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GROWTH, CARCASS AND MEAT QUALITY TRAITS OF STRAIGHTBRED AND CROSSBRED BOTUCATU RABBITS

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Abstract: The objective was to evaluate the effects of genetic group and age on growth, carcass, and meat traits of rabbits. A total of 144 straightbred Botucatu and White German Giant × Botucatu crossbred rabbits were involved. Rabbits were weaned at 35 d and sequentially slaughtered, four per genetic group × sex combination, at: 42, 49, 56, 63, 70, 77, 84 and 91 d. A 2×2 factorial arrangement was employed in a completely randomized design with repeated measures for growth traits, and a split-plot for carcass and meat traits. Crossbred rabbits were heavier (2032 *vs.* 1962 g; P<0.01), consumed more feed (143.5 *vs.* 131.0 g/d; P<0.01), and presented higher slaughter weight (2169 *vs.* 2093 g; P=0.02) and dressing percentage (59.0 *vs.* 58.2%; P=0.07) than straightbreds throughout the experiment. No difference between genetic groups was detected for feed conversion and empty gastrointestinal weight corrected for slaughter weight (SW). Crossbreds showed higher skin weight (308.2 *vs.* 299.7 g; P=0.06) and distal parts of leg weight (75.7 *vs.* 71.4 g; P<0.01), both corrected for SW. No genetic group effect was detected on dissectible fat and hind part weights. Chilled commercial carcass (1284 *vs.* 1229 g; P=0.02), chilled reference carcass (1036 *vs.* 1000 g; P=0.06), fore part (297.9 *vs.* 283.3 g; P=0.01) and loin (308.7 *vs.* 295.5 g; P=0.05) were heavier in crossbreds than in straightbreds, but these differences were attributed to differences in SW. Uncorrected weights of head, kidneys, liver and thoracic viscera were higher in the crossbred group, but only head (116.6 *vs.* 113.6 g; P=0.06) and thoracic viscera (30.4 *vs.* 28.6 g; P=0.01) were, in fact, proportionately heavier in crossbreds than in straightbreds. No effect of genetic group was detected on meat to bone ratio, muscle ultimate pH and chemical composition of the *Longissimus dorsi* muscle. All traits, except for ash and fat contents of the *Longissimus* muscle, showed age effects (P<0.01). Crossbreeding may be recommended for the production of whole commercial carcasses, but it is not clearly advantageous for the production of retail cuts. Slaughter should take place between 63 and 70 d of age for both genetic groups.

Key words: rabbit, carcass traits, dressing percentage, growth, muscle pHu, retail cuts

INTRODUCTION

The rabbit industry in Brazil has not reached a high level of organisation, so that the selection and maintenance of specialised sire and dam lines for a subsequent crossbreeding program is not yet viable. The *Botucatu* is a multi-purpose rabbit strain, selected simultaneously for litter size and growth traits (Moura *et al.*, 2001), as an alternative to specialised sire and dam lines. Rabbit meat consumption in Brazil is still quite low, estimated to be around 0.070 kg per capita/ year, due to both cultural and market reasons. Among the latter are high purchase prices associated with low consumer interest in whole carcasses. However, there is an increasing concern with healthiness of diet, especially in the more developed Southeast. Compared to more popular meats, rabbit meat shows high nutritional quality, characterized by high protein and low fat percentages, combined with a relatively high content of polyunsaturated fatty acids (Ouhayoun, 1992).

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The development of processed products such as retail cuts and precooked meals is needed to meet the changing demand. Knowledge about carcass traits such as weight and percentage of prime retail cuts and meat to bone ratio are essential for this new market.

The production of commercial carcasses in a short time and the improvement of feed efficiency and dressing percentage are the most important criteria to optimize rabbit meat production costs, under the producer and processor perspectives. Genetics, along with other effects such as age and weight, were grouped by Dalle Zotte (2002) among factors of high impact on rabbit carcass and meat quality. Proportion of loin ranges from 23 to 28% and of hind legs from 27 to 29 % of the commercial carcass, whereas meat to bone ratio ranges from 6 to 8 for the reference carcass and 4 to 6 for the hindleg (Dalle Zotte, 2002). For the meat processing industry, non-edible by-products, such as the gastrointestinal tract, distal parts of fore and hind legs, and even the skin, represent an important cost fordisposal.

