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The Identification of the Endangered Black-eared Miner *Manorina melanotis*

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Summary

The Black-eared Miner *Manorina melanotis* is probably Australia's rarest and most endangered bird. The greatest existing threat to its continued survival is genetic swamping by the common and widespread congeneric Yellow-throated Miner *M. flavigula*. The existence of birds that exhibit intermediate (hybrid) plumages has resulted in substantial identification problems. This has also complicated attempts to define the conservation status of the Black-eared Miner. A comparison of museum skins of birds determined to be phenotypically pure Black-eared Miners with phenotypically pure Yellow-throated Miners from within the historical distribution of the Black-eared Miner reveals that at least 17 different plumage characters separate the two species. This information is presented and the difficulties associated with the identification of Black-eared Miners are discussed. Additionally, an examination of commonly used field-guides and reference texts reveals that no currently available guides provide sufficient information to identify the species accurately.

Introduction

The Black-eared Miner *Manorina melanotis* is probably the rarest and most endangered bird species in Australia (Emison et al. 1987; Brouwer & Garnett 1990; Schodde 1990; Garnett 1992). The historical distribution of this colonial honeyeater included the denser mallee eucalypt scrub of north-western Victoria, south-western New South Wales and south-eastern South Australia (Blakers et al. 1984), in an area collectively referred to as the 'Murray Mallee' (Land Conservation Council [LCC] 1987). The Black-eared Miner is now possibly extinct in South Australia (Joseph 1986), and no positive sightings have been made in New South Wales in many years (Royal Australasian Ornithologists Union [RAOU] records; see also McAllan & Bruce 1988). Currently it is known to exist only in Victoria, with up to 11 individuals at five widely separated sites (McLaughlin 1990). In recent times, the status and ecology of this species have been the subject of studies in South Australia (Joseph 1986) and Victoria (Starks 1987; McLaughlin 1990, 1992). Research aimed at enhancing the conservation status of this species is currently being undertaken by the RAOU and the Victorian Department of Conservation & Natural Resources.

The major factor implicated in the decline of the Black-eared Miner is the loss and modification of suitable habitat (Schodde 1981; Joseph 1986; Starks 1987; McLaughlin 1990, 1992), primarily through the clearing of vast areas required for large-scale wheat production (LCC 1987). In addition to reducing the availability of suitable habitat, the clearance and modification of vegetation has favoured a range expansion of the common and widespread congeneric Yellow-throated Miner *M. flavigula* (Starks 1987). In contrast with the Black-eared Miner, this species favours open habitats (Blakers et al. 1984; Emison et al. 1987; Starks 1987; McLaughlin 1992). Though normally isolated through their occupancy of different habitats (Joseph 1986; McLaughlin 1992), the disruption of this balance has apparently allowed large-scale introgressive hybridisation between Black-eared and Yellow-throated Miners (Schodde 1981). As a result, the Black-eared Miner is being genetically 'swamped'.

Defining the status of this rare bird is complicated by problems associated with identification. The existence of birds exhibiting plumage states intermediate between Black-eared and Yellow-throated Miners was first noted by Ford (1981) and Schodde (1981). Although acknowledging the difficulty of separating Black-eared Miners from

Black-eared Miner-like intermediates, both Joseph (1986) and Starks (1987) identified a number of plumage characters that they considered would enable the identification of phenotypically pure birds. These guides were reappraised by McLaughlin (1990), who found them to contain insufficient descriptive detail for wholly accurate identifications to be made. This was found to be especially true when examining birds in the hand (McLaughlin 1990). In addition, neither of these guides provided detail on possible variability within each pure plumage character.

