

Original paper

Effects of racial groups hereford, braford and hereford crossed in the hereford meat program

Marcelo M. Severo¹, Saimon de S. e Souza¹, Fabiano N. Vaz^{ID}², Ricardo Z. Vaz³ and Ana P. M. Martini²

1 Federal Technological University of Parana, Dois Vizinhos-PR, Brazil

2 Federal University of Santa Maria, Santa Maria-RS, Brazil

3 Federal University of Pelotas, Pelotas-RS, Brazil

Received: 24 October, 2017. Accepted: 11 December, 2017

First published on the web March, 2018

Doi: 10.26545/ajpr.2017.b00011x

Abstract

With quality characteristics, the meat originated from Hereford, Braford and crossed breed animals, obtained a considerable increase in the meat market, seeking improvement. In order to have an expression of this quality in the market, through this idea came meat programs, with the purpose of offering quality to the final consumer. The objective of this work was to study the effect of the racial group on the carcass characteristics, classifications and declassifications within the Meat Hereford Program and aggregation and disaggregation of the value of the animals individually and of the batches of animals. Lots with Hereford predominantly presented higher mean carcass weight, higher percentage of animals with dentition 8, higher percentage of animals with 1 "thin" and 4 "uniform" finishing in relation to the others. The average number of animals finishing 5 "excess fat" in the lot is higher when the predominance of the lot is Braford animals. The declassification of animals with a racial pattern is similar between lots with predominance of Hereford, Braford or Hereford crossed, due to lack of finishing of the carcass or with dentition superior to 6 teeth. The value paid for certified heads did not differ between the evaluated groups. Disaggregation, although negative for groups with Hereford predominance, did not differ statistically from the other groups.

Key-words: Productive Chain, Pampa Meat, Agroindustrial Markets, Racial Predominance, Disaggregation

Introduction

Nowadays, the livestock market has been emphasizing improvement of its herds, through industrial crossings, or even working with pure animals, aiming at the maximum productivity and yield in the production of the Cutting Cattle.

In the last decades in the state of Rio Grande do Sul, the increase of pure animals of European origin, among them Hereford breed, of English origin, was introduced its first specimen in Brazil in 1906, soon after, the first bellies were registered, originating Of Uruguay (ABHB, 2014).

They are characterized by resistance animals and ability to produce meat, due to their conformation and fattening capacity, are considered reasonably

rustic and prolific. With the objective of greater adaptation of animals to the environment, crossed were used for a better performance of the animals in regions where there was no good adaptation when pure animals were created, often these crossed use more than 2 races, being considered industrial crossed, and from there increased the use of the race in the crossings, where later a synthetic race, the race Braford, was constituted of zebuino blood.

Braford aims to look for traits such as fertility, maternal ability, resistance to ectoparasites, rusticity and carcass yield of zebu, as well as the indisputable benefit of heterosis, which is currently the most sought for a better yield in beef cattle.

The Braford aims to look for characteristics such as fertility, maternal ability, resistance to

✉ Marcelo M. Severo

E-mail: marcelozoot9@yahoo.com.br

ectoparasites, rusticity and carcass yield of zebu, as well as the indisputable benefit of heterosis, which is currently the most sought for a better yield in beef cattle. Vaz and Restle (2001) observed that in crossed animals, it had a positive heterosis effect, for the quantitative analysis of the carcasses evaluated. With quality characteristics, beef from Hereford, Braford and their crossed, gained a considerable increase in the meat market, seeking improvements. In order to have an expression of this quality in the market, through this idea came meat programs, with the objective of offering quality to the final consumer.

Thus, the objective of this study was to study the effect of the racial group on carcass traits, classifications and declassifications in the Hereford program of the meat and aggregation and disaggregation of the value of individual animals and lots of animals.

