

PRODUCTION PERFORMANCE OF MEAT TYPE HYBRIDS

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Abstract: Modern broiler production is based on exploitation of meat type hybrids which are characterized by intensive growth, excellent food efficiency, strong constitution and excellent body conformation. In Serbia, many foreign proveniences are present and therefore there is a need to define a hybrid which in existing production conditions would realize the best fattening results. Objective of the study was to determine the production results of two most present line hybrids on our market, Cobb-500 and Ross-308. The following production parameters: body mass, gain, feed consumption, feed conversion, mortality and production index were monitored. One day old chickens were distributed randomly in two groups with 4 repetitions per each hybrid. In nutrition of broilers complete pellet mixtures were used, which ensured that all broiler requirements in energy, proteins, mineral substances, vitamins and essential amino acids were met. Higher final body mass was realized by Ross-308. In regard to feed conversion, mortality, feed consumption and value of production index, it is observed that Cobb-500 broilers realized better feed conversion (1,78), lower mortality (7,00%), lower consumption of feed per chicken (4238g) and higher value of production index with 316 index points compared to Ross-308 (1.82; 9,00%; 4407g; 309). Obtained production indexes for both hybrids were very high, so it can be concluded that there are no statistically significant differences between these two hybrids. It can be concluded that achieved results are satisfactory, and that hybrids have high genetic potential.

Key words: production parameters, broiler chickens

Introduction

Poultry production as one branch of livestock production is of great importance for our country since it represents major branch of economy. Poultry production enables production of large quantities of high quality products for human nutrition in very short period of time (*Ravindran and Blair, 1993*). Within

the poultry production, intensive production of poultry meat by fattening of chickens – broilers developed and expended globally (Rodić et al., 2003). In the last 30 years, intensive selection of broilers for faster growth in the shortest possible time and with the highest feed efficiency, was carried out (Đukić Stojčić et al., 2008). Thirty years ago, during 56 days of rearing of fattening chickens their body mass reached only 700-800 g, whereas in the recent years, depending on the fact if fast or slow growing fattening chickens are used in fattening, they reach within 35-42 days body mass of 1,8-2,8 kg (Grashorn and Clostermann, 2002). Objective of broiler rearing is production of healthy and high quality meat to meet the demands and needs of consumers (Ljubojević et al., 2010). Therefore, chickens of better genetic potential, better production performance, i.e. high productive hybrids should be preferred, because they will give meat of better quality (Stanačev et al., 2007; Bjedov et al., 2009; Milošević et al., 2010; Petričević et al., 2011). So, modern poultry production today is based exclusively on utilization of line hybrids (Rishell, 1997). Line hybrids are divided into easy line hybrids – for production of table eggs (Pavlovski et al., 2007) and meat type hybrids – for production of meat (Mitrović et al., 2010). All meat type hybrids are characterized by very intensive growth, good feed efficiency, strong constitution and excellent body conformation (Arsenijević et al., 2001). Today many hybrids are used which are slightly different from each other. In our country the following meat type hybrids are present: Ross 308; Cobb 500; Hybro; Hubbard; Lohman, (Bogosavljević-Bošković, 1994) but Cobb 500 and Ross 308 are most present. Meat type hybrid Cobb 500 was created in USA. This hybrid is characterized by very fast growth rate, fast feathering, white plumage, resistance, wide and deep breasts, very muscular and rather short legs (www.cobb-vantress.com). In the last decade, parent flocks were introduced in Serbia and slowly they conquered part of the domestic market. Ross 308 is also known and recognized hybrid in the world and in Serbia. It is characterized by intensive growth rate, good conversion and low mortality. It is relatively tolerant to poor housing and micro-environment conditions (en.aviagen.com/ross-308/). This hybrid has been present in Serbia for some time. Objective of the present study was to determine and compare production results of two heavy line hybrids most present on our market. The following production parameters were observed: body mass, weekly gain, feed consumption, feed conversion, mortality and production index.

