ECONOMIC VALUE OF RABBIT LINES SELECTED FOR DIFFERENT CRITERIA

Szendrő K.[1]*, Szendrő Z.[2], Gerencsér Z.[2], Radnai I.[2], Horn P.[2], Matics Z.[2]

[1]Faculty of Economic Science, Kaposvár University, 40 Guba S. St., H-7400, Kaposvár, Hungary
[2]Faculty of Agricultural and Environmental Sciences, Kaposvár University, 40 Guba S. St., H-7400, Kaposvár, Hungary
*Corresponding author: szendro.katalin@ke.hu

ABSTRACT

The aim of the experiment was to compare three genetic groups, slaughtered at similar weights, to examine their productive and carcass traits and economic value. Pannon Ka (PKa, maternal line) does were inseminated with semen of PKa, Pannon White (PWhite) or Pannon Large (PLarge, terminal line) bucks. The kits (PKa x PKa, PWhite x PKa, PLarge x PKa; n=60 in each genetic group) were weaned at 35 days of age and reared until 88, 83 and 79 days, respectively, when they reached similar body weights for slaughtering (2.8 kg). Results show that PLarge x PKa rabbits were able to exceed the average economic indicators compared to other groups. It can be concluded that the production performance of growing rabbits was affected by the adult weight, but the carcass traits were influenced by the computer tomography (CT)-based selection.

Key words: Growing rabbit, Lines, Production, Carcass traits, Economic value

INTRODUCTION

Most of the publications showed that rabbits originated from larger-sized parents (terminal lines) had better growth rate (Ramon *et al.*, 1996; Larzul and Rochambeau, 2004), but lower values of carcass traits (Dalle Zotte, 2002; Hernández *et al.*, 2006), since they were not as mature when slaughtered at the same weight as the progeny of maternal lines which had lower adult weights. Our hypothesis is that rabbits selected for L-value or TMV by computer tomography (CT) will be mature for slaughtering at younger age and achieve good slaughter results at a lower % of their adult weight than rabbits did not select for those traits.

The aim of the study was to compare economic values of three genetic groups slaughtered at similar weights to estimate whether the response in purebred within line selection – basically following a CT-aimed procedure –, it is also observed under commercial condition.

MATERIALS AND METHODS

Animals and housing

The experiment was carried out at Kaposvár University. Three lines selected for different criteria, were examined in the experiment. Kaposvár University has a special breeding program, in which two lines (Pannon White and Pannon Ka) have been selected for a long time for carcass traits, based on the data of computer tomography (CT).. The characteristics of the lines of Pannon Breeding Program were summarized by Matics *et al.* (2014).

Pannon Ka (PKa) does (maternal line) were inseminated with semen of PKa, Pannon White (PWhite) or Pannon Large (PLarge) bucks. Randomly selected kits (PKa x PKa, PWhite x PKa, PLarge x PKa; n=60 in each genetic group) were weaned at 35 days of age and reared until 88, 83 and 79 days, respectively, when they reached similar body weights for slaughtering (2.8 kg). Rabbits were housed in a closed building in wire-mesh cages (3 rabbits/cage, 16 rabbits/m^2). They were fed with commercial pelleted diets *ad libitum* and they could drink water freely from nipple drinkers. The temperature in the building was between 16 and 25 °C, and the daily lighting was 16 hours.

Measurements

Body weight and feed intake were measured from 5 weeks of age till they reached a similar body weight of 2.8 kg, therefrom weight gain was calculated. At the end of the experiment rabbits were slaughtered. The slaughtering and carcass dissection procedures followed the recommendations of World Rabbit Science Association (WRSA) described by Blasco and Ouhayoun (1996).

