

DRESSING PERCENTAGES AND CARCASE
CHARACTERISTICS IN HORSES

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INTRODUCTION

The consumption of horse-meat in Italy is 1.1 Kg per head yearly and has remained constant for a number of years. However, this statistic does not reflect the real situation in that many consumers never eat horse-meat while others consume a much greater amount. The overall consumption of horse-meat over recent years has been approximately 65,000 tons each year, with less than 20% of this being produced in Italy. The consumption of horse-meat in 1988 was 65,200 tons, of which 18.4% production accounted for a large number of horses for slaughter.

In recent years this number has been around 160,000 horses annually, with the imports coming from the Eastern European countries and more recently from South America too.

Obviously, the slaughtered horses belong to a wide range of genetic types. In North-East Italy many of the animals slaughtered are saddle-horses or from the Croatian population or Avelignese (Haflinger) breed.

Over the last few years there has been a considerable increase in Italy in the number

of riding-schools and in holidays on horse-back, with a consequent increase in the number of saddle-horses slaughtered. The Croatian horse takes its name from the area in Yugoslavia from which it is imported, and is of mesomorphic type. The Avelignese breed is named after the village of Avelengo (Haflinger in German) which is situated on the Austrian border. It is a large pony with a compact body conformation.

The aim of this study is to assess the carcase characteristics of horses and foals of different body conformation, i.e. the saddle horses, Croatians and Avelignese breed.

MATERIALS AND METHODS

The trial was carried out using 40 animals divided into two main groups: 20 foals of about 1 year of age and 20 adult horses of varying age.

The groups of yearlings consisted of 10 Avelignese and 10 Croatian subjects. The group of adult horses contained 10 saddle-horses and 10 Croatian animals. Each group had 5 males and 5 females in it.

At slaughter the live weight, the weight of the main components of the fifth-quarter, as well as the weight of the contents of the alimentary tract (to calculate the empty body weight) and the weight of the hot carcase were all determined.

The carcasses were divided into half-sides and evaluated by an expert using the grading system proposed by Roy and Dumont(1). The carcasses were weighed again after a period of 8-10 days under refrigeration and the right half-side of each one was divided

into forequarter and hindquarter by means of a cut made perpendicular to the longitudinal axis of the half-side, between the fourth and fifth thoracic vertebrae. The cuts of meat customary for the area in which the trial was carried out (province of Vicenza, North-East Italy) were taken from each quarter.

The values reported here concern only the division of the muscle, fat and bone tissue of the fore-and hind-quarters and of the whole half-side.

RESULTS

a) Slaughter data

Table 1 reports the slaughter data for the adult horses. The following summary may be given of the most interesting results: - the live weight of the saddle-

TABLE 1. Adult horses: slaughter data.

Item	Genetic type	
	Saddle	Croatians
No. of animals	10	10
Slaughter Weight	Kg 470.0	462.6
Empty Body Weight (EBW)	Kg 421.3	412.8
Skin	Kg 23.0 ^a	28.4 ^b
	% EBW 5.46 ^A	6.88 ^B
Feet	Kg 10.5	10.9
	% EBW 2.49	2.61
Head (without skin)	Kg 15.0	16.0
	% EBW 3.56	3.88
Lights	Kg 6.43	5.93
	% EBW 1.53	1.44
Liver	Kg 5.57	5.64
	% EBW 1.32	1.37
Heart	Kg 3.16 ^a	2.53 ^b
	% EBW 0.75 ^a	0.61 ^b
Spleen	Kg 1.40	1.13
	% EBW 0.33	0.27
Alimentary Tract (empty)	Kg 29.2	30.7
	% EBW 6.93	7.44
Hot Carcase	Kg 286.6	276.1
Chilled Carcase	Kg 277.9	266.8
Cooler Shrink	% 3.07	3.33
Dressing Percentages:		
Hot Carcase / Live Weight	% 60.94	59.77
Hot Carcase / EBW	% 67.97	67.33
Chilled Carcase / EBW	% 65.91	64.73

a, b = $P \leq 0.05$ A, B = ≤ 0.01

horses and the Croatian horses is very similar despite the considerable differences in the morphological type;

