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Original Contribution

WEIGTH DEVELOPMENT AND BODY CONFIGURATION OF TURKEY- BROILER PARENTS BIG-5

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ABSTRACT

Because of the short generation-related period of use, the breeding value of fowl is determined in the earliest age. With regard to selection, the timely evaluation of parents is particularly essential. The aim of the present study was to investigate the production traits of parental turkey line imported and reared in the Hybrid Centre of Poultry Breeding. The live body weight of turkeys aged 4-20 weeks was determined. We evaluated also the following valuable quantitative exterior traits that influence the conformation of the body: stockiness, massiveness and length of the legs. Consequently the following conclusions can be drawn: the growth of BIG 5 turkeys was the most intensive during the 8^{th} – 12^{th} weeks of age. By 20 weeks they reached a live body weight of 9.5 kg. The increase in body parts was regular; the stockiness and massiveness indexes increased due to the more intensive development of the principal productive traits characterising meat production: breast circumference and live body weight.

Key words: turkey, way of breeding, exterior, quantitative indice, production quality, index, correlation.

INTRODUCTION

Because of the short generation-related period of use, the breeding value of fowl is determined in the earliest age With regard to selection, the timely evaluation of parents is particularly essential.

The contemporary turkey breeding industry is showing a progress at a global scale. The turkey is becoming an increasingly preferred source for production of poultry meat.

Some authors (Bachev, N., 1967, 1990; Todorova, V., 1978; Moyseeva, I. G., 1987) have used quantitative exterior traits and the correlations among some body parts and between body measurements and live body weight for improvement of production traits in turkeys.

The authors (Akimov V., 1996; 1986; Kresan J., 1987; Mitrovic S, 1987) emphasized on the possibilities of using body measurements at a younger age for prediction of live body weight of adult turkeys but only after the age of 2 weeks.

The live body weight of turkeys is one of the most important selection traits, determining their meat production quality. The observed levels of the hereditability coefficient of live body weight between 0.44 and 0.61 (Bachev, 1967) allow a rapid improvement of this trait through extensive selection. The live body weight is improved via the metatarsal length or shank length because of the high positive correlation among them (Bachev, 1990). In his studies, the author reports on a stable positive correlation between the live body weight of turkeys and the principal body measurements.

McCartney (cited by Bachev, 1990) has observed a high positive correlation between the live body weight in turkey poults at the age of 8–16 weeks, 16–24 weeks (r=1.0) and 8–24 weeks (r=0.73).

The main selection trait in meat type lines in turkey breeding industry is the breast meatiness. With regard to the simpler and easier control on selection traits (Lalev M., M. Oblakova, 2002, Oblakova M., 2006) it is recommended to use chest circumference for prediction of the live body weight of turkeys. The live body weight, the width and depth of

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the breast and breast circumference are exhibiting a medium, moderate and high correlation respectively that did not change considerably with age (4–6 months). The correlation between the live body weight and breast circumference is the highest and could be used in the selection at a younger age for prediction of live body weight of turkeys.

The set of quantitative exterior traits should be included in breed characteristics (Moysseeva, 1987) and the development of breed standards.

The aim of the present study was to investigate the production traits of parental turkey line imported and reared in the Hybrid Centre of Poultry Breeding. For this purpose, we proposed to do the following:

1. Determination of the live body weight of turkeys at the age of 4, 6, 8, 10, 12, 14, 16, 18, 20 weeks;
2. Determination of some valuable quantitative exterior traits that influence the conformation of the body;
3. Determination of principal selection indexes: stockiness, massiveness, and length of legs.

MATERIAL AND METHODS

The study was performed in 2004 in the selection farm of the Hybrid Centre of Poultry Breeding at the Agricultural Institute, Stara Zagora. Thirty female turkeys *BIG 5*, aged 4-20 weeks, were used. The growing turkey poults were reared under a routine technology in the breeding farm– deep litter, feeding *ad libitum* with commercial feeds in compliance with the age and the type of birds.

