# EXTERNAL CHARACTERIZATION OF FOUR INDIGENOUS HELMETED GUINEA FOWL VARIETIES

*(Numida meleagris galeata* Pallas 1882) IN NIGERIA

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## ABSTRACT

**The physical charactersstics of 338 indigenous helmeted guinea fowls at 28 and 52 weeks of age were described. Four main colour types or varieties recognised were Ash (Lavender), Black, Pearl (Grey) and pure White. Body weights averaged 1.15 ± 0.03kg and 1.34 ± 0.05kg at 28 and 52 weeks of age respectively for the guinea cocks and 1.07 æ 0.04kg and 1.29 æ 0.06kg at 28 and 52 weeks respectively for the guinea hens. The overall mean body weight for the entire population was 1.1 ± 0.4kg at 28 weeks of age and 1.31 ±0.07kg at 52 weeks of age. Body weights were significantly (P< .05) bigger at end of laying (52 weeks) than at point of lay. The males at each age and in each variety also had larger body weights than the females. The guinea cocks had slightly longer body (43.1 vs 42.6cm), keel (14.8 vs 14.4cm), wing (20.3 vs 20.2cm), shank (8.4 vs 7.9cm), drum stick (13.1 vs 12.4cm), thigh (9.9 vs 9.6cm), toes and claws, wattle (3.0 vs 2.6cm), jhelmet (3.7 vs 3.2cm), beak (2.7 vs 2.5cm) and larger body girth (30.3 vs 29.4cm) than the guinea hens. About 21.14 and 24.16% of the neck of the males and females respectively were devoid of feathers. Colour of the naked portion of the neck was bluish-black and bear long hair like filoplumes on the dorsal region. The colour of the beak was light brown in all the birds. All the Black and White birds had light brown shanks while 28.9 and 37.5% of the Ash and Pearl birds, respectively had partly brown and partly grey shank. 62.5 and 28.6% of the Pearl and Ash birds respectively, had brown shanks while 42.6% of the Ash birds ha dgrey shank. The colour of the wattle was red in all the birds. The great variation in the various parameters measured and weighed suggests that they can probably be used in selection and hence genetic improvement of the local helmeted guinea fowl.**

Keywords: Guinea fowls, body weight, plumage, conformation.

## INTRODUCTION

The guinea fowl family (Numididae) embraces many wild species that are endemic and widely distributed in Africa. The specie *Numidameleagris galeata* Pallas 1882) is restricted in distribution to the West African guinea savanna and sahel zone. This specie together with the crested guinea fowl, Guttera edouardi, are the two species found in Nigeria. The peculiar feature of the former species is the presence on the head of a bony process called the helmet (Platel). Other species have either a crest of feathers or the head is completely bare like in vultures.

Information on the helmeted guinea fowl is scanty. Though attempts to increase animal protein intake have largely focused on poultry, this has relied mainly on their importation as day old for either meat or egg production. Systematic evaluation and improvement of the native breeds according to agreed standards of conformation and productivity relevant to local conditions have received little or no attention.

In order to effectively improve the indigenous guinea fowl, information on its characteristics and conformation will be required as these can form the basis for selection and genetic improvement. Infact breeders often determine the heritabilities of such body parts as body weight, body girth, depth and length, keen length and shank length and thickness (Kinney Jr. 1969, Maciejowski and Zieba, 1982) in order to determine their correlation with carcass yield and or egg production.

If the indigenous guinea fowl is to be used as a pilot animal for increasing animal protein supply in the country, information on its physical characteristics or conformation, as this study sought to do, would be required for efficiently planning selection and genetic improvement programmes.

TABLE 1: VALUES OF SOME PHYSICAL PARAMETERS IN FOUR LOCAL HELMETED GUINEA FOWL VARIETIES (MEAN " S E)

