

## Performance of progeny of wild and domesticated guinea fowl (*Numida meleagris*) in Southern Botswana

S.J. Nsoso<sup>#</sup>, G.M. Seabo, J. Kgosiemang, S.G. Molatlhegi, M. Mokobela, R.G. Chabo and O.M. Mine

Botswana College of Agriculture, Private Bag 0027, Gaborone, Botswana

---

### Abstract

Guinea fowls are adaptable to harsh climatic conditions of Botswana and survive well with limited feed resources for most part of the year. Very little research has been done on guinea fowls in Botswana. The objectives of this study were to document the body and carcass weight, parasites, diseases and behaviour of progeny of wild and domesticated guinea fowls raised under confinement as they grow. Eggs were collected and artificially hatched during the wet season (October-January). Keets (n = 8 and 12 for batches one and two respectively) were raised under deep litter system and fed appropriate commercial chicken feeds *ad libitum* at each stage of growth and development. Water was provided *ad libitum*. Batch one was weighed weekly for 23 weeks, while batch two was weighed weekly for 32 weeks. The guinea fowls from batch two were slaughtered at 16, 24 and 32 weeks of age. The dressed carcass was divided into different portions, which were weighed individually. Data were analysed using procedures General Linear Model and ANOVA for live weight and carcass data respectively in Statistical Analysis System. The live weight of the guinea fowls increased with age from  $0.029 \pm 0.04$  kg at one week of age to  $1.55 \pm 0.05$  kg at 24 weeks of age after, which it became almost constant. The carcass, breast, intestines and back weights were significantly ( $P < 0.05$ ) higher in guinea fowls killed at 24 weeks of age ( $1.30 \pm 0.15$ ,  $0.36 \pm 0.03$ ,  $0.05 \pm 0.01$  and  $0.18 \pm 0.00$  kg) than those killed at both 16 weeks ( $1.03 \pm 0.10$ ,  $0.28 \pm 0.08$ ,  $0.03 \pm 0.00$  and  $0.12 \pm 0.01$  kg) and at 32 weeks of age ( $1.09 \pm 0.12$ ,  $0.35 \pm 0.02$ ;  $0.03 \pm 0.01$  and  $0.14 \pm 0.02$  kg), which were similar. Guinea fowls reached market weight of about 1.5 kg at 20 weeks of age. Therefore, they should be slaughtered between 16 and 24 weeks of age to reduce costs of production. Neither pathogens in the blood samples nor parasites were observed in these birds. Birds were flighty when caught for sampling throughout the study period. A lot of feed was wasted when birds scooped with their beak during feeding. More research on genetic improvement and nutrition to reduce age at slaughter is recommended.

---

**Keywords:** Wild and domesticated guinea fowl, *Numida meleagris*, body and carcass weight, behaviour, parasites, Botswana

<sup>#</sup>Corresponding author. E-mail: [snsoso@temo.bca.bw](mailto:snsoso@temo.bca.bw); Tel: 00267 3650158; Fax: 00267 328753

### Introduction

The domesticated guinea fowl is kept for egg and meat production (Smith, 1990; Ajala *et al.*, 1997; Maganga and Haule, 1998). Meat of the guinea fowl can be distinguished from duck, chicken and turkey meats by its nice gamey taste (Feltwell, 1992). Many hotels and restaurants in large cities around the world serve guinea fowl meat at banquet and club dinners as a special delicacy or as a substitute for gamey birds, grouse, partridge, quail and pheasant (Ensminger, 1980). The meat of the guinea fowl has higher protein (23% vs. 21%), lower fat (4% vs. 7%) content and higher edibility after cooking (80% vs. 65%) than chicken (CAB International, 1987). Therefore it is likely to appeal to consumers more than chicken meat.

Guinea fowl exists in the wild in Botswana, although domestication of the bird has been practised for probably about 5000 years (Appleby *et al.*, 1992). The objectives of this study were to document the body and carcass weight, parasites, diseases and behaviour of progeny of wild and domesticated guinea fowls raised under confinement as they grow.

### Materials and Methods

#### Wild guinea fowls

#### Egg collection and incubation

The wild guinea fowls were hatched from thirteen (13) eggs of wild guinea fowls, which were collected from Mr Mokobela's farm in Gaborone North, Farm 195. The eggs were collected from two nests. Tswana

chickens were used to incubate the eggs. After collection eggs were placed among the eggs of chickens, which were being incubated. Within sixteen days, all the eggs hatched. Keets were collected and placed in a cage in a secure place. This was to make sure that the keets were provided with all the necessary care, and to keep them away from predators.

