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HOME RANGE SIZE, BREEDING BEHAVIOUR, AND ACTIVITIES OF HELMET GUINEAFOWL *NUMIDA MELEAGRIS* IN NIGERIA

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INTRODUCTION

Literature on Helmet Guineafowl in Nigeria is still very scanty (Ayeni 1979). Ayeni (1981, 1982) reported on its habitat and feeding biology near Kainji Lake; this paper reports further observations on distribution, home-range sizes, numbers and activities within Kainji Lake National Park and adjoining areas.

METHODS

Distribution

Previous sightings of Guineafowl had been mapped in relation to the drainage system in the Park; they occur mainly around known sources of dry season surface water. It was decided to census them by trekking along a major drainage system, the Oli River.

Three observers walked along the Oli river approximately 100 m apart and parallel to a fourth on the river bank. 50 m around each observer was considered the most effective sampling distance; adjacent observers were in continual contact and probably all Guineafowl were flushed. Double counting was minimised by observers' comparing notes on counts, flight directions and times after the survey. Every 500 m, the driver of a vehicle travelling parallel to the observers sounded its horn, helping the observers to mark their locations and records on the field map. Four strips 200-400 m wide and 133 km in total length were traversed during the census (Fig. 1). Four census surveys were carried out, in March and April at the end of the dry season and in May and June, at the beginning of the rains.

Estimates of home-range sizes were made where coveys were regularly encountered. Coveys were regularly encountered in the same places, their home-ranges, except at waterholes. Here different coveys evidently mixed, separating when they flew off to near or distant home-ranges. Once in their home-range, birds gave "barking" threats from the trees; if disturbed further within their home-range area they moved from tree to tree rather than fly away altogether from the vicinity.

Sightings were plotted accurately. In ten visits to the home area the greatest distance between two consecutive sightings was taken as the diameter of a circle approximating the home-range size (Fig. 2).

Behaviour and Activities

Diurnal behaviour of wild birds was quantified during study from hides, and supplemented by observations on captives. Daylight activities were timed in sample periods. Diurnal behaviour of wild birds was quantified during study from hides, and supplemented by observations on captives. Wild birds were caught in foot snares and acclimatised to captivity by enclosing for 3 months in a grass-fenced chain-linked aviary 7.6 m square. After 3 months the fence mats were gradually removed and the birds were by then accustomed to people.

RESULTS

Population and Home-Range Area

The average density along Oli river was between 4.6 ± 4.3 and 9.1 ± 12.7 birds/km^2 (Table 1). Table 2 shows estimates of home-range sizes in eight locations; two within the Park and six between the Park and Kainji Lake. In primary woodland areas in the Park, home-ranges were 0.8-1.8 km^2; in upland secondary woods outside the Park they were much larger: 7.6-21.2 km^2. The widest home-range sizes were recorded in the vicinity of village sites and farmlands. The overall mean home-range size was 8.8 ± 6.3 km^2, which is similar to that of *N. m. meleagris* in South Africa (Crowe 1978). Guineafowl with larger group sizes ranged wider than the smaller groups but proximity of roosting sites to watering points appeared to influence the total area covered by particular guineafowl groups.

Activity Patterns

During the beginning of the rainy season flocks broke up into small groups and monogamous, territorial pairs. Territories and moderate overhead tree cover and abundant ripe grass seeds. Nests construction and egg laying were in July-August, and hatching in August-October. Several adults accompanied chicks of mixed broods. Chicks hatched later than October died from cold harmattan nights in November. 15 nests were found; they were shallow and circular average, 7.5 cm deep and 32 cm diam, lined with grass and leaf litter up to 2 cm deep. They were all under, or concealed by, bushes on well drained soil.

Guineafowl are active all day; they roost from about 1830 to 0500 h. Main foods are grass seeds, fruits, and insects (Ayeni 1982). Activity classified as "sand pecking" include feeding on unidentifiable objects such as small seeds, sand, and insects or plant parts (Ayeni, Olowo-Okorun and Aire, 1982); the incidence of "sand pecking" and scratching through litter was high (61.3% of the daytime). When birds fed on identifiable objects, feeding on seeds of standing grass (19.6% of the time) came highest, followed in decreasing order by feeding on *Cyperus* bulbs, leaves and fallen fruits. At dawn birds fed first and drank later, as they moved from roosts to the river. Feeding and drinking peaked at about 1000 h. Birds drank but did not feed in the hot mid-day period, and drank finally at about 1600 h. Guineafowl fed while walking back to roost.