Material and methods

The slaughtering of the Carne Hereford Program, linked to the Brazilian Association of Hereford and Braford (ABHB) from November 2011 to October 2012, was carried out in a cold store located in the Central Region of the State of Rio Grande do Sul, Brazil. Slaughter on average 140 thousand animals per year. Data from 1902 lots were analyzed, totaling 73485 animals. The data collected were taken from the production information system of the refrigerator, and checked by the ABHB technicians.

The analyzed carcasses came from batches of slaughtered animals which took part in the Hereford Meat Program, which had to be analyzed for at least one animal classified under that program regardless of sex.

The classification of live animals, considered standard animals, and carcasses is done by ABHB technicians. In the corrals, in the pre-slaughtering procedure, the technicians identify the phenotypic characteristics that can include the animals in the quality meat programs. For this, the animals must have the following phenotypic characteristics that identify the racial group:

i) Hereford - includes animals identified visually as pure Hereford, assessed by the pelage of the face and / or white head, and the remainder of the red pelage body. The breed also accepts spots on the belly and paws, but not allowed animals with the whole line of white loin. The animals must be owl or

aspired, they should not present phenotypic manifestations of zebu breeds.

ii) Braford - covers animals visually identified as being pure Braford characterized by crossed animals zebu x Hereford, in varying degrees of blood, as long as it does not visually exceed 50% of zebu blood.

iii) Hereford Cross - considers crossed animals from mating between bulls or Hereford cows with European breeds, since they retain the characteristic of white or spotted head or face, which characterizes the presence of the Hereford genotype at the crossing.

Following, during slaughter, these pre-selected animals have their carcasses typified by the same ABHB technicians, for the dentition and finishing characteristics, being later weighed. To be included in the meat program animals need to have a dentition ranging from zero (tooth of milk) to six teeth. Animals eight teeth are disqualified, regardless of the racial grouping to which they belong. Regarding the finish, the animals must have a minimum "medium" carcass finish, which also includes "uniform" and "excessive" carcasses, finishing and declassifying carcasses with "lean" and "scarce" finishes.

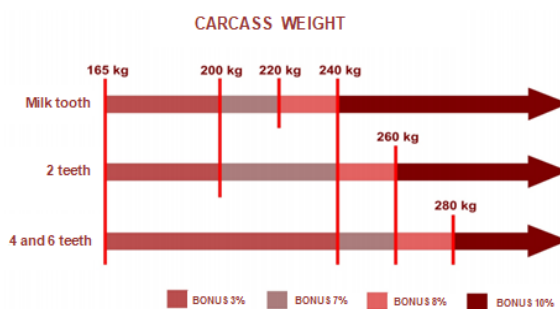


Fig. 1. Bonus table of the Hereford beef program.

For animals to be placed in the Hereford Meat Program, they must have a racial condition, dentition and finish, and discard carcasses that have only one or two of the requirements stipulated by ABHB. The animals certified by the ABHB receive differentiated remuneration, according to the carcass weight, as shown in Figure 1.

For the analysis of the data, the final prices of the animals that received the bonuses for being included in the Hereford beef quality program were considered in relation to the price that those same carcasses would receive if they were not included in the quality promotion program.

The independent variables studied were the four racial groups: Hereford, Braford, Hereford crossed and witness, the latter represented by animals without

racial definition. As dependent variables the carcass weight, teething and finishing characteristics were analyzed.

Data were analyzed using statistical software R, submitted to analysis of variance (ANOVA) and test of comparison of means for the characteristics that differed in ANOVA at the level of 5% of significance. Tukey's test was used to compare means, also at the 5% level of significance.

Results and discussion

The following tables do not consider the framing of animals in the Hereford Meat Program, only the classification of pre-slaughter animals, when the breed pattern is identified and later when they are typified as a function of the dentition (Table 1) and finish (Table 2).

Table 1. Carcass weights and distribution of the number of animals per lot according to the dentition.

