

Species limits in the Golden Bulbul *Alophoixus* (*Thapsinillas*) *affinis* complex

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The Golden Bulbul *Thapsinillas affinis* of the Moluccan islands, Sula archipelago, Banggai islands, Togian islands and Sangihe, Indonesia, was until recently treated in *Alophoixus* before being placed in the resurrected genus *Thapsinillas* and shortly afterwards split into Northern and Southern Golden Bulbuls *T. affinis* and *T. longirostris*, but with a general consensus that a break-up into more species was required. We used plumage and morphometric analysis of museum specimens, supplemented by vocal samples, to determine where new species limits might be drawn. We found that the nine generally accepted subspecies break down into seven full species, five monotypic and two with two subspecies each: *T. chloris* on Morotai, Halmahera and Bacan (small, featureless; undifferentiated olive-green lores and ear-coverts, blackish base to submoustachial area; song reportedly a 'jumbled babbling'); *T. lucasi* on Obi (round yellow lores, yellow-tinged ear-coverts, seemingly simple often squeaky-toy-like vocalisations); *T. affinis* on Seram with race *flavicaudus* on Ambon (larger than previous two, with half-wedge yellow lores, broad yellow tips to tail, song a group of strong rich flat whistles); *T. mysticalis* on Buru (half-wedge yellow lores, partial yellow eye-ring, olive-green underparts, olive-grey tail, whistled phrases recalling domestic canary); *T. longirostris* on Sula with race *harterti* on Peleng and Banggai (longest-billed, large, undifferentiated olive-green lores, song a loud jumble); *T. aurea* on the Togian islands (golden-yellow underparts, vague half-wedge yellow lores, blackish frontal superciliary line, yellow-tinged rump, song seemingly more complex than in *longirostris*) and *T. platenae* on Sangihe (vivid yellow chin and submoustachial area to throat and breast, bright yellow triangular lores, almost-complete yellow eye-ring, song seemingly simple and nasal). Comprehensive vocal sampling and molecular work may shed light on the origins and colonisation routes of this geographically unusual cluster of species.

INTRODUCTION

The taxonomy of the Golden Bulbul *Alophoixus* (*Thapsinillas*) *affinis* complex of Wallacea, Indonesia, has long been considered problematic, owing to the considerable variation in plumage pattern and size shown by most of its subspecies (Hartert 1922, Delacour 1943, White & Bruce 1986). These subspecies possess an unusual and indeed unique distribution for a species in the region, in the geographic sequence given by White & Bruce (1986) as follows: *chloris* (North Moluccas: Morotai, Halmahera, Bacan); *lucasi* (Obi); *affinis* (Seram); *flavicaudus* (Ambon); *mysticalis* (Buru); *longirostris* (Sula); *harterti* (Peleng, Banggai); *aurea* (Togian Islands) and *platenae* (Sangihe).

It is perhaps a measure of the uncertainty surrounding this complex that it has appeared in so many generic guises in the past hundred years. Until at least 1922 it was largely treated in *Criniger* (e.g. Wallace 1862a,b, 1863, Blasius 1888, Hartert 1903, 1922), but Delacour (1943) placed it in *Microscelis* (subgenus *Iole*), Rand & Deignan (1960), Morony *et al.* (1975) and Andrew (1992) in *Hypsipetes*, White & Bruce (1986) and Coates & Bishop (1997) in *Ixos*, and Sibley & Monroe (1990) and Inskipp *et al.* (1996) in *Alophoixus*. Finally Dickinson & Gregory (2002) resurrected the genus *Thapsinillas* for the complex (a decision we follow hereafter), citing as diagnostic characters 'typically dark oily green [plumage], relieved by areas of yellow in some forms; crown not crested and feathers only slightly elongated; bill much like *Iole* but perhaps more hooked and with lower mandible deeper; rictal bristles fewer and weaker', but unaccountably omitting mention of the key criterion in the original description, namely that 'from all the related genera with lengthened nostrils *Thapsinillas* may easily be distinguished... by its very short tarsus, this being considerably less than the exposed culmen' (Oberholser 1905).

