

EFFECT OF FOOD AVAILABILITY AND FEEDING PATTERN ON THE POPULATIONSPREAD OF HELMETED GUINEA FOWL (*NUMIDA MELEAGRIS*) OVONUM, CROSS RIVER STATE

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Abstract

The effect of food availability and feeding pattern on the population spread of the helmeted guinea fowl (*Numida meleagris*) was investigated within a duration of ten months. Data on population size, food availability and population spread of the species was collected using direct and visual observation methods. Data generated was analyzed using analysis of variance (ANOVA), with the Spearman's rank (rs) correlation analysis was used in determining if relationship exist between variables. The number of guinea fowls recorded on the average within the habitats was between 4.0 to 5.0 individuals/km² in the dry and rainy seasons. The food species available differ significantly across locations in the wet (F= 51.7, p = .000), and dry (F= 53.3, p = .000) seasons. The food species identified also differ significantly in the wet (F= 83.0, p = .000), and dry (F= 47.6, p = .000) seasons. There was a positive relationship in the wet (rs = 0.88, p = .000), and dry (rs = 0.71, p = .002) seasons between food species availability and population spread. Variability in food availability was responsible for the population spread across habitats, seasons and locations.

Keywords: Food, feeding, guinea fowl, migration, spread.

1. Introduction

Helmeted Guinea fowls are social birds that are native to Africa. They live in flocks and belong to the family of birds called *Numididae*. The body sizes of these birds are only similar to partridges and are capable of strong flight, but prefer to run most of the time. The head and face of this bird is featherless and has a reddish bony casque on the top of the head (Brown *et al.*, 2001). Their plumage ranges from dark grey to black with white spots, including short wings and rounded tails. The distribution of the birds cuts across countries like Guinea, Mali, Ghana,

Nigeria, Gambia, Sierra Leone, and Burkina Faso (Crowe, 2000). The birds are highly polygamous in nature, and dwell mostly in agricultural fields, dry bushes and woodland savannah. Their occurrence in these habitat types is preconditioned on easy access to trees for roosting, dense bushes for shelter and water for daily activities and other metabolic processes. The meat from these birds is tender and lean, and eggs can be consumed like those from other domesticated birds, which makes them important for both meat and egg production. In the wild they eat mostly insects,

bulbs and seeds, and occasionally scavenge for food in the soil. The guinea fowl is categorized in the IUCN red list as least concerned (IUCN, 2006). The increasing human population, limited food supplies which is a basic necessity have resulted to the movement of the birds to other locations in search of food.

The species is sparsely distributed within its range, with scarce information on the condition of its habitat and feeding behavior (Sajid *et al.*, 2010). The availability of this information will prevent the obliteration of the species population, unnecessary emigration and inform management and policy decisions. An idea of the food availability and feeding pattern of the species will serve as a guide for the achievement of a meaningful strategies for conservation. This research is aimed at assessing the effect of food and feeding pattern on the population distribution of *Nimida meleagris* within the area of study (Whittingham and Evans, 2004).

Methodology

2.1. Study area

The research was carried out in Obubra campus of Cross River University of Technology. The geographical coordinates of the area are 5.45150N and 8.12170E, covering an expanse of 1,115 square kilometers (Ogwa, 2007). The yearly rainfall of the area is 2500mm - 3000mm, with an annual temperature of 25 – 27°C (Adinya *et al.*, 2007).

2.2. Experimental techniques and sampling procedure

The area was partitioned into four locations; North, West, East and South, using the direct and visual observation methods (Hosteler and Main, 2001). These methods were used in agricultural field (AF), Swamp field (SF) and Secondary Shrub land area (SA) in each of the locations, respectively. A total of 10,000 km² land area was walked simultaneously with trained research assistants. Data was collected periodically between mornings (6:00am), and evenings (6:00pm)

during both seasons consecutively for three months (Tariku *et al.*, 2019).

Identification keys, note books, binoculars, biros, stop watches, protective clothing, measuring tape and data recording sheets were the materials used during the survey.

2.3. Estimating population size

For three days within 6 months, data was collected between morning and evening hours. The visual observation methods were used in population estimation, and food materials availability. The size of the population was estimated using the formula

$$D = \frac{n}{2LW} \quad (1)$$

Where L = Total length of transect, n = Number of the species observed, W = Transect width, D = Estimated density of the species (Asokan *et al.*, 2010).

2.4. Determining food availability and feeding pattern

Different food materials and remnants were collected from the different locations where the birds flew or had fed from, during the wet and dry seasons, and identified. Food type and quantity available in the different seasons and locations was determined. Food availability was categorized as available (AV), moderately available (MA), highly available (HA) and not available (NA)

All activities carried out during foraging, including resting, flying, length and site of perching as well as preening were recorded using field observations as described by Shimelis and Afework, 2009. The birds were watched and followed for 15 minutes during the hours of survey.

