THE SOCIAL ORGANIZATION OF THE PUKEKO

Porphyrio porphyrio melanotus

Temminck, 1820

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ABSTRACT

The social organization and behaviour of the pukeko, Porphyrio porphyrio melanotus, is described for two different habitats. The study shows that pukeko breed in pairs or communal groups with the proportion of these varying according to habitat. All breeding pairs and groups defend territories, but the degree of maintenance varies. In some defence occurs at all times of the year; of the remainder and outside the breeding season, some restrict defence to a core area while with the rest defence ceases. Outside the breeding season also, part of the population form flocks. A hierarchy exists among members of groups and flocks. Furthermore, a hierarchy is found between pukeko of adjacent territories as is demonstrated by differential boundary positions. In group territories, all adults participate in breeding and often more than one female lays in the same nest. Breeding success varies, in this study, pairs are more successful than groups

CONTENTS

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SUMMARY

1. The year-round social organization of the pukeko, Porphyrio porphyrio melanotus, was investigated in two areas of differing habitat; a dune lake at Pukepuke and a small stream valley at Linton. Special emphasis was given to assessing the interaction of social hierarchy and territory, and the role of communal breeding. The study was carried out between March 1970 and April 1973.

2. Pukeko were sexed and aged from body measurements (Williams and Miers, 1958) which varied with reproductive state but were adequate when repeated several times during the year. Nares-to-tip was the most reliable measurement with males exceeding 30 mm. A frontal shield less than 23 mm wide coupled with an olive colouration in the iris indicated a bird less than one year old.

3. The overall dispersion of pukeko was territorial during breeding but varied from territorial to flocking in autumn and winter. Most (79%) of territories were held by communal groups of 3-6 birds, the remainder (n = 7) were held by pairs, with six of these at Linton. Sex ratios within territories were equal except in those formed by flock birds: here males predominated. Flocks had a preponderance of males (63-64%) and juveniles (63-69%).

4. Pukeko are mainly herbivorous although quantities of animal food were taken in the breeding season and fed mainly to chicks. Most territories contained both pasture and swamp. Pasture provided most of the food outside the breeding season but when nesting or caring for young chicks, pukeko confined their activities to the swamp where they fed mainly on raupo.

5. Pukeko that failed to join a territory dispersed radially as did chicks at Linton that were expelled

from the pair territories prior to nesting. Most chicks in group territories remained in their natal territories. Dispersal accelerated during the shooting season when small numbers were shot.

6. The behavioural repertoire of the pukeko is described and analysed quantitatively. Agonistic displays centred around the head or tail. In the most aggressive displays, the head was held in a pecking position with the red beak pointed at the opponent, but with increasing conflict between escape and aggression, the beak was lowered towards the ground and finally pointed at it. Alternatively, the beak was turned away from the opponent. The red frontal shield is believed to accentuate the beak as the aggressive releaser. Submissive displays focused on the white under-tail which was directed at the opponent. The wings were raised to expose a greater amount of white in the more submissive displays, and infrequently sexual displays were used for signalling submission.

7. Social hierarchies were investigated in all territories and within the flocks, with artificial feeding used to increase the number of interactions. A linear hierarchy existed between all members of all territories and flocks. Status was dependent on sex, males dominating females; on age, adults dominating juveniles; and in the flock alone, on prior residence. Where territories broke down outside the breeding season, the same birds were still dominant over pukeko of similar age and sex in their previous territorial ranges.

8. All breeding groups established defended territories, but maintenance varied outside the breeding season. In some, defence continued unchanged, in others defence became restricted to a core area, while in the remainder, it broke down completely. All members of the territories helped in defence although the greater proportion (75%) was done by males. Territory size varied from 0.5 to 3.2 hectares and appeared to be

unrelated to the number of birds in the territory.

9. Territorial boundaries were constant between group territories but varied markedly between pairs, apparently as a result of fewer birds being available for defence during breeding. The length of boundary requiring defence was short in pair territories. A hierarchy between members of adjacent territories was demonstrated by the existence of different boundary positions for different opposing pairs although the presence of more than two birds at the boundary complicated results. Inter-territorial status correlated with intra-territorial status.

10. Courtship and copulations occurred between all adult members of a territory regardless of sex although male-female copulations were the most common. Participation in copulation by more than two birds was common and is believed to help synchronize sexual cycles allowing several females to lay in the same nest at the same time. No relationship between frequency of copulation and status was obvious although low ranking yearlings were excluded.

11. Clutch size correlated directly with the number of birds in a territory with an overall mean of 6.0. Dominant and older females tended to lay more eggs and also contributed more to the more successful earlier clutches. Most territories were double brooded.

12. All adults incubated with frequency of incubation dependent on status: the dominant male and female each tended to spend more time incubating than lower ranked birds did. Incubation time varied from 23 to 29 days as hatching was asynchronous. All full-grown birds cared for the chicks with the proportion of care dependent on status: the dominant male did a greater amount than the dominant female who in turn did more than the lower ranking adults. Where yearlings were present, these cared for chicks more than any other bird,

while in pair territories, early chicks fed later ones.

13. Hatching success varied but was higher (not significantly) in groups. Overall reproductive success was significantly higher in pair territories than in group territories and there was a significant difference between the two study areas. Most groups were found at Pukepuke where low summer water levels dried the territories, thereby reducing the amount of animal food for the chicks and so leading to the loss of almost all the young of second clutches. In contrast, water levels at Linton were constant and survival was high in all broods. Breeding success of individual territories appeared to be related to the amount of cover, and to water depth.