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Comparsion of production performance of two genetic groups of turkeys reared in the Semi-intensive system

Porównanie wyników produkcyjnych dwóch grup genetycznych indyków utrzymywanych w systemie półintensywnym

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ABSTRACT

Production results were compared for two groups of turkeys reared in semi-intensive system. The material included 40 primitive turkeys of the light type and 40 heavy hybrids of the Big-6 line (commercial flock). Females was raised to 14 and males to 22 weeks of life. During the rearing, body weight (g) was controlled individually and feed intake (g) was monitored in groups, in weekly intervals. Significantly higher body weight values (P ≤ 0.01) were reported in both females (8806 g) and males Big-6 (23593 g), compared to primitive turkeys (2418 g and 6589 g, respectively). Big-6 turkeys were also characterized by a faster growth rate. This group compared to primitive turkeys showed also a higher feed intake and lower FCR values. Losses control of the turkeys throughout the rearing period showed a 17.5% increase in the survival rate in the group of primitive turkeys.

Keywords: turkey, genetic group, growth performance, semi-intensive system

STRESZCZENIE

Porównano wyniki produkcyjne dwóch grup indyków, odchowywanych w systemie półintensywnym. Materiał stanowiło 40 indyków prymitywnych w typie lekkim i 40 indyków ciężkich mieszańców Big-6. Indyczki odchowywano do 14. a indory do 22. tygodnia życia. W trakcie trwania odchowu w odstępach tygodniowych indywidualnie kontrolowano masę ciała (g) oraz grupowo spożycie paszy (g). Stwierdzono istotnie większą masę ciała (P ≤ 0,01) u indyczek (8806 g) jak i u indorów Big-6 (23593 g) w porównaniu do indyków prymitywnych (odpowiednio 2418 g i 6589 g). Indyki Big-6 charakteryzowało również szybsze tempo wzrostu, większe spożycie paszy, natomiast niższe wartości FCR. Kontrola śmiertelności indyków w całym okresie odchowu wykazała o 17,5% większą przeżywalność w grupie indyków prymitywnych.

SŁOWA KLUCZOWE: indyk, grupa genetyczna, cechy wzrostu, system półintensywny

DETAILED ABSTRACT

Celem pracy było porównanie wyników produkcyjnych dwóch grup genetycznych indyków w warunkach chowu półintensywnego: ciężkich indyków Big-6, selekcjonowanych z przeznaczeniem do chowu intensywnego i indyków prymitywnych w typie lekkim utrzymywanych od pokoleń w systemie ekstensywnym. Do badań użyto mieszańce użytkowe: 40 indyków Big-6 i 40 indyków prymitywnych. W każdej grupie razem odchowywano osobniki obu płci. Indyczki utrzymywano do 14. a indory do 22. tygodnia życia.

Do końca 5. tygodnia życia pisklęta w obu grupach odchowywano zgodnie z technologią chowu intensywnego. W trakcie przebywania na wybiegach indyki uzupełniały dietę zielonką. W trakcie trwania doświadczenia co tydzień indywidualnie kontrolowano masę ciała ptaków z dokładnością do 1 g i grupowo spożycie paszy z dokładnością do 10 g. Analizowano również przyczyny upadków i brakowań w całym okresie odchowu. Uzyskane wyniki posłużyły do obliczenia w kolejnych tygodniach odchowu: średniej masy ciała (g) i zmienności tej cechy (SE) w obrębie grupy i płci, oraz tempa wzrostu (%) w obrębie grupy i płci, a także w grupach wykorzystanie paszy (*FCR*) (kg*kg^{-1}) i wskaźnik przeżywalności (%).

