THE SUNBIRD

Journal of the
QUEENSLAND ORNITHOLOGICAL SOCIETY
Birds Queensland

Volume 40 Number 1 July 2010

SUNBIRD 40(1) **JULY 2010**

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ISSN 1037-258X

All members receive a monthly newsletter and a copy of the periodical journal, *The Sunbird.* The price of *The Sunbird* to non-members is $10.00 per issue. The Society holds a general meeting and a field excursion each month.

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THE SUNBIRD

Volume 40 No. 1 July 2010

DISTRIBUTION OF YELLOW-EARED HONEYEATERS (GENUS *MELIPHAGA*) IN TROPICAL QUEENSLAND

JIRO KIKKAWA

ABSTRACT

Three species of yellow-eared honeyeater (genus *Meliphaga*) occur in north-eastern Queensland. Distributional data collected between Darnly Island in Torres Strait and Conway National Park south of Bowen showed that Lewin's Honeyeater, *Meliphaga lewinii*, is generally found in highland rainforests (above 450 m altitude) while the Yellow-spotted and Graceful Honeyeaters are restricted to lowland forests in the Wet Tropics. In Torres Strait the Graceful Honeyeater, *Meliphaga gracilis*, is restricted to Moa Island while the Yellow-spotted Honeyeater, *Meliphaga notata*, is found on most wooded islands. On Cape York Peninsula north of Cooktown, Lewin's Honeyeater is restricted to the rainforest of higher altitudes (above 550 m) in McIlwraith Range, but south of Cooktown it is also distributed to some coastal lowland rainforests. The two lowland species occur commonly in rainforests and adjacent vegetation including mangroves on Cape York Peninsula. South of Townsville their distributions taper out while Lewin's Honeyeater occurs in all types of rainforest at all altitudes. The Lewin's Honeyeater of the Wet Tropics was considerably smaller than its south-eastern Queensland counterpart. Numerical analysis of measurements taken from netted birds showed size differences in all standard measurements between the two lowland species, but sexual size differences within each species, most significantly contributed to by bill length, produced some overlap of measurements between the female Yellow-spotted Honeyeater and the male Graceful Honeyeater. Further investigation of sexual size differences within species and ecological differences between species is required for the understanding of relationships among the yellow-eared honeyeaters in tropical Queensland habitats.

INTRODUCTION

The yellow-eared honeyeaters (genus *Meliphaga*) are primarily rainforest birds consisting of very similar species, often occurring sympatrically in New Guinea (Beehler *et al.* 1986) and north-eastern Australia. The three species that occur in Queensland are considered to have derived from the New Guinea stock and their distribution is of great interest to the students of evolution (e.g. Keast 1961, Norman et al. 2007). They have size differences but all have conspicuous yellow gape stripes and ear-spots, thus field identification of species presents a challenge to many birders where more than one species occur together (James 1995). The White-lined Honeyeater *Meliphaga albilineata* and Kimberley Honeyeater *M. fordiana* are the only other Australian species of *Meliphaga*. They are restricted in distribution to Arnhem Land and Kimberleys, respectively, where no other *Meliphaga* species occur, and will not be considered in this paper.

The species with the widest distribution in Australia is Lewin's Honeyeater, *M. lewinii,* which is the largest of the three, and ranges from McIlwraith Range on Cape York Peninsula (Kikkawa 1976, Christidis & Schodde 1993) to approximately Powelltown in Victoria (Gannon 1962) along the Great Dividing Range. In subtropical and temperate regions this species is associated with all types of rainforest (closed forest) and wet sclerophyll forest (tall open forest) and occurs at all altitudes, though it is rare on the western slopes of the Great Divide (Kikkawa 1968). In the tropical region it is generally absent from the lowlands (Barnard 1926, Gill 1970, Griffin 1974). Schodde & Mason (1999) recognize three subspecies of Lewin's Honeyeater, representing populations of northern Cape York Peninsula (*M. l. amphochlora*), tropical Queensland (*M. l. mab*) and subtropical to temperate regions east of the Great Divide (*M. l. lewinii*). Shoo et al. (2009) reviewed the conservation status, particularly distribution and population size, of *M. l. amphochlora*.

The two other species (Yellow-spotted Honeyeater, *M. notata,* and Graceful Honeyeater, *M. gracilis*) are smaller than Lewin's Honeyeater and are restricted to tropical Queensland where they overlap in distribution in lowland rainforests and adjacent vegetation (Gannon 1962, Blakers *et al.* 1984). The Graceful Honeyeater is the smallest species.

In order to ascertain geographical and ecological distribution of these three species in the region of sympatry, I have assembled reliable records of their reported localities and my own observations in tropical Queensland between 1965 and 1995. In this paper I report on their distribution, relative abundance in marginal habitats and size ranges in north Queensland.

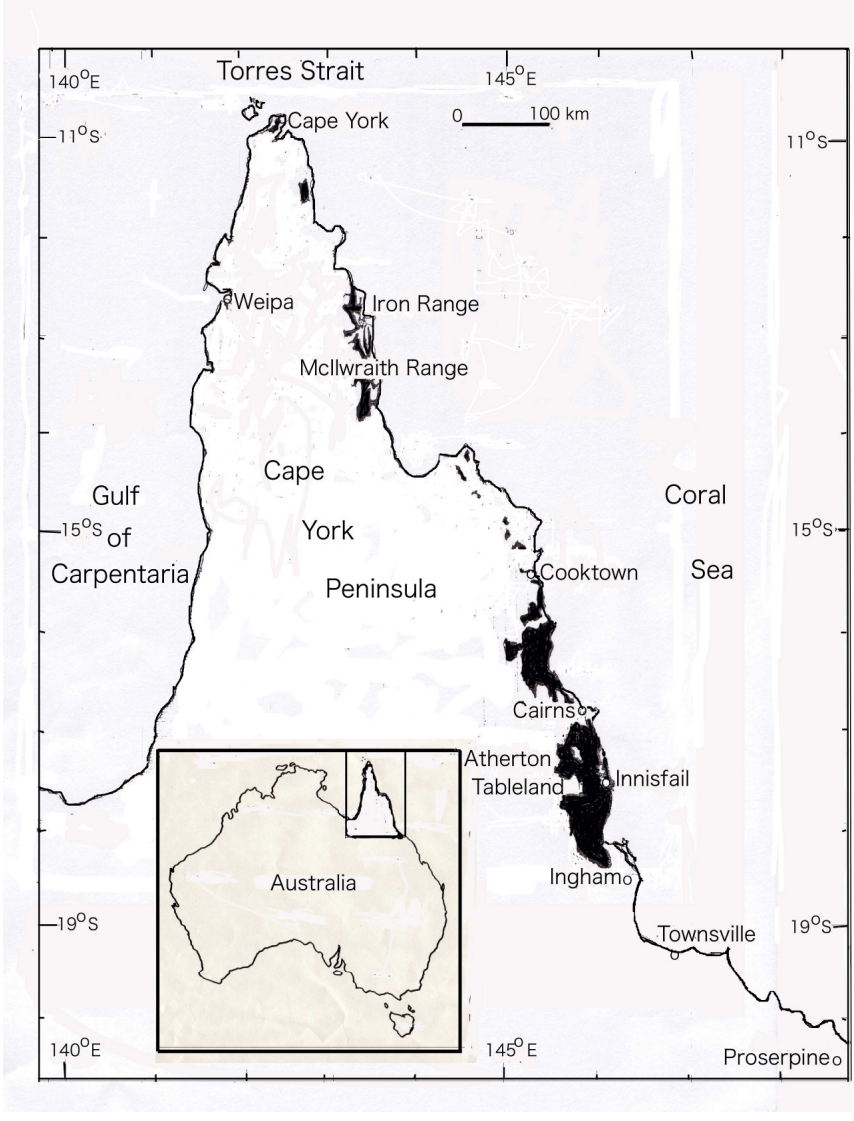

Fig. 1, North Queensland regions from which distributional data of *Meliphaga* species have been collected. Rainforest fragments are shown in black.