	Pred.* Hereford	Pred.* Braford	Crossed Hereford	Without pred.*	CV, %	P ¹
Carcass weight, kg	267,8 a	236,5 b	234,3 b	236,2 b	23,9	0
Dentition 0, N	0,93 b	2,54 ab	3,36 a	0,95 b	312,9	0
, %	3,56 b	12,41 a	12,72 a	10,33 ab	223,4	0
Dentition 2, N	5,09 ab	3,41 bc	7,15 a	1,75 c	262	0
, %	14,71	17,03	22,56	15,92	154,5	0
Dentition 4, N	3,84 ab	2,42 bc	4,73 a	1,73 c	219,3	0
, %	15,16	13,28	17,73	16,17	144,2	0,3
Dentition 6, N	3,91 a	1,88 bc	3,57 ab	1,73 c	221,5	0
, %	17,9	10,77	13,76	16,68	149,4	0
Dentition 8, N	8,47	8,26	7,33	3,36	192,7	0
, %	47,66 a	46,50 a	33,18 a	40,92 b	104	0

Lowercase letters in the row differ from each other by the Tukey Test (5%).* Racial predominance in the lot. ¹ Probability.

Analyzing the carcass weight shown in Table 1, it can be observed that the batch with Hereford predominance had the highest average carcass weight in relation to the others, possibly as a result of higher carcass finishing or greater age at slaughter, since, at the same age and finishing, the yield of Hereford cattle carcasses is lower than the carcass yield of Braford animals, as demonstrated by Restle et al.

(1999). For the mentioned authors, the higher yield of the animals crossed zebuinos is due to the smaller relative weight of leather, paws and head, as it is also reported in other works (Huffman, 1990; Sherbeck, 1995). The racial grouping of animals classified as Hereford crossed shows carcass weight quite similar to that of the "non-predominant" and "Braford" animals, corroborating with previous findings (Table 1).

Analyzing the number of animals in each batch with milk dentition, it is observed that the animals crossed Hereford (3.36) are more frequent than the defined Hereford (0.93) and groups without racial predominance, representing the great use of crossed between races with Hereford in the herds of Rio Grande do Sul, since the pure Hereford animals were not very representative in the lots analyzed, even when the percentage of animals in the lot was analyzed, when Braford was equal to the percentage of animals that crossed Hereford .

When two and four-tooth animals are observed, a larger number of animals crossed Hereford, by lot than the other groups, when comparing the percentage within the lot, there was no difference between the groups, this shows that there is an equal, not privileging only one group, maintaining the balance of genetic groups in batches at that age by keeping a constant number of Braford, Hereford and their crossed.

As for animals 6 teeth, there are a larger number of Hereford breed animals, even in the percentage size of the lots there was no difference. This data responds to the question of Hereford animals having heavier carcass weights than the other batches, since animals aged more advanced are slaughtered.

In animals with 8 teeth or "full mouth," there was no difference between Hereford, crossed or Braford animals, since the animals had no predominance, did not have a significant value at that age, confirming that producers, who designate slaughter animals fall into two or more classifications, prefer to send younger animals.

Regarding the dentition, it is observed that when the batch of animals is crossed in Hereford, there is an average of 3.36 animals of milk teeth, a value that is significantly higher than the number of animals of the milk in batches with predominance of Hereford or lots Without predominance, where the value is less than one milk tooth per batch. In the predominantly Braford lots, an intermediate value was observed,

without differentiating from the others. Turning to percentage of dairy animals, the predominant lots of Braford are different from the predominant lots of Hereford, with predominant lots having intermediate values.

Table 2 shows that the percentage of animals fat 1, that is, the "lean" finish is higher in the lots with predominance of Hereford, however, at the same time, this type of batch presents the highest percentage of animals with finish 4, i.e. "Uniform", and the number of animals classified as "lean" in Hereford animals can be explained by the fact that these animals are not yet suitable for slaughter, or because these animals have greater difficulty in depositing the other crossed animals, which benefit from heterosis. Corroborating that found by Vaz and Restle (2001), where they observed that in the crossings between Charolais and Nellore, heterosis was superior in 14.2% in F1 crossing compared to the pure ones. Also Restle et al. (1999) observed that there was no significant difference between Hereford and its crossed in the fat thickness question.

