NOTE ON THE SEX RATIO OF THE PARADISE SHELDUCK
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In addition to the sex ratios obtained from shooters' bags and from trapping the Paradise Shelduck, field counts to determine the ratio can be accomplished because of the easily distinguished white head and neck of the female from the black head and neck of the male. An error may be hidden in the counts of the autumn flocks because the juvenile female has a black head and neck similar to that of the male. The white head and neck are attained at about three months of age and as the main breeding season is from September to November, it is considered that the error is small.

The counts were made in the central North Island from November 1960 to November 1962.

METHOD

The flocks were observed from a vantage point through binoculars. The females, the males and the total number were each counted and checked.

Certain areas nearly always held flocks, the numbers of which varied according to the time of the year. These flocks were always recorded. Other flocks were recorded when encountered.

RESULTS

Testing the figures of the large post-moult autumn flocks (March 1961, April 1962) with the X^2 test at the 5% level, shows that the numbers are not significantly different from each other or from the 50:50 percentage ratio. The test shows that the figures for the non-breeding flocks are significantly different amongst themselves, but when summed over the years they are not significantly different from the percentage ratio of the autumn flocks. December has not been included in the non-breeding flocks for there is the possibility that some of the early broods may have joined these flocks.

The X^2 test also shows that the overall percentage ratio of 48.9 : 51.1 does not differ significantly from the 50:50 ratio but is a borderline case.

TABLE 1

Date	No. of Flocks	Range of Percentage Ratio of Males in Flocks	No. Males	No. Females	Total No.	Percentage Ratio
March 1961	19	22.2 - 60.0	1666	1699	3365	49.5 : 50.5
April '62	15	31.0 - 61.8	1022	1048	2070	49.4 : 50.6
July '60	1		42	49	91	46.2 : 53.8
November '60	4	22.5 - 37.0	57	124	181	31.5 : 68.5
September '61	9	9.5 - 82.2	223	181	404	55.2 : 44.8
October '61	4	16.7 - 74.0	70	94	164	42.7 : 57.3
December '61	2	35.0 - 56.6	240	192	432	55.6 : 44.4
May '62	3	31.5 - 80.0	121	238	359	33.7 : 66.3
September '62	8	22.0 - 78.0	46	78	124	37.1 : 62.9
November '62	5	41.7 - 71.8	175	125	300	58.3 : 41.7
		Total:	3662	3828	7490	48.9 : 51.1

BANDED

Date	No. Males	No. Females	Total No.	Percentage Ratio
January 1962	55	76	131	42.0 : 58.0
January 1963	50	50	100	50.0 : 50.0
	105	126	231	45.5 : 54.5

SHOOTERS' BAG

Date	No. Males	No. Females	Total No.	Percentage Ratio
May 1961 May 1962	135	143	278	48.6 : 51.4

DISCUSSION

As the tertiary sex ratio is close to the 50 male; 50 female, it supports the commonly held view that the Paradise duck is a monogamous species. It also indicates that there is no differential mortality and that all the adults in this area are potential breeders.

The question " why do the non-breeding flocks differ so much in the percentage ratios ? " arises. This is difficult to answer with present knowledge but two possibilities are:

(a) During the winter months, perhaps beginning as early as May, a proportion of the non-breeding population may emigrate from the area.

(b) The range of percentage ratios for males suggests that there is an unequal distribution of the sexes. It has been frequently remarked upon by farmers and is recorded by Buller (1888). This unequal distribution and the topography may lead to sampling error in any one trip, but when the figures for the two years are taken it is smoothed out. No satisfactory reason has been found for this biased distribution.

It is considered that the number of birds banded near Taihape is not sufficient to give a reliable percentage ratio figure. It is, however, interesting to note that the ratio resulting from the shooters' bag is very similar to that of the overall percentage ratio.

The results obtained in this study confirm that the Paradise Shelduck is a monogamous species. In contrast to this, Taylor (1944) found a mean ratio of 1 male : 4.2 females in the South African shelduck *(Tadorna cana)* which implies (a) that it is not a monogamous species although Taylor states it appears to be, and (b) that not all of the population is able to breed as there seems to be a large differential mortality in the male. The size of the sample area may be influencing Taylor's figures.

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