

CALVING PERFORMANCE OF SOME BEEF HERDS IN THE DOMINICAN REPUBLIC¹

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The calving performance of five beef herds from the eastern part of the Dominican Republic involving 4,000 cows during a five year period is reported.

The mean calf crop varied between 35.4% in natural pastures and crossbred cows, to 72.52 in planted pastures with predominantly Romana Red cows. The mean calving interval was 21.1 months. Farms with planted pastures recorded reduced intervals; cows in natural pastures calved in alternate years. Age at first calving was spread over seven years of life with only Romana Red cows showing a peak calving at four years of age. Interval between first and second calving averaged 22.6 months and the interval between the second and third calving was 18.3 months with 17.6 months for the next calf. There was a reduction in the interval between the first and second calf with increase in the age at which the cows calved for the first time. The mean number of calves produced in eight years of life of the cows varied from 3.8 for Romana Red in planted pastures to 2.7 for crossbreds in natural pastures.

The poor performance, particularly of the crossbred cows in natural pastures, is considered to be due to poor nutrition caused by poor quality and quantity of forage, and mineral deficiencies.

Key words: Calving percentage, planted pastures, calving interval. Romana Red, beef cattle

Beef production is concentrated in the Eastern part of the Dominican Republic between the 1600 and 1000 mm isohyets in land planted *Digitaria decumbens* (Pangola grass) in the wetter and *Panicum maximum* (guinea grass) in the drier parts. These pastures were probably planted during the 1950's and early 60's on virgin land and supported high stocking rates with acceptable calving and growth rates of beef animals. With time, however, due to lack of maintenance of soil fertility and unsuitability of the planted grasses, there has been a steady decline in productivity. Much of these pastures, where the planted species have completely disappeared, are now classified as natural pastures.

In the present conditions calving percentages of the cows are low and animals lose weight during the relatively short dry periods experienced in the region. Production parameters are mere estimates and vary widely making development planning rather difficult. The UNDP/FAO sponsored project on Pasture and Livestock Development in the Dominican Republic is studying performance of herds in the various parts of the country and this paper records results of analysis of the calving performance of five beef herds.

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More than 90% of the beef herds in the country are small with an average of 50 breedable cows with no record keeping. Some of the larger herds are owned by Consejo Estatal de Azucar, Seccion Ganaderia y Boyada (CEAGANA). The principal objective of CEAGANA is to produce oxen for traction in the sugar cane fields of the organization. However some records of the performance of the cows are available.

Materials and Methods

The CEAGANA herds are crosses of Zebu, Criollo and Romana Red; the latter is a local breed developed by crossing various breeds. These animals would be representative of the general beef herd population in the country.

Table 1 represents the names, extent and cow population of the five farms.

Table 1:

The names, extent and cow population of the five CEAGANA farms studied

Name	Total area (Ha.)	Cow population		
		Zebu	Romana Red	Crosses
Margarin	468	-	718	40
Los Hatillos	798	101	-	569
El Palmar	998	-	-	914
Sabana Grande	1120	-	-	744
Caño Hondo	986	-	-	913

All farms were planted to either Pangola (*Digitaria decumbens*, Stent) or Guinea grass (*Panicum maximum* Jacq) some time in the past (dates not known), but due to poor management much of the planted species disappeared and the percent vegetation cover of four farms as recorded in a botanical survey carried out in May 1978 is presented in Table 2,

Table 2:

Percent vegetation cover of the four farms surveyed in May 1978

Farm ¹	Planted grass	Natural grasses	Natural legumes	Other species	Vacant
Margarin	14.5	29.0	2.8	27.6	26.1
Los Hatillos	36.8	9.9	5.9	13.7	33.7
El Palmar	0.0	27.1	4.5	60.5	7.9
Sabana Grande	0.0	79.6	2.5	6.1	11.8

¹ The fifth farm, Caño Hondo, where the survey could not be carried out was similar to El Palmar

The mean annual rainfall varies from 1,200 to 1,600 mm with flat to rolling, hilly terrain. The vegetation within each farm changes from grass on the flat to shrubs on steep slopes, indicating difficulties encountered in brush control with increase in inclination of the terrain.

Seasonal mating is practised, generally, with bulls introduced at the onset of the rainy season in May/June and removed four to five months later. Weaning is carried out in December. Calving is recorded at fort nightly intervals, which would not account for still births and deaths from birth to two weeks of age in many cases. Thus the present analysis deals with calf crop rather than actual carvings. Such detailed recordings commenced early in 1979; prior to which female calves were tattooed with year of birth and hence age of cows could only be referred to in terms of years. No supplementary minerals were offered to the cattle.