Selection for post-weaning growth rate has been one of the main focuses of paternal lines in rabbit breeding programs (Baselga, 2004). Feed efficiency has been indirectly improved, but dressing percentage, meat to bone ratio, and meat quality traits have all decreased to some extent. These negative effects were detected not only when selected and control animals were slaughtered at the same weight (Pla *et al.*, 1996; Piles *et al.*, 2000; Gondret *et al.*, 2005), but also when they were compared at the same age and different body weights (Gondret *et al.*, 2002, Hernández *et al.*, 2004, Ramírez *et al.*, 2004, Larzul *et al.*, 2005). Thus, for each genetic group it becomes necessary to determine the optimum slaughter age.

This study was designed to evaluate the effects of the genetic group (straightbred vs. crossbred) and age on growth performance, dressing percentage, carcass and meat quality of Botucatu rabbits.

MATERIAL AND METHODS

The experiment was carried out at the Rabbit Production Unit of *Faculdade de Medicina Veterinária e Zootecnia,* UNESP, Botucatu, SP, Brazil. Initially, 144 weaned rabbits, males and females, were caged in flat deck wire cages (0.80 × 0.60 × 0.45 m), fitted with nipple drinkers and feeders. Cages were housed in an open, east-west oriented building protected with plastic adjustable curtains. Rabbits were randomly assigned to treatments, nine per cage, according to genetic group and gender, at weaning (35 d of age). Only 128 animals were, in fact, used in the experiment; the remaining 16 (one per cage) were included with the objective of replacing possible mortality losses.

Half of the rabbits were from the Botucatu genetic group and half were products of crossbreeding between White German Giant males from a commercial producer and Botucatu females. The Botucatu genetic group is a synthetic strain, originated from Norfolk 2000 rabbits (Moura *et al.,* 2000). According to this breeding company, Norfolk hybrids originated from a two-generation crossbreeding program involving the New Zealand White, Californian and Bouscat Giant breeds. The German Giant breed is heavier and assumed to be later maturing than the Botucatu strain.

Animals had free access to feed and water. A pelleted feed was formulated according to De Blas and Mateos (1998) (Table 1). Average feed consumption was recorded weekly on a cage basis. At 42, 49, 56, 63, 70, 77, 84, 91 d of age all rabbits were weighed; one was randomly taken from each cage (four per treatment) for slaughter. The total number of animals whose performance was recorded decreased weekly due to the slaughter of 16 animals per week. The age of slaughter effect in this study was combined with the slaughter day effect.

Slaughter took place at the Experimental Chicken Slaughter House on campus. Jugular vein bleeding followed a neck hit. Weights of hot commercial carcass (carcass including head, thoracic viscera –

Table 1: Ingredients and chemical composition of the experimental diet.

Feed ingredient (%)		Calculated composition[1]	
Corn	19.700	Digestible energy (kcal/kg)	2500
Soybean meal	22.400	Crude protein (%)	16.016
Brachiaria decumbens grass hay	21.500	Starch (%)	15.960
Wheat bran	20.000	Acid detergent fiber (%)	16.730
Citrus pulp	10.000	Fat (%)	4.900
Vegetable oil	2,500	Ca (%)	0.600
Bentonite	2.000	P (%)	0.443
Salt	0.419	Na (%)	0.220
Limestone	0.559	Cl (%)	0.309
Vitamin and Mineral Supplement[2]	0.500	Lysine (%)	0.819
Dicalcium phosphate	0.300	Sulfur aminoacids (%)	0.602
DL-Methionine 99	0.099	Threonine (%)	0.640
L-Threonine	0.023		

[1]

[2] Suprevit®: cobalt 100 mg, copper 2,400 mg, iron 16.000 mg, iodine 200 mg, manganese 12,000 mg, selenium 40 mg, vitamin A 40,000 UI, vitamin B1 500 mg, vitamin B12 2,500 mcg, vitamin B2 1.000 mg, vitamin B6 400 mg, vitamin D3 250,000 UI, vitamin E 7,000 mg, vitamina K3 400 mg, zinc 10,000 mg, calcium pantothenate 2,000 mg, folic acid 100 mg, choline 25 g, niacin 6,000 mg, antioxidant 40 mg, robenidin 6.6 g, vehicle to complete 1,000 g.