- the differences in the body weight (EBW) are also slight, as the weight of contents of the alimentary tract was almost identical for two groups; the dressing percentage calculated on the empty weight, was 67.97% for the horses and 67.33% in the animals. Apart from the comparison between the groups, it should be noted that the values of dressing percentage are and thus that the horse is suited to meat production. The dressing percentage of the horses was higher than that of the Croatian horses, although the difference was not significant. This is easily explained considering

TABLE 2. Foals: slaughter data.

Item	Genetic type	
	Croatians	Average
No. of animals	10	10
Slaughter Weight	Kg 346.0	325.3
Empty Body Weight (EBW)	Kg 316.8	298.7
Skin	Kg 21.5	20.3
	% EBW 6.79	6.80
Feet	Kg 9.36 ^A	7.30 ^B
	% EBW 2.95 ^A	2.44 ^B
Head (without skin)	Kg 12.6	11.2
	% EBW 3.98	3.75
Lights	Kg 5.00 ^A	4.17 ^B
	% EBW 1.58 ^a	1.36 ^b
Liver	Kg 4.65	4.14
	% EBW 1.47	1.39
Heart	Kg 1.81	1.59
	% EBW 0.57	0.53
Spleen	Kg 0.97	0.83
	% EBW 0.31	0.26
Alimentary Tract (empty)	Kg 22.05	20.46
	% EBW 6.96	6.85
Hot Carcase	Kg 213.4	206.9
Chilled Carcase	Kg 204.3	200.3
Cooler Shrink	% 4.28	3.16
Dressing Percentages:		
Hot Carcase / Live Weight	% 61.57	63.34
Hot Carcase / EBW	% 67.79	69.05
Chilled Carcase / EBW	% 64.33	66.87

a, b = $P \leq 0.05$ A, B = ≤ 0.01

the most important components of the fifth-quarter (skin, head and alimentary tract) are developed in the Croatian horses.

The only statistically significant differences concern the weight of the skin, which is higher in the Croatian horses (6.88 vs 5.46% of the EBW) and the weight of the heart which, by contrast, is greater in the saddle-horses (0.75 vs 0.61% of the EBW). The morphological and functional differences between the two types of horses easily explain these data.

Table 2 gives the slaughter data for the yearlings. It should be noted that statistically significant differences can be seen in the development of the feet, lungs and trachea, which is greater in the Croatian foals.

Other components of the fifth-quarter (head, liver, heart, spleen and alimentary tract) are also more developed in the Croatian foals, thus explaining the lower dressing percentage when compared to the Avelignese foals (67.79 vs 69.05% on the EBW).

The dressing percentage, especially for the Avelignese foals, is very high; this is because the animals slaughtered were well finished.

The cooler shrink was 3.16% for the Avelignese and 4.28% for the Croatian yearlings. While this difference is not significant, it is worthy of note and may be partially justified by the lower degree of fattening of the Croatian foals compared to Avelignese breed.

As a consequence of the

TABLE 3. Adult horses: half-carcass dissection.

Item	Genetic type	
	Saddle	Croatians
Half-carcass weight (HC)	Kg 138.8	133.4
Forequarter	Kg 45.1	43.6
	% HC 32.5	32.7
Hindquarter	Kg 93.7	89.8
On the forequarter:	% HC 67.5	67.3
Muscle	Kg 31.30	29.26
	% 69.40 ^A	67.11 ^B
Bone	Kg 2.86	3.73
	% 6.34	8.56
On the hindquarter:	Kg 10.92	10.57
Muscle	% 24.21	24.24
Fat	Kg 70.87	65.59
	% 75.64	73.04
Bone	Kg 9.63	11.63
	% 10.30	13.00
On the whole half carcass:	Kg 12.52	11.72
Muscle	% 13.36	13.05
Fat	Kg 102.17	94.85
	% 73.61 ^B	71.10 ^D
Bone	Kg 12.49	15.36
	% 9.00	11.51
	Kg 23.44	22.29
	% 16.89	16.71

a, b = P ≤ 0,05
A, B = P ≤ 0,01

TABLE 4. Foals: half-carcass dissection.

