



Studies on Helmeted Guinea Fowl (*Numida meleagris* - L) Population with reference to Fragmented Micro Habitats in Gondar Woreda of Ethiopia

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Abstract

This study was conducted from three fragmented micro habitats in Gondar woreda viz., Gendma, Mankura and Genfokuch mountains during rainy and post rainy seasons of the year 2011. The results of this study shows difference in monthly and seasonal variations in wild helmeted guinea fowls population. The overall maximum density per hectare (7.14 ± 1.96) was recorded from Mankura mountain and the minimum density per hectare (2.02 ± 0.51) was recorded from Gendma mountain. The results of monthly density vary between the three mountains. In Gendma mountain it peaks during the month of October and falls during November. In Mankura mountain the highest and lowest density was observed during the month of December and July respectively. The density of guinea fowls in Genfokuch mountain was highest during the month of November and lowest during July. The seasonal variations also found in wild fowls during this study period, the maximum density per hectare was recorded from the Mankura mountain for both the seasons i.e. 5.74 ± 0.95 and 8.54 ± 1.70 during rainy and post rainy seasons respectively. The minimum density was recorded from the mountain Gendma for both the seasons i.e. 2.13 ± 0.30 and 1.91 ± 0.72 for rainy and post rainy seasons respectively.

Key words: Helmeted Guinea Fowl, *Numida meleagris* Gendma, Mankura, Genfokuch, Micro habitat, Gondar woreda.

Introduction

Guinea fowl is believed to have evolved from a francolin-like Asiatic ancestor (Ghigi, 1905; Sibley and Ahlquist, 1972) but it is believed that the evolution, radiation and development to modern forms occurred solely in Africa (Cracraft, 1973; Oslon, 1974). Of the five world Galliformes, it is only the guinea fowl, Numidinae, which is entirely endemic to Africa (Delacour, 1977). Guinea fowl has been classified into four genera (*Agelastes*, *Guttera*, *Acryllium* and *Numida*), six species and 16 subspecies. The major genera of guinea fowls can be distinguished by the lateral views of the head, neck and collar region as well as by the biome they occupy. The *Numida* is the genera of all the helmeted guinea fowls found ubiquitously distributed throughout the African savanna outside desert, Mediterranean and montane areas. The helmeted guinea fowl is the best known of the guinea fowl bird family. It is a large bird (53 – 58 cm) with a round body and small head. They weigh about 1.3 kg both males and females are around the same size. The body plumage is gray-black spangled with white dots.

There are three main genders of the Numidae family in Africa. These are Royal guinea fowl that has only some feathers on the nape of the neck, distributed in Somalia, Tanganyika and Zanzibar regions. Crested guinea fowl found in the African tropical forest and helmeted guinea fowl, that has been introduced all over the world from West Africa. Guinea fowl have been domesticated and kept for many centuries and are valued for their eggs and meat. Guinea fowl are still common in most localities of African continent, however, the Moroccan form (*Numida meleagris sabyi*) is disappearing in the wild. There are many geographical variations of wild helmeted guinea fowls, in total more than 30 races have been described; currently 9 races are generally recognized (Crowe and Elbin, 1987).

Habitat disturbance, egg collection, hunting and predation by co-in habitats of the same ecosystem and man have contributed immensely to population decimation of guinea fowl (Ayanda and Ayeni, 1980). The ultimate cause of the collapse in guinea-fowl populations is habitat fragmentation and destruction, even though the final blow might come from disease, poisons, poaching, etc. Resuscitating guinea-fowl populations to viable levels requires re-creating their preferred habitat, namely weedy, fallow lands with adjacent open spaces. Thus the key to the conservation of this fascinating game bird and, indeed, of Africa's biodiversity as a whole, is maintaining the connections between populations that allow them to rescue one another from extinction. The guinea fowl originate in Africa where they still retain many of their original traits. The helmeted guinea fowl thrive in moderately to heavily human modified landscapes and increased both in number and range during the first two thirds of the 20th century (Crow, 1984).

Starting in the mid-1980s there were reports of wide-scale collapses of guinea fowl populations outside of protected areas (Crowe and Siegfried, 1978). The fundamental cause of guinea fowl population declines and collapses in agricultural landscapes was population fragmentation leading to the undermining of meta-population structure (Ratcliffe and Crowe, 2001). In other words, when local fragmented subpopulations came under threat (for whatever reason) they could not be resuscitated by immigration from adjacent subpopulations. Guinea fowl in human-transformed landscapes do not have a home range as traditionally understood. Their daily and seasonal movements are determined by the dispersion of habitat focal points, roosts, drinking water, and habitat for feeding, dusting, and cover (Prinsloo, *et al.*, 2005). Almost all wild Galliformes have been, or still are being, extensively hunted for subsistence, sport, or trade. The vast majority (90%) of hunters are farmers who hunt for both subsistence and commercial purposes (Feltwell, 1992).