2.5. Data Analysis

The data generated was analyzed using analysis of variance test (ANOVA) at a significant level $\alpha = .05$, frequency tables and charts. While the Spearman's rank correlation was used to determine the relationship between food availability and population distribution.

3. Results

3.1. Estimated population density of *Numida meleagris*

The mean number of *Numida meleagris* recorded for the dry and wet seasons was 364.

The lowest number was recorded during the dry season, while the highest number was recorded during the wet season (Figure 1).

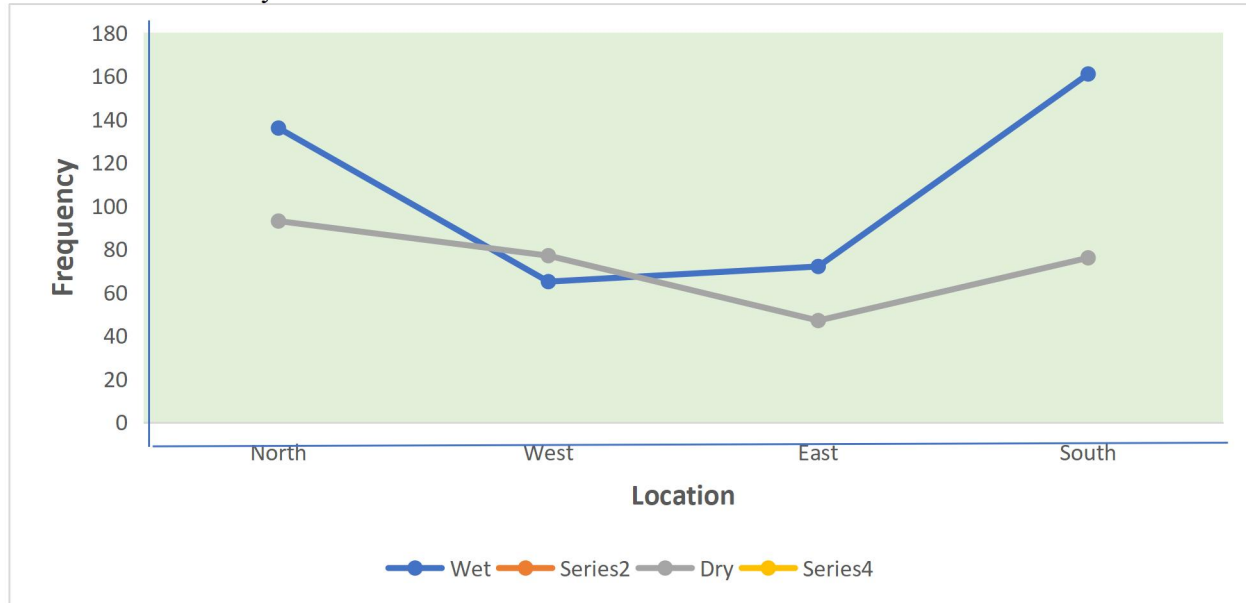


Figure 1: Seasonal and sectorial distribution of helmeted guinea fowl in the study area

3.2. Food availability of helmeted Guinea fowl in relation to seasons

The food items available varied across seasons and locations (Table 1). There were significant

differences in food materials available during the wet season ($F= 51.7, p = .000$) and dry season ($F= 53.3, p = .000$).

Table 1. Food availability (%) of helmeted guinea fowl in the different locations across seasons

	Wet season				Dry season			
	North	West	East	South	North	West	East	South
A	0.37	0.72	0.46	0.81	0.31	0.57	0.41	0.66
MA	0.64	0.58	0.69	0.77	0.78	0.81	0.61	0.58
HA	0.23	0.31	0.15	0.38	0.33	0.11	0.41	0.31
NA	0.13	0.00	0.18	0.21	0.00	0.16	0.04	0.15
Mean	1.37	1.61	1.48	2.00	1.42	1.65	1.47	1.7

A, M, H, N = Available, moderately available, highly available, not available

During the wet season, the helmeted guinea fowls were available in the southern and northern locations and almost not available across locations (Figure 2). For the dry season,

the population of *Numida meleagris* were moderately available in the western location, followed by the northern location.

