# Zosterops white-eyes in continental South-East Asia. 2: what is Zosterops auriventer Hume?

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# *Zosterops* white-eyes in continental South-East Asia. 2: what is *Zosterops auriventer* Hume?

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Summary.—An accompanying paper (Wells 2017, this issue) presented reasons for treating the type series of *Zosterops auriventer* Hume, 1878, type locality Tavoy, south-east Myanmar, as a taxonomic composite, and for re-naming its (distantly allopatric) paratypes. Conventionally classified as a subspecies of Oriental White-eye *Z. palpebrosus*, the de-coupled *auriventer* is now known solely from its holotype and one other Myanmar specimen. Among provisional contenders, it is shown to be less convincingly related to *Z. palpebrosus* (as currently defined) than with the morphology of regionally widespread, inland forest-dwelling Everett's White-eye *Z. everetti*—and to become the species name of the latter's continental Asian populations should, as suggested, *everetti* be returned to the status of Philippine endemic. As before, the term 'continental' includes islands in South-East Asian shelf waters, i.e., out to the Greater Sundas and their satellites.

The de-coupling via morphology and habitat of *Z.* (*palpebrosus*) *auriventer* from its Malacca Straits paratype population (re-named *Z. p. erwini*) (Wells 2017) invites a re-opening of the century-old question of where, at species level, taxon *auriventer* actually belongs. A. O. Hume's type description of *Z. auriventer* (Hume & Davison 1878) emphasised a bold yellow stripe running from vent to mid-breast level, fronted and flanked by grey. Additional to *erwini*, however, at least six other white-eye taxa breeding in continental South-East Asia show some evidence of this character. *Z. p. williamsoni* and *Z. p. buxtoni*, respectively, of mangrove forest from the north-east (north?) Thai-Malay Peninsula to Cambodia, and inland, mainly slope-land forests of Sumatra and far western Java, are both more similar to *erwini* than to *auriventer*, especially in tones of upperparts green. They also show a yellow supra-loral stripe, which is actually broader and more prominent than in *erwini*, whereas the cap of *auriventer* is uniformly green with no stripe. In addition, *buxtoni* has uppertail-coverts, merging onto rump, conspicuously yellow, and an all-black tail (lacking any green on outer webs). These characters reappear in an unidentified Bornean coastal white-eye (Wells 2017) but otherwise are unshared.

The third contender (Figs. 1–2) comprises intermediates between the yellow- and grey-bellied morphs of *Z. p. siamensis* of more northerly, mainly upland forests, e.g., USNM 534535 and 535703 from montane forest edge on Doi Inthanon, north-west Thailand. Mees (1957) may have had such grey-flanked individuals in mind when he maintained the link between *auriventer* and species *Z. palpebrosus*. Over most of its range, however, *siamensis* shows contrasting yellow above the lores and bill base and, irrespective of underparts colour and pattern, aligns with other northern and western subspecies of *Z. palpebrosus* in being at least as bright Citrine Green (Smithe 1975) above as *erwini*, *williamsoni* and *buxtoni*, *contra* the more olive-toned, mid-green *auriventer*. It also differs from *auriventer* in wingtip shape (Table 1), and the outer webs of the rectrices of *siamensis* are broadly green-edged virtually to their tips, as in northern nominate *palpebrosus*, whereas green edging on the

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TABLE 1
Morphometrics (mm; range and mean) of the *Zosterops* taxa discussed in this paper. Wing, tail and shortfall of p5 and p9 (descendant) behind wingtip measured as max. chord; tarsus from tarso-tarsometatarsal notch to third toe flexure point; bill from anterior edge nasal groove to tip. Sexes combined (label determinations discounted).

| Taxon | *n* | Wing | Tail | Tail / wing ratio (×100) | P5 <wingtip | P9 < wingtip | Tarsus | Bill |
|---|---|---|---|---|---|---|---|---|
| *auriventer* | 2 | 52, 52 | 35.6, 36.7 | 68, 71 | 4.1, 5.4 | 1.2, 1.2 | 14.3, 14.7 | 6.8, 7.1 |
| *wetmorei* | 16 | 51.0–54.5 (52.7) | 30.6–36.1 (34.6) | 59–70 (65.7) | 1.9–3.3 (2.5) | 2.1–3.4 (2.8) | 14.1–14.5 (14.3) | 7.0–8.1 (7.3) |
| *tahanensis* | 12 | 49.5–54.0 (51.9) | 27.0–35.1 (33.2) | 55–70 (64.1) | 2.3–4.5 (3.7) | 1.1–2.4 (2.0) | 13.1–14.5 (13.8) | 6.4–6.8 (6.6) |
| *medius* | 12 | 48–51 (48.9) | 29.3–33.6 (31.2) | 60–69 (63.7) | 1.7-3.8 (2.9) | 1.7-3.4 (2.3) | 12.8–14.2 (13.5) | 6.0-6.8 (6.4) |
| *siamensis* (Mount Mulayit) | 8 | 52.0–54.5 (53.0) | 34.0–38.4 (36.1) | 65–71 (68.0) | 0.7-2.6 (1.8) | 2.8–4.6 (3.9) | 14.2–16.6 (15.0) | 5.2–7.2 (6.4) |
| *basilanicus* | 7 | 53–56 (54.7) | 37.3–40.1 (38.4) | 68–72 (70.0) | 0.0–2.6 (1.7) | 2.7–5.3 (4.4) | 14.3–15.5 (14.9) | 6.1–7.9 (6.9) |

