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# BROWN HONEYEATERS *Lichmera indistincta* AT A BANDING STATION IN SOUTH-EASTERN QUEENSLAND

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Brown Honeyeaters *Lichmera indistincta* were studied at a banding station near Beerburrum, south-eastern Queensland, between 1971 and 1987. This species was most plentiful between May and September, and major influxes of juveniles occurred in the spring of some years. Comparitively few birds were retrapped in later years and the two oldest birds known were last retrapped just over nine years after banding. Three birds were recovered away from the banding site, all within a 33 km radius. Adult Brown Honeyeaters can be reliably sexed by measurements and weight, males being larger than females. Adults can also be sexed by the colour of the crown, grey in males and olive-brown in females. Seasonal changes in the colours of the oral flange of adult males are summarized. The pattern of post-nuptial moult follows the typical sequences for most Australian passerines

## INTRODUCTION

J. S. Robertson banded Brown Honeyeaters *Lichmera indistincta* at Wellington Point (27°28′S., 153°14′E.), south-eastern Queensland, between 1964 and 1977 (Robertson 1966, 1969). His most important findings were (i) the species is size dimorphic, males being larger than females, and (ii) females retain a yellow oral flange throughout life, whereas males acquire a black oral flange during the breeding season (or winter months in south-eastern Queensland), which then reverts to yellow during the non-breeding season (or summer months). Survival rates of Brown Honeyeaters banded by Robertson were analysed by Robertson and Woodall (1987).

Cowiebank (26°58′S., 153°04′E.), approximately 11 km east of Beerburrum, is 58 km NNW of Wellington Point. Birds were banded* at Cowiebank between 1971 and 1987. The study area has been described elsewhere (Liddy 1982, 1983). This paper details results derived from the examination and measurement of Brown Honeyeaters during the 15 years to June 1986. These data compliment the studies by Robertson at Wellington Point.

*Bands used were provided by the Australian Bird Banding Scheme, CSIRO and the Australian National Parks and Wildlife Service.

## METHODS

### *Mist-netting*

Mist-netting and banding were carried out at Cowicbank at about monthly intervals between July 1971 and mid-1975, using between 12 and 18 nets. After mid-1975 an attempt was made to net the study area every two weeks, but climatic and other factors often precluded this frequency. Between 24 and 28 nets were normally used, and these were erected in fixed positions at the edge of the open forest, within the open forest, and in salt-marsh and mangrove areas. Nets were normally erected between 0600-0700 h and taken down between 1400-1500 h, irrespective of the season.

### *Morphometric data*

The length of the flattened, straightened wing was measured for most birds handled after August 1975, using the method described by Disney (1974).

The extended length measurement of most birds handled after late 1975 was taken on a measuring board. This consisted of a hard-surfaced kitchen cutting board with a short length of aluminium angle bolted to one end as a stop. A ruler, inscribed in millimetres, abutted the stop and ran the length of the board. Each bird was held on its back, with body, tail and bill parallel to the ruler. The bird's head was held with the left hand, with the tip of the bill resting against the stop. The bird's legs were held with the thumb and first finger of the right hand and the bird was gently extended. The little finger of the right hand rested on the tail and applied gentle elongation pressure to the tail. The distance from the ruler stop to the end of the longest tail feather, read directly from the ruler, was the extended length.

The extended wingspan of most birds handled between January 1976 and December 1985 was measured using the technique described by Disney (1974). Wingspan measurements taken during 1976 and 1977 have been excluded from the present study as it now appears that a few birds were not fully extended while being measured in these years, resulting in non-reproducible measurements. In this study all measurements of birds were taken to the nearest whole millimetre.

The weight of most Brown Honeyeaters handled between late 1975 and late 1977, and between May 1982 and June 1986, was measured to the nearest 0.5 g on a 30 g Pesola balance.

### *Plumage and moult*

The colour of the oral flange was recorded for most Brown Honeyeaters handled from 1971 onwards, and the shape of the flange for most birds handled after August 1975. The shape of the flange was subjectively characterized as 'pouting', 'fleshy', 'semi-lean' or 'lean'. Fleshy oral flanges can be seen extending past the outline of the bird's head when viewed vertically from below. Pouting flanges extended further from the mandibles and were appreciably more obvious that fleshy oral flanges. Lean flanges displayed little flesh. Semi-lean flanges were intermediate between lean and fleshy. Robertson (1969, p. 55) presented photographs of Brown Honeyeaters showing typical fleshy yellow and lean black flanges.

