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PRODUCTION POTENTIAL OF THE ROMOSINUANO AND ITS USE IN CROSSBREEDING FOR BEEF

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Data accumulated from 1959 to 1975 from the herd of upgraded Romosinuano of CATIE in Turrialba, Costa Rica were analized to evaluate the productive potential of the breed. The following characteristics were considered: Weaning weight (WW), calving index (CI), and calf weight weaned per cow (WWC). For each variable the analysis included estimation of the effects of year (Y), grade of Romosinuano (R), and their interaction (YR) using the method of weighted mean squares with unequal subclass numbers. Estimated of heritability (h^2)were calculated for each of the characteristics as was the repatibility of WWC. The average WW was 163 kg overall and varied from 140 kg in calves 7/8 R to 170 kg in the 3/8 R and 4/8 R groups. As the grade of R increased the WW was reduced significantly. The h^2 for WW was 0.37 ± 0.17 based on the progeny of 14 sires. The average CI was 0.72 and this characteristic did not differ significantly by the sources of variation studied. The tendency shown by the means indicates that for each 1/4 grade of R, the CI increased by 0.04. The h^2 for CI was 0.14 ± 0.13 based on the progeny of 5 sires. The average WWC was 159.1 kg. Although no significant differences were detected for this characteristic, the average tended to decrease with increased grading of R. The 1/2 R averaged 172 kg whereas the 7/8 and 8/8 R averaged 156 and 155 kg WWC, respectively. The h^2 (seven sire groups) and repeatibility estimates for WWC were respectively 0.10 ± 0.36 and 0.10 ± 0.05.

Key words: cattle, Romosinuano breed, beef, reproductive parameters, growth

Small populations of *Bos taurus* cattle, commonly known as "criollos", are still to be found in several Latin American countries. They are phenotypically variable but characterised by their rusticity and adaptability to the tropical environment. Due to their low productivity, however, they have gradually been absorbed by crossbreeding with zebu and European-breed cattle. This situation is not fully justified because results of various research projects demonstrate that these cattle have special qualities which make them useful for crossbreeding programmes. At present, efforts are being directed to save groups of criollo cattle with the purpose of carrying out selection programmes and evaluating their production potential. This paper is devoted to an evaluation of the growth and reproduction of a herd with various grades of Romosinuano crosses. The Romosinuano breed is a beef-type Criollo breed found in northern Colombia (Williamson and Payne 1978)

Materials and Methods

The data used refer to information collected in the period 1959-1975 from the Romosinuano herd of the Cattle Experiment Station of CATIE, Turrialba, Costa Rica. The herd was founded in 1958, using almost exclusively bulls descended from Romosinuano sires imported from Jamaica and the United States, and cows of the Brangus, Criollo Lechero and Romosinuano breeds.

Initially, a grading-up system was used until 7/8 Romosinuano animals were obtained. Later, the 1/2 to 7/8 Romosinuano cows were inseminated with semen from Charolais and Red Angus sires, in order to avoid inbreeding. The progeny of these matings were selected and backcrossed with Romosinuano bulls. Subsequently, a similar crossbreeding plan was used using, in addition, semen from Red Angus, Red Dane and South Devon sires with the crossbred Romosinuano cows and backcrossing the progeny with Romosinuano bulls. An effort was made to keep the level of inbreeding to a minimum.

During the period studied, the herd received uniform management. The animals were kept exclusively on grazing, with a breeding season from April to June.

Data on growth, reproduction and productivity measured as weaning weight (WW), calving index (CI) and weight weaned per cow (WWC) were analyzed for seven genetic groups (Table 1).

The WWC is calculated as the total weight of calf weaned by a cow during her herd life, in relation to the number of calves weaned by her during that time.

Table 1

Number of observations for each character studied, according to level of Romosinuano breeding.

Grade*	Weaning weight	Calving index	Weight weaned per cow
2/8	20	14	6
3/8	137	37	11
4/8	169	219	157
5/8	48	2	1
6/8	160	226	163
7/8	79	49	30
8/8	18	47	33
Totals	631	594	401

*** The fraction shown indicates the higheat grade in each class.**

For each of e variables, an analysis of variance was carried out to determine the effects of Year (Y), grade of Romosinuano cross (R) and the interac'on (Y x R), using the following model:

$$V_{ijk} = \mu + Y_i + R_j + YR_{ij} + E_{ijk}$$

donde: V_{ijk} = Any of the variables considered for the animal K in year i and grade of crossbred j

A_i = Year i

R_j = Grade of Romosinuano crossbred j

AR_{ij} = Interaction

E_{ijk} = Residual term

For the analyses of variance, the weighted squares of means method was used because of unequal subclass numbers (Steel and Torrie, 1960). Finally, estimates were obtained of heritability of the characters studied and of repeatability of the weight weaned per cow.

Results and Discussion

The results obtained for each of variables considered are shown in Tables 2, 3 and 4.

