# MOULT OF THE BANDED DOTTEREL (CHARADRIUS BICINCTUS) IN WINTER QUARTERS

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## ABSTRACT

The Banded Dotterel *(Charadrius bicinctus)* is a short-distance migrant, breeding in New Zealand and wintering in some numbers in Australia. This study was done to check the hypothesis that the flight feathers are renewed before autumn migration and to determine the timing of the body moult. It is concluded that the flight feathers are renewed on or near the breeding grounds coinciding with the pre-basic body moult which is complete. The pre-alternate moult occurs on the wintering grounds and is incomplete, involving the body feathers only. A comparative table is given showing sequence of plumages according to Dwight (1900) and Humphrey and Parkes (1959).

## INTRODUCTION

In general, long-distance migrants renew flight feathers after they have reached winter quarters, whereas short-distance migrants and resident species do so on or near the breeding grounds (Snow 1967). This appears to be so for waders because the Little Stint *Calidris minuta,* (Middlemiss 1961), Red-necked Stint, *C. ruficollis* (Thomas & Dartnall 1971) and Curlew Sandpiper *C. ferruginea,* (Thomas & Dartnall in prep.) moult remiges and rectrices in winter quarters. All winter exclusively in the Southern Hemisphere. Alaskan Dunlins *(C. alpina),* which winter in the Northern Hemisphere, moult flight feathers on or near the breeding grounds (Holmes 1966). The significant adaptation in these long-distance migrants is that the start of moult of the flight feathers is delayed until after the birds reach winter quarters and no longer does it coincide with the pre-basic (post-breeding) body moult (Thomas & Dartnall 1971).

The Banded Dotterel *(Charadrius bicinctus)* is a short distance migrant, breeding in New Zealand and wintering in south-eastern Australia and Tasmania, a few birds reaching Queensland and Western Australia. Probably most remain in New Zealand throughout the winter. It would be expected to renew flight feathers before autumn migration. The work reported here was undertaken to check this hypothesis and to determine the timing of body moult.

## NOMENCLATURE

Many waders do not assume breeding plumage until nearly two years old. Because of this, the sequence of plumages and moults suggested by Humphrey and Parkes (1959) is preferred to the more often used one of Dwight (1900). The two systems are compared in Table I. Waders only renew flight feathers once a year. A moult is complete when body and flight feathers are renewed and incomplete when only body feathers are renewed.

NOTORNIS 19: 33-35 (1972)

TABLE I: Sequence of plumages according to Dwight (1900) and Humphrey and Parkes (1959)

| DWIGHT | HUMPHREY AND PARKES | |
|---|---|---|
| | *Breeding in first year* | *Breeding in second year* |
| Juvenile | Juvenal | Juvenal |
| First winter | Basic | Basic |
| A First nuptial | A Definitive alternate | Alternate |
| Second winter | Definitive basic | B Definitive basic |
| Repeat from A | Repeat from A | Definitive alternate |
| | | Repeat from B |

In all work dealing with moult the system of numbering primaries and secondaries should be stated clearly. In my work I number the primaries 1 to 10 starting with the innermost, and the secondaries 1 to 10 starting with the outermost and ignoring additional feathers ('tertials'). This appears to be the most logical sequence because normally moult starts with No. 1 and proceeds sequentially to No. 10. Additionally, the number of primaries may be reduced, e.g. the Bullfinch *(Pyrrhula pyrrhula)* has nine, when it is the outermost feathers that are absent (Newton 1966).

## METHODS AND RESULTS

Skins in the Australian Museum (Sydney), National Museum of Victoria (Melbourne), including the H. L. White Collection, and Tasmanian Museum (Hobart) were examined. The presence/absence of moult of primaries, secondaries, tail, upperparts, head and breast was noted. A total of 73 birds was examined. All were collected away from New Zealand as follows:

| | |
|---|---|
| Lord Howe Island | 2 |
| New South Wales | 9 |
| Tasmania | 37 |
| Victoria | 23 |
| Western Australia | 2 |

No bird showed moult of primaries, secondaries or tail feathers. Several birds collected by me within a few days of their arrival in south-eastern Tasmania had new flight feathers which showed no signs of wear. It is concluded that these are renewed before birds leave New Zealand.

The results for body moult are shown in Table II. There is considerable variation in the timing of both the pre-basic and pre-alternate moults. Birds present in south-eastern Australia from February to June are in basic or (February to April) an intermediate plumage, in which the breast-bands are only faintly discernible. Individuals may not complete the pre-basic moult until May whereas others may have finished by February. As about 50% of February-March birds had finished moult, the pre-basic moult must start before the birds leave New Zealand. Although it is not apparent in Table II moult is only slight in April and May and is restricted to a few pteryla. Neither of the June specimens showed any moult. The pre-alternate moult starts in July and is probably completed before birds leave for the New Zealand breeding grounds.

| Month | No. of birds examined | No. not in moult | No. showing moult of | | | % birds in | | |
|---|---|---|---|---|---|---|---|---|
| | | | Head | Upper | Breast | Basic | Alternate | Intermed |
| January | 1 | 0 | 0 | 1 | 1 | - | - | - |
| February | 8 | 4 | 3 | 0 | 3 | 88 | 0 | 12 |
| March | 7 | 3 | 2 | 2 | 3 | 71 | 0 | 29 |
| April | 22 | 9 | 2 | 4 | 11 | 84 | 0 | 16 |
| May | 8 | 5 | 0 | 0 | 3 | 100 | 0 | 0 |
| June | 2 | 2 | 0 | 0 | 0 | 100 | 0 | 0 |
| July | 5 | 1 | 2 | 1 | 4 | 0 | 80 | 20 |
| August | 16 | 6 | 4 | 8 | 9 | 6 | 69 | 25 |
| September | 2 | 1 | 0 | 0 | 1 | 0 | 100 | 0 |
| October/November | 0 | - | - | - | - | - | - | - |
| December | 2 | 1 | 0 | 0 | 1 | - | - | - |

TABLE II: The incidence of body moult in wintering Banded Dotterels

## CONCLUSION

As with other short-distance migrants, the Banded Dotterel renews flight feathers on or near the breeding grounds. Moult of the flight feathers thus coincides with the pre-basic body moult, which is complete. The pre-alternate moult involves the body feathers only and is thus incomplete. It occurs on the wintering grounds.

## ACKNOWLEDGEMENTS

I thank Messrs. A. J. Dartnall, H. J. de S. Disney and A. R. McEvey for permission to work on the collections under their care.

## REFERENCES

DWIGHT, J., 1900. The sequence of plumages of the passerine birds of New York. Annals of the New York Academy of Science 13: 73-360.

HOLMES, R. T., 1966. Molt cycle of the Red-backed Sandpiper *(Calidris alpina)* in western North America. Auk 83: 517-533.

HUMPHREY, P. S.; PARKES, K. C., 1959. An approach to the study of molts and plumages. Auk 76: 1-31.

MIDDLEMISS, E., 1961. Biological aspects of *Calidris minuta* while wintering in South-west Cape. Ostrich 32: 107-121.

NEWTON, I., 1966. The moult of the Bullfinch *Pyrrhula pyrrhula.* Ibis 108: 41-67.

SNOW, D., 1967. A guide to moult in British birds. BTO Field Guide 11.

THOMAS, D. G.; DARTNALL, A. J., 1971. Moult of the Red-necked Stint. Emu 71 (2): 49-53, figs 1-3, tables I-IV.

——— In prep. Moult of the Curlew Sandpiper in relation to annual cycle adaptations.

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