Continuing this theme of taxonomic hesitancy, both Dickinson & Gregory (2002) and Dickinson & Dekker (2002) suspected that the variation between the subspecies in this resurrected genus 'will justify subdivision into two to four species'. However, Delacour (1943) bluntly cited 'distribution' as the reason to resist a split into two species based on 'size and tail pattern' (larger taxa with 'particolored tail, dark olive and bright yellow', smaller ones

'strangely similar to *M. ictericus*' (=Yellow-browed Bulbul *Iole indica* in Inskipp *et al.* [1996]). By contrast, Fishpool & Tobias (2005) took what they regarded as 'a preliminary measure' by separating the 'Northern Golden Bulbul' *T. longirostris* (with *chloris*, *lucasi*, *harterti*, *aurea* and *platenae*) from 'Southern Golden Bulbul' *T. affinis* (with *flavicaudus* and *mysticalis*) on account of reported vocal differences between these groups, thereby 'drawing attention to the broadest rift in the complex, and paving the way for appropriate fieldwork and research into the song, morphology and genetics of all taxa involved'. These authors, like Dickinson & Dekker (2002), judged that 'further subdivision' would almost certainly be required, 'in view of significant differences between the various island populations'. This was partially achieved by Rheindt & Hutchinson (2007), who, without going into detail, considered 'Southern Golden Bulbul' to comprise two morphologically and vocally distinct species, Buru Golden Bulbul *T. mysticalis* and Seram Golden Bulbul *T. affinis* (including *flavicaudus*).

Steadily accumulating evidence on apparent differences in vocalisations of most of the taxa in the *Thapsinillas affinis* complex now prompts a more detailed review of their morphological and morphometric characters in order to attempt to reach a further stage in the revision of the Golden Bulbul complex. As Fishpool & Tobias (2005) observed, this is important not least because 'some island races would prove to be very rare...' such that 'taxonomic review is vital for the compilation of a realistic conservation strategy for Wallacea, and must be made a priority'.

METHODS

We considered one line of hard evidence in this review, namely plumage and mensural characters from museum material, and supplemented it with morphological evidence from photographs as well as recordings and reports of vocalisations.

Museum specimens of Golden Bulbuls were examined (NJC) in the Natural History Museum, Tring, UK (NHMUK), Naturalis, Leiden, Netherlands (Naturalis), Staatliches Museum für Tierkunde, Dresden, Germany (SMTD), Staatliches Naturhistorisches Museum, Braunschweig, Germany (SNMB) and Zoologisches

Museum (Museum für Naturkunde), Berlin, Germany (ZMB). Each specimen was measured (by NJC) for length of bill (skull to tip), tarsus, wing (curved) and tail (tip to point of insertion), the characters of each taxon were logged in a matrix, and representative specimens were photographed. From these collections the numbers of specimens by taxon and island were:

- *chloris*—North Moluccas: 39 specimens, 10 from Morotai, 16 from Halmahera, 13 from Bacan (11 males [m], 8 females [f], 20 unsexed [u])
- *lucasi*—Obi: 13 (7 m, 5 f, 1 u)
- *affinis*—Seram: 12 (4 m, 3 f, 5 u)
- *flavicaudus*—Ambon: 8 (6 m, 1 f, 1 u)
- *mysticalis*—Buru: 21 (4 m, 10 f, 7 u)
- *longirostris*—Sula (Taliabu & Mangoli): 23 (7 m, 2 f, 14 u)
- *harterti*—Banggai (Banggai & Peleng): 13 (1 m, 2 f, 10 u)
- *aurea*—Togian: 2 (1 m, 1 f)
- *platenae*—Sangihe: 3 (3 m)

The large number of unsexed specimens and an occasional numerical bias in the sexed specimens prompted a comparison of males only (Table 2), but the full figures and standard deviations given in Table 1 are used in the analysis of character difference below.

Photographs of live birds were assembled from our own collections (JAE, ROH), from those of colleagues, contacts and friends, and (with due care as to identification and provenance) from the internet (notably Oriental Bird Images). Sound recordings were likewise assembled from our own collections (JAE, ROH),

Table 1. Means and standard deviation (in brackets) of four morphometric variables in all specimens of the *Thapsinillas* complex. Notes: ^a = sample size reduced by 1; ^b = sample size reduced by 2; ^c = sample size reduced by 6. These reductions were caused by damage to the parts being measured or (in the case of tarsi) their inaccessibility (being tucked tightly against the body).