Materials and Methods

The trial was conducted on the experimental farm of the Department of Animal Science of the Faculty of Agriculture in Novi Sad. Two hybrids were included in the trial, Ross 308 and Cobb 500. One day old chickens of Ross 308 hybrid were delivered from AD „Topiko“, Bačka Topola, and one day old chickens

of Cobb 500 hybrid from DOO „Pileprom“, Kovilj. One day old chickens were housed in previously prepared, disinfected and heated facilities and distributed into adequate groups and repetitions. There was total of 4 repetitions per each hybrid with 75 birds per each repetition, i.e. 300 chickens per hybrid. Chickens in the facility were randomly distributed. The stocking density was 17 birds per m². In the broiler nutrition, from the first day to the end of fattening, complete pellet mixtures were used in order to meet all requirements and needs of broilers in regard to energy, proteins, mineral substances, vitamins and essential amino acids. During the first ten days, chickens were fed from plastic dishes, and later on from feeders. Food and water were available to chickens *ad libitum* during entire trial period. The chickens were fed three types of mixtures: starter (with 22% of crude proteins), finisher 1 (with 21% of crude proteins) and finisher 2 (19% of crude proteins). Starter mixture was used in feeding of chickens from day 1 to 10, finisher 1 mixture from day 11 to day 28, and finisher 2 to the end of the fattening, 29-42 days. Food for chickens was supplied by feed mill “Tehnooprema”. After the trial, the value of conversion for tested hybrids was calculated, and subsequently value of other production parameters. All obtained values were processed by using appropriate statistical variation methods of the statistical package STATISTIKA 9 (*StatSoft, 2010*).

Table 1. Composition of the mixture

Feeds %	Starter	Finisher 1	Finisher 2
Corn	47,36	51,93	58,14
Wheat livestock flour	9,00	6,00	5,90
Methionine DL 99%	0,10	0,00	0,00
Soybean meal 44%	22,48	16,12	10,77
Soybean grits	16,75	22,35	21,72
Lysine L 78%	0,19	0,00	0,00
Monocalcium phosphate	1,15	1,01	0,92
Threonine 98%	0,09	0,00	0,00
Salt	0,33	0,33	0,33
Limestone	1,56	1,26	1,22
Premix	1,00	1,00	1,00
Total	100,00	100,00	100,00
Dry matter %	89,54	89,52	89,50
Crude protein	22,00	21,03	19,00
Crude fibre	5,44	6,43	6,50
Crude ash	6,25	5,62	5,20
Crude fibre	4,36	4,08	3,82
ME MJ/kg**	12,65	13,20	13,40
Lysine %	1,43	1,24	1,10
Methionine %	0,72	0,61	0,59
Methionine + cistein %	1,07	0,95	0,90
Total phosphorus	0,81	0,76	0,76
Available phosphorus	0,50	0,45	0,42

**Metabolic energy by calculation

Results and Discussion

Broiler chicken tests in the world are mainly carried out by producers of the genetic material, and results are formulated as technological norms (*Hopić et al., 1996*). In our country, hybrids are tested even though there is no domestic breeding in poultry. Many foreign proveniences are present in Serbia and therefore there is a need to define the hybrid with best fattening results in existing production conditions. In addition to good fattening results, meat quality of tested hybrids is also important (*Vieira et al., 2004; Bianchi et al., 2006; Ristić et al., 2007*). In consideration of all these facts, the conclusion is that it is very important to constantly repeat testings of this type. More researchers have tested production parameters of broiler chickens of various proveniences and established that certain differences in production performance of tested hybrids indicated the high genetic potential of tested hybrids (*Moran and Bilgili, 1990; Holsheimer and Veerkamp, 1992; Schutte and Pack, 1995*). Body masses and average weekly gains of broiler chickens are presented in Table 2.

