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## THE WHITE-EYES OF THE AROE ISLANDS (AVES, ZOSTEROPIDAE)

by

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From the Aroe Islands, four different species of White-eyes were recorded with more or less certainty in literature (Salvadori, 1881; Finsch, 1901; Stresemann, 1931). Mayr (1941), the latest revisor, lists three species, viz., *Zosterops novaeguineae* subsp., *Z. minor sharpei*, and *Z. chloris chloris* (now named *Z. lutea chloris*, cf. Mayr, 1944).

The presence in the Leiden Museum of a small series (6 specimens) of *Z. novaeguineae* from the Aroe Islands, and of the type specimen of *Z. sharpei*, enables me to discuss these forms more fully than hitherto has been possible.

### ***Zosterops novaeguineae*** Salvadori

As at Leiden no material for comparison was available, I sent 5 specimens from the Aroe Islands to the American Museum of Natural History, New York, where Dr. Mayr and Dr. Amadon compared them with series of *Z. n. novaeguineae* (7 adults) and *Z. n. wuroi* (4 adults and several immatures). I am very much indebted to Dr. Mayr and Dr. Amadon for their notes which enabled me to describe the Aroe specimens as a new race. Here follow the distinctive characters of the three races:

*Zosterops novaeguineae novaeguineae* Salvadori, 1878. Eye-ring comparatively narrow; upper parts yellowish green; breast and flanks rather pale grey; throat and under tail coverts yellow. Wing: ♂ 59 (Salvadori's type specimen); ♂ 57 (Leiden Museum); ♂♂ 55, 56, 56, 58; ♀♀ 54, 56; sex ? 55 mm (American Museum). All specimens are from the Arfak Mountains, Vogelkop, Dutch New Guinea.

*Zosterops novaeguineae wuroi* Mayr & Rand, 1935. Eye-ring broad; upper parts much greener than in the nominate race (the original publication

has a slip, as it states that *novaeguineae* is the greener of the two); breast and flanks darker grey; throat and under tail coverts a deeper yellow. Wing: ♂♂ 51, 54, 54, 54, 54 (type), 55; ♂? 51; sex ? 53 mm (all American Museum).

*Zosterops novaeguineae aruensis* new subspecies. Eye-ring broad, as in *wuroi*; upper parts in coloration intermediate between *novaeguineae* and *wuroi*; breast and flanks darker again than in *wuroi*; throat and under tail coverts even darker yellow than in *wuroi*. Wing ♂ 53 (American Museum); sex ? 52, 53, 53, 53.5, 54, 55 mm (Leiden Museum). Perhaps the new race averages somewhat smaller than the nominate race, as suggested by Salvadori (1881); it agrees in this respect with *wuroi*.

Type: sex ?, Aroe Islands, 1866, collected by von Rosenberg, Rijksmuseum van Natuurlijke Historie, Leiden.

The presence of the above mentioned six specimens in the Leiden Museum was already noted by Salvadori (1881), who considered them to be wrongly labelled, and by Finsch (1901). Salvadori also records specimens from Ambon and Ceram, again doubting their origin, whereas Finsch without a query includes these islands into the area inhabited by *novaeguineae*.

In the Leiden Museum there are several specimens, identified by Finsch as *Z. novaeguineae*, from Ambon (collected by Hoedt and by Teysmann), and one from Ceram. Examination of these skins reveals that not their records of the localities are false, but their identification as *Z. novaeguineae*, because in fact all these specimens belong to *Z. kühni* Hartert, a species not described before 1906, that superficially bears a close resemblance to *Z. novaeguineae*.

As far as I am aware, the occurrence of *Z. kühni* in Ceram has not yet been recorded in literature; the specimen mentioned above, that undoubtedly belongs to this species, was collected by Moens at Wahai on the north coast. The occurrence of the species in Ceram proves that it does not vicariate with *Z. atrifrons stalkerii* Ogilvie-Grant, as suggested by Stresemann (1931, 1940), and van Bemmelen (1948). Indeed, I do not see any resemblance suggestive of a close relationship between *Z. atrifrons*, of which *stalkerii* is without doubt a well-pronounced race, and *Z. kühni*. The latter is very near to *Z. novaeguineae*, from which it can be separated at a glance by the greenish edges over the whole length of the outer webs of the tail feathers, whereas in *Z. novaeguineae* the greenish edges are confined to the anterior half of the tail feathers. It is remarkable that Hartert (1906) does not mention this conspicuous difference, and that Finsch and Salvadori failed to note it.

