The Influence of Gender on Growth Traits of Broiler Rabbits

Peter Šmehýl*, Michaela Rybanská

Department of Poultry Science and Small Animal Husbandry
Faculty of Agrobiology and Food Resources, Slovak University of Agriculture,
Nitra, Slovakia

Abstract
The present study deals with the comparison of the impact of gender on selected production parameters of rabbits in conditions of intensive farming. Followed by an analytical evaluation of live weight differences between male and female hybrid subjects, and a confrontation of observed results with those published in professional and scientific publications. In particular time periods we compared the values of live weight of both sexes. At the 35 days of age live weight of both sexes were almost balanced, but in the 56th day we observed a slight difference in the values of live weight between the sexes. In the last time period, from the 77th to 105th day, the offspring of both sexes reached higher live weight, while we once again identified just small differences in the values of body weight between the two sexes. Over the whole period, we found a slightly higher live weight of males, but the differences between these values are minimal. This means, there is no statistically significant difference between males and females. In terms of statistical significance, we therefore found that the both sexes are growing equally, thus guiding the sex of new-born offspring, is in principle ineffective.

Keywords: broiler rabbit, gender, growth rate.

1. Introduction

Broiler rabbit production is affected by many biological and artificial factors. The growth rate of broiler rabbits belongs to the most important factors influencing the effectivity of the production. The factors that affect the growth rate and slaughter body quality are especially as follows: environmental effects or microclimate conditions, rearing techniques, feeding effects which includes feeding restriction, feeding plans, diet composition, and dietary protein content. Factors influencing the quality of carcass are especially pre-slaughter conditions and stunning conditions. More important are the high effect factors as genetic effects, biological factors including age and live weight and technological factors [1]. The nutrition of domestic animals presents a very large scale of research and many works present, that the influence of feeds significantly affects productivity traits of all species and breeding categories of animals. That fact is confirmed also in studies of broiler rabbit nutrition [2-4]. The genetics and hybridization is inseparable part of rabbit production. High intensity of growth causes shortening of fattening period and increases the economy of production. A very high importance of genetic effects and significant differences of growth rate in relationship to the genetic of the rabbits are the results of many research [5-8]. Hybridization and selection are the next breeding technologies, that improve the intensity of growth in rabbits [9-11]. The sexual dimorphism is described in many species. Rabbit is an animal with a very small sexual dimorphism [1]. Animals with larger body size show more somatic differences comparing to small animals. Significant differences of growth

* Corresponding author: Peter Šmehýl, + 421 37 6414706, peter.smehyl@uniag.sk

rate relating to gender were found out in lambs aged of six months [12] and similar results were obtained in growth rate of goats [13]. Differences of growth rate with significant level between sexes were also described in cattle [14]. The significant effect of sex on growth rate was found in swine as well [15-17]. Vice versa at the small live weight in early age (28 days) there was not find any significant difference in live weight between sexes of piglets [18]. That proves the theory that sexual dimorphism is more marked in large bodied animals, but to be sure, it is depended on specie. Gender is named as the factor influencing the growth rate and causes changes in relative growth of organs and tissues, leading to modification of rabbit carcass traits [19]. Differences of body composition depending of gender of rabbits like higher fat tissue content [20,21] or slightly lighter colour of meat in females of processed rabbits [22] are stated in literature. Poor effect of sex on some productive meat traits like qualitative characteristics of meat [23,24] or differences in food conversion, growth rate [21,25] and smaller meat yield of males comparing to females [25] are well known. The data relating to gender effect concerns hybrids selected for fast growth, and they are conflicting as at commercial slaughter age some authors observed significant gender differences on some carcass traits and on meat quality [21,25], whereas others did not observe any significant difference [23,24]. Meat quality differences due to gender depend on the slaughter age, as the differences between sexes become more evident as age gradually approaches puberty [23]. However, carcass traits and meat characteristics may be affected by gender to a different extent, especially in the case of rabbits slaughtered at heavy weight (>2.5 kg) [26]. Non-significant differences in growth rate depending on gender were found out in synthetic giant line, while differences increase in relation to age of rabbits. Slightly higher live weight was shown in males [27]. That work proves previous results. Non-significant differences were also detected at 77th day but vice versa higher live weight and carcass was shown in females [26]. Similar results were found out also in other studies [28,29], where a higher live weight was determined in females. The study of Kabylian rabbit population shows no differences in growth traits between the sexes, so this population could be added to the long list of populations and lines were no significant sex differences are observed during the fattening period [30]. Among the management factors, gender separation is not a common practice in rabbit rearing because of the limited sexual dimorphism and the large variations in commercial slaughter weight adopted within and among the various countries [1]. The aim of this study was to found out the level of differences in growth traits of rabbits depending on the gender to think about the possibility of potential sexing of offsprings.

2. Materials and methods

Animals

Population of animals analyzed in this experiment presents a synthetic broiler population, created in experimental conditions. This giant synthetic line was a product of standard local productive broiler population as a maternal line and giant pure breed Belgian Giant White as a sire line. The analyzed population was an albino line and had 12,5 % ratio of giant breed and was considered to be a line with high intensity of growth.

Housing system

Wire cages technology, with automatic drinking system and pelleted mixture diet was used. Drinking and feeding was served ad libitum. Animals were hold in room with controlled microclimatic conditions. Animals were hold in mixed groups after weaning.

