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February / février 2010

WEIGHT CHANGES OF SOME SAVANNA FINCHES IN GHANA

by N. C. Davidson, P. W. Greig-Smith and P. Fisher

Received 20 March 1978
Revised 20 April 1978

INTRODUCTION

That many birds inhabiting the seasonal West African savannas suffer seasonal and diurnal weight changes is well known (Ward 1965, Fry 1970, Jones & Ward 1976, Davidson 1978). One of us has documented weight changes in two species of bishops (Euplectes) at Mole National Park, Ghana, in the Northern Guinea savanna zone (Davidson 1978), and this paper presents comparable data for several species of estrildine and fringillid finches: Estrilda bengala, E. caerulescens, E. larvata, E. melpoda, Lagonosticta rara, L. rufopicta, L. senegala, Lonchura cucullata, and Serinus mozambicus. L. senegala (Jones & Ward 1977) and S. mozambicus (Ward & Jones 1977) are known to make an early-rains migration, and some individuals may have been on passage during my study period.

These species were mist-netted in several habitats around Samole (09°16'N,01°51'W), Mole National Park, during the mid wet season (July/August) in 1974, 1975 and 1977, and the late wet season (September/October) in 1975. Most individuals were captured from large mixed flocks of finches feeding on abundant weed and grass seeds in disturbed vegetation around human habitation. Average weights of birds netted at Mole are given by Fry (1970) and Greig-Smith & Davidson (1977a), and weight changes of individuals by Greig-Smith & Davidson (1977b).

DAILY CHANGES

For analysis, weights have been grouped into two-hour periods. Although all the species fed together on the same food source, their weight changes showed no common pattern. Both sexes of E. bengala (Fig. 1), L. rufopicta (Fig. 2), L. rara (Fig. 2), and both sexes of S. mozambicus (Fig. 3) showed a significant increase of weight in late afternoon. E. bengala and L. rufopicta also had a significant peak in late morning. But E. melpoda (Fig. 1), L. senegala (Fig. 2) and L. cucullata (Fig. 3) had significant maximum weights in early or mid afternoon. Woodall (1975) noted a similar pattern in L. cucullata.

Davidson (1978) found that shortly before they breed, both sexes of Euplectes afer and E. orix show peaks of weight in the morning, but in the

afternoon only males do - perhaps because females are laying down protein reserves (e.g. Jones & Ward 1976). The sexes of E. bengala and S. mozambicus (which were breeding - Greig-Smith 1977) showed similar patterns, consistent with feeding in the morning and late afternoon and avoiding activity in the heat of midday, (Davidson 1978). Ward (1965, 1969) considered a late afternoon weight increase to be normal for small birds, as a night-time energy

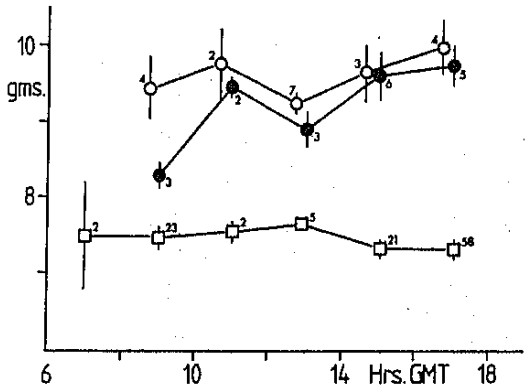

Figure 1 Daytime weight variation in Estrilda bengala ♂ ● , E. bengala ♀ ○ , and E. melpoda □ . Each point shows the mean ± 1 standard error. Numerals denote sample sizes.

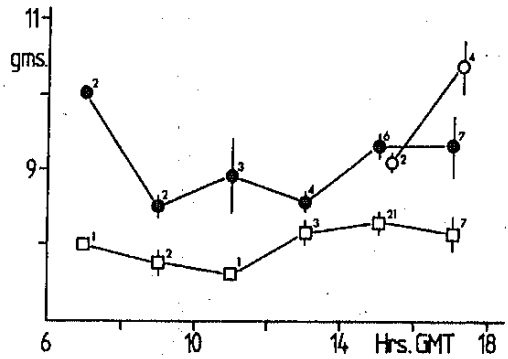

Figure 2 Daytime weight variation in Lagonosticta rufopicta ● , L. senegala □ , and L. rara ○ . Each point shows the mean ± 1 standard error. Numerals denote sample sizes.