**Zosterops sharpei** Finsch

Stresemann (1931) regarded *Z. sharpei* as a doubtful species, believing it to be based on wrongly labelled specimens, but Mayr (1933, 1941) restored it under the name *Z. minor sharpei*, stating that no doubt was justified, because of the presence of a specimen in the Leiden Museum.

The type and the four other specimens recorded by Salvadori (1878, 1881) are still in the Leiden Museum. The original labels were removed by Finsch, who identified these skins, including the type specimen, as *Z. atrifrons*. On the label of the type specimen Finsch wrote: "*Z. nigrifrons* auct. Salvad. on stand und erwähnt unter *Z. frontalis* Salv. Orn. Pap. II, p. 369 als wahrscheinlich neue Art.", and on the reverse: "C. v. Rosenberg '66, Aru Isl. Kat. No. 13 Ad.", whereas one of the other specimens (no. 14) bears the note: "No. 14-17 von Salvadori unter *Z. frontalis* (Orn. Pap. II, 369) als muthmasslich neu erwähnt. C. v. Rosenberg, no locality! and date, vielleicht ? Aru Islands."

The type specimen has a wing of 53 mm, which corresponds with *Z. atrifrons atrifrons* Wall. from the Minahassa, N. Celebes (cf. Stresemann, 1940). The supposed smaller measurement of the wing is the only difference from *atrifrons* given by Salvadori in his original description of *Z. frontalis*, and as a matter of fact I cannot distinguish it from specimens of *Z. atrifrons atrifrons*. As only one specimen of the series under discussion is really labelled Aroe, whereas the others did not even bear an indication of locality and date, I am convinced that the specimens originate from the Minahassa, where von Rosenberg made extensive collections.

This "enriches" the synonymy of *Z. atrifrons atrifrons* with the following names:

*Z. frontalis* Salvadori, 1878, 1881.

*Z. sharpei* Finsch, 1901.

*Z. minor sharpei* Mayr, 1933, 1941.

It is remarkable that Finsch (1901), though he correctly identified Salvadori's specimens in the collection as *Z. atrifrons*, gave the specimen labelled "Aroe Islands" a new name; the more so as he also records *Z. atrifrons* from the Aroe Islands, doubtless on the strength of the evidence supplied by the same specimens. It seems that his paper appeared before he closely examined them, and that he failed to publish a correction.

**Zosterops grayi** Wallace

A specimen of this species, supposed to have come from the Aroe Islands, is present in the Leiden collection. It was recorded by Salvadori (1881), who

doubted the correctness of its labelling, and subsequently by Finsch (1901). I do not understand why Finsch lists the Aroe Islands without comment, as on the label of the specimen examined by him he mentioned the supposed locality with a great query.

Though perhaps the possibility of the occurrence of a stray specimen of *grayi* on the Aroe Islands cannot altogether be ruled out, it is much more likely that the specimen in question, collected again by von Rosenberg, is incorrectly labelled. The species certainly should be excluded from the Aroe list, a view shared by all recent authors.

Hartert (1903), and subsequently Stresemann (1931) and van Bemmelen (1948), record *Z. grayi* from "Add Islet, north of Great Key". This record rather puzzles me, for Lieutenant Planten's excellent map (Planten, 1892) does not show any islands north of Great Key. There is, however, a village Ad on the northern part of Great Key, and it seems probable that this locality has crept into literature as an island. Hence, *Z. grayi* is known from Great Key only.

I list *Z. grayi* as a full species, and not as a race of *Z. lutea*, for, though *grayi* probably belongs in the same superspecies, the differences from the surrounding races of *lutea* (*chloris* and *griseiventris*; I did not examine true *lutea* from Australia), are striking.

*Z. grayi* is the closest relative of the even more aberrant *Z. uropygialis* Salv., a fact that hitherto apparently remained unnoticed (Stresemann, 1931; Mayr, 1944; van Bemmelen, 1948), though van Bemmelen recognised the distinctness of *uropygialis*. Notwithstanding their relationship, the differences between *grayi* and *uropygialis* are so pronounced that it is a doubtful matter whether or not both forms should be considered conspecific. Personally, I am inclined to the latter view, but, as an indication of their affinity, I prefer to maintain the name *grayi* at least in parentheses for *uropygialis*.

