Province (now within Tshuapa Province) in western DR Congo. The fourth sample they left undiagnosed ('*nitens* ?'), presumably because the source of it, Kivu (now Sud-Kivu) Province in eastern DR Congo, fell outside the range of either taxon as described by Urban & Keith (1992) and Turner (2004).

Methods

The morphological characters by which *centralis* differs from nominate *nitens* were re-assessed by examination of 64 nominate specimens and 70 (putative) *centralis*. The latter were all collected in DR Congo (current names of provinces of origin and number of specimens: Équateur $n = 3$, Sud-Ubangi $n = 1$, Tshuapa $n = 13$, Haut-Uélé $n = 1$, Bas-Uélé $n = 2$, Tshopo $n = 6$, Ituri $n = 8$, Nord-Kivu $n = 7$ and Sud-Kivu $n = 29$) while the *nitens* specimens came from Sierra Leone ($n = 4$), Liberia ($n = 18$), Ghana ($n = 2$), Nigeria ($n = 1$), Cameroon ($n = 34$), Equatorial Guinea ($n = 1$), Gabon ($n = 2$) and Angola (Cabinda) ($n = 2$). This material is held in the Natural History Museum, Tring (NHMUK) (59 nominate, three *centralis*), the Royal Museum for Central Africa, Tervuren (RMCA) (five nominate, 57 *centralis*) and the Royal Belgian Institute of Natural Sciences, Brussels (RBINS) (ten *centralis*).

In addition to an assessment of plumage and bare parts, measurements were taken of length of folded wing (unflattened chord) using a ruler with a perpendicular stop at zero, length of bill (to skull), width of bill at the distal end of the nares, and length of tail, from the tip of the outermost rectrix to the point of insertion, using callipers accurate to 0.1 mm. Tarsal length was not measured.

Mensural data were analysed for statistically significant differences using Student's t tests. Where appropriate, effect sizes were assessed using Cohen's d.

To inform assessment of taxonomic rank, the scoring system offered by Tobias *et al*. (2010) was used. In this, an exceptional character difference (radically different coloration, pattern, size or sound) scores 4, a major character (pronounced difference in body part colour or pattern, measurement or sound) 3, medium character (clear difference, e.g. a distinct hue rather than different colour) 2, and minor character (weak difference, e.g. a change in shade) 1. Scores are also given on the basis of geographical relationship: allopatry 0, broad hybrid zone 1, narrow hybrid zone 2 and parapatry 3. A threshold of 7 is set to afford species status, such that it cannot be triggered by minor characters alone, and only three plumage characters, two vocal characters, two non-covarying biometric characters (assessed for effect size using Cohen's d where 0.2–2 is minor, 2–5 medium and 5–10 major) and one behavioural or ecological character (allowed 1) may be counted. Molecular data are not included within this system.

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Results

Almost the entire plumage of adult nominate *nitens* is, as described in the literature (e.g. Bannerman 1939, Turner & Rose 1989, Urban & Keith 1992, Turner 2004, 2020), dark brown to blackish, washed with a dull, dark oily green gloss. The exceptions are the lores which, from the bill base to the leading rim of the orbit and extending a little way both above and below the eye, are matt black, and the chin and throat, which are unglossed greyish brown and hence somewhat paler than the rest of the plumage (Figs. 1a–c, 2). The underside of the flight feathers is also unglossed while, dorsally, the sheen on the remiges is confined to the leading edges. The gloss varies in intensity somewhat, appearing inconspicuous in younger birds (see below) as well as in skins in poor condition and, while nowhere pronounced, it is usually most obvious on the dorsal surface (Figs. 1a, 2). The bill is black, the eyes are brown and the legs and feet are black, dark grey or dark brown (label data from 30 specimens).

Adult males (n = 33) and females (n = 22) are identical in plumage except that the leading edge of the outer primaries in the male is modified such that the terminal portions of the barbs on the anterior vane form short, bare, spine-like projections, flexed inwards—towards the body—and downwards, giving the wing its eponymous saw (Fig. 3). Females lack this modification and the anterior vane of the outer primary is therefore slightly broader than in males. There are statistically significant differences in sizes between adult males and females in all parameters measured: wing and tail lengths are longer in males while bill length and width are smaller (Tables 1, 2a). Comparisons between taxa were therefore disaggregated by sex.

