Influence of Live Weight at Born on Growth Traits of Synthetic Broiler Rabbit Line

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Abstract
The initial live weight of the body is considered a very important factor influencing the growth traits and the final body weight. The differences are expressive especially in species of large litters and short period of fattening. The large litters are the precondition of different live weights of the youngs. Especially the large litters with more than ten alive youngs produces youngs of different live weight. The aim of this study was to evaluate the influence of live weight at born on growth traits of synthetic broiler rabbit line. The 3rd generation of giant sire line with the basis of Belgian Giant White rabbit and local standard broiler population (M91) was tested in this experiment. Animals born in 18 litters were individually marked and weighted at birth day, 35th day, 84th day and at the age of 105 days. All animals were consequently divided in eight groups according to the live weight at born. The average growth rate of each groups was evaluated. The lowest average live weight at weaning (35th day) was 846.25 g in group 1 and the highest live weight was 1093.18 in group 8 with significant differences between groups (P-value = 0,0000 at the 95,0 % confidence level). Similar results were determined also at the age of 84 days, when the lowest weight was obtained in group 2 and the highest weight in group 8 with average weight 2442,50 g; 3173,64 g resp. Significant differences with P-value = 0,0000 at the 95,0 % confidence level. The 105th day is considered as the age of sexual maturity. The lowest body weight reached group 3 and the highest live body weight was in group 8 with average value 2913.50 g and 3701.82 g resp. The significant differences were determined as well with P-value = 0.0000 at the 95.0 % confidence level.

Keywords: live weight at born, growth rate.

1. Introduction

The growth rate of rabbits is influenced by many factors like breed [1, 2], feed efficiency [3-5], tissues composition [2, 5], postnatal weight gain and composition of carcass [6, 7]. The feed efficiency is the most important trait of young fryers during fattening period due the fact that the fattening period of young rabbits presents up to 40 % of costs [4, 5]. Body weight is an economic important character of commercial meat rabbit industry [8, 9]. The gender influences the growth rate with slightly higher growth rate of males but without significant differences [10, 11]. The breeding condition and climate conditions in housing system influence the growth rate as well [12, 13]. An early and very early weaning of young rabbits negatively influences the weight gains up to the slaughter age [14-17] and feed efficiency [18, 19]. The sire lines seem to be a very effective tool for productive phase of broiler rabbit production improving the values of productive traits as the growth rate, meat yield and carcass composition [20]. The live weight at weaning is considered to be the most important trait of broiler rabbits [2]. Live weight at 120 days of age (as the age of sexual maturity) is highly correlated with the live weight in the age of

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slaughter maturity. So that trait is considered to be a very good trait as a selection criterion for growth rate and allows to increase the productive traits of broiler rabbit populations [21]. The positive effect of live weight at weaning on final weight at slaughter age in different crosses proves in dependence on genotype [22]. The influence of giant breed on growth was expressed when initial higher weights of giant breed and crosses showed significantly higher weights in the age of slaughter. The results showed that the body weight at born influenced the body weight at weaning and consequently the final body weight at slaughter age in 98 days [23].

2. Materials and methods

Animals and breeding conditions

The crosses of Belgian Giant White rabbit and local standard synthetic broiler rabbit line – M91 were used in that experiment. The 3rd generation of crosses was analysed. The influence of live weight at born on the final body weight of individuals was studied in that work. Altogether 147 rabbits of 18 litters were analysed. All animals were individually marked by cut with scissors in the ears. All animals were kept in roomed condition with controlled climate condition. Wire cages were used as a standard breeding technology. Pelleted commercial mixture was fed during whole experiment water was allowed at libitum by automatic drinkers.

Analysed traits

The aim of the study was to analyse influence of body weight at born on the body weight at 35th day, 84th day and on the final weight at 105th day. The age of 105 days presents the sexual maturity of the animals. Live weight of all animals was monitored and recorded weekly up to the 105th day of age. After finishing of all measures of analysed animals whole set of data was consequently divided according to the live weight of new-born in eight experimental groups as follows:

The next statistical analyses were carry out according to the weight groups. Live weights on the 35th day (weaning), the 84th day (slaughter age) and the 105th day (sexual maturity) were analysed in that experiment.