tail of *auriventer* is no more than a fine fringe reaching not more than halfway towards the feather tips.

The museum record offers a further, distributional clue to relatedness, centred on Mount Mulayit (2,100 m) in the Dawna Range of Tenasserim (south-east Myanmar), *c*.200 km north of the Tavoy district type locality of *auriventer*. L. Fea collected the more northerly of the two accepted specimens of *auriventer* at 300–400 m elevation just south-west of this peak, whereas on the mountain itself he, and a few years before him Hume's curator W. R. Davison, collected yellow-bellied *siamensis*, and only *siamensis*, from the summit zone down to 1,200 m (Hume & Davison 1878, Salvadori 1888). Based on March and April collection dates, potentially, in this area at least, the breeding season ranges of *auriventer* and *siamensis*, two different-looking birds, might have approached one another closely. E. C. S. Baker (NHMUK egg collection records) implied actual overlap, arising from nests of *siamensis* and *auriventer* both reported at Tavoy itself, but this must be rejected as Baker had acquired his clutches from other collectors without full data. Their identity has not been verified independently below genus level (D. G. D. Russell pers. comm.).

Other, as far as is known entirely allopatric, yellow-striped candidates form what Mees (1954) chose to lump with Everett's White-eye *Zosterops everetti* Tweeddale, 1878, widespread in the Philippines and (see below) accepted by him as represented by subspecies *tahanensis* in inland forests of Borneo and the southern Thai-Malay Peninsula, and *wetmorei* Deignan, 1943, in the northern half, north to 11°40′N on the Thailand / Tenasserim upland divide (Meyer de Schauensee 1946). During mid-March 1966, B. F. King collected three additional *wetmorei* (USNM 535707–709) in montane forest on Khao Soi Dao Tai, Chanthaburi province, south-east Thailand, and in July 2004 (Pierce & Round 2006) two *Z. everetti* were mist-netted at 14°26′N in upland Khao Yai National Park, east-central Thailand, on a latitude with confirmed *auriventer* localities (Fig. 3), but a published photograph of the wingtip of one of the two captures showing disposition of the tips of its outer primaries indicates *wetmorei* (see below).

In ventral view (Fig. 1), on colour pattern—allowing for some plumage soiling—the two Tenasserim *auriventer*, Soi Dao Tai specimens, representative *wetmorei* from the Thai-Malay Peninsula including topotypes, representative *tahanensis* from the Peninsula and

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Figures 1–2. The *Zosterops auriventer* grouping and neighbours, in ventral and dorsal views. Top row in each, left to right: *auriventer* (Tavoy, Tenasserim; holotype); *auriventer* (Mulayit, Dawna Range, Tenasserim); two *wetmorei* (Soi Dao Tai peak, south-east Thailand); two *wetmorei* (Trang, Peninsular Thailand); bottom row: two *tahanensis* (Main Range, Peninsular Malaysia); *medius* (Sadong peak, south-west Sarawak, Borneo; holotype); *medius* (Mount Kinabalu, Sabah, Borneo; holotype of *parvus*); *Z. palpebrosus siamensis* (Doi Inthanon peak, north-west Thailand); *Z. palpebrosus williamsoni* (Ra Island, Peninsular Thailand) (Harry Taylor, © The Natural History Museum, Tring)

Borneo including the types of its synonyms *medius* (south-west Sarawak) and *parvus* (Mount Kinabalu, Sabah) are inseparable. All have white lower wing-coverts, one common tone and distribution of lead grey on breast and flanks, a common extent of ventral yellow, and similar dorso-ventral merging of colours behind the jaw. Dorsally (Fig. 2), all show the