METHODS

Field identification of yellow-eared honeyeaters was made at localities where bird species lists were complied. The three species have very similar coloration and colour patterns and, while size difference exists, the sexes are size-dimorphic (Schodde & Mason 1999). Thus, the only certain means of field identification is by their characteristic calls. Lewin's Honeyeater usually has a rapid, but occasionally slow, succession of same-pitched notes, which are equally spaced within one call. The Yellow-spotted Honeyeater has a similar but harsher call, starting with a single note followed by a few similar notes of less intensity uttered with increasing rapidity. This type of call is absent in the Graceful Honeyeater which, however, utters a single note, 'tut', frequently and short repeated harsh notes occasionally. The 'tut' is similar to one of the calls of the Brown Honeyeater, *Lichmera indistincta,* but is harsher. All positive identifications were made either from the distinguishable calls described above or from netted birds in the hand.

Attempts were made to cover all types of closed forest (rainforest) and related vegetation within the geographical range of the species in north Queensland (Fig. 1). At each locality the habitat was recorded in terms of vegetation types (Specht 1981, Webb & Tracey 1981). Wherever reliable records are available in the literature, information was incorporated in the list of significant localities. The list is given in the Appendix together with coordinates, altitudes and vegetation types, which have been derived from maps and early records of CSIRO Division of Plant Industry (Tracey & Webb 1975) or from examination on site.

In addition to recording presence or absence of species, birds were mist-netted at selected localities between 1973 and 1977 (Kikkawa 1982), and measurements taken of representative samples of live birds. No specimens were collected. Wing, tail, tarsus and exposed culmen were measured for three Lewin's Honeyeaters (Atherton Tableland), 48 Yellow-spotted and 41 Graceful Honeyeaters (Cape York Peninsula and north Queensland wet tropics). Wing and tail measurements were read down to 0.5mm using a ruler and dividers (for tail), and tarsus and exposed culmen down to 0.1mm using callipers. Weights were also obtained for three Lewin's Honeyeaters, 44 Yellow-spotted Honeyeaters and 36 Graceful Honeyeaters. This data set was subjected to numerical classification and ordination. For classification an agglomerative polythetic program MULCLAS (Lance & Williams 1967) was used, with Euclidean metric dissimilarity measure and Burr's sorting strategy. The diagnostic program GROUPER was also applied to identify the measurements significantly contributing to the fusion of groups in classification. For ordination the principal coordinate analysis (Gower 1967) with the same dissimilarity measure was carried out and the diagnostic program GOWECOR back-correlated the points on the Gower vectors to the measurements.

The habitats examined included major types of north Queensland closed forest and some adjacent vegetation. In the list of localities given in the Appendix some sites with apparently suitable habitats but without any record of *Meliphaga* species were included. Also included were some records of absences in the habitat types adjacent to one, which was occupied by at least one of the three species. On the other hand, many localities of tropical lowlands and tablelands were omitted if the pattern of distribution was the same as nearby localities that were listed. The altitudinal distribution in the coastal ranges (e.g. Thompson Range, Thornton Range) and in parts of the Dividing Range (e.g. Mossman River Gorge, Mount Windsor Tableland) has not been examined. If the occurrence of any species is known to be very irregular or rare, particularly in relation to the co-habiting species, it was recorded as rare.

RESULTS

Distribution:

In the Torres Strait only the Yellow-spotted Honeyeater has been recorded except on Moa Is., where the Graceful Honeyeater is also known from the H.L. White collection (Campbell 1920, Draffan *et al.* 1983) and from my observations. In the riverine rainforest vegetation of Moa Island only Yellow-spotted Honeyeaters were netted in July 1977, although the Graceful Honeyeater was also observed there and near the villages. Only the Yellow-spotted Honeyeater was recorded in the hillside vine forests. According to Draffan *et al.* (1983), Yellow-spotted Honeyeaters inhabit all large wooded islands of the Torres Strait, except mangrove islands and Mount Adolphus Is. (rainforest and mangroves). They are found primarily in vine forests but sometimes extending to mangroves and nearby woodlands.

On Cape York Peninsula north of Cooktown, both the Yellow-spotted and the Graceful Honeyeaters are common in most types of rainforest. The Graceful Honeyeater is rarer than the Yellow-spotted Honeyeater around Cooktown (Storr 1953, McLean 1995). On the west coast, both are recorded commonly from the patches of monsoon forests (Kikkawa 1975) around Weipa and dune vegetation of the Edward River (14°52'S, Garnett & Bredl 1985) in the north, but Thomson (1935) found only the Graceful Honeyeater near the mouths of the Edward and Coleman Rivers. Further south, neither species has been recorded from riverine vegetation of the Mitchell River (Standfast 1965, Domrow 1967). Ecologically, the Yellow-spotted Honeyeater is mostly confined to vine-forests whereas the Graceful Honeyeater tends to spread into the adjacent vegetation, be it mangroves or woodlands (Barnard 1911, Macgillivray 1914, 1918; White 1922, Officer 1967). Isolated deciduous vine-thickets and heaths adjacent to vine-forests at Capelands (Heathlands, July 1975) were inhabited by Graceful Honeyeaters without Yellow-spotted Honeyeaters, but in heath vegetation near Cape Flattery and a patch of vine-forest at Hopevale, north of Cairns, only the Yellow-spotted Honeyeater was found (July 1976). Both species are lowland

birds, but also occur on the slopes of Mt Tozer (May 1968) to the top (545 m), the highest peak on northern Cape York Peninsula. In McIlwraith Range, which rises to 823 m, their distributions taper out above 560 m (October 1969).

The only records of Lewin's Honeyeaters from northern Cape York Peninsula come from the McIlwraith Range, where the species has been recorded in vine forests above 550 m in altitude (October 1969; see Shoo et al. 2009). Earlier, the Archbold Expedition of 1948 to Cape York Peninsula was joined by Donald Vernon of the Queensland Museum, who collected 134 species of birds in this region (Mack 1953). One Lewin's Honeyeater (male) was collected in the Rocky Scrub, which refers to the rainforest of McIlwraith Range (Kikkawa 1976). This record was not recognised by Storr (1973), but Schodde (1989) collected the species from the summit ridge of the McIlwraith Range to re-confirm its disjunct occurrence north of Cooktown (Christidis & Schodde 1993, Schodde & Mason 1999).