Table 1. Dividing of all analysed rabbits in weight groups

Group number	*Live weights interval [g]*
1.	50 – 59
2.	60 – 69
3.	70 – 79
4.	80 – 89
5.	90 – 99
6.	100 – 109
7.	110 – 119
8.	120 - 129

Statistical analyses

Statgraphics Centurion 15 programme was use for data analyses. Descriptive statistics were calculated for each group in monitored ages. F-test (ANOVA) was used to determine the significance of differences between each monitored groups.

3. Results and discussion

The aim of the study was to evaluate the influence of initial live weight of individuals on the final weight at slaughter and at the sexual maturity. All data collected from animals were divided in eight groups in accordance to live weight of individuals at born. The average live weights of each group at born in order were following: 52.86; 62.00; 71.33; 82.05; 91.73; 102.11; 111.67 and 121.67 g. A high variability of live weights was shown. The variability was caused especially with the different litter sizes when litters of high numbers contain small animals and litters of small number of born contain usually noticeably bigger individuals. As the differences of new-born live weights were used as a base for weight group determination, no analyses of average values differences were count in the new-born individuals. The analyses of average values differences between all experimental groups in all monitored ages are presented in the table 2. The 35th day was the day of weaning, when the fattening period of fryers starts. The initial weight of fattening period was significantly influenced directly proportionately with the live weights of new-born animals.

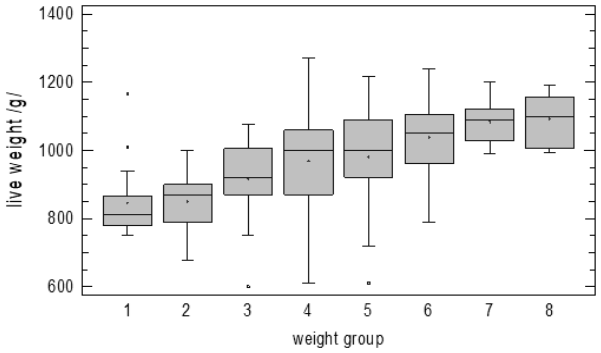

Figure 1. The live weights of rabbits on 35th day according to live weight on birth

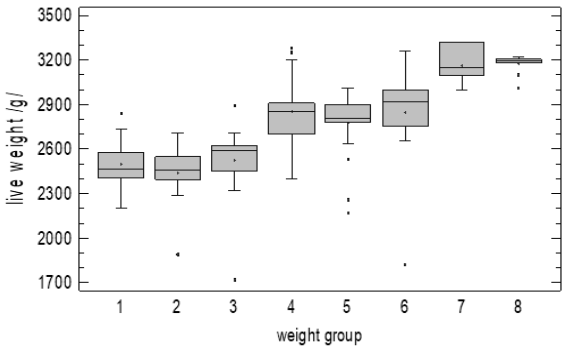

Figure 2. The live weights of rabbits on 84th day according to live weight on birth.

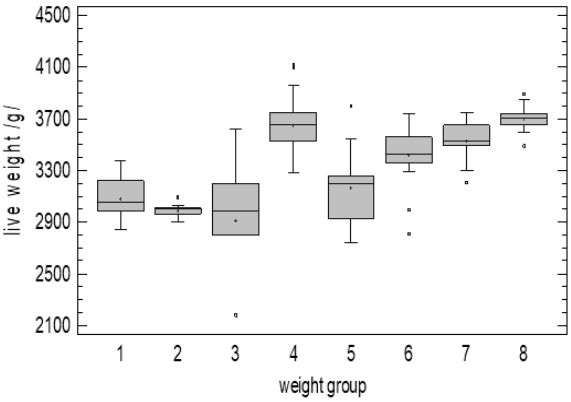

Figure 3. The live weights of rabbits on 105th day according to live weight on birth