Taxon	n	Bill	Wing	Tarsus	Tail
<i>chloris</i>	39	22.3 (1.06) ^a	98 (3.44) ^a	18.6 (0.6)	82.9 (2.36) ^a
<i>lucasi</i>	13	23.4 (0.53) ^a	104.8 (3.11)	18.6 (0.69) ^b	86.3 (2.06)
<i>affinis</i>	12	27.8 (1.17)	109.2 (4.35)	20 (0.78) ^a	86.8 (3.49)
<i>flavicaudus</i>	8	28.4 (0.94)	111.4 (3.25)	20 (0.95)	93.5 (2.93)
<i>mysticalis</i>	21	25.7 (0.88)	104.4 (4.48)	19.6 (0.82) ^a	92.4 (3.37)
<i>longirostris</i>	23	29.8 (1.31) ^a	115.6 (4.62)	21.2 (0.56) ^c	106.9 (4.56)
<i>harterti</i>	13	28.9 (1.24) ^a	120.7 (5.11)	21.2 (0.72) ^a	108.7 (3.61) ^b
<i>aurea</i>	2	27.1 ^a	117	20.5	108
<i>platenae</i>	3	27.7	121	20	109.3

Table 2. Means of four morphometric variables in male specimens of the *Thapsinillas* complex. Note: ^a = sample size reduced by 1.

Taxon	n	Bill	Wing	Tarsus	Tail
<i>chloris</i>	11	22.7 ^a	99.8	18.6	82.8
<i>lucasi</i>	7	23.6 ^a	106	18.7	86.3
<i>affinis</i>	4	28.4	109.5	20 ^a	87.3
<i>flavicaudus</i>	6	28.1	110.5	19.8	92.7
<i>mysticalis</i>	4	25.8	109.3	19.8	92.8
<i>longirostris</i>	2	28.7	112.5	21.5	105.5
<i>harterti</i>	1	29.5	123	22	113
<i>aurea</i>	1	27.1	124	21	111
<i>platenae</i>	3	27.7	121	20	109.3

those of others and the internet (AVoCet [AV], Xeno-Canto [XC] and the Internet Bird Collection [IBC]). They were compared qualitatively and informal descriptions and transcriptions of them prepared. Use of capitals in the transcriptions indicates emphasis (volume).

We measured the degree of phenotypic differentiation between each taxon using a system in which an exceptional difference (a radically different coloration, pattern or vocalisation) scores 4; a major character (pronounced difference in body part colour or pattern, measurement or vocalisation) scores 3; a medium character (clear difference reflected, e.g. by a distinct *hue* rather than different colour) scores 2; and a minor character (weak difference, e.g. a change in shade) scores 1; a threshold score of 7 is set to allow species status; species status cannot be triggered by minor characters alone, and only three plumage characters, two vocal characters, two biometric characters (assessed for effect size using Cohen's *d* where 0.2–2 is minor, 2–5 medium, 5–10 major and >10 exceptional), and one behavioural or ecological character may be counted (Tobias *et al.* 2010). Where additional characters are apparent but under these rules cannot be scored, the formula 'ns [1]' is used, signalling 'not scored' but giving in parenthesis the estimated value of the difference in question.

RESULTS

We review each taxon in turn for its diagnostic morphological, morphometric (Tables 1 and 2) and acoustic distinctiveness. However, the acoustic component of the analysis remains qualitative, because the vocalisations of each taxon appear to be variable and complex, so that only tentative and general comments on their diagnostic distinctiveness can be ventured from the limited and fragmentary material available. From this evidence a shared pattern of song nevertheless seems to exist between all taxa, which involves a hesitant series of staccato nasal or guttural notes that accelerate and switch abruptly either to a short jumble of babbled and fluty notes on often widely differing pitches or to a short series of fairly even whistles; but most taxa sound in varying degrees different, and if these findings are replicated widely by other recordings in future then they will add substantially to the case made below for the redrawing of species limits based on morphology.

Photographs and museum label data indicate that there are no significant differences in the bare-part colours of any of the taxa: basically the bill is shiny black to plumbeous, reflecting light and looking whitish at some angles or in some photographs; the legs are brownish-grey; and the iris is reddish-brown to brown. There are slight variations in how museum labels report iris colour: for example, for the taxon *mysticalis* NHMUK 1969.29.203 gives 'iris brown', 1923.9.15.91 'iris dark crimson' and 1923.9.15.92 'eye red', while the describer, Wallace (1863), also gives 'iris red', although photographs repeatedly show reddish-brown irides. Hombron & Jacquinot (1841) likewise gave '*iris rouge*' for their new species *affinis*, but in photographs it is reddish-brown. Two of the three known specimens of the very rare *platenae* are labelled by the collectors as having '*iris: rot-braun*'.