Item	Genetic type	
	Croatians	Avelignese
Half-carcass weight (HC)	Kg 102.1	100.1
Forequarter	Kg 33.4	31.3
	% HC 32.7	31.3
Hindquarter	Kg 68.7	68.8
	% HC 67.3	68.7
On the forequarter:		
Muscle	Kg 25.72	23.47
	% 77.1	75.0
Fat	Kg 2.50	3.35
	% 7.49 ^B	10.7 ^D
Bone	Kg 5.16 ^B	4.52 ^D
	% 15.4	14.4
On the hindquarter:		
Muscle	Kg 53.81	51.16
	% 78.3	74.4
Fat	Kg 6.16 ^B	10.43 ^D
	% 8.97 ^B	15.20 ^D
Bone	Kg 8.20 ^A	6.71 ^B
	% 11.90 ^A	9.75 ^B
On the whole half-carcass:		
Muscle	Kg 79.56	74.63
	% 77.92	74.56
Fat	Kg 8.66 ^B	13.78 ^D
	% 8.48 ^B	13.77 ^D
Bone	Kg 13.36 ^A	11.23 ^B
	% 13.09 ^A	11.22 ^B

a, b = P ≤ 0,05 A, B = P ≤ 0,01

lesser cooler shrink, the dressing percentage calculated on the chilled carcase is higher in the foals of the Avelignese breed, with a difference which is significant at the level of 10% ($P \leq 0.1$).