| Variety | Sex | Body wt. (g) 28 weeks | Body wt. (g) 52 weeks | BL (cm) | BG (cm) | KL (cm) | VL (cm) |
|---|---|---|---|---|---|---|---|
| Ash | Male | 1144.4 ± 80.7 | 1278.6 ± 115.3 | 43.5 ± 3.9 | 29.6 ± 1.6 | 14.8 ± 1.1 | 20.3 ± 2.1 |
| | Female | 1075.1 ± 88.2 | 1147.3 ± 95.8 | 43.6 ± 4.2 | 28.6 ± 1.4 | 14.3 ± 1.0 | 20.3 ± 2.8 |
| | All | 1098.9 ± 81.1 | 1198.3 ± 105.2 | 43.7 ± 3.8 | 28.9 ± 1.2 | 14.5 ± 0.8 | 20.3 ± 2.7 |
| Black | Male | 1096.3 ± 94.4 | 13010.7 ± 166.2 | 41.0 ± 2.7 | 30.0 ± 1.0 | 14.5 ± 0.9 | 19.6 ± 1.4 |
| | Female | 1003.9 ± 87.3 | 1 243.3 ± 184.5 | 41.8 ± 2.2 | 29.5 ± 1.2 | 14.2 ± 1.2 | 19.4 ± 1.3 |
| | All | 1042.8 ± 88.2 | 1265.6 ± 175.8 | 41.2 ± 2.5 | 29.8 ± 1.1 | 14.4 ± 1.3 | 19.5 ± 1.6 |
| Pearl | Male | 1170.6 ± 105.1 | 1469.4 ± 204.3 | 44.3 ± 2.6 | 30.8 ± 1.4 | 15.1 ± 0.8 | 20.9 ± 1.5 |
| | Female | 1084.3 ± 161.3 | 1429.6 ± 217.0 | 42.5 ± 3.1 | 29.8 ± 1.1 | 15.5 ± 1.4 | 20.7 ± 1.6 |
| | All | 1116.4 ± 141.1 | 1443.0 ± 206.9 | 43.2 ± 2.6 | 30.3 ± 1.3 | 15.2 ± 1.2 | 20.7 ± 1.3 |
| Whit | Male | 1109.1 ± 123.1 | 1180.1 ± 144.6 | 42.0 ± 2.8 | 29.4 ± 1.3 | 14.0 ± 0.6 | 19.0 ± 0.9 |
| | Female | 1033.3 ± 112.2 | 1137.6 ± 138.2 | 41.0 ± 2.9 | 30.4 ± 1.5 | 14.3 ± 0.3 | 19.0 ± 0.7 |
| | All | 1057.6 ± 121.5 | 1146.2 ± 141.2 | 41.2 ± 3.1 | 29.8 ± 1.4 | 14.2 ± 0.4 | 19.0 ± 0.7 |
| Overall | Male | $1147.6^{a}$ ± 130.2 | $1333.9^{\alpha}$ ± 165.9 | $43.1^{\alpha}$ ± 3.2 | 30.3 ± 1.4 | 14.8 ± 0.6 | 20.3 ± 1.1 |
| | Female | $1065.5^{b}$ ± 140.4 | $1288.7^{\alpha}$ ± 155.6 | $43.6^{\alpha}$ ± 2.6 | 29.4 ± 1.3 | 14.4 ± 0.5 | 20.2 ± 1.0 |
| | All | 1095.9 ± 148.9 | 1306.8 ± 157.4 | 42.8 ± 2.7 | 9.8 ± 1.3 | 4.5 ± 0.5 | 20.2 ± 1.2 |

Means followed by different letter superscripts differed significantly ($P < .05$)

## MATERIALS AND METHODS

### Experimental birds

65 Ash (44 females and 23 males), 58 Black (34 females and 24 males), 188 Pearl (118 females and 70 males) and 25 White (17 females and 8 males) guinea fowls obtained from hatches of eggs collected from Peasant keepers around New-Bussa, Yelwa, Shagunu and Babana area of the Kainji Basin were used for the work. The birds were raised on the deep litter through out the experimental period. During 0 to 8 weeks of age, a starter diet con taining23.9% crude protein, 2945 koal ME/kg ration, 4.35% crude fibre, and 3.2% other extract was fed. Feed fed during the 9th to 24th weeks of age contained 16.39%crude protein, 8.85% crude fibre, ME of 2855 loal.kg and 3.43% fat. Thereafter a layers mash containing 17.5% crude protein 10.5% crude fibre, ME of 2782 koal/kg and 5.5% fat was given.