The presence, absence or incompleteness of the small colour patch behind the eye was recorded for most Brown Honeyeaters handled after August 1975. The colour of the crown, as compared with the colour of the upper back, was recorded for most birds handled after mid-1984.

Moult of the wing feathers was recorded for most birds undergoing post-nuptial moult after September 1975, using the method described by Snow (1967) and by Ginn and Melville (1983). Particular attention was given to moult of the primary flight feathers, but that of the secondary and tertial flight feathers was also recorded. Primary moult was scored as per Snow (1967): each feather was given a score from 0 for old feathers to 5 for fully grown new feathers. As the wing has ten primaries, each bird can have primary moult score from 0 to 50.

## RESULTS AND DISCUSSION

### *Abundance*

Brown Honeyeaters were a variable component of the avifauna at Cowicbank, varying from approximately 6 to 22 per cent of the birds netted annually. Most were netted between May and

## TABLE 1

Numbers of Brown Honeyeaters netted each month, 15 years to June 1986.

| Month | Number of mist-netting days | Numbers of Brown Honeyeaters Netted | Netted per day |
|---|---|---|---|
| January | 15 | 22 | 1.5 |
| February | 14 | 32 | 2.3 |
| March | 18 | 47 | 2.6 |
| April | 18 | 43 | 2.4 |
| May | 22 | 122 | 5.5 |
| June | 27 | 172 | 6.4 |
| July | 27 | 144 | 5.3 |
| August | 28 | 119 | 4.2 |
| September | 27 | 243 | 9.0 |
| October | 20 | 107 | 5.3 |
| November | 21 | 27 | 1.3 |
| December | 23 | 14 | 0.6 |

September (Table 1), when they fed on nectar of *Amyema cambagei*, *Eucalyptus teretecornis* and *E. gummifera*. There was no substantial source of nectar in the study area during the summer, and Brown Honeyeaters were relatively scarce or absent in that season.

Major influxes of Brown Honeyeaters occurred at Cowiebank during the spring months of some years, such as 1975, when 43 and 61 birds were netted on 20 September and 5 October respectively. The origins of the birds making up these influxes are unknown. Most birds were juveniles and few were later retrapped; for example, there were no retraps for the birds banded on 5 October 1975. Other birds were much more sedentary (Table 2). The range of Brown Honeyeaters frequenting Cowiebank is unknown. Three birds were recovered away from the study area: one found dying on a road, probably hit by a car, near Beerwah, 15 km NNW, almost three months after banding; another killed by a cat at Clontarf, 33 km south of the banding station, 19 months after banding; and a third retrapped at a banding station on Bribie Island, 11 km east of the banding site, 5 years 11 months after banding.

### *Longevity*

Less than 14 per cent of the Brown Honeyeaters banded at Cowiebank were retrapped,

## TABLE 2

Colour of oral flanges of individual male Brown Honeyeaters trapped over several years (Y=yellow; I=intermediate colours; B=black; *=moulting primary flight feathers).

| Band number | Year/ Month | Colour of oral flange J | F | M | A | M | J | J | A | S | O | N | D |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 021-43498 | 1973 | | | | | | | | | Y | | | |
| | 1974 | | | | | | | B | | | | | |
| | 1975 | | | | | | | | B | B | | | |
| | 1976 | | | | B | | | | | | | | |
| | 1978 | Y | | | | | | | | | | | |
| 021-14437 | 1977 | | | | | | I | I | | | | | |
| | 1978 | | | | | | | | B | | | | Y* |
| | 1979 | | | | B | | B | | | | | | |
| | 1980 | Y* | | | | B | | | B | | I | | |
| | 1981 | | | | | | | | | | | I | |
| | 1982 | | | Y | | B | | B | | | | | |
| 021-14717 | 1981 | | | B | | B | | B | | B | | | |
| | 1982 | | | | | | | B | | | | | |
| | 1983 | | | I | | | B | | | | | | |
| | 1984 | | Y* | | | | | | | | | | |
| 021-14859 | 1983 | | | | | | | B | | | | | |
| | 1984 | | Y* | Y | | | | B | | | B | | |
| | 1985 | | | B | | | | | | | | | |
| | 1986 | | | Y | | | | | | | | | |

while 12.2 per cent of birds banded at Wellington Point were recaptured or recovered (Robertson and Woodall 1987). Most retraps occurred within a few months of banding, and the retrap rate decreased progressively with time. The proportions of banded birds known to be alive at increasing intervals following banding are shown in Table 3. The two birds with the longest known