The plumage of immature *nitens* (n = 9) differs mainly in the colour of the underparts, which are dark matt brown throughout. They thus lack the grey tones of the chin and throat of the adult but are similarly unglossed or, at most, only faintly so (Fig. 2). Adult feathering seems to be attained progressively, as a number of otherwise apparently mature birds show more or less extensive brown patches, particularly on the belly, resulting in an uneven, mottled appearance. Feather tracts elsewhere on young birds show much the same faint greenish gloss as adults. Other characters of immatures include yellow gape flanges (which seem to be persistent and remain visible on skins), notably shorter tails in some specimens (relative to the values in Table 1) and, in males, unmodified outer primaries. The legs and feet are also paler; label data report them as being 'pale brown', 'grey-brown' and 'flesh colour' as well as 'greyish' and 'blackish tinged'. Mensural data for the nine specimens adjudged immature by the combination of some or all of these characters, not all of which were so designated on their labels, were omitted from the morphometric analysis presented in Table 1.

Examination of the DR Congo material confirmed that specimens from throughout the interior forest zone of the country shared the same plumage characteristics as those from Ituri and Uélé, the areas from where *centralis* has been generally considered to be confined. All interior DR Congo birds were therefore analysed together as *centralis*, separable morphologically from material taken elsewhere.

The plumage of adult *centralis* differs from that of adult nominate in two ways. First, the chin and throat are the same colour as the rest of the feathering which is—except for the black lores—therefore uniform throughout. Second, because of the appreciably greater gloss, the entire plumage appears dark bottle green (Figs. 1a–c and, lower specimens, Figs. 2, 4). Otherwise, the two forms are similar, including in colours of the bare parts and in size, and size differences between adult males (n = 38) and females (n = 18) where, again, females have bigger bills (Tables 1, 2a,b). Statistically significant differences (at 5%) were

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Figure 1a–c. Dorsal, ventral and lateral views, respectively, of Square-tailed Saw-wing *Psalidoprocne nitens centralis* (left two) and *P. n. nitens* (right two). Male *centralis* (far left) and female (second left) from Ndomo, Ituri, DR Congo; nominate *nitens*, both females, from (far right) Belabo, Cameroon, (second right) from Inang, Cameroon. Plumage of *centralis*, including the throat, with evident green gloss; in *nitens*, except for matt grey chin and throat, it is blackish and only faintly glossed. RMCA, Tervuren specimens, registration numbers (left to right) 126107, 126108, 75-56-A-46 and 123191 (L. D. C. Fishpool)

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TABLE 1
Measurements (mm) of male and female Square-tailed Saw-wing *Psalidoprocne nitens* taxa. Bill width measured at distal end of nares. For other measuring techniques see text. SD = standard deviation.

Taxon	Sex	Parameter	Wing	Tail	Bill length	Bill width
nitens	Male	Mean	96.125	54.575	6.32	2.56
		Range	88–103	51.5–59.6	5.4–7.6	1.9–3.2
		SD (±)	2.97	2.08	0.49	0.27
		n	32	32	31	29
	Female	Mean	86.82	48.98	6.81	2.84
		Range	83–92	46.1–53.7	6.1–7.6	2.2–4.5
		SD (±)	2.26	2.2	0.39	0.44
		n	22	22	22	22
centralis	Male	Mean	95.83	53.99	6.02	2.44
		Range	85–101	48.3–57.8	5.4–6.9	2.0–3.1
		SD (±)	3.28	2.02	0.465	0.255
		n	36	38	34	33
	Female	Mean	88.72	50.69	6.7	2.77
		Range	84–92	46.3–56.4	6.1–7.5	2.4–3.2
		SD (±)	2.32	2.64	0.39	0.28
		n	18	18	17	17

