THE INFLUENCE OF WEANING WEIGHT ON GROWTH OF THE HYPLUS BROILER RABBIT

Vostrý L.*, Mach K., Jakubec V., Dokoupilová A., Majzlík I.

Department of Genetics and Breeding, Czech University of Life Science, Prague, Czech Republic
*Corresponding autor: vostry@af.czu.cz

ABSTRACT

The final crossbreds of the broiler rabbit HYPLUS (product of the company Grimaud Frères) were fattened from 42 to 84 days of age. The following traits were weekly recorded: body weight, average daily weight gain, average daily consumption of feed and feed conversion ratio with regard to the effect of the genotype (♂PS59 × ♀PS19; ♂PS119 × ♀PS19), replication, interaction genotype x replication and weight at 42 days of age (group 1: weight lower then 1300 g and group 2: weight greater then 1300 g). The highest difference in body weight between both genotypes was found at the age of 70 days, when the difference was 5.6%. During the whole fattening period the genotype (59 x 19) showed lower feed conversion ratio ($P<0.001$) and higher average daily gain ($P<0.05$). The effect of replication was not-significant in most of the traits. The first replication showed a significantly higher value in the average daily gains than the second replication ($P<0.05$). The interaction genotype x replication was significant in the body weight at 42, 56, 63 and 70 days of age and in the feed consumption from 49 to 56 days. Rabbits of group 1 weighed 2655 g at the end of fattening period and rabbits of group 2 weighed 2892 g respectively. No growth compensation during the fattening period was observed in group 1. The body weight at 42 days of age had a significant influence on body weight at the end of fattening.

Key words: Rabbit, Growth, Feed conversion, Final hybrid.

INTRODUCTION

Currently, the annual world market production of rabbit meat is estimated about 1 300 000 tons, 60% of the whole meat production is realized on specialized farms (Mach *et al.*, 2001). The broiler rabbits are mostly two- and four way crossbreds. The knowledge of the growth and development patterns of defined genotype is the presumption of a successful profitable production of meat animals. The performance of meat type rabbits (purebreds and crossbreds) were analyzed by Krogmeier and Dzapo (1991), Mach (1992), Skřivanová *et al.* (1997), Nofal *et al.* (1997), Pla *et al.* (1998) and Dědková *et al.* (2003). The final crossbreds descend from medium-sized parental lines. In the Czech Republic the fattening period begins about the age of 30 days and ends generally between 80 to 100 days of age. The demanded levels of traits are: final body weight ranging from 2500 to 3000 g, average daily gains ranging from 20 to 40 g and total feed consumption during the feeding period ranged from 2500 to 4500 g. The crossbreds growth curve reaches the inflection point at the age from 7 to 10 week (Dědková *et al.*, 1999). The differences in the fattening traits between the broilers are caused by the genotype, environment and management.

The objective of the paper was the analysis of the effect of genotype and body weight at 42 days on the future growth, feed consumption and conversion of the final crossbreds of broiler rabbits HYPLUS (♂PS59 × ♀PS19 and ♂PS119 × ♀PS19).

MATERIALS AND METHODS

Animals and experimental design

Final crossbreds (66 heads) of the broiler rabbit HYPLUS (product of the company Grimaud Frères) were fattened during the interval from 42 to 84 days of age. Rabbits from ten multiple litters of one commercial farm were weaned at the age of 34–35 days and fattened in a wire cage (67 cm × 45 cm × 100 cm) on the experimental and demonstration stable of the Czech University of Life Science. The replicate fattening were carried out within the month. The average temperature was approximately 17°C and the relative humidity about 65%. The rabbits were fed with a granulated fattening mixture. The content of the nutrients per 1 kg feeding mixture is shown in Table 1. Food and water were supplied *ad libitum*. The feeding mixture contained anticoccidica only in the first week of fattening.

Table 1: The composition of the experimental diet

Composition	g/kg
Dry matter	904
Crude protein	171
Fat	42
Crude roughage	156
Calcium	11,5
Phosphor	7,5
Salt (NaCl)	6
Natrium (converted)	2.4

Traits analysed

The following traits were weekly recorded from 42 to 84 days: body weight (BW 42 to BW 84), average daily gains for each week (ADG 42-49 to ADG 77-84), average daily consumption of feed for each week (ADF 42-49 to ADF77-84) and feed conversion ratio for each week (FC 42-49 to FC77-84). For the whole fattening period average feed conversion ratio (AFC), total body weight gain (TDG) and total feed consumption (TDF) were also recorded.

Statistical analysis

The growth traits were analysed by the least-squares analysis using the GLM procedure (SAS, 2005). The following linear model was used:

$$Y_{ijkl} = \mu + GENOT_i + REPL_j + GROUP_k + (GENOT \times REPL)_{ij} + e_{ijkl}$$

where:
y_{ijkl} - observation, μ - overall mean, $GENOT_i$ - fixed effect of the *i*-th genotype, $REPL_j$ - fixed effect of the *j*-th replication, $GROUP_k$ - fixed effect of the *k*-th group, $(GENOT \times REPL)_i$ - fixed effect of the *ij*-th interaction genotype × replication, e_{ijklmn} - random residual error

The F-test statistic was used to determine the significance of the effects. Significance was set at $P<0.05$. The effect of sex was not included into the model due to the fact that the sex dimorphism was not proved yet in the rabbit (Krogmeier and Dzapo, 1991).

