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COMPARISON OF PRODUCTIVE AND CARCASS TRAITS AND ECONOMIC VALUE OF LINES SELECTED FOR DIFFERENT CRITERIA, SLAUGHTERED AT SIMILAR WEIGHTS

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Abstract: The aim of the experiment was to compare 3 genetic groups, slaughtered at similar weights, to examine their productive and carcass traits and economic value. Three lines of the Pannon Breeding Programme, selected for different criteria, were examined in the experiment. 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×PKa, PWhite×PKa, PLarge×PKa; n=60 in each genetic group) were weaned at 35 d of age and reared until 88, 83 and 79 d, respectively, when they reached similar body weights for slaughtering (2.8 kg). The weight gain of PLarge×PKa was the largest (51.0 g/d) and that of PKa×PKa was the smallest (47.2 g/d), while PWhite×PKa (41.8 g/d) was intermediate ($P<0.001$). Difference was found in feed conversion ratio between weaning and the age of slaughter (PKa×PKa: 3.03 respect to PWhite×PKa: 2.75 and PLarge×PKa: 2.66; $P<0.05$). Dressing out percentage and ratio of hind part to reference carcass of PWhite×PKa, PLarge×PKa and PKa×PKa were 62.4 and 37.7, 61.8 and 37.5, 61.3 and 36.8%, respectively ($P<0.01$). Results show that PLarge×PKa rabbits were able to exceed the average economic indicators compared to other groups. It may 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, economics.

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.

A special selection programme has been implemented at Kaposvár University using computer tomography (CT) to measure the muscle content in different parts of the body. Some results have showed the efficiency of CT-based selection. The L-value (surface cross section of *m. longissimus dorsi*) had moderate heritability (0.33), but this value was higher than that of the thigh muscle volume (TMV: 0.19-0.25) (Nagy *et al.*, 2006, 2010; Gyovai *et al.*, 2008, 2012). The genetic trends for TMV were higher in the Pannon Large (PLarge) rabbits (5.8 cm^3) than in the Pannon White (PWhite) line (4.0 cm^3) (Gyovai *et al.*, 2008; Nagy *et al.*, 2013). In a divergent selection experiment (Szendrő *et al.*, 1996), CT-based selection for L-value improved the dressing out percentage by 1.8%, and increased the weight of mid- and hind parts of carcass (by 5.1 and 2.7%, respectively). In another experiment, the divergent selection for TMV caused differences in dressing out percentage and meat on hind legs (1.1 and 1.9 %, respectively) in the second generation (Szendrő *et al.*, 2012).

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In weight gain and body weight of growing rabbits a clear order could be seen among the Pannon lines: Pannon Ka (PKa)<PWhite<PLarge (Szendrő *et al*., 2009a), which is similar to the order of adult weights of the lines. Results of comparison of different genetic groups have proven that PWhite rabbits had better dressing out percentage and ratio of hind part to reference carcass than PKa rabbits, although these differences have not been demonstrated between PLarge and PKa (Szendrő *et al*., 2009b). Our hypothesis is that rabbits selected for L-value or TMV by CT will be mature for slaughtering at a younger age and achieve good slaughter results at a lower % of their adult weight than rabbits not selected for these traits.

The aim of the study was to compare 3 genetic groups (PKa×PKa, PWhite×PKa, PLarge×PKa) slaughtered at similar weights to estimate whether the response in purebred within line selection –basically following a CT-aimed procedure–, is also observed under commercial conditions.

MATERIALS AND METHODS

The study was approved by the Institutional Animal Welfare Committee as the animal-welfare body of the Kaposvár University. All animals were handled according to the principles stated in the EC Directive 86/60963/2010 EU on the protection of animals used for experimental and other scientific purposes.