Ford (1981) indicated that behavioural differences may exist that would enable the separation of Black-eared and Yellow-throated Miners. Although behavioural differences do exist, these differences are unreliable when attempting to identify phenotypically pure examples of each species. For example, although Black-eared and Yellow-throated Miners occupy different habitats, intermediate-plumaged birds occur in a range of habitat types including those occupied by the two species (Starks 1987; McLaughlin 1990, 1992). Black-eared Miners are known to be shy, generally quiet and more difficult to observe than Yellow-throated Miners (Chandler 1913; Starks 1987; McLaughlin 1990). However, these are also behavioural characteristics of many intermediate-plumaged miners occuring in dense mallee habitats. In Victoria at least, Black-eared Miners are known to possess slightly but significantly smaller wing, tail and tarsus lengths and head widths than Yellow-throated Miners (McLaughlin 1990). Compared with Yellow-throated Miners, the impression given by Black-eared Miners in the field is of a slightly smaller bird. However, morphometric measurements are less sensitive than plumage characteristics in delineating hybrid birds (McLaughlin 1990), and have been found to be of little use in field identification (Joseph 1986). Ashby (1912) and Sutton (1929) noted that Black-eared Miners had a distinctive call, though neither provided details, and this point requires clarification.

As part of a broader study of the status and ecology of the Black-eared Miner (McLaughlin 1990), plumage characteristics and variation within phenotypically pure Black-eared Miners were examined. Given that Yellow-throated Miners within the historical distribution of Black-eared Miners may also show hybrid characteristics (Joseph 1986; McLaughlin 1990), a sympatric population of phenotypically pure Yellow-throated Miners from the Murray Mallee area was also described.

Methods

Specimens were examined of putative Black-eared, Yellow-throated and Black-eared/Yellow-throated Miner intermediates held by the Museum of Victoria (MV), and specimens of putative Black-eared and Black-eared/Yellow-throated Miner intermediates held by the South Australian Museum. With the exception of one skin held in the American Museum of Natural History (AMNH), New York, all known or supposed specimens of Black-eared Miners were examined. Diagnostic plumage characteristics were described and where possible colours standardised using Smithe's (1975, 1981) charts. Sexes of specimens were taken as indicated on museum tags (sexed by dissection). All specimens examined were adults.

The following criteria were used to determine the plumage characteristics exhibited by phenotypically pure Black-eared Miners:

(i) The original description of the species (Wilson 1911), and the holotype specimen (R5039, MV). The original description referred to a male only. A second male specimen collected by Wilson and also used to describe the species is held by the AMNH (paratype — 694538).

(ii) The plumage characteristics and variation exhibited by specimens collected before any land clearing in South Australia (see Joseph 1986). Note that early specimens from Victoria were collected at about the same time as land clearing was being undertaken (see LCC 1987; also McAllan & Bruce 1988), and it cannot be ascertained with certainty that the small amount of plumage variation observable in these early Victorian specimens is not related to the effects of land clearing.

(iii) The work of authors who have previously examined Black-eared Miner skins (Joseph 1986; Starks 1987).

Table 1: Variation within Black-eared Miners and Murray Mallee Yellow-throated Miners for plumage characters that separate the two species. Numbers refer to specific colour swatches as presented in Smithe (1975, 1981). A diagonal slash (/) indicates the actual colour is between the colours indicated. Those characters marked with an asterisk (*) are those most easily assessed under field conditions.