Figure 2. Ventral view of adult male (below) and unsexed immature Square-tailed Saw-wing *Psalidoprocne nitens nitens*, both from Mt. Nimba, Liberia. Underparts of immature, including chin and throat, are uniformly brown and mostly matt whereas in the adult, chin and throat are matt grey while breast and belly are blackish with a weak green gloss. NHMUK, Tring specimens, registration numbers 1977.20.798 (above) and 1977.20.815 (L. D. C. Fishpool, © Trustees of the Natural History Museum, London)

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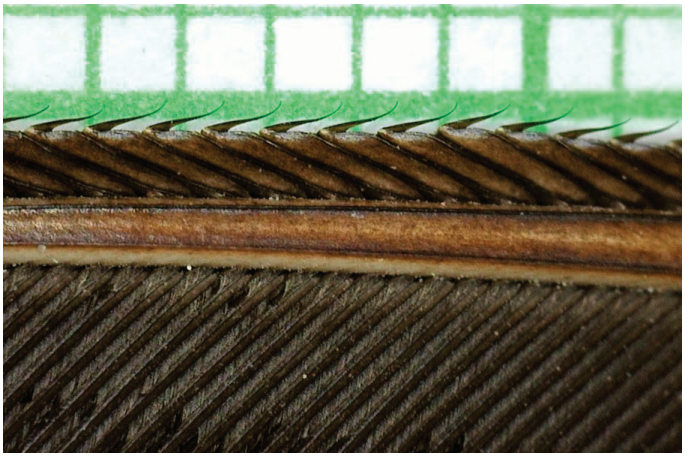

Figure 3. Ventral view of part of the outer primary from the right wing of an adult male Square-tailed Saw-wing *Psalidoprocne nitens nitens* showing part of the 'saw', the modification to the leading edge of the outer vane; scale in mm (L. D. C. Fishpool, © Trustees of the Natural History Museum, London)

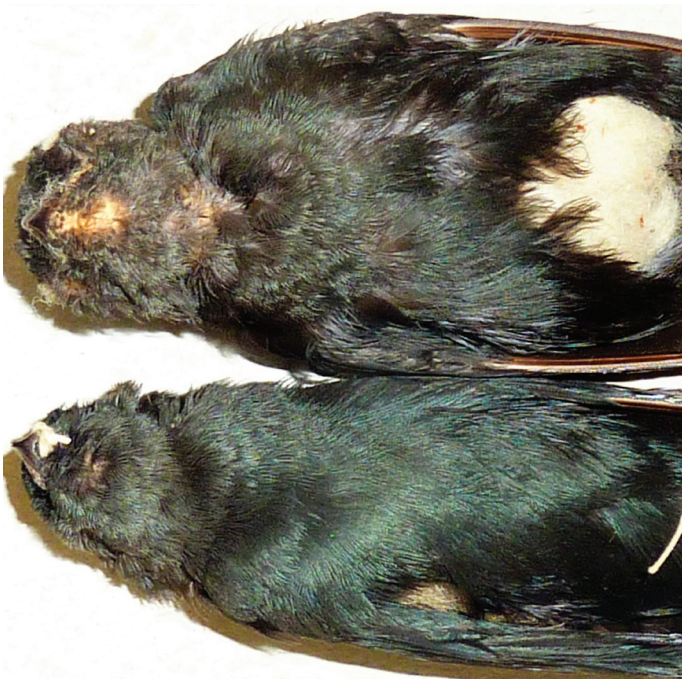

Figure 4. Ventral view of adult male (below) and immature female Square-tailed Saw-wing *Psalidoprocne nitens centralis*, from 'near Angu' and '40 miles north-west of Fort Beni', DR Congo, respectively. Although slightly less glossy, the immature is similar in colour to the adult. The vestige of a pale gape flange at the base of the left side of the bill on the immature can just be seen (top left). NHMUK, Tring specimens, registration numbers 1906.12.23.1609 (above) and 1911.12.23.1307 (L. D. C. Fishpool, © Trustees of the Natural History Museum, London)

found between the taxa, in males for bill length and, in females, for both wing and tail lengths (Tables 1, 2b). Label data on bare part colours of adults are lacking.