In order to establish the phenotype characteristics of BIG 5, measurements of 9 exterior body parameters were performed with a precision of 1 cm: body length, breast circumference (with a band), breast width and depth (with calipers), keel length, shank length, femur length, metatarsal length, total leg length (with a band). The live body weight was determined with a precision of 10 g.

Three principal exterior indices were calculated (in %): stockiness, massiveness and length of legs. Data were statistically processed using the one and two descriptive factor analysis - ANOVA 2000. The arithmetic mean, standard error, criterion and level of reliability of the arithmetic mean were determined.

RESULTS AND DISCUSSION

The results from the study of the age-related dynamics of live body weight are presented on **Table 1**. The data were highly significant. The most intensive growth was observed during the 8^{th}-12^{th} weeks of life – from 152.68% to 162.24% respectively. The relative live weight percentage decreased to 112.67% at the age of 20 weeks.

Table 1. *Live weight of female turkey BIG-5(g)*

Age, weeks	***N 30***	***x ± Sx***	***C %***	***% Live weight vs the previous week***
4		767.00 ± 13.88	2.79	100
6		1128.00 ± 32.11	20.13	147.06
8		1722.26 ± 58.85	22.15	152.68
10		2601.00 ± 98.64	24.87	151.04
12		4220.00 ± 130.81	20.32	**162.24**
14		5973.00 ± 161.05	17.68	141.54
16		7230.30 ± 134.80	10.71	121.05
18		8412.50 ± 134.98	9.08	116.35
20		9478.13 ± 110.87	6.62	112.67

***Significant differences at $p<0.001$

By the age of 20 weeks, female BIG 5 poults weighed 9478.13 g. Compared to the turkeys from the genetic fund, they were superior to all lines with the exception of the Super Heavy (SH) line by 10036.70 g (Oblakova M., 2006).

The diversity of this trait was the greatest during the 10^{th} week– 24.87%. With advancing age, the variation of live body weight in the group decreased and reached 6.62% by the 20^{th} week. The formation of parent groups and the selection of birds on the live body weight trait should be preferably done not later than the 16^{th} -18^{th} week of life. The highest growth intensity during the first 3 months requires paying more attention to the microclimate and the nutrition.

Table 2 shows the age-dependent changes in the principal body measurements from the 6^{th} to the 20^{th} week of age. The data were significant at $p<0.001$.

The variation of body measurements with age

was characterized by stabilization of alterations in body length, shank length, metatarsal length and breast depth after the age of 18 weeks. The parameters of meat productivity of turkeys: breast circumference, keel length, femur length and breast width continued to increase after that age too. The weak variation in the dynamics of all body measurements was noticeable.

The dynamics of body configuration is presented on **Table 3**. The data showed that BIG 5 turkeys were distinguished by their high stockiness index due to the increased breast circumference and stabilization of body length (stockiness index = breast circumference to body length ratio x100). By the age of 20 weeks, it was 213.23%. For comparison, turkeys from the genetic fund, the Super Heavy line, had a stockiness index of 200.76% (Oblakova M., 2006)

Table 3. *Body configuration of female turkey - BIG-5 –(%)*

weeks	***stockiness index***		***massiveness index***		***long-leggedness index***	
	x ± Sx	Vc	x ± Sx	Vc	x ± Sx	Vc
6	168,00 ± 58 ** 10		6,42 ± 0,21***	17,80	179,90± 1,31 ***	17,80
8	157,03 ± 11,24*** 4,4		8,54 ± 0,22***	14,30	175,53± 1,38 ***	14,30
10	161,50 ± 1,55 *** 5,3		11,14 ± 0,32***	16,80	169,13± 1,96 ***	16,80
12	165,75± 1,64 *** 5,5		15,20 ± 0,30***	11,00	164,00 ± 2,31 ***	11,00
14	187,77± 2,46 *** 7,2		20,83 ± 0,50***	13,20	164,87 ± 2,35 ***	13,20
16	180,37± 1,84 *** 5,6		22,27 ± 0,36***	9,10	140,20 ± 3,44 ***	9,10
18	191,97± 1,57 *** 4,5		26,44 ± 0,43***	8,90	150,89± 1,09 ***	8,90
20	213,23± 2,09 *** 5,4		30,21 ± 0,35 ***	6,40	156,80± 1,55***	6,40

****Significant differences at p<0.001; ** Significant differences at p<0.01*

The massiveness index (live body weight to body length x100) increased up to 30.21% due to the same reason – higher live body weight with age and stabilization of body length by the age of 20 weeks.

