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Breeding seasons of three estrildid species in Ile-Ife, Nigeria

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Summary

Reproductive activities of three species of Estrildidae, *Lonchura cucullata*, *L. bicolor* and *Estrilda melpoda*, were monitored for three years (April 1987 to March 1990) with the aim of determining the influence of environmental factors on reproduction. Breeding seasons coincided with the rainy season, when grass seeds were abundant. Reproduction was bimodal in both species of *Lonchura* but unimodal in *Estrilda melpoda*.

Résumé

Les activités reproductrices de trois espèces d'Estrildidés, *Lonchura cucullata*, *L. bicolor* et *Estrilda melpoda*, ont été suivies pendant trois ans (d'avril 1987 à mars 1990) en vue de préciser l'influence des facteurs du milieu sur la reproduction. Les saisons de reproduction coïncidaient avec la saison des pluies quand les graines de Graminées sont abondantes. La reproduction était bimodale chez les deux espèces de *Lonchura* mais unimodale chez *Estrilda melpoda*.

Introduction

This paper presents part of an ecological study of three estrildids, the Bronze Mannikin *Lonchura cucullata*, the Black and White Mannikin *L. bicolor* and the Orange-cheeked Waxbill *Estrilda melpoda*. The three-year study investigated breeding seasons in relation to environmental factors, particularly solar hours, temperature and rainfall.

Study area and methods

The study was carried out from April 1987 to March 1990 on the 5,065 ha campus of

Results

Climate

Meteorological data from April 1987 to March 1990 (Fig. 1) show the pattern of solar radiation, relative humidity, temperature, rainfall and number of rain-days. The rainy season starts around mid-March and ends in October, with a slight decrease in the amount of rainfall and number of rain-days during August. The decline in rainfall during August was invariably followed by a spell of heavy rains throughout September and October. The dry season lasts for about four and a half months from November to mid-March. Weather data for 1988 showed an early commencement of rains in February; November to January were the driest months and much of the vegetation during these months was dry or burnt.

Relative humidity at 9.00 was higher during the rainy season (70-85%) than during the dry season (38-66%). The mean monthly maximum temperature fluctuated between 26.7°C and 37.0°C while the mean minimum temperature was between 14.2°C and 23.3°C. The dry season mean minimum temperatures were slightly lower than those for the rainy season while the dry season mean maximum temperatures were higher than those for the rainy season. The number of solar hours depends on cloud cover so was lower during the rains (Fig. 2).

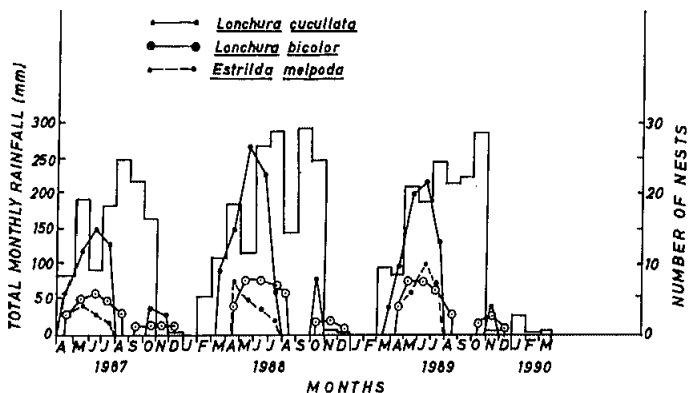


Figure 2. Breeding period of three estrildid species between April 1987 and March 1990 plotted against rainfall (histogram).

Breeding

The number of active nests (with eggs) for 1987, 1988 and 1989 recorded for *L. cucullata* was 53, 88, 72, for *L. bicolor* it was 28, 44, 38 and for *E. melopoda* 12, 33 and 33 respectively. Fig. 2 shows monthly distribution of all the active nests each year. The breeding season commenced in mid-April and lasted till mid-August for *L. bicolor* and July for *E. melopoda*. In *L. cucullata* it commenced from mid-March and extended until July. A second breeding season in both *Lonchura* spp. started in mid-October and lasted till early December except for 1987 when it was observed as early as September for *L. cucullata*. The peak number of nests was recorded in May and June for *L. cucullata* and *L. bicolor* respectively. No active nest was observed from late August to early October and from late December to March of the following year for *L. cucullata*. In each year the breeding peak (May-July) for all three species occurred a few weeks before the rainfall peak. The timing of peak breeding for *E. melopoda* varied between years (May 1987, April 1988, June 1989) but was constant for the other two species.

The proximity of the reproductive peak to the rainfall peak is adaptive, because at that time there was an abundance of nesting materials (green grass inflorescences); also, grass seeds, which formed a major part of the diet of nestlings (Table 1), would be most abundant in the late rains when the eggs had hatched.

Table 1. Number of crops of adults and nestlings of each species containing specific foods.

Food	<i>Lonchura cucullata</i>		<i>Lonchura bicolor</i>		<i>Estrilda melopoda</i>	
	Adults (n=25)	Nestlings (n=13)	Adults (n=11)	Nestlings (n=5)	Adults (n=8)	Nestlings (n=4)
Plants						
<i>Panicum</i> seed	25	13	10	5	6	4
<i>Digitaria</i> seed	25	13	11	5	0	2
<i>Sporobolus</i> seed	22	11	11	4	3	4
<i>Chloris</i> seed	7	2	8	5	3	4
<i>Urochloa</i> seed	0	6	0	4	4	4
<i>Portulaca</i> seed	0	2	0	2	0	0
<i>Eragrostis</i> seed	16	1	0	1	0	0
Unidentified seed AX	0	0	8	5	0	2
Unidentified seed W	0	0	0	2	0	2
Unidentified seed Rm	0	8	0	2	0	0
Unidentified seed Bc	0	0	0	0	0	1
Arthropods						
Isoptera alates	18	13	7	4	3	4
Lepidoptera larvae	5	9	7	5	5	4
Diptera larvae	0	11	0	0	7	4
Arachnida	0	4	0	5	1	2

Discussion

Biannual breeding has been reported previously in a number of tropical birds including the Chestnut-bellied Starling *Spreo pulcher* (Wilkinson 1983) and the Village Weaver *Ploceus cucullatus* (Din 1986). The three estrildid species reproduced about the same period of the year with April to August being the major breeding season and November being a minor reproductive peak for the *Lonchura* spp.. *Estrilda melpoda* did not exhibit this minor peak. All three species bred during the rains which is contrary to the observation of Woodall (1975) on *L. cucullata* in southern Africa where breeding took place in the dry months. Cessation of breeding during the dry season may have resulted from scarcity of nesting materials and grass seeds.

A number of factors like the onset of rainfall (Immelmann 1971), changes in food availability (Earlé 1981) and body condition (Jones & Ward 1976) are important in the stimulation of breeding in tropical and arid zone birds. Nest building with green grass inflorescences started in the three estrildid species as early as April when rainfall may have acted as a proximate factor through the stimulation of fresh green vegetation. The abundance of alate termites during their prenuptial flights and other insect larvae during the rainy season may have contributed to peak performance during the breeding season (Table 1). This conforms with the observations of Skead (1975), in South Africa, and Thompson (1989) in Sierra Leone, where grass seeds and insects were fed on by several estrildids, including *Lonchura* spp..

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Village Weaver - Tisserin gendarme - *Ploceus cucullatus*

Photo: Michael Gore