South of Cooktown, all three species are known in the Wet Tropics, with the Yellow-spotted and the Graceful Honeyeaters generally restricted to the lowland forests up to about 600 m in altitude at Mt Finnigan, Mt Bartle Frere and Tully Falls. Of the two lowland species, only the Yellow-spotted Honeyeater was recorded in the vine forest of higher altitudes (580 m) on Mt Sampson, Mt Spec (930 m) and Paluma (890 m), whereas only the Graceful Honeyeater was recorded at high altitudes of Lode Hill (610 m), Gold Hill (500 m), Owen Creek (420 m), Lake Barrine (700 m), Lake Eacham (740 m), Boonjie (660 m), Henrietta (600 m) and Water Hill Range (670 m). Lewin's Honeyeater is common in tableland vine forests, overlapping with the other species at most of the above localities. On Big Tableland and Atherton Tableland, Lewin's Honeyeater is common above about 600 m in altitude (Bourke & Austin 1947, Storr 1953, Bravery 1970), whereas to the south in the hinterland of Innisfail it

Table 1. Lewin's, Yellow-spotted and Graceful Honeyeaters (HE) measurements. Mean (Sample size) ± SD

	Wing (mm)	**Tail** (mm)	**Tarsus** (mm)	**Exposed culmen** (mm)	**Weight** (g)
Lewin's HE	87.3 (3)	76.8 (3)	25.03 (3)	18.37 (3)	29.8 (3)
(N Qld)	±0.58	±1.6	±0.907	± 0.569	±2.020
Lewin's HE	102.0 (6)	90.3 (6)	28.48 (5)	19.56 (6)	33.3 (52)
(SE Qld)	±4.98	±2.93	±1.098	±1.815	±3.700
Yellow-spotted HE	81.7 (49)	68.4 (49)	24.04 (48)	17.6 (48)	25.7 (50)
(N Qld & Cape York P)	±4.17	± 3.88	±1.247	±1.111	±2.74
Graceful HE	72.5 (41)	59.4 (41)	20.45 (40)	16.37 (39)	14.8 (43)
(N Qld & Cape York P)	±3.55	±1.73	±0.611	±1.266	±1.09

is common above 450 m in altitude (Gill 1970) or much higher in the Cardwell Range (Barnard 1926). At Red Peak station (540 m) of the Skyrail north of Cairns, two lowland species occur without Lewin's Honeyeater. In some localities Lewin's Honeyeater is known to co-exist with the lowland species at lower altitudes near the coast: China Camp (riverine vine forest at 200 m), south of Noah Head (impoverished vine forest on coastal sand at 10 m), Hartley Creek (semi-deciduous vine forest close to the beach at 5–50 m). Although some of the early records from north Queensland are unreliable (e.g. Broadbent 1910, White 1946, Tarr 1948, Austin 1950), the presence of Lewin's Honeyeaters at the last two localities has been known for a long time (Binns 1954), suggesting that factors other than altitude may influence the distribution of this species where the lowland habitat is contiguous with the highland vine forests. Lewin's Honeyeater may also move to lower altitudes seasonally as the record at Little Crystal Creek (360 m, Griffin 1974) shows. South of Townsville (19° 11'S), the two lowland species disappear while Lewin's Honeyeater ranges in all types of vine forests from the coastal lowland over the dividing range to the inland deciduous vine thickets as it does in subtropical Queensland.

Within the wet tropics the altitudinal distribution of Lewin's Honeyeaters varied with latitudes, but the regression of latitudes with the lowest altitude at which the species was recorded was not significant (R^2=0,057, P=0.065).

Morphometrics

Table 1 gives a summary of the measurements taken in the field. For comparison measurements of Lewin's Honeyeaters taken in southeast Queensland rainforests are included. Lewin's Honeyeaters of north Queensland were considerably smaller than their south eastern Queensland counterparts. Yellow-spotted and Graceful Honeyeaters did not show morphological differences across a geographic range between Cape York Peninsula and tropical north Queensland. However, size differences between the sexes were reflected in the numerical classification (Fig. 2). Because of the similar size range and small sample size, all three Lewin's Honeyeaters were classified with a group of Yellow-spotted Honeyeaters (presumably mostly males). Two Yellow-spotted Honeyeaters (presumably female) were classified with a group of Graceful Honeyeaters (presumably mostly males), at low dissimilarity levels. Relatively high-level fusions of these "male" and "female" groups (A & B and C & D) suggest that if misclassification occurred between the sexes within the same species it would be rather limited. Thus, size differences (Table 2) could be used to identify sexes of these species when netting them, though no confirmation was possible without collecting. The order of contribution of attributes towards the fusion of "male" and "female" groups was the same for both species, with the exposed culmen contributing most to the fusion at 37.8 % for the Yellow-spotted Honeyeaters and 47.6 % for the Graceful Honeyeaters, followed by the wing (25.3 % for the Yellow-spotted Honeyeaters and 31.3 % for the Graceful Honeyeaters) and

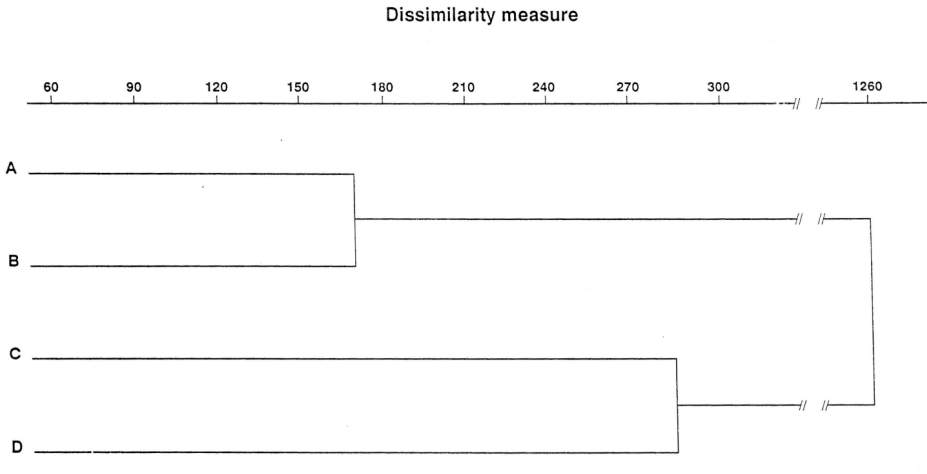

Fig. 2. Numerical classification of yellow-eared honeyeaters using standard measurements (wing, tail, tarsus and exposed culmen) and weight. Group A contains 3 Lewin's and 26 (presumed male) Yellow-spotted Honeyeaters; B, 20 (presumed female) Yellow-spotted Honeyeaters; C, 2 (presumed female) Yellow-spotted and 27 (presumed male) Graceful Honeyeaters; D, 14 (presumed female) Graceful Honeyeaters.

Table 2. Mean values of measurements for each of the four classified groups of Honeyeaters (HE) (see Fig. 2)

	A	B	C	D
	3 Lewin's HE + 26 (24 for wt) male Yellow-spotted HE	20 (18 for wt) female Yellow-spotted HE	2 female Yellow-spotted HE +27 (24 for wt) male Graceful HE	14 female Graceful HE
Wing (mm)	85.02	78.15	74.88	68.18
Tail (mm)	71.78	65.23	61.03	56.46
Tarsus (mm)	24.72	23.42	20.85	20.12
Exposed culmen (mm)	18.47	16.53	17.06	15.14
Weight (g)	27.52	24.40	15.76	13.79

the tail (24.4 % for the Yellow-spotted Honeyeaters and 15.4 % for the Graceful Honeyeaters). The weight was the greatest contributor to the fusion of the two species (26.9 %), followed by the tarsus (24 %), the tail (22 %) and the wing (20.6 %).