Animals and housing

The experiment was carried out at the Kaposvár University rabbit farm. Three lines from the Pannon Breeding Programme, selected for different criteria, were examined in the experiment. In Hungary, Kaposvár University has a special breeding programme, in which 2 lines have been selected for a long time for carcass traits, based on data from computer tomography (CT). From 1992, CT selection was based on 2 CT scans (junction of the 2nd and 3rd, and the 4th and 5th lumbar vertebrae), and the L-value (average of the 2 surfaces of cross section of *m. longissimus dorsi*) measured and expressed in cm^2 (Romvári *et al.,* 1996). In 2004, L-value was replaced by TMV. TMV was estimated on the basis of 11-12 scans taken every 10 mm between the *crista iliaca* of the *os ilium* and the patella on the hind legs by CT. Voxel frequency of density range belonging to the muscle tissue (between +20 and +200 of the Hounsfield Unit scale) was determined in each scan. Summing the values of 11-12 scans, the TMV was estimated in cm^3 (Szendrő *et al.,* 2012).

The characteristics of the Pannon Breeding Programme lines were summarised by Matics *et al.* (2014). Development of the PWhite line was initiated in the late 1980s and originated from New Zealand White and Californian breeds. PWhite rabbits have been selected for daily weight gain (replaced by 21-d litter weight since 2010) and carcass traits measured by CT; for L-value between 1992 and 2004, and for TMV since 2004. Their adult body weight is 4.3-4.8 kg. PKa, (maternal line) was established in 1999 and originated from some highly prolific Hungarian and foreign rabbit populations, also including some PWhite rabbits, and they have been selected for litter size using BLUP methods. Their adult body weight is 4.0 to 4.5 kg. PLarge (terminal line) originated from PWhite does inseminated with semen of some Hungarian and foreign breeds showing high growth rate, and has been selected for daily weight gain and TMV since 2005. Their adult body weight is 4.8 to 5.4 kg.

PKa does were inseminated with semen of PKa, PWhite or PLarge bucks. Randomly selected kits (PKa×PKa, PWhite×PKa, PLarge×PKa; n=60 in each genetic group, sex ratio 1:1) were weaned at 35 d of age and reared until 88, 83 and 79 d, 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 commercial pelleted diets *ad libitum* (between 5 and 9 wk of age the diet contained 10.3 MJ/kg digestible energy (DE), 16.1% crude protein (CP), 2.8% ether extract (EE), 16.9% crude fibre (CF) and medication: 1 ppm Clinacox®/diclazuril/, 500 ppm oxytetracycline, 50 ppm tiamulin and between 9 wk of age and slaughter the pellets contained 11.0 MJ/kg DE, 16.1% CP, 4.4% EE and 16.0% CF with no medications), and they could drink water freely from nipple drinkers. The temperature in the building was between 16 and 25°C, and the photoperiod was 16 h light and 8 h dark.

Measurements

Body weight and feed intake were measured every second week (at 5, 7, 9 wk, and when they reached a similar body weight of 2.8 kg), therefrom weight gain and feed conversion ratio were calculated. Body weight of rabbits was measured individually, but in the case of feed intake and feed conversion ratio the experimental unit was the cage. At the end of the experiment rabbits were slaughtered. Rabbits were weighed at slaughter (SW). The slaughtering and carcass dissection procedures followed the World Rabbit Science Association (WRSA) recommendations described by Blasco and Ouhayoun (1996). Rabbits were electro-stunned and slaughtered by cutting the carotid arteries and jugular veins. The slaughtered rabbits were bled, then the skin, genitals, urinary bladder, gastrointestinal tract and the distal part of the legs were removed. Skin and gastrointestinal tract, hot carcasses (HC) with head, set of organs (consisting of thymus, trachea, oesophagus, heart and lungs), liver, kidneys, perirenal fat and scapular fat were weighed and the HC was chilled at +4°C for 24 h. After chilling, the chilled carcasses (CC) were weighed. The head, set of organs, liver and kidneys were removed from each carcass to obtain the reference carcass (RC), which included the meat, bones and fat depots. Then the carcasses were cut between the 7th and 8th *thoracic vertebrae* and between the 6th and 7th *lumbar vertebrae* to obtain the fore-, mid-, and hind parts, which were weighed separately. Hind legs were deboned and meat on hind legs (HL) and *m. longissimus dorsi* (MLD) were weighed. The dressing out percentage (HC, CC and RC weight as % of SW) and the ratio of the organs and carcass parts to either the CC or to the RC weight were calculated.

