

EFFECT OF AGE AND SEX ON BODY WEIGHT AND BODY DIMENSIONS OF PEARL GREY GUINEA FOWL (*NUMIDA MELEAGRIS* L.)

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Abstract. Sixty pearl grey guinea fowl were investigated. Birds were kept in a closed facility without regard to sex. For the first three weeks, guinea fowl were kept in boxes on plastic mesh floor, and then in straw-bedded pens. They were fed commercial mash diets for turkeys or hens. At the end of 13 and 52 weeks of age, body weight was determined and birds selected for slaughter were subjected to body measurements. As guinea fowl aged, their body weight and body dimensions increased except for lower leg length in males. Compared to 13-week-old males, males aged 52 weeks had significantly higher body weight and highly significantly higher sternum length and chest circumference. As females aged, their body weight, lower leg length and chest circumference increased highly significantly, and sternum length and shank length increased significantly. Males compared to females were characterized by lower body weight at both evaluation times, and by significantly shorter lower leg at 52 weeks of age. The body conformation indices of massiveness, compactness and long-leggedness were higher in older birds.

Keywords: age, body conformation, body weight, guinea fowl, sex

INTRODUCTION

The modern domesticated guinea fowl originates from the wild *Numida meleagris* L., which is native to the steppes of south Africa and Madagascar [Świerczewska et al. 1999]. This species is a member of the class Aves and the Galliformes order, which also includes turkeys, pheasants, partridges and quail.

Guinea fowl are medium-sized birds. Adult birds weigh up to 2.5 kg. The trunk is oval shaped and oblique relative to the ground. Rectrices are carried low and almost fall to the ground (hump-backed posture). The head of an adult bird is about 9 cm long, devoid of feathers, and has light blue skin. Guinea fowl have a brown helmet on their heads: straight in females, larger and sloping in males. The wattle is small and red. Legs are short, dark brown/green, without spurs. The lower leg (tibia) is about 12 cm in length and the shank

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is 8 cm long. Mean body length is 55–61 cm, with wing span of 74–76 cm. Guinea fowl have thick and dense plumage of various colours. Domesticated guinea fowl are predominantly grey (pearl), white, black or lavender (light blue), and their feathers have small white dots (pearling) [Ayorinde 1989, Kozaczyński 1999].

The effect of age on the body weight and body dimensions of guinea fowl was studied by Sergejev et al. [1988], Salez and Du Preez [1997], Saina et al. [2005], Nahashon et al. [2006] Nsoso et al. [2006, 2008] and Fajmilehin [2010]. Biometrical evaluation of guinea fowl raised in Botswana [Nsoso et al. 2006] showed that body weight, body length, neck length, metatarsal length and hip width increased significantly from 5 to 12 weeks of age regardless of the housing system (concrete or earth floor). In another study by Nsoso et al. [2008], guinea fowl body weight, body length, shank length and shank circumference increased significantly from 5 to 45 days of age.

In the literature available to us we found no studies on body measurements of guinea fowl raised in Poland. The aim of the present study was to determine the effect of age and sex on the body weight and body conformation of pearl grey guinea fowl.

MATERIALS AND METHODS

The study was carried out in 2009 at a poultry farm in Wierzchucinek, which belongs to the Agricultural Experimental Station Minikowo. Subjects were 60 day-old pearl grey guinea fowl chicks hatched at the Department of Poultry Breeding of the University of Technology and Life Sciences in Bydgoszcz.

Throughout the experiment, guinea fowl were kept in a confined facility under a controlled environment, without outdoor access. Birds were kept without regard to sex in boxes on plastic mesh floor for the first three weeks, and then in straw-bedded pens (2 groups with 30 birds per group). Guinea fowl were fed a commercial mash diet for broiler turkeys during the rearing period, and a layer mash diet during the egg production period. Birds received a diet containing 24.5% crude protein and 12.15 MJ (2900 kcal) ME to 3 weeks of age, a diet containing 22.6% protein and 12.35 MJ (2950 kcal) ME from 4 to 8 weeks of age, and a diet containing 20.7% protein and 12.55 MJ (3000 kcal) ME from 9 to 16 weeks of age. From 17-30 weeks, birds were fed wheat grain containing 12.0% protein and 12.85 MJ ME. A diet with 16.0% protein and 11.45 MJ (2725 kcal) energy was used during the egg production period.