Data collection

All animals were individually marked also within the litter. The gender was determined during the weaning at 35th day. Live weight was individually marked weekly from birth to 105th day. Live weight at birth, 21st day, 35th day, 77th day and 105th day were monitored in this experiment. Digital scale was use for individual live weight monitoring.

Data analyses

Statgraphic Centurion programme was use for data analyses. Descriptive statistics were calculated for each group and age. T-test was used to determine the significance of differences between sexes in each monitored age.

3. Results and discussion

The results presented as the means and descriptive statistics of live weight at analysed age of both sexes are shown in Table 1. At the first time analyze we obtain the average weight at birth in males and females 74.81 and 73.21 respectively. That numbers present common values, comparing to 60 – 93g of new-born offsprings [8]. A very small difference was determined however no significant difference is calculated for live weight at birth. Up to the age of 21 days the growth rate depends only on the influence of mother by force of her milk production. After decreasing of milk production at this time of offspring age the individual growth ability of youngs became more important and can be manifests. The differences obtained in this age are very small and no significance was found out. The values ranging from 325.5 to 441.7 g were obtained in synthetic populations of standard and giant crosses [8]. The main fattening period starts after the weaning at the 35th day in our study. As for P value, we can note, that no difference occurred between sexes in this stage of life. Our current results are in agreement with results of other authors [8,27], that present values ranging from 942.7 to 968.0 g. A very interesting fact occurred when males show slightly lower value of live weight comparing to females in this age that is in reverse with all next values during whole experiment. The fattening period ends in dependence of the market claims. In general, the live weight of approx. 2.5 kg is considered to be the final weight of fryers. At the age of 77 day we obtained the live weight of males and females 2658.90 and 2602.72 g respectively. [26] notes in Grimauld genotype live weights 2628 or 2694 g in males and females respectively. Those values are almost similar to our results and prove no relevant differences between sexes. In the opposite of our findings, there is shown a slightly higher live weight of females in this study.

Table 1. Average values, descriptive statistics and significance tests results in tested ages

	birth		*21th day*		*35th day*		*77th day*		*105th day*	
	♂	♀	♂	♀	♂	♀	♂	♀	♂	♀
n	107	95	102	87	103	94	68	79	40	41
$\vec{x}$ [g]	74.81	73.21	425.44	424.71	947.03	953.40	2658.90	2602.72	3554.25	3542.68
SD	16.59	17.08	87.94	66.66	212.65	157.52	369.88	326.13	400.08	383.67
v [%]	22.18	23.34	20.67	15.69	22.45	16.52	13.91	12.53	11.25	10.83
min [g]	50.00	40.00	220.00	270.00	400.00	555.00	1940.00	2000.00	2840.00	2300.00
max [g]	120.00	105.00	620.00	590.00	1520.00	1280.00	3440.00	3300.00	4190.00	4400.00
P-value	**P** = 0.0936037		**P** = 0.293584		**P**= 0.318872		**P** = 0.283008		**P =** 0.693497	

*P≤0.05, no significant differents were detected in the present analyse

The analyse of Kabylian population of rabbits shows in the age of eleven weeks average means of live weight 1966 and 2037 g in males and females. The small values present the genotype of low growth rate intensity population however general results note non-significant difference in live weight [28]. The final weight monitored in this experiment was live weight at 105th day. The average value we obtain was 3554.25 g for males and 3542.68 g for females. The males reached higher weight but no significance was determined. Our result is in agreement with [29] as for differences level, but that authors present vice versa higher live weights in females. The identical results were find out in Kabylian population, where females reached rather higher weights comparing to males [28].

Figure 1 presents the comparison of live weight during the experiment.

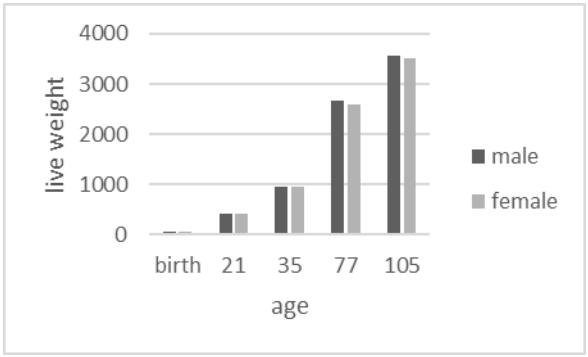

Figure 1. Live weight [g] of males and females of analysed rabbit population in selected age [day]

As shown in Figure 1 the differences between sexes are negligible and the growth rate of different sexes of broiler rabbits can by consider as equal. The differences between sexes increase with the age of animals, that proves the results of many other authors [30, 8,]. Due to the minimal values of live weight differences we can note, that application of artificial affecting of gender, which present complicated operations [31-33] seems to be useless as a idea to improve productivity of broiler rabbits production. Although these practises are managed in detail [34] the operation is a very risky in rabbit production [35].

4. Conclusions

Five times from born up to 105th day of age we monitored the live weight of males and females separately and test the different of growth rate between sexes. During whole trial we monitored very poor differences with slightly higher weights in males, except for 35th day. However no significant difference was obtained in the experiment. The differences increased with the age of the rabbits but also in the age of sexual maturity (105 d) they did not reached relevant value. Thus this experiment proves the results of several works and notes the minimal sexual dimorphism of rabbits growing traits. According to our results we have to say that there is no purpose to influence the gender of offsprings as this process will not positively effects the economy of broiler rabbit production.

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