Najszybciej zwiększały masę ciała i najdłużej utrzymywały na wysokim poziomie tempo wzrostu indory Big-6, a następnie indyczki z tej samej grupy genetycznej. W 14. tygodniu życia stwierdzono wysoko istotnie większą ($P \leq 0,01$) masę ciała u indorów (23592,9 g) i indyczek (8806,2 g) Big-6 niż u indyków prymitywnych (odpowiednio 6589,1 g i 2418,0 g) (tabela 3 i 4). Indyki Big-6 charakteryzowało ponadto szybsze tempo wzrostu, większe spożycie paszy, ale lepsze jej wykorzystanie (mniejsze FCR). Wykorzystanie paszy w grupie Big-6 było niższe o 0,34 kg*kg^{-1} do końca 14 tygodnia (obie płcie) i o 1,85 kg*kg^{-1} od 15 do 22 tygodnia odchowu kiedy w obu stadach pozostawały wyłącznie indory. Kontrola padnięć i brakowań wykazała wysoką przeżywalność w grupie indyków prymitywnych (95%). W grupie indyków Big-6 wartość tego wskaźnika była znacznie niższa i wynosiła 77,5%.

Wyniki badań pozwoliły na potwierdzenie skuteczności selekcji indyków na wzrost i masę ciała. Damme (2003) również wykazał szybsze tempo wzrostu i większą masę ciała u szybko rosnących mieszańców Big-6 w porównaniu z wolno rosnącymi Kelly Bronze. Masa ciała indyków Big-6 nie odbiegała również od wartości tej cechy podawanej przez Krajową Rada Drobiarstwa (2010) dla indyków Big-6 utrzymywanych w systemie intensywnym. Można przypuszczać, że możliwość korzystania z wybiegów nie wpłynęła negatywnie na wzrost ptaków. Podobne wnioski wysunęli Herendy i wsp. (2004). Lepsze wykorzystanie paszy (kg*kg^{-1}) indyków Big-6 sprawia, że odchów tej grupy genetycznej w systemie półintensywnym jest bardziej opłacalny niż indyków prymitywnych. Niższa odporność na choroby (Li i wsp., 2001; Huff i wsp., 2005), problemy lokomotoryczne (Oviedo-Rondon, 2008) i wyższy wskaźnik śmiertelności indyków Big-6 sugeruje jednak na konieczność poszukiwania nowych grup genetycznych, które w półintensywnym systemie utrzymania, charakteryzowałby szybki wzrost, niskie wykorzystanie paszy i wysoki wskaźnik przeżywalności. W przyszłości rozwiązaniem może okazać się wytworzenie mieszańców a nawet rodów i linii indyków z udziałem w zestawach hodowlanych zarówno indyków szybko rosnących jak i prymitywnych.

INTRODUCTION

In Poland, the annual production of turkey meat reaches 345-360 thousands tons, which constitutes ca. 17.6% of poultry meat production, which ranks it second after chicken meat (~72%) - Dybowski (2011). Multi-generation breeding works have led to the development of turkey strains and lines designed for commercial rearing of hybrids with a fast growth rate, high body weight values and a low feed conversion ratio (FCR) (Nestor, et al., 2008). Budnik and Burek (2009) report that only within the last ten years the body weight value of turkey males of heavy lines increased by 13.4%, and that of turkey females by 11%.

Undoubtedly, such a great advance in breeding improves the profitability of turkeys rearing and makes the meat of this species a food product available to an ever increasing group of consumers. Nevertheless, a number of undesirable phenomena are observed along with the increasing body weight of birds, including, e.g., excessive body adiposity and deterioration of the sensory and technological quality of meat (Doktor, 2007; Batkowska and Brodacki, 2011). In addition, there appear health problems linked mainly with loco-motor difficulties (Oviedo-Rondon, 2008) and lower immunity (Li, et al., 2001; Huff, at al., 2005). According to many authors, those faults do not result exclusively from the breeding advance, but also from the mass production in the intensive system (Burs, et al., 2006; Castellini, at al., 2008). Hence, increasing attention is being paid to the search for alternative methods to the intensive rearing system that would enable the rearing of commercial flocks of poultry.

In the case of turkeys, the only solution may be the merging of the intensive rearing with the free range (pasture) one, commonly referred to as semi-intensive system. As reported by Brodacki, et al. (2006), for the first 6-8 weeks of life turkey poults are very helpless and vulnerable to unfavorable environmental conditions. Therefore, at this stage of life they should be reared following guidelines of the intensive system, and already afterwards released to the earlier-prepared free ranges (pastures). Damme (2003) demonstrates, however, that rearing performance of Big-6 turkeys in the semi-intensive system in respect of such traits as body weight, feed intake, and feed conversion ratio is slightly worse than in the intensive system, but nevertheless such a production may turn out cost-effective at increasing prices of thus-produced food products. Nowadays, new breeds, lines or strains of turkeys are searched for that would be better adjusted to conditions of the semi-intensive rearing system. In the USA, the extensive rearing of turkeys is highly developed based on regional breeds referred to as “primitive”. Those turkeys are characterized by a slow growth rate and a low body weight (American Poultry Association, 2001) .