heart, lungs, esophagus, trachea and thymus – liver and kidneys), skin, distal parts of fore and hind legs, and empty gastrointestinal tract were recorded (Blasco and Ouhayoun, 1996). Hot carcasses including head, thoracic viscera (heart, lungs, trachea, esophagus and thymus), liver and kidneys were packed in plastic bags, chilled with crushed ice, and kept in the refrigerator at 4°C for 24 hours for further measurements.

Growth performance traits were: body weight, feed consumption, feed conversion and slaughter weight, at 42, 49, 56, 63, 70, 77, 84, 91 d of age. Yield traits, recorded before carcass chilling, were: dressing percentage (calculated as 100 × commercial hot carcass weight/slaughter weight) and weights of skin, distal parts of fore and hind legs, and empty gastrointestinal tract.

Twenty-four hours after slaughter, chilled commercial carcass and chilled reference carcass weights were recorded according to Blasco and Ouhayoun (1996). Dissectible fat (scapular, perirenal, and inguinal deposits), as well as thoracic viscera, liver, and kidneys were weighed in an analytical scale. First retail cuts (fore legs plus thoracic cage, hind legs, and loin) were obtained by cutting chilled carcasses at the technological joints (Blasco and Ouhayoun, 1996). Percentage of retail cuts were obtained relative to chilled reference carcass. The left hind leg was used for meat to bone ratio evaluation. The ultimate pH (pHu) was determined *in situ* on the left *Longissimus dorsi* muscle next to the 5th lumbar vertebra on the 24 h chilled carcass. A glass electrode digital pHmeter (Digimed), suited for meat penetration, was employed. Both *Longissimus dorsi* muscles were frozen for chemical analyses. Water, protein, ether extract, and ash contents were determined according to standard procedures (A.O.A.C., 1984; Bailey, 1967).

For body weight and feed consumption, a 2 × 2 factorial arrangement (genetic groups × genders) was employed in a completely randomized design with repeated measures, where the factorial was applied to the main plots (cages) and the repeated measures consisted of weighings. Because the number of rabbits per cage decreased each week, these analyses were weighted according to the number of animals remaining each week. For carcass and meat quality traits the same 2 × 2 factorial arrangement, but with a split-plot design, was employed. Two analyses of growth, yield, and carcass traits, except for dressing percentage and meat to bone ratio, were performed: uncorrected and corrected for slaughter weight. The MIXED procedure of SAS (2001) was used in all analyses. A significance level of $P<0.10$ was considered in the discussion, but the actual probability values obtained in the analyses were presented, so that the reader is allowed to make his own interpretation of the significance level.

RESULTS AND DISCUSSION

This is the first report on carcass and meat quality traits of Botucatu rabbits. Results presented in Tables 2 and 3 reflect performance throughout the experiment, i.e., from 42 to 91 d of age. Age effect (as well as its interaction with genetic group and sex, when significant) are shown in Figures 1 to 4.

The mortality rate was low during the experiment (2.1%): only two crossbred males and a straightbred female out of the initial 144 rabbits died. Since they were allocated in different cages, the exceeding animals replaced them at slaughter, such that all the 128 rabbits were in fact slaughtered, 16 per week, from 42 to 91 days of age. For performance traits (body weight, feed consumption and feed conversion) data were recorded on 142, 125, 109, 92, 75, 59, 43 and 27 rabbits at 42, 49, 56, 63, 70, 77, 84, and 91 d of age, respectively. Two of the male rabbits slaughtered at 63 d of age, one straightbred and one crossbred, showed body weights that were more than three standard deviations below average. Furthermore, they were both found to be athymic at slaughter. Their performance and carcass data were ignored. Therefore, carcass and meat quality traits were recorded from 126 rabbits: 16 slaughtered at 42, 49, 56, 70, 77, 84, and 91 d and 14 rabbits slaughtered at 63 d.