## TABLE 3

Percentages of Brown Honeyeaters known to be alive by retrapping in years after banding.

| Time interval | Percentage of banded birds known to be alive |
|---|---|
| Same year | 13.8 |
| One year | 7.6 |
| Two years | 3.5 |
| Three years | 2.5 |
| Four years | 1.3 |
| Five years | 0.9 |
| Six years | 0.8 |
| Seven years | 0.8 |
| Eight years | 0.7 |
| Nine years | 0.7 |
| Ten years | Nil |

life spans were last retrapped a little over nine years after banding. The oldest bird, a male, was banded on 29 June, 1974 and retrapped on 20 August, 1983, without being retrapped in the interim. The second bird, a female, was banded on 17 June, 1974, and was retrapped during 1975, 1979, 1980 (twice) and 1983 (twice), the last occasion on 25 June, 1983. Robertson and Woodall (1987) found that male Brown Honeyeaters at Wellington Point had higher survival rates than females, the two oldest known birds (both males) being 10 years 11 months and 8 years 0 months respectively.

*Morphometrics*

Frequency histograms of the flattened, straightened wing length, extended length and extended wingspan measurements of all Brown Honeyeaters at first capture showed bimodal distributions with overlaps (Figures 1b, 2b and 3b). Similar histograms of known adult Brown Honeyeaters (that is, birds recaptured at least 15 months after banding) showed bimodal distributions without overlap (Figures 1a, 2a and 3a). Some first-year birds, sexed as males when recaptured in later years, had wing lengths or wingspan measurements within the ranges of adult females. Most first-year males, however, had measurements which fell within the intervals between the measurements of adult females and adult males (Figures 1a and 3a).

A frequency histogram of the weights of all Brown Honeyeaters at first capture showed a doubtful bimodal distribution (Figure 4b). The limited data for known adult birds showed a bimodal distribution without overlap (Figure 4a).

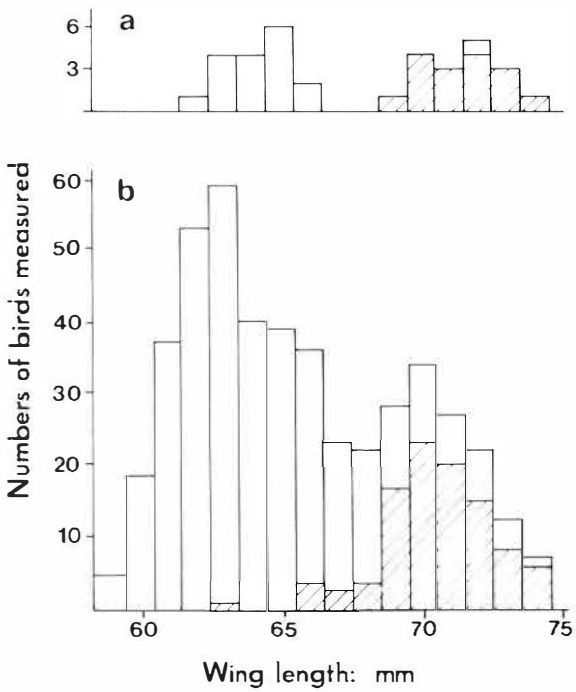


Figure 1. *Frequency histograms of measurements of flattened straightened wing length of Brown Honeyeaters handled at Cowiebank.*
*(a) recaptured at least 15 months after banding,*
*(b) all birds banded.*
*Hatched areas indicate known males.*