### **Management of keets**

The keets were kept in a secure place for two weeks and provided with commercial chick starter mash and clean water *ad libitum*. Thereafter these were transferred to a poultry unit, where they were kept in a small house and provided with chick starter mash up to five weeks of age. From six weeks of age up to 6 months they were fed a mixture of sorghum, maize and sunflower *ad libitum*. Clean water was also provided *ad libitum*. At six months of age, the birds were provided with commercial layers mash to prepare them for breeding from 31 weeks onwards (Joubert, 1980; Nwagu, 1997). The guinea fowls were raised under the deep litter system with sawdust spread on the floor of the house. The house was cleaned regularly and sawdust changed.

### **Body weight**

The keets were tagged, and weighed as soon as they were hatched, but tags could not be continued as the birds forced them off by pecking on them, so no other identification method was then used. Keets were weighed on weekly basis from week 1 till week 9. After 9 weeks two keets died from haemorrhage due to crushing of some internal parts such as the liver, which was due to the birds hurting themselves because of their flighty behaviour when they were caught for weighing and blood sampling. Therefore, the weekly weighing was discontinued.

### **Blood parasites**

Blood samples were collected periodically to check for parasites and pathogens using standard procedures.

### **External Parasites**

During weighing the guinea fowls were observed visually for infestation by external parasites.

### **Behaviour**

Behavioural patterns were observed as birds were feeding and during the weighing periods.

### **Domesticated guinea fowls**

A total of 36 guinea fowl keets were donated at hatching by collaborating farmers to Botswana College of Agriculture. The management, measurements and observation of parasites and behaviour were the same as for the wild guinea fowls above.

At approximately 9 months of age the wild guinea fowls ( $n = 11$ ) and domesticated guinea fowls ( $n=36$ ) were mixed and run as a single mob under intensive system, with plenty of space for exercise. The birds were provided with commercial layers mash and water *ad libitum*.

### **Egg Production**

During the breeding season, October to March, eggs were produced. These were collected and artificially hatched in an incubator. The keets were managed following the procedure above. Two batches ( $n = 8$  and 12 for batches one and two respectively) were raised from October 2001 to June 2002.

### **Measurements and observations**

Weight and behaviour were recorded on weekly basis for 23 and 32 weeks for batches 1 and 2 respectively.

### **Carcass data**

This was recorded from batch two only. The first birds were slaughtered at 16 weeks of age. After that birds were slaughtered after every eight-week interval up to week 32. Four guinea fowls were killed during each slaughtering period, comprising 3 females and 1 male. After dressing, all individual parts were weighed including the offals as reported in Table 1.

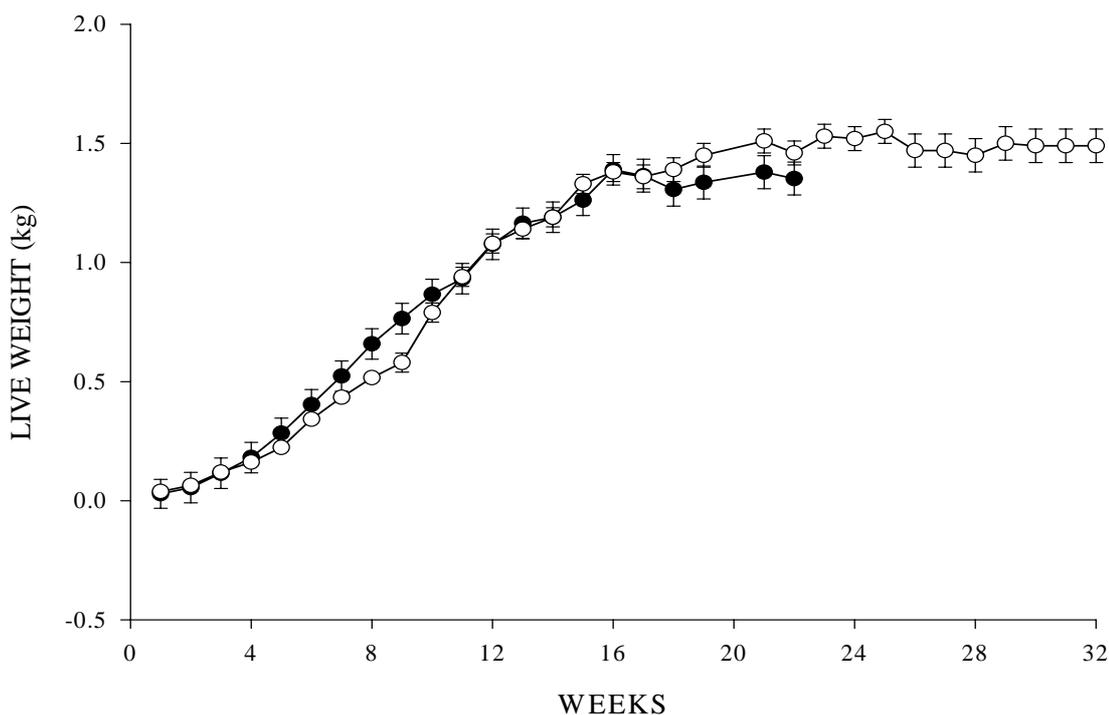
### Statistical Analysis

Procedures General Linear Model (GLM) and ANOVA in Statistical Analysis System (SAS, 1999-2000) were used to analyse live weight and carcass data respectively. GLM was used because the number of observations varied over the study periods. Results reported are least squares means.