### Parameter measured

The birds were weighed at point of lay (28 weeks) and at 52 weeks of age. At 52 weeks of age, the plumage colour and shape of the birds were described using the methods adopted by the American Poultry Association in describing the standards of modern chicken breeds (North, 1978). Apart from the plumage, the head, neck, face, helmet, wattles, eyes, beak, ear lobes, skin, breast, wings, drumstick, thigh, toes and claws of the four varieties were fully described.

Linear body measurements were made using a flexible tape rule graduated in contimetres for body length, body girth and wing length while a pair of vernier callipers were used for the other parts.

The body length (BL) was measured from the anterior point of the nasal openings along the caps and saddle to the tip of the pygostyle. The circuference of the body around the breast region was measured as the body girth (BC). The length of the keel (KL) was measured from the posterior tip of the breast bone to the depression below the crop.

The necks of the live birds were measured (NL), after straightening with one hand by an attendant, along the entire length of the

TABLE 2: CHARACTERIZATION OF THE HEAD AND NECK LOCAL HELMETED GUINEA FOWL VARIETIES (MEAN AND S.E.)

| Variety /Sex | Parameter (cm) NL | DNNL | VNNL | WAL | HH | HL | HW | BEL |
|---|---|---|---|---|---|---|---|---|
| **Ash** | | | | | | | | |
| Male | 17.1±0.42 | 3.1±0.11 | 2.6±0.09 | 3.1±0.23 | 2.0±0.12 | 3.4±0.20 | 2.2±0.11 | 2.9±0.22 |
| Female | 17.1±0.55 | 3.6±0.14 | 3.0±0.13 | 2.6±0.18 | 1.4±0.10 | 3.1±0.18 | 2.1±0.09 | 2.5±0.16 |
| All | 17.1±0.40 | 3.4±0.12 | 2.8±0.12 | 2.8±0.15 | 1.6±0.09 | 3.2±0.19 | 2.1±0.10 | 2.7±0.17 |
| **Black** | | | | | | | | |
| Male | 17.3±0.46 | 3.7±0.14 | 3.0±0.20 | 3.5±0.24 | 2.3±0.13 | 3.7±0.24 | 2.0±0.11 | 2.5±0.20 |
| Female | 17.3±0.46 | 4.3±0.13 | 3.0±0.18 | 3.0±0.13 | 1.7±0.13 | 3.4±0.20 | 2.2±0.20 | 2.5±0.20 |
| All | 17.5±0.60 | 3.9±0.13 | 3.0±0.18 | 3.3±0.14 | 2.0±0.13 | 3.6±0.30 | 2.1±0.20 | 2.5±0.20 |
| **Pearl** | | | | | | | | |
| Male | 18.7±0.80 | 4.1±0.14 | 3.3±0.23 | 2.8±0.22 | 1.7±0.12 | 3.8±0.23 | 2.3±0.10 | 2.6±0.12 |
| Female | 18.9±0.92 | 4.1±0.13 | 3.6±0.26 | 2.6±0.21 | 1.4±0.11 | 3.3±0.18 | 1.9±0.10 | 2.6±0.12 |
| All | 18.8±0.76 | 4.1±0.14 | 3.5±0.24 | 2.7±0.22 | 1.6±0.12 | 3.5±0.23 | 2.1±0.09 | 2.6±0.11 |
| **White** | | | | | | | | |
| Male | 17.4±0.54 | 4.7±0.14 | 3.0±0.22 | 3.1±0.20 | 1.7±0.14 | 3.5±0.24 | 2.1±0.11 | 2.7±0.12 |
| Femela | 17.8±0.80 | 5.7±0.15 | 3.7±0.23 | 2.3±0.19 | 1.3±0.15 | 3.2±0.20 | 2.0±0.10 | 2.4±0.11 |
| All | 17.7±0.77 | 5.5±0.13 | 3.6±0.23 | 2.4±0.20 | 1.4±0.12 | 3.3±0.20 | 2.0±0.10 | 2.5±0.12 |
| Overall | | | | | | | | |
| Male | $17.5^{a}$±0.66 | $3.7^{\alpha}$±0.13 | $3.0^{\alpha}$±0.20 | $3.0^{\alpha}$±0.20 | $1.9^{\alpha}$±0.18 | $3.7^{\alpha}$±0.24 | $2.2^{\alpha}$±0.12 | $2.7^{\alpha}$±0.15 |
| Female | $17.8^{a}$±0.70 | $4.3^{a}$±0.22 | $3.4^{\alpha}$±0.22 | $3.4^{\beta}$±0.16 | $1.4^{\beta}$±0.12 | $3.2^{\beta}$±0.23 | $2.0^{\alpha}$±0.11 | $2.5^{\alpha}$±0.14 |
| All | 17.6±0.65 | 4.1±0.20 | 3.2±0.21 | 2.8±0.19 | 1.6±0.14 | 3.4±0.24 | 2.1±0.12 | 2.6±0.14 |