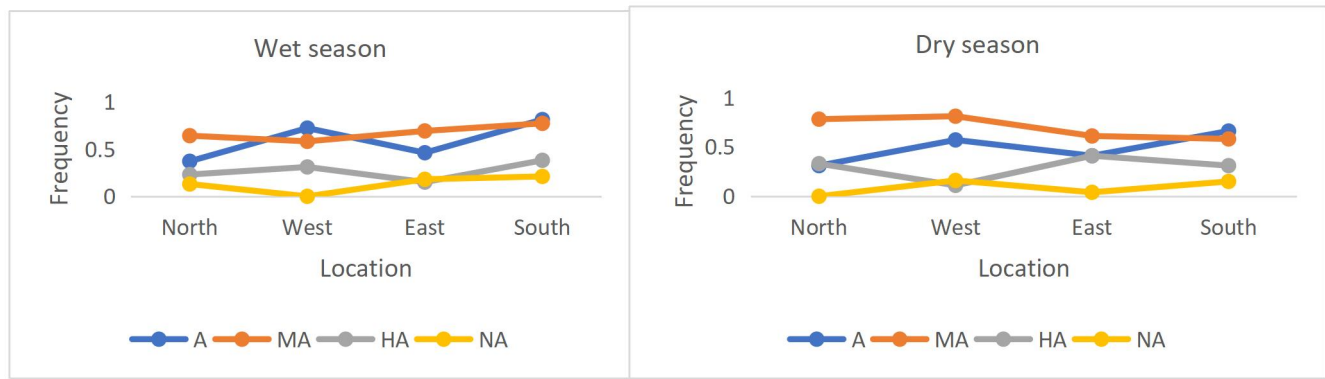


Figure 2: Variability in food availability of *Numida meleagris* according to seasons

For the different food types identified, invertebrates were moderately available, followed by leaves tubers and grains (Table 2). Food species identified however, differed

significantly across seasons the wet season ($F= 83.0, p = .000$) and dry season ($F= 47.6, p = .000$).

Table 2. Percentage feed seasonal variability of helmeted guinea fowl in the study area

	Wet season				Dry season			
	Invertebrates	Tubers	Leaves	Seeds/Grains	Invertebrates	Tubers	Leaves	Seeds/Grains
A	0.54	0.66	0.52	0.71	0.41	0.26	0.32	0.55
MA	0.88	0.68	0.79	0.52	0.51	0.63	0.48	0.74
HA	0.21	0.13	0.32	0.38	0.11	0.33	0.16	0.38
NA	0.08	0.10	0.17	0.11	0.15	0.22	0.13	0.23
Mean	1.71	1.57	1.74	1.72	1.18	1.44	1.09	1.9

A, M, H, N = Available, moderately available, highly available, not available

Invertebrates were moderately available in the northern location, followed by leaves and tubers in the eastern and southern locations during the wet season (Figure 3). For dry season, grains

were highest in the southern location, followed by tubers in western location.

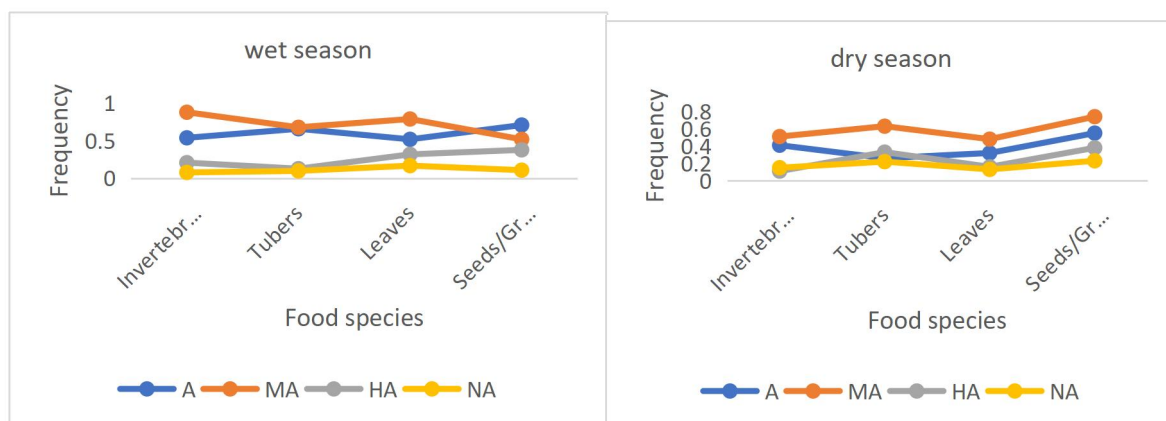


Figure 3: Food species variability across seasons in the study area

During the wet season, there was a positive relationship ($r_s = 0.88, p = 0.000$) between food types availability and population spread (Figure

4). Also, for the dry season, there was a positive relationship between food types availability and population spread ($r_s = 0.71, p = 0.002$).