Records of 380 hours of observations on "other" daylight activities of guineafowl consisted of: moving about (186), shade seeking (74), courtship and mounting attempts (53), fighting (91), and bathing or wallowing

(123), roosting (49) and vocalisation (308). Calling and moving about together accounted for over half 56% of the "other" activities.

Guineafowl are very mobile, investigating their habitat on foot, although good fliers, they rarely fly far except when disturbed. Sand bathing (13.90% of counted activities) and fighting are common. Sand bathing, mostly around mid-day or in the hot afternoon, was accompanied by preening and on cool days sometimes with sun basking. Fighting often occurred mainly on the feeding grounds and on the way to and from the roosting sites; its intensity and frequency increased with the onset of reproductive activity. Less common activities are shade seeking (8%), courtship displays and mounting attempts (6%) and day roosting (5.5%). Birds rested in the shade of tree canopies during most hot afternoons, gular-fluttering, and with wings spread out and moved occasionally evidently to ventilate the body.

GENERAL BEHAVIOUR IN CAPTIVITY

Aggressive Behaviour

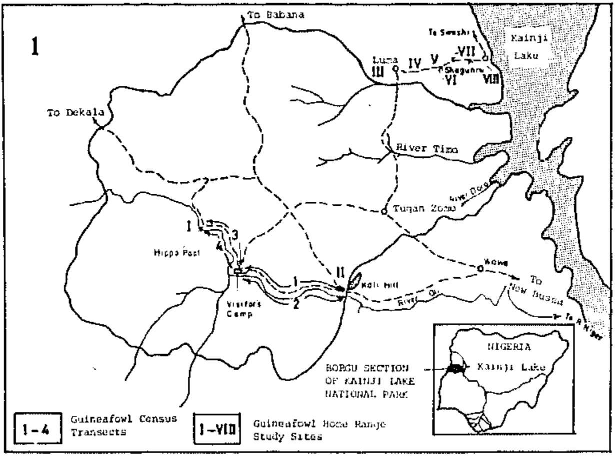
Birds were most aggressive at pairing time at the beginning of the rains. Among captive birds fighting led to death in many instances. When fighting, neck 'hairs' are erected and the neck is stretched, wings arched, breast and tail raised, and sparring birds approach each other in short stiff-legged steps. Leaping from the ground, they fly against each other in mid air, striking with the beak at the helmet or back. Submission consists of stopping fighting, lowering the head, gasping and finally turning round and presenting the tail to the attacker.

The dominant posture of attack is similar to that of social dominance among males observed in the aviary, and that of a male with a sexually responsive female. Differences in responses to the posture are that sub-dominant males lower the head and turn round to present the tail. That usually terminates further aggression, but the subdominant may also run away. Probably it is such aggression which breaks up the covey into smaller juvenile groups and ultimately into reproductive pairs. The response of a female to the male's aggressive display was to crouch, when the male grabbed her neck or back feathers, spread his wings and copulated. Copulation was observed in captive birds only during the cooler hours of the day near and after sunset.

Courtship feeding of female by male occurred during April-September. At its peak the male's courtship consisted of lateral displays, wing-whirring and mounting. Neck 'hairs' are erected, one wing arched and the other extended as the bird approaches the female in short stiff-legged steps, flapping the extended wing (Domm 1927).

Egg Laying, Nesting and Care of Young

Guineafowl raised from the egg in captivity laid eggs at 28-32 weeks of age. The first clutch were small, thin-shelled eggs. Egg laying in the wild was in June-July after the peak flood levels of rivers. In the aviary, most eggs were laid indiscriminately so that individual clutches were not usually recognised; but in three nests clutches of 16, 17 and 20 eggs were laid which were attributed to three known breeding pairs. Sometimes a pair


1
To Babana
To Swashi
Kainji
Lake
Luma
III
IV
V
VII
Shagunnu
VI
VIII
To Dekala
River Timo
River Doro
Tugan Zomo
I
3
4
Hippo Pool
II
Kali Hill
Wawa
To
New Bussa
Visitor's
Camp
1
2
River Oli
NIGERIA
Kainji Lake
BORGU SECTION
OF KAINJI LAKE
NATIONAL PARK
1 - 4
Guineafowl Census
Transects
I - VIII
Guineafowl Home Range
Study Sites