Financial indicators

Calculations are presented in Table 1. All financial figures were calculated in Euro. The first cost factor was the price of a weaned rabbit (weight×price of weaned rabbit/kg). Data for weaned and slaughter rabbit price (1.83 and 1.53 €/kg, respectively) was gained from Olivia Ltd. According to Maertens (2010), feeding cost may represent 60-70% of total production costs at farm level, including the consumption of does, bucks and suckling kits. As our experiment was carried out on growing rabbits, we used a value of 80% in calculating the production cost in cases of medium priced feed (Maertens, personal communication). When calculating the production cost in 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. Mortality cost, as a loss of revenue, was considered as the price of the weaned rabbit and the cost of feed consumed till death. Hence, production cost included the price of the weaned rabbit, the feeding cost and the cost of mortality. As feed cost may vary significantly year by year, or even during a year depending on the weather (thus the production quantity) and the market, the cost analysis was carried out based on the average cost of feed (0.275 €/kg, Demeter, Cargill, personal communication) and 10% lower and 10% higher prices than the average price as well (low, medium, high price). Price of rabbits at slaughter was considered as revenue. In addition, profit was calculated as the difference between the revenue (price at slaughter) and production cost.

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

	Cost of feed		
Indicators	Low (0.25 €/kg)	Medium (0.275 €/kg)	High (0.3 €/kg)
1. Cost of weaned rabbit	1.83 €/kg body weight		
2. Cost of feeding	Feed intake between weaning and slaughtering×cost of feed (±10%) (hay: 0.1 €/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 body weight		
6. Farm profit	Revenue (price at slaughter)–Cost (Cost of production)		
7. Revenue from whole carcass	Chilled carcass (g)×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)]×weight of each carcass part		

The revenue from the whole rabbit carcass (including head and edible offal) and from different carcass parts (revenue from rabbit products) was calculated. Data were gathered from Olivia Ltd. (Odermatt, personal communication) in €/kg: whole carcass (4.3), loin fillet (12.0), thigh meat (11.0), liver (2.8), kidney (2.5), fore part (2.6), head, bone, heart and lungs (0.45). Based on these medium prices, 10% lower and 10% higher selling prices (low, medium, high) were also calculated on the most valuable carcass parts (loin fillet and thigh meat), as the selling price of these items depends on different market prices. In these cases, a price change in whole carcass of ±8% was considered. As the prices of other carcass parts (head, bones, fore part, etc.) are independent of the market, these were calculated on medium price.

Statistical analysis

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

$Y_{ij}=\mu+T_i+e_{ij;}$

where: μ=general mean, T_i=effect of the Genetic group (i=1-3), e_{ij}=random error.

RESULTS AND DISCUSSION

Productive traits

Results of productive traits are shown in Table 2. Weight of PKa×PKa at weaning was lower than that of the PLarge×PKa, and the largest in PWhite×PKa groups (P<0.001); presumably due to the differences in weight gain of kits between 3 and 5 wk of age. Weight gain of kits till they began to consume solid feed depended on their mother (milk production/kit), but after that age the growth rate was determined by their own ability, as proven several years ago by Venge (1953), who compared the growth of dwarf and giant breeds depending on which breeds were the foster mothers.

Significant differences were found in weight gain; the growth rate of PLarge×PKa was the largest and that of PKa×PKa was the smallest, while the PWhite×PKa rabbits had intermediate values, so they reached similar slaughter weights (2.8 kg) at different ages (79, 88 and 83 d, respectively). Similar results were achieved by other authors (Ramon *et al.*, 1996; Larzul and Rochambeau, 2004; Piles *et al.*, 2004; Metzger *et al.,* 2006a,b) who compared breeds or lines with different adult weights. They revealed a strong connection between the adult body weight and growth rate. Szendrő *et al.* (2009a,b) also showed correlation between adult weight and growth rate of purebred Pannon rabbits (PKa, PWhite and PLarge).