A comparison of the production performance of heavy Big-6 hybrids with primitive turkeys seems unjustified from the economic point of view. The phenotypic similarity to wild turkeys makes, however, that the primitive turkeys may be treated as a control group, useful for instance for the determination of the effect of selection on production parameters. Kamara, et al., (2007) determined the genetic distances between those groups (ca. 0.40), yet data is missing on the comparison of their production parameters that would be examined in parallel under the same rearing conditions.

The objective of this study was to compare production performance of two genetic groups of turkeys under conditions of semi-intensive rearing: heavy turkeys of Big-6

type, selected from generations for intensive rearing, and primitive turkeys of the light type reared from generations in the extensive system.

MATERIAL AND METHODS

The study involved two genetic groups of turkeys, 40 birds each. The control group (C) included primitive turkeys originating from a private farm whose population has never been selected for production traits. The experimental group (E) included commercial Big-6 hybrids originating from a hatchery plant belonging to the Turkey Rearing Centre in Frednowy. In none of the groups were the poults subjected neither to sexing nor to the shortening of beaks, nails or snoods. Before rearing, all poults have been wing-tagged individually.

Up to the end of the 5th week of life, all poults were reared following the intensive rearing technology elaborated by Faruga and Jankowski (1996). Since the 6th week of life, the birds were allowed to use the earlier-prepared free ranges. Stock density at the ranges reached 1 birdx12.5 m², and thus was threefold lower than the density provisioned for that species by Damme (2003). The birds were exploiting the free ranges in the summer period (June – October), using the natural day length (ca 14 h*day -1).

Both groups of turkeys were fed the same basal diets, namely standard feed mixtures by De Haus „Zielona Zagroda" in the four-stage system, and the composition of individual feed mixtures was adjusted to birds' demands at each stage of life (Table 1). The composition of mixtures (Table 1) used was similar to that developed by Jankowski (2005) for young commercial turkeys.

Table 1. Declared by the manufacturer nutritive value of basal diet applied in turkeys feeding depending on their age

Tabela 1. Deklarowana przez producenta wartość pokarmowa mieszanek paszowych zastosowanych w żywieniu indyków w zależności od ich wieku

Parametr Składniki	Age (weeks) Wiek (tygodnie)			
	0-4	5-11	12-15	over 15
EM_N (MJ*kg -1) EM_N (MJ*kg -1)	11.1	11.7	11.9	12.1
Total protein (%) Białko ogólne (%)	26.0	20.1	16.4	15.1
Crude ash (%) Popiół surowy(%)	7.3	5.7	4.4	3.8
Crude fat (%) Tłuszcz surowy (%)	3.3	3.9	4.2	4.3
Crude fibre (%) Włókno surowe (%)	3.8	4.0	3.8	3.9
Methionine (%) Metionina (%)	0.63	0.46	0.39	0.34
P (%)	0.78	0.6	0.47	0.4
Ca (%)	1.3	1.0	0.7	0.5

Feed mixtures for both groups were prepared simultaneously from the same batch of raw materials. Irrespective of the age and genetic group, the birds were fed *ad libitum* throughout the rearing period. Since the first day of life till the end of rearing, both groups were receiving a mineral-vitamin preparation Polfamix B added to drinking water. The preparation was diluted following the producer's recommendations, i.e. 2,5 g*l of water.

Since the 6th week of life, the turkeys were supplementing their basal diet with green fodder while using free ranges. The ranges had earlier been sown with mixes of cereals (mainly with oat, wheat and barley), and wild vegetation was still occurring therein (including e.g. various species of grass, clover, nettle and yarrow). The chemical analysis of vegetation growing on free ranges was conducted with the AOAC method (2005), and the respective results were presented in Table 2.