Sample sizes of specimens of *aurea* and *platenae* were respectively two and three; and recordings of all taxa were inadequate in number, duration and representativeness. However, no clinching evidence depends on data stemming from these limited sources.

In the following account, the size and shape of (yellow) lores are mentioned and require definition here. 'Round' (taxon *lucasi*) lores means that the shape of the yellow patch is large and relatively circular, and comes into contact with the leading edge of the eye. 'Half-wedge' (taxa *affinis*, *flavicaudus*, *mysticalis* and *aurea*) indicates that the patch of yellow is compressed into a flat triangular

bar close to the line of the upper mandible and separated from the eye by an olive-green area. ‘Triangular’ (taxon *platenae*) describes a fuller area of yellow than the wedge, extending to the eye.

Taxon *chloris* (Morotai, Halmahera, Bacan)

This form is characterised by its small size (it is the smallest of the taxa in the complex) and its relatively featureless plumage; no differences were apparent between the three island populations. It differs from its geographically and morphologically closest relative, *lucasi* of Obi, by its olive-green *vs* yellow lores (3), olive-green *vs* olive-yellow ear-coverts (1), blackish base to submoustachial area *vs* all olive-green (2) and slightly smaller size and distinctly shorter wing (effect size -2.28) (2)—total score 8.

Originally described by Wallace (1862a) under the pre-occupied name *simplex*, this form was renamed and further described by Finsch (1867), who pointed out that Wallace failed to mention the blackish submoustachial line. Finsch found this a very distinctive (‘*ganz besonders*’) character, but in specimens examined for this review it proved to be constant but somewhat variable in strength.

Fishpool & Tobias (2005) provided a description (‘a hurried, cheery, jumbled babbling’) that conforms closely with the general structure of *Thapsinillas* songs available to us. However, brief recordings by ROH of two consecutive song strophes consist (after 2–3 brief staccato introductory *twis* notes) of three or so simple clear paired whistles, high-pitched at the start but each pair slightly lower than the preceding, morphing subtly into a slightly more drawn-out double-whistle with the stress on the first syllable, each again slightly lower than the last: *pi-pi, pi-pi, pi-pi, wiwi, wiwi, wiwi, wiwi*, thus fairly closely resembling the falling-pitch song of *T. affinis* (below). Otherwise the only recording we have found is of a bird giving quiet thin *sii* calls in apparent mild alarm or for contact (IBC video under *T. longirostris*, ‘A bird softly calling from a branch’).

Taxon *lucasi* (Obi)

Hartert (1922), while itemising Rothschild’s type specimens and therefore not reviewing the Golden Bulbul complex in any detail, remarked of *lucasi*, which he himself established as a full species (Hartert 1903), that ‘though differing by its yellow lores and larger size, [it] can hardly be anything but a subspecies of *chloris*, and lumped it accordingly (albeit keeping *chloris* separate from *affinis*). However, the morphological differences with *chloris*, as scored above, gainsay this judgement.

The island of Obi is roughly equidistant from Seram, Buru and Taliabu, where three further relatives of *lucasi* occur, respectively *affinis*, *mysticalis* and *longirostris*. Of these, *lucasi* is closest in size and general structure to *mysticalis* and remotest from *longirostris*, but differs in turn from

- *mysticalis* by its shorter bill, tarsus and tail (effect size for bill -3.22) (2); larger, much rounder yellow lores (2); lack of yellow partial eye-ring (2); largely yellow chin to vent *vs* largely (yellow-tinged) olive chin to vent (3); yellower ear-coverts (ns [1])—total score 9;
- *affinis* by its smaller size (effect size for bill -4.83) (2); larger, rounder yellow lores (2); yellower ear-coverts and submoustachial area (at least 1); paler and less extensive olive-green on breast and flanks (ns [1]); lack of yellow tips to uppertail-coverts (ns [1]); olive-grey *vs* broadly yellow-tipped and -edged rectrices with entire undertail bright yellow (3)—total score 8;
- *longirostris* by its smaller size (effect size for bill -6.03) (3); large round yellow *vs* olive-green lores (3); all-olive-grey *vs* bright yellow-fringed (on inner webs) rectrices (3); narrow whitish *vs* narrow yellow inner fringes to tertials (1); yellower ear-coverts (ns [1])—total score 10.