Crossbred rabbits were heavier and ate more throughout the experiment than straightbreds, but no differences in feed conversion were detected between genetic groups (Table 2). Consistently, slaughter weight was also higher for crossbreds. Although skin, distal part of fore and hind legs and empty gastrointestinal tract were heavier in crossbred rabbits, dressing percentage showed higher values in crossbreds (P=0.07; Table 2). These results are in agreement with those of Ozimba and Lukefahr (1991). Working with New Zealand White and Californian straightbreds and several different crossbreds, they found purebreds to have lighter live and carcass weights.

Chilled commercial carcass was heavier in crossbred rabbits throughout the experiment, and chilled reference carcass tended to be heavier in crossbreds, but when those means were corrected for slaughter weight, differences became non significant (Table 3). The head was heavier in crossbreds, but no differences between genetic groups were detected for dissectible fat weight, both uncorrected and corrected for slaughter weight. Fore part and loin were heavier in crossbreds; after the correction for slaughter weight, those differences became non-significant. No differences between genetic groups were detected for hind part weight and meat to bone ratio. Uncorrected weights of kidneys, liver and thoracic viscera were higher in the crossbred genetic group. After the correction for slaughter weight, thoracic viscera still remained heavier in crossbreds, revealing higher development of those organs and perhaps a slightly lower degree of maturity at slaughter in this group. Consistently, percentage of fore part tended to be larger in crossbreds (28.8 *vs.* 28.4%, P=0.05), but no differences were detected in the percentages of loin (29.5%) and hind part (40,2%) between genetic groups. Piles *et al.* (2000) interpreted higher development of liver, kidneys and thoracic viscera in rabbits selected for growth rate, as a sign of lower degree of maturity, when compared to control rabbits slaughtered at a constant weight.

A genetic group × age interaction effect (P=0.03) was found on dressing percentage (Figure 1). Evolution of this trait followed distinct patterns in straightbreds and crossbreds up to 70 d; means

Table 2: Least-squares means (standard errors) of growth performance and slaughter traits uncorrected and corrected for slaughter weight, according to the genetic group[1].

	Uncorrected			Corrected		
	Straightbred	Crossbred	*P-value*	Straightbred	Crossbred	*P-value*
Body weight (g)[2]	1962 (13)	2032 (13)	<0.01			
Feed consumption (g)[2]	131.0 (2.2)	143.5 (2.2)	<0.01			
Feed conversion [2]	4.06 (0.12)	4.19 (0.12)	0.44			
Slaughter weight (g)[3]	2093 (20)	2169 (20)	0.02			
Dressing percentage (%)[3]	58.25 (0.26)	58.98 (0.26)	0.07			
Skin (g)[3]	293.1 (3.7)	314.3 (3.7)	<0.01	299.7 (2.9)	308.2 (2.8)	0.06
Distal part of legs (g)[3]	70.41 (0.61)	76.55 (0.61)	<0.01	71.35 (0.51)	75.7 (0.51)	<0.01
Empty gastrointestinal tract weight (g)[3]	170.9 (1.8)	178.1 (1.8)	0.02	173.2 (1.8)	175.9 (1.8)	0.31

[1] The least-square means reflect performance throughout the experiment, i.e., from 42 to 91 d of age.
[2] The number of rabbits measured decreased weekly due to mortality (3 rabbits) and slaughter. The actual number of rabbits was 142, 125, 109, 92, 75, 59, 43 and 27 at 42, 49, 56, 63, 70, 77, 84, and 91 d of age, respectively.
[3] Total number was 126 rabbits 16 slaughtered at 42, 49, 56, 70, 77, 84, and 91 d and 14 slaughtered at 63 d.

Table 3: Least-squares means (standard-errors) of carcass traits and ultimate muscle pH (pHu), uncorrected and corrected for slaughter weight, according to the genetic group[1].