Character	*Black-eared Miner*	*Yellow-throated Miner*
Crown and dorsum	Crown blackish grey 82/83; dorsum with increasing (anteriorly) number of brown 28/119A feathers fringed 82/83, producing overall dark grey/brown colour.	Crown grey 84 to 84/85; dorsum with increasing (anteriorly) number of brown 119B/119C feathers fringed 84 or 84/85, producing overall medium grey/brown colour.
***Rump**	Brown 119A/119B varying to slightly paler than 119B. Rump concolorous with dorsum.	Upper rump feathers pale brown 119C/119. Rump and upper tail coverts white to (mostly) off white. Obvious contrast with dorsum.
Uppertail	Varying from brown 119A to slightly paler than sepia 219.	Varying from dark brown 20/121 to 121.
***Terminal tail band**	No white. Varies from a slight gradual 'fading' of uppertail colour at tips to a clearly demarcated band of brown 119C to 119D, up to 15 mm in width. Band often not clearly visible in worn tails. Often more pronounced in outer rectrices. More noticeable in birds with darker tails	Always with white tips, though amount present varies with feather wear. Terminal band up to 20 mm wide. Band distinct; no gradual fading.
Frons	Darker and more olive than yellow 55. Extends anteriorly from posterior of external nares to at least halfway between nares and a point directly above pupil. Extends posteriorly at most (and more commonly) to a point directly above centre of pupil.	More olive than yellow 55. Extensive in area of lores. Distribution otherwise as in *M. melanotis*, though more intensely coloured.
***Facial mask**	Black 82/89. Black in lores extends to region of posterior external nares where merges with frons. One to two mm wide black superciliary stripe continues behind eye to ear coverts. Ear coverts faintly (of variable intensity) fringed 'silver-grey' (not visible in field).	Black 82/89. Black in lores extends to less than halfway between eye and posterior of nares. Superciliary stripe absent or indistinct. Ear coverts generally intensely fringed 'silver-grey'.
***Post-auricular spot**	Post-auricular feathers brown 239, contrasting with grey of neck and black ear coverts. Most specimens exhibit a very faint post-auricular spot (not visible in field) where 1-4 feathers are edged yellow 55. Some specimens show no yellow.	Post-auricular feathers white to light grey, contrasting with grey of neck and black ear coverts. Post-auricular spot prominent bright yellow 55.
Moustachial stripe	Small (about 5 mm in length) stripe at corner of gape. Yellow 55 or slightly darker. Paler than frons. Same colour as chin spot and varies accordingly.	Prominent (about 10 mm). Intense yellow 55 or brighter. Generally same colour as chin spot and varies accordingly.
***Sub-moustachial stripe**	Varies from dark grey 84 to a paler dark grey 84/85. In all specimens darker than throat, and slightly paler than facial mask.	Bright 'glossy-white'. Usually slightly paler than throat but occasionally the same colour as throat.
Chin spot	Small (up to 10 mm in length) faint spot at base of mandible. Colour as for moustachial stripe.	Large (up to 16 mm) intensely coloured spot at base of mandible. Colour as for moustachial stripe.
Malar apterium	Gular skin overlying mandibular rami concealed by throat and sub-moustachial feathering.	Gular skin exposed and prominent yellow 55 (feathering of sub-moustachial area short and/or appressed anteriorly).
Throat	Grey. Varies between 84 to slightly paler than 85.	'Off white' to pale grey 86.
Breast	General colouration of grey 83/84. Sub-terminal band on breast feathers brown 119A fading proximally to light grey; narrow terminal bands of white to 'off white'. Fine scalloped appearance. Darker-throated birds have darker breasts.	Overall heavily scalloped 'off white'. Sub-terminal bands of mid-brown 27 to 28. Broad terminal bands of white to 'off white'.
***Breast patches**	4-15 feathers of side of neck and occasionally upper breast tipped pale yellow 57 or 55. Most specimens 6-10 feathers only on side of neck. Yellow colouration rarely visible in field conditions.	At least 20 feathers (usually more) of side of neck and upper breast tipped intense olive yellow 55. Brighter than chin spot and moustachial stripe. Always extends onto breast.
Hind-neck barring	Feathers with narrow terminal bands of light grey extend dorsally from breast to at least level with top of ear coverts. Some specimens show continuous barring across nape, though not prominent.	Barring conspicuous. May extend from nape to middle of back. Always across nape, though variable.
Belly to vent	'Off white' of belly and flanks graduating to white at vent.	'Off white' of belly and flanks graduating to white at vent. General glossy appearance.
Tibial feathers	Brown 119B/119C.	Light brown 119C/119D to 119D.

The plumage characteristics exhibited by phenotypically pure Murray Mallee Yellow-throated Miners were determined by:

(i) Reference to the plumage characteristics and plumage variation present within a population of the same subspecies outside the range and genetic influence of the Black-eared Miner.

(ii) The work of authors who have previously examined Murray Mallee Yellow-throated Miner skins (Joseph 1986; Starks 1987).

Following the determination of the diagnostic plumage characters of each species, and the categorisation of phenotypically pure specimens, all remaining specimens were examined for characters indicating possible hybridisation. All specimens were examined for variation in plumage characters related to sex, season of collection, and location.