Table 2. Results of chemical analysis (%) of fresh vegetation growing on free ranges for turkeys

Tabela 2. Wyniki analizy chemicznej (%) świeżej roślinności porastającej wybiegi dla indyków

Dry matter Sucha masa	Crude ash Popiół surowy	Total Protein Białko ogólne	Crude fat Tłuszcz surowy	Crude fibre Włókno surowe
22.31	3.99	4.52	0.74	4.50

During the rearing period (14 weeks in the case of females and 22 weeks in the case of males), body weight of individual birds and feed intake were controlled in weekly intervals. Body weight values were measured exact to 1 g, and feed intake was computed exact to 10 g. The first control measurement was conducted by determining body weight of one-day-old poults before administering the first water and the first mixture to the birds. Results achieved served to calculate the following parameters in the successive weeks of rearing: mean body weight (g) and variability of this parameter (SE) in genetic and sex groups, growth rate (%) in genetic and sex groups, and feed conversion ratio (*FCR*) (kg*kg^{-1}) in groups. In addition, the health status of the birds was monitored over the entire experimental period. Clinical and postmortem examinations enabled determining causes of deaths and health losses. These data were used to calculate mortality rate of the birds (%) in a group.

In statistical calculations referring to body weight values in the successive weeks of rearing consideration was given only to the birds that survived until the end of the rearing. As a consequence, in Big-6 group 14 males and 17 females, whereas in the group of primitive turkeys – 23 males and 15 females remained at the end of the experiment.

Results achieved were elaborated statistically using a one-way analysis of variance and Mann-Whitney test of the SPSS 14.0 statistical package, procedure GLM (SPSS, 2006). Significance of differences was determined for male and female birds between genetic groups. Results were presented in the form of tables and figures.

RESULTS AND DISCUSSION

Tables 3 and 4 present mean body weight values of turkeys in particular weeks of rearing and the significance of differences between genetic groups noted for males (Table 3) and females (Table 4). Even one-day-old poults differed significantly ($P \leq 0.01$) in their body weight values in sex groups. The Big-6 females were heavier than the primitive ones by 8 g (Table 4). In the case of males, the recorded body weight value was also higher in the Big-6 group, by 4.7 g (Table 3).

Table 3. Comparison of body weight (g) the Big-6 turkey males and primitive turkey males in the successive weeks rearing

Tabela 3. Porównanie masy ciała (g) indorów Big-6 i indorów prymitywnych w kolejnych tygodniach odchowu

Weeks of rearing Tygodnie chowu	Big-6 males (n=14) Indory Big-6 (n=14)		Primitive males (n=23) Indory prymitywne		Significance of differences istotność różnic
	LSM	± SE	LSM	± SE	
0	60.6	1.0	55.9	0.8	**
1	137.7	2.9	132.5	2.2	NS
2	316.9	8.6	254.9	6.7	**
3	642.6	20.7	402.7	16.2	**
4	1,140.1	32.7	607.3	25.5	**
5	1,556.1	43.4	696.0	33.9	**
6	2,166.4	62.3	990.9	48.6	**
7	2,992.1	71.3	1,283.0	55.6	**
8	3,757.1	85.1	1,472.0	66.4	**
9	4,712.1	102.5	1,767.8	80.0	**
10	5,944.3	1 39.0	2,110.9	108.4	**
11	7,195.7	154.8	2,401.3	120.8	**
12	8,205.7	170.8	2,752.4	133.3	**
13	9,405.7	184.5	3,026.7	144.0	**
14	10,802.5	200.4	3,371.3	156.4	**
15	12,814.3	221.0	3,717.4	172.4	**
16	14,725.0	233.3	4,128.3	182.0	**
17	16,271.4	246.5	4,515.2	192.3	**
18	17,896.4	262.9	4,858.7	205.1	**
19	19,007.1	274.2	5,208.7	213.9	**
20	20,350.0	237.3	5,604.3	185.1	**
21	21,835.7	246.9	6,123.9	192.6	**
22	23,592.9	249.5	6,589.1	194.6	**