Table 2. Finishing of the animals according to the racial group that the animals were classified by ABHB technicians.

	Pred.* Hereford	Pred.* Braford	Crossed Hereford	Without pred.*	CV, %	P ¹
Finishing 1, N	0,2	0,06	0,04	0,11	852,5	0
, %	4,28 a	0,26 b	0,45 b	0,22 b	955,8	0
Finishing 2, N	2,40 b	2,68 b	1,84 b	4,54 a	205,9	0
, %	11,24	16,43	19,71	17,27	134,7	0
Finishing 3, N	15,00 ab	11,78 b	6,64 c	17,97 a	126,2	0
, %	67,38	63,46	68,18	68,99	42,6	0,5
Finishing 4, N	4,56 a	3,81 a	0,98 b	3,50 a	238,4	0
, %	21,08 a	19,25 ab	11,73 b	13,31 ab	191,9	0
Finishing 5, N	0,13 ab	0,17 a	0,02 b	0,05 b	890,6	0
, %	0,46	0,6	0,3	0,25	1205	0,9

Lowercase letters in the row differ from each other by the Tukey Test (5%).* Racial predominance in the lot. ¹ Probability.

If the average number of animals per batch is analyzed, it is observed that the non-predominant batches present the highest average number of animals with finish 2 ("lean fat") and finish 3 ("medium fat"). According to VAZ et al., (2012), animals with "2" finishing considered low fat, represents a better economic return for slaughterhouses, considering the sale of primary cuts

(hindquarter, forequarter and side cut), related to the weight and price of these cuts. The average number of animals with finishing 5 ("excessive fat") in the lot is higher when the predominance of the lot is Braford animals, not differing from the lots with Hereford predominance.

Table 3 shows that in the lots that prevail the Hereford breed it is observed that on average 76.52% of the animals are classified in this breed. When the lot is Braford predominant, the representatively is 67.53% and, in the lots that predominate Hereford crossed, these animals represent 78.21% of the lot. These data show that in the lots with Hereford predominance, the others are classified as Hereford crossed, significantly larger than the Braford ones. Likewise, in the predominantly Braford lots, the animals not classified in this breed were also classified as Hereford crossed. This shows relatively standardized lots for zebu mestizos or more European, however, the total standardization of plots is not observed, since even in Hereford plots, only 76.52% are animals of this breed.

Table 3. Percentage of the racial pattern in different batches of racial predominance.

	Racial group predominant in lot					P _i
	Hereford	Braford	Crossed Hereford	Without pred.*	CV, %	
Hereford on the lot, %	76,52 a	1,25 c	4,10 b	0,19 c	262	0
Braford on the lot, %	2,74 c	67,53 a	17,69 b	1,44 c	192	0
Crossbred Hereford on the lot, %	20,74 d	31,22 c	78,21 b	98,37 a	13,3	0
Total	100	100	100	100		

Lowercase letters in the row differ from each other by the Tukey Test (5%).* Racial predominance in the lot. ¹ Probability.

Table 4 presents the absolute values of animals in the different types of lots, observing that the lots with predominance Hereford crossed are those with the largest number of animals (48.38 head, P < 0.05) and in these, the crossed arrive to 20.82 heads classified in the Hereford Meat Program. There is no difference in the size of the lots when the predominance is Hereford, Braford or there is no racial predominance (P < 0.05).

Table 4 - Average size of lots and number of animals per breed in lots with different racial predominance.