Immature *centralis* (n = 12) are duller, less glossed than adults, particularly below, and so appear darker, but are essentially similar in colour (Fig. 4). Like the nominate, *centralis* also shows yellow gape flanges (Fig. 4), shorter tails and unmodified outer primaries in males. Label data of one immature *centralis* stated the bill to be black, the iris dark hazel and the feet brown. The 12 specimens considered immature by this study were excluded from the morphometric analysis (Table 1).

Applying the methodology of Tobias *et al*. (2010) described above, the morphological differences between *centralis* and *nitens* were scored as follows: plumage of adult glossy dark bottle green overall vs. dark blackish brown glossed dull green, except throat (3); chin

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TABLE 2
Results of student *t*-test comparisons for lengths of wing, tail and bill plus width of bill at the distal end of the nares of Square-tailed Saw-wing *Psalidoprocne nitens*, between **a.** the sexes, separately by subspecies and **b.** nominate *nitens* and *centralis*, separately by sex. Effect size statistics (Cohen's *d*) given only for comparisons between *nitens* and *centralis* with a significant *p*-value: see text. ***Emboldened, italicised p-values indicate the result is significant at p <0.01***. *Italicised p-values indicate the result is significant at p <0.05 but not at p <0.01.* Remainder not significant.

		Statistic	Wing	Tail	Bill length	Bill width
a	males vs. females					
	nitens	*t*-value	12.418	9.494	-3.931	-2.732
		p-value	***<0.001***	***<0.001***	***>0.001***	***0.009***
	centralis	*t*-value	8.206	5.156	-5.182	-4.262
		p-value	***<0.001***	<0.001	<0.001	<0.001
b	*nitens* vs. *centralis*					
	males	*t*-value	0.382	1.192	2.543	1.893
		p-value	0.703	0.237	*0.013*	0.063
		Cohen's *d*			0.627	
	females	*t*-value	-2.619	-2.241	0.902	0.533
		p-value	*0.012*	*0.031*	0.373	0.597
		Cohen's *d*	0.829	0.683		

and throat glossed green vs. unglossed grey-brown (2); underparts of immatures dark green (sheen variably developed) vs. dark matt brown (2). Total 7.

Three statistically significant size differences, mentioned above, were found between nominate *nitens* and *centralis*—longer bill length in male *nitens* and longer wing and tail in female *centralis* (Table 1, 2b). In each case the effect size of these differences ranks as minor under the Tobias criteria, thereby attracting scores of 1. However, since wing and tail lengths are unlikely to be independent of each other, only one of these can be retained. Although a combined score of 2 is therefore possible, the fact that these differences are not consistent between the sexes makes it seem improbable that they are truly informative, particularly given the extensive overlap between taxa in the ranges of measurements in all cases (Tables 1, 2b). In consequence, no score is awarded.

Little can be said with regard to voice. Although there are few recordings available on online platforms (e.g. xeno-canto.org and macaulaylibrary.org) these do, since they originate from Mt. Hoyo, DR Congo, include two of *centralis* (Macaulay Library ML 1433, ML 1434). Preliminary analysis of sonograms reveals some differences between its calls and those of the nominate; these are however relatively minor while the small sample sizes of both mean that no firm conclusions can be drawn. Moreover, since vocalisations within the genus as a whole are relatively homogeneous, such that differences between currently recognised *Psalidoprocne* species are poorly understood, it is likely that the results of more detailed comparisons of *centralis* with nominate would be uninformative as to status (P. Boesman *in litt*. 2022). No ecological differences are known.

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As described below, the two forms appear to be separated by the Congo and Ubangi Rivers and are therefore allopatric. I have seen no indication in the material examined of intergrades or hybrids nor any mention of such a possibility in the literature. The geographic relationship score is hence 0. The overall score is therefore 7.

Discussion

In his description of *centralis* Neumann (1904) referred only to the type, collected by W. Ansorge on 25 May 1899, at Kitima Station, Ituri River, Ituri Province, DR Congo. LeCroy (2003) has pointed out that this skin, now in the American Museum of Natural History (AMNH), New York, was in fact one of three males taken by Ansorge on that date, all from Kitima—01°18′N, 27°55′E (Chapin 1954: 682)—and all part of the same collection received by AMNH. It seems likely therefore that they would therefore have all been examined by Neumann. Since Neumann (1904) did not mention the additional specimens, in order to remove any ambiguity, LeCroy (2003) designated as lectotype the specimen (AMNH 560915) identified as the type by Neumann on the label.