Financial indicators

Calculations are presented in Table 1. All financial figures were calculated in Euro. According to Maertens (2010) feeding cost may represent 60-70% of total production costs at the farm level. Since our experiment was carried out on growing rabbits, we used a value of 80% in calculating cost of production in case of medium price of feed (Maertens, personal communication). When calculating the cost of production on low and high feed price, – due to the change in the rate of feed cost – the percentage of feeding cost was 78.4 and 81.6%, respectively. Since cost of feed may vary significantly year by year, or even during a year and the market, the cost analysis was carried out based on the average cost of feed and 10% lower and 10% higher prices than the average price as well (low, medium /med/, high price).
The revenue from the whole rabbit carcass and from different carcass parts (revenue from rabbit products) was calculated. Based on these medium prices, 10% lower and 10% higher selling prices (low, med, high) were also calculated on the most valuable carcass parts (loin fillet and thigh meat), because the selling price of these items depends on different market prices. In these cases, a price change in whole carcass of +/- 8% was considered. Since the prices of other carcass parts (head, bones, fore part, etc.) are independent of the market, these were calculated on medium price.

Table 1: Calculation of financial indicators (Cost and revenue based on farm and slaughterhouse level, €/rabbit)

Indicators	Cost of feed		
	Low (0.25 €/kg)	**Med** (0.275 €/kg)	**High** (0.3 €/kg)
1. Cost of weaned rabbit*	1.83 €/kg x body weight		
2. Cost of feeding**	Feed intake between weaning and slaughtering x cost of feed (+/-10%) (hay: 0.17 €/kg)		
3. Cost of mortality (dead rabbit)	1. + cost of feed (+/-10%) till death		
4. Cost of production	1. + 2. (78.4%) + 3.	1. + 2. (80%) + 3.	1. + 2. (81.6%) + 3.
5. Price at slaughter	1.53 €/kg* x body weight		
6. Farm profit	Revenue (price at slaughter) - Cost (Cost of production)		
7. Revenue from whole carcass*	Chilled carcass (g) x selling price (4.3 €/kg)		
8. Revenue from carcass parts*	[Loin fillet (12 €/kg); thigh meat (11 €/kg); liver (2.8 €/kg); kidneys (2.5 €/kg); fore part (2.6 €/kg); head, bone, heart and lungs (0.45 €/kg)] x weight of each carcass part		

*Data was gained from Olivia Ltd. ** Data were gained from Demeter /Cargill/

Statistical analysis

Statistical analysis was conducted using the SPSS 10.0 software package. The productive and carcass traits were evaluated by one-way ANOVA.

RESULTS AND DISCUSSION

Productive and carcass traits

Weight of PKa x PKa at weaning (889 g) was lower than that of the PLarge x PKa (923 g), and the largest in PWhite x PKa (947 g) groups ($P<0.001$); presumably due to the differences in weight gain of kits between 3 and 5 weeks of age. Daily feed intake of PLarge x PKa rabbits (136 g/d) was significantly higher than that of PKa x PKa (127 g/d) and PWhite x PKa rabbits (129 g/d). These results were in accordance with those published in the literature (Ramon *et al.,* 1996; Feki *et al.*, 1996). However, the number of feeding days was less in the PLarge x PKa and more in PKa x PKa group,

this is why the total feed consumption of PLarge x PKa was lower than that of PKa x PKa rabbits. Mortality was low, and no differences existed among the genetic groups.

In the present experiment rabbits were slaughtered at similar body weight. Despite finding no differences in body weight at slaughter, the weight of hind part, hind legs and meat on hind legs were higher in PWhite x PKa and PLarge x PKa groups, respectively, and the smallest in PKa x PKa rabbits (P<0.001; Table 3). The MLD was larger in PWhite x PKa and PKa x PKa rabbits than in group of PLarge x PKa (P<0.05).

Table 3: Effect of genetic groups on carcass traits of rabbits (g) slaughtered at similar (2.8 kg) body weights

Traits	Genetic groups			SE
	PKa x PKa	PWhite x PKa	PLarge x PKa	
Age at the slaughter, d	88	83	79	
Body weight at slaughter	2785	2793	2795	9.7
Warm carcass	1708	1742	1726	6.9
Chilled carcass	1648	1678	1665	6.7
Fore part	418	418	425	2.2
Mid part	430	440	428	2.3
Hind part	512[a]	537[b]	530[b]	2.5
Hind legs	476[a]	501[b]	495[b]	2.4
HL	378[a]	402[c]	392[b]	2.1
MLD	171[b]	174[b]	165[a]	1.4

PKa = Pannon Ka (maternal line); PWhite = Pannon White; PLarge = Pannon Large (termimal line), HL = meat on hind legs; MLD = *m. longissimus dorsi,* [a,b,c]: Means in the same row with unlike superscripts differ at P<0.05 level.