** difference significant at $P \leq 0.01$; NS - difference not significant

** różnica istotna przy $P \leq 0.01$; NS - różnica nieistotna.

According to Applegate and Lilburn (1996), differences in body weight of poults are mainly due to the mass of hatching eggs, which is also determined by the body weight of turkey females (Hocking, 1993). It may be speculated that in the discussed experiment, the differences in body weight of the poults between groups resulted from the origin of birds. In the successive weeks of rearing, except for day 7 of life,

the differences between groups in body weight values of males and females were highly significant (P ≤ 0.01). A lack of the significance of differences in the first week of birds life might have resulted – especially in the case of females – from the difference in the level of variability (ca. 6% in one-day poults vs. ca. 13% in successive weeks). It is also likely that the Big-6 turkeys are more susceptible to stress linked with the handling in the hatchery and transportation to the rearing farm, than the primitive turkeys. This fact may be confirmed by earlier studies of Caver, et al., (2002) and Huff, et al., (2007), which demonstrate that hybrids of heavy lines of turkeys are more susceptible to environmental stress, which is manifested in disturbed feed intake and temporary retardation of growth rate. As it results from Tables 3 and 4, the greatest differences between both males and females from different genetic groups were noted in the last weeks of rearing. In the 14th week of rearing, the Big-6 females were heavier than the primitive females by ca. 6.4 kg (Table 4). The difference noted between males in the 22nd week of rearing was significantly greater and reached ca. 17.0 kg (Table 3).

Table 4. Comparison of body weight (g) the Big-6 turkey females and primitive turkey females in the successive weeks rearing

Tabela 4. Porównanie masy ciała (g) indyczek Big-6 i indyczek prymitywnych w kolejnych tygodniach odchowu

Weeks of rearing Tygodnie chowu	Big-6 females (n=17) Indyczki Big-6		Primitive females (n=15) Indyczki prymitywne		Significance of differences Istotność różnic
	LSM	± SE	LSM	± SE	
0	62.8	0.9	54.8	0.9	**
1	125.9	4.1	114.9	3.9	NS
2	272.6	11.5	218.4	10.8	**
3	553.4	19.0	333.6	17.9	**
4	985.2	28.7	495.0	27.0	**
5	1,283.5	36.8	553.7	34.6	**
6	1,820.6	46.3	773.3	43.5	**
7	2,488.2	55.2	981.3	51.8	**
8	3,063.8	65.7	1,099.7	61.7	**
9	3,831.2	85.1	1,298.0	79.9	**
10	4,812.6	104.4	1,496.0	98.0	**
11	5,667.1	118.5	1,697.7	111.3	**
12	6,568.2	126.8	1,938.3	119.1	**
13	7,492.6	134.0	2,114.0	125.9	**
14	8,806.2	153.3	2,418.0	144.0	**

** difference significant at P ≤ 0.01; NS - difference not significant
** różnica istotna przy P ≤ 0.01; NS - różnica nieistotna

The systematic control of the body weight of turkeys enabled graphical illustration of their growth and growth rate (Figure 1 and 2). As claimed by Mignon-Grasteau and Beaumont (2000), it is the best form of depicting correlations between body weight and growth rate of birds. According to those authors, the course of a growth curve is different for each genetic group of birds. This has been confirmed in the reported experiment. When tracking the course of the curves in figures, the fastest body

weight gains and the highest growth rate maintained for the longest period of time may be observed in the case of Big-6 males, followed by females from the same genetic group. When comparing Figures 1 and 2, it may be seen that the growth curve of Big-6 females runs also considerably higher over the curve characterizing the primitive males. This information confirms the substantial impact of selection on body weight gains, because amongst other poultry species – turkeys are characterized by, most of all, significant sexual dimorphism in respect of this trait (Toelle, et al., 1990).

