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A new subspecies of White-eared Honeyeater *Nesoptilotis leucotis* (Meliphagidae)

by Andrew Black

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SUMMARY.—White-eared Honeyeater *Nesoptilotis leucotis* ranges broadly across southern Australia, where it is a constituent of eucalypt forest and woodland communities. A recent phylogeographic study recovered deep divergence between western and eastern populations. Within the western phylogroup are two allopatric populations that are differentiated by morphometrics, plumage coloration and voice. The eastern of the two, which occupies mallee woodland on the Eyre Peninsula, South Australia, is described here as a new subspecies.

White-eared Honeyeater *Nesoptilotis leucotis* (Latham, 1801) occupies temperate humid eucalypt forest and semi-arid eucalypt woodland across southern Australia and, until recently, was treated as comprising three subspecies (Schodde & Mason 1999). The subspecies were: an eastern forest form *N. l. leucotis* (Latham, 1801), *N. l. novaenorcaiae* (Milligan, 1904), from western to inland eastern Australia, chiefly in low woodlands of multi-stemmed eucalypts known as mallee (Johnstone & Storr 2004), and *N. l. thomasi* (Mathews, 1912), on Kangaroo Island, where it occurs in both forest and mallee (Baxter 2015).

In a phylogeographic study of 12 southern Australian bird species, Dolman & Joseph (2015) identified two phylogroups within the White-eared Honeyeater, separated by 21 base pair differences in the mitochondrial gene ND2. The break is at the Eyrean Barrier (Ford 1974, 1987, Schodde & Mason 1999: 787), a periodic arid intrusion during Pleistocene times and perhaps earlier, at the longitude of the present-day Spencer Gulf and Lake Torrens. Dolman & Joseph's (2015) findings placed populations previously assigned to subspecies *novaenorcaiae* within both phylogroups, and, to reflect phylogeographic history, led them to restrict *novaenorcaiae*, type locality Wongan Hills, south-west Australia (30°49'S, 116°38'E), to the western group. Black (2018) demonstrated that these genetically divergent western and eastern mallee populations are allopatric as well as distinct phenotypically. He argued that the eastern mallee population consequently required distinction from forest-based nominate *leucotis* there, a view supported by Lamb *et al.* (2018), who identified two subclades within the eastern phylogroup. Black (2018) noted that the name *depauperata* Mathews, 1912, type locality Coonalpyn, South Australia (35°42'S, 139°51'E), was available for the eastern mallee population. He also showed that the western phylogroup comprised two allopatric populations, one in Western Australia, the other on the Eyre Peninsula north to the Gawler Ranges and the Yellabinna region of South Australia, the two separated by the treeless Nullarbor Plain (see Fig. 1). Consequently, he questioned whether they might also be taxonomically distinct.

The present study addresses that question by examining the phenotypes of the two populations within the western phylogroup of White-eared Honeyeater.

Methods

Specimens of White-eared Honeyeaters were examined from the two populations west of the Eyrean Barrier: 14 adult males of the Western Australian population east to the Great