The terminology applied to plumage characteristics in this paper follows Grant & Mullarney (1989). In some cases these terms differ from those used by previous authors who have described plumages of Black-eared and Yellow-throated Miners. These differences are as follow:

Gape spot as used by Considine (1986), Joseph (1986), Starks (1987) and McLaughlin (1990) to describe the small spot or stripe originating at the gape is now referred to as the **moustachial stripe.**

Malar stripe as used by Considine (1986), Joseph (1986), Starks (1987) and McLaughlin (1990) to describe the stripe originating between the gape and malar point, is now referred to as the **sub-moustachial stripe.**

Sub-malar apterium as used by McLaughlin (1990) to describe the exposed gular skin overlying the mandibular rami is now referred to as the **malar apterium.**

Finally, descriptions of Black-eared Miners presented in a selection of commonly used field-guides and reference books were examined. This information was assessed for its ability to enable the accurate identification of this species.

Results

Seventeen plumage characters separating the two species were identified. This information is presented in Table 1. This table also contains information detailing the extent of variation observed within each species for each of the plumage characters described. Figure 1 illustrates the position of upper-torso plumage characters. Of the 41 Murray Mallee museum skins that formed the basis of this study, 13 were classified as pure Black-eared Miners (8 male, 5 female). For comparison, an even-sexed sample of 14 pure Murray Mallee Yellow-throated Miners was described. Fourteen specimens were classified as 'intermediate' (or hybrid) (9 male, 3 female, 2 sex unknown). The details of all Murray Mallee specimens are provided in Appendix I. No variation in plumage characteristics attributable to location, season or sex was observed in any of these birds.

Specimens classified as Black-eared/Yellow-throated Miner hybrids displayed at least one, though usually more than one, plumage character intermediate between those described for phenotypically pure specimens. No specimens exhibited a mixture of pure plumage characteristics of both species. Plumage characters displayed by hybrid birds were not consistently similar, and appeared to vary anywhere between the two pure extremes (see Joseph 1986 for an elaboration on this point).

Paintings and photographs in field-guides and reference texts

The following list is a general guide to the deficiencies of paintings and photographs purporting to illustrate Black-eared Miners. Only those characters considered incorrectly illustrated are mentioned. It should be noted that in some cases the illustrations may differ from the original art or photographic work owing to difficulties encountered with colour reproduction.

Paintings:

What Bird is That? (Cayley — all editions). Overall colour is too pale, tibial feathers and sub-moustachial stripe incorrectly white, insufficient black around eye. Text for revised field-guide edition (Cayley 1991) states '. . . identify with caution'.

A Field Guide to Australian Birds (Passerines) (Slater 1974). Dorsal (excluding tail) and ventral surfaces too pale. Tail is too dark and contrasts significantly with the rump. Sub-moustachial stripe is white, malar apterium is exposed, post-auricular feathers are too pale and there is a large amount of white (as much as in Yellow-throated Miners) on tips of rectrices.

A Field Guide to the Birds of Australia (Pizzey 1980). Too pale overall. Pale rump appears to contrast with dorsum, distinct pale tips to rectrices, distinct grey fringing on ear coverts, tibial feathers same colour as belly, and insufficient black above eye, in lores and in ear coverts. However, the accompanying text is substantially correct in describing the species as being generally uniform grey from crown to rump, and having no white tips on tail feathers.

The Birds of Australia (Simpson & Day 1984 and subsequent editions). Overall colour is too light (see also Joseph & Jaensch 1985), the tail exhibits a white tip, the tibial feathers are grey, the rump appears to contrast with the dorsum and tail feathers, and the sub-moustachial stripe is much too pale.

The Slater Field Guide to Australian Birds (Slater et al. 1986). Overall too pale (see also Carpenter 1988). Sub-moustachial stripe is too pale, and the posterior half of the bird is not displayed (thereby not illustrating major identification features), although the relevant features are mentioned in the accompanying text.

Photographs:

The second edition of the Reader's Digest *Complete Book of Australian Birds* (Schodde & Tidemann 1986), which considers the Black-eared Miner a subspecies of the Yellow-throated Miner, does not display a Black-eared Miner photograph. However, a photograph of a Black-eared Miner appears in the first edition of this book (Frith 1976).

Every Australian Bird Illustrated (Wade 1975). The photograph in this publication was taken at the same nest (of almost certainly the same bird) as that illustrated in Frith (1976). However, the reproduction is very poor, giving the impression of less black in ear coverts, grey fringing on ear coverts and a paler sub-moustachial stripe.