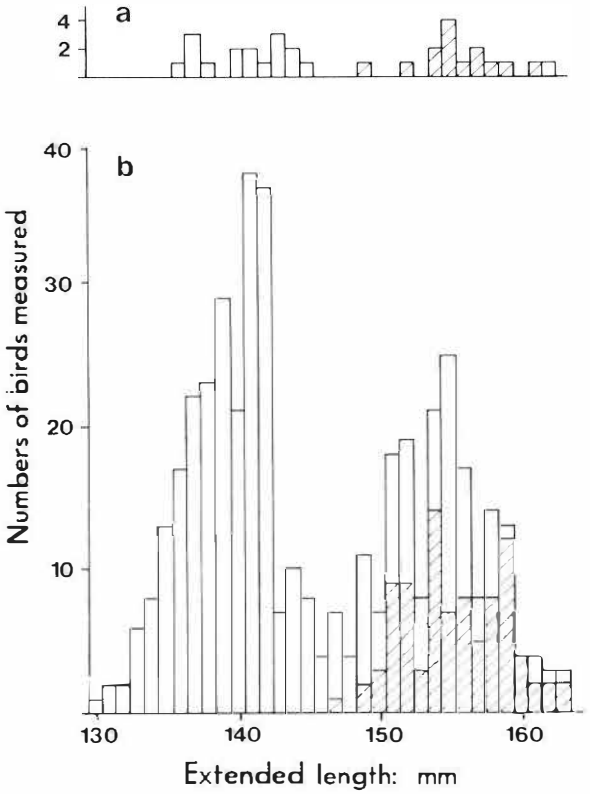


Figure 2. *Frequency histograms of measurements of extended length of Brown Honeyeaters handled at Cowiebank.*
*(a) recaptured at least 15 months after banding,*
*(b) all birds banded.*
*Hatched areas indicate known males.*

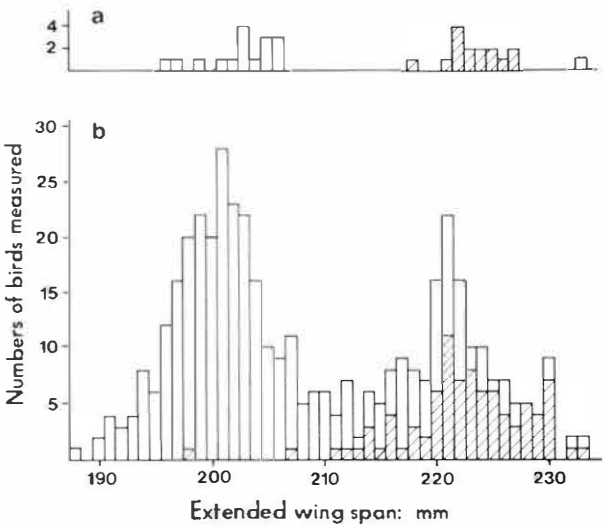


Figure 3. *Frequency histograms of measurements of extended wing span of Brown Honeyeaters handled at Cowiebank.*
*(a) recaptured at least 15 months after banding,*
*(b) all birds banded.*
*Hatched areas indicate known males.*

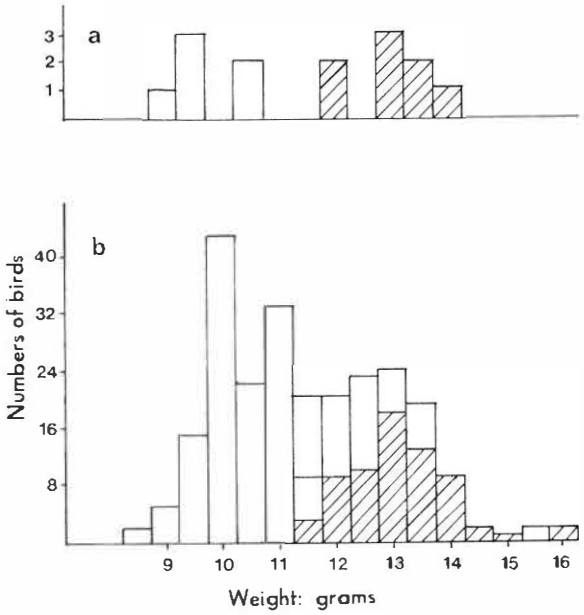


Figure 4. *Frequency histogram of weights of Brown Honeyeaters handled at Cowiebank.*
*(a) recaptured at least 15 months after banding.*
*(b) all birds banded.*
*Hatched areas indicate known males.*

Based on the above information, most Brown Honeyeaters cannot be reliably sexed by measurements or weight at first capture. However, the largest birds are males, and many of these can be reliably sexed by size alone.