As reported above, the type description of *centralis* stated that the wing- and tail-coverts and the flight feathers showed obvious blue tones (Neumann 1904), an interpretation which would, it is fair to assume, have been based upon these three specimens. This coloration was disputed by Gyldenstolpe (1924: 231) who, with the partial exception of one of the four specimens from Ituri at his disposal—which showed 'a very slight bluish gloss on the wing-coverts, not on the upper tail-coverts'—otherwise noted that 'in the remaining specimens there is no bluish gloss at all'. I am in agreement with Gyldenstolpe's view: under good artificial lighting and in both ambient indoor daylight and full sunlight beside a window, these feather tracts appear to me, in all specimens examined and allowing for variation in intensity, to be glossed the same colour green as the body feathers.

Such interpretations may vary with observer. P. Sweet (*in litt.* 2022) informs me that he found the lectotype of *centralis* to show 'a slight blue sheen in the coverts and rump' from a particular angle, and he considered other specimens to be similar. A colleague to whom he showed these specimens found them to be 'more blue than green' overall, implying some subjectivity in the eye of the beholder. Three people who I consulted at NHMUK saw the specimens there as green, although one felt that the wing-coverts on one specimen could be construed as bluish. Such variation between observers may also explain why Chapin (1953) described the throat of adult *centralis* as 'glossy black' while I find these feathers to be glossed the same green as the rest of the plumage (Fig. 1b).

This phenomenon could, moreover, be the reason why the purplish-blue wash on the central tail feathers of the nominate form, reported by Bannerman (1939) and repeated by Turner & Rose (1989) and Urban & Keith (1992), is not evident to me. Here too, under both artificial light and sunlight, the colour of the gloss appears to me to be uniform with the rest of the plumage. These observations reinforce the belief that a spectrophotometric analysis of the plumage of these taxa, and indeed of other members of the genus, would be a potentially fruitful area of future study.

The single specimen of *centralis* that Ogilvie-Grant (1910) had at his disposal (from near Fort Beni, Nord-Kivu, NHMUK 1906.12.23.1609) and which he considered 'typical'—although on what basis is not clear, since there is no indication that he had seen the type—and 'indistinguishable from examples from Cameroon and Gaboon' (i.e., nominate *nitens*), proves on further examination to be an immature (Fig. 4). Thus, this specimen is relatively dull-plumaged and shows evidence of a gape flange, while its feet are described on the label as brown. The difference in body colour between it and the *nitens* material Ogilvie-Grant examined was therefore less pronounced than had he been comparing

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adults. Complicating the situation further was his belief that the 'sooty brown throat' of *nitens* was 'no doubt a sign of immaturity'. He therefore inferred that he was comparing immature *nitens* with adult *centralis*, when in fact the reverse was true. Gyldenstolpe (1924), citing Ogilvie-Grant (1910), asserted that '…*centralis* is most probably based on immature specimens of *Psalidoprocne nitens* Cassin, of which it becomes a synonym'. The label data of the Fort Beni specimen are very probably the source of the statement by Mackworth-Praed & Grant (1973) that the legs and feet of (by implication, adult) *centralis* are brown; since the specimen is immature, this explains the colour difference between it and the legs and feet of the adult nominate reported by Mackworth-Praed & Grant (1973).

The difference in the strength of the green gloss between adult *centralis* and nominate has been disregarded or overlooked ever since the original description. Gyldenstolpe (1924), although quoting most of this description in the original German, did not comment on the colour contrast, presumably because, as he acknowledged, he had no nominate material with which to compare his *centralis* specimens. Nor did Chapin (1953) mention it; he reported only the difference in throat colour—which, equally, was not mentioned by Neumann (1904)—and because, as indicated above, almost all subsequent authors appear to have relied solely upon Chapin (1953) for their understanding of *centralis*, the very feature which prompted Neumann (1904) to describe it has, ironically, never since been mentioned.

