

THE AGE AND HOUSING SYSTEM EFFECTS ON THE GROWTH OF BROILERS**

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Abstract: Bearing in mind certain established European Union regulations on the conventional extensive broiler rearing system as well as poultry breeding specificities of our country, experimental investigations were organised with the aim of making a comparison between broiler growth in two different non-industrial rearing systems. The systems included extensive fattening in a poultry house and free-range rearing. The fattening period in both rearing systems lasted up to the 63rd day of broiler age.

During the fattening period chicken growth was controlled by individual chicken weighing on a weekly basis.

Based on the research results it was determined that the growth of broilers in both rearing systems was similar up to the 49th day of age. The differences established were small and statistically insignificant ($P > 0.05$). The controls at 56 and 63 days of age showed somewhat higher differences in mean body weights of chicks. The difference determined on the 63rd day was statistically significant ($P < 0.05$). From the results mentioned it could be concluded that the differences in broiler growth between the rearing systems examined increased with the prolongation of the fattening period.

Key words: chickens, rearing systems, age, body weight.

Introduction

Over the last few decades, poultry production has developed (*Havenstein et al.*, 1994) towards intensification gaining the character of industrial production it has today. The poultry production of today involves rearing highly productive hen hybrids, confined and space-restricted farming with strictly controlled microclimatic conditions and balanced nutrition, adequate

care and health protection. This intensification in modern poultry industry has produced great production results (*Bogosavljevic-Boskovic et al.*, 2005). As a way of illustration, in 1950, the fattening period required for achieving the slaughter weight of 1.8-2 kg was 12 weeks, and only a little more than 4 decades later, the requirement is even less than 6 weeks (*Remignon et al.* 1994). However, this tendency in the poultry production development ever more frequently raises both new issues and new dilemmas before breeders and researchers. Among the most frequent issues is the one referring to the quality of products obtained from intensive poultry production. Among the non-genetic factors considerably affecting meat quality, according to certain authors (*Hellmeister et al.* 2003, *Lewis et al.* 1997, *Bokkers and Koene* 2003, *Ristic* 2003), broiler rearing or keeping system is specifically pronounced. The authors also stress that intensive industrial poultry production can result in poorer product quality, among other things.

There are different rearing systems in poultry meat production, today. The roughest distinction made is that between the intensive - industrial and extensive traditional rearing systems. The intensive system involves broiler production under the floor or battery housing system, where over 30 kg of live broilers per 1 m² of floor area are produced and chicken fed well-balanced compound concentrate solely and reared in a confined controlled system (*Milosevic et al.* 2005).

The extensive or traditional rearing method involves a number of non-industrial systems and organic production which are strictly specified in some countries, as those of the European Union. In that respect, the VO/EWG 1538/91 and VO (EG) 1804/99 directives prescribe minimum conditions required for satisfaction of non-industrial and organic poultry production standards (*Ristic*, 2003).

Based on the aforementioned and considering the importance of the length of fattening in non-industrial poultry meat production, the research objective was to examine broiler growth in two different non-industrial rearing systems (extensive chicken-house rearing and free-range breeding) with different fattening periods employed.

Material and methods

A total of 200 day-old chicks of the Co0 208 line hybrid was used as an initial experimental material. Broiler rearing in the first two weeks was carried out within the same house on a deep litter floor. At 14 days of age, the broilers examined were divided into two groups. One group was reared

in a poultry house at a stocking density of 12 chicks per 1 m² of floor (extensive poultry-house rearing – according to the European Union non-industrial poultry meat production standards). The second-group chickens were provided with equal useable area in the poultry house but from 28 days of age they had access to free range of 1 m²/chick.

Feeding and watering of the trial chicks were carried out ad libitum. The chicks were fed complete compound feeds – the feed with 21% of protein and 13.25 % of ME (metabolisable energy) from the 28th day of age, and the feed with 19% of proteins and 13.5% of ME from the 28th to 42nd day. From day 42 till the end of the fattening period feeding involved feeds made up of ground maize, cracked barley, vitamin and mineral supplements and 30% of complete compound feed.

The fattening lasted 49, 56 and 63 days. Namely, at 49 days of age 24 broilers (12 males and 12 females) were randomly selected from each trial groups and their fattening was prolonged until 56 or 63 days of age.

The growth of broilers was examined during the trial by weighing their body weights at 1, 14 and, further on, each 7 days of age till the end of the fattening period.

The mathematical statistical data analysis was made using the Microsoft STATISTICA, Ver. 5.0., StatSoft Inc. software package (1995).

Results and discussion

Table 1 presents data on mean body weights of broilers from the two trial groups during the fattening period.