In ordination, 83.1 % of total variation was explained by the first vector (Fig. 3), which showed a size gradient contributed to by all measurements. The second vector (9.5 % of total variation) was weakly correlated with the exposed culmen. The Yellow-spotted and Graceful Honeyeaters are clearly separated in this ordination, with the exception of one Yellow-spotted Honeyeater in the domain of Graceful Honeyeaters.

DISCUSSION

The present survey describes geographical and ecological distribution of yellow-eared honeyeaters in north Queensland. In an earlier work (Kikkawa 1982), Lewin's and Yellow-spotted/Graceful Honeyeaters were separated along an altitudinal gradient in a principal coordinate analysis of species distribution in the Wet Tropics. However,

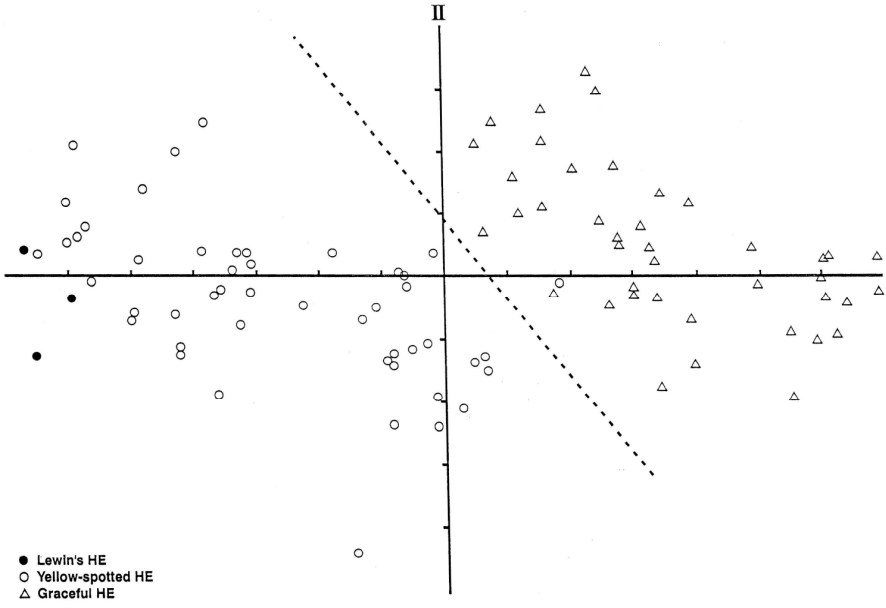

Fig. 3. Ordination (vectors I and II) of 92 yellow-eared honeyeaters by standard measurements and weight data. The dotted line separates Graceful Honeyeaters from all but one Yellow-spotted Honeyeaters (HE).

the data presented in the Appendix spanned a much wider geographical range of Lewin's Honeyeaters and the trend that Lewin's Honeyeater occurred at higher altitudes in lower latitudes did not become significant. It extended its range to coastal lowland rainforests north of Cairns, where rainforests were contiguous with those of highlands (Bell *et al.* 1987) and contained stoned mahogany (*Backhousia* sp.) and swamp mahogany (*Lophostemon suaveolens*) on sand (Kikkawa 1982). This suggests that the species may have reached coastal rainforests at other localities within the Wet Tropics before the clearing of the lowland rainforest (Tracey & Webb 1975, Winter *et al.* 1987). Lewin's Honeyeater also has a disjunct distribution to the highest section (550 - 800 m) of McIlwraith Range on northern Cape York Peninsula, where the subspecies *M. l. amphochlora* has been described (Schodde 1989).

The Yellow-spotted and Graceful Honeyeaters are primarily lowland forest birds in north Queensland, overlapping almost completely in geographical range (Williams *et al.* 1996). Only on the Torres Strait islands did the Yellow-spotted Honeyeater occur without the Graceful Honeyeater, except on Moa Island where both were recorded (Draffan *et al.* 1983). At other localities, both at higher altitudes and on Cape York Peninsula, presence of one without the other seems to be more a result of chance than an indication of ecological differences between the species. The Black Mountain Barrier within the Wet Tropics (Winter 1997, Schneider *et al.* 1998), while affecting the genetic composition of some bird populations (e.g. scrubwrens (*Sericornis* spp.), Joseph and Moritz 1993), does not appear to affect the distribution of yellow-eared honeyeaters. Molecular analysis of Lewin's Honeyeater populations across the barrier would be useful in interpreting the past dispersal between Pleistocene refugia (Kershaw 1994).

Protein electrophoresis of meliphagine population samples revealed two lineages for the Australian species, with Lewin's and Yellow-spotted Honeyeaters in one and the Graceful Honeyeater in the other (Christidis & Schodde 1993). The fact that the Yellow-spotted and Graceful Honeyeaters, which belong to different lineages, are sympatric and feed together (Crome 1978) in wet tropical lowlands of north Queensland suggests that ecological differentiation has occurred between the species. The shape of the bill, particularly the width at its base, differs between the two species (Crome & Chaffer 1976), which may indicate possible differences in their food niche. Their relationship awaits a detailed ecological study.

The sexual differences in sizes of yellow-eared species may also have ecological implications, especially as bill length is the most significant difference between the sexes. Further studies are needed to ascertain the degree of sexual differences in all three species in north Queensland.

ACKNOWLEDGMENTS

The fieldwork in the Wet Tropics was supported by grants from Australian Research Council (ARGC and ARC) and the fieldwork in Cape York Peninsula by Australian Biological Resources Study (ABRS). The fieldwork was conducted under permits from Queensland Parks and Wildlife Service and banding under Australian Bird and Bat Banding Scheme. I thank John Winter, Billie Gill and Andree Griffin for providing unpublished distributional data, Geoff Monteith, the late Len Webb and Geoff Tracey for the selection of study sites and other advice in the field, David Thomae for fieldwork, Mike Dale for help with numerical analysis and Peter Douglas for data management. I also thank John Winter and anonymous referees for useful suggestions on earlier drafts of the paper. I am also grateful to Leo Joseph for updating information on *Meliphaga* and references.

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APPENDIX.

Locality records for Lewin's Honeyeater *Meliphaga lewinii,* Yellow-spotted Honeyeater *M. notata* and Graceful Honeyeater *M. gracilis* in north Queensland. x: common or regular presence; rare: irregular or rare occurrence, if known, particularly in relation to the co-habiting species. The localities are arranged from low to high latitudes within each subregion (for reference towns see Fig. 1). The habitat is described in terms of vegetation types following Specht (1970) for open forests and woodlands and Webb (1968) for closed forests. The following abbreviations are used: CMVF: complex mesophyll vine-forest, CNVF: complex notophyll vine-forest, DMVF: deciduous mesophyll vine-forest, DVT: deciduous vine-thicket, EVT: evergreen vine-thicket, LMVF: low mesophyll vine-forest, LOF: low open-forest, LW: low woodland, MLOF: open-forest - low open-forest, MLW: woodland - low woodland, MOF: open-forest, MVF: mesophyll vine-forest, MW: woodland, NVF: notophyll vine-forest, SDMVF: semi-deciduous mesophyll vine-forest, SDVF: semi-deciduous vine-forest, SEVT: semi-evergreen vine-thicket, SNVF: simple notophyll vine-forest, TOF: tall open-forest, VF: vine-forest, VT: vine-thicket.