Means followed by different letter superscripts differed significantly ($P < .05$).

straightened axical skeleton from the base of the skull to the shoulder point. Similarly, the length of the dorsal (DNNL) and ventral (UNNL) surfaces of the neck lacking feathers were measured. The colour of the neck was also observed.

The distance between the foot pad and the hock joint when the tibio-tarsus and tarso metatarsus were held at right angles to each other was measured as the shank length (SL). The colours of the shank were also noted. The lengths of the toes and their claws were also measured. The distance between the joint of each toe with the shank to the toe-claw joint represented the toe length.

The drumstick length (DL) was measured from the hock joint to the tibio-fibula- femoral joint. The length along the entire femur from the tibio-fibula-femoral joint to the ball and socket joint of the femur and accetabulum was measured as the thigh length (YL). The distance between the tip of thephallanges and the coracoid - humerus joint was measured as the wing length (WL).

Helmet height (HH) was measured vertically from its base on the skull to the highest point.

The width at the base on the skull represented the helmet width (HW) while the distance between the base of the helmet on the front of the skull to its tip was measured as the helmet length (HL). The colour of the head was observed.

Wattle length (WAL) was measured as the distance between the tip of the wattle and the base. The colour of the wattles were also noted. The colour and length (BEL) of the beak in each bird were also recorded.

Statistical Analysis

The body weights and the various measurements were each analysed using a one way analysis of variance in a complete randomised design (Steel and Torrie, 1980). The F-test was used to test for significant differences among the four local varieties while thestudent -t-test was used in comparing means of sexes within each variety. The means of each datum and the standard errors were also calculated.

## RESULTS AND DISCUSSION

Plumage of the guinea fowl

The guinea fowl like other birds, is covered with feathers, skin and scales. On basis of plumage colour, there are four distinct varieties of the helmeted guinea fowl (NumidaMeleagris galeata Pallass 1882) in Nigeria. These are the Ash or Lavender (Hausa - Hurudu), Black or Blue-Black (Hausa-Angulu), Pearl or Grey (Hausa- Sake) and White (Hausa-Pararen Zabi).

Depending on the variety, there are many feather colours and colour patterns. While in some birds, certain shapes, colours and sizes of feathers vary with sex as a result of gonadal hormones (North, 1978), there is no striking feather variation in the guinea fowl, Feathers do not cover the body of the guinea fowl uniformly and the head, shank and part of the neck infact lack feathers.

The body of the guinea fowl is covered with a thin skin and except for the specialized areas of the head, neck and shank, the skin of the remainin g part of the body is fairly uniformly coloured. The skin of the White lvariety is light yellow or whitish while that of the other varieties is either greyish or blackish probably due to a high concentration of melanin. The yellow colour according to North (1978) correlates with the amount of xantophyll in the ration although in this instance the influence of genetic differences is apparent. The neck is creamy close to the head, while the remaining portion lacking feathers is bluish-black. The naked portion also carries long hair-like filoplumes on the dorsal surface.

The Ash or Lavender guinea fowl has either a completely ash colour or the ash background is regularly dotted with circular white spots. 64.9% of Lavender birds in this study were of completely ash colour (28.57% of the males and 36% of the females). 35% of this variety also had white feathers at the breast. There are 18 - 23 flight feathers per wing of the Lavender variety and the number is similar in both sexes (21.82 in the males and 20.32 in the females) and wings (21.61 on the right and 22.0 on the left).

The Black variety has a dark vulturine plumage with bluish black tains around the base of the neck (Cape). 44.44% of the Black variety has solid black plumage while the rest has white circular dots on the black feathers. 20.54% of the Black variety also had white feathers at the breast region. The number of flight feathers per wing ranges from 20 - 26 (21.25 in the males and 20.25 in the females, 22.84 in the right wing and 22.44 in the left).