### Results and discussion

#### Body weight

Figure 1 shows the growth changes of the progeny of wild and domesticated indigenous guinea fowls between one and 32 weeks of age. These were similar to those reported by Joubert (1980), where the birds also reached an average weight of 1.4 kg at 4 months of age. The slow body weight growth of the guinea fowls in this study is in accordance with previous reports on unimproved stocks of guinea fowls (Ayoringe et al., 1988). Genetic improvement has reduced the slaughtering age of chickens from twelve weeks to eight weeks of age with a live weight of 1.5 kg to 1.6 kg. Comparatively, birds of this study weighed an average of 1.4 kg at 4 months of age. It should be possible that similar reduction in the slaughtering age and increased body weight can be obtained in the guinea fowls through well-planned genetic improvement programmes. This is possible since the heritability estimates for body weight of the indigenous guinea fowl ranges from 35% at day old to 40% at 16 weeks of age and variation in large (Ayoringe et al., 1988). Joubert (1980) and Sanjeev *et al.* (1997) also report high heritability estimates of 47 and 49% for body weight at 8 and 16 weeks of age, respectively.



**Figure 1** Least squares means of live weight of guinea fowls on weekly basis for batches one (●) and two (○) respectively

**Table 1** Weights of different portions of guinea fowl before and after slaughter for the three groups<sup>†‡\*</sup>

Group	LW (kg) LSD=0.21	CW (kg) LSD=0.21	WW (kg) LSD=0.02	SK (kg) LSD=0.005	TH (kg) LSD=0.03	DS (kg) LSD=0.02	BW (kg) LSD=0.04	GW (kg) LSD=0.01	IW (kg) LSD=0.01	LV (kg) LSD=0.01	HW (kg) LSD=0.002	CP (kg) LSD=0.01	NW (kg) LSD=0.02	LG (kg) LSD=0.005	BK (kg) LSD=0.02	SW (kg) LSD=0
1	1.33± 0.12a	1.03±0.10a	0.13±0.01a	0.03± 0.00a	0.14± 0.02a	0.10± 0.01a	0.28± 0.08a	0.03± 0.01a	0.03± 0.00a	0.02± 0.00a	0.01± 0.00a	0.02 ±0.01a	0.07±0.01a	0.01±0.00a	0.12±0.01a	0.01±0.00a
2	1.46±0.11a	1.30±0.15b	0.14±0.01a	0.03±0.00a	0.17±0.02a	0.12±0.01a	0.36±0.03b	0.04±0.01a	0.05±0.01b	0.02±0.00a	0.01±0.00a	0.01±0.00a	0.05±0.01a	0.01±0.00a	0.18±0.00b	0.01±0.00a
3	1.26±0.15a	1.09±0.12a	0.13±0.01a	0.03±0.00a	0.15±0.02a	0.11±0.01a	0.35±0.02b	0.04 ±0.00a	0.03±0.01a	0.02±0.00a	0.01±0.00a	0.01±0.01a	0.06±0.01a	0.01±0.00a	0.14±0.02a	0.01±0.00a

† Group 1, 2 and 3 were slaughtered at 16, 24 and 32 weeks of age respectively

‡ LW, CW, WW, SK, TH, DS, BW, GW, IW, LV, HW, CP, NW, LG, BK and SW are abbreviations for live weight, carcass weight, wing weight, shank weight, thigh weight, drumstick weight, breast weight, gizzard weight, intestine weight, liver weight, heart weight, crop weight, neck weight, lung weight, back weight and spleen weight respectively. LSD is abbreviation for Least significant difference

\* Means with different letters within a column differ significantly ( $P < 0.05$ )

### **Carcass yield**

Carcass, breast, intestines and back weights were significantly ( $P < 0.05$ ) higher from group 2 killed at 24 months of age than the other two groups killed at 16 and 32 weeks respectively. Otherwise other variables did not show any significant difference between groups (Table 1). Guinea fowls killed at 16 weeks of age yielded the lowest in all measured parts, while those killed at 32 weeks were intermediate. The low yield from group 1 showed that the birds were still growing. The different portions of the guinea fowls in group 3 were almost equal to the yield in group 2. This indicated that feeding the guinea fowls after 24 weeks of age did not increase their weight. All the offal were not significantly different at different slaughter ages except the intestines and this could be a biological factor for their early maturity to perform their functions. This was the same for the neck, which is important for feeding. The digestive tract, respiratory tract and other inedible interval parts form a large part of the weight of a newly hatched bird (CAB International, 1987). For a farmer to maximize profits, guinea fowls should be slaughtered around 24 weeks of age.