### *Oral flange colour*

As recorded by Robertson (1969), female Brown Honeyeaters retain a yellow oral flange throughout life. Males acquire a black flange during the breeding season, but this reverts to yellow in the non-breeding season. Black flanges were not recorded at Cowiebank during the months of November to February inclusive, but Robertson (1969) had single records of black flanges at Wellington Point in November and January. The transitional colours (cream, creamy-grey, grey-brown and fawn) were noted many times at Cowiebank (Table 4). Different patterns are shown when the seasonal colours of the oral flanges of all birds handled are compared with those displayed by adult males only. A comparatively large proportion of all birds handled displayed intermediate coloured flanges during the winter months, but there was only one record of an adult

**TABLE 4**

Seasonal colours of oral flanges of Brown Honeyeaters (Oral flange colours: Y=yellow; I=intermediate colours; B=black; T=total number of birds examined).

| | Numbers of birds | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | All birds handled | | | | Adult males only | | | |
| Month | Y | I | B | T | Y | I | B | T |
| January | 18 | 3 | — | 21 | 1 | 1 | — | 2 |
| February | 31 | 2 | — | 33 | 1 | 3 | — | 4 |
| March | 36 | 1 | 3 | 40 | 2 | 5 | 1 | 8 |
| April | 29 | 4 | 3 | 36 | 1 | — | 6 | 7 |
| May | 75 | 20 | 22 | 117 | — | — | 6 | 6 |
| June | 64 | 16 | 36 | 116 | — | 1 | 6 | 7 |
| July | 64 | 6 | 34 | 104 | — | — | 14 | 14 |
| August | 61 | 3 | 32 | 96 | — | — | 9 | 9 |
| September | 146 | 4 | 20 | 170 | — | — | 3 | 3 |
| October | 31 | 5 | 4 | 40 | — | 1 | 2 | 3 |
| November | 27 | 2 | — | 29 | — | 1 | — | 1 |
| December | 10 | 1 | — | 11 | 1 | 1 | — | 2 |
| TOTAL | 592 | 67 | 154 | 813 | 6 | 13 | 47 | 66 |

male with an intermediate coloured flange during the period from May to September inclusive (Table 4). This indicates that the Cowiebank birds with intermediate coloured oral flanges during winter are most likely to be immatures approaching their first breeding season. Table 4 shows that adult males acquired black flanges at Cowiebank between March and October and reverted to yellow flanges over the summer. Adult males undergoing post-nuptial moult all exhibited yellow flanges.

The changes in the colours of the oral flanges of individual males over several years are given in Table 2. The flange colour of 021-14859 is of interest in that it was yellow in March 1984 and March 1986, but black in March 1985, presumably indicating that it came into breeding condition earlier during 1985 than in the other two years.

*Oral flange shape*

Pouting oral flanges occurred on recent fledglings only, but became fleshy before the birds acquired the full colour patch behind the eyes. Fleshy oral flanges were carried by all juveniles soon after fledging and by most females throughout life, though a few adult females were noted with semi-lean flanges over several years. All fleshy oral flanges were yellow. Pouting oral flanges were also yellow, usually with a faint tinge of orange. Lean oral flanges occurred on adult males only and were black, yellow or intermediate. Black oral flanges were all lean. Many birds with intermediate coloured flanges were recorded as having semi-lean flanges, and most of these birds appeared to be immature males approaching their first breeding seasons.

*Museum skins*

Dow (1973) analysed the colour and shape of oral flanges of Brown Honeyeaters in museum collections. He recorded combinations that do not occur in nature, such as females with dark or intermediate coloured oral flanges, and more females with 'non-fleshy' than fleshy flanges. I examined Brown Honeyeaters in the collections of the Queensland Museum in late 1978, and these skins exhibited most of the unnatural combinations recorded by Dow. It is apparent that the oral flanges of some Brown Honeyeaters undergo changes in colour and shape after death. Dow's analyses thus apply to an artefact of post-mortem change in the oral flanges of some Brown Honeyeaters and cannot validly be applied to live populations.