Tables commence Page 16

					Meliphaga		
Place Name	**Latitude**	**Longitude**	**Habitat**	**Altitude (m)**	***lewinii***	***notata***	***gracilis***
Torres Strait Islands							
Darnly Is.	9° 35′ S	143° 46′E	VF	10	–	x	–
(Draffan et al. 1983)							
Badu Is.	10° 07′ S	142° 09′ E	VF – MW	20	–	x	–
(Draffan et al. 1983)							
Moa Is.	10° 10′ S	142° 18′ E	Riverine VF	20	–	x	x
Moa Is.	10° 11′ S	142° 16′ E	Mangrove – VF – MW	0 – 50	–	x	x
(Campbell 1920; Draffan et al. 1983)							
Goat Is.	10° 11′ S	142° 11′ E	Mangrove – VF	0 – 10	–	x	–
(Draffan et al. 1983)							
Thursday Is.	10° 35′ S	142° 13′ E	VF – MW	20	–	x	–
Horn Is.	10° 37′ S	142° 17′ E	Mangrove – VF – MW	0 – 10	–	x	–
Mt Adolphus Is.	10° 39′ S	142° 39′ E	Mangrove – VF	0 – 20	–	–	–
(Draffan et al. 1983)							
Prince of Wales Is.	10° 41′ S	142° 09′ E	Mangrove – VF – MW	0 – 20	–	x	–
(Draffan et al. 1983)							
Cape York - Cooktown (10°41′S - 15°28′S)							
Cape York	10° 41′ S	142° 32′ E	Mangrove – LW	0 – 20	–	–	–
Albany Is.	10° 44′ S	142° 36′ E	VF – MW	10	–	x	–
(Storr 1973; Draffan et al. 1983)							
Somerset	10° 45′ S	142° 35′ E	Coastal complex	0 – 20	–	x	x
Lake Boronto	10° 46′ S	142° 34′ E	NVF on sand	30	–	x	x
Lake Boronto	10° 46′ S	142° 34′ E	MLW	30	–	x	x
Lockerbie	10° 48′ S	142° 27′ E	SDVF – OF	80 – 120	–	x	x
(Barnard 1911; Macgillivray 1914)							
Bamaga	10° 53′ S	142° 24′ E	SDVF with palms	40	–	x	x
Cockatoo Creek	10° 55′ S	142° 27′ E	NVF	80	–	x	x
Jardine River Crossing	11° 08′ S	142° 22′ E	Gallery VF	60	–	x	x
Captain Billy Creek	11° 37′ S	142° 50′ E	Riverine VF – MLOF with *Calitris*	40	–	x	x
Captain Billy Creek	11° 38′ S	142° 51′ E	NVF on sand	20	–	x	x
Capelands escarpment	11° 39′ S	142° 43′ E	NVF with abundant *Calamus* – Scrub	150	–	x	x
Gunshot Creek	11° 42′ S	142° 28′ E	Riverine VF	70	–	x	x
Gunshot Creek	11° 42′ S	142° 28′ E	Heath	80	–	–	x
Eleven Mile Creek	12° 17′ S	142° 35′ E	SDVF	80	–	x	x
Wenlock River Crossing	12° 27′ S	142° 39′ E	Gallery MVF	80	–	x	x
Andoom, Weipa (Kikkawa 1975)	12° 29′ S	141° 47′ E	SDVF	30	–	x	x
Mission River, Weipa (Kikkawa 1975)	12° 35′ S	141° 55′ E	Riverine CMVF	10	–	x	x
Portland Roads	12° 36′ S	143° 25′ E	Mangrove – DVT	0 - 10	–	–	x
Hibbard Point, Weipa (Kikkawa 1975)	12° 39′ S	141° 51′ E	Mangrove	0	–	–	x
South of Batavia Downs	12° 42′ S	142° 42′ E	DVT	100	–	–	x
Tozer's Gap	12° 43′ S	143° 13′ E	Scrub – LW	120	–	–	x
Middle Claudie River, Iron Range	12° 43′ S	143° 17′ E	Gallery SDVF	60	–	x	x
Middle Claudie River	12° 43′ S	143° 17′ E	MLOF	80	–	–	x
Middle Claudie River	12° 43′ S	143° 17′ E	LW with *Banksia* and *Melaleuca*	60	–	x	x
West Claudie River	12° 44′ S	143° 15′ E	Gallery SDVF	80	–	x	x

Mt. Tozer	12° 45′ S	143° 13′ E	EVT	400 - 520	–	x	x
Capsize Creek	12° 56′ S	142° 45′ E	DVT	100	–	–	x
Night Is. (MacGillivray 1910)	12° 56′ S	142° 45′ E	Mangrove – VF	0 - 10	–	x	–
Pat Creek	13° 22′ S	142° 53′ E	DVT	120	–	–	x
Leo Creek	13° 42′ S	143° 20′ E	Riverine NVF with *Lophostemon*	442	–	x	x
Peach Creek	13° 43′ S	143° 13′ E	Gallery VF with *Melaleuca*	183	–	–	x
Rocky River	13° 48′ S	143° 28′ E	SDMVF	250	–	x	x
Rocky River	13° 50′ S	143° 27′ E	SDMVF with sclerophyll trees	500	–	x	x
McIlwraith Range	13° 52′ S	143° 18′ E	Araucaria VF	640	x	–	–
Lankelly Creek	13° 53′ S	143° 15′ E	DMVF	350	–	–	x
Lankelly Creek	13° 53′ S	143° 15′ E	Riverine VF with *Acacia* and *Callistemon*	350	–	x	x
Upper Lankelly Creek	13° 53′ S	143° 17′ E	SDVF	560	x	x	x
Massy Creek	13° 56′ S	143° 03′ E	Riverine MVF	30	–	x	x
Coen River	13° 57′ S	143° 11′ E	MW	200	–	–	–
Lower Edward River (Thomson 1935)	14° 46′ S	141° 36′ E	Gallery VF/LW	10	–	–	x
Edward River Settlement (Garnett & Bredl 1985)	14° 52′ S	141° 37′ E	Dune woodland	10	–	x	x
Cape Flattery	14° 58′ S	145° 08′ E	Heath	10	–	x	–
Mt. Webb	15° 05′ S	145° 08′ E	SDMVF	120	–	x	x
Coleman River (Thomson 1935	15° 06′ S	141° 58′ E	Gallery VF/LW	20	–	–	x
McIvor River	15° 09′ S	145° 05′ E	Riverine VF	20	–	x	x
Hopevale	15° 17′ S	145° 06′ E	VF	50	–	x	–
Mt Milman (McLean 1995)	15° 24′ S	145° 15′ E	VF	370	–	x	rare
Mitchell River Mission (Standfast 1965, Domrow 1967)	15° 28′ S	141° 40′ E	Gallery LW	20	–	–	–
Cooktown – Cairns (15°28′S - 16°55′S)							
Mt Cook (McLean 1995)	15° 28′ S	145° 17′ E	VF	420	–	x	–
Walker Bay (Winter pers. comm.)	15° 35′ S	145° 19′ E	VT - coastal complex	5	–	x	–
Helenvale (Winter pers. comm.)	15° 43′ S	145° 13′ E	CMVF, riverine	140	–	x	x
Big Tableland (Hall 1974; McLean 1995)	15° 43′ S	145° 17′ E	SNVF	760	x	–	–
Mt. Sampson (NE slopes) (Winter pers. comm.)	15° 49′ S	145° 11′ E	CNVF	290	–	x	x
Mt. Sampson (NE slopes) (Winter pers. comm.)	15° 49′ S	145° 11′ E	SNVF	580	–	x	–
The Little Forks, Annan River (Winter pers. comm.)	15° 49′ S	145° 14′ E	VF with *Acacia* and *Eucalyptus*	210	–	x	x
Mt. Finnigan (E slopes) (Winter pers. comm.)	15° 49′ S	145° 18′ E	MVF	600	x	x	x
Gap Creek (Winter pers. comm.)	15° 52′ S	145° 20′ E	CMVF	30	–	x	–
NormanbyTin Mines (Hopkins 1972)	15° 53′ S	145° 12′ E	CMVF	530	rare	x	x