As seen from the data presented in Table 1, the differences in mean body weights of broilers during all control weighings up to 42 days of age were small. The results of testing the significance of differences expressed also showed that the differences were small and insignificant ($P > 0.05$). Somewhat higher differences in mean body weights of the chicks from two trial groups were recorded at control weighings at 49, 56 and 63 days of age. The broilers reared extensively in a poultry house had higher mean body weight compared to those provided with free range. However, even in these weighings, it was only the difference determined on the 63rd day of the production cycle that was statistically significant. Based on the result, it can be concluded that the chickens reared under the free range system had a significantly lower mean body weight ($P < 0.05$) after 9 weeks compared to the ones reared extensively in the poultry house. The growth differences between the rearing systems examined were also expressed by the data that

the average daily weight gain of broilers of the first and second trial groups in the last week of fattening was 48 gr and 12 gr, respectively. These results could be due to the fact that the free-range chicks moved about more pecking green grass and sand and consequently using part of energy to secure the movement function. Based on the results mentioned, it can be inferred that with the prolongation of the fattening period after 42 days of age, there was an increase in the growth difference between the broilers from two different rearing systems. A more uniform and faster growth was recorded with the chicks reared extensively in the poultry house compared to that registered with the broilers under the free-range system.

Table 1. Mean body weights of broilers by groups and fattening periods

Age, days	Group	Body weight, gr					
		\bar{X}	$S\bar{X}$	S_d	Min	Max	$C_v, \%$
1 day	I	45,85	0,32	3,18	40,00	55,00	6,93
1.day	II	45,05	0,31	3,06	40,00	55,00	6,79
14 day	I	385,95	5,71	57,08	220,00	530,00	14,80
14.day	II	386,55	5,94	58,52	230,00	520,00	15,14
21 day	I	847,96	15,03	148,75	475,00	1190,00	17,54
21.day	II	855,08	12,28	121,00	515,00	1150,00	14,14
28 day	I	1385,10	23,83	234,68	735,00	1935,00	16,94
28.day	II	1398,45	20,89	205,76	855,00	1895,00	14,71
35 day	I	2066,13	31,63	311,53	1305,00	2635,00	15,08
35.day	II	2039,74	33,01	325,12	1300,00	2635,00	15,94
42 day	I	2495,00	39,86	390,50	1320,00	3240,00	15,65
42.day	II	2533,38	34,63	339,27	1750,00	3260,00	13,39
49 day	I	2771,97	39,80	385,87	1800,00	3615,00	13,92
49.day	II	2762,90	38,93	375,40	1780,00	3600,00	13,59
56 day	I	3134,58	86,46	299,51	2375,00	3590,00	9,55
56.day	II	3113,75	70,33	243,63	2740,00	3525,00	7,82
63 day	I	3467,50	105,75	366,34	3095,00	4345,00	10,56
63.day	II	3198,33	146,67	518,48	2750,00	4340,00	16,21

I without free range, II free range provided

The research results obtained can be only partially compared with the literature data available, primarily due to the specific character of the rearing systems applied, on the one hand, and relatively few investigations employing similar methodology, on the other. Nevertheless, it can be concluded that similar research results were obtained by *Peric et al.* (2003), *Bogosavljevic-Boskovic et al.* (2003) and *Milosevic et al.* (2003).

Conclusion

Based on the research results on the rearing system and fattening period effects on broiler growth, the following can be inferred:

Growth of broilers reared extensively in a poultry house and of broilers that had access to free range from 28 days of age was similar in all control weighings up to 49 days of age. The differences in mean body weights in these controls between the groups investigated were small and statistically insignificant ($P>0.05$).

Body weight controls at 56 and 63 days of age showed somewhat higher mean body weights of the chicks reared extensively in the poultry house, with the difference established on day 63 being statistically significant ($P<0.05$) compared to the free-range broilers.

Based on the results mentioned it can be concluded that with the fattening period prolongation the difference in broiler growth between the rearing systems examined increased.

UTICAJ UZRASTA I SISTEMA DRŽANJA NA PORAST PILIĆA U TOVU

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Rezime

Imajući u vidu pojedine ustanovljene propise Evropske unije za ekstenzivni tradicionalni sistem gajenja brojlerskih pilića, ali i specifičnosti u živinarstvu naše zemlje, organizovana su eksperimentalna istraživanja sa ciljem upoređivanja porasta brojlerskih pilića u dva različita neindustrijska sistema gajenja. Jedan sistem podrazumevao je tov ekstenzivno u živinarniku, a drugi gajenje uz korišćenje slobodnog ispusta. I u jednom i u drugom sistemu gajenja tov je trajao do 63 dana uzrasta pilića.

U toku tovnog perioda kontrolisan je porast (individualnim merenjem svih pilića) jednom nedeljno.

Na bazi rezultata ovog istraživanja ustanovljene je da je do 49. dana porast pilića u oba sistema gajenja bio sličan. Razlike su bile male i nisu bile statistički značajne ($P>0,05$). Kontrole 56. i 63. dana pokazale su nešto veće razlike u prosečnim telesnim masama pilića. Razlika ustanovljena 63. dana bila je i statistički značajna ($P<0,05$). Iz navedenih rezultata moglo bi se

zaključiti da sa produžavanjem tova rastu i razlike između ispitivanih sistema gajenja, sa aspekta porasta pilića.

Ključne reči: pilići, sistemi držanja, uzrast, telesna masa.

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