The bottle-green gloss of *centralis* appears to me to match closely that of the long-tailed Fanti Saw-wing *P. obscura*, the range of which overlaps extensively with nominate *nitens*. Indeed, the contrast in the language used by Urban & Keith (1992) to describe the plumage of nominate *nitens* ('dark blackish brown glossed with dull green') with that of *obscura* ('glossy dark bottle green'), captures perfectly how *nitens* differs from *centralis*.

It is notable that, while the colour of the underparts of immature *nitens* differs from that of the adult, in immature *centralis*, apart from the strength of the sheen, it does not (*cf.* upper specimens Figs. 2 and 4). This difference does not appear to have been reported previously.

The modification to the leading edge of the outer primary in adult males (Fig. 3) provides a means of sexing and ageing specimens independent of label data, a means which, judging by the number of unsexed adult specimens and mismatches found in this study, is somewhat overlooked.

The range of *centralis* described by Chapin (1953), reported above, echoed closely what he had written 30 years previously: that it was found 'in the forested parts of Ituri and southern Uelle districts' (Chapin 1923). This may have informed Boetticher (1943)—the paper cites no references—who reported *centralis* to be restricted to 'Uelle, Ituri und Semliki' and whose map of *nitens*, which distinguished between the races, showed the nominate to be present across much of western DR Congo and extensively contiguous with *centralis*. Since Chapin (1953) in turn cited but did not comment on Boetticher (1943), it is possible that Chapin did believe that nominate *nitens* was present in north-western and central parts of DR Congo; he was evidently unaware of the holdings of RMCA, details of which began to be published shortly afterwards (Schouteden 1955).

Current evidence indicates *centralis* to be confined to the east and south of the Congo and Ubangi Rivers and is therefore endemic to DR Congo. To the west, nominate *nitens* is considered to be distributed continuously across the Lower Guinea forest zone (Turner & Rose 1989, Urban & Keith 1992, Turner 2004, 2020, del Hoyo & Collar 2016). Both Central African Republic (CAR) and Republic of Congo, which border the Ubangi and Congo Rivers to the west, are relatively poorly studied ornithologically, and there appear to be few specimens of *nitens* in collections from these countries. Although I have not personally been able to examine material from either, Patrick Boussès, Muséum national d'Histoire naturelle (MNHN), Paris and Nate Rice, Academy of Natural Sciences at Drexel

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University, Philadelphia (ANSP), have kindly assessed specimens in their care on my behalf. In particular, the former confirms that a specimen (MNHN-ZO-MO-1989-572) from La Maboké (03°54′N, 17°50′E), CAR—mentioned by Germain & Cornet (1994) but without subspecific determination—and the latter, that two (ANSP 160268, 160269) from Oka (03°35′S, 15°15′E), Republic of Congo, as well as a third (ANSP 122654) from Berbérati (04°16′N, 15°47′E), CAR, are nominate *nitens*—the last already published as such by Stone (1936: 587)—identifications which appear to me to be correct on the basis of photographs. La Maboké and Oka are, respectively, some 90 km west of the Ubangi River and 60 km northwest of the Congo River. Since the two localities—the former within 100 km of Bangui, the latter equally close to Brazzaville—span much of the latitudinal extent of suitable habitat, the assessment that *nitens* occurs throughout the Lower Guinea forest zone appears correct. Although the distribution map of *nitens* in Borrow & Demey (2014) left blank a large expanse of east-central Republic of Congo, covering much of the distance between these two sites, this is thought to reflect a lack of information rather than genuine absence. In summary, the evidence suggests that *centralis* and *nitens* are narrowly allopatric, separated by the Congo and Ubangi Rivers.

To my knowledge, the specimens of nominate *nitens* from Ganda Sundi (04°52′S, 12°52′E), Kongo Central [= Lower Congo], in the coastal far west of DR Congo (Chapin 1953), remain the only ones from the country. Its continued presence in the region is implied by some relatively recent field observations (Ayer 2011, Liyandja *et al*. 2015).