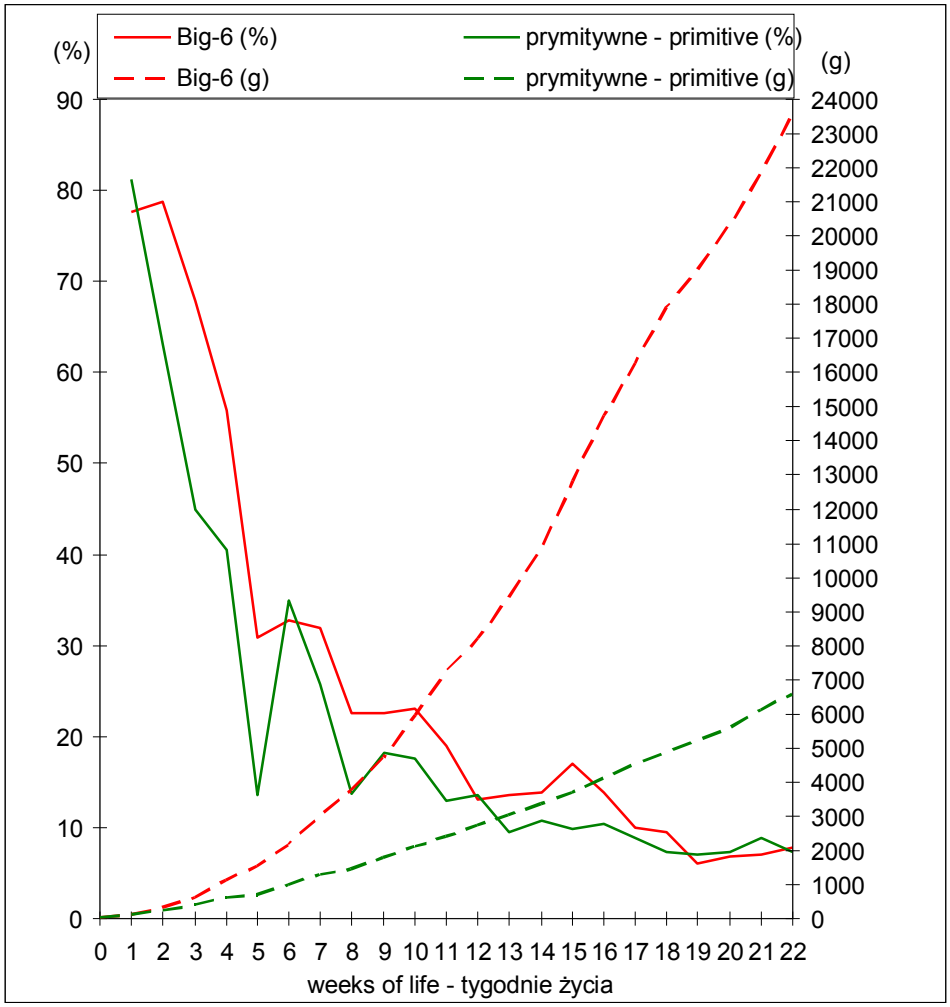

Figure 1. Comparison of growth rate (%) and growth (g) of turkey males from both genetic strains

Wykres 1. Porównanie tempa wzrostu (%) i wzrostu (g) indorów z obu grup genetycznych

The collapse of growth rate curves in the 5th week especially in the control group (Figure 1 and 2), was most likely due to a change in the structure of feed mixture from crumble into granulate after the termination of the 4th week of life. In a consequence, this could have led to a reduction in feed intake. Within the 5th week of life, the intake of feed by the primitive turkeys was lower by 0.26 kg per bird than a week before the change in feed mixture structure (0.53 kg per bird). Piccard, et al.

(2000) report that the size of feed granules should be adjusted to the body size of birds, to the size of their beak in particular.

Furthermore, according to Hogan (1984) apart from sight also tactual sensations determine the willingness to ingest feed. Perhaps the structure of the feed mixture, which was adjusted to the needs of fast-growing turkeys, turned out inappropriate for birds with smaller body sizes. Growth of body weight compensation as early as in the 6th week of life suggests that the turkeys adapted fast to the new structure of the feed mixture. Similar responses of birds to changes in granule size were observed by Yo, et al. (1997) and Chagneau, et al. (2006). In experiments conducted by those authors, the birds were also negatively responding to a rapid changes in feed mixture structure, yet the situation usually improved as soon as after 3 days.

The results achieved correspond to data reported earlier by Damme (2003). This author also reports on considerable differences in body weight gains and growth rate between fast-growing Big-6 hybrids and slow-growing Kelly Bronze turkeys.