The Pearl variety, the commonest helmeted guinea fowl found in Nigeria, has grey feathers regularly dotted or splashed with white circular dots. 61.90% of the Pearl birds have white breast feathers (75% of the males and 53.85% of the females). The numer of flight feathers ranges from 18-25 (24.35 in the males and 23.98 in the females). The number of flight feathers averaged 24.29 on each of the wings.

The White variety, the rarest of the helmeted guinea fowl in Nigeria, has a completely white plumage and 18 - 25 flight feathers on each wing (20.25 in the male and 21.25 in the male, 20.22 and 20.0 on the right and left wing respectively). The wings, in all the varieties, were short and thinly fleshed.

Though the Pearl guinea fowl with white breast feathers (Hausa-Hankaaka) has been commonly referred to as a variety (Ayeni, 1980, Ogundipe, 1976), observations sin this study revealed that such white breasted 'types' exist also in the Ash (35%) and Black (20.54% varieties. According to Hann (1966), the Pearl guinea fowl with white breast feathers result from crossing Pearl and White guinea fowls. It is therefore likely that the white breasted Ash and Black individuals also result from such matings.

Body size and conformation

TABLE 3: VALUES OF SOME LINEAR MEASUREMENTS ON THE LEG OF FOUR LOCAL HELMETED GUINEA FOWL VARIETIES (MEAN ± S.E)