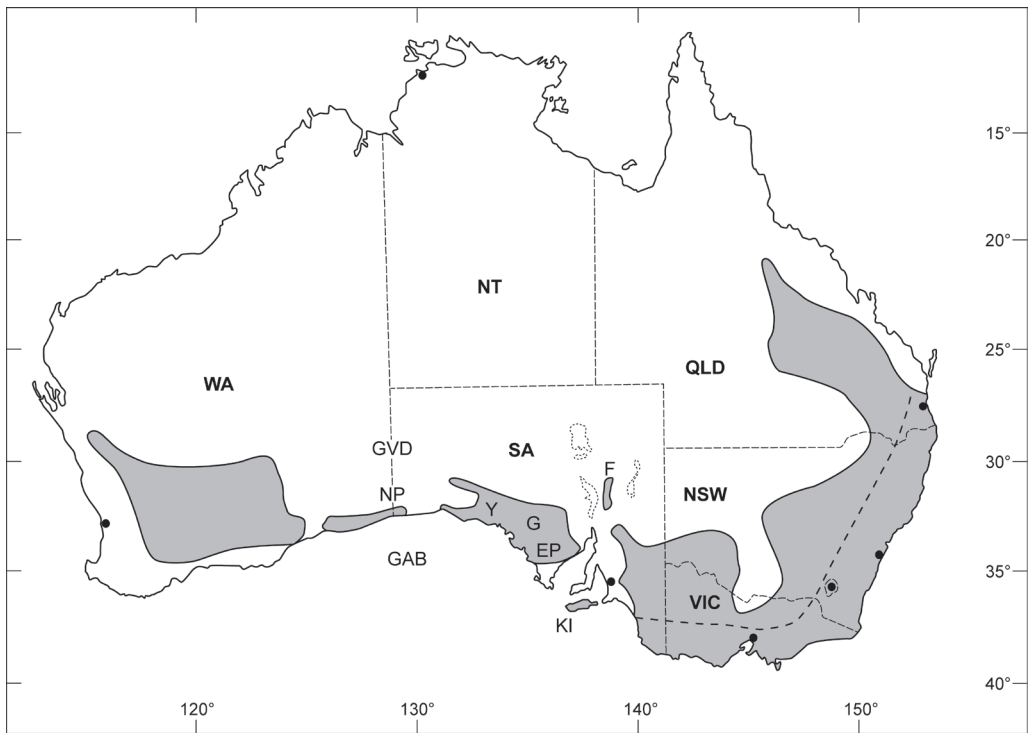


Figure 1. Map showing the distribution of White-eared Honeyeater *Nesoptilotis leucotis*, derived from Johnstone & Storr (2004; for Western Australia), Schodde & Mason (1999; eastern Australia) and Black (2018; South Australia). Two phylogroups range either side of the Eyrean Barrier, represented by the saline Lake Eyre and Lake Torrens (dotted outlines) and the larger Spencer Gulf, with the Eyre Peninsula (EP) to the west and Flinders Ranges (F) to the east. Other than the small Flinders Ranges and Kangaroo Island (KI) isolates, the eastern phylogroup is distributed continuously, with an intergradient zone between inland *N. l. depauperata* and coastal *N. l. leucotis* represented by the dashed line. The western phylogroup contains two allopatric populations, one in southern Western Australia extending across a small discontinuity, south of the Nullarbor Plain (NP) into western South Australia, and another, separated across the NP near the head of the Great Australian Bight (GAB), in the Yellabinna (Y), Gawler Ranges (GR) and EP.

Australian Bight, held at the Western Australian Museum, Perth (WAM), and 12 adult males of the Eyre Peninsula population, at the South Australian Museum, Adelaide (SAMA). Only male specimens were compared because of the small female sample sizes of this sexually dimorphic species (Schodde & Mason 1999, Higgins *et al.* 2001, Black 2018).

Standard measurements were taken: wing, flattened from the 'shoulder' to the tip of the longest primary; tail, from the base to the tip of the longest rectrix when closed; length of the culmen, from the cranio-frontal hinge to the tip; and depth of the bill, at the feather line on the base of the maxilla. All measurements were taken to 0.1 mm, except wing, which was measured to the nearest 1 mm (Table 1).

Plumage coloration of the olive upperparts and yellow underparts was compared using the *Naturalist's color guide* (Smithe 1975).

Results

Morphometrics.—The measurements of males for each population are presented in Table 1. A plot of the significantly differing variables is presented graphically in Fig. 2. It shows that separation between the two populations is substantial, albeit with some overlap.

TABLE 1

Mensural data for male White-eared Honeyeaters *Nesoptilotis leucotis* of the two populations, Western Australia and Eyre Peninsula, presenting means, standard deviation and sample sizes for each variable, and the statistical significance of differences in compared values.