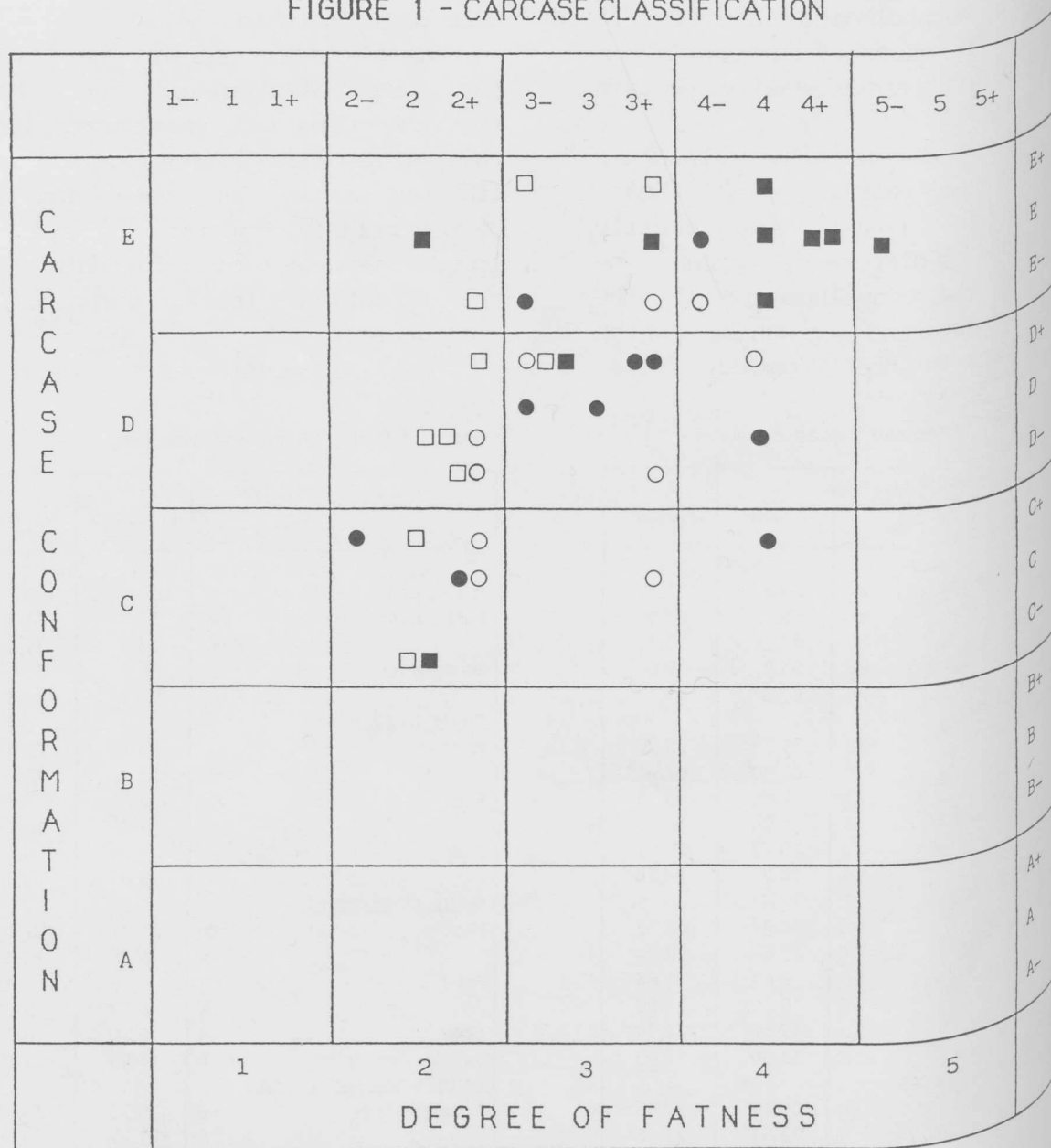
b) Half-side dissection

Table 3 shows the data regarding the dissection of the half-side of the adult horses.

It may be noted that the proportion between the forequarter and hind-quarter of half-side is practically identical for two genetic types.

The proportions of the different tissues vary however. The saddle horses have a higher percentage of muscle (73.61 vs 9.00 vs 11.51%) whereas

FIGURE 1 - CARCASS CLASSIFICATION



○ Saddle horses □ Croatian foals
● Croatian horses ■ Avelignese foals

development of bone tissue is very similar in the two groups. Although the difference between the mean values of fat percentage is considerable it is significant only at the level of 10% ($P \leq 0.1$). This is partly due to the limited sample, but above all to the great variability of fat deposition.

It should be considered that the bones of back and loin (from the 5th to the 18th thoracic vertebra, including part of the ribs, and the lumbar vertebrae) are included in the muscle, as the cuts taken from these areas are sold on the bone.

The higher quantity of muscle in the saddle-horses is a result above all of the greater development of the muscles of the neck, shoulder, chest and loin.

The data for the dissection of the half-sides of the foals are reported in Table 4. It may be clearly seen that the Croatian foals have a greater development of the muscle and bone tissue and less fat. The amount of muscle and bone in the half-sides is slightly inexact as some cuts of meat from the foals are sold on the bone (rib, loin and shank) and thus the actual values would be less for muscle and greater for the bone than those given in the table. This does not however change the differences between the two genetic types.

c) Carcase evaluation

Figure 1 shows the distribution

of the 40 carcasses examined according to the grading system used. Letters A,B,C,D and E indicate a bad, sufficient, good, very good and excellent conformation respectively. The numbers 1,2,3,4 and 5 refer to the degree of fatness and indicate carcasses that are too lean, lean, sufficiently fat, fat and too fat respectively.

The relationships between the expert's assessment and the data from the half-side dissection are good, especially as regards the degree of fattening. However, the number of observations is too limited to calculate correlation coefficients. It should also be noted that the horses and foals slaughtered were well finished animals, given that 31 of the 40 carcasses (77.5%) were classified as belonging to classes E and D (excellent and very good).

CONCLUSION

The results of this trial show that the horse is very well suited to meat production. This fact is highlighted by: a) high dressing percentages; b) considerable muscle development; c) limited development of fat.

REFERENCES

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