Results

Annual calf crop: This factor would normally be referred to as annual calving rate or percentage, but since the present data deals only with calves recorded it would be appropriate to call it annual_calf crop and express it as percentage of number of breeding cows. The mean calf crop over five years varied between 35.4% in Sabana Grande to 72.5% in Margarin, with an overall mean of 51.7% (Table 3). Variations between years is less marked with 37.9% in 1972 and 56.5% in 1971. However, there

Table 3:

Annual calf crop in five CEAGANA farms from 1971 to 1975 (calves recorded as % of cows bred)

Farms	1971	1972	1973	1974	1975	Mean
Margarin	83.8	72.7	65.1	76.0	70.4	72.5
Los Hatillos	52.9	34.8	51.5	76.5	65.7	56.6
El Palmar	69.0	24.2	58.0	33.8	73.6	49.8
Sabana Grande	40.9	42.6	30.9	55.9	16.7	35.4
Caño Hondo	46.1	15.4	61.5	38.5	46.1	45.1
Mean	56.5	37.9	53.4	56.1	54.5	51.7

appears to be a tendency in alternate years of high and low calf crops within individual farms, which is more marked in natural compared to planted pastures. The superior performance in Margarin is confounded between the predominant breed of cattle there (Romana Red) and the presence of planted grasses. The smaller size and relative accessibility of Margarin compared to the other farms has permitted better management which may be a contributing factor. There appears to be a decline in performance with increase in size of the farms in general.

Overall calving interval: The overall calving interval in the five farms was 21.1 ± 7.2 months (Table 4). Here again Margarin and Los Hatillos with planted pastures recorded very much shorter intervals compared to the other farms with only natural pastures, where calving in alternate years was the rule.

Table 4:
Mean calving interval (months) in five CEAGANA farms

Farm	Calving interval (months)
Margarin	17.1 ± 5.9
Los Hatillos	19.0 ± 6.7
El Palmar	21.2 ± 7.0
Sabana Grande	24.3 ± 6.8
Caño Hondo	24.4 ± 6.5
Mean	21.1 ± 7.2

Age of first calving: Due to the nature of recording it is not possible to calculate age at first calving of the heifers in months and the data are presented in terms of the year of age when the animal calved for the first time (Table 5). Less than 10% of the heifers had their first calf in their third year and a similar percentage in the seventh year of their life. There was a peak calving in the fourth year of age in Margarin and Cano Hondo, while in the others calving was spread more evenly over the years.

Table 5:
Age at first calving (years) of heifers in five CEAGANA farms, as % of total heifers

Farms	3rd yr	4th yr	5th yr	6th yr	7th yr	Total
Margarin	15.7	68.8	14.1	1.3	0.0	369
Los Hatillos	13.5	28.2	28.2	19.8	10.2	117
El Palmar	1.8	24.4	24.4	26.8	22.6	168
Sabana Grande;	0.0	30.5	23.2	20.6	25.8	233
Caño Hondo	6.6	47.5	26.6	11.5	7.8	425
Mean	7.5	39.9	23.3	16.0	13.3	

Interval between first and second calving: The mean interval between first and second calving was 22.6 months (Table 6). The values for Margarin and Los Hatillos, with some planted grasses still persisting, are significantly lower ($P < 0.01$) compared to the other four farms which are of natural pastures. There appears to be a general decrease in the interval with time which may indicate improvement in recording and/or management of the herds.

Interval between second and third calving: The mean interval between the second and third calving was 18.3 months (Table 7) which is considerably less than the interval between the first and second calving. Here too the interval was significantly shorter in the farms with planted grasses compared to those with natural pastures.

Table 6:
Mean interval (months) between first and second calving of heifers in five CEAGANA farms

Farms	Year of birth of heifers					Mean
	1968	1969	1970	1971	1972	
Margarín	20.8	16.8	19.6	19.5	13.5	19.4 ^a
Los Hatillos	21.1	22.7	16.4	20.9	21.0	20.7 ^a
El Palmar	23.8	24.8	23.4	22.6	20.1	23.5 ^b
Sabana Grande	26.9	-	29.2	22.5	-	25.5 ^b
Caño Hondo	23.8	24.8	23.4	22.6	20.1	23.5 ^b
Mean	23.3	22.3	22.4	21.6	18.6	22.6

"a" is significantly different from "b" at $P < 0.01$ according to Sheffer's single degree of freedom sum of squares.

