

EFFECT OF AGE AND WEIGHT OF RABBITS AT SLAUGHTER ON CARCASS VALUE

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ABSTRACT

The study is an economic evaluation of the effect of age and weight at slaughter on the value of loin fillet, thigh meat and whole carcass of rabbit. Rabbits were 74, 84 and 94 days of age at slaughter, with the average body weight of 2.53, 2.84 and 3.15 kg, respectively, and with five weight categories in each age group. Revenue from the whole carcass and different carcass parts were 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 lung (0.45). Beside the real values, relative value (%) of whole carcass and its main parts (loin fillet and thigh meat) compared to values of the largest body weight category within each age group (100%) were determined. Within the same age categories, the effect of body weight on the value of whole carcass, loin fillet and thigh meat was significant in each case ($P < 0.001$). Concerning the effect of age, similar tendency can be seen in whole carcass, loin fillet and thigh meat, but significant differences were observed only between the 74 d rabbits and the two older age groups. The conclusion is that when the values were evaluated, 74 d rabbits are not mature enough, while 84 d rabbits are considered favorable for slaughter. This slaughter age is regarded as a reasonable compromise from either the slaughterhouse or the breeder point of view.

Key words: rabbits / age / body weight / carcass traits

1 INTRODUCTION

Dalle Zotte (2002) summarised some results of carcass traits in a review. In those studies the older rabbits were usually heavier and vice versa. However, it could not be determined whether the observed changes were caused by the age or the body weight. The design of the experiment of Metzger *et al.* (2011) allowed us to examine the separate effect of age and body weight, showing the changes of dressing out percentage and fore, mid and hind parts to reference carcass ratio. A negative correlation was observed between the ratio of mid part and hind part of the carcass (Metzger *et al.*, 2011). Since these are the most valuable parts of the carcass, the inverse relation could influence the market price. Based on these findings, the results of the economic evaluation of rabbit genotypes differing in growth rate and carcass character-

istics were recently published by Szendrő *et al.* (2012). The aim of the present study was to carry out an economic evaluation of the effect of age and weight of rabbits at slaughter on the real and relative value of whole carcass and the two more valuable parts (loin fillet and thigh meat), which determine the value of the carcass for the slaughter houses.

2 MATERIAL AND METHODS

The study was based on an experiment which was carried out at the rabbit farm of Kaposvár University, on Pannon White rabbits (Metzger *et al.*, 2011). The rabbits were housed in cages until slaughtering (2–3 rabbits/cage). They were fed a commercial diet *ad libitum*,

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Table 1: Number of rabbits in the different age groups and body weight categories

Age (days)	Body weight categories (kg)						
	1.86–2.05	2.15–2.35	2.49–2.63	2.78–2.92	3.09–3.25	3.35–3.52	3.65–3.84
74	4	14	21	19	9		
84		5	20	27	21	7	
94			11	19	31	19	11

and drinking water was available *ad libitum* from nipple drinkers.

Three, randomly selected groups of does were mated with an interval of 10 days, thus the kits were born at different times. Rabbits ($n = 238$) – independently of their gender – belonging to the three age groups were slaughtered on the same day, when they were 74, 84 and 94 days of age, with the average body weight of 2.53, 2.84 and 3.15 kg, respectively. Within each age group, rabbits were slaughtered at a body weight 0.3 and 0.6 kg more or less than the average weight, respectively. In this way the weight difference between two neighboring weight and age groups was equally 0.3 kg. This design enabled the separate examination of age and body weight on the carcass traits and their values. The numbers of rabbits in the experimental groups are shown in Table 1.

Rabbits were slaughtered at a slaughterhouse located at a distance of 200 km from the farm. Animals were weighed before slaughter. At the end of the slaughtering line the hot carcasses (with the head, heart, lungs, liver, kidneys and fat depots) were chilled at 3 °C for 24 h, and then were weighed again. The chilled carcasses were dissected according to the recommendation described by Blasco and Ouhayoun (1996). The head was separated from the carcass and then the liver, the kidneys and the perirenal fat were removed. Afterward the carcass was cut between the last thoracic and the first lumbar vertebrae and between the 6th and 7th lumbar vertebrae to obtain the fore, mid and hind parts. From the mid part the *m. Longissimus dorsi* was removed, then the hind legs were deboned.