	Racial group predominant in lot				CV, %	P ¹
	Hereford	Braford	Crossed Hereford	Without pred.*		
Lot size, cab	26,11 b	28,67 b	48,38 a	35,61 b	91,9	0
Hereford on the lot, N	15,71 a	0,20 bc	1,01b	0,02 c	540,1	0
Braford on the lot, N	0,80 c	12,47 a	4,32 b	0,05 c	242,3	0
Crossbred Hereford on the lot, N	5,73 b	5,84 b	20,82 a	9,44 b	124,6	0

Lowercase letters in the row differ from each other by the Tukey Test (5%).* Racial predominance in the lot. ¹ Probability.

Table 5 - Size of the lots and number of animals in the classification according to different racial predominance.

	Racial group predominant in lot				CV, %	P ¹
	Hereford	Braford	Crossed Hereford	Without pred.*		
Carcasses certified per lot, number	11,22 ab	8,07 bc	14,82 a	4,58 c	171,1	0
Carcasses certified per lot, %	35,31 a	26,84 b	32,33 ab	13,16 c	119,8	0
Animals with declassified racial pattern	11,02 a	10,43 a	11,34 a	4,94 b	147,4	0
Animals with declassified racial pattern, kg of carcass	2659,0 a	2649,7 a	2676,5 a	1198,7 b	155,6	0
Certified lot weight, kg	2739,1 ab	1760,2 bc	3438,0 a	1060,9 c	177,1	0
Total lot weight, kg	6420 b	6793 b	11341 a	8372 ab	95,1	0
Average number of disqualified carcasses	3,87 b	10,19 b	22,19 a	26,11 a	112,3	0

Lowercase letters in the row differ from each other by the Tukey Test (5%).* Racial predominance in the lot. ¹ Probability.

Table 5 shows that also the number of animals certified in the predominant lots of Hereford is higher (P < 0.05) than in the predominant lots of Braford and without predominance, but did not differ statistically of the plots with predominance of Hereford (P > 0, 05). When compared in absolute numbers, the number of animals certified in the groups with predominance of Hereford results in greater use of carcasses, in relation to the groups with

predominance Braford or without racial predominance.

The declassifications of breed animals whose carcasses are not intended for the Hereford Meat Program is similar between lots with Hereford, Braford or Hereford predominance, showing similarity in the number of carcass kilograms that lose the chance of adding value through certification.

The reason why these animals are not attributed to the Hereford Meat Program is because of the lack of finishing of the carcass, or because they have a dentition greater than six teeth. Excluding the slaughter of discard cows that have eight teeth, since males with this dentition are quite rare, the declassifications due to lack of finishing of the carcasses are quite significant, as discussed in Table 2.

It is observed in table 5 that there are on average a number of 11.82 animals certified in the Hereford crossed lots, with no difference when compared to lots of Hereford animals defined. As for the Braford animals and the groups that did not present a predominance of genotype, there was superiority, and there was no difference when comparing Hereford VS Braford, but these genotypes when evaluated percentage, obtained a difference, where the Hereford breed was superior, reason for this genetic group be smaller numerically, relative to the Braford group of animals.

After being classified in their respective racial patterns, we observed that the Hereford animals, their crossed and the Braford animals, because they did not fit the standard of classification for dentition and finishing, obtained greater disqualification in relation to the lot with animals without predominance of these genetic groups.

The disqualification between animals of the groups was only different when compared to the group that did not have phenotypic predominance having a value of 4.94 animals in average declassified by lot, generating 1198.7 kg of disqualified carcass, inferior to those of more groups that obtained 2659.9 kg, 2649.0 kg, 2676.5 kg, Hereford, Braford and Hereford crossed, respectively.

Regarding the total weight of certified carcasses, the lots with predominance of Hereford and Hereford crossed did not differ among themselves, with 2739.1 kg and 3438.0 kg, respectively, lots with predominant Braford synthetic animals did not differ when compared to those mentioned previously, but higher

than the carcass weight of the group of animals that did not have a genetic predominance.

Observing the weight of the lot, those with animals crossed Hereford, obtained a superior weight, not differing from the lot of animals without racial predominance, where they were superior to the lots that predominate Hereford and Braford that did not differentiate statistically among them.