RESULTS AND DISCUSSION

The Table 2 shows the least squares means and standard errors for body weight and feed consumption of both genotypes and groups of 42 days body weight.

Table 2: Least squares means (LSM) and standard errors (SE) for genotypes, replications, significance of interaction genotype × replication and groups (Group1 – lower body weight; Group 2 - higher body weight at 42 days of age)

Trait	Genotype				Prob.	Group				Prob.
	59 ×19		119×19			1		2		
	66					66				
	LSM	SE	LSM	SE		LSM	SE	LSM	SE	
BW 42	1359.30	21.58	1351.42	20.26	0.7910	1248.74	15.13	1464.83	15.13	<.0001***
BW 49	1590.60	25.20	1583.50	23.65	0.8379	1492.63	22.23	1684.00	22.59	<.0001***
BW 56	1853.83	27.16	1786.92	25.45	0.0768	1724.10	24.53	1919.22	24.53	<.0001***
BW 63	2123.18	29.70	2047.58	27.87	0.0682	1973.68	26.16	2200.08	26.57	<.0001***
BW 70	2387.78	32.43	2276.58	30.43	0.0151*	2216.96	29.33	2450.49	29.80	<.0001***
BW 77	2618.78	35.13	2516.92	32.96	0.0385*	2450.49	32.54	2688.37	33.06	<.0001***
BW 84	2822.48	36.43	2723.00	34.18	0.0508	2656.46	34.28	2892.14	34.82	0.0001***
ADG 42-49	33.04	2.22	33.16	2.08	0.9711	34.84	2.38	31.31	2.42	0.3447
ADG 49-56	37.60	1.90	29.06	1.78	0.0017**	33.07	2.05	33.60	2.09	0.8677
ADG 56-63	38.48	2.29	37.24	2.15	0.6940	35.65	2.45	35.65	2.49	0.2465
ADG 63-70	37.80	1.31	32.75	1.23	0.0064**	34.75	1.42	35.77	1.44	0.6462
ADG 70-77	33.00	1.64	34.33	1.54	0.5567	33.36	1.78	33.98	1.80	0.8231
ADG 77-84	29.10	1.50	29.44	1.41	0.8686	29.43	1.62	29.11	1.64	0.9006
ADF 42-49	123.20	4.46	147.87	4.18	0.0002***	127.91	143.36	143.36	4.72	0.0368*
ADF 49-56	157.72	5.19	153.00	5.07	0.5266	152.70	5.82	158.09	5.91	0.5538
ADF 56-63	178.66	5.01	170.49	4.70	0.2388	174.49	5.42	174.66	5.50	0.9848
ADF 63-70	186.24	4.23	172.81	3.97	0.0239*	173.63	4.46	185.57	4.53	0.0911
ADF 70-77	164.30	4.29	178.76	4.03	0.0168*	164.80	4.50	178.44	4.57	0.0563
ADF 77-84	161.42	4.10	173.05	3.85	0.0430*	164.17	4.40	170.38	4.47	0.3694
FC 42-49	3.81	0.20	4.47	0.19	0.0179*	3.89	0.21	4.39	0.21	0.1374
FC 49-56	4.45	0.21	5.37	0.20	0.0026**	3.89	0.23	4.39	0.23	0.5010
FC 56-63	4.60	0.21	4.87	0.20	0.3508	4.76	4.70	4.70	0.23	0.8545
FC 63-70	4.91	0.16	5.26	0.16	0.1212	4.95	5.22	5.22	0.18	0.3171
FC 70-77	5.05	0.22	5.39	0.20	0.2577	5.16	0.23	5.16	0.24	0.7477
FC 77-84	5.94	0.29	5.86	0.27	0.8350	5.67	0.31	6.13	0.32	0.3424
AFC	4.67	0.08	5.13	0.08	0.0002***	4.81	0.09	4.98	0.09	0.2299
TDG	1463.18	29.54	1371.58	27.72	0.0273*	1407.72	31.89	1427.31	32.40	0.6948
TDF	6800.68	118.3	6971.83	111.05	0.2957	6703.94	124.24	7073.48	126.23	0.0610

*P<0.05; **P<0.01; ***P<0.001; BW=body weight; ADG=average daily gains; ADF=average daily feed consumption; FC=feed conversion; AFC=average feed conversion; TDG=total gain; TDF=total feed consumption