Table 2: The price of the carcass and its parts in the Italian market (€/kg)

Carcass parts	Price, €/kg
Whole carcass	4.3
Loin fillet	12.0
Thigh meat	11.0
Liver	2.8
Kidneys	2.5
Fore part	2.6
Head, bone, heart and lung	0.45

Financial data were collected from the owner of a Hungarian rabbit slaughterhouse. Table 2 shows the price of the carcass and its parts valid in the Italian market.

With the help of the financial data (Table 2), the value (€) of the carcass and carcass parts (weight multiplied by price) were calculated in each experimental age groups and body weight categories. The following carcass parts were involved into the economical calculation: whole carcass (meaning the chilled carcass with the head, heart, lungs, liver, kidneys and fat depots), loin fillet (meaning *m. Longissimus dorsi*), thigh meat (meaning the deboned hind legs) and total carcass parts (meaning the fore part of the carcass + the mid part of the carcass + hind legs + the head + the liver).

Beside the real value, the relative value (in %) of the whole carcass, the loin fillet and the thigh meat was calculated. In this case the value of these parts was calculated as the percentage of the value in the highest body weight within each age group.

For the separated evaluation of the two factors (age or body weight), data of each age group and body weight category was analyzed separately. In this case one-way analysis of variance was used with Tukey Post Hoc test. The effect of gender was not taken into consideration in the statistical analysis. The experimental data were processed by SAS programme package 9.1 (SAS, 2001), LS mean was used.

3 RESULTS AND DISCUSSION

Table 3 shows the value of the whole carcass, the loin fillet, the thigh meat and total carcass parts depending on the age and body weight at slaughter. Within each age category, the effect of body weight on whole carcass value was significant ($P < 0.001$), the whole carcass value increased continuously with the body weight. The difference was also significant ($P < 0.05$) between the neighbouring weight groups. On the other hand, within the same body weight categories, the effect of age was significant only in body weight categories of 2.49–2.63 and 3.09–3.25 kg ($P < 0.001$ and < 0.05 , respectively) comparing 74 d rabbits to the older age categories. There was no significant difference between 84 and 94 days of age. To-

Table 3: Value of the whole carcass, the loin fillet, the thigh meat and total carcass parts depending on the age and body weight at slaughter (€/kg of carcass)

Age (days)	Body weight categories, kg						
	1.86–2.05	2.15–2.35	2.49–2.63	2.78–2.92	3.09–3.25	3.35–3.52	3.65–3.84
Whole carcass ¹ value (SEM: 0.070)							
74	4.386 ^A	5.123 ^B	5.840 ^{C_a}	6.790 ^D	7.382 ^{E_a}	-	-
84	-	5.487 ^A	6.211 ^{B_b}	6.917 ^C	7.625 ^{D_b}	8.330 ^E	-
94	-	-	6.192 ^{A_b}	6.964 ^B	7.636 ^{C_b}	8.476 ^D	9.100 ^E
Loin fillet ² value (SEM: 0.021)							
74	0.750 ^A	0.969 ^{AB}	1.186 ^{BC_a}	1.388 ^{CD_a}	1.448 ^{D_a}	-	-
84	-	1.133 ^A	1.357 ^{B_b}	1.530 ^{BC_b}	1.589 ^{C_{ab}}	1.875 ^D	-
94	-	-	1.346 ^{A_b}	1.520 ^{AB_{ab}}	1.626 ^{B_b}	1.890 ^C	2.042 ^C
Thigh meat ³ value (SEM: 0.044)							
74	2.354 ^A	2.819 ^B	3.292 ^{C_a}	3.701 ^{D_a}	4.053 ^{E_a}	-	-
84	-	2.930 ^A	3.571 ^{B_b}	3.960 ^{C_b}	4.387 ^{D_b}	4.626 ^D	-
94	-	-	3.674 ^{A_b}	4.136 ^{B_b}	4.421 ^{B_b}	4.910 ^C	4.856 ^C
Total carcass parts ⁴ value (SEM: 0.079)							
74	4.237 ^A	5.134 ^B	6.020 ^{C_a}	6.847 ^{D_a}	7.400 ^{E_a}	-	-
84	-	5.438 ^A	6.488 ^{B_b}	7.242 ^{C_b}	7.955 ^{D_b}	8.639 ^E	-
94	-	-	6.547 ^{A_b}	7.406 ^{B_b}	7.985 ^{C_b}	8.972 ^D	9.305 ^D