Table 6 when we observe in the part of more interest by the whole productive chain, the economy, we can observe that the value paid by the certified heads, there was no difference between the evaluated groups, just as the paid values were the carcasses that were disqualified even containing phenotypically the standard required by the programs.

Table 6. Remuneration of carcasses with racial pattern to the Hereford Meat Program in the different batches of racial predominance.

	Racial group predominant in lot				CV, %	P ¹
	Hereford	Braford	Crossed Hereford	Without pred.*		
R\$ head certified	1.598,91	1.477,18	1.555,34	1.589,54	69,63	0,8
R\$ Head with unclassified HB standard	1.853,27	1.690,21	1.554,58	1.745,13	284,99	0,9
R\$ potential	1.814,00	1.720,50	1.564,50	1.761,20	283,31	0,9
Disaggregation	-39,29	30,24	9,88	16,05	1.329,50	0,3

* Racial predominance in the lot. ¹ Probability

The value potential also showed no difference in any of the genotypes, the disaggregation that is, failed to win, not classified in the classification, obtained a negative value in groups with predominance of Hereford animals, but nevertheless, was shown to be different, when statistically evaluated.

Conclusion

The carcass weight of certified animals is higher for animals from lots with predominant Hereford cattle. Lots with predominance of animals that fall under the Hereford Meat Program, present the majority of animals between 2 and 4 teeth.

Regarding the finishing, the predominant lots of Hereford present a larger number of animals with fat 1, and lots without predominance have a greater number of animals fat 2 when compared to the other batches. The predominant animal lots crossed Hereford has a larger number of cattle, as well as the

largest number of certified carcasses per absolute lot, and the predominant lots of Hereford have a higher relative quantity of carcasses classified.

Concerning the aggregation, the predominant batches of Braford cattle present higher aggregation when certified for the Hereford Meat Program, while the predominant lots of Hereford animals, there is no aggregation when certified, but devaluation.

Conflict of interest: All authors declare no conflict of interest.

References

- Associação Brasileira de Hereford e Braford. Accessed in 03 Set. 2016. Available in: <http://www.hereford.com.br/>
- Huffman, R.D., Williams, S.E., Hargrove, D.D. 1990. Effects of percentage Brahman and Angus breeding, age season of feeding and slaughter point on feedlot performance and carcass characteristics. *Journal of Animal Science* 68(8): 2243-2252
- Restle, J.; Vaz, F.N.; Quadros, A.R.B.; Muller, L. 1999. Características de carcaça e da carne de novilhos de diferentes genótipos de Hereford x Nelore. *Revista Brasileira de Zootecnia* 28(6): 1245-1251
- Sherbeck, J.A., Tatum, J.D., Field, T.G. 1995. Feedlot performance, carcass traits, and palatability traits of Hereford and Hereford Brahman steers. *Journal of Animal Science* 73(12): 3613-3620
- Vaz, F.N.; Restle, J. 2001. Efeito de Raça e Heterose para Características de Carcaça de Novilhos da Primeira Geração de Cruzamento entre Charolês e Nelore. *Revista Brasileira de Zootecnia* 30(2): 409-416
- Vaz, F. N., Vaz, R. Z., Pascoal, L. L., Pacheco, P. S., Miotto, F. R. C., Teixeira, N. P. 2012. Análise econômica, rendimentos de carcaça e dos cortes comerciais de vacas de descarte 5/8 Hereford 3/8 Nelore abatidas em diferentes graus de acabamento. *Ciência Animal Brasileira* 13(3): 338-345

Cite this article as:

Severo, M.M.; Souza, S. de S.; Vaz, F.N.; Vaz, R.Z.; Martini, A.P.M. 2017. Effects of racial groups hereford, braford and hereford crossed in the hereford meat program. **Amaz. Jour. of Plant Resear** 1(2): 94-100.

Submit your manuscript at

[http:// www.ajpr.online](http://www.ajpr.online)