Although a discussion of these interesting birds falls somewhat beyond the scope of this paper, a short review of the characters by which the two species agree and differ, may here be given:

*Zosterops grayi*. Upper parts generally bright yellowish citrine; crown darker, brownish; frontal area yellow; eye-ring very wide, white, interrupted in front by a blackish spot; primaries and rectrices blackish brown, with broad yellowish citrine edges. Under parts: Throat, upper breast and under tail coverts lemon chrome (Ridgway), upper breast somewhat more greenish; a broad yellow streak connecting the yellow of throat and under tail coverts; remainder of under parts satin white. Bill in the dead skin horny black.

Measurements of 14 specimens (Leiden Museum and Amsterdam Museum): Wing 60-64, average 62.54 mm; tail 40-44.5, average 42.00 mm; tarsus 18-19+ mm; culmen from gape 14-15.5 mm; exposed culmen 11-12 mm, bill from anterior point of nostril 8.5-9.5 mm; proportion wing: tail = 1.49.

*Zosterops (grayi) uropygialis*. Upper parts indistinguishable from those of *grayi*, brownish colour on the head somewhat more extended, also covering the front and loreal region; consequently no yellow frontal area; wings and tail as in *grayi*; eye-ring reduced to a number of very small, scaly feathers, not giving the impression of a ring; on account of this reduction skin round the eye partly bare. Under parts: Whole under side bright yellow, lemon chrome on throat and centre of belly, more olive on the flanks. Bill in the dead skin horny brown. Measurements of 10 specimens (Leiden Museum, Amsterdam Museum): Wing 59-63, average 60.90 mm; tail 38-42.5, average 40.45 mm; tarsus 18-20 mm; entire culmen 14.5-15.5 mm; exposed culmen 11-12 mm; bill from anterior point of nostril 8.5-9 mm; proportion wing: tail = 1.505.

Apart from the general similarity in proportions and in coloration of the upper parts, my most important reason for assuming a close relationship between *uropygialis* and *grayi*, as opposed to the *chloris-citrinella* group, is the dark cap present in both.

The probable common ancestry of the two forms makes it even more remarkable that they have grown so distinct from each other, as the distance between Great Key, inhabited by *Z. grayi*, and Little Key, inhabited by *Z. (grayi) uropygialis*, on the narrowest point of the channel separating these islands, is not more than 7.5 km. This gap of hardly 5 miles apparently acts as a very effective barrier.

#### ***Zosterops lutea chloris* Bonaparte**

From the Aroe Islands only one specimen of this race has been recorded in literature; it is the specimen secured by Beccari on Pulo Babi (Salvadori, 1880). The tiny island of Pulo Babi does not appear on ordinary maps, it is situated about 20 km SSW of Dobo, in the large bay south of P. Wamar.

*Z. l. chloris* is a typical inhabitant of very small islands, with a wide distribution. Besides occurring on P. Babi, it is known from several islets in the Key group, such as Soa (or Soea) and "Teniai near Taam" (Hartert, 1903; Stresemann, 1931; van Bemmelen, 1948), but the latter name is almost certainly a lapsus for Noeniai, as no island named Teniai exists in this region (Planten, 1892). To the north, the race not only extends to Misool (a specimen in the Leiden Museum; there is no reason to doubt this locality)

and the Schildpad Islands (Mayr & de Schauensee, 1939), but also to the islands north of Ceram (P. Toedjoe), as the proposed race *Z. l. tudjuensis* van Oort probably cannot be upheld.

In the Key group, *chloris* is ecologically separated, by its preference for small islands, from *grayi* and *uropygialis*. Thus, it cannot be said that the species coexist there. On the other hand, the fact that *chloris* has a habitat so different from that of the other two species, combined with its evident ability to cross considerable stretches of sea, adds to their differences.

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#### EXPLANATION OF THE PLATE

Left, *Zosterops (grayi) uropygialis* Salv., ♂, 9. V. 1922, Toeal, coll. Blanchemanche, R. M. N. H. no. 6774, collector's no. 1153.

Right, *Zosterops grayi* Wall., ♀, 18. IV. 1922, Gng. Daab, Great Key, coll. Blanchemanche, R. M. N. H. no. 6774, collector's no. 1112.