### **Diseases and Parasites**

Neither pathogens nor internal parasites were observed from the blood samples. No external parasites were found on the birds. This could have been due to the fact that the birds were isolated from all other species of birds immediately after hatching onwards. Usually guinea fowls are subject to the same diseases as chickens although they show greater resistance than the latter species (Joubert, 1980).

### **Behavioural patterns**

Guinea fowls even though they were kept under the intensive system did not change their flighty behaviour; they flew about when they were caught for weighing and blood sampling. The fowls also made a lot of noise each time somebody was passing or entering the poultry house. A lot of feed was wasted when birds scooped with their beak during feeding.

### **Conclusions**

The indigenous guinea fowls were found to have slow growth and hence reached market weight late. The slaughter age was estimated to be between 16-24 weeks of age at an average carcass weight of 1.30 kg. The guinea fowls also yielded more in terms of meat and other carcass variables between 16 and 24 weeks of age than other ages. Neither pathogens in the blood samples nor parasites were observed in these birds. The guinea fowls were flighty when caught for sampling throughout the study period. Feed was wasted by the guinea fowls scooping with their beak during feeding. More research should be done on indigenous guinea fowls kept under different management systems in order to determine the most profitable system and also on genetic improvement in order to reduce time taken for the birds to reach market weight.

### **Acknowledgements**

The authors would like to thank the Department of Wildlife and National Parks for issuing out the permit to collect eggs in the wild and collaborating farmers for donating keets. The Botswana College of Agriculture is thanked for providing the funds.

### **References**

- Ajala, M.K., Nwagu, B.I. & Osuhor, C.U., 1997. Socio-economic of free-range guinea fowl production among agropastoral Fulani women in Giwa local government area of Kaduna state, Nigeria. *International Journal of Tropical Agriculture (India)* 15, 37-44.
- Appleby, M.C., Hughes, B.O. & Elson, H.A., 1992. *Poultry Production systems, behaviour, management and welfare*. CAB International. pp. 6-8.
- Awotwi, E.K. & Boohene, Y.G., 1992. Haematological studies on some poultry species in Ghana. *Bulletin Animal Health Production Africa* 40, 65-71.
- CAB International, 1987. *The technical centre for agricultural and rural co-operation. Manual of poultry production in the Tropics*. Cambrian News, Ltd, Aberystwyth, U.K. pp. 111-11.
- Ensminger, M.E., 1980. *Poultry Science*. The Interstate Printer and Publishers, Inc, Illinois, U.S.A. pp 398-399.
- Feltwell, R., 1992. *Small-scale Poultry keeping. A guide to free-range poultry production*. Faber and Faber Ltd. pp. 142-143.

- Joubert, J.J., 1980. J.1.3 Breeding, selection and AI in guinea fowl. Poultry J.1.3. 1980. Farming in South Africa.
- Magaga, S.L & Haule, K.S., 1998. The domestication of guinea fowl: a case of Morogoro Municipal, Tanzania. *Nature-et-Faune (Ghana)* 14: 14-28.
- Nwagu, B.I., 1997. Factors affecting fertility and hatchability of guinea fowl eggs in Nigeria. *World Poultry Science Journal* 53: 279-286.
- Nwagu, B.I. & Alawa, C.B.I., 1995. Guinea fowl production in Nigeria. *World's Poultry Science Journal* 51(3), 261-270.
- Oyoringe, K.L., Oleyemi, J.A. & Ayeni, J.S.O., 1988. Growth performance of four indigenous helmeted Guinea fowl varieties (*Numida meleagris* Galeata Palla) in Nigeria. *Bulletin Animal Health Production Africa* 36, 356-360.
- Sanjeev, K, Harpreet, Sharma, R.D., Kumar, S. & Singh, H., 1997. Prediction of annual egg production on the basis of part record egg production in guinea fowl. *Indian Journal of Poultry Science* 32(2), 122-125.
- SAS, 1999-2000. SAS<sup>®</sup> User's Guide Version 8.1. SAS Institute Inc., Cary, NC.
- Smith, A.J., 1990. *The Tropical Agriculturist: Poultry*. McMillan Publishers, Ltd. pp. 20-21.