Ayton (Hall 1974)	15° 56′ S	145° 22′ E	Mangroves – VF – LW with *Lantana* edges	0 – 100	–	x	x
Ten Mile Creek (Winter pers. comm.)	16° 00′ S	145° 13′ E	VF with *Acacia* and *Melaleuca*	230	–	x	x
Chapman's Corner (Winter pers. comm.)	16° 00′ S	145° 15′ E	VF with *Acacia* and *Eucalyptus*	270	–	x	x
China Camp (Winter pers. comm.)	16° 02′ S	145° 17′ E	Riverine VF with *Lantana*	200	x	rare	x
Bourgamba (Winter pers. comm.)	16° 02′ S	145° 20′ E	MVF	440	x	–	–
Lode Hill (Winter pers. comm.)	16° 03′ S	145° 19′ E	SNVF	610	x	–	x
Gold Hill (Winter pers. comm.)	16° 05′ S	145° 17′ E	MVF– VF with *Acacia*	500	–	–	rare
Palmer River, Mullingan Highway	16° 07′ S	144° 46′ E	Riverine LOF	400	–	–	–
Mount Hemmant (S slopes) (Winter pers. comm.)	16° 07′ S	145° 25′ E	MVF – SNVF	460	x	x	x
South of Noah Head	16° 08′ S	145° 27′ E	MVF on sand	10	rare	x	x
Noah Creek	16° 09′ S	145° 27′ E	CMVF	10	–	x	x
Upper Daintree Crossing	16° 10′ S	145° 17′ E	CMVF, TOF, disturbed	100 – 200	–	x	x
Thornton Peak (Winter pers. comm.)	16° 10′ S	145° 22′ E	LMVF and *Lacospadi x* palm	1125	rare	–	–
Bailey Creek	16° 13′ S	145° 26′ E	CMVF	20	–	x	x
Mt. Windsor Tableland (Winter pers. comm.)	16° 17′ S	145° 01′ E	SNVF and *Agathis*	950	x	–	–
Daintree River Mouth, Wonga Beach (Winter pers. comm.)	16° 18′ S	145° 26′ E	Coastal complex	5	–	x	x
Mossman River	16° 27′ S	145° 22′ E	CMVF	50	–	x	x
West of B061 (Winter pers. comm.)	16° 32′ S	145° 23′ E	MVF	430	rare	x	x
Bushy Creek, Julatten (Gill pers. comm.)	16° 36′ S	145° 21′ E	Riverine VF with *Eucalyptus*	430	x	x	x
Hartley Creek (Binns 1954; Gill pers. comm.)	16° 39′ S	145° 32′ E	SDMVF	5 – 50	rare	x	x
Font Hills (Gill pers. comm.)	16° 43′ S	145° 10′ E	SNVF	900	x	–	–
Kuranda Forestry, Black Mtn Road	16° 46′ S	145° 37′ E	MVF and VF with *Acacia*	460	–	x	x
Moon River mouth	16° 47′ S	145° 43′ E	Coastal complex and LW with thickets	5 – 10	–	x	–
Trinity Beach turn-off, north of Cairns	16° 48′ S	145° 41′ E	Gallery MVF	70	–	x	x
Trinity Beach turn-off, north of Cairns	16° 48′ S	145° 41′ E	MW	70	–	–	–
Hann Tableland	16° 49′ S	145° 12′ E	CNVF with *Agathis*	600 – 700	x	–	–
Big Mitchell Creek	16° 49′ S	145° 22′ E	Gallery SEVT and MW	400	rare	–	–
Kuranda	16° 49′ S	145° 38′ E	VF with *Acacia*	400	rare	x	x
Owen Creek	16° 51′ S	145° 36′ E	CNVF with *Agathis*	420	–	–	x
Red Peak	16° 51′ S	145° 37′ E	CNVF	540	–	x	x

Cairns – Innisfail (16°55′S – 17°32′S)							
Tablelands							
Mareeba	16° 59′ S	145° 25′ E	MW	400	–	–	–
Davies Creek	17° 04′ S	145° 37′ E	SNVF	850	x	–	–
Tinaroo Dam	17° 11′ S	145° 33′ E	CNVF with *Agathis*	670	x	–	–
Danbulla Forest	17° 11′ S	145° 39′ E	SNVF	760	x	–	–
Tolga	17° 13′ S	145° 28′ E	CNVF	760	x	–	–
Lake Barrine	17° 15′ S	145° 38′ E	CNVF	700	x	–	rare
Bellenden Ker (below summit)	17° 16′ S	145° 51′ E	LMVF	1250	rare	–	–
Bellenden Ker (E slopes)	17° 16′ S	145° 52′ E	MVF – NVF	530	–	x	x
Lake Eacham	17° 17′ S	145° 38′ E	CNVF	740	x	–	rare
Gadgarra Forest	17° 17′ S	145° 42′ E	CNVF – SNVF	680	x	–	–
Malanda Falls	17° 21′ S	145° 36′ E	NVF	720	x	–	–
Boonjie	17° 25′ S	145° 44′ E	MVF – NVF	660	x	–	rare
The Crater	17° 26′ S	145° 31′ E	CNVF – SNVF	960	x	–	–
Mt. Bartle Frere (E slopes) (Gill pers. comm.)	17° 26′ S	145° 50′ E	MVF – NVF	600	x	rare	rare
Mt. Bartle Frere (E slopes) (Gill pers. comm.)	17° 26′ S	145° 50′ E	NVF	850	x	–	–
Kaban	17° 31′ S	145° 25′ E	MW with *Casuarina*	950	x	–	–
Sluice Creek	17° 31′ S	145° 32′ E	SNVF – CNVF	1200	x	–	–
Lowlands							
Freshwater Valley	16° 56′ S	145° 42′ E	CMVF	50	–	x	x
Trinity Inlet	16° 57′ S	145° 47′ E	Mangroves	0	–	–	rare
Miriwinni	17° 23′ S	145° 54′ E	CMVF on granite	100	–	x	x
Eubenangee Swamp	17° 25′ S	145° 58′ E	VF with palms, CMVF and MOF with *Melaleuca*	40	–	x	x
Mount Maria	17° 29′ S	146° 03′ E	MVF with abundant *Calamus* and *Acacia*	100	–	x	x
Cooroolands	17° 31′ S	145° 53′ E	CMVF with abundant *Calamus*	200	–	x	x
Innisfail – Ingham (17°32′S – 18°39′S)							
Tablelands							
Maalan	17° 36′ S	145° 37′ E	CMVF – CNVF	674	x	–	x
Henrietta (Gill pers. comm.)	17° 36′ S	145° 44′ E	CMVF	600	x	–	x
Crawfords Lookout	17° 37′ S	145° 48′ E	CMVF	300	rare	x	x
Water Hill Range (W slopes) (Hall 1974)	17° 38′ S	145° 39′ E	MVF – NVF with abundant *Calamus*	670	x	–	x
Millstream	17° 40′ S	145° 25′ E	CNVF	670	x	–	–
McNamee Creek	17° 40′ S	145° 51′ E	CMVF	250	rare	x	x
Forty Mile Scrub	17° 47′ S	144° 58′ E	DVT	690	x	–	–
Koombooloomba Forest	17° 47′ S	145° 33′ E	SNVF – CNVF	780	x	–	–
Tully Falls	17° 47′ S	145° 34′ E	MVF – SNVF	600	x	x	x
Mt. Surprise (Dwyer 1972)	18° 08′ S	144° 18′ E	DVT	460–540	x	–	–
Undara Lava Tunnels	18° 12′ S	144° 37′ E	DVT	790	x	–	–
Kirrama Range	18° 12′ S	145° 46′ E	SNVF	530	x	–	–
Wallaman Falls (Gill and Griffin pers. comm.)	18° 36′ S	145° 48′ E	CNVF and OF with *Casuarina*	530	x	x	x