¹whole carcass means the chilled carcass with the head, heart, lungs, liver, kidneys and fat depots; ²loin fillet means m. *Longissimus dorsi*; ³thigh meat means the deboned hind legs; ⁴total carcass parts mean the fore part of the carcass + the mid part of the carcass + hind legs + the head + the liver
A, B, C, D, E: different subscripts within a row show significant differences ($P < 0.05$) within an age; a, b: different subscripts within a column show significant differences ($P < 0.05$) within weight categories

tal carcass parts represented similar results as the whole carcass.

Similarly to the value of the whole carcass, the effect of weight on the value of the loin fillet was significant ($P < 0.001$) in all age categories (it increased with body weight), however the differences between the neighboring body weight groups were not significant in all cases (Table 3). The effect of age was significant only in the body weight categories of 2.49–2.63 kg ($P < 0.01$) and 2.78–2.92 kg ($P < 0.05$) (Table 3).

The value of the thigh meat increased significantly ($P < 0.001$) with the body weight in all age categories (Table 3). However the effect was “stronger” at a younger age, since, in 74 d rabbits all neighboring body weight groups differed significantly ($P < 0.05$). On the other hand, no significant difference was found in one case in 84 d groups (between 3.09–3.25 and 3.35–3.52 kg body weight categories) and in two cases in 94 d groups (between 2.78–2.92 and 3.09–3.25, and between 3.35–3.52 and 3.65–3.84 kg). The effect of age on the value of the thigh meat was significant in body weight categories of 2.49–3.25 kg ($P < 0.001$) however, significant ($P < 0.05$) differences were observed only between the youngest and the two older age groups (Table 3). The effect of age on

the value of total carcass parts was similar to that of thigh meat, while the effect of weight was similar to the whole carcass (Table 3).

Comparing 84 and 94 d rabbits within the same weight categories of 2.49–3.52 kg (Table 3), there was an average difference of 0.42% in loin fillet value, while 3.56% in thigh meat's value, which has a great economic importance.

These results indicate that 74 d rabbits are less valuable even if they are slaughtered at the same weight as older ones, thus, 74 d rabbits are not “mature” enough for the slaughter. Since, within the same body weight categories there was no significant difference between 84 and 94 d rabbits, 84 d rabbits could be favorable enough for the slaughterhouse.

The alteration in the value of the loin fillet and thigh meat within the same age category could be demonstrated clearer when the largest weight group is considered to be 100% (Fig. 1). In this case, the relative values of the loin fillet of the lightest rabbits were 52, 60 and 66% in 74, 84 and 94 d groups, respectively. This shows that the effect of body weight is more considerable in younger rabbits than in older ones. Similar tendency was observed in the relative value of the thigh meat which was 58, 63 and

