

Abstract

A survey of bird populations was made in three breeding seasons 1958-61 in various forest habitats of the South Island of New Zealand. Detailed accounts of observations are recorded for the less known areas. There was a difference in the species composition and breeding population density of birds between the warm-temperate podocarp-dominant forest and the cool-temperate *Nothofagus*-dominant forest. Among indigenous species of birds, honeyeaters, the Fantail and the Grey Warbler preferred the former habitat and the Rifleman the latter habitat. Total population density was highest in low hardwood forest (175-600 pairs per 100 acres), and lowest in *Nothofagus* forest (70-175 pairs per 100 acres). An intensive study of bird populations in a modified habitat revealed nesting success, productivity, mortality factors and seasonal population changes of some common species with wide ecological distribution and whose diet changed seasonally. Naturalized species in indigenous habitats and indigenous species in modified habitats seem to have modified their breeding and feeding habits only slightly. Present interaction among the existing species, both indigenous and naturalized, is probably not great enough to cause interspecific competition in indigenous habitats. An attempt has been made to explain the commonness and rarity of indigenous species from two aspects of their preadaptive conditions: habitat selection and breeding capacity. An examination of the known facts and evidence obtained in the present study support the hypotheses that (a) the highly specialized species, the populations of which are stable only in limited environmental conditions, have small reproductive capacity and have decreased in number since European settlement, and (b) the species with wide ecological distribution generally have greater reproductive capacity and have been less affected by introduced influences. For the understanding of the long-term effects of environmental changes, it is necessary to know the distribution and stability of populations in relation to vegetation and reproductive capacity. Since such aspects of ecological study are still scanty in New Zealand, further studies along these lines are needed before conservation of indigenous birds can be carried out on sound principles.

INTRODUCTION

To date the majority of ecological studies of birds have been carried out in northern temperate regions where the description of communities and classification of habitats have been made and theories concerning population dynamics, habitat selection and competition among closely related species have been developed. New Zealand, composed of oceanic islands in a southern temperate region, has received little attention from avian ecologists in the past. The opportunity that New Zealand offers for the study of ecological relationships of birds is nonetheless unique. The uniqueness of the avifauna in New Zealand may be illustrated by comparing it with that of the mainland of Japan, which is similar to New Zealand in size and in latitude range but is in the Palaearctic Region and lies close to the continent (Table I). In New Zealand, apart from a few species of archaic elements, characteristic of this zoogeographical subregion, there is a striking paucity of land birds. This is in contrast with a profusion of oceanic birds, most of which breed on the New Zealand coast or subantarctic islands. The regular migratory species which spend part of their life outside the New Zealand area are almost exclusively waders and sea birds. Among the land birds only two species in Cuculiformes and none in Passeriformes migrate. The indigenous species of passerines which at present breed in New Zealand are only 18 in number (72 species in Japan) and these are closely or distantly related to birds of the western Pacific Islands and eastern Australia (Mayr, 1939; Falla, 1953). The element of naturalized species is conspicuous, forming 47% (16 species) among the passerines. Most of the introduced species are Palaearctic and British in origin.

Elton (1958) has shown how drastic are the changes that are taking place in the present world fauna, apparently resulting in the modification of community structure and establishment of new food chains. The environmental changes that the introduced species met in the different zoogeographical regions were not gradual and time so far has not permitted their morphological adaptation. The successful