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Frontispiece: Adult female Wrybill at nest

THE BEHAVIOURAL ECOLOGY

OF THE WRYBILL PLOVER

Anarhynchus frontalis

J.R. HAY

Thesis submitted for
the degree of
Doctor of Philosophy
Auckland University
1984

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BIOLOGY

THESIS

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"Thus quite unavailingly did we for two days strain our eyes in that grey blue desert light which so soon calls a halt to the long unblinking stare by which alone a bird can be kept in view."

H. Guthrie-Smith (1936)
Sorrows and Joys of a
New Zealand Naturalist

ABSTRACT

The behavioural ecology of the wrybill (Anarhynchus frontalis) is examined in its breeding and wintering areas. Anarhynchus is a monotypic genus closely related to the cosmopolitan genus Charadrius (Family: Charadriidae). It breeds exclusively on braided greywacke shingle riverbeds in the central South Island of New Zealand and migrates for winter to harbours and estuaries of the northern North Island.

In view of the lateral curvature of its bill and its highly restricted and flood-prone breeding habitat, the wrybill raises a number of questions regarding the relationship between habitat and the evolution of structure and behaviour. The aims of the study were to examine the structure and use of the bill in breeding and winter habitat, the use of space in relation to the mobile and unpredictable riverbed, to look at parameters of breeding and survival, and to consider the results in relation to evolution and possible requirements for management.

A section of the population on the upper Rakaia River, Mid-Canterbury was studied, with most adults and offspring being individually colour-banded so that their movements and survivorship could be followed. Birds were also banded on other rivers and at winter localities.

In addition to enabling capture of insects from under stones, the bill has elements of structure specifically associated with prey capture in winter intertidal habitat. The implications of this in considering the origin and evolution of the bill are discussed.

Despite a mobile habitat and fluctuating food supply, breeding dispersion is territorial and the mating system monogamous, with site and mate fidelity being very high, suggesting evolution of the strategy of defence of sufficient area to contain an adequate food resource during floods.

Wrybills lay two eggs per clutch and can rear two consecutive broods per season. Incubation period is long and the chick development rate slow for a small plover. Possible factors accounting for these features are discussed. Floods were the greatest source of mortality of eggs and probably of chicks during the study and evidence suggests that flooding has been important through much of the recent evolution of the species.

The size and distribution of the wrybill population is assessed, the estimate of total numbers being 5140 birds during the course of the study. Winter site fidelity was strong for adults but juveniles wandered more freely and birds from one breeding locality dispersed randomly through wintering areas. While natal philopatry was high for juveniles, some non-breeding immatures moved between breeding localities, suggesting that, despite having a strong site attachment, populations do not remain genetically isolated. The cost of migration did not result in significant mortality and mean annual adult survival (0.83) was high compared with that of a number of other shorebirds.

Factors affecting the wrybill population are discussed in relation to evolution of the species and to its management and conservation.

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