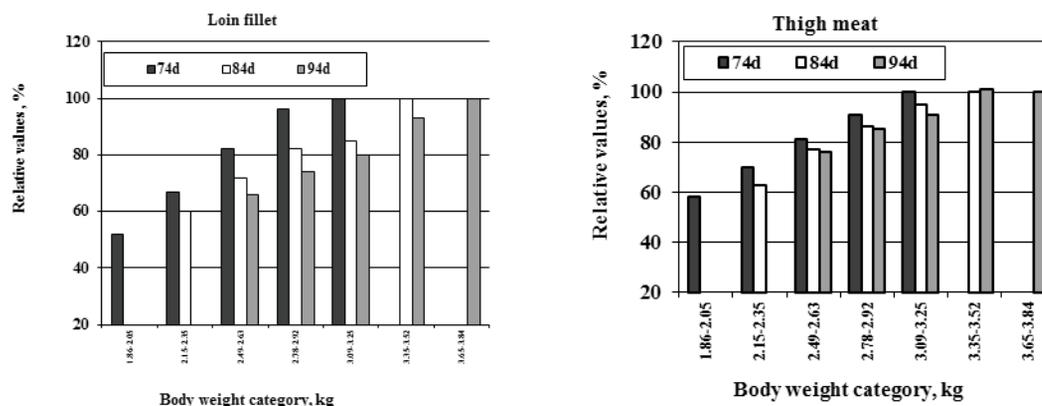


Figure 1: Effect of body weight in each age on the relative values of loin fillet and thigh meat (100% = the largest body weight within each age group)

76% in 74, 84 and 94 d rabbits, respectively. It can be stated that the effect of body weight was more considerable in the relative value of loin fillet, since it was 6, 3 and 10% lower in 74, 84 and 94 d groups, respectively, compared to the relative value of the thigh meat.

The ratio of the thigh meat value to the value of the total carcass parts is shown in Fig. 2. In 74 d rabbits this ratio started to decrease with increasing body weight (from 55.6 to 54.1%), but it increased by 0.7% in the largest body weight group. In the age category of 84 d, an increasing trend was found between the two lowest body weight categories (from 53.9 to 55.0%), while a decline was observed between the two highest ones (from 55.2 to 53.6%). In 94 d group a continuous decline was observed, however the highest decrease was found between the two highest body weight categories (from 54.7 to 52.2%). Figure 2 shows that within each body weight category older

rabbits had higher ratio of thigh meat value, which is in line with the findings of Metzger *et al.* (2011) who concluded that from the viewpoint of the ratio of hind part to the carcass, older rabbits are the advantageous. While comparing the highest body weight categories of each age group (Fig. 2), the youngest rabbits had the highest thigh meat value ratio related to the total carcass part value (54.8, 53.5 and 52.2% in 74, 84 and 94 d, respectively).

Whereas previous researches evaluated groups on parameters which are partly independent from body weight, for instance on carcass traits, ratio of fore, mid and hind part (Dalle Zotte, 2002; Metzger *et al.*, 2011), this economic evaluation provided new information, especially for slaughterhouses, since the effect of the individual factors were based on real and relative values.

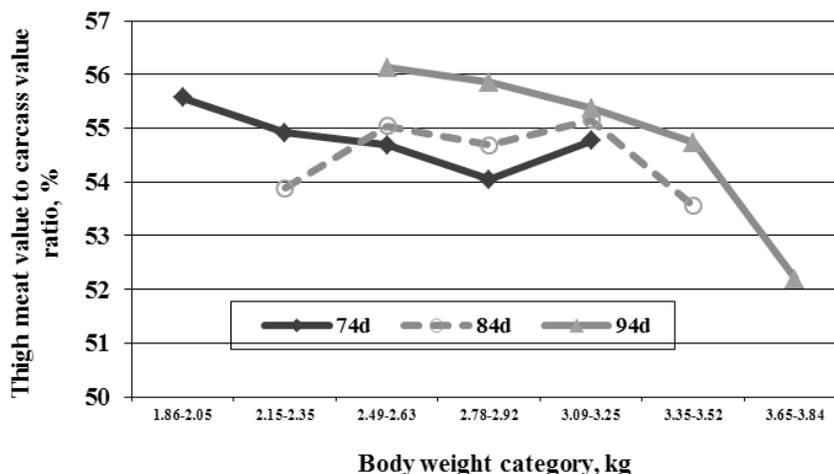


Figure 2: The ratio of the thigh meat value to the value of the total carcass parts depending on age and weight

4 CONCLUSIONS

Our results suggest that, from the viewpoint of the slaughterhouse, it is not advantageous to slaughter rabbits at a young age; however 84 d is considered to be favorable. This slaughter age could be a reasonable compromise from the viewpoint of both the slaughterhouse and the breeder, since the expenses of the longer fattening period may not be rewarded in the purchase price.

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