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Original Article

Increasing Guinea Fowl Eggs Availability and Hatchability in the Dry Season

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ABSTRACT

The study was designed to identify the possibility of making guinea fowls (Numida meleagris) to lay fertile eggs throughout the year and was investigated for nine months. Fifty guinea fowls (growers) consisting of ten males and forty females were purchased and raised to laying stage. At the laying stage, they were fed with commercial layer diet, confined in the day time and opened at 3:00 p.m. to go out and forage until 6:00 p.m. when they were driven back into the pen. Their supplementary feed intake and egg laying performance were monitored during the period. The eggs were artificially incubated to determine hatching rate. The results showed that the fowls' mean supplementary feed intake was 84.5g/fowl/day and laid a total of 3,920 eggs in nine months investigation period by an average of 39 guinea hens. The hatching rate of the eggs was mostly found to be in the range of 66% to 69% but fell sharply to 18% in December at the peak of the harmattan season. It was concluded that good feeding and provision of water ad lib to the guinea fowls were effective means of making them lay eggs even in the dry season. The North – East dry winds (harmattan) which occur annually from November to February, was suspected to have negative influence on guinea fowl egg production and hatchability.

Keywords: Guinea fowls, egg production, Harmattan, incubation, hatching rate.

INTRODUCTION

Guinea fowl (*Numida meleagris*) meat is a delicacy with demand being higher than supply and can be a tool for poverty reduction (Koney, 2004 and Avonyo et al., 2007). In Ghana the bird is reared mostly in the Northern sector. Guinea fowl is a source of ready cash for investment in crop production and purchase of grains to bridge gaps in food shortage before the harvest of the next season starts. It is therefore very influential in food security and livelihood improvement. Culturally, the bird is very important for welcoming important guests, respectable social gifts, funerals, festivals, sacrifices and payment of dowries (Dei and Karbo, 2004). The manure is also used for soil fertility management.

Guinea fowls take six months to reach slaughter weight of 1.5 to 2 kg depending on geographical location and management system (Koney, 2004; Ikani and Dafwang, 2004). The birds lay in cycles of 40 weeks period which coincide with the rainy season and a few weeks after the rains. The local birds can lay about 70 to 100 eggs per year while the improved exotic guinea hens lay an average of 200 eggs per year (Avornyo et al., 2007). However, the free range management system causes low egg collection (Gueye, 2007; Teye and Adam, 2000) due to losses through theft, undetected changes of laying pits and predation. Sachim (2011) reported over 70% egg loss under the free range management system of guinea fowl production.

On hatching of guinea keets, the preferred times are at the beginning of the rainy season (May) and towards the end (October) as the hatchability of guinea fowl eggs increases progressively from March and peaks in June (Gueye, 2007), however, mortality rate is very high due to cold weather and worms infestation (Avornyo et al., 2007 and Karbo et al., 2002). In the dry season, when helminthes and cold weather are relatively less severe, eggs are often not readily available for hatching. Incubation of guinea fowl eggs last for 26 to 28 days with a 68 to 80% or more hatchability with local hen (Dei and Karbo, 2004 and Karbo et al., 2002). Artificial incubation also takes 26-28 days to hatch with 72% and above hatchability (Avornyo et al., 2007). Artificial incubation is being advocated because of its ability of taking large quantity of eggs and produce large number of keets. The natural incubation, which uses local hens mostly has quiet variable hatchability rates and have been reported to include 72.9 % (Gueye, 2007), 64% in Zimbabwe (Saina, 2005), 88%, Binali and Kanengani (1998) and

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as low as 16.4% hatchability in Nigeria observed by Ayeni and Ayenda (1982) relative to the artificial incubation. The quality of eggs, pre - incubation handling and incubation management accounts for these variable hatchability rates (Avornyo et al., 2007 and Gueye, 2007).

The objectives of this work were to identify practical ways of making guinea fowl lay abundant fertile eggs throughout the year, maximized egg collection and therefore, making it available for incubation and other uses at all time and increase hatchability rate to 80% or more using artificial incubation technology.

MATERIALS AND METHODS

Study area

The experiment was carried out at the Animal Research Institute (ARI) of the Council for Scientific and Industrial Research (CSIR) at Nyankpala, in the Tolon-Kumbungu District of the Northern Region. Nyankpala is located on longitude 0^0 58^1 42^{11} W and latitude 9^0 25^1 41^{11} N and at a height of 183 m above sea level and in the dry savanna ecological zone of Ghana (SARI, 2007). It has a unimodal rainfall pattern that begins in May and ends in October. The mean annual rainfall is 1043 mm. Temperatures generally fluctuate between 15^0C (minimum) and 42^0C (maximum) with a mean annual temperature of 28.3^0C. The mean annual day time relative humidity is 54% (SARI, 2007). The area experiences dry cold harmattan winds from November to February and a period of warm dry conditions from March to May. The dry season therefore stretches from November to late April.