| Variety/ | Parameter (cm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Toe | | | | Claw | | | |
| Sex | SL | DSL | TL | 1 | 2 | 3 | 4 | 1 | 2 | 3 | 4 |
| **Ash** | | | | | | | | | | | |
| Male | 8.5[a] ± 0.22 | 12.6 ± 0.31 | 9.5 ± 0.24 | 1.9 ± 0.04 | 3.2 ± 0.16 | 4.9 ± 0.14 | 3.6 ± 0.15 | 1.2 ± 0.02 | 1.4 ± 0.04 | 1.6 ± 0.03 | 1.5 ± 0.03 |
| Female | 7.8[b] ± 0.18 | 12.4 ± 0.32 | 9.3 ± 0.19 | 1.8 ± 0.08 | 3.0 ± 0.14 | 4.8 ± 0.16 | 3.3 ± 0.12 | 1.1 ± 0.01 | 1.4 ± 0.03 | 1.4 ± 0.04 | 1.3 ± 0.02 |
| All | 7.8 ± 0.24 | 12.5 ± 0.30 | 9.4 ± 0.23 | 1. 8 ± 0.08 | 3.0 ± 0.13 | 4.9 ± 0.13 | 3.4 ± 0.14 | 1.1 ± 0.02 | 1.4 ± 0.04 | 1.5 ± 0.03 | 1.4 ± 0.03 |
| **Black** | | | | | | | | | | | |
| Male | 8.2[a] ± 0.20 | 12.9 ± 0.33 | 10.4 ± 0.28 | 2.0 ± 0.07 | 3.3 ± 0.13 | 4.6 ± 0.12 | 3.9 ± 0.13 | 1.2 ± 0.01 | 1.5 ± 0.06 | 1.8 ± 0.06 | 1.4 ± 0.04 |
| Female | 7.8 ± 0.24 | 12.3 ± 0.29 | 9.9 ± 0.29 | 2 .1 ± 0.10 | 3.3 ± 0.15 | 4.7 ± 0.13 | 3.6 ± 0.12 | 1 .3 ± 0.03 | 1.8 ± 0.05 | 2.3 ± 0.07 | 1.4 ± 0.03 |
| All | 8.0 ± 0.23 | 12.6 ± 0.32 | 10.2 ± 0.21 | 2.0 ± 0.08 | 3.3 ± 0.14 | 4.6 ± 0.13 | 3.8 ± 0.14 | 1 .2 ± 0.03 | 1.6 ± 0.04 | 2.0 ± 0.06 | 1.4 ± 0.04 |
| **Pearl** | | | | | | | | | | | |
| Male | 8.5[a] ± 0.19 | 13.4[α] ± 0.23 | 10.0 ± 0.29 | 2.2 ± 0.11 | 3.4 ± 0.13 | 5.0 ± 0.17 | 3.9 ± 0.14 | 1.3 ± 0.04 | 1.6 ± 0.03 | 1.7 ± 0.04 | 1.8 ± 0.04 |
| Female | 7.8[b] ± 0.16 | 12.6[β] ± 0.32 | 9.8 ± 0.21 | 2.2 ± 0.12 | 3.3 ± 0.14 | 5.1 ± 0.21 | 3.7 ± 0.12 | 1.3 ± 0.02 | 1.7 ± 0.05 | 1.9 ± 0.06 | 1.7 ± 0.03 |
| All | 8.1 ± 0.18 | 12.9 ± 0.31 | 9.9 ± 0.21 | .2 ± 0.12 | 3.3 ± 0.12 | 5.1 ± 0.18 | 3. ± 0.14 | 1.3 ± 0.03 | 1.6 ± 0.03 | 1. 8 ± 0.0 | 1.7 ± 0.03 |
| **White** | | | | | | | | | | | |
| Male | 8.1 ± 0.16 | 12.8 ± 0.32 | 9.8 ± 0.20 | 1.8 ± 0.10 | 3.2 ± 0.14 | 4.7 ± 0.16 | 3.4 ± 0.12 | 0.0 ± 0.10 | 1.7 ± 0.02 | 2.0 ± 0.04 | 1.6 ± 0.02 |
| Female | 8.2 ± 0.18 | 12.1 ± 0.29 | 9.6 ± 0.19 | 1.9 ± 0.11 | 2.6 ± 0.12 | 4.7 ± 0.18 | 3.3 ± 0.13 | 1.0 ± 0.02 | 1.8 ± 0.03 | 2.1 ± 0.09 | 1 .7 ± 0.03 |
| All | 8.1 ± 0.20 | 12.3 ± 0.31 | 9.2 ± 0.20 | 1.9 ± 0.12 | 2.7 ± 0.12 | 4.7 ± 0.17 | 3.3 ± 0.12 | 0.9 ± 0.12 | 1.8 ± 0.03 | 2.0 ± 0.04 | 1 .7 ± 0.03 |
| **Overall** | | | | | | | | | | | |
| Male | 8.4[a] ± 0.24 | 13.1[a] ± 0.25 | 9.9[a] ± 0.22 | 2.0[a] ± 0.13 | 3.3[a] ± 0.15 | 4.9[a] ± 0.16 | 3.8[a] ± 0.16 | 1.2[a] ± 0.01 | 1.5[a] ± 0.02 | 1.7[a] ± 0.08 | 1.7[a] ± 0.02 |
| Female | 7.9[b] ± 0.22 | 12.4[b] ± 0.32 | 9.6[a] ± 0.21 | 2.0[a] ± 0.12 | 3.1[a] ± 0.14 | 4.9[a] ± 0.17 | 3.5[a] ± 0.14 | 1.2[a] ± 0.01 | 1.6[a] ± 0.03 | 1.8[a] ± 0.07 | 1.5[a] ± 0.03 |
| All | 8.1 ± 28 | 12.7 ± 0.25 | 9.7 ± 0.24 | 2.0 ± 0.11 | 3.2 ± 0.14 | 4.9 ± 0.16 | 3.6 ± 0.14 | 1 .2 ± 0.01 | 1.6 ± 0.03 | 0.8 ± 0.07 | 1.6 ± 0.02 |

Means followed by different letter superscripts differed significantly ($P < .05$).

Values of the various body parameters are shown in Table 1. The guinea fowl has a characteristic blocky shape (Hann, 1966). Probably as a result of feral characteristics both semi domesticated and wild stocks have a compact shape as indicated by the low body girth (28.6-30.8cm), small keel length (14.2-15.5cm) and fairly long body (41.0-44.3cm) (Table 1). The compact or sleek swhape is probably characteristic of the local guinea fowl as this is required for fast running and powerful and rapid flight to escape from predators sespecially in the wild. The body shape as indicated by the values of the body length (BL), body girth (BG) and keel length (KL) was not significantly (p.05) influenced by either variety or sex though the Ash and Pearl varieties had slightly higher values and thus slightly more blocky shape and higher body weight than the other two varieties (Table 1). The females also had sleeker shapes than the males (Table 1) as indicated by the smaller body girth, keel length and body weight. This is in view of the positive correlation betwen body girth, keel length and body weight (Macijowski and Zieba, (1982). By selecting for these physical measurements therefore it should be possible to improve body weights of the Ash and Pearl varieties more rapidly than in the other two. It is likely though that small body size and sleek shape are characteristic of the inddigenous guinea fowl or are adaptive responses to heat stress (Williamson and Payne, 1987). If this is so then body weight of the local guinea fowl can only be moderately improved and the virds may therefore be more suitable for eff production.