The smallest value was obtained in group 1 while the highest live weight was obtained in group 8. The 35th day weights varied from 846.25 g (group 1) to 1093.18 g (group 8). The new-born live weight caused expressive differences of weight at weaning that show significant differences ($P \leq 0.05$) of average values between experimental groups. The 35th day weights are shown in fig. 1. As shown in fig. 1 the weaning weight was rising in direct accordance to the live weight of new-born. The average live weights and standard deviations of 84th day weight of each weight group is shown in table 2. The influence of live weight of new-born was expressed as well. Significant differences ($P \leq 0.05$) of average live weights was detected between analysed weight groups. The values of 84th day weights present the comercial live weights of fryers.

Table 2. The average values ± SD of each weight groups live weights in different ages

Weight group	***Age***		
	35[d]	***84[d]***	***105 [d]***
	$\vec{x}$ ± SD	$\vec{x}$ ± SD	$\vec{x}$ ± SD
1	846.25 ± 99.07^{a}	2499.67 ± 161.75^{a}	3079.29 ± 154.89^{ab}
2	850.55 ± 74.85^{a}	2422.50 ± 191.83^{a}	2990.00 ± 51.19^{ab}
3	917.105 ± 119.61^{ab}	2527.33 ± 257.16^{a}	2913.57 ± 440.11^{a}
4	968.261 ± 152.38^{bc}	2851.36 ± 220.06^{b}	3653.42 ± 235.74^{d}
5	981.154 ± 144.23^{bc}	2772.76 ± 214.79^{b}	3165.25 ± 289.94^{b}
6	1039.47 ± 113.16^{cd}	2849.71 ± 311.87^{b}	3418.82 ± 227.73^{c}
7	1084.09 ± 61.71^{d}	3162.27 ± 116.52^{c}	3529.09 ± 160.74^{cd}
8	1093.18 ± 70.89^{d}	3173.64 ± 62.81^{c}	3701.82 ± 110.66^{d}
P-value	$6{,}51765^{-10}$	0,0000	0,0000

Mean´s values with different letters, in the same column, showed a statistical significance of $P \leq 0.05$

The high degree of variability is considered to be a negative trait of broiler rabbit production when the commercial conditions requires equal body size of commercial fryers. So, the differences of new-

born live weights caused the unequal production of slaughtered fryers.

A considerable variability of body weights is obtained also in the age of sexual maturity. The average values of live weights on 105th day shown in table 2 and fig. 3 confirm the significant differences ($P \leq 0.05$) between analysed groups. As shown in fig. 3 the differences of body sizes are not in direct accordance to new-born weights. A very similar results was proved in experiment with Pannon White rabbits. A high variability of rabbits of the same breed was detected in the ages 74, 84 and 94 days. The differences show significant differences ($P \leq 0.05$) of live weight in all analysed ages. The different body weight influenced significantly also the slaughter performances of processed fryers [24]. The dependence of weaning live weight on the final slaughter weight was shown also in HY PLUS genotype rabbits. The smaller animals reach the final weight (2600 g) much more later than the bigger individuals [2]. An experiment with Flamish Giant and Californian White and their crosses shows that the weight at 84th day was influenced significantly by live weight at weaning (42 days) that was simillary influenced by live weight at born [23]. That results are in acodrance with our findings, however the authors compared different genotypes. The high influence of body weight at weaning on final slaughter body size shows [25] that declares the highest growth intensity in the animals with highest live weight at weaning.

4. Conclusions

The aim of our study was to evaluate the influence of initial live weight on the weight at slaughter age and the weight at sexual maturity. The present study confirms in accordance of many authors that the live weight at born influences significantly the live weight at weaning and the live weight on 84th day. The average live weights increased in dependence on live weights of new-born. Our study also proved that the differences of body weight of new-born animals maintain the differences up to the time of slaughtering that cause unequal production of fryers. That is considered to be a negative phenomenon from the point of view commercial requirements. Mainly the numerosity litters use to produce animals with different body size. So, the selection of maternal lines for litter size seems to be a very important trait influencing the meat production and slaughter traits of fryers.

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