At 13 and 52 weeks of age, birds were individually weighed using a poultry scales to the nearest 20 g. At weighing, their sex was identified from secondary sex characters (wattle and/or helmet size) and based on random selection of 10 guinea fowl (5 males and 5 females) aged 13 weeks and 14 guinea fowl (7 males and 7 females) aged 52 weeks. After slaughter, plucking and evisceration, sex determination was confirmed based on the sexual organs identified. The birds selected for slaughter were subjected to body measurements. They were tape-measured to an accuracy of 1 mm for length of body: length of trunk with neck (between the first cervical vertebra and posterior edge of the ischium), length of trunk (between shoulder joint and posterior edge of the ischium), chest circum-

ference (behind wings through anterior edge of the keel and middle thoracic vertebra), length of keel (from the anterior to the posterior edge), length of lower leg (along the shin bone) and length of shank (between the hock joint and bottom area of fourth toe at its base). Body weight and body measurement values were used when calculating the conformation indices of massiveness (percentage proportion of body weight in kg to trunk length in cm), compactness (percentage proportion of chest circumference to trunk length in cm) and long-leggedness (percentage proportion of shank length to body length in cm).

The numerical data were analysed statistically to determine arithmetic means (\bar{x}) and coefficients of variation (cv) for the traits studied. Significance of differences between mean values of guinea fowl of different age within the same sex and between males and females of the same age was determined using Student's t-test. Calculations were made using Statistica[®] software [StatSoft 2001].

RESULTS AND DISCUSSION

The analysed pearl grey guinea fowl, which were maintained without selection, had a high genetic potential for meat traits, as evidenced by their high body weights at 13 and 52 weeks. With age, the body weight increased significantly in males (by 388 g) and highly significantly in females (by 476 g) (Table 1). The body weight of 13-week-old males and females accounted for 76% and 72.5% of the body weight of adult (52-week-old) birds, respectively. Similar to a study by Baéza et al. [2001a], males were heavier than females on both evaluation dates. Compared to our study, lower body weight of 13-week-old guinea fowl (980 g) was found by Sergejev et al. [1988] and similar body weight was reported by Nahashon et al. [2006]. Sales and Du Preez [1997] obtained higher body weight in males (1678 g) and females (1656 g) aged 13 weeks compared to birds evaluated in our study. Much higher body weights than in our study were obtained by young slaughter birds improved for meat traits [Leterrier et al. 1999, Baéza 2001b].

The analysis of body dimensions in guinea fowl of different age shows that their body and trunk length increased with age (Table 1). At 13 weeks of age, males had smaller body length (by 0.5 cm) and trunk length (by 0.4 cm) compared to females. An inverse relationship was found for birds aged 52 weeks, when males had longer body (by 0.3 cm) and trunk (by 0.1 cm). Kozaczyński [1999] reported that adult guinea fowl had a body length of 58 cm, which is much more than in our study. Meanwhile, in 12-week-old guinea fowl weighing 1.11 and 1.29 kg, Nsoso et al. [2006] found smaller body lengths (22.79 and 22.61 cm, respectively) than in birds evaluated in our study. The coefficients of variation for both traits analysed on the evaluation dates were small (cv below 6).

With age, there were highly significant increases of chest circumference in males and females and of sternum length in males, and a significant increase of keel length in females (Table 1). The large chest circumference that increased as guinea fowl became older may be indicative of the normal growth and good development of internal organs. The increase in sternum length with age may indicate that breast muscles formed a large proportion of the carcass. Compared to females, males had larger chest circumference

at 13 and 52 weeks of age and longer sternum at 52 weeks. Variation in keel length and chest circumference was small and did not exceed 8% on both evaluation dates.

Lower leg length was the same in males aged 13 and 52 weeks (12.0 cm) but increased by 1.6 cm in females (from 11.1 to 12.7 cm), with a highly significant difference. Adult guinea fowl aged 52 weeks had longer shanks than birds aged 13 weeks. In females, the increase in shank length was significant. Males and females had the same shank length (6.4 cm) at 13 weeks of age and similar shank length at 52 weeks of age (7.0 and 7.1 cm, respectively). Kozaczyński [1999] reports that tibia (lower leg) length is 12 cm and shank length is 8 cm in adult guinea fowl. Nsoso et al. [2006] reported higher shank length in 12-week-old guinea fowl (8.91 and 8.38 cm) compared to the present study.