*Plumage*

Brown Honeyeaters fledge without the minute yellow and off-white feathers that make up the tiny colour patch behind the eyes of older birds, and these colour patches are acquired over a period of several months. As noted by Pizzey (1980), juveniles can be recognized by the absence of this colour patch. Pizzey also stated that immatures could be recognized by 'a yellow-white mark near gape'. This mark was not recognized on juveniles or immatures at Cowiebank (this study) or at Wellington Point (Robertson, pers. comm.). North (1909) noted that a yellow wash to the general plumage of some honeyeaters was 'a certain indication of youth' and indicated that this applied to Brown Honeyeaters. Robertson (1969) observed that some birds at Wellington Point had a distinct golden wash, while other birds lacked this. Examination of Cowiebank birds did not show any correlation between a yellow or golden colouration and immaturity.

In mid-1984, while removing Brown Honeyeaters from mist-nets, I realized that I was subconsciously recognizing adult males by a combination of larger size and darker colouration. The latter is due basically to a grey crown which contrasts with the olive-brown of the upper back of males, whereas the crowns of adult females and immatures are olive-brown like the back. Males appear to acquire this grey crown during the first complete moult, at about 15 months, but additional data are needed to substantiate this. All known adult males handled after mid-1984 displayed grey crowns, and all known adult females had olive-brown crowns. Rogers *et al.* (1987) recorded similar differences in the colours of the crowns of male and female Brown Honeyeaters from Western Australia.

**TABLE 5**

Body measurements and weights of Brown Honeyeaters at Cowiebank, south-eastern Queensland.

| | | Range | Mean | SD | n |
|---|---|---|---|---|---|
| Wing length (mm) | A ♂ | 69-74 | 71.5 | 1.3 | 17 |
| | A ♀ | 62-66 | 64.2 | 1.1 | 17 |
| | ABM | 59-74 | 65.7 | 3.8 | 463 |
| Extended length (mm) | A ♂ | 149-162 | 155.9 | 3.2 | 15 |
| | A ♀ | 136-145 | 140.7 | 2.8 | 16 |
| | ABM | 130-163 | 145.7 | 8.2 | 434 |
| Extended wing span (mm) | A ♂ | 218-233 | 224.0 | 3.2 | 16 |
| | A ♀ | 196-206 | 202.7 | 3.0 | 16 |
| | ABM | 188-233 | 209.1 | 11.1 | 429 |
| Weight (g) | A ♂ | 12-14 | 13.0 | 0.7 | 8 |
| | A ♀ | 9-10.5 | 9.8 | 0.4 | 6 |
| | ABM | 8.5-16 | 11.5 | 1.5 | 242 |

ABM=all birds measured

A=adults, i.e., birds recaptured at least 15 months after banding.

*Ageing and sexing*

Juveniles, for perhaps three months after fledging, can be recognized by (a) the lack of, or incomplete, colour patches behind the eyes; (b) pouting, yellow flanges; and, at the end of this plumage stage, active post-juvenile moult.

Brown Honeyeaters at Cowiebank with wing lengths greater than 69 mm, extended lengths of at least 149 mm, extended wingspans longer than 218 mm and weights greater than 12 g were males (Figures 1-4, Table 5). Adult males can also be recognized by the contrast between the grey crown and the olive-brown colouration of the upper back. Adult males have lean oral flanges, which are black between about March and October, yellow over the summer, and intermediate colours between times.

Birds which do not fit the above categories have olive-brown crowns and yellow oral flanges. These include females of all ages and some immature males.