Region and sample size	Wing (mean \pm SD) (n)	Tail (mean \pm SD) (n)	Culmen length (mean \pm SD) (n)	Bill depth (mean \pm SD) (n)
Western Australia	88.3 \pm 2.2 (n = 13)	90.0 \pm 3.2 (n = 13)	18.6 \pm 0.8 (n = 14)	4.5 \pm 0.3 (n = 12)
Eyre Peninsula	91.0 \pm 2.0 (n = 11)	89.1 \pm 2.4 (n = 12)	18.4 \pm 1.0 (n = 12)	4.8 \pm 0.2 (n = 12)
Probability value	0.005	0.4 NS	0.6 NS	0.003

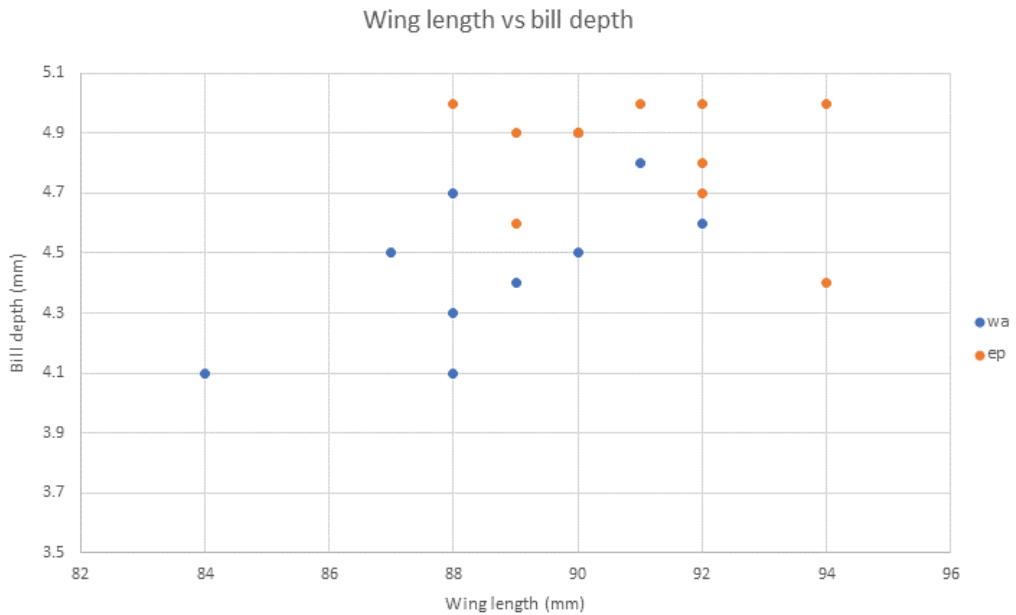


Figure 2. Plot of the variables wing length and bill depth of Eyre Peninsula (orange) and Western Australian (blue) samples of White-eared Honeyeater *Nesoptilotis leucotis*, indicating differentiation between them in morphometrics.

Overall the two populations are of similar size. Tail lengths are not significantly different, but wings are on average shorter in the Western Australian population ($p = 0.005$) with a consequently greater tail / wing ratio. Bills are of similar length, but shallower in Western Australian birds ($p = 0.003$).

Plumage.—The Eyre Peninsula population is brighter overall than the Western Australian population (Figs. 3–4). The colour of the underparts in the former approaches highly saturated Spectrum Yellow (55; numbers follow Smithe 1975), that of the latter being a paler, creamy yellow, between Sulphur Yellow (57 or 157) and Cream Color (54). Variation occurs in both populations, with the dullest four of the Eyre Peninsula population overlapping the brightest two from Western Australia, and can be little attributed to plumage wear or specimen age. The dorsum of the Eyre Peninsula population is also brighter and yellower, Yellowish Olive-Green (50) that consistently distinguishes all specimens from the Olive Green (Basic) (46) of the Western Australian population.