Methods

Study Area

Gondar woreda

The Present research was carried out on helmeted guinea fowls (*Numida meleagris*) in Gondar woreda of Ethiopia. The geographic location extends from 13°9'57" to 13°19'58" north latitude and from 37°54'48" to 38°24'43" east longitude. The elevation of the study area ranges from 1700 to 2200 msl. The temperature varies from 12°C to 30°C and annual rainfall around 1700 mm. (Fig. 1)

Gendma mountain

The basal area of this mountain is 15.68 hectare (Fig. 1A). This mountain ranges from 2109 meters at the base and 2139 meter at the peak in elevation from the mean sea level. The circumference of this mountain is 1478.73 meters from the base. This mountain's vegetation is predominantly eucalyptus (*Eucalyptus globules*) plantation.

Mankura mountain

This mountain is located between Gendma and Gefokuchi mountains. The areal distance from Gendma mountain is 525 meters south. The basal area (Fig. 1B) of this mountain is 8.59 hectare and the basal circumference is 1457.33 meters. The elevation of this mountain ranges between 2100 meters at foot and 2121 meters at peak from the mean sea level. This mountain is predominantly grass land and fewer smaller trees also found on the northern portion of this mountain in the lower slopes. This mountain is acting as the feeding and breeding ground for the guinea fowls.

Genfokuch Mountain

This mountain is located at 382 meters (areal distance) in southwest direction from the Mankura mountain. The basal area (Fig. 1C) of this mountain is 8.14 hectare, and the circumference is 1041.02 meters at base. The elevation of this mountain ranges from 2031 meters (base) to 2043 meters (peak) from the mean sea level.

Data Collection

The population estimation of wild helmeted guinea fowls (*Numida meleagris*) was made in the three different mountainous areas from July to December 2011. The entire study period was divided into rainy (July to September) and post rainy seasons (October to December). These birds were identified by using a field guide book "A photographic guide to birds of East Africa" by Dave Richards, (1995). The males were distinguished by their distinct bright coloured helmet and wattle from the females and the keets by size from the adults. The monthly surveys were made twice a month on foot in all the three mountains. Information gathered on the population by following the sex and age of the birds in to adult males, adult females and keets (young ones less than 3 months) during the early hours of the day from 6:00 am to 10:00 am and late hours of the day from 4:00 pm to 7:00 pm by using the direct count method (Bibby *et al.*, 2000). The birds were enumerated by direct observation of the flocks from the trails.