Influence of the genotype

The difference between the genotypes (Table 2) was significant for body weight at 70 and at 77 days (P<0.05). There was no significant difference between the genotypes for other weights. During the whole fattening period the genotype (59 × 19) showed a lower feed consumption ratio (P<0.001), higher body weight at 70 and at 77 days and higher average daily gain (ADG) (P<0.05). The highest significant difference between both genotypes was found for the body weight at 70 days (5.6%). The differences in body weight between the genotypes from this time declined. Similar values for body weights were published by Metzger *et al.* (2006) for the genotype (59 ×19). The same authors found a significantly lower feed consumption in the genotype (59 × 19) than in the genotype (119 x 19) for the time intervals 42-49, 70-77, 77-84 days (P<0.01, P<0.05 and P<0.05). On the contrary, the genotype (119 ×19) had a significant lower feed consumption in the interval 63-70 days (P<0.05). The differences between the genotypes in average daily gains were not-significant for the most week periods. The only significant difference was detected in period 49-56 and 63-70 days. The genotype (59 ×19) had a lower total feed consumption (P<0.001) and a higher total gain (P<0.05). The differences between the genotypes in the feed conversion during the whole fattening period were not-significant. Dědková *et al.* (2002) found similar results for the genotype (59 × 19).

Influence of the body weight at 42 days

Highly significant differences were found between the two groups for each body weight of the whole period (Table 2). On the contrary no significant difference was found for each weekly average daily gain during the whole period of fattening. Significant differences were found only for the average daily consumption at the beginning of the fattening period from 42 to 49 days. The difference for the other traits (feed conversion, average feed conversion, total gain, and total feed consumption) did not reach statistical significance. The Figure 1 demonstrates that both age groups showed a parallel growth trend during the fattening period. Growth compensation during the whole fattening period was not observed in the rabbits with a lower body weight at 42 days of age. The rabbits with higher weaning weight are of specially interest of farmers due to higher intensity of growth, lower feed consumptions and the shorter fattening period to the constant slaughter weight.

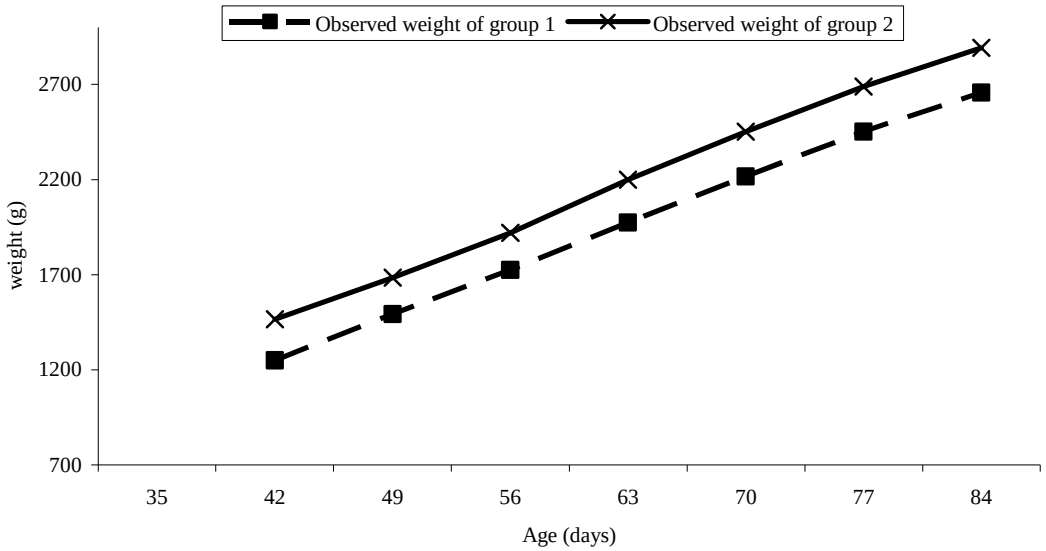

Figure 1: Approximation of the weaning weight and age

Our results are inconsistent with another paper (Rommers *et al.*, 2001). These authors found a growth compensation for rabbits with a lower weight at the beginning of fattening. The growth compensation was found also in other species of livestock. For instance Přibylová *et al.* (2004) found growth compensation in beef breeds in rearing houses and Barabasz and Łapiński (2007, personal information) in the Chinchilla. According to the same authors, the body weight at 42 days of age is an important factor for the age, body weight at the end of fattening respectively. The growth of rabbits can be influenced by the age at weaning (Fergutson *et al.*, 1997; Zita *et al.*, 2007). On the other hand Tůmová *et al.* (2002) and Xiccato *et al.* (2003) mentioned that the different age at weaning did not affect the growth of rabbits. Our results show that we should focus our attention to higher weaning weights of rabbits, which gives higher and matched weight of animals at slaughter.

CONCLUSIONS

Our experiment demonstrated that the body weight at the beginning of fattening of rabbits is strongly linked with body weight at the end of fattening. The results shown that the crossbred (59 × 19) is especially suitable for fattening to a greater carcass weight then the crossbred (119 × 19). The group of rabbits with a lower weight (group 1) with an average body weight of 1248.74 g at 42 days achieved a body weight of 2656.46 g at 84 days. The group of rabbits with a higher weight (group 2) with an average body weight of 1464.83 g at 42 days achieved a body weight of 2892.14 g at 84 days of age.

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