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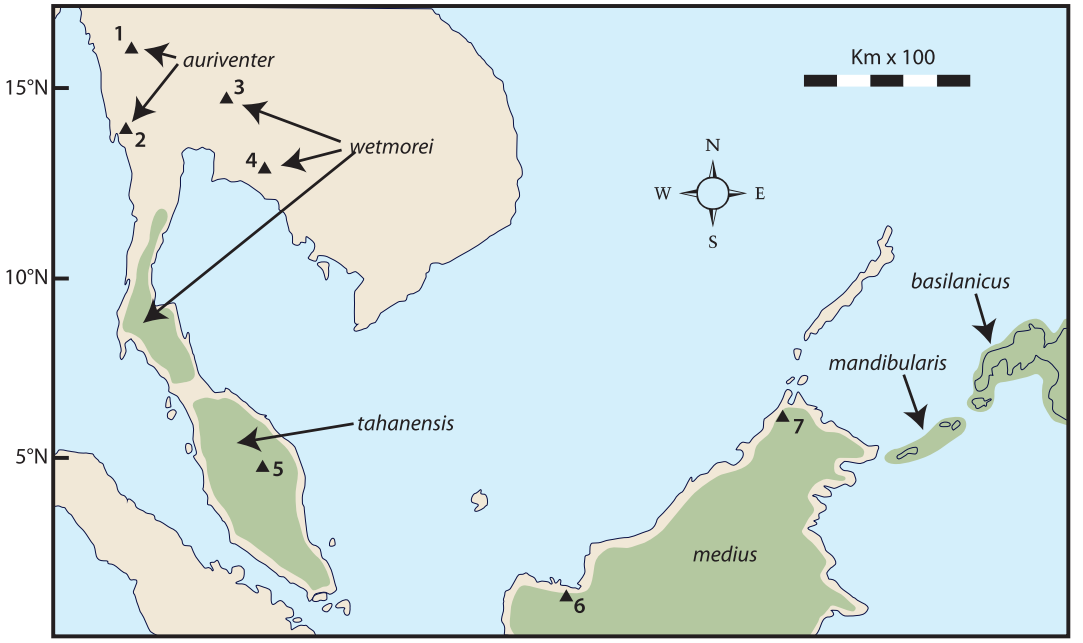


Figure 3. Currently understood geographical range relations of the *Zosterops auriventer* subspecies and neighbouring Philippine *Z. everetti mandibularis* and *Z. e. basilanicus*. Key: 1—Mulayit peak; 2—Tavoy; 3—Khao Yai National Park; 4—Soi Da Tai peak; 5—Mount Tahan; 6—Sadong peak; 7—Mount Kinabalu.

same fine green outer-web fringing at the base of rectrices and, except for one yellow-based supra-loral feather on one of the Soi Dao Tai specimens, green of the cap continuous to the lores and bill base, with no interposed yellow.

Within this series, *auriventer* and *wetmorei* specimens show identical tones and distribution of upperparts green, and measurements demonstrating that the supposedly diagnostically long bill of *wetmorei*, described from the Peninsula, is replicated north as well as east—making it difficult to accept that these two could be anything except one another's geographical representative. Apart from wingtip shape—shortfall of the outermost large primary (p9 descendant) behind tip <2 mm in *auriventer*, 3–5 times less than that of p5, vs. p9 and p5 sub-equal in *wetmorei* (Table 1)—indeed, nothing obvious from morphology stands in the way of linking them at an even lower taxonomic level. As such, it appears that *auriventer* should be added to Mees' *Z. everetti*.

The mainland *tahanensis* sample differs from *wetmorei* only by its shorter bill (Table 1) and, in most individuals, including all of three from the type locality, Mount Tahan in Taman Negara National Park, Malaysia, by being subtly darker olive-green above (Smithe colour Greenish Olive, no. 49), with even less uppertail-coverts contrast. Mees (1954) included Borneo in the range of *tahanensis*, but upperparts greens and level of tail-coverts contrast in most Bornean specimens, from east and north-west Sabah and south-west Sarawak, more closely resemble *auriventer* and *wetmorei*; only one (of three from Mount Kinabalu) being as dark above as topotypical *tahanensis*. They also average shorter winged than *tahanensis* from the Peninsula (Table 1), with a generally finer bill. No good reason has been found not to re-recognise their separate subspecies status, as *medius* Robinson & Kloss, 1923 (senior to Hachisuka's Kinabalu *parvus* by three years), type locality Mount 'Sidong' (= Sadong), Samarahan Division, south-west Sarawak.

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Completing the continental round-up (*cf*. Stresemann 1939), a link with Black-capped White-eye *Z. atricapilla*, prominently yellow-striped and almost as similar in its tones and distribution of green, grey and yellow, is ruled out of contention mainly by a combination of black (rather than green) forecrown and face in adults, and, in montane forests of Borneo, up to 800 m of altitudinal range overlap with *medius* (Mann 2008).