Table 2. Masses and average daily gains per weeks of fattening

Fattening, week	Cobb 500		Ross 308	
	Mass	Gain	Mass	Gain
1. day	42,2		39,3	
1	150	15,4	147	15,38
2	354	29,14	361	30,57
3	793	62,71	773	58,85
4	1212	59,85	1191	59,71
5	1917	100,71	1876	97,85
6	2542	89,28	2592	102,28

Presented results show that chickens of hybrid Ross 308 realized somewhat higher final body masses at the end of the fattening. At the beginning of the fattening, Ross 308 has slightly lower body mass compared to Cobb 500. This difference was present at the end of the first week, and in the second week, Ross 308 chickens realized higher body mass by 7g, but by the fifth week, chickens of Cobb 500 hybrid had greater masses. In the sixth week, chickens of Ross hybrid realized higher daily gains and ended the fattening with higher average mass by 50g compared to Cobb 500. By comparing the final masses, no statistically significant difference between tested hybrids was observed. Results obtained in the present study were not in concordance with results obtained by *Bogosavljević-Bošković et al. (2003)* who reported in their paper that Ross 308 had lower average body mass, poorer conversion and higher mortality compared to

Hybro G. Results pertaining to consumption of food per chicken, feed conversion, mortality and value of production index are presented in Table 3.

Table 3. Consumption of food per chicken, conversion, mortality and value of production index

Production parameter		Cobb 500	Ross 308
Food consumption per average chicken (g)		4238	4407
Conversion		1,78	1,82
Number of chickens	Start	300	300
	Finish	279	273
Died		21	27
Mortality %		7,00	9,00
Production index		316	309

In regard to other production parameters, primarily feed conversion and mortality, consumption of food and value of production index, it can be observed that chickens of hybrid realized better feed conversion, lower mortality and higher value of production index by 7 index points, compared to Ross 308 chickens. These results are in concordance with results reported by *Mandić (2006)*.

Conclusion

Looking at the results at the end of the fattening, it can be concluded that hybrids Cobb 500 and Ross 308 have high genetic potential. Higher final body mass was realized by chickens of Ross 308 hybrid. Feed conversion was somewhat better in chickens of hybrid Cobb 500, although it can be concluded that achieved results are very satisfactory and indicate extraordinary potential in utilization of food in both hybrids. Lower mortality was recorded in chickens of Cobb 500 hybrid. Obtained production indexes in both hybrids were very high, so it can be concluded that there are no statistically significant differences between these two hybrids. By analyzing the production results obtained in this test we can observe that chickens of Ross 308 hybrid realized higher final body mass, but, taking into consideration other researches, these results can not be regarded as the general statement that chickens of this hybrid were significantly superior to chickens of Cobb 500 hybrid.

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Proizvodne performanse teških linijskih hibrida

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Rezime

Savremena proizvodnja brojlera se zasniva na iskorišćavanju teških linijskih hibrida, koji se odlikuju intenzivnim porastom, odličnim iskorišćavanjem hrane, snažnom konstitucijom i odličnom konformacijom tela. Na teritoriji naše zemlje je prisutan veći broj inostranih provenijenci i postoji potreba da se definiše hibrid koji će u našim uslovima proizvodnje dati najbolje rezultate u tovu. Cilj rada je bio da se utvrde proizvodni rezultati dva najzastupljenija teška linijska hibrida na našem tržištu, Cobb-500 i Ross-308. Praćeni su sledeći proizvodni parametri: telesna masa, prirast, konzumacija hrane, konverzija, mortalitet i proizvodni indeks. Jednodnevni pilići su bili raspoređeni po principu slučajnog rasporeda u dve grupe sa 4 ponavljanja po hibridu. Ishrana brojlera je vršena kompletnim peletiranim smešama, koje su obezbeđivale zadovoljenje potreba pilića u energiji, proteinima, mineralnim materijama, vitaminima, esencijalnim aminokiselinama. Veću završnu telesnu masu ostvario je Ross-308. Kada su u pitanju konverzija, mortalitet, utrošak hrane i vrednost proizvodnog indeksa može se uočiti da je Cobb-500 ostvario bolju konverziju (1,78), niži mortalitet (7,00%), manji utrošak hrane po piletu (4238 g) i ostvario veću vrednost proizvodnog indeksa sa 316 indeksnih poena u odnosu na Ross-308 (1.82; 9,00%; 4407 g; 309). Dobijeni proizvodni indeksi kod oba hibrida su vrlo visoki, može se zaključiti da ne postoje statistički značajne razlike između ova dva hibrida. Može se konstatovati da su postignuti rezultati veoma zadovoljavajući, te da hibridi imaju visok genetski potencijal.

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