

cubation response.—H. W. HEUSMANN AND PETER R. PEKKALA, *Massachusetts Division of Fisheries and Game, Westboro 01581. Accepted 7 Feb. 1975.*

Extremes of sexual dimorphism in size in birds.—Current theories relating sexual dimorphism, breeding system, and ecological factors are based largely on avian data. As part of an attempt to assess the extent to which these theories account for the degree and distribution of sexual dimorphism in mammals, I became interested in comparing the range of sexual dimorphism in size in birds with that in mammals.

For birds, I at first used the extreme cases given by Lack (*Ecological Adaptations for Breeding in Birds*, Methuen, London, 1968:161). The biggest difference between the sexes in birds, he says, occurs in an Australian passerine, *Cincloramphus cruralis*, the Brown Song-lark. He gives the Australian Goshawk, *Accipiter fasciatus*, as an extreme case of sexual dimorphism in which the female is larger than the male. In both cases he cites Amadon (*Proc. Am. Phil. Soc.* 103:531–536, 1959) as his source of data. Lack's figures (Table 1) yield a female/male ratio of about .45 for the Brown Song-lark and 1.77 for the Australian Goshawk. If they were correct, and if wing length is a fair measure of size in birds, there would be more extreme cases of sexual dimorphism in birds favoring both males and females than in mammals. The range of sexual dimorphism in size would thus be much greater in birds than in mammals.

However, the figures Lack gives are not in the paper by Amadon which he cites. Furthermore, the figures given in Serventy and Whittell (*Birds of Western Australia*, Paterson Brokensha, Perth, 1951) for the Brown Song-lark suggest that it is not nearly as sexually dimorphic as Lack states. They give the total length of males as $9\frac{3}{4}$ to $10\frac{1}{2}$ in (248–267 mm) and of females as $7\frac{1}{2}$ in (191 mm) and the weight of males as $2\frac{1}{2}$ to 3 oz (71–85 g) and of females as 1 oz (28 g). If the mid-points of the male ranges are used as average male values, the female/male ratio is .74 by total length and .71 by the cube root of weight.

Because of the conflict between the 2 sets of figures, I measured 7 females and 7 of the largest males (all in breeding plumage) of the Brown Song-lark at the American Museum of Natural History. Dr. D. W. Snow kindly measured the 4 females and 7 males at the British Museum of Natural History for me. My measurements on wings (Table 1) yield a female/male ratio of .74; Snow's one of .78. Since Serventy and Whittell give no data on wings, I also measured total length. The mean total length of males was 241 mm, of females 176, yielding a female/male ratio of .73. All of these estimates of the degree of sexual dimorphism are in line with those based on Serventy and Whittell's figures. Lack's figures are incorrect.

The Brown Song-lark is an extreme case of sexual dimorphism in size favoring males in birds, but it is of the same order of magnitude as other extreme cases such as the Capercaillie, *Tetrao urogallus*. In this species the average female/male ratio is .77 by the length of the 10th primary (Helminen, *Papers on Game Research*, Helsinki, No. 23:1–124, 1963) and .78 by the cube root of weight (Koskimies, *Ornis Fenn.* 35:1–18, 1958).

Lack's figures for the Australian Goshawk are also incorrect. According to the figures in Wattel (*Publ. Nuttall Ornithol. Club No.* 13:1–231, 1973) (Table 1), the female/male wing length ratio of this species is only 1.15 rather than the 1.77 indi-

TABLE I
WING MEASUREMENTS OF *C. CRURALIS* AND *A. FASCIATUS*

Species and authority	Wing length, mm	
	♂	♀
<i>Cinclorhampus cruralis</i>		
Lack (1968)	65-68	28-32
Ralls (pers. observ.)	112	83
Snow (pers. comm.)	107	83
<i>Accipiter fasciatus</i>		
Lack (1968)	269	477
Wattel (1973)	262	302
Brown and Amadon (1968)	264	302
Ralls (pers. observ.)	261	299

cated by Lack. Data for one specimen of each sex that I measured and specimens measured by Brown and Amadon (Eagles, Hawks, and Falcons of the World, vol. 2, Hamlyn Publ. Group Ltd., Feltham, England, 1968) are similar to those of Wattel (Table 1). It seems probable that the most extreme case of sexual dimorphism in size favoring females in birds is a member of the genus *Accipiter* but it is not clear whether or not it is *A. fasciatus*. Several other species have more extreme female/male ratios by wing length according to the figures in Wattel. The most extreme case in North America is *A. striatus*. This species has a female/male ratio of 1.19 by wing length and 1.21 by the cube root of weight (Snyder and Wiley, Ornithol. Monogr., in press).

Amadon was correct when he said in 1959 that more extreme cases of sexual dimorphism in size favoring males occurred in mammals than in birds: the elephant seal, *Mirounga leonina*, is a much more extreme case than either the Brown Song-lark or the Capercaillie (Bryden, Growth 33:531-536; Bryden in Harrison, ed., Growth and Development of Marine Mammals, vol. 1, Academic Press, New York, 1972). The most extreme cases favoring females in birds probably exceed those found in mammals.

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New bird records for El Salvador.—During June of 1964 I accompanied the late Merriam L. Miles on an ornithological trip to El Salvador. Considering the paucity of ornithological investigations in El Salvador, it was not surprising that during our 18-day trip we collected 3 previously unrecorded species. The specimens were