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NEST SITES, BREEDING SEASONS, CLUTCH SIZES AND EGG SIZES

OF THE HAMERKOP Scopus umbretta

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INTRODUCTION

Two sub-species of the Hamerkop are recognised, namely S.u. umbretta and S.u. minor (Brown et al. 1982). The former is larger and distributed more widely, being found throughout sub-Saharan Africa except the coastal belt of West Africa. The latter is smaller and confined to the West African coastal region from Sierra Leone eastwards to Nigeria. In spite of being a common and conspicuous bird, the Hamerkop had not been the subject of a detailed study until its breeding biology in central Mali was recently investigated (Wilson et al. in press). Earlier, less detailed accounts of its breeding biology relate to South Africa (Cowles 1930, Liversidge 1963) and there are several short notes, some anecdotal, scattered throughout the literature. Additional information is available in regional or country handbooks, most of which was summarised by Brown et al. (1982).

This paper attempts to provide more detailed information on the choice of nest site, on breeding seasons and on clutch and egg sizes based on information from a variety of sources.

MATERIALS AND METHODS

A four-year study of a population of Hamerkops in central Mali (Wilson et al. in press) was the principal source of the data reported below. Observations on Hamerkops were also made in Ethiopia from November 1983 to April 1986. Other sources of information were the Nest Record Card schemes of South Africa, Zimbabwe and East Africa. Data from Botswana and Zambia were obtained from newly established recording schemes. Additional information for other countries was provided through personal contacts and from literature sources.

Information obtained from nest record cards is often fragmentary and usually incomplete. Records in the East African scheme dated from 1906 onwards and in both the South African and Zimbabwean schemes, there were records from the 1920s. Where the number of eggs or young was stated, it was not always clear whether the clutch was complete or not and it was not known how many young may have died. In order to eliminate, as far as possible, the bias inherent in these sources, I examined all cards for the species and attempted to interpret them systematically on the same basis for each country. The month of breeding was considered to be the start of laying, based either on the eggs or the stage of growth of young - in the latter case using the Mali data as a reference. I did not include single egg or two egg clutches in the analysis of clutch size except where it was clear from the card that the original observer considered it to be a complete one. Similarly, where only young were present in the nest and these were at an advanced age, they have not been used in clutch size

analysis. In spite of the precautions taken, it is probable that, with the exception of Mali data, there is still a slight underestimation of the true clutch size. Egg sizes were measured by me in Mali but have been taken from record cards for other areas.

RESULTS AND DISCUSSION

Nest site

In Mali, all 178 nests found in 1978-1983 were in trees. The majority (87 per cent) were built in African Mahogany (Khaya senegalensis), the remainder, with four exceptions, being in Mango (Mangifera indica) or Peltophorum pterocarpum: all of these species were introduced to the irrigation scheme on which the study took place.

In East Africa, 20 of 28 record cards provided information on the nest site. Only one nest was built on a rocky surface (at Mwanza in Tanzania), the remainder being in trees, usually unspecified, but five were in Figs (Ficus spp.) and one each in Croton, Albizia, baobab (Adansonia) and Mangifera.

In Zimbabwe, 18 of 93 nests were built on rocks or rocky outcrops, one was constructed down a mine shaft, and the remainder were built in trees.

Of 57 nest sites recorded in South Africa, 24 were built on rocks or in rock-like situations (one, for example, on the face of a dam), one on the roof of a corrugated-iron hut and the remainder in trees. Of the 32 tree sites, 14 were in Willows (Salix), three in Gums (Eucalyptus spp.) and one each in Oak (Quercus), Albizia and Mangrove (? Avicennia), the remainder being unspecified.

There were no mentions of sites from other areas. The Hamerkop nest weighs a minimum of 25 kg and therefore requires strong support. Large trees are usually present near water, which the Hamerkop also requires in order to obtain its food. The tendency to increasing use of rock surfaces as one moves southwards does not appear to have any simple explanation.

Breeding season

The monthly distribution of the onset of egg-laying for three areas is shown in Figure 1. In Mali, most clutches were laid towards the end of the rainy season and in the early dry season. In South Africa there was a very marked breeding season starting in the southern hemisphere spring and being completed before the height of summer: in most of the region, this also coincides with the start of the rainy season. In Zimbabwe, the breeding season appeared to be similar to that in South Africa but occurred slightly earlier in relation to the onset of rainfall. There was, however, a small percentage of clutches laid in other months in Zimbabwe and this spread led McLean (1984) to state that breeding occurs throughout the year there.