Table. 1. Body weight and body dimensions of pearl grey guinea fowl

Tabela 1. Masa i wymiary ciała perlic perłowoszarzych

Trait – Cecha		Age in weeks – Wiek w tygodniach			
		13		52	
		♂	♀	♂	♀
Body weight, g	x	1232 ^a	1257 ^A	1620 ^b	1733 ^B
Masa ciała, g	cv	2.4	1.7	11.0	13.5
Body length, cm	x	33.7	34.2	35.0	34.7
Długość ciała, cm	cv	2.5	4.6	3.7	3.8
Trunk length, cm	x	17.9	18.3	18.9	18.8
Długość tułowia, cm	cv	4.7	4.1	1.3	5.2
Chest circumference, cm	x	27,2 ^A	26.2 ^A	31.3 ^B	30.9 ^B
Obwód klatki piersiowej, cm	cv	5.8	6.1	4.0	3.4
Sternum length, cm	x	9.8 ^A	10.2 ^a	11.4 ^B	10.9 ^b
Długość mostka, cm	cv	5.0	2.8	7.5	4.3
Lower leg length, cm	x	12.0	11.1 ^A	12.0	12.7 ^{B*}
Długość podudzia, cm	cv	4.2	2.3	4.8	4.9
Shank length, cm	x	6.4	6.4 ^a	7.0	7.1 ^b
Długość skoku, cm	cv	5.9	5.7	2.0	4.5

A, B – $P \leq 0.01$; a, b – $P \leq 0.05$.

The indices of massiveness and compactness were calculated to be higher in 52-week-old than in 13-week-old guinea fowl. There were highly significant increases in the indices of massiveness and compactness in females, and in the index of massiveness in males. Compared to females, males had higher indices of compactness and long-leggedness at the age of 13 weeks, and higher indices of compactness at the age of 52 weeks (Table 2).

Table 2. Body conformation indices of pearl grey guinea fowl

Tabela 2. Indeksy ukształtowania ciała perlic perlówoszarych

Trait – Cecha		Age in weeks – Wiek w tygodniach			
		13		52	
		♂	♀	♂	♀
Massiveness index, %	x	6.9 ^A	6.9 ^A	8.6 ^B	9.2 ^B
Indeks masywności, %	cv	5.8	5.6	10.6	11.6
Compactness index, %	x	151.9	143.2 ^A	165.6	164.4 ^B
Indeks zwięzłości, %	cv	10.1	10.1	5.0	4.2
Long-leggedness index, %	x	19.0	18.7	20.0	20.5
Indeks wysokonożności, %	cv	7.0	8.4	3.7	6.0

A, B – $P \leq 0.01$.

CONCLUSIONS

The analysed birds were characterized by large body weight on both evaluation dates. The body weight and body dimensions of adult birds aged 52 weeks were higher, indicating that guinea fowl grew after 13 weeks. The indices of massiveness, compactness and long-leggedness were higher in older guinea fowl.

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WPŁYW WIEKU I PŁCI NA MASĘ I WYMIARY CIAŁA PERLIC PERŁOWOSZARYCH (*NUMIDA MELEAGRIS* L.)

Streszczenie. Badania przeprowadzono na 60 perlicach perłowszarych. Ptaki utrzymywano w pomieszczeniu zamkniętym, bez podziału na płęć. Przez pierwsze trzy tygodnie perlice utrzymywano w skrzyniach na podłodze z plastikowej siatki, a później w kojcach na słomie i karmiono je przemysłowymi mieszankami paszowymi dla indyków lub kur. Na koniec 13. i 52. tygodnia życia określono masę ciała, a na ptakach wybranych do uboju wykonano pomiary zoometryczne. Wraz z wiekiem stwierdzono zwiększenie masy i wymiarów ciała perlic, z wyjątkiem długości podudzia u samców. Samce w wieku 52 tygodni w porównaniu z 13-tygodniowymi perlikami miały statystycznie istotnie większą masę ciała oraz wysoko istotnie większą długość mostka i obwód klatki piersiowej. U samic wraz z wiekiem odnotowano wysoko istotnie zwiększenie masy ciała, długości podudzia oraz obwodu klatki piersiowej oraz istotne zwiększenie długości mostka i skoków. W obu terminach oceny samce, w porównaniu z samicami charakteryzowały się mniejszą masą ciała, a w wieku 52 tygodni statystycznie istotnie krótszym podudziem. U starszych ptaków stwierdzono większe wartości indeksów ukształtowania ciała – masywności, zwężłości i wysokonożności.

Słowa kluczowe: masa ciała, perlica, płęć, ukształtowanie ciała, wiek

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