Recordings kindly sent by M. Thibault reveal only very simple calls: (a) a flat nasal penetrating *tuuu-tuuu-tuuu-tuuu* (3–4 notes separated by short pauses); (b) a high, thin, dropping-then-rising *TSIIuuuuuu*, starting like a squeaky toy but ending more richly whistled, this evidently the *tweeuwip* described by Linsley (1995) and mentioned in Coates & Bishop (1997); and (c) an equally high thin squeaky toy *zu-WIIIT! zu-WIIIT! zu-WIIIT!*—these last sounds not dissimilar to those recorded from *platenae* (see below) but much thinner in tone, lacking the latter’s thrush-like richness. Linsley (1995) also mentioned groups giving ‘raucous calls reminiscent of *Charmosyna placentis* although without the harsh or scratchy quality of that species’.

Taxon *affinis* (Seram)

Morphological differences from *lucasi* (and by extension *chloris*), *aurea* and *platenae* are scored above and below. It differs from

- *chloris* by its greater size (effect size for bill length 4.68) (2); half-wedge yellow lores *vs* all olive-green lores (2); yellow tips to uppertail-coverts (1); rectrices broadly tipped and edged yellow (entire undertail bright yellow) *vs* olive-green (3)—total score 8;
- *mysticalis* by its slightly larger size (effect size for bill length 1.99) (1); lack of partial yellow eye-ring (2); yellow *vs* olive-green belly to vent (3); rectrices broadly tipped and edged yellow (entire undertail bright yellow) *vs* olive-green (3); yellow tips to uppertail-coverts (ns [1])—total score 9;
- *longirostris* by its rather smaller size and notably shorter tail (effect size for latter -4.82) (2); half-wedge yellow *vs* olive-green lores (2); darker and more extensive olive-green breast (2); different tail pattern, with broad yellow tips and all-yellow undersides *vs* broad yellow edges on both surfaces (3)—total score 9.

A recording by F. R. Lambert (AV4805, XC67566) captures a single song strophe which starts with some scratchy clucking calls and then abruptly turns into a sequence of seven strong rich flat whistles, each longer and perhaps a shade lower in pitch than the previous, the last note most obviously lower: *p’tupwupwud’p-p’TI-WI-WII- WIII-WIIII-WIIII-WUÜÜÜÜ*. Another, by JAE, involves a very similar song but with the last two notes rolled throatily. Rheindt & Hutchinson (2007) also describe this song (‘a clean descending melodious whistle’) and present a sonogram of it. Isherwood *et al.* (1997) found that at one of their study sites (Wae Salas) ‘this species was found to possess a distinct variety of the usual call’, and Coates & Bishop (1997) independently mentioned two types of song (see ‘Conclusion and conservation’).

Taxon *flavicaudus* (Ambon)

Bonaparte (1850) gave a nugatory diagnosis of this taxon (translated from Latin: ‘olivaceous green, greenish-yellow below; throat, undertail mostly strong yellow’), but his scientific name nails the only discernible plumage difference from *affinis*: in the rather small sample in NHMUK the specimens appear to have less olive markings in the rectrices than those of *affinis* and hence seem more fully yellow-tailed. White & Bruce (1986) suggested that *flavicaudus* males ‘tend to be lighter and yellower dorsally and on the breast, with a deeper yellow throat’, but admitted that ‘it is only a slightly differentiated form’. Measurements suggest that *flavicaudus* is also marginally larger than *affinis* (Tables 1 and 2). Consequently, always accepting that a larger sample of *flavicaudus* may show all these slight differences to be inconstant, *flavicaudus* is provisionally retained here as a valid taxon, but it is clearly conspecific with *affinis*. Given the proximity and biogeographical unity of Seram and Ambon, this is hardly surprising.

Recordings of *flavicaudus* could not be found.

Taxon *mysticalis* (Buru)

Differences from *lucasi* (and by extension *chloris*) and *affinis* (including *flavicaudus*) are scored above; those from *aurea* and *platenae* are given below.