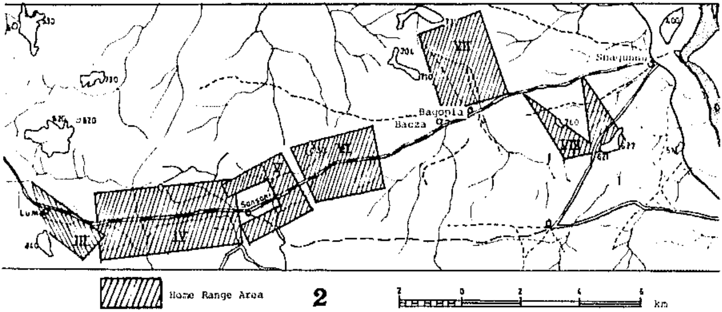

Shagunnu
Bagopia
Bacza
Sonson
Luma
VII
VIII
VI
V
IV
III
Home Range Area
2
km

Table 1 Group size and density estimates of Guineafowl River Oli, Nigeria

Location (see Fig. 1)	Strip width (m)	Month	Total no. of birds	No. of groups	Max. group size	Mean group size ± SD		Density (birds/km²)	Area sampled (km²)
1	300	March	163	20	24	8.25	8.35	11.94	12.30
2	300	April	162	16	50	9.13	12.66	11.85	12.30
3	400	May	284	46	24	6.17	4.63	25.91	10.96
4	200	June	65	14	18	4.46	4.29	13.49	4.82

Figure 1 Location of the Guineafowl study sites in relation to the National Park and the Kainji Lake

Figure 2 Home range sizes of guineafowl coveys in relation to the drainage systems in Kainji Basin Area

(figures opposite)

Table 2 Guineafowl home-range sizes

Site (see Fig. 1)		Greatest distance between 10 sightings (km)	Estimated Home-range sizes (km²)
I	in National Park	0.5	0.79
II		0.75	1.77
III	out of National Park	1.65	8.55
IV		2.60	21.24
V		1.55	7.55
VI		1.70	9.08
VII		1.70	9.09
VIII		1.95	11.95
Mean ± SD		1.55 ±0.66	8.75± 6.32

incubated their clutch together sitting pressed side by side; also two females were seen incubating similarly. In one clutch all 20 eggs hatched on the 27th day.

Vocalisation

Guineafowl are noisy, with often repeated strident calls, differing sexually. From about 15 weeks of age females have a disyllabic contact call "*put-rock, put-rock*" and males have a monosyllabic squawk "*chick, oo*". When excited, females have a similar call, faster and harsher: "*cher, cheering*". Males never make the "*put-rock*" call.

The alarm is a hard cackling, rapidly stuttered "*ke kkekkek*". The roosting call is "*chick, oo*" but in the breeding season there is also a long monotonous "*kek-kek-kek*" variation at moonlight, the last two syllables being advertisement calls.

A soft, gentle "*chio*" is given by a female feeding her young, and when a rich source of food is discovered; it is also used as an adult and parent-young contact call. The noise of wing flapping when taking flight signals danger.

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SUMMARY

Observations were made on population, distribution, and home-range sizes of Helmet Guineafowl *Numida meleagris* in natural habitats in Kainji Lake Basin, Nigeria. Their average density in Kainji Lake National Park is 4.6-9.1 km^2. Home-range size is 0.8-1.8 km^2; near farms and villages outside the Park it varies from 7.6 to 21.2 km^2.

Foraging activities during daylight hours (0600-1800 h) consisted of pecking unidentified objects (46.5% of time) scratching soil litter (14.8%), feeding on grass seeds (19.5%), vegetable matter (3.9%), fallen fruits (3.3%), and other foods (11.6%). Other daytime activities were calls (34.8% of time), locomotion (21.4%), and roosting (5.5%). Since more than one activity could take place together the total frequencies exceed 100% of the time.

The Guineafowl is monogamous. Pairing takes place with the early rains April-May. Courtship feeding of female by male occurs (observed in captivity and in the wild). The clutch is 15-17 eggs and hatches on the 27th day. Normally egg laying is restricted to the rainy season but in captivity it is extended into the dry season. Fertility and hatching rates are lower in captivity than in the wild.

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