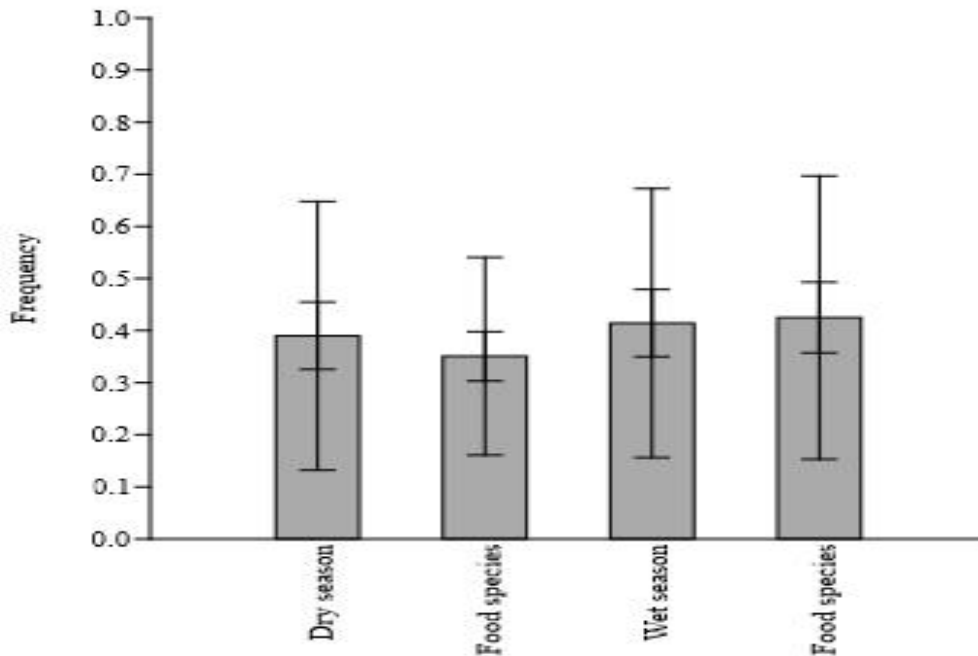


Figure 4: Box plot showing how food availability correlates with population distribution

4. DISCUSSION

Food, water and shelter form the basis of many ecosystems. The most important among these three is food, for without food no ecosystem can function properly. Food availability is a major concern in ecosystem management as many factors both natural and Man-made have forced many species of birds especially helmeted guinea fowl to migrate to different habitats, apparently due to little or no food within their original habitat (Heidari *et al.*, 2009).

The helmeted guinea fowl according to this study were abundant, but this abundance was variable across locations and according to seasons, agreeing with the assertion by Sajid *et al.*, 2010. Wet season however, recorded the highest density, and this is not unconnected with the fact that during periods of rain, food such as invertebrate and tubers is usually more available as corroborated by Asokan *et al.*, 2010. The southern and the northern location recorded the highest numbers during the wet season, a complete deviation from the work of Brown *et*

al., 2001, which recorded more species during the dry season.

However, the low density recorded in other locations may have been due to anthropogenic activities such as hunting and habitat disturbance. Though the southern and western locations had a greater number of the species, the species was recorded in all the locations, in conformity with bird's ability to move freely in search of food.

Invertebrates were the most available of the food species the helmeted guinea fowl was identified to consume. However, seeds and leaves were more during the dry and wet season, respectively. This variability in food availability was due highly to seasonal variability, habitat changes and dispersal, in line with assertion of Pennington and Blair., 2011.

The strong positive relationship that exists between food availability, population size and population spread is due to the fact that food availability is a prerequisite for reproduction,

healthy populations, and determines migration pattern in species, especially birds, and in agreement with the work of Tewodros and Afework., 2013.

5. Conclusion and recommendation

The sustainable and productive capacity of ecosystems is dependent on healthy habitats, which provides the basic requirements of wildlife species. These populations utilize these habitats for food, shelter and water for daily activities and other metabolic processes. The distribution of food species in isolated locations and habitats creates alternatives for wild animals especially birds to migrate to areas where food is available, as was the case with helmeted guinea fowl in the study area. The survival of these species is dependent on equitable distribution of food across locations and habitats, which wasn't the case in this study. This scattered distribution of food species occasioned by vagaries of weather and human activities can be ameliorated through the establishment of a buffer zone with a view to preventing farming and poaching activities from taking place. Engagement and massive sensitization of the local people can in addition provide a long term solution to the problem. Supplemented feeding through the growing of forages in a rotational grazing system can also be a considerable option.

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