At RMCA, I was able to examine the specimens that Barrow *et al*. (2016) sampled and can confirm that both are *centralis*. One originated from Boende (00°14′S, 20°50′E), Tshuapa District, Équateur Province (now Tshuapa Province). Material from this part of DR Congo had previously been attributed by Schouteden (1961) to *centralis*. The second sample was said by Barrow *et al*. (2016) to have been collected at 'Kilungu', apparently an error for Kiliungu (03°07′S, 28°14′E), Kivu (now Sud-Kivu) Province, from where Prigogine (1984) reported a specimen of *centralis*. The catalogue number / sample reference of this specimen was given by Barrow *et al*. (2016) in their Table S1 as 77-44-A-18 while in their Figs. 2 and S1 it appeared as 77-14-A-18; the latter is correct.

Confirmation that these specimens, along with all others from interior DR Congo, are *centralis*, casts new light on the results of the genetic analysis presented by Barrow *et al*. (2016). Their study of sections of two mitochondrial genes (cyt B and ND2) found that *nitens* divided into two well-marked clades, one comprising material of the nominate from Liberia and Côte d'Ivoire, the second the two DR Congo—*centralis*—samples, between which the sequence divergence was some 4%. Although the study was limited in sample size and to mitochondrial DNA alone, this is nonetheless a conspicuous result. While they found the relationship between these lineages to be unresolved—maximum likelihood phylogenetic analysis placed nominate *nitens* as basal to all others; Bayesian analysis put *centralis* in this position, with poor support for either—both sets of results indicated *nitens sensu lato* was sister to all other *Psalidoprocne*, with a mean sequence divergence of 3.7%. It is striking that the size of the divergence between the *nitens* clades was comparable to that between them and those of the four other recognised *Psalidoprocne* species, samples of all of which were analysed by Barrow *et al*. (2016), and irrespective of the fact that some of the clades revealed by their study did not fully correspond with current taxonomic treatments.

Further genetic study is clearly required to resolve the relationship between the lineages of *nitens sensu lato* and this needs to include samples from Lower Guinea: the provenance of the *nitens* specimens sampled by Barrow *et al*. (2016)—Liberia and Côte d'Ivoire—means that populations from east of the Dahomey Gap have yet to be analysed. The possibility therefore remains that these could prove to be closer genetically to DR Congo material,

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such that the discontinuity might fall between the Lower and Upper Guinea forest blocks. Nothing was found in specimens, however, to suggest that this might be so: no differences in plumage or bare-part coloration were apparent between those of nominate *nitens* from Lower and Upper Guinea. While there were some minor mensural differences, with the sample from Lower Guinea averaging somewhat larger, these were insufficient to invite further enquiry (data not shown). Despite this, it remains the case that genetic sequence data are needed for material from this region.

That caveat notwithstanding, the results of the existing genetic analysis, combined with the differences in morphological characters reported here, call for a re-evaluation of the taxonomic rank of *centralis*. With a total score of 7 under the Tobias criteria, the threshold of species recognition is reached. Given this, and reinforced by the striking, if preliminary, molecular evidence of Barrow *et al*. (2016), the case for elevation of *centralis* to species level seems sufficiently strong to warrant adoption. If so, the new taxonomic arrangement and geographical ranges would become:

Western Square-tailed Saw-wing *Psalidoprocne nitens*
—Guinea to Ghana; south-east Nigeria east to Central African Republic and Republic of Congo and south to Cabinda (Angola) and extreme western DR Congo.

Congo Square-tailed Saw-wing *Psalidoprocne centralis*
—northern and central DR Congo.

The identity of the population in Uíge Province, north-west Angola (Dean *et al*. 1988, Mills & Tebb 2015) is, in the absence of specimens or other evidence, unproven and therefore its placement uncertain. The Uíge record reported by Dean *et al*. (1988) was omitted from Dean (2000) and not mentioned by Mills & Tebb (2015). If, as seems most likely, it is attributable to *nitens*, it would be the only such population to occur south of the Congo River. That being so, pending further information, it is here left unassigned.

The English names offered reflect their relative distributions: although the modifier 'Eastern' is an obvious alternative for *centralis*, it does not sit comfortably with the specific epithet, while that suggested indicates that it is endemic to DR Congo.

There are unlikely to be any conservation implications arising from this split, should it be adopted, for although reliant on forest, both species have extensive distributions.

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