COMMENTARY ON A STATISTICAL OVERSIGHT USED TO DESCRIBE A MASKED BOOBY SUBSPECIES

P.D. SHAUGHNESSY

CSIRO Division of Wildlife and Ecology, P.O. Box 84, Lyneham, A.C.T. 2602, Australia

A recent paper by O'Brien & Davies (1990) uses wing measurements to describe a new subspecies of the Masked Booby *Sula dactylatra*. It includes a statistical oversight that should be corrected before it is perpetuated.

In the METHODS section, O'Brien & Davies (1990, p. 2) state "In Figure 1, the unshaded rectangles represent 1.3 x the standard deviation on either side of the mean, and illustrate the area within which 90% of the population can be expected to occur. If these rectangles do not overlap, subspecific separation, by Rowley's criterion, would be justified." Rowley's criterion was set out in a taxonomic study of Australian corvids (Rowley 1970).

In fact, rectangles representing 1.3 x the standard deviation are expected to represent 81% of the population, assuming that wing measurements follow a normal distribution and sample size exceeds 30. For 90% of the population to be included in the rectangles, they would need to be of length 1.645 x the standard deviation as estimated from a large sample.

Figure 1 of O'Brien & Davies (1990) illustrates wing measurement data that are summarized in Table 1. If rectangles in Fig. 1 are increased to 1.645 x standard deviation, that for females from the Kermadec Islands (of the newly proposed subspecies *fullagari*) overlaps with that of females from Bedout Island (subspecies *bedouti*).

It should be pointed out that sample sizes for the comparison of wing measurements were small in the booby study (two to seven for each sex), considerably smaller than in the study of corvids (5 to 223; Rowley 1970). In these circumstances the 90% confidence limits exceed 1.645 x standard deviation. The discriminating ability of the comparisons could have been improved by assuming that the variances of the populations were much the same and conducting an analysis of variance.

Other criteria have been recognised for separating subspecies using quantitative characters, for example the 75:99+% rule of Amadon (1949) and a test of significance using analysis of variance. The latter is recommended in procedures proposed by Zink & Remsen (1986) and is used, for example, by Schodde *et al.* (in press) to separate subspecies for the Glossy Black-cockatoo *Calyptorhynchus lathami*.

ACKNOWLEDGEMENTS

REFERENCES

AMADON, D. 1949. The seventy-five per cent rule for subspecies. *Condor* 51: 250-258.

O'BRIEN, R.M. & DAVIES, J. 1990. A new subspecies of Masked Booby *Sula dactylatra* from Lord Howe, Norfolk and Kermadec Islands. *Mar. Orn.* 18: 1-7.

ROWLEY, I. 1970. The genus *Corvus* (Aves: Corvidae) in Australia. *C.S.I.R.O. Wildl. Res.* 15: 27-71.

SCHODDE, R., MASON, I.J. & WOOD, J.T. in press. Geographic differentiation in the Glossy Black-cockatoo, *Calyptorhynchus lathami* (Temminck), and its history. *Emu*.

ZINK, R.M. & REMSEN, J.V. 1986. Evolutionary processes and patterns of geographic variation in birds. *Current Ornithol.* 4: 1-69.