

A Field Method of Sexing the Swamp-hen or Pukeko

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During the course of studies on the Takahe (*Notornis mantelli* Owen) the difficulty was soon met of distinguishing the sexes in this monomorphic species. Eventually a tentative method was devised which depended upon capture and the taking of culmen length measurements and weights.¹ However, with a species as rare as the Takahe there is no opportunity of testing the method by the ideal arbitration of dissection, and, although cloacal examination could perhaps be some guide, we have felt a little diffident about applying this technique—mainly because we wish to subject the species to as little handling as possible. In the Pukeko (*Porphyrio p. melanotus* Temminck) we not only have a genus closely related to *Notornis* (perhaps even congeneric with it)², but the same problem also in need of solution. And as the Pukeko is, fortunately, an expendable species, an opportunity therefore exists to see if the method tentatively suggested to separate the sexes in the Takahe will do the same, *mutatis mutandis*, in the Pukeko.

In May 1956 a number of Pukeko were obtained from the Bulls area of the North Island. Various body measurements were taken and all birds were then sexed by dissection. It became obvious that of all the measurements made, the ones most likely to be of use for sexing the birds in the field were those of culmen length (including the frontal shield) and body weight. In fact, an almost complete separation could be accomplished by using these two in combination—thus bearing out what we suspect to be the case with the Takahe. With only two clear exceptions among the 38 birds then available, we found that the males were characterized by the possession of a culmen with a length equal to or greater than 70 mm. and a weight equal to or greater than 950 gm.; and females by the possession of a culmen with length equal to or less than 70 mm. and a weight equal to or less than 950 gm. (The equivalent standards in the Takahe are 86 mm. and 2.6 kg.). Obviously there is a narrow zone of overlap, using this combination of measurements, arising from the fact that there is an overlap between the sexes in the distribution curves of the individual body measurements with which we are concerned. But, as will be seen later, this has so far not proved to be a serious drawback. Among the 38 birds two females with culmen lengths in excess of 70 mm. had weights well below those in the male range, so there was no difficulty in assigning these to their proper sex before dissection.

In May 1957 twenty-two more birds were obtained from the same locality and were sexed according to the scheme

just described and the accuracy of the result then checked by dissection. It was found that two errors had been made and one bird with a culmen length in excess of 70 mm. was correctly diagnosed as a female because its weight was well below the male range. Thus, of the 60 Pukeko from Bulls, 56 were assigned to the proper sex (an accuracy of 93.3 per cent) and the following four birds were wrongly classified—two females of culmen lengths 75 mm. and 73 mm. and weights 1,100 gm. and 1,000 gm., respectively, and two males of culmen lengths 70 mm. and 67 mm. and weights 920 gms. each.

Now a check on the method was sought by trying it on birds from a different locality. In August 1957 nineteen Pukeko from Matamata in the North Island (nearly 150 miles away from Bulls) were examined, and of these 18 were correctly sexed. One bird with culmen length of 68 mm. and weight of 960 gm. could not be assigned at all by our system, though, as can be seen from the table below, it was more likely to be a female than a male—and so it proved. Therefore, of the grand total of 79 Pukeko from two localities in the North Island 74 (or 93.7 per cent) were assigned to the proper sex immediately, four (5.1 per cent) to the wrong sex and one (1.2 per cent) remained doubtful. We regard the method we have suggested, then, as a fairly satisfactory one for sexing live Swamp-hens, especially as we have applied no corrections to take account of age. However, we cannot expect that it will give good results if it is applied to a sample containing other than rather late immature birds or adults, and in New Zealand most birds sampled in May should be at least six months old. Neither can we expect that the standards we have used in this paper will be of universal application, for variations attendant upon gross differences in geographical distribution will probably make a local re-determination necessary. When either culmen length or weight *alone* are used in an attempt to separate the sexes, the minimum errors attainable are double those resulting from the combination of both into a standard, and the incorporation of a third measurement (such as that of the mid-toe) does not materially improve upon this accuracy.

	Sex	N	Range	Mean	σ	V
Culmen	♂	37	67-82 mm.	75 mm.	3.29	4.39
	♀	42	56-75 mm.	67 mm.	3.80	5.67
Weight	♂	36	920-1,200 gm.	1,060 gm.	77.1	7.27
	♀	42	700-1,100 gm.	860 gm.	77.2	8.98

Weights were determined on a spring balance graduated to 10 gm.
 'Culmen' is the chord of the exposed culmen plus frontal shield
 taken to the nearest mm.

There is one point that our work on a number of species of birds has made clear: weight is a very useful characteristic for classifying populations or parts of populations. Admittedly its coefficient of variation is usually greater than that for other body measurements (though not very much so in this instance), but whether that is a disadvantage or not depends upon the amount of overlap occurring between the two sets of weights being compared. There is one great advantage in weight measurements — of all external body measurements likely to be taken it is the one least subject to bias arising from variations in method used by the operator. In fact, it may be true to claim that when comparisons are being made between populations measured, as far as can be assured, in the same way by different operators, the extra amount of variation arising from even slightly-different techniques, say in measuring a tarsus, will offset the inherently-smaller coefficient of variation in such a measurement to an extent sufficient to make the use of weight comparisons of approximately equal value. We therefore recommend that weights of some kind be included as a matter of course in the series of measurements taken of any species.

REFERENCES

1. Williams, G. R., and K. H. Miers (1958). 'A Five-year banding study of the Takahe (*Notornis mantelli* Owen)', *Notornis*, 8, in press.
2. Fleming, C. A. (1950). 'Affinities of some New Zealand Birds'. *N.Z. Bird Notes* (*Notornis*) 3, 241 (quoting Mayr).

Association between the Black Honey-eater and the Emu Bush

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The Emu bush (*Eremophila longifolia*) is a shrub or small tree growing to some 15 feet in height, which, according to Anderson (*Trees of New South Wales*, p. 11), is widespread in the Western Plains Division of New South Wales. In those southern parts of the Division with which I am familiar it grows most frequently on the sand-ridges across the saltbush plains. It is nowhere really common, occurring for the most part in small, scattered clumps. It is practically absent from the red gum/yellow box association of the Murray River system, the soils apparently not being conducive to its growth. It bears a flower which is roughly tubular in form, slightly decurved and about three-quarters of an inch long. Nectar is stored in some quantity at the base of the flower. Blossoming is profuse, but owing to the dull red colour of the flower is not particularly noticeable.

The Black Honeyeater (*Myzomela nigra*), in the south-west of New South Wales, bears out its reputation of being a strictly nomadic species subject to irregular irruptions. In