Figure 3. Ventral view of White-eared Honeyeater *Nesoptilotis leucotis* specimens (from left to right) SAMA B28176 (paratype of *N. l. schoddei*), east of Kimba, South Australia, 17 July 1963, SAMA B51326 (holotype of *N. l. schoddei*), Port Kenny, South Australia, 17 February 2004 (both from the Eyre Peninsula population), and WAM A11429, Tarin Rock, Western Australia, 23 May 1971 and WAM A19788, Toolina Rockhole, Western Australia, 11 May 1985 (from the Western Australian population), showing the brighter yellow underparts of the Eyre Peninsula population (P. Horton)

Discussion

Schodde & Mason (1999) found that western, including Eyre Peninsula, populations of White-eared Honeyeater are brighter than those in the eastern mallee. That observation anticipated distinction between the two groups, which are now known to be genetically divergent (Dolman & Joseph 2015) and were subsequently recognised subspecifically, as *N. l. novaenoriae* and *N. l. depauperata* respectively (Black 2018). Black (2018) also found that the Eyre Peninsula population is brighter above and below than all populations of the eastern phylogroup, including the nominate subspecies (Figs. 5–6). The present study now finds that the Eyre Peninsula population has brighter and more yellowish upper- and underparts than the Western Australian population as well. Thus, Eyre Peninsula White-eared Honeyeaters are probably the brightest of all, except potentially the as yet unexamined inland Queensland birds reported by Schodde & Mason (1999) to be ‘small



Figure 4. Dorsal view of the same specimens in the same order as in Fig. 3, showing the brighter and yellowish olive tone in the Eyre Peninsula, South Australia, specimens (P. Horton)

yet bright citrine'. The nature of interactions among mallee and forest populations of the eastern phylogroup needs further, more detailed evaluation, as Schodde and Mason (1999) already observed.

In morphometrics, Eyre Peninsula and Western Australian populations differ slightly but significantly in wing length and bill depth.

In distribution, the same two populations are evidently allopatric, being separated by the Great Victoria Desert and the treeless Nullarbor Plain. Many southern Australian landbirds with Western Australian and Eyre Peninsula representatives, while absent from the Nullarbor Plain, are nonetheless continuously distributed through the mallee corridor of the Great Victoria Desert to the north (Ford 1971, Black & Badman 1986). Others, such as Yellow-plumed Honeyeater *Ptilotula ornata*, Brown-headed Honeyeater *Melithreptus brevirostris*, Shy Heathwren *Hylacola cauta* and the present species, extend through the Yellabinna region into the southern Great Victoria Desert, but are not known to contact Western Australian populations therein. In the south, the Nullarbor Plain extends to the coast at the head of the Great Australian Bight, producing a discontinuity in the mallee vegetation for more than 150 km and forming a narrow barrier to mallee-dependent birds.



Figure 5. Ventral view of White-eared Honeyeater *Nesoptilotis leucotis* specimens (from left to right) SAMA B28176 (paratype of *N. l. schoddeii*), east of Kimba, Eyre Peninsula, South Australia, 17 July 1963, SAMA B55328, *N. l. depauperata*, south of Pinnaroo, South Australia, 13 June 2006, SAMA B25251, *N. l. leucotis*, south of Naracoorte, South Australia, 25 October 1958, and SAMA B3041, *N. l. thomasi*, Kangaroo Island, South Australia, 20 May 1921; showing the brightest underparts of the Eyre Peninsula specimen (P. Horton)

White-eared Honeyeater occurs in mallee either side of that barrier but is not reliably reported from within it (Black 2018, Atlas of Living Australia www.ala.org.au; see Fig. 1).

Black & Stewart (submitted) reviewed many recordings of voice, chiefly song, of the four mainland populations of White-eared Honeyeater and found distinct regional differences. This was particularly pronounced between the western and eastern phylogroups, conforming to the understanding that song divergence in songbirds may reflect or even drive genetic divergence (Päckert 2018). Differences between Western Australian and Eyre Peninsula populations within the western phylogroup were also evident, the former being more complex and more variable. Further standardised comparative sonographic analyses are recommended.

Thus, isolation of Eyre Peninsula and Western Australian populations, albeit only narrowly, has evidently been sufficient to limit gene flow and generate differentiation in plumage pigmentation, proportions and voice. Accordingly, the so-far un-named Eyre Peninsula population is described as a new subspecies.



Figure 6. Dorsal view of the same specimens in the same order as in Fig. 5, showing the Eyre Peninsula specimen to be the brightest and yellowest (P. Horton)

Nesoptilotis leucotis schoddei subsp. nov.