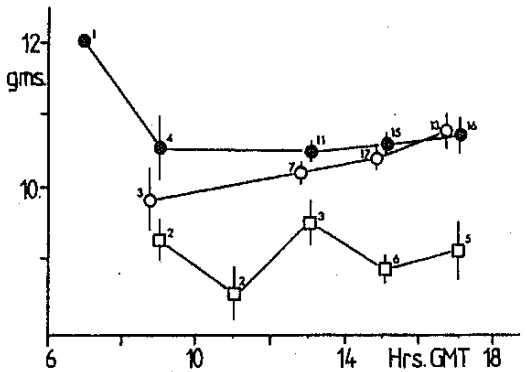

Figure 3 Daytime weight variation in Serinus mozambicus ♂ ● . S. mozambicus ♀ ○ , and Lonchura cucullata □ . Each point shows the mean ± 1 standard error. Numerals denote sample sizes.

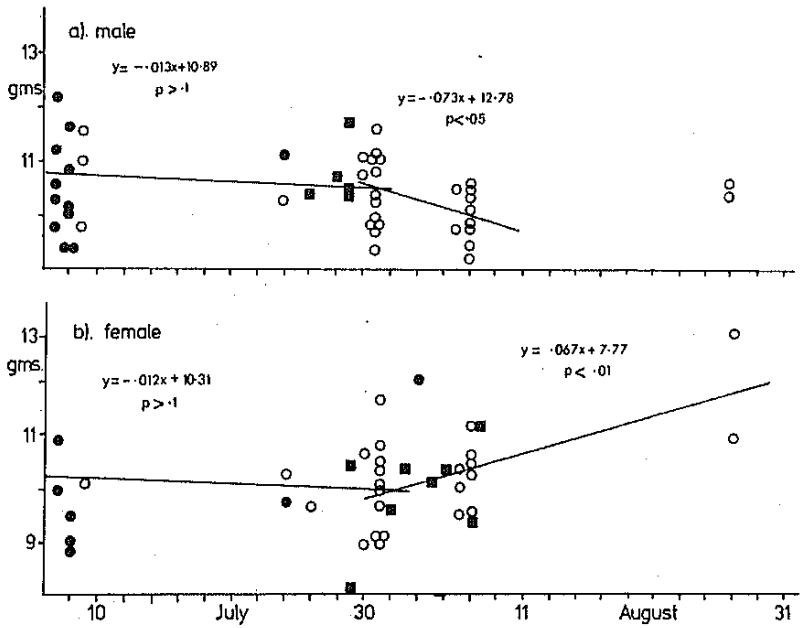

Figure 4 Seasonal weight changes in a) male and b) female Serinus mozambicus in 1974 ● , 1975 ○ , and 1977 □ . Weights are adjusted for daytime variation (see text). Regressions are for 1975 only.

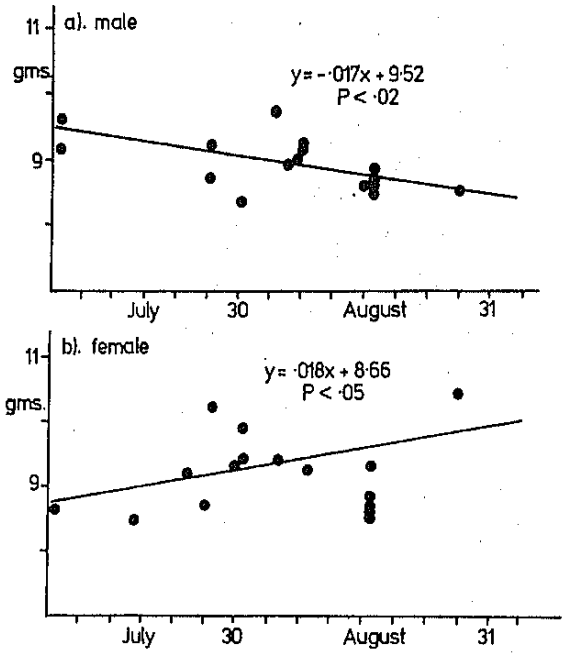

Figure 5 Seasonal weight changes in a) male and b) female Estrilda bengala. Data from 1974, 1975 and 1977 are combined, and weights are adjusted for daytime variation (see text).