	Uncorrected			Corrected		
	Straightbred	Crossbred	*P-value*	Straightbred	Crossbred	*P-value*
Commercial carcass Chilled commercial carcass (g)	1229 (14)	1284 (14)	0.02	1253.1 (4.9)	1261.0 (4.9)	0.29
Reference chilled carcass (g)	1000 (12)	1036 (12)	0.06	1020.3 (5.7)	1017.3 (5.7)	0.72
Head weight (g)	112.4 (1.1)	117.7 (1.1)	<0.01	113.60 (0.98)	116.59 (0.98)	0.06
Dissectible fat (g)	27.3 (1.6)	27.4 (1.6)	0.98	29.3 (1.3)	26.5 (1.2)	0.14
Fore part (g)[2]	283.3 (3.5)	297.9 (3.5)	0.01	289.3 (1.5)	292.4 (1.5)	0.17
Loin (g)	295.5 (4.3)	308.7 (4.3)	0.05	300.9 (2.2)	303.3 (2.2)	0.48
Hind part (g)	401.4 (4.7)	412.4 (4.7)	0.12	408.9 (3.1)	405.6 (3.1)	0.47
Meat to bone ratio	7.027 (0.064)	7.040 (0.064)	0.89			
Kidneys (g)	11.82 (0.17)	12.5 (12.52)	0.01	11.99 (0.16)	12.37 (0.16)	0.11
Liver (g)	68.3 (1.5)	73.2 (1.5)	0.04	70.0 (1.2)	71.7 (1.2)	0.35
Thoracic viscera (g)[3]	28.16 (0.44)	30.79 (0.44)	<0.01	28.60 (0.42)	30.36 (0.42)	0.01
pHu	5.581 (0.019)	5.607 (0.019)	0.34	5.575 (0.020)	5.613 (0.020)	0.21

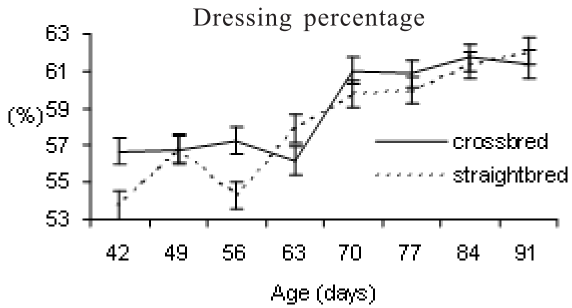
[1] The least-square means reflect performance throughout the experiment, i.e., from 42 to 91 d of age. Total number was 126 rabbits: 16 slaughtered at 42, 49, 56, 70, 77, 84, and 91 d and 14 rabbits slaughtered at 63 d

[2] Fore legs plus thoracic cage

[3]Heart, lungs, trachea, oesophagus and thymus

ranged from 53.8 at 42 d to 59.8 at 70 d and to 62.1% at 91 d for straightbreds and 56.7 to 61.0 and to 61.4% for crossbreds, at the same age points. A pronounced increase in dressing percentage seemed to have occurred a week earlier (between 56 and 63 d of age) in straightbreds than in crossbreds (between 63 and 70 d of age, Figure 1). This finding gives further support to the hypothesis of later maturity in crossbreds. The dressing percentage of Pannon White rabbits weighing from 2.2 to 3.5 kg ranged from 59.5 to 62.1% (Szendrö *et al.*, 1998), values that are very similar to those found in the present study. According to Dalle Zotte and Ouhayoun (1998) dressing percentage may increase up to 91 d of age.

There was a genetic group × gender × age interaction effect (P<0.01) on distal parts of fore and hind legs weight, but no meaningful explanation was found for it. No genetic group x age or gender x age interaction effects were detected for other growth or yield traits but age was positively related with all of them (P<0.01). Age least-squares means for slaughter weight ranged from 1274 ± 37 at 42 d to 2929 ± 37 g at 91 d. The minimum commercial live weight of 2 kg was attained at 63 d of age (2047 ± 40 g, for both genetic groups). Feed conversion increased consistently from 42 (2.16 ± 0.17) to 70 d (5.21 ± 0.23). Empty gastrointestinal weight followed a steeper increase with age than skin weight up to 77 d. This trend was reversed afterwards, in accordance with the fact that skin and adipose tissue show progressive increase in their allometric coefficient, whereas gastrointestinal tract and bone tissue show decreasing allometric coefficients as age progresses (Ouhayoun, 1983).