1. Weaning weight. The average weight at weaning was 163.1 kg, with highly significant differences ($P < 0.01$) due to year (Y), grade (R) and the interaction (Y x R). The 7/8 Romosinuano crosses had significantly ($P < 0.01$) lower weaning weights than the rest, with a mean of 139.8 kg. The results show that weaning weight is decreased significantly as the level of Romosinuano breeding increases, and the weights of the 7/8 Romosinuano animals were similar to those obtained in herds of purebreds (Reyes, 1976; Salazar, 1975). The low weaning weights obtained may be due to the inclusion of Angus and Criollo Lechero cattle in the formation of the herd which contributed unfavourable additive effects. The slow growth rate of the purebred Romosinuano (Bailon, 1974; Hernández, 1976) should also be taken into account. The estimate of heritability for this trait, based on data from the progeny of 14 sires, was 0.37 ± 0.17, which is within the range reported by other authors (Bailon, 1974; Preston and Willis, 1974; Plasse, 1976). The wide genetic variation observed shows the possibility of improving this trait through selection.

2. Calving index. The overall calving index was 0.72, with no differences due to the effects studied. However, the data show a tendency for the calving index to improve as the grade of Romosinuano inheritance increases. According to the tendency shown by the means, as the level of inheritance increases by 1/4, the calving index rises by 0.04. Although these results are based on a limited number of data with a high standard deviation, special importance is attributed to this aspect, because of its effect on overall productivity. The estimate of h^2 for this trait was 0.14 ± 0.13, based on data from the progeny of 5 sires, which contrasts with the results obtained from highly selected populations in temperate climates. Similar results have been reported for reproductive characters in some rustic breeds which have been submitted to relatively little selection (Koger, 1976).

3. Weight weaned per cow. The mean weight weaned per cow was 159.5 kg, with differences ($P < 0.01$) due only to year (Y). Although there was no significant difference due to level of Romosinuano breeding, the mean of the halfbred animals was 171.7 kg WWC, exceeding the means of the higher grades which were 156.5 (3/4), 155.8 (7/8) and 154.9 (purebred Romosinuano) kg, respectively. This tendency was similar to that found for weaning weight where increasing levels of Romosinuano inheritance decreased weight. This situation is explained by the fact that the WWC is calculated using only the data of cows which actually calved, and eliminates an important part of the variation due to reproductive efficiency. The estimate of heritability for this characteristic, based on data of the progeny of 7 bulls, was 0.10 ± 0.36 and that of repeatability was 0.10 ± 0.05.

Table 2

Weaning weights (kg) of different grades of Romosinuano crossbreds, according to year and grade.*

Year	Level of Romosinuano inheritance					Mean per year
	3/8	4/8	5/8	6/8	7/8	
1970	190.4	220.0	171.0	123.0	225.0	181.5
1971	153.8	163.0	151.8	146.8	138.0	154.9
1972	161.5	168.3	159.5	175.0	137.8	163.6
1973	161.1	169.7	149.3	161.8	140.4	159.1
1974	177.1	171.6	174.8	157.1	151.6	172.8
1975	170.8	173.6	150.9	147.4	117.2	155.2
Mean per grade	170.0	169.5	156.1	154.1	139.8	163.1

* Adjusted for age (210 days), sex (male) and age of dam (adult cows).

Table 3

Calving index (CI) of different grades of Romosinuano crossbreds, according to year and grade.

Year	Level of Romosinuano inheritance						Mean per year
	2/8	3/8	4/8	5/8	6/8	7/8	
1971	1.00	1.00	0.55	0.67	0.64	0.75	0.68
1972	0.50	0.71	0.78	0.69	0.80	0.75	0.71
1973	0.25	0.64	0.72	0.88	1.00	0.80	0.78
1974	1.00	0.50	0.59	0.83	0.67	0.60	0.69
Mean per grade	0.64	0.65	0.65	0.76	0.78	0.72	0.72

Table 4

Average weight (kg) weaned per cow in different grades of Romosinuano crossbreds, according to year and grade.

Year	Level of Romosinuano inheritance				Mean per year
	4/8	6/8	7/8	8/8	
1970	182.8	179.5	226.0	219.5	183.5
1971	157.0	150.8	152.2	145.3	151.8
1972	173.3	154.8	156.4	167.5	157.9
1973	172.4	158.2	154.4	123.3	156.3
1974	177.0	153.0	172.5	166.5	160.1
1975	169.5	153.3	126.4	120.0	153.4
Mean per year	171.7	156.5	155.8	154.9	159.5

In the case of this herd, the improvement of productivity through weaning weight should be the principal objective, since improvement by increasing reproductive eficiency is difficult. In other herds, advantage should be taken of the reproductive efficiences of the Romosinuano breed.

Conclusions

Given the conditions under which this study was carried out,it may be concluded that weaning weight is significantly reduced with increasing levels of Romosinuano inheritance above the 1/2-bred level. There is a tendency for the calving index to improve with levels of Romosinuano inheritance up to the 3/4 level or higher. On the basis of the estimates of heritability obtained, a rapid response to selection is to be expected for weaning weight but a poor response for reproduction. The Romosinuano breed has a useful role to play in the improvement of reproductive efficiency in cattle in tropical zones.

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