Lowlands							
Etty Bay	17° 34′ S	146° 05′ E	MOF with *Melaleuca*	5	–	x	x
Cowley Beach	17° 42′ S	146° 07′ E	MVF with palms	10	–	x	x
Kurrimine Beach	17° 46′ S	146° 07′ E	MVF on sand and MOF with *Melaleuca*	5	–	x	x
Jarra Creek	17° 47′ S	145° 52′ E	CMVF with *Acacia*	70	–	x	x
Clump Point	17° 51′ S	146° 07′ E	Mangrove – CMVF	0–20	–	x	x
Lacey's Creek	17° 52′ S	146° 04′ E	MVF with emergent	60	–	x	x
Tully River	17° 53′ S	145° 47′ E	MVF disturbed	50	–	x	x
(Hall 1974)							
Sugar Cane Creek	17° 56′ S	146° 02′ E	Riverine MVF	5	–	x	x
Sugar Cane Creek	17° 56′ S	146° 02′ E	LLW	5	–	–	–
Dunk Is.	17° 57′ S	146° 09′ E	Mangrove – VF	0 – 200	–	x	x
(Gill pers. comm.)							
Meunga Creek	18° 14′ S	146° 00′ E	MVF	5	–	x	x
(Gill pers. comm.)							
Hinchinbrook Island	18° 25′ S	146° 15′ E	MVF	50	–	x	x
(Gill pers. comm.)							
Muller Creek	18° 26′ S	146° 08′ E	LOF	60	–	–	x
Muller Creek	18° 26′ S	146° 08′ E	Gallery MVF	60	–	x	x
Sunday Creek mouth	18° 30′ S	146° 13′ E	LLW	5	–	–	–
Cardwell Gap	18° 32′ S	146° 11′ E	CMVF	100	–	x	x
Ingham – Proserpine (18°39′S – 20°24′S)							
Little Crystal Creek	19° 01′ S	146° 16′ E	NVF with *Araucaria*	360	rare	x	x
(Griffin 1974)							
Mt. Spec	19° 02′ S	146° 14′ E	SNVF	950	x	–	–
(Griffin pers. comm.)							
Mt. Spec	19° 02′ S	146° 14′ E	SNVF	930	x	rare	–
(Thomae pers. comm.)							
Paluma	19° 05′ S	146° 13′ E	SNVF and gardens	890	x	rare	–
(Griffin 1995)							
Surveyor's Creek	19° 05′ S	146° 25′ E	Gallery thicket and LW with *Melaleuca*	10	–	x	x
Shelley Beach, Townsville	19° 11′ S	146° 45′ E	Mangrove	2	–	x	x
(Gill pers. comm.)							
Cape Pallarenda	19° 11′ S	146° 46′ E	Coastal complex	5	–	rare	–
(Lavery & Hopkins 1963; Griffin pers. comm.)							
Killymoon	19° 24′ S	146° 58′ E	Scrub creek	10	–	–	x
Alligator Creek (Griffin pers.comm.)	19° 27′ S	146° 58′ E	Riverine VF and OF with *Callistemon*	120	x	x	–
Giru	19° 31′ S	147° 05′ E	NVF	5	x	–	–
(Gill pers. comm.)							
Mt. Elliot	19° 30′ S	146° 58′ E	SNVF with palms	1200	x	–	–
(Lavery & Johnson 1968 and Lavery pers. comm.)							
West Barratta Creek	19° 35′ S	147° 13′ E	Gallery forest	10	–	–	rare
Mount Inkerman	19° 45′ S	147° 30′ E	SEVT	20–218	–	–	–
Mount Roundback	20° 00′ S	148° 03′ E	DVT with *Araucaria*	40–300	x	–	–
Bowen	20° 03′ S	148° 14′ E	DVT	5	x	–	–
Dingo Beach, Cape Gloucester	20° 05′ S	148° 30′ E	Coastal complex	0–20	x	–	–
Deep Creek, Mount Dryanden (Hall 1974)	20° 17′ S	148° 34′ E	SEVT – DVT	20–60	x	–	–
Conway National Park (northern end)	20° 18′ S	148° 46′ E	CNVF adjacent to mangroves	0–50	x	–	–

SURVIVAL OF A XANTHOCHROISTIC BROWN HONEYEATER *LICHMERA INDISTINCTA* (MELIPHAGIDAE)

JULIAN BIELEWICZ, FAY BIELEWICZ,
SUE WEDLOCK & TONY WEDLOCK

A yellow [xanthochroistic] bird was first observed by us (SW & TW) on 20 January 2009 at Nanango (152º 00´ E, 26º 40´ S) in southeast Queensland as it foraged low down in the wet vegetation in our home garden after rain. We later identified it as a leucistic Brown Honeyeater, *Lichmera indistincta*, a species whose usual colour is variously described (e.g. Higgins et al. 2001, Pizzy & Knight 2007) in shades of brown. Together we observed it intermittently for a period of 12 months as it foraged in several home gardens which it visited at Nanango until January 2010 (Table 1). The photograph (Figure 1) was taken in very bright sunlight on the 15 November 2009. The yellow colour of the plumage appeared brighter than shown in the photographs. The iris was brown as normal (Higgins et al. 2001) but the legs were paler, flesh-coloured or tan (normally grey black) and while the gape was pale yellow, the bill (normally black, Higgins et al. 2001) darkened from tan to brown towards the tip.

Figure 1. Aberrant (xanthochroistic) Brown Honeyeater, *Lichmera indistincta*.
(Photo: J. Bielewicz)

Only one yellow individual was observed at any time with other more normal coloured individuals, calling and behaving similarly as Brown Honeyeaters. We assumed that it was the same leucistic individual, seen repeatedly. No courtship or other sexual activity was observed and, as it was not measured, its gender remains undetermined. The bird was last seen in January 2010 having survived for a full year and its ultimate fate is not known to us.

We believe this is the first report of xanthochroism (leucism) in Brown Honeyeater and that it is of interest to record that it

Table 1. Xanthochroistic Brown Honeyeater sightings.