Daily feed intake of PLarge×PKa rabbits was significantly higher than that of PKa×PKa and PWhite×PKa rabbits (Table 2). These results were in accordance with those published in the literature (Feki *et al.*, 1996; Ramon *et al.,* 1996). However, the number of feeding days was less in the PLarge×PKa and more in PKa×PKa group, this is why the total feed consumption of PLarge×PKa was lower than that of PKa×PKa rabbits. Significant differences were found in feed conversion ratio between weaning and the end of the fattening period, with the best result for PLarge×PKa and the worst one in PKa×PKa group. According to our previous results (Szendrő *et al.*, 2012; Matics *et al.*, 2014), selection for TMV by CT also improved the feed conversion ratio.

Mortality was low (0-3 rabbits per group), and there were no differences among the genetic groups (Table 2).

Table 2: Effect of genetic groups on productive traits of rabbits slaughtered at similar (2.8 kg) body weights.

	Genetic groups			
Traits	PKa×PKa	PWhite×PKa	PLarge×PKa	SE
Weight at 5 wk, (g)	889^a	947^c	923^b	5.10
Weight gain, (g/d)	41.8^a	47.9^b	51.0^c	0.48
Feed intake, (g/d)	127^a	129^a	136^b	1.13
Feed conversion ratio	3.03^b	2.75^a	2.66^a	0.03
Mortality, (%)	5.0	3.3	0.0	-

PKa: Pannon Ka (maternal line); PWhite: Pannon White; PLarge: Pannon Large (terminal line); SE: standard error.
^{a,b,c}Means in the same row with unlike superscripts differ at P<0.05 level.

Carcass traits

Comparing breeds and lines slaughtered at similar age, several authors (Lukefahr *et al.*, 1982; Gómez *et al.*, 1998; Larzul and Rochambeau, 2004) found larger carcasses, carcass parts, and organ weights in larger bodied breeds and lines. Nevertheless, 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×PKa and PLarge×PKa groups, respectively, and the smallest in PKa×PKa rabbits (P<0.001; Table 3). The MLD was larger in PWhite×PKa and PKa×PKa rabbits than in group of PLarge×PKa (P<0.05). The largest amount of perirenal fat was found in PKa×PKa and the least in PLarge×PKa rabbits (P<0.05). Significant difference was also found in the weight of the gastrointestinal tract, which was the smallest in the PWhite×PKa group, and opposite results were found in skin weight in (P<0.01).

The dressing out percentages were the highest in PWhite×PKa and the lowest in PKa×PKa rabbits, while PLarge×PKa rabbits were between the other 2 genetic groups (P<0.05; Table 4). In general, breeds with larger adult weight grow faster and are slaughtered at a younger age, and they are not at the same level of maturity as medium-sized breeds. This is why lines with smaller adult body weights had a higher level of maturity at slaughter and better dressing out percentages, but with a lower ratio of the fore part, and higher ratio of the hind part to RC compared to large bodied lines (Gómez *et al.*, 1998; Pla *et al.,* 1996, 1998; Hernández *et al.*, 2006). Gómez *et al.* (1998) compared rabbit lines selected for litter size or growth rate. When the carcass traits were compared at the same age (having different body weights of maternal and terminal lines), the differences in dressing out percentages were lower compared to the examination when the body weight was similar (but the age was different). In the latter case, the rabbits of higher adult body weight were less mature at slaughter compared to the examinations made at identical ages. Differences in dressing out percentages between maternal and terminal lines were about twice as large when they were evaluated in identical body weight (Pla *et al.*, 1996, 1998) as at the same age (Hernández *et al.*, 2006). The greater the difference between the adult body weight of the lines and the lower the age at slaughter, the greater are the detectable differences for dressing out percentage. This phenomenon can explain the substantial differences found in slaughter