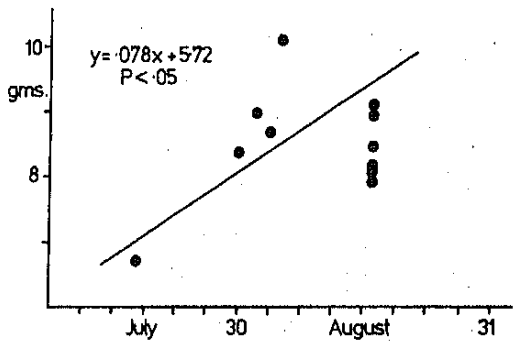

Figure 6 Seasonal weight change in Estrilda caerulescens. Data from 1974, 1975 and 1977 are combined, and weights are adjusted for daytime variation (see text).

reserve. A peak in the middle of the day might reflect either the formation of protein reserves (in females) as above, or a need to feed at that time. That could arise if nestlings are fed in the morning and evening, to the exclusion of self-feeding. At least two of the three species with an afternoon weight peak were breeding in the wet season (Greig-Smith 1977).

SEASONAL CHANGES

Morel & Morel (1970) noted that estrildines start breeding at a fixed time each year, but that other finches vary their time of breeding according to the rains. Consequently, we have combined weights of estrildines for all years, but those of S. mozambicus have been analysed with the years distinguished. To eliminate variations due to daytime changes, weights have been standardised to their midday level (1200-1400 GMT) by the addition or subtraction of mean percentage differences.

Table 1 shows changes between the mid and late wet season, revealing significant decreases of 4% and 7% in E. bengala females and E. larvata, and a significant increase of 9% in L. cucullata. Within the mid wet season, however, E. bengala females gained weight while males lost weight (Fig. 5). A comparable difference between the sexes of S. mozambicus was evident in July and August 1975, while the limited data from 1974 and 1977 appear to

Table 1 Weights of estrildine finches at Mole National Park. Values are means (gms) ± 1 standard error, with sample sizes in parenthesis.

Species	Mid wet season	Late wet season	Significance (Student's t-test)
Estrilda bengala ♂	9.26±0.20(16)	9.26±0.14(3)	
E. bengala ♀	9.56±0.17(16)	9.13±0.13(4)	$P < 0.05$
E. larvata	9.63±0.26(7)	8.93±0.35(3)	$P < 0.05$
Lagonosticta rufopicta	8.97±0.35(10)	8.78±0.35(4)	
L. senegala ♂	7.92±0.23(5)	7.60±0.20(2)	
Lonchura cucullata	8.65±0.23(4)	9.50±0.36(4)	$P < 0.05$

conform to the pattern (Fig. 4). Davidson (1978) found that E. afer males lose weight at that time of year, after maintaining a stable weight during July. This pattern is attributable to the northward movement of birds after and early rains migration (Jones & Ward 1977), and S. mozambicus makes a similar migration (Ward & Jones 1977). E. caerulescens gained weight in July and early August (Fig. 6), but no seasonal changes were detectable in E. melpoda, E. larvata, L. senegala, L. rufopicta, L. rara or Lonchura cucullata, beyond those shown in Table 1.

Seasonal changes in these species are likely to have three causes: gonad hypertrophy before breeding, and recrudescence after breeding (e.g. Fry 1970); energetic costs associated with breeding (e.g. Ward 1965); and changes in feeding conditions, such as an increase in the abundance of grass seed towards the end of the wet season (e.g. Hopkins 1974). Interpretations of the patterns described above in terms of these factors requires breeding-time information, which is unfortunately lacking, although the available evidence (Greig-Smith 1977) suggests that differences among breeding birds are as great as those between breeding and non-breeding species.

ACKNOWLEDGEMENTS

We are grateful to the Ghana Game and Wildlife Department for providing facilities at Mole National Park, and to the many people who assisted with netting. Finance was provided by grants to the 1st, 2nd, and 4th Aberdeen University Ghana Expeditions from the Royal Society, the Carnegie Trust, and Aberdeen University.

SUMMARY

Daily and seasonal weights of estrildine and fringillid finches were studied in Mole National Park during the 1974, 1975 and 1977 wet seasons. There are no common patterns of weight change, nor are there consistent differences between breeding and non-breeding species.

RÉSUMÉ

Au cours des saisons humides de 1975 et 76, les variations journalières et saisonnières du poids ont été étudiées chez les Estreldidés et les Fringillidés du Parc National du Mole. Les resultats indiquent qu'il n'y a ni schème commun de modification du poids, ni différences significatives entre les espèces reproductrices et non reproductrices.

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N. C. Davidson, Department of Zoology, University of Durham, Science Laboratories, South Road, Durham DH1 3LE

P. W. Greig-Smith, School of Biological Sciences, University of Sussex, Falmer, Brighton, Sussex BN1 9QG

P. Fisher, Department of Zoology, University of Aberdeen, Tillydrone Avenue, Aberdeen AB9 2TN