Date	Notes
20.01.09	Yellow bird first sighted low to the ground in garden on a morning following rain (SW& TW).
04.04.09	A "light yellow to white bird" larger than a canary (SW&TW) again foraging in garden after rain.
Winter	Occasionally seen in the garden of a morning (SW & TW).
Spring	More regularly heard and observed flying between trees throughout the day and not timid when approached (SW and TW).
26.08.09	Photographed (SW&TW).
04.09.09	Re-photographed (SW&TW).
29.10.09	Seen foraging in neighbours garden (SW & TW).
15.11.09	FB & JB first observe and photograph the bird.
20.12.09	Bright yellow colour clearly seen at a distance as the bird flew across one garden to the next (SW & TW, FB & JB).
2010	Occasionally seen in a neighbouring garden in January (SW&TW).

survived for at least a year. Aberrant plumage colour can severely shorten the lives of young birds if their colour breaks camouflage or invokes attacks from predators (Slagsvold et al. 1995) or parents (Norman 1977). But as we recently observed a leucistic (pale) adult female Australian Brush-turkey *Alectura lathami* on the foreshore at Noosa, some may survive to maturity.

Xanthochroism (or leucism) of bird plumage is a phylogenetically widespread condition that is generally under-reported in scientific literature (Hosner & Lebbin 2006, Wilson et al. 2006, Gonclaves et al. 2008). It can be caused by the absence of melanin revealing residual pigments in feathers, like yellow carotenes from diet (Terres 1980), or endogenous pigments (e.g. psittacofulvins) (Berg & Bennett 2010) and may be reported as a form of albinism. It is rare in the wild (Terres 1980) but a few instances have been recorded, including a small number in Australia. Lepschi (1990) reports 298 examples of albinism in 95 species from 45 families (Graham et al. 2005). Of the latter only 19 (6%) involved eight species of the family Meliphagidae.

We wish to thank an anonymous referee for commenting on an early version of this article.

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CRIMSON FINCH AT MACKENZIE RIVER CENTRAL QUEENSLAND

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A flock of Crimson Finches, *Neochmia phaeton phaeton,* observed near the Mackenzie River (23°3'30"S, 149°2'40"E) in central Queensland is reported. This is the first sighting of the species in the area since 1845 (Storr 1984). Crimson Finch *Neochmia phaeton* occurs in northern tropical Australia, southern Papua New Guinea and Fredrik Hendrik Island (Clement et. al. 1993). It has not been observed in central Queensland during recent atlases (Blakers et. al. 1984, Barrett et. al. 2003). Several previous records of the species south of 19° S are from the upper Connors River-Lotus Creek area (22° S, 149° E) northwest of Marlborough (Wilson 1988, 1990; Todd 2002) but Birds Queensland members have reported no further sightings.

We noticed the Crimson Finches at approximately 13:15 on Thursday 30th September 2004. They were taking seed from the top of tall grass about 10 metres south of the bank of the Mackenzie River, below the bridge at the Fitzroy Development Road crossing. Two males in full adult plumage and six females, or immature males, formed the feeding flock of at least eight birds. Other finches, Double-barred Finch and Chestnut-breasted Mannikin, were feeding nearby on the same and similar grasses. The Crimson Finches remained together as a group, not interacting with any other finches present. Photographs of two of the birds were taken by OJ.

These birds were observed for over an hour as they fed and preened, never more than 2 metres above the ground, within a portion of approximately 1 hectare of a larger stand of available grassy vegetation. Grasses were dry and senescent in the prevailing drought and the birds fed on remnant seed heads. Trees in the grassy woodland (Read 1987) were larger and in greater number along the river bank. There were many fallen trees and branches in the river which could have been utilised by drinking birds.

Crimson Finch has not been reported from this region in over a hundred years. Drought conditions at the time may have caused them to move southward for suitable habitat or available water. Alternatively, further searching may reveal this declining species residing in the region near Bingegang Weir just upstream from this site.

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Book Reviews

Australian Bustard

by Mark Ziembicki

Published by CSIRO Publishing, 2010, 120pp

http://www.publish.csiro.au

"Australian Bustard" by Mark Ziembicki is a fine introduction to Australia's largest flying land bird. It contains an overview of the biology, status and conservation of this iconic species, indigenous and cultural references and a comparison with others in the family Otididae.

To most "top-end" birdwatchers bustards, or "bush turkeys", are graceful cryptic birds and an opportunistic "must see" twitch. Their ancient lineage links them to cranes, crakes and rails and their habits are highly distinctive. Sexes are dimorphic and the largest dominant males display in exploded leks to attract females.

This book is authoritative and like others in the Australian Natural History Series it is well written, generously illustrated in colour and extremely readable.

David Rounsevell

Invisible Connections: Why migrating shorebirds need the Yellow Sea.

by

Jan van de Kam, Phil Battley, Brian McCaffery, Danny Rogers, jae-San Hong, Nial Moores, Ju Yung-Ki, Jan Lewis, Theunis Piersma.

Published by CSIRO Publishing, 2010, 160pp, 240 colour photographs
http://www.publish.csiro.au

"Invisible Connections" is illustrated magnificently by Jan van de Kam. It tells a story of the power of cooperation in bird studies for nature conservation in Pacific-rim countries. Chapters by different authors bring together personal perspectives on the daily realities for migrating shorebirds. This human story of international cooperation, based on contributions from volunteers and organisation to discover the significance of shorebird habitat as a diminishing resource around the Yellow Sea and to alert governments, is powerful and eloquent.

The birds and the astonishing trans-equatorial strategies they use to survive are allowed to speak for themselves. Readers will find the photography alone gorgeous and the personalised accounts contemporary, authoritative and even inspiring. This beautiful educational book, combining art and science in an accessible high quality paperback, is highly recommended.

David Rounsevell

"The Owls of Australia: A Field Guide to Australian Night Birds"

by Stephen Debus
Illustrated by Jeff Davies and David Hollands

Paperback,105 pp. Colour illustrations, colour photographs and line drawings.
Published in 2009 by Envirobook, Canterbury, NSW, Australia.

This book is similar in presentation to the author's previous field guide "The Birds of Prey of Australia". It contains paintings by Jeff Davies and photographs by David Hollands, who by now, must have a vast range of nocturnal bird photographs at his disposal. It includes all Australian owls and frogmouths. Perhaps it would have been even more useful for identification to have included the nightjars and owlet-nightjar.

The octavo format is easily carried in the field as a reference but the glued binding of such books means two hands are needed to find a page and to hold the book open. I believe that a spiral binding would have been a better option for a book that may need to be held with one hand while the other hand holds a torch.

The text is up to date, accurate and easy to understand as expected from this author who is one of Australia's most knowledgeable experts on birds of prey. It includes new data on the behaviour of birds in the field that is very useful. Some of this data will also facilitate the finding of owls and frogmouths following behaviour and habitat preferences. It also includes much information on biology and conservation and makes considered sense of the vast lore associated with night birds.

Paintings from the Handbook of Australian New Zealand and Antarctic Birds, Volume 4 are used. I would have preferred that some of these paintings showed the underparts of the frogmouths better. An obvious difference between the Tawny and the Marbled Frogmouths is that the Tawny by colour contrast shows mostly vertical markings on the underparts, while the Marbled shows horizontal marking to be more

pronounced. The photographs are clear and well done with the exception that there is a little over-exposure on those photographs that might have made the difference of these features clearer.

Other drawn illustrations are excellent aids to the text. This is a book that all keen birders should have in their collection of useful field guides. From a practical standpoint, watching night birds requires one to concentrate on a single group of birds and a book that only deals with them is invaluable.

Ian Venables.