Wallace (1863) gave this taxon the name *mysticalis* (not, incidentally, *mystacalis*), meaning moustached (Jobling 2010), evidently because of its 'remarkable half-yellow gape-bristles'. This character (rectal bristles yellow basally, black distally) is not particularly striking in specimens or photographs, nor is it unique within the complex, being shared with *platenae* and to a lesser degree with other taxa which show yellow lores; but olive-lored member taxa have all-black rectal bristles). Unique to *mysticalis*, however, is the extent of olive-green on the undersides, with only vague areas on the chin and vent being distinctly shaded yellow, the rest having the merest yellow tinge (score 3). It further differs from *longirostris* (including *harterti*) by its considerably smaller size and notably shorter tail (effect size -3.62) (2); half-wedge yellow *vs* olive-green lores (2); partial yellow eye-ring (ns [2]); dark olive-grey *vs* bright yellow-fringed rectrices (3); narrow whitish *vs* narrow yellow inner fringes to tertials (ns [2])—total score 10.

A recording by F. R. Lambert (AV4147, XC 67565) consists of single nervous low clucks, with occasional higher, very rapid chatters, and three times a drawn-out, flat whistle with a very curt downward inflection at the end, *tweeeeee(wh)*. These three calls also feature in recordings by JAE, but with the drawn-out whistle starting with a distinct short higher strangled tone, *tswiUUUUUU(wh)*. However, other recordings by JAE also capture a series of song-phrases, starting with hesitant staccato accelerating notes before breaking into longer, musical whistles on (sometimes greatly) varying pitches and sometimes with glissandos, somewhat reminiscent of a domestic canary: *pip up... pip-up... pipup-pipupipuu WEE-WEE-WEE-puu-puu-puu-WEE-puii-PII-WEE-WEE-WEE*. Jepson (1993) reported: 'Call comprised a descending "si-si-seew seew seew", and typical bulbul chattering notes'.

Taxon *longirostris* (Sula)

As the name given it by Wallace (1862b) indicates, this form is the longest-billed taxon in the complex, although *flavicaudus* runs it close, and it is altogether the largest form, with the possible exception of *aurea*. It differs from *lucasi* (and by extension *chloris*), *affinis* (including *flavicaudus*), *mysticalis*, *aurea* and *platenae* by the characters scored under those taxa. It differs little from *harterti* (see below).

Recordings of *longirostris* by ROH all contain a song that consists of a throaty, rolling *ch(a)rrrr*, rapidly repeated several times and accelerating before breaking into a loud jumble of short whistled notes, some very clear: *charr... charr... charr-charr-charr-didlyDOOdiblyDOOdiblyDOO*; or *charr... charr... charr-charr-charr-wididlyWAAbeDibeDI*, etc. However, the *charr* component may not be obligate, given the evidence under *harterti* below.

Taxon *harterti* (Peleng, Banggai)

Stresemann (1912) separated this form from *longirostris* on account of the darker olive coloration of the breast, less yellow upperparts and narrower yellow edges to the outertail. Specimens in SMTD, where 10 *harterti* are held alongside 7 *longirostris*, confirm this diagnosis; but as Eck (1976) observed, *harterti* is 'only subtly differentiated' (which is true also of its morphometrics: see Table 1) and on morphological grounds it must remain a subspecies of *longirostris*, as biogeography might predict.

Recordings by ROH reveal song-phrases similar or identical to those of *longirostris*; however, two by P. Verbelen (AV3344, 3345) are of a singer that gives several clucks and only one very brief *charr* before launching into its song, suggesting that the *charr* component may be a separate call that is sometimes run together with the song.

Taxon *aurea* (Togian)

While noting the morphological proximity of this form to *longirostris* (which is indeed the closest taxon in plumage and size), Walden (1872) diagnosed it on its smaller size, 'much shorter bill' and 'bright golden colouring of its plumage'. However, while a female specimen (ZMB 2000/26784) conforms in these respects, the type of this taxon, a male, actually has wing and tail longer and bill only 1.6 mm shorter than the mean for two male *longirostris* (Table 2). Both specimens are distinguished by their notably more golden-yellow underparts (2); much reduced yellow fringes to the tips and inner vanes of the rectrices (2); vague half-wedge yellow lores below a very narrow blackish-brown frontal superciliary line and notably darker olive-green crown (2); rump a shade yellower, less green (ns [1], well shown but perhaps a shade too obvious in Fishpool & Tobias 2005: 236); and presumed shorter bill (allow 1)—total score 7.