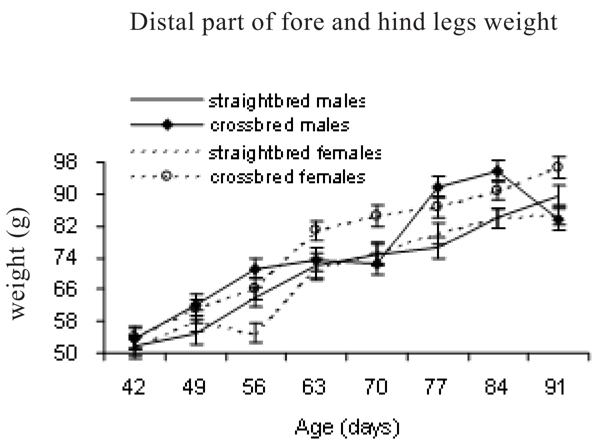


Figure 1. Effect of genetic group × age interaction (P=0.03) on dressing percentage and of genetic group × sex × age interaction (P<0.01) on distal part of fore and hind legs weight. Data were uncorrected for slaughter weight.

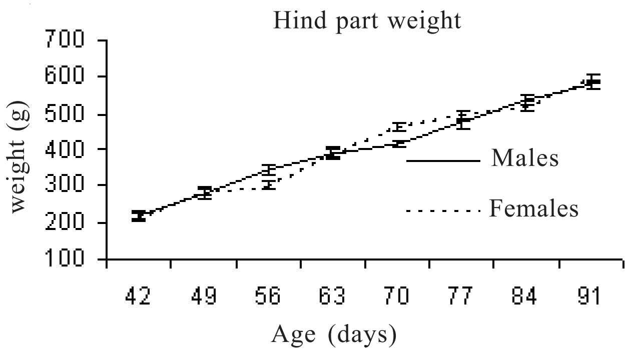


Figure 2. Effect of sex × age interaction (P=0.03) on hind part weight. Data were uncorrected for slaughter weight.

No genetic group × age interaction effect was found for commercial and reference carcass traits. There was an age × gender interaction (P=0.03) for hind part weight (Figure 2); males exceeded females from 49 to 63 d of age, whereas from 63 to 77 d females exceeded males for this trait. All commercial and reference carcass traits showed age effects. Their relationship with age was positive, sometimes clearly linear (such as for commercial and reference carcass, head and carcass parts weights, and meat to bone ratio), but sometimes non linear (e.g. for thoracic viscera, kidneys, liver and dissectible fat). These non-linear relationships refer to organs and tissues whose allometric coefficients undergo significant changes during the phase of rapid growth. The most important traits concerning retail cut processing (i.e. chilled reference carcass weight, loin and hind part weights, and meat to bone ratio), which mainly reflect muscle development, showed linear increase with age.

Chilled reference carcass weight ranged from 544 g at 42 d to 1101 g at 70 d to 1492 g at 91 d of age. Meat to bone ratio, determined on the left hind leg, ranged from 5.10 to 7.88 to 8.47, respectively, at the same age points. These latter values compare favorably to those reported by Pla *et al.* (1998), which ranged from 4.16 to 4.87 for three lines and live weights ranging from 1800 to 2300 g, and by Piles *et al.* (2000) of 5.03 evaluated at 2 kg body weight. This finding uncovers a high degree of muscularity of the hindquarters of Botucatu rabbits, comparable to that reported by Gondret *et al.* (2005) for the low 63-d body weight line. Dissectible fat represented only 2.11% of the chilled reference carcass at 42 d and 3.38% at 91 d of age. A more pronounced increase in fat weight occurred after 70 d, when it corresponded to 2.22% of the chilled reference carcass. These values are compatible with that of 2.5% reported by Pla *et al.* (1996) for the precocious strain R at the live weight of 2 kg.