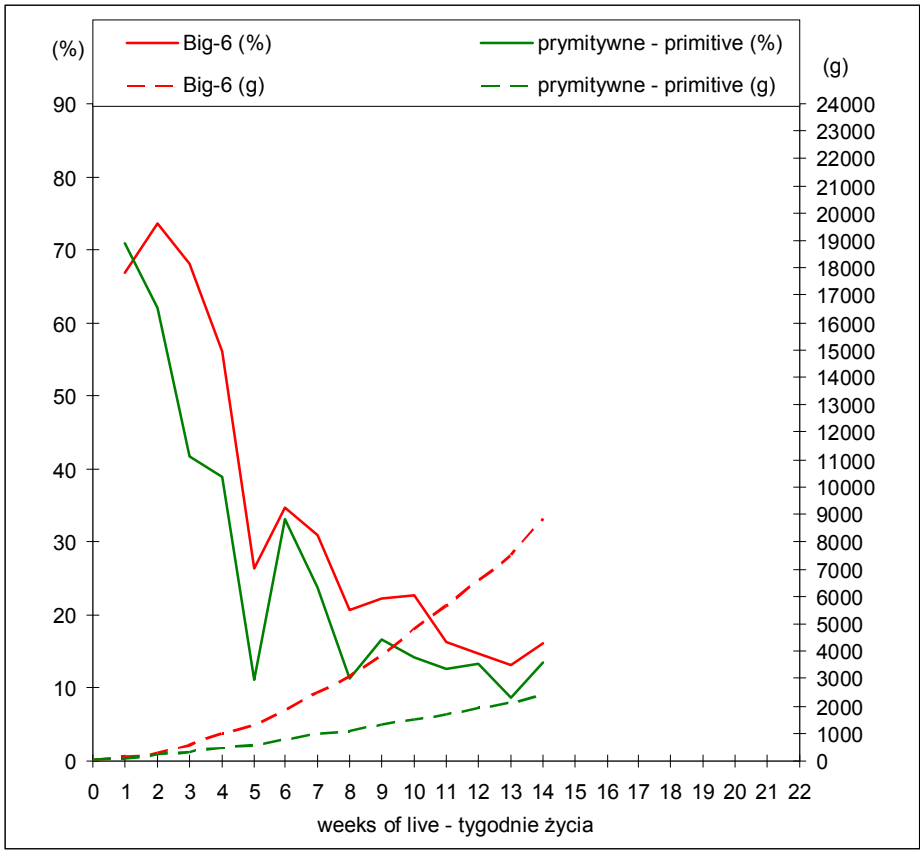

Figure 2. Comparison of growth rate (%) and growth of body weight (g) of turkey females from both genetic strains

Wykres 2. Porównanie tempa wzrostu (%) i wzrostu (g) indyczek z obu grup genetycznych

The high body weight of Big-6 turkeys (Table 3 and 4) did not differ either from the value of this parameter provided by the National Poultry Board (Krajowa Rada Drobiarstwa) (2009) for heavy turkeys kept under conditions of the intensive rearing system. It may, therefore, be concluded that the rearing system had no negative

effect on the growth of the birds. Alike conclusions were formulated by Heredny, et al. (2004) while comparing the growth of Big-6 males reared simultaneously in both systems.

For poultry producers, apart from a fast growth rate and high body weight values of birds, of great significance are results of feed intake and feed conversion ratio (FCR). Table 4 collates data referring to those parameters in the investigated genetic groups of turkeys. Data were presented as summary values for each feed mixture in particular stages of birds life. Until the 14th week of life, the parameters were calculated for both sexes in total, which was due to the joint rearing of male and female birds. From week 15 till week 22, the values presented refer only to males.

A higher feed intake over the entire rearing period was noted in the group of Big-6 turkeys. Until the end of the 14th week of life, the feed intake was higher in this genetic group (both in male and female birds) by 14.08 kg per bird than in the group of primitive turkeys. Since the 14th week of life, when only males were left in both flocks, this difference increased and in the period from week 15 till week 22 reached 19.23 kg per bird. Irrespective of the age of the birds, the FCR parameter was always more beneficial in the Big-6 group. The difference in FCR accounted for 0.34 kg*kg^{-1} on average in the period of administering the first three feed mixtures and for 1.85 kg*kg^{-1}in the last rearing period.