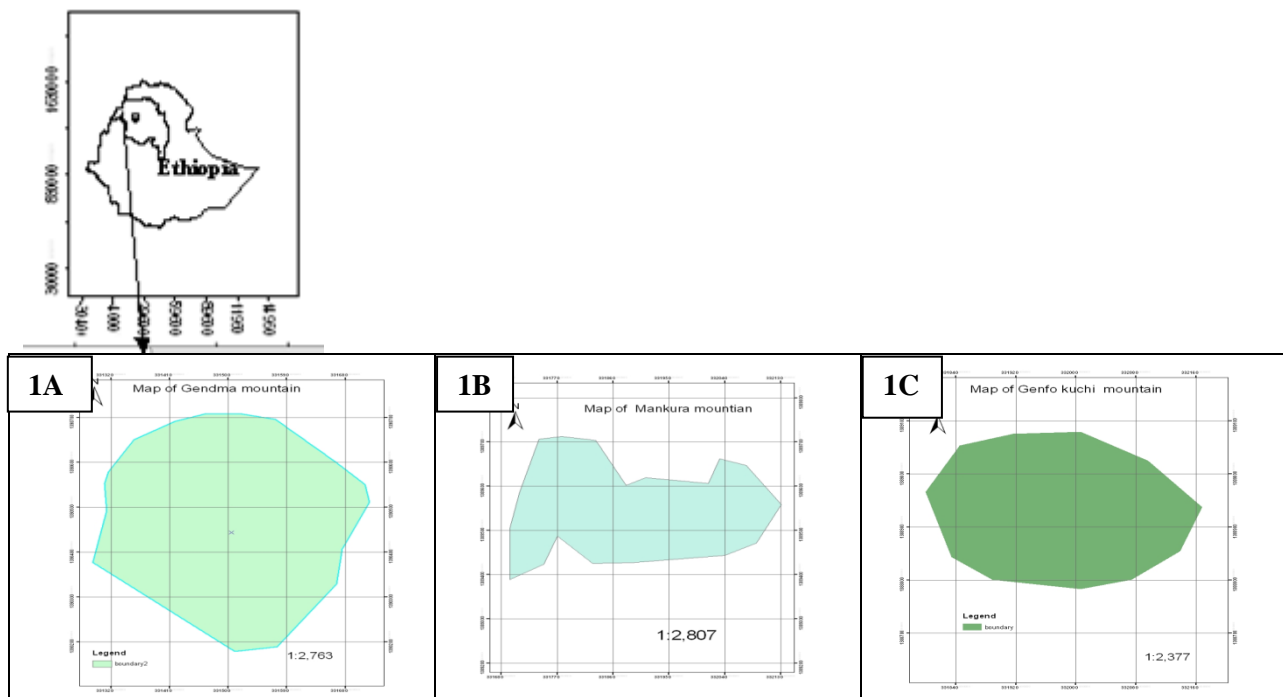


Fig: 1. Map shows the Gondar woreda of Ethiopia and Basal area maps of Study Mountains (1A – Gendma mountain; 1B – Mankura mountain; 1C – Genfokuch mountain).

Results

Wild Guinea fowl Population

The population results of helmeted guinea fowls shows difference in their density during different months and seasons. The results of findings compared and population density was calculated per hectare, the overall density was calculated invariable of months and seasons. The maximum density was recorded from Mankura mountain (7.14 ± 1.96) followed by Genfokuch mountain (3.63 ± 1.46) and the minimum density was from the Gendma mountain (2.02 ± 0.51) (Fig. 2).

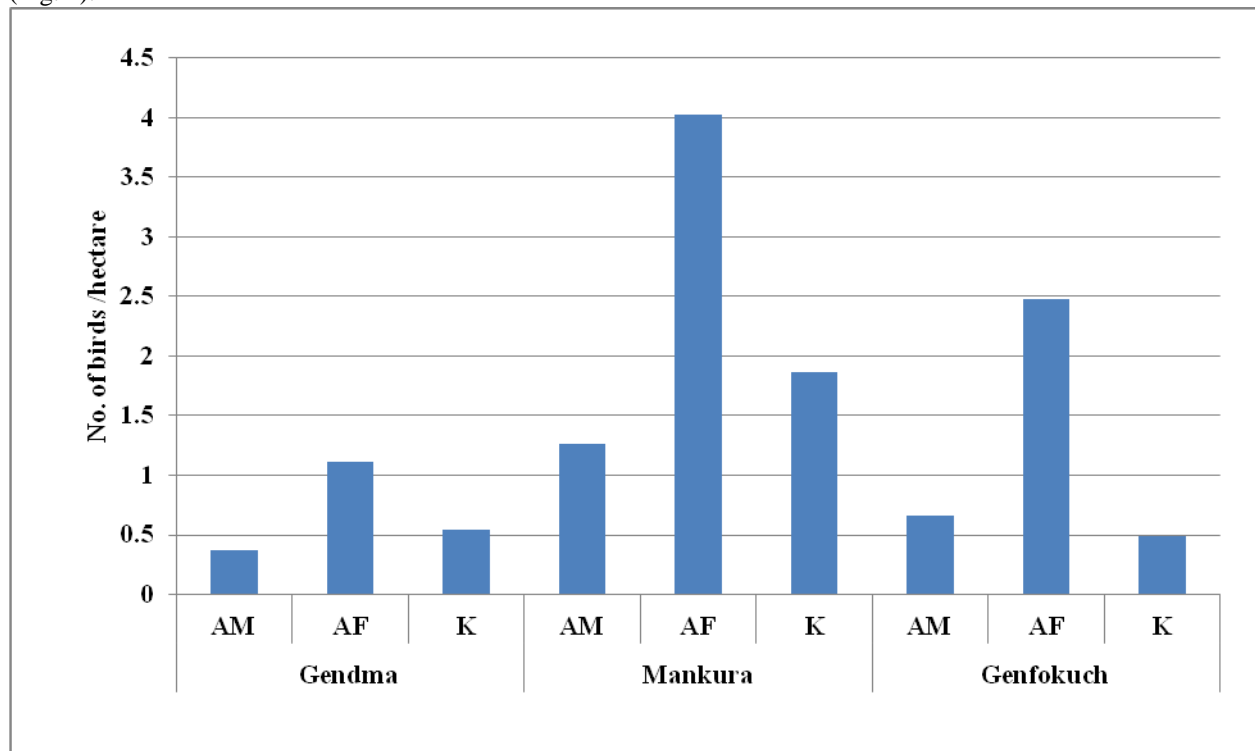


Figure 2. The overall density of wild Guinea fowls recorded during the study period from different mountains in Gondar woreda (Note : AM – Adult male; AF – Adult female; K – Keets)