Empty gastrointestinal tract, uncorrected and also corrected for slaughter weight, was heavier in females (178.3 *vs.* 170.6 g, P=0.01, and 177.9 *vs.* 171.2 g, P=0.02, respectively). On the other hand, males had more developed heads than females, both corrected and uncorrected for slaughter weight (116.9 *vs.* 113.2 g, P=0.03 and 117.2 *vs.* 113.0 g, P<0.01, respectively), reflecting a secondary sexual characteristic. The weights of liver and kidneys, corrected for slaughter weight, were also higher in males (72.8 *vs.* 68.8 g, P=0.03, and 12.4 *vs.* 11.9 g, P=0.03, respectively). Differences between males and females were not detected for any other traits.

No differences in the pHu (Table 3) or in the chemical composition of the *Longissimus dorsi* muscle were detected between genetic groups or genders. The overall means (standard errors) for water, protein, ether extract and ash contents were: 76.108 (0.076), 21.540 (0.097), 0.687 (0.028) and 1.2393 (0.0050)%, respectively. It is worth noticing that the intramuscular fat content was very low, under 0.70%. No genetic group x age or gender x age interaction effects were detected for these traits. Age at slaughter, on the other hand, affected water and protein contents and pHu of this muscle. Water content decreased with age from 77.1% at 42 d to 75.1% at 91 d. Protein percentage showed a positive trend with age up to 84 d, increasing from 20.3% at 42 d to 23.1% at 84 d. Ether extract and ash contents did not show age effects. At more advanced ages (between 77 and 126 d), Gondret *et al.* (1998) found greater changes in the chemical composition of the *Longissimus dorsi* muscle of New Zealand White males. Protein and fat contents increased from 23.4 to 26.9% and 1.3 to 2.2%, whereas water decreased from 74.0 to 63.9%. Intramuscular fat content in rabbits is rather low and increases slowly with age or body weight gain (Parigi-Bini *et al.*, 1992; Szendro *et al.*, 1998). Thus, subcutaneous and abdominal fat deposition make a much more substantial contribution to carcass fat deposition in mature rabbits than does intramuscular fat.

There was a positive relationship of muscle pHu with age from 42 (5.49) to 63 d (5.70), but no consistent trend was perceived thereafter. A slaughter day effect, which can not be separated from the slaughter age effect in this experiment, could have caused the oscillating pattern in pHu after 63 d. Similarly, Hernández *et al.* (2004) did not find differences in the pHu of the *Longissimus* muscle between 9 and 13 weeks of age. These results are unexpected because the combination of an increase in glycolytic metabolism and a decrease in oxidative activity during muscle growth should be accompanied by pHu lowering (Dalle Zotte and Ouhayoun, 1995). However, the increase in the glycolitic metabolism as a function of age was reported to be more pronounced in the *Biceps femoris* than in the *Longissimus dorsi* (Hulot and Ouhayoun, 1999). Pla *et al.* (1998) reported values for *Longissimus dorsi* pHu ranging from 5.58 to 5.69 for three lines of rabbits and live weights ranging from 1800 to 2300 g, whereas Gondret *et al.* (2002) reported values of 5.79 and 5.76 for lines divergently selected for 63 d weight.

In summary, crossbred rabbits showed higher body weight and produced heavier chilled commercial carcasses with no differences in feed conversion, when compared to straightbreds. Weights of non-edible by products, head, and organs included in the chilled commercial carcass, as well as the fore part of chilled reference carcass were heavier in the crossbred group, but except for skin, distal parts of legs and thoracic viscera, differences could be attributed exclusively to differences in slaughter weight. Chilled reference carcass, dissectible fat, loin and hind part weights, dressing percentage, meat to bone ratio and meat quality traits did not differ between genetic groups. Age, as expected, affected most traits, pointing out the relevance of determining optimum age of slaughter.

Crossbreeding may be recommended for the production of whole commercial carcasses, because the minimum slaughter and carcass weights could be attained earlier. However, there is no clear evidence of advantage of crossbreeding for the production of retail cuts, because the weights of the most valuable retail cuts were similar to those of straightbreds. Considering age trends for feed conversion, dressing percentage, meat to bone ratio, dissectible fat, and muscle protein content, slaughter should take place between 63 and 70 d of age for both genetic groups. The same recommendation could be made for attainment of the minimum commercial live weight of 2 kg and minimum reference carcass weight of 1 kg.

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