Data presented in Table 5 regarding feed intake and feed conversion ratio may, however, be treated rather as estimated values owing to the joint rearing of female and male turkeys until 14 weeks of life. For this reason, these data were not elaborated statistically, because results of their statistical analysis could prove unreliable. In addition, according to Walker and Gordon (2003), turkeys feeding on free ranges may distort results of those parameters, because it is impossible to determine exactly the quantity of green fodder ingested by birds on pasture.

Table 5. Feed consumption (kg) and feed conversion (kg*kg^{-1}) for turkeys of two genetic strains (both sexes together)

Tabela 5. Spożycie paszy (kg) i wykorzystanie paszy (kg*kg^{-1}) przez indyki z dwóch grup genetycznych (obie płcie razem)

Age (wk) Wiek (tyg.)	Big-6 Turkeys Indyki Big-6		Primitive Turkeys Indyki Prymitywne	
	Feed consumption (kg/pc) Spożycie paszy (kg*szt.$^{-1}$)	FCR (kg*kg^{-1}) Zużycie paszy (kg*kg^{-1})	Feed consumption (kg/pc) Spożycie paszy (kg*szt.$^{-1}$)	FCR (kg*kg^{-1}) Zużycie paszy (kg*kg^{-1})
1 - 4	1.46	1.37	1.15	2.09
5 – 10	7.95	1.84	2.72	2.17
11 – 14	11.97	2.70	3.43	3.14
15 – 22 (males)	33.64	2.63	14.41	4.48

Nevertheless, significant differences observed especially in the case of FCR parameter, which at the end of the rearing period oscillated around 2 kg*kg^{-1}, suggest

that the turkeys – Big-6 males in particular – are far better utilizing the administered feed mixtures, owing to which their rearing is substantially more profitable.

A comparison of results of own studies referring to the intensive rearing of turkeys with those presented by the Aviagen International Group (B.U.T., 2011) demonstrates that under conditions of semi-intensive system the Big-6 hybrids are characterized by a higher feed intake by 7.9 kg per bird on average and by poorer FCR by ca. 0.33 $kg*kg^{-1}$. In the case of the primitive turkeys, it is impossible to compare the results achieved with those noted for the group from the intensive system, because available literature lacks data on rearing the birds from this genetic group in that production system.

The survivability of turkeys in the entire rearing period was higher in the group of primitive turkeys by 17.5%. In the group of Big-6 turkeys, the total number of culling and deaths constituted 22.5% of flock population, whereas in the group of primitive turkeys – only 5%. Most of the losses of turkeys (17.5% in Big-6 group and all losses in the group of primitive turkeys) occurred before the birds completed the 6^{th} week of life, and thus during the preliminary rearing of poults at a rearing farm, which means that they were not linked with the semi-intensive rearing system. The reasons of deaths and culling of the birds in that period were disorders in water and feed intake referred to as “poults death from starvation”. The other 5% in the Big-6 group included fatal cases as a result of colibacteriosis in the 6^{th} and 8^{th} week of life. The higher mortality of the Big-6 hybrids was most likely due to greater susceptibility of the poults to environmental stress and to their lower immunity to diseases as compared to the primitive turkeys. This value was higher by ca. 5-10% from the respective value noted during intensive rearing of Big-6 turkeys (Witak, et al., 2003).

CONCLUSION

Results of this study enabled confirming the effectiveness of turkey selection. Owing to significantly more intensive growth, higher body weight and better feed conversion per 1 kg of body weight gain under conditions of the semi-intensive rearing, the Big-6 turkeys meet demands of poultry meat producers to a greater extent than the group of primitive turkeys. A drawback of this genetic group is, however, lower resistance to diseases and higher susceptibility to stress, which makes commercial production of those birds under alternative rearing conditions impossible. It seems that in the future the only solution to this problem and the only chance for the production of turkey meat originating from free range rearing and with price being attractive to consumers may be the use of primitive turkeys to produce hybrids or even strains and lines that would be characterized by a fast growth rate, low feed intake and a high survivability rate.

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