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

	Genetic groups			
Traits	PKa×PKa	PWhite×PKa	PLarge×PKa	SE
Age at slaughter, (d)	88	83	79	
Body weight at slaughter	2785	2793	2795	9.7
Skin	394[a]	409[b]	390[a]	2.5
Gastrointestinal tract	491[b]	458[a]	487[b]	4.2
Distal part of legs	90.9[a]	95.5[b]	97.0[b]	0.58
Head	135	137	134	0.7
Warm carcass	1708	1742	1726	6.9
Chilled carcass	1648	1678	1665	6.7
Set of organs	23.3	22.3	23.6	0.33
Liver	81.5	76.9	81.6	1.02
Kidneys	16.6	15.9	16.3	0.18
Reference carcass	1392	1425	1410	6.1
Perirenal fat	25.1[b]	23.2[ab]	20.8[a]	0.62
Scapular fat	7.16	7.13	6.25	0.29
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 (terminal line); SE: standard error.
Set of organs: thymus, trachea, oesophagus, heart and lungs; 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.

Table 4: Effect of genetic groups on ratios of carcass and carcass parts of rabbits slaughtered at similar (2.8 kg) body weights.

Traits	Genetic groups			SE
	PKa×PKa	PWhite×PKa	PLarge×PKa	
Ratio to slaughter weight (dressing out percentage), (%)				
Warm carcass	61.3[a]	62.4[b]	61.8[a]	0.13
Chilled carcass	59.2[a]	60.1[b]	59.6[ab]	0.13
Reference carcass	50.0[a]	51.0[b]	50.5[ab]	0.13
Ratio to chilled carcass, (%)				
Head	8.21	8.18	8.02	0.04
Set of organs	1.41	1.33	1.42	0.02
Liver	4.94[b]	4.58[a]	4.90[b]	0.06
Kidneys	1.01	0.95	0.98	0.01
Perirenal fat	1.51[b]	1.38[ab]	1.25[a]	0.04
Scapular fat	0.43	0.42	0.37	0.02
Ratio to reference carcass, (%)				
Fore part	30.0[b]	29.3[a]	30.2[b]	0.10
Mid part	30.9[b]	30.9[b]	30.4[a]	0.09
Hind part	36.8[a]	37.7[b]	37.5[b]	0.09

PKa: Pannon Ka (maternal line); PWhite: Pannon White; PLarge: Pannon Large (terminal line); SE: standard error.
Set of organs: thymus, trachea, oesophagus, heart and lungs.
[a,b]Means in the same row with unlike superscripts differ at P<0.05 level.

traits between rabbits selected for number of kits born alive or growth rate, evaluated at 9 wk of age or at a body weight of 2 kg (Pla *et al.*, 1996, 1998; Gómez *et al.*, 1998; Hernández *et al.*, 2006). Comparing our results to Spanish publications (Pla *et al.*, 1996, 1998; Hernández *et al.*, 2006), we did not detect any similar difference between lines selected for litter size (PKa) or selected for growth rate (PLarge). In contrast, in the present experiment both genetic groups with higher adult body weights (PWhite×PKa and PLarge×PKa) had better dressing out percentages and higher ratios of hind part, but lower or similar percentages of fore parts compared to PKa×PKa rabbits (P<0.05). In the selection centres of hybrid companies, the maternal lines are selected for improving reproductive performance (litter size at birth or at weaning), and the objective of selection of the terminal lines is the weight gain (Baselga, 2004; Garreau *et al.*, 2004; Khalil and Al-Saef, 2008). Generally, carcass traits are not included among the selection criteria. However, the aim of CT-based selection is to improve the meat content in the most valuable carcass parts. PWhite rabbits were selected for L-value between 1992 and 2004, which was closely correlated with the weight and ratio of MLD (Szendrő *et al.*, 1992). When the first generation of divergently minus selected rabbits for L-value was compared with the second generation of plus selected rabbits, 1.5% differences in dressing out percentage and 5.1% in mid part were found (Szendrő *et al.,*1996). Since 2004 PWhite and PLarge rabbits have been selected for TMV, which was highly correlated with weight and ratio of hind part, hind legs and meat on hind legs (Matics *et al.*, 2014). According to Gyovai *et al.* (2008) and Nagy *et al.* (2013) the TMV can be increased by 5.8 cm^3 and 4.0 cm^3 in PLarge and PWhite lines, respectively, in each generation. The results of the present experiment were in accordance with the purpose of CT-based selection, as significant difference was found in the MLD ratio between groups of PWhite×PKa and PLarge×PKa (with higher value in PWhite×PKa rabbits, because PWhite rabbits were selected for L-value), and the ratio of hind part to RC of these genetic groups was similar in PWhite×PKa and PLarge×PKa rabbits, as both lines (PWhite and PLarge) were selected for improving TMV. In our former experiment, PWhite and PKa does were inseminated with semen of PWhite, PKa, PLarge bucks (Szendrő *et al.*, 2010). The differences between the groups' dressing out percentages were not significant. The ratio of the fore part was higher in rabbits originated from PLarge bucks, but the ratio of hind part to the RC was the largest in the progenies of PWhite bucks and the lowest in the PLarge progenies. The results of the present experiment showed that over the past few years we have also been able to increase the meat content of the hind legs. This was the first time when it could be shown that PLarge, as a large-bodied line, had better results in meat production (ratio of hind part to RC) than PKa rabbits when these lines were compared at similar body weight range.