Monthly Density of Guinea fowl population

The results of monthly density vary between the three mountains. In Gendma mountain it peaks during the month of October (2.74 birds / hectare) and falls during the month of November (1.47 birds / hectare). The highest and lowest density of the guinea fowls were recorded from the mountain Mankura during the month of December (10.48 birds / hectare) and July (4.66 birds / hectare) respectively. The density of guinea fowls in Genfokuch mountain was maximum (5.77 birds / hectare) during the month of November and minimum (1.72 birds / hectare) during the month of July (Table 1).

Table: 1. Monthly density of Helmeted Guinea fowls (*Numida meleagris*) per hectare recorded during the study period.

Month	Gendma Mountain	Mankura Mountain	Genfokuch Mountain
July	2.23	4.66	1.72
August	1.79	6.17	3.93
September	2.36	6.40	4.42
October	2.74	7.80	3.56
November	1.47	7.33	5.77
December	1.53	10.48	2.33
*Mean	2.02 ± 0.51	7.14 ± 1.96	3.62 ± 1.46

*Mean density derived from 12 replicas

Seasonal Density of Guinea fowl population

The seasonal variations was observed invariable of sex and age in density was given in Table 2, which was maximum for both the seasons in Mankura mountain, *ie.* 5.74 ± 0.95 birds / hectare during rainy season and 8.54 ± 1.70 during post rainy season and minimum for both the seasons in Gendma mountain *ie.* 2.13 ± 0.30 birds / hectare and 1.91 ± 0.72 birds / hectare during the rainy and post rainy seasons respectively.

Table: 2. Seasonal density variations of the Helmeted Guinea fowls (*Numida meleagris*) per hectare

Seasons	Adult Males			Adult Females			Keets		
	GEN	MAN	GEF	GEN	MAN	GEF	GEN	MAN	GEF
Rainy season	0.51 ± 0.17	1.59 ± 0.37	0.78 ± 0.31	1.25 ± 0.32	4.15 ± 0.60	2.58 ± 1.17	0.36 ± 0.63	0	0
Post rainy season	0.23 ± 0.13	0.93 ± 0.35	0.53 ± 0.40	0.96 ± 0.23	3.88 ± 0.76	2.38 ± 1.01	0.72 ± 0.45	3.73 ± 0.82	0.98 ± 0.33

Note: GEN = Gendma Mountain; MAN = Mankura Mountain; GEF = Genfokuch Mountain (Mean density derived from 6 replicas).

Age and sex ratio of Guinea fowls

The ratio of adult males, adult females and keets were made, in Gendma mountain the ratio (adult male : adult female : keets) was observed as 1 : 3 : 1.46 ; in Mankura mountain it was 1 : 3.19 : 1.48 ; and in Genfokuch mountain 1 : 3.76 : 0.74.

Discussion

The results of the present study revealed that the Helmeted Guinea fowl species density differed between sites. Irregular physiographic factors, mainly climatic ones, may affect the population size. Literature abounds with reports on seasonal variation in avian species density (Rice *et al.*, 1980). Various factors may be cited for yearly variations in bird densities *viz.*, predation, intra and inter specific resources, competition, parasites and diseases, habitat availability and weather (Baskin, 1994). However, a rapid survey by Vijayan *et al.*, (1999) in the Nilgiri biosphere reserve showed that bird species density were greatly reduced by human interference factors such as cattle grazing, wood logging, minor forest product collection and hunting and collection of birds. In this habitat, as per our observation these factors are severe; it may affect the population in this area. Normally this species forage and breed in grass lands with shrub species.

Conclusion

It could be inferred that the Mankura maintain habitat is more important for this species. As the Mankura mountain is a grass land, this mountain can support this birds in this area for their existence. As Gendma and Genfokuch mountains are used as roosting sites by this species, these mountains also playing a major role in the existence of this bird species in this area.

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