Financial indicators

Cost of production and the profitability of different crossing combinations slaughtered at similar weights are shown in Table 4. The average difference in production costs (0.02 €/rabbit) was negligible between the PKa x PKa and PWhite x PKa groups, while a larger difference in cost of production (0.30 €/rabbit) was found between the former and PLarge x PKa in favor of PLarge x PKa rabbits, due to their shorter fattening period and, as a consequence, lower feed cost. Profit of PKa x PKa rabbits was 85 and 42% than that of the PWhite x PKa and PLarge x PKa group on a medium feed price, respectively. Results show that PLarge x PKa rabbits were able to exceed the average economic indicators on each feed price compared to the other groups.

A different ranking order occurred when the calculation was made at the slaughterhouse level. Revenues from rabbit carcass and rabbit products were 0.06 and 0.19, and 0.13 and 0.30 €/rabbit lower in PLarge x PKa and PKa x PKa rabbits, respectively, compared to PWhite x PKa group at a medium selling price. These differences were based on the carcass yields.

Results show a conflicting interest at farm and slaughterhouse level, since the farmer reached the highest benefit from PLarge x PKa, while the slaughterhouse in case of from PWhite x PKa rabbits, when they were sold and slaughtered at similar weight.

Table 4: Profitability of genetic groups (slaughtered at similar body weights, 2.8 kg) at the farm and slaughterhouse levels

Indicators	Genetic groups								
	PKa x PKa			PWhite x PKa			PLarge x PKa		
	At farm Price of feed								
	Low[1]	Med[1]	High[1]	Low[1]	Med[1]	High[1]	Low[1]	Med[1]	High[1]
Cost of feeding (€/r)[2]	1.68	1.85	2.02	1.61	1.77	1.94	1.49	1.63	1.78
Cost of mortality (€/r)[2]	0.09	0.09	0.09	0.06	0.06	0.06	0.00	0.00	0.00
Cost of production (€/r)[2]	3.87	4.04	4.20	3.86	4.02	4.17	3.59	3.73	3.88
Price at slaughter (€/r)[2]	4.27	4.27	4.27	4.28	4.28	4.28	4.29	4.29	4.29
Farm profit (€/r)[2]	0.40	0.23	0.07	0.43	0.27	0.11	0.70	0.55	0.41

	At slaughterhouse Selling price								
	Low[1]	**Med[1]**	**High[1]**	**Low[1]**	**Med[1]**	**High[1]**	**Low[1]**	**Med[1]**	**High[1]**
Revenue from rabbit carcass (€/r)[2]	6.82	7.42	8.01	6.95	7.55	8.16	6.89	7.49	8.09
Revenue from rabbit products (€/r)[2]	7.76	8.39	9.01	8.04	8.69	9.34	7.87	8.50	9.12

PKa = Pannon Ka (maternal line); PWhite = Pannon White; PLarge = Pannon Large (termimal line), [1]: Low, Med and High: low, medium and high price of pellets and selling price, [2]: €/r= €/rabbit

CONCLUSIONS

It can be concluded that the production performance of growing rabbits was affected by the adult weight, but the carcass traits were influenced by the CT-based selection. The results of the present experiment showed new evidence, since the lines (PWhite and PLarge) which have been selected for carcass traits by CT had better dressing out percentage, ratio of hind part to reference carcass and profitability ratios than the maternal line (PKa) when they were compared at similar live weight range. The farmer reached the highest benefit from PLarge x PKa, while the slaughterhouse in case of PWhite x PKa rabbits when they were sold and slaughtered at similar weight. The Pannon Large as terminal line can improve the growth and also the carcass traits of progenies.

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