Table 5: Profitability of genetic groups (slaughtered at similar body weights, 2.8 kg) at farm and slaughterhouse levels.

	Genetic groups								
	PKa×PKa			PWhite×PKa			PLarge×PKa		
Indicators	Low	Medium	High	Low	Medium	High	Low	Medium	High
Price of feed at farm									
Cost of feeding (€/r)	1.68	1.85	2.02	1.61	1.77	1.94	1.49	1.63	1.78
Cost of mortality (€/r)	0.09	0.09	0.09	0.06	0.06	0.06	0.00	0.00	0.00
Cost of production (€/r)	3.87	4.04	4.20	3.86	4.02	4.17	3.59	3.73	3.88
Price at slaughter (€/r)	4.27	4.27	4.27	4.28	4.28	4.28	4.29	4.29	4.29
Farm profit (€/r)	0.40	0.23	0.07	0.43	0.27	0.11	0.70	0.55	0.41
Selling price at slaughterhouse									
Revenue from rabbit carcass (€/r)	6.82	7.42	8.01	6.95	7.55	8.16	6.89	7.49	8.09
Revenue from rabbit products (€/r)	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 (terminal line); Low, Medium and High: low, medium and high price of pellets and selling price; €/r: €/rabbit.

Financial indicators

Cost of production and the profitability of different crossing combinations slaughtered at similar weights are shown in Table 5.

The average difference in production costs (0.02 €/rabbit) was negligible between the PKa×PKa and PWhite×PKa groups, while a larger difference in cost of production (0.30 €/rabbit) was found between the former and PLarge×PKa in favour of PLarge×PKa rabbits, due to their shorter fattening period and, as a consequence, lower feed cost. Profit of PKa×PKa rabbits was 85 and 42% than that of the PWhite×PKa and PLarge×PKa group on a medium feed price, respectively. Results show that PLarge×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 performed 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×PKa and PKa×PKa rabbits, respectively, compared to PWhite×PKa group at a medium selling price. These differences were based on the carcass yields.

Results in Table 5 show a conflicting interest at farm and slaughterhouse level, as the farmer reached the highest benefit from PLarge×PKa, while the slaughterhouse did so from PWhite×PKa rabbits, when they were sold and slaughtered at similar weight.

CONCLUSIONS

It may 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 for shorter or longer periods had better dressing out percentage, ratio of hind part to reference carcass and profitability ratios than the maternal line (PKa) when they were compared in a similar live weight range. The farmer achieved the highest benefit from PLarge×PKa, while the slaughterhouse did so with PWhite×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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