Body weight

Body weight (Table 1) was significantly ($P < .05$) influenced by age, variety and sex. The birds were larger (P.05) at 52 weeks of age than at 28. The higher body weights at 52 weeks of age than at point of lay (28 weeks of age) in all the varieties despite the physiological function of egg laying was probably due to the attendant physiological maturity and fat deposition in the adult birds (Nwosu *et al*, 1985). In the wild, adult birds weigh 0.95 ± 0.16kg (Ayeni 1980). Under demonstication however body weights at point of lay ranged from 1004 to 117g (Table 1) and averaged 1065.5 ± 40.4g and 1147.6 ± 30.2g for the females and males respectively. At 52 weeks of age, mean body weights of the guinea hens was 1288.9 ± 55.6g while that of the guinea cocks was 1333.9 ± 65.9g.

Obviously results of the body weight indicate that the local guinea fowl is relatively small bodied and is thus closer to egg laying strains than meat birds. The high variation in body weight in both sexes seems to indicate that through mass selection body weight of the local guinea fowls can be improved at least beyond what were obtained in this study.

Head and Neck

The characteristics of the head and neck of the helmeted guinea fowl are shown in Table 2. Neck length (NL) was not significantly ($P < .05$) influenced by either variety or sex but the Pearl variety had thelongest neck (18.8 ± 1.7cm) while the Ash variety had the shortest (17.1 Ç± 1.4cm). The females had slightly longer neck (17.8 C± 1.7cm) than the males (17.5 Ç± 1.6cm).

One peculiar chaaracteristic of the guinea fowl neck is the absence of feathers on the portion closest to the head. The proportions of the naked portions of both the dorsal (DNNL) and (UNNL) surfaces of the neck are shown in Table 2. The first 23.1% of the dorsal and 18.2% of the ventral portions sof the neck are devoid of feathers but long hair - like filsplumes are found on the dorsal region.

The naked portions expressed as percentages of the neck revealed that a greater fraction of the neck of the white variety (31.07% of the dorsal and 20.34% of the ventral surfaces) lack feather and the females also had longer naked portions than the males (24.16 vs 21.19% of the dorsal and 10.10 vs 17.14% of the ventral regions). Generally, 23.30 and 18.18% of the dorsal and ventral surgfaces of the neck of the helmeted guinea fowl are devoid of feathers.

The peculiar feature of the helmeted guinea fowl is the head which is devoid of feathers and carries o bony structure (Plate 1) called the helmet. A thin light brown scaly skin covers the helmet while the rest area of the head is covered by a creamy white skin.

The following parts are also located on the head: eyes with eye lids, eye rings and eye lashes, ear lobes, wattles, nasal openings and beak. The eyes were bright and alert and the ear lobes small and pinkish. The shape of the head is either triangular or trapezial. The head is small in both sexes but fairly larger and coarser in the male.

The height, width and length of the helmet of the four varieties are indicated in Table 2. There were no significant ($P < .05$) effect of variety on these parameters. The males within each variety however had significantly ($P < .05$) larger helmets than the females. Distinguishing of sexes isa problem in guinea fowl though experienced

keepers often use the size and shape of the head, helmet and wattle, especially in the adults.

The wattle (Table 2) was significantly ($P < .05$) larger in the Black than other varieties and in the males (3.03cm) than the females (2.62cm) and thus can be used for distinguishing sexes. The wattle is fleshy and red in colour though white-creamy patches can be found on it.

The beak in the four varieties (Table 2) appears short (2.4 - 2.7cm) probably indicating that is is used regularly. The beak is brown in colour in the Ash, Pearl and White varieties but lightly pinkish in the Black. Beak lengthwass not significantly (P.05) influenced by either variety or sex though the males tended to have longer beaks (2.69 vs 2.52cm). The beak was longest in the Ash variety (2.7cm) and shortest in the White (2.5cm).