Honeyeaters and their Allies of Australia (Longmore 1991). Photograph p. 112 — although labelled as Black-eared Miner, this photograph is clearly of a hybrid bird, exhibiting overall pale colour, prominent hind-neck barring, large moustachial stripe and chin spot, pale sub-moustachial stripe, prominent silver-grey fringing of ear coverts and obvious breast patches. Photograph p. 114 — same photograph as in Frith (1976), although reproduction is better, overall colouration is still too pale.

Encyclopedia of Australian Animals — Birds (Lindsey 1992). The photograph in this publication professing to be of a Black-eared Miner is of a distinct hybrid bird, showing overall pale colour, large moustachial stripe, glossy-white sub-moustachial stripe and underparts, silver-grey fringing on ear coverts, prominent post-auricular spot and breast patches.

Discussion

At least seventeen plumage characteristics separate pure Black-eared Miners and sympatric pure Yellow-throated Miners. When compared, the two species are substantially different in appearance. Statements such as 'no single plumage character distinguishes the Black-eared from the Yellow-throated' (Blakers et al. 1984) are misleading, because the difficulties associated with identification lie not in separating the two species, but in identifying *pure* examples of each.

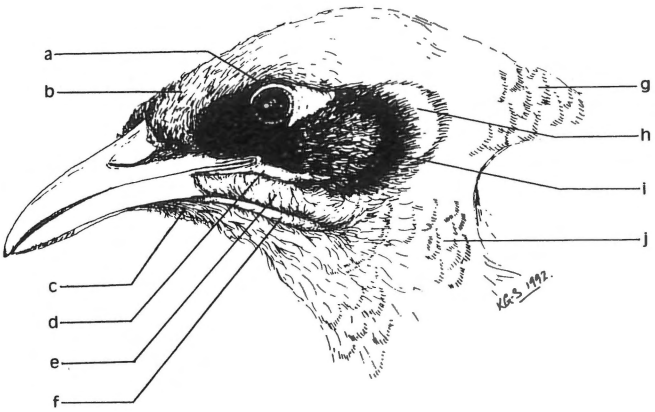

Figure 1. Drawing of a generalised miner illustrating upper-torso plumage features. (a) superciliary stripe; (b) frons; (c) chin spot; (d) moustachial stripe; (e) sub-moustachial stripe; (f) malar apterium; (g) hind-neck barring; (h) post-auricular spot; (i) ear coverts; (j) breast patches.

Drawing: Kate Gorringe-Smith

Table 1 indicates those plumage features that are most easily assessed under normal field conditions. However, the identification of those features *only* is insufficient to classify a particular miner as Black-eared. Further information is still required. A bird-watcher prepared to identify a Black-eared Miner must be conversant with all diagnostic plumage characters. Furthermore, the observation must be made in good lighting conditions, as variations in ambient light levels, or even the angle at which a particular plumage character is viewed (e.g. birds appear darker when in shade or against a cloudy sky) may result in an erroneous identification. Indeed, as some plumage characters are difficult (though not impossible) to determine in the field (e.g. prominence of moustachial stripe and chin spots, relative shades of grey on dorsum and uppertail), all field identifications of Black-eared Miners (and Yellow-throated Miners in the Murray Mallee) made by inexperienced observers must be considered tentative (Joseph 1986; McLaughlin 1990).

Nevertheless, the identification of even hybrid birds is important for the conservation of biological and genetic diversity, and the identification of colonies containing Black-eared Miner-like intermediates will be important in identifying habitat areas of potential suitability for Black-eared Miners (Joseph 1986; McLaughlin 1992). For example, all known phenotypically pure Black-eared Miners occur in colonies that also contain hybrid birds (McLaughlin 1990, 1992).

Given the current endangered status of the species, it is imperative that the information provided for identification purposes is accurate. No bird identification guides currently available are wholly accurate, and some are, in fact, thoroughly misleading. As pointed out by Joseph (1986), in some cases the illustrations and descriptions of Black-eared Miners may have been based on intermediate-plumaged museum skins.

The information presented in this article is intended primarily to assist bird observers visiting the Murray Mallee, and to assist in clarifying the status of this endangered species.