Acoustically, *aurea* seems rather close to *longirostris/harterti*. However, multiple recordings by ROH on different dates suggest that (a) the homologous call in *aurea* to the '*ch(a)rrr*' call of *longirostris* lacks the latter's rolling throaty quality, and (b) the short fluty babbling song is somewhat abrupt and simple in *longirostris* whereas in *aurea* it can be more protracted and typically ends with a set of very rich notes, slightly tailing off in pitch and volume, vaguely recalling the yaffling cadence of a Green Woodpecker *Picus viridis*.

Taxon *platenae* (Sangihe)

This is the most isolated, most threatened and in some ways most distinctive form in the Golden Bulbul complex. Blasius (1888), working with two syntypes (illustrated, with a photograph of one of them, in Hevers 2004), accurately characterised this bird as closest to *aurea* and *longirostris* but distinguished by its shorter bill (this is true for *longirostris* but not for *aurea*), almost entirely uniform olive-green upperparts, and vivid yellow colour of the chin, throat, submoustachial area, eye-ring and inner vanes of all five outer rectrices. Our own examination of the only three specimens in existence (SNMB N13945 and N43300, and RMNH [Naturalis] 84768) indicates that it is distinguished from all other taxa by its bright yellow triangular lores (much fuller and brighter than the yellow triangular lores of *mysticalis* against which it is here scored on this feature) extending to and contiguous with the eye-ring (2); bright yellow eye-ring, only broken by a narrow gap at the rear of the eye (much more obvious and complete than in *mysticalis*, in which it is confined to the 'brow' and a short arc on the lower rear edge) (3); yellowish ear-coverts and yellow submoustachial area, producing a broad yellow throat (ns [2]); and very broad yellow fringes to the inner vanes of the rectrices extending the length of the feathers, creating a different pattern from other taxa (2)—total score 7.

A recording by P. Verbelen (AV3347) consists of a vigorously delivered series of fairly short, simple strophes composed of little groups of repeated thrush-like whistles. Recordings of this form by ROH reveal a consistent pattern of song, comprising two short abutting components, (a) four nasal but rich notes, each rising in pitch but each lower than the previous, the last cutting to (b) usually three high whistled notes, approximately: *cui-cui-cui-cui-DEEP-pDEEP-pDEEP!* (As noted above, in structure these sounds vaguely resemble those on a recording of *T. lucasi*, but are much richer and less strangled in tone.)

CONCLUSION AND CONSERVATION

Fishpool & Tobias (2005) separated the Golden Bulbul into Northern *longirostris* (with *chloris*, *lucasi*, *harterti*, *aurea* and *platenae* as races) and Southern *affinis* (with *flavicaudus* and *mysticalis* as races) on account of their songs, the former lacking

the 'long sliding notes and descending cadence' of the latter, *affinis* and *flavicaudus* possessing 'a distinctive mournful series of sweet and minor-key notes, lasting 2–4 seconds, slightly erratic or meandering in pace and note length, but essentially slow and leisurely, sliding down scale almost throughout', *mysticalis* 'vaguely similar but much more complex'—and hence a reason why Rheindt & Hutchinson (2007) recommended its separation from *affinis*. However, while Coates & Bishop (1997) support the account of the voice of *affinis* ('main song... a lovely descending series of c. 15 short, clear, mellow whistles... slightly slurred as the song dies away') they also mention a second song type, 'a rapidly swelling series of 20–30 pure, high-pitched whistled notes that climbs to a notably high pitch and ends abruptly'. Moreover, the clear resemblance of songs of *chloris* and *affinis* tends to confound the notion of a north–south divide in song types. This all suggests that the vocalisations of the taxa in this complex may be considerably more varied but also perhaps ultimately more homologous than we yet know, and that the sample used in descriptions above should not be considered anything more than partially representative.

Even so, from the very limited material available to us we derive the impression that vocal differences largely support the seven-way split of the Golden Bulbul complex which the morphological evidence indicates, using the scoring system of Tobias *et al.* (2010):

- Halmahera Golden Bulbul *Thapsinillas chloris*
- Morotai, Halmahera, Bacan
- Obi Golden Bulbul *Thapsinillas lucasi*
- Obi
- Seram Golden Bulbul *Thapsinillas affinis*
- T. a. affinis* Seram
- T. a. flavicaudus* Ambon
- Buru Golden Bulbul *Thapsinillas mysticalis*
- Buru
- Sula Golden Bulbul *Thapsinillas longirostris*
- T. l. longirostris* Sula
- T. l. harterti* Peleng, Banggai
- Togian Golden Bulbul *Thapsinillas aurea*
- Togian Islands
- Sangihe Golden Bulbul *Thapsinillas platenae*
- Sangihe