Feet and Neck

The shank of the guinea fowl, like most other birds, is devoid of feathers and covered with scales. However, the ventral surface of the shank is smoother than the dorsal region. The colour of the shank is either black (grey), light brown or different fractions of these.

28.57% of the Ash cocks had grey shanks, 28.57% also had light brown shanks and 42.8% had the upper 60-75% of the shank as light brown while the remaining portion is grey. 90.9% of the Ash hens had light brown shanks while 9.1% had the upper half as light brown and the lower half was grey. All members of the Black variety had light brown shanks.

In the Pearl variety, 62.9% of the cocks had black shanks while 37.5% had black colour at the upper half and light brown at the lower half of the shank. 53.33% of the Pearl females also had black shanks, 20% had light brown shanks and the remaining 26.67% had black upper half and light brown lower half. The White variety had white shanks.

The varying shades of black probably indicates the result of melanic pigment in the dermis and epidermis. The White shank of the White variety thus indicates complete absence of booth yellow and black pigments in the dermis or epidermis.

Shank length was not significantly (P.05) influenced by variety (Table 3) but the males of the Ash and Pearl varieties had significantly (P.05) longer shanks than their female conuterparts. Except for the White variety (8.06 vs 8.17cm), the males had longer shanks than the females. There were no significant (P.05) effect of sex and variety on the drumstick and thigh lengths (Table 3).

There were four toes in the helmeted guinea fowl (Table 3). The spur or hallux as is commonly observed in chickens and turkeys was not observed in the guinea fowl. The toes were brown in colour in the White variety and either brown, black (grey) or a combination of both colours in the other varieties. The length of the toes did not differ significantly (P0.05) both between and within varieties. Except for the first toe in the Black and White varieties and the fourth toe in the Black and Pearl, the males had longer toes.

Each toe terminates in a claw which is brown in colour. Claw length was not significantly (P.05) affected by either variety of sex. Mean claw lengths for all the varieties combined were 1.2, 1.6, 1.8 and 1.6cm for the 1st, 2nd, 3rd and 4th toes, respectively. The generally short, straight and strong claws were probably because the birds were kept on the deep litter and hence continously use the claws in scratching the litter unlike the long, weak and curved claws commonly observed in caged birds as a result of disuse.

Results in this study indicate that the four varieties differ in point of lay and one year body weight and that only slight variations exist in the other parameters. A number of body parts such as shank length, body girth, keel length, breast angle etc. are reported to be fairly highly heritable and to be correlated to either potential carcass yield or egg production abilities in poultry (Macijowski and Zieb, 1982). It should be possible thefore in genetically improving the performance of the indigenous guinea fowl to utilize such data by breeding high producing birds so as to increase animal protein supply in the country.

## REFERENCES

AYENI, J. S. O. 1980. The biology and utilization of the helmet guinea fowl (Numida galeata Pallas) in Nigeria. Ph.D. thesis, University of Ibadan, 345 pp.

HANN, C. M. 1966. A Summary of reported estimates of heritabilities and of genetic and phenotypic corrlations for traits of chickens. Agr. Handbook. No. 363. A.R.S., U.S.D.A. 49 Pages.

MACIEJOWSKI, J. and J. ZIEBA 1982. Genetics and Animal Breeding. Part. B. Genetic Improvement Methods. Elsevier Scientific Publishing Co. Amsterdam, Oxford - New - York. PWN - Polish Scientific Publishers, Warszawa.

NORTH, M. O. 1978. Commercial chicken Production Manual. Avi Publishing Company, Inc. Westport, Connecticut. 2nd edition.

OGUNDIPE, S. O. 1976. The Raising of Guinea Fowl. Extension Guide. No. 83, Poultry Series No 10. AERLS, ABU. Zaria.

STEEL, R. G. D. and J. H. TORRIE 1980. *Principles and Procedures of Statistics. A Biometrical Approach.* McGraw-Hill Book Co. Inc. Second Edition.

WILLIAMSON, G. and W. J. A. PAYNE 1978. *An Introduction to Animal Husbandry in the Tropics.* (3rd ed.) ELBS series, London.