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Appendix 1

Specimens of Murray Malley Black-eared, Yellow-throated and Black-eared/Yellow-throated Miner intermediates used in this study. MV=Museum of Victoria; SAM=South Australian Museum; (HLW)=H.L. White Collection. Sex of specimen indicated in brackets after museum catalogue number.

Catalogue Number	*Location*	*Date*	*Collector*
Black-eared Miners			
MVR4846(m)	Underbool, Vic.	8.9.1910	C.J. Cole
MVR5039(m)	30 km N Kow Plains (=Cowangie), Vic.	8.9.1911	F.E. Wilson
MV(HLW)795(f)	Kow Plains, Vic.	11.9.1912	R. & L. Chandler
MVB3248(f)	W Murrayville, Vic.	5.5.1949	H.F. Thomas
SAMB4316(m)	Karoonda, S.A.	14.4.1920	F.E. Parsons
SAMB4317(f)	Karoonda, S.A.	14.4.1920	F.E. Parsons
SAM2983(m)	Karoonda, S.A.	14.4.1920	F.E. Parsons
SAMB23167(f)	Loxton, S.A.	20.6.1920	F.E. Parsons
SAMB23165(m)	Karoonda, S.A.	23.5.1921	F.E. Parsons
SAMB23166(f)	Karoonda, S.A.	23.5.1921	F.E. Parsons
SAMB4315(m)	Karoonda, S.A.	23.5.1921	F.E. Parsons
SAMB23164(m)	Karoonda, S.A.	25.7.1928	F.E. Parsons
SAMB18761(m)	Perponda, S.A.	16.5.1937	C.E. Rix
Yellow-throated Miners			
MV(HLW)832(m)	Kow Plains, Vic.	7.9.1912	R. & L. Chandler
MV(HLW)831(f)	Kow Plains, Vic.	12.9.1912	R. & L. Chandler
MVR7631(m)	Raak Plains, Vic.	19.10.1912	A. Milligan
MV(HLW)827(m)	Linga, Vic.	19.9.1917	T. Tregellas
MVB2627(m)	Coomealla, N.S.W.	12.9.1944	H.F. Thomas
MVB2226(f)	Carwarp, Vic.	22.8.1947	H.F. Thomas
MVB5965(m)	Mildura, Vic.	15.5.1951	P. Favaloro
MVB5964(f)	Mildura, Vic.	15.7.1951	P. Favaloro
MVB6455(f)	Benetook, Vic.	12.9.1961	N. Favaloro
MVB7776(f)	Gol Gol, N.S.W.	18.9.1961	N. Favaloro
MVB7778(m)	Gol Gol, N.S.W.	18.9.1961	N. Favaloro
MVB7779(f)	Gol Gol, N.S.W.	18.9.1961	N. Favaloro
MVB8093(m)	Benetook, Vic.	?.11.1963	'Museum Staff'
MVB14729(f)	'Calder Hwy', Vic.	?.9.1964	N. McDonald
Black-eared/Yellow-throated Miner Intermediates			
MVR5040(f)	30 km N Kow Plains, Vic.	8.9.1911	F.E. Wilson
MV(HLW)794(m)	Kow Plains, Vic.	11.9.1912	R. & L. Chandler
MV(HLW)796(f)	Kow Plains, Vic.	11.9.1912	R. & L. Chandler
MV(HLW)833(m)	Kow Plains, Vic.	11.9.1912	R. & L. Chandler
SAMB17633(m)	N Manya, Vic.	21.9.1934	H. Condon
SAMB23170(m)	N Manya, Vic.	28.9.1935	F.E. Parsons
MVB3247(m)	E Murrayville, Vic.	6.5.1949	H.F. Thomas
MVB5958(m)	Hattah, Vic.	27.8.1951	N. Favaloro
MVB5959(m)	Hattah, Vic.	27.8.1951	N. Favaloro
SAMB24815(?)	Rough Hill, Hartley, S.A.	17.11.1957	A.H. Lendon
MVB10265(m)	W Wymlet, Vic.	8.7.1962	A. McEvey
MVB10266(f)	W Wymlet, Vic.	8.7.1962	A. McEvey
MVB8092(m)	Benetook, Vic.	?.11.1963	'Museum Staff'
MVB8037(?)	N Rainbow, Vic.	12.5.1966	A. McEvey