Finally, Mees (1954) came to his view of the geographical range of *Z. everetti* impressed by similarity of the colour patterns of Bornean '*tahanensis*' (= *medius*) and *Z. e. basilanicus* of Mindanao west to Basilan, at the east end of the Sulu Island chain (Dickinson *et al*. 1991); also by equivalence of their habitats. Though widely adopted, his merger proposal faced certain difficulties. One, noted by Mees himself, being that *Z. e. mandibularis* Stresemann, 1931, which occupies the Sulu archipelago range gap between *basilanicus* and *medius*, rather than intergrading, diverges from both of these forms in the brightness of its upperparts green and paleness of its grey flanks. Another, not previously raised but apparent from the distribution map, Fig. 8 *in* Mees (1957), is that no representative has been found on Palawan, a biogeographical 'stepping stone' between the Sunda region and oceanic Philippines, or on any of its satellites; nor is one known to occur in the Philippines archipelago anywhere near the eastern end of this dispersal route. Among inland forest passerines accepted as being shared by Borneo and the Philippines such a gap is exceptional, as far as is known being shown only by Rufous-tailed Jungle Flycatcher *Cyornis ruficauda* and Chestnut-capped Thrush *Geokichla interpres*, the latter in any case reaching east only as far as the Sulu archipelago itself (Kennedy *et al*. 2000). Adding in a re-assigned *auriventer* and additional Thai populations also gives *Z. everetti sensu lato* a far larger continental Asian range than envisaged by Mees when he proposed the hypothesis of *everetti* stock having 'recently' invaded westward from the Philippines.

Any of three scenarios might apply: (a) Asian continental forms and *basilanicus* have separately retained hypothetical ancestor-group plumage features lost in other Philippine representatives of *Z. everetti*; (b) *basilanicus* does not form a part of Philippine *Z. everetti* but is a misclassified vicariant population of an otherwise wholly continental species; or (c) in comparable ecological space, similarities are due to convergence. Other tools are needed to tease these apart, but note is taken of size divergence between *basilanicus* and continental taxa (Table 1) that actually peaks against nearest neighbouring *medius*. *Contra* options (a) and (b), *basilanicus* also retains characters found only among other Philippine populations of *Z. everetti* (including *mandibularis*): dusky brownish vs., in continental adults, black lores; a relatively stout bill, especially different from that of *medius*; pale brown vs. slate-grey feet; and extensive green fringes to the rectrices. In fact, the tail pattern of Philippine *Z. everetti* is much more like that of *siamensis* and other northern *Z. palpebrosus* subspecies than it is of any presumed representative of *everetti* on the continent. In addition, some Mindanao *basilanicus* show yellow above the lores (Mees 1957). These populations might be related, but the strictly morphological rationale for species lumping has surely been stretched.

Returning *Z. everetti* to the status of Philippine endemic would leave nomenclature on the archipelago undisturbed. As first accepted (apparently unwittingly) for an inland forest white-eye by Sharpe (1887a) and recognised as such at least temporarily by several subsequent investigators (e.g., Stresemann 1931), by seniority the name of its continental counterparts would revert to being *Zosterops auriventer* Hume. Rather than an oceanic island species with a continental bridgehead, this proves to be widespread in inland mixed evergreen forests of mainland continental South-East Asia but has penetrated and / or persisted in only a part of the latter's island sector (absence particularly from Sumatra as yet unexplained). Provisionally, four subspecies must be recognised, the first two with uncertain range limits: nominate *auriventer* Hume, 1878, known only from central

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Tenasserim; *wetmorei* Deignan, 1943, in southern Thailand (northern and eastern range limits as yet unknown) and the northern Thai-Malay Peninsula; *tahanensis* Ogilvie-Grant, 1906, in the southern Thai-Malay Peninsula; and *medius* Robinson & Kloss, 1923, on Borneo. 'Hume's White-eye', the only already published English name appropriate to an actual species *auriventer*, is proposed here in recognition of A. O. Hume's original description.

## Conclusion

Having cut *auriventer* adrift from species-level moorings on a combination of morphology and habitat selection (Wells 2017), the search here has been for a best fit of characters among alternative regional contenders, sorted by showing some degree of development of the main character of the *auriventer* type description—a mid-ventral yellow stripe. Among these, tightness of the fit of a range mainly of plumage features backed by apparently unique habitat equivalence permits a strong presumption that the true relatives of *auriventer*, at not above subspecies level, are the continental, as opposed to Philippine, forms of *Z.* '*everetti*'. This and the taxonomic realignments that follow nevertheless still require the support of both molecular genetics and field data such as on vocalisations, especially song. Sampling should be sufficiently broad to address at least the following: (1) the relatedness of nominate *auriventer* (for which, given the age of museum material, fresh tissue collection probably will be required) and *siamensis*, testing the proposition that these two are not conspecific; (2) relatedness of nominate *auriventer* and the *erwini* / *williamsoni* pair, testing the proposition that they too are not conspecific; (3) range-wide relatedness within *Z. auriventer* as re-defined; and (4) the relatedness of *medius*, *mandibularis* and *basilanicus*, testing the Mees hypothesis. A wider investigation of *Z. everetti* within the Philippines would be expected to follow.

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