The conservation status of these seven species will require formal assessment against the IUCN Red List criteria, but a few preliminary remarks may be made here. From evidence in Fishpool & Tobias (2005), our own observations in the field (JAE and ROH) and material cited below, the first six species in the list above are relatively common in their various woodland/forest habitats. Poulsen & Lambert (2000) tabulated records of *chloris* (Halmahera) indicating a high encounter rate, with birds found (albeit less commonly) even in mangrove. Linsley (1995) saw *lucasi* (Obi) in 'small numbers (less than ten)... daily', with two instances of breeding evidence 'in scrub on the edge of disturbed forest'. Bowler & Taylor (1989) reported *affinis* (Seram) 'common and widespread... in forested areas' from sea-level up to c.900 m, while JAE saw them up to at least 1,300 m; Isherwood *et al.* (1997) also found the species common. Jepson (1993) called *mysticalis* (Buru) 'common and widespread... in all types of forest' (confirmed in Poulsen & Lambert 2000, and by JAE, ROH pers. obs.). Stones *et al.* (1997) found *longirostris* (Sula, specifically Taliabu) 'abundant at each study site, in all habitat types surveyed, but most common in primary forest, both lowland and montane' (confirmed by JAE, ROH pers. obs.), while Indrawan *et al.* (1997) reported *harterti* (Peleng) as 'commonly seen' in 'groups of three to four birds... in degraded forest at Monggiyas' (confirmed by JAE, ROH pers. obs.). Coates & Bishop (1997) were concerned that *aurea* (Togian Islands) was 'apparently rare and local', but Indrawan *et al.* (2006)

documented records from three of the seven larger islands in the group, finding it 'relatively frequently' on Togian itself and 'relatively common' on Walea Bahi (confirmed by ROH pers. obs., and J. Riley *in litt.* 2013).

The status of *platenae* (Sangihe) is, however, worrying. Although Bishop (1992) observed it 'commonly in secondary woodland and mixed tree crop plantations' during a visit over 16–19 May 1986, others have not been able to repeat this finding (Riley 1997a,b). A year before, on 30 May 1985, a male specimen (RMNH 84768) was collected on Gunung (Gn) Sahendaruman in 'primary forest on eastern slope: 750 m: S of Liwung and SW of Kuma' (Naturalis label data) by F. G. and C. M. Rozendaal, but it took until November 1996 before the species was seen again, with records of three birds twice and one bird once on three days, all evidently in the same area on Gn Sahengbalira (Riley 1997b). These records were the only ones in four months' fieldwork in 1995 and 1996, when the only local people to recognise photographs of the species (presumably from museum skins) were 'in the village closest to the forest on Gunung Sahengbalira' (Riley 1997b). Further fieldwork on Sangihe between August 1998 and March 1999 led Riley (2002) to suggest that *platenae* 'is one of the island's most endangered species', being found only on Gn Sahendaruman with an estimated population of 50–230 birds. However, he noted that it was missed at one locality when not calling but found to be common there when it became vocal (Riley 2002), thereby confirming an earlier remark that 'this can be a cryptic species, despite its bright coloration' (Riley 1997b). Even so, visits to its small fragment of remaining habitat on Gn Sahengbalira in recent years have not produced any evidence to revise the view that this species is in trouble: JAE and ROH found four birds in August 2004, although a subsequent visit over two days in 2012 by ROH failed to record any. Of other observers visiting the area this century, P. Verbelen saw several in November 2008 but B. Demeulemeester, P. Gregory, J. Hornbuckle, C. Robson and M. Thibault (*in litt.* or verbally to JAE, ROH) all failed to find it. Consequently, we judge that the Sangihe Golden Bulbul now requires urgent attention in order to secure its future.

Clearly it would be valuable if this new arrangement of *Thapsinillas* were to be tested and corroborated by molecular study. Such work might also reveal the biogeographic history and colonisation routes of the taxa across this unusual range (which no other species or genus shares). Moreover, a far more comprehensive sampling of vocalisations would also be of great interest, in part simply to determine the variation within individual taxa, in part to assess more confidently the degree of difference between taxa, and in part to test whether such differences correspond to the hoped-for molecular evidence.

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