Experimental birds and management

Fifty guinea fowls (eight weeks old growers) were purchased and raised to lying age of 32 weeks and investigated for nine months. The growers were fed with formulated growers' diet to the laying stage using local feed ingredients. The layers were then fed with commercial layers feed at 85 g/fowl/day) in locally made feeding troughs. Water was provided *ad lib.* The fowls were also dewormed every two weeks in rainy season and every four weeks in the dry season and given antibiotic treatment when ill health is observed. At the laying stage, the birds were housed and opened at 3:00 p.m. to pick feed in the environs of the station in addition to the commercial layer feed offered to them. The eggs were incubated artificially at 38^oC in a locally fabricated incubator to determine the hatching rate.

Data collection

Data collected during the study were daily feed intake, egg production performance and the hatching rate of the eggs.

Data analysis

Descriptive statistics from SPSS 16^{th} edition computer software program was used in analyzing the data for this study.

RESULTS AND DISCUSSION

Feed intake

The guinea fowls' intake of the supplementary feed was very high (84.5g/fowl/day), all the feed offered was consumed leaving small quantities of fine particles of the feed and some spill over all estimated to be 0.5g/fowl/day. This is more than the 70 to 80 g per bird per day range for guinea fowls reported by Ikani and Dafwang (2004) but within the range of 80 to 90 g per bird per day intake stated by Avornyo et al. (2007) for layer guinea hens.

Egg production and collection

The peak of the guinea fowl egg production occurred between August and October, coinciding with the peak of the rainy season in the savanna zone. A pictorial presentation is made in Figure 1. Same findings were reported by Avornyo et al. (2007) and Dei and Karbo (2004). The egg laying increased from July to September and began decreasing in October as the rain fall ends till February and rises up in March. The decline during this period coinciding with harmattan suggests that the dry and dusty weather conditions might have an adverse effect on guinea fowl egg production.

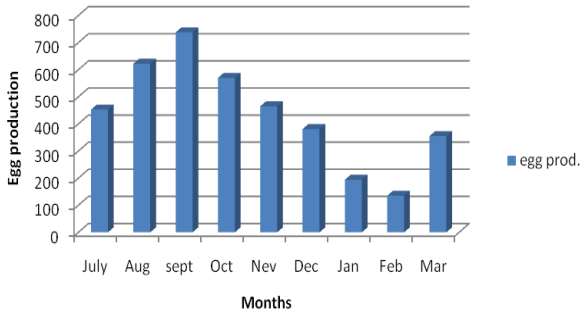

Figure 1: Monthly guinea fowl egg production

A total of 3,910 eggs were laid in nine months period by an average of 39 guinea hens. This gives 100 eggs per guinea hen in these nine months period or 11 eggs/guinea hen/month (0.37 eggs / guinea hen / day). The result is higher than the upper limit of the 70 to 100 eggs range per guinea hen per year reported by Dei and Karbo (2004) as the yearly egg production capacity of the local guinea hens under free range system but lower than 150 to 160 eggs / bird in 8 month period stated by Ikani and Dafwang (2004). This is attributable to differences in management system offered to the fowl. The average daily egg collection was 13 with a range of 10 to 17 eggs per day. The closed range indicates less daily egg production differences and good egg collection, eliminating egg losses through theft, predation or inability of the stockmen to locate laying pits as reported by Teye and Adam (2000) and Gueye (2007).

Eggs hatching rate:

The eggs hatchability was 69% and 66% for October and November, 2010 respectively. This is similar to the 68% hatchability reported by Karbo et al. (2002) and the 70% stated by Avornyo et al. (2007) but lower than 88% reported by Saina (2005). It however, decreased sharply to 18% in December at the peak of the harmattan season. Variation in environmental temperature and wind speed associated with the

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harmattan might have negative effect on the incubated eggs hatchability. Incubation was not done in January and March. Figure 2 shows a pictorial presentation of the hatchability trend of the incubated eggs.

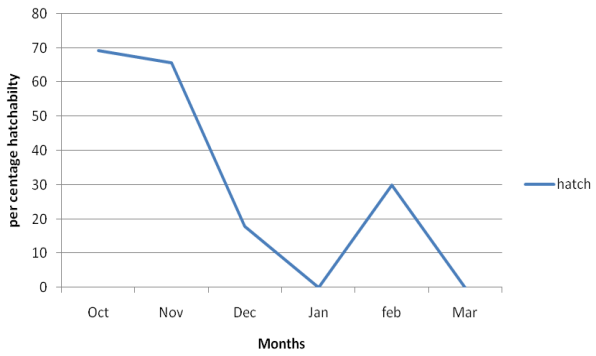

Figure 2: Increased eggs hatchability

CONCLUSION AND RECOMMENDATION

The local guinea fowl layers (pearl) are capable of laying fertile eggs throughout the year when given adequate supplementary feeding with the provision of water *ad libitum*. The hatching rate of 69% or more may be obtained with an artificial incubator if incubation is properly done.

The harmatan weather conditions appear to have adverse effect on guinea fowl egg production and hatchability. Also, the semi-free range system of layers management enhances greater egg collection in its good state.

The egg production of guinea fowls during harmattan period needs further investigation to enable better conclusion to be draw.

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