Holotype.—Adult male, SAMA B51326, collected by D. Armstrong 1 km north-west of Port Kenny, Eyre Peninsula, South Australia (33°09'45"S, 134°40'03"E) on 17 February 2004. Wing (max. flattened chord) 91 mm, tail (central rectrix from emergence to tip) 90.7 mm, bill length (from skull to tip) 18.7 mm, bill depth (at level of frontal feathering) 4.9 mm (Figs. 3–4).

Paratypes.—Adult male, SAMA B28176, collected by W. Head, 15 km east of Kimba, Eyre Peninsula, South Australia (33°08'S, 136°25'E) on 17 July 1963. Wing 92 mm, tail 88.7 mm, bill length 16.8 mm, bill depth 5.0 mm (Figs. 3–6). Adult male, SAMA B55914, collected by L. Pedler, on Coomra Track c.67 km west-northwest of Yalata, western South Australia (31°23'19"S, 131°20'27"E) on 2 April 2008. Wing 93 mm, tail 85.8 mm, bill length 17.3 mm, bill depth 4.8 mm.

Diagnosis.—Distinguished from the most similar and genetically closest subspecies *N. l. novaenorciae* by brighter plumage overall, especially the brighter, yellow olive upperparts and purer (more saturated) yellow breast and belly, slightly longer wing and deeper bill (Table 1), and less complex voice. It is also substantially brighter than subspecies within

the eastern phylogroup, *N. l. leucotis*, *N. l. depauperata* and *N. l. thomasi*, and is further distinguished from them in mtDNA sequence (Dolman & Joseph 2015).

Etymology.—Named to honour the foundational work in Australian ornithology of Richard (Dick) Schodde OAM. Particularly, it recognises his identification of distinguishing traits among populations of this and other Australian bird groups that anticipated more recent genetic findings or has facilitated their interpretation. Dr Schodde was foundation Director of CSIRO's Australian National Wildlife Collection 1970–2000, and in 2009 he was awarded the Medal of the Order of Australia for his contribution to the natural sciences, particularly ornithology.

Distribution.—The new subspecies is centred on the Eyre Peninsula, South Australia, where it is confined to mallee woodland. It extends west to the limit of mallee near the head of the Great Australian Bight at 31°22'S, 131°20'E and north-west through the Gawler Ranges and Yellabinna at least to Maralinga (30°10'S, 131°34'E). *N. l. schoddei* also ranges east through the Gawler Ranges to the north-east limit of mallee vegetation in the Baxter Range at 32°20'S, 137°17'E.

Conspectus of subspecies in *Nesoptilotis leucotis*

N. l. leucotis (Latham, 1801).—The nominate subspecies of eastern Australian forests, chiefly east of the Great Dividing Range, north to slightly beyond Brisbane, south-east Queensland and through southern Victoria into south-eastern South Australia. A brightly plumaged form, it is larger than other subspecies (Schodde & Mason 1999).

N. l. depauperata (Mathews, 1912).—Smaller than nominate *leucotis*, and distributed in south-eastern mallee woodlands, inland of the Great Dividing Range. Its zone of interaction with the nominate subspecies remains incompletely evaluated (Schodde & Mason 1999). Likewise, Lamb *et al.*'s (2018) detection of two subclades within the two eastern subspecies, this and *N. l. leucotis*, warrants further study. This is the palest subspecies and the dullest mainland form.

N. l. thomasi (Mathews, 1912).—Restricted to Kangaroo Island, South Australia. Differs from all others in its greyer, more melanised plumage. It occupies both forest and mallee (Baxter 2015). This and the previous two subspecies form an eastern clade.

N. l. schoddei Black, 2019.—The subspecies of mallee on the Eyre Peninsula, the Gawler Ranges and Yellabinna region, South Australia. A very brightly plumaged subspecies.

N. l. novaenorciae (Milligan, 1904).—The subspecies of Western Australia's mallee and taller semi-arid eucalypt woodlands and scrub (Johnstone & Storr 2004). With *N. l. schoddei* it forms a western clade in *N. leucotis*, but is less brightly plumaged, shorter winged and more slender billed than the Eyre Peninsula form. Its song also contains unique elements.

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