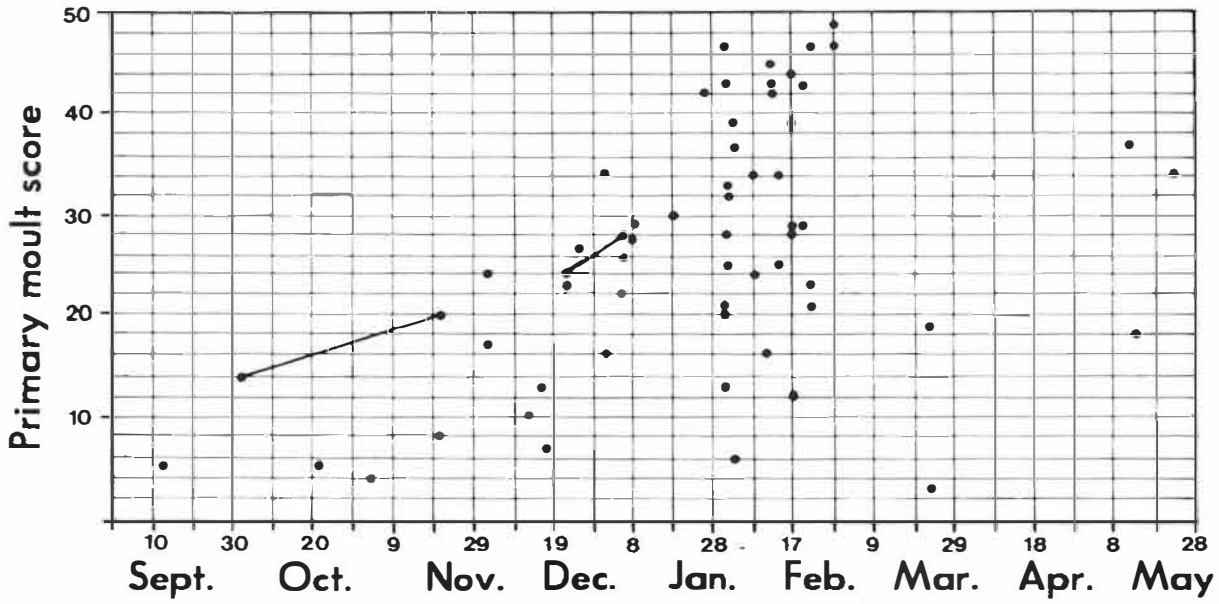


Figure 5. *Primary moult score in relation to date in Brown Honeyeaters at Cowiebank. Solid lines link moult scores for two birds retrapped during the same moult.*

*Sex ratio*

The sex ratio of all birds handled is unknown as immature birds could not be sexed. Forty-six birds were handled at least one year after banding (adults), and all were sexed according to criteria previously given; 23 were males and 23 were females.

*Moult*

Brown Honeyeaters have ten primaries, six secondaries and three tertials per wing and 12 tail feathers. During moult, these feathers were moulted in sequence typical for most passerines (see Snow 1967): primaries are moulted from the innermost outwards, secondaries from the outermost inwards. The central feather of the tertials was generally shed first, followed by the inner and then the outer tertial, but the inner feather was sometimes shed after the outer tertiary; one bird shed the central feather last. Brown Honeyeaters followed the typical passerine sequence of tail moult with a symmetrical progression from the central feathers outwards, though asymmetrical moult occurred in some individuals.

Brown Honeyeaters undergoing moult were handled 60 times, including two birds handled twice during the same moult. Primary moult scores of birds at Cowiebank are given in Figure 5. There were differences of one, two or three between the moult scores of the wings of some individuals, and in such cases Figure 5 shows the average of the moult scores of the two wings. Most Brown Honeyeaters frequenting Cowiebank appeared to commence primary moult during October, November or December, the variations assumedly arising from a staggered end to the breeding season for some individuals. As only two birds were recaptured during the same moult, no realistic assessment of the normal duration of the moult is possible. The significance of the three birds undergoing moult during May is unknown; none of these birds had been handled before, and their ages were unknown.

Primary 2 usually dropped soon after Primary 1, and typically had a moult score of one unit less. Normally two primaries grew simultaneously, with differences in moult scores of two or three units, but Primary 10 usually dropped before Primary 8 had completed growth.

Secondary 1 usually dropped at about the same time as Primary 5, and Secondary 5 usually dropped at about the same time as primary 10. Secondary moult thus usually extended past the period of primary moult. The first of the tertials usually dropped at about the same time as Primary 3 or 4, and all tertials were usually fully grown before Primary 9 dropped. The central tail feathers usually dropped at about the same time as Primaries 4 or 5, but sometimes a little earlier or later. Moult of the tail feathers was usually, but not always, completed within the period of the primary moult.

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