Table 7:
Mean interval (months) between second and third calving of cows in five CEAGANA farms

Farms	Years of birth of cow				Mean
	1968	1969	1970	1971	
Margarín	15.1	15.9	14.9	14.0	15.1 ^a
Los Hatillos	20.0	12.5	16.0	14.8	16.6 ^a
El Palmar	20.1	20.3	18.2	14.4	19.5 ^b
Sabana Grande	20.8	-	22.7	-	20.8 ^b
Caño Hondo	-	23.7	17.9	-	19.3 ^b
Mean	19.1	18.1	15.8	14.5	18.3

"a" and "b" are significantly different at $P < 0.01$

Table 8:
Mean interval (months) between third and fourth calving of cows in five CEAGANA farms

Farms	Year of birth of cows			Mean
	1968	1969	1970	
Margarín	13.9	12.1	13.2	13.1
Los Hatillos	17.3	17.3	11.0	14.9
El Palmar	19.2	17.0	-	18.1
Sabana Grande	18.0	-	-	18.0
Caño Hondo	25.0	23.6	-	14.3
Mean	18.7	17.3	-	17.6

Subsequent calving intervals: The interval between the third and fourth calf is presented in Table 8. There was a general reduction in time compared to the previous calving interval and similar trends are evident.

Relationship between age at first calving and interval for next calf: As the age at first calving increased there was a tendency for the interval required for the second calf to decrease. This tendency was particularly marked in Margarín and Los Hatillos (Table 9). This tendency is unlikely compensate for the delay in first calving, which as already noted was too late.

Table 9:

Relationship between age at first calving (years) and interval between first and second calving (months) in five CEAGANA farms

Farms	Age at first calving		
	3rd yr	4th yr	5th yr
Margarín	19.8	16.8	14.1
Los Hatillos	22.9	19.0	13.0
El Palmar	24.0	23.6	21.6
Sabana Grande	25.3	25.9	27.1
Caño Hondo	28.1	25.9	22.7
No. of animals	517	473	158

Calves per cow in eight years: Many of the cows live up to 15 years of age, however, due to lack of records it is not possible to calculate lifetime calf production of the cows, nor is it possible to estimate the production curve. Complete records were available to estimate the number of calves produced during the first eight years of life of some of the cows (Table 10). This was again higher in farms with planted grasses compared to those with natural pastures.

Table 10:

Number of calves produced in eight years of life of cows in five CEAGANA farms

Farm	No. of calves
Margarín	3.8
Los Hatillos	3.5
El Palmar	3.2
Sabana Grande	2.7
Caño Hondo	-

Discussion

The general calving performance of the herds studied may be described as very poor particularly on natural pastures. While this may to some extent be caused by lack of a rigorous selection and disease control programme, detailed recording procedure and cow/bull relationships in large paddocks, the main cause appears to be improper nutrition of the animals. The superior performance in farms with planted or improved pastures, as in Margarín and Los Hatillos, lend support to this assumption. It is further reinforced by ongoing experiments on cow fertility and heifer growth at Margarín.

There appears to be some confounding at Margarín and Los Hatillos due to the breed of animals and infrastructure facilities which may also have contributed to the superior performance of the herds there.

Accepting that the poor performance is principally a nutritional problem in these parts where rainfall is relatively high and dry periods short, the performance of herds in areas with even lower rainfall and consequent longer dry periods would be expected to be even poorer.

The high rainfall in the poorer farms studied would suggest that the main nutritional problem would be quality rather than quantity of forage. The natural grasses which form the major forage of the animals are low in protein and digestibility during the wet season and unpalatable during the dry season. The island has a wealth of natural legumes but these are generally eliminated by the grazing animals in the farm; those that persist are either unpalatable such as some *Indigofera* spp and *Desmodium* spp or are unavailable due to the nature of growth such as *D triflorum*. Those shrubs that exist do so by virtue of unacceptability to the grazing animal. In addition to this situation the soils are highly deficient in phosphate and generally high in calcium; deficiencies of other nutrients such as copper and cobalt are suspected.

Thus for overall improvement of calving performance there appears to be a need to select adapted grasses and legumes and develop management systems with minimum use of phosphate fertilization. While this would be an inevitable long-term objective, herd performance could be substantially improved by preferential grazing and mineral supplementation during the critical phases of the animals. Setting up targets of performance supported by a realistic programme of culling would also help to improve the situation. Such programmed farm management would require as a first step, subdivision of the farms and development of the infrastructure to facilitate preferential grazing and animal management.

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