The long-leggedness index (the ratio of total leg length and body length x100) was most optimal by the age of 16 weeks – 140.20%. Compared to our previous study on the Meat Heavy turkey breed (164,73±1,56) (Oblakova M., 2006), the turkeys from the BIG 5 line had more compact bodies.

With age, the body indices were altered on the account of change in the relative growth of the different body parts.

CONCLUSION AND RECOMMENDATION

The data from the present investigation allowed us to make some principal conclusions about the growth and development of growing turkey poults from the BIG 5 line on the basis of the live body weight and the exterior traits:

1. The growth of BIG 5 turkeys was the most intensive during the 8^{th} – 12^{th} weeks of age.
2. By the age of 20 weeks, they reached a live body weight of 9478,13 g.
3. The increase in body parts was regular; with age, the stockiness and massiveness indexes increased due to the more intensive development of the principal productive traits, characterizing meat productivity: breast circumference and live body weight.

Table 2. *Body measurements of female turkey - BIG-5- (cm)*

	6	***8***	***10***	***12***	***14***	***16***	***18***	***20***
measurements	*x ± Sx Vc*	*x ± Sx Vc*	*x ± Sx Vc*	*x ± Sx Vc*	*x ± Sx Vc*	*x ± Sx Vc*	*x ± Sx Vc*	*x ± Sx Vc*
body length	17,22 ± 0,26 8,25	21,65±0,25 6,37	24,88±0,34 7,40	20,45±0,37 6,79	28,58±0,33 6,51	32,75±0,27 4,34	31,70±0,21 3,72	31,450±0,30 5,18
breast circumference	28.34 ± 0.37 7,09	33,95±0,36 5,83	40,12±0,52 7,15	47,18±0,61 7,08	53,55±0,88 9,02	59,02±0,62 5,73	60,94±0,46 4,25	67,12±0,53 4,35
keel length	8,65±0,12 7,51	10,33±0,14 7,16	11,48±0,17 8,01	13,42±0,19 7,80	14,82±0,81 0,01	15,14±0,15 5,55	16,5±0,12 4,12	17,68±0,11 3,38
femur length	9,32±0,14 8,37	11,28±0,16 7,62	12,39±0,18 8,04	13,5±0,15 6,15	14,77±0,22 8,46	14,57±0,11 4,12	15,36±0,14 4,95	16,27±0,17 5,78
shank length	12,48±0,18 1,01	15,35±0,18 6,51	12,32±0,18 8,04	19,08±0,21 1,16	19,5±0,23 6,67	18,89±0,15 5,29	19,22±0,14 4,21	19,25±0,17 4,83
metatarsal length	9,17±0,14 0,77	11,18±0,14 7,06	12,4±0,18 7,58	13,81±0,19 7,82	13,66±0,20 8,13	13,50±0,11 4,44	13,19±0,11 4,78	13,57±0,13 5,08
total leg length	30,95±0,42 7,46	37,96±0,46 7,26	42±0,56 7,24	46,21±0,51 6,04	47,19±0,25 2,99	46,93±0,25 2,88	47,83±0,24 2,84	49,08±0,27 3,06
breast width	9,05±0,15 0,83	10,97±0,15 7,29	12,39±01,8 7,99	14,33±0,20 7,54	16,49±0,27 9,10	18,05±0,25 7,50	18,19±0,20 5,94	19,8±0,12 3,28
breast depth	10,86±0,17 0,91	13,91±0,18 7,26	15,23±0,19 6,91	78,66±59,53 4,15	19,95±0,17 4,66	21,80±0,30 7,39	22,17±0,21 5,41	19,85±0,18 5,09

****Significant differences at p<0.001*

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