Botswana has only one breeding record, this being in June in the middle of the southern dry winter. In Zambia, the 23 records available suggested that breeding occurred in two periods: in the rainy summer (December to

TABLE 1 Clutch sizes of the Hamerkop in four different areas

Area	Number of clutches	Clutch size			
		\bar{x}	+	s.d.	range
South Africa	53	4.2		1.36	1-7
Zimbabwe	67	4.5		0.91	3-7
East Africa	10	4.6		0.52	4-5
Mali	34	4.8		0.74	3-7
Overall	164	4.5		1.03	1-7

TABLE 2 Sizes and volumes of Hamerkop eggs from four different areas

Areas	Number of eggs	Length (mm)			Breadth (mm)			Volume (ml ³)		
		\bar{x}	+	s.d.	\bar{x}	+	s.d.	\bar{x}	+	s.d.
East Africa	26	45.0	1.40		35.0	1.16		27.9	2.18	
Zimbabwe	34	45.2	2.04		34.3	1.25		27.0	2.74	
South Africa	16	46.7	1.56		34.3	1.01		27.8	2.16	
Mali	164	44.2	1.49		34.0	0.92		25.9	1.91	
Overall	240	44.8	1.58		34.1	1.05		26.5	2.21	

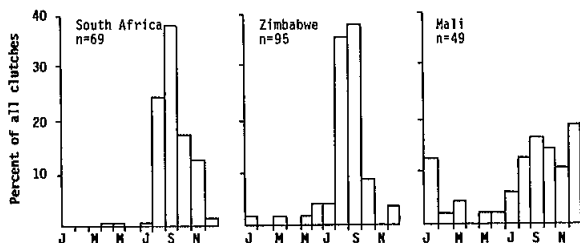


Figure 1. Monthly distribution of Hamerkop clutches started in three areas

April) and in the dry winter (June to August). In Malawi, there was one breeding record for the wet summer (January) and five for the dry cool season (June to August) (Benson & Benson 1977).

In East Africa, breeding occurred in most months and there were no obvious peaks either overall or in the different climatic zones into which East Africa has been divided (Brown & Britton 1980, Brown *et al.* 1982). There were only 17 record cards in the East African scheme from which it was possible to calculate the month of laying; however, these came from throughout the region and made any attempt to relate laying to season impossible.

In Ethiopia, the few records available (mostly in Urban & Brown 1971) indicated that laying occurred during the latter part of the main rains (September to October) and in the winter dry season (November to January) with one record from the spring rains (March). My own observations of young with parents in family groups support a winter dry season laying period in January.

Pitman (1959) who contributed eight cards to the East African scheme which indicated laying in five or six months of the year, considered that the induction of breeding in the Hamerkop was due to an indeterminate rhythmic response independent of the rains. The evidence from the current study (Figure 1) shows that breeding seasons tended to be restricted and supports a hypothesis that induction of breeding in Hamerkops is not indeterminate but may well be related to a flush in the availability of food.

Clutch size

Data on clutch size from four areas are provided in Table 1. In spite of the fact that only the Mali data came from a detailed study, there were no significant differences in clutch size between the areas. Average clutch size in Hamerkops throughout the bird's range was about 4.5 eggs.

Additional data from South Africa, not in the record card scheme, provided a clutch size of 4.4 ± 1.04 for 13 clutches (Dean 1971) although McLean (1984) gave 3.3 (range 1-5) eggs for 17 clutches. Brown *et al.* (1982) reported that clutch size in East Africa varied between 3 and 5 eggs. In Malawi, the mean number of eggs in five clutches was 5.2 (Benson & Benson 1977).

Egg size

Table 2 provides data on egg size from four different areas. Over the whole of its range, measurements were 44.8 ± 1.58 mm (range 41.3-52.8) for length ($X \pm s.d.$) and 34.1 ± 1.05 mm (31.4-36.7) for breadth for a total of 240 eggs. The calculated volume, from the formula $V = K LB^2$ where K is a constant set at 0.507 (Hoyt 1979), is 26.5 ± 2.21 ml³. There were significant differences (student's "t" test) in length between regions, those from South Africa being longer than all others ($P < 0.01$) and those from East Africa and Zimbabwe being longer than the Mali eggs ($P < 0.05$). East African eggs were broader ($P < 0.05$) than from all the other areas, among which there were no significant differences ($P > 0.05$). On the calculated volume, Mali eggs were significantly smaller than from other

areas ($P < 0.001$), among which there were no differences ($P > 0.05$).

CONCLUSIONS

The Hamerkop is an Afro-tropical species. The available data suggests that there are some differences in birds from different regions in the choice of nest site. The distribution of the time of egg laying -- which should not, in the Hamerkop, be confused with or related to observed periods of nest-building (Wilson *et al.* in press) -- indicates that the induction of breeding is seasonal but further studies are required to determine what factors influence its timing. In spite of its wide distribution, there are no differences in clutch size throughout its range. There are differences in egg sizes which might be real ones or which might be attributed to the different people measuring them.

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SUMMARY

Aspects of the breeding of Hamerkops were analysed from a four-year study in Mali and from records held in Nest Record Card schemes from Central and Southern Africa. Egg-laying was seasonal, although the factors influencing its timing were unknown. Clutch size did not vary significantly between locations, but there were unexplained differences in egg size.

RESUME

Aspects de la reproduction de l'Ombrette étaient analysés pendant une étude de quatre années au Mali, augmentées avec les données des 'Nest Record Card schemes' de l'Afrique Centrale et Australe.

La ponte était saisonnière, mais les éléments déterminants de sa date exacte restent inconnus. La taille de la couvée ne se varie pas significativement entre endroits, mais il y avait des différences inexplicables à la taille des oeufs eux-mêmes.

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