

HEIFER REARING IN THE TROPICS

by

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INTRODUCTION

It is generally recognized that dairy heifers have lower growth rates throughout their life in tropical areas than in temperate ones (Figure 1). The pattern of growth is the traditional curved shape with a high growth rate and body development in the early stages of life, followed by a continuous slow increase as the animal gets older (Vaccaro and Rivero, 1985) (Figure 2). Liveweight differences between heifers reared in tropical and temperate areas are greater in animals over 18 months of age. These results suggest that more attention must be paid to this aspect, because of the positive relationship between mature weight and milk production.

These problems are not related to the genetic potential of the breed but are due to the environmental conditions, particularly feeding level (Menéndez, 1984).

PUBERTY

Age at first calving is basically determined by age at puberty. Average age at puberty is one of the most important components of the herd net reproduction because of its relation to the number of calves obtained each year and to the feed intake up to calving.

It is generally accepted that live weight is the most important factor affecting puberty. Heifers of large breeds usually reach puberty at 270 kg and smaller ones at 240 kg. In normally fed heifers, live weight is less variable and age at puberty tends to be relatively uniform, according to the breed.

LIVE WEIGHT GAIN AND AGE AT MATING

There is general agreement that it is economically advantageous to mate the heifers at early ages, no older than 15 months. This means daily liveweight gains from birth of 650 to 800 g. Higher gains of over 900 g/day, from 3 to 12 months of age, are undesirable because they decrease the growth of secretive tissue and increase fat deposition in the developing mammary gland. More difficulties at calving in over-fed heifers have also been reported (James and Tomlinson, 1988).

Unfortunately these liveweight gains and mating ages are not feasible in tropical areas because they depend on feeding cereals. Hence, it is necessary to look for alternatives that may not achieve

Figure 1. Liveweight of female Holstein calves.

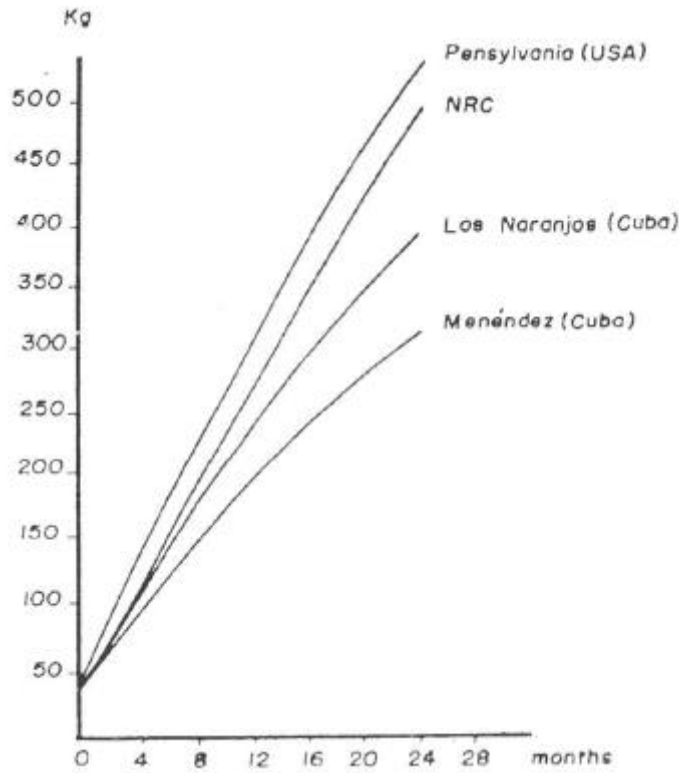
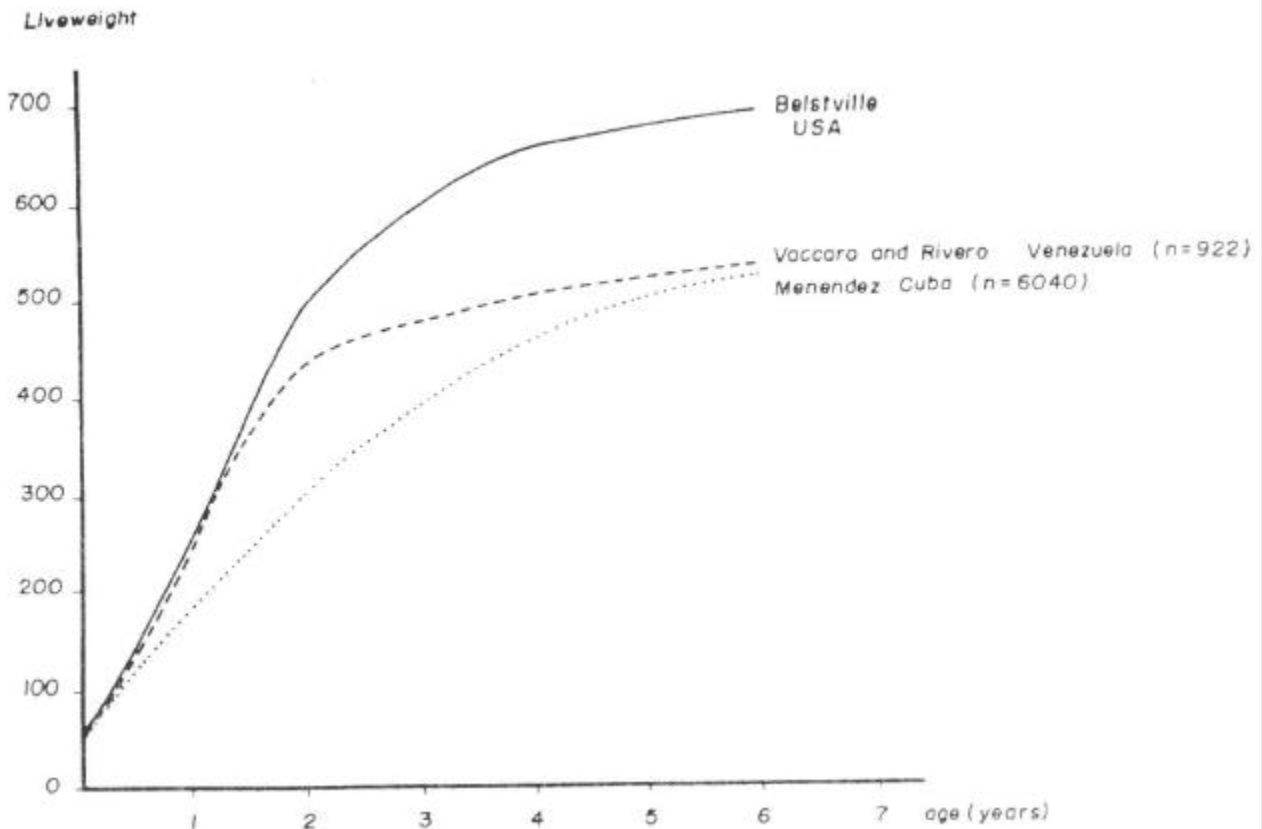


Figure 2. Liveweight of female Holsteins in the Venezuelan and Cuban tropics compared to Beltsville standards.



the performance obtained in developed countries but are adjusted to the prevailing conditions and naturally available resources of tropical countries.

It is well known that heifers in these areas are commonly underfed and receive poor management. Usually they graze on poor quality soils and receive small amounts of supplements or none at all. This could explain the low productivity and efficiency of cattle in such regions and the great number of unproductive animals in the herds (0.6 to 1.0 heifer/cow). Older ages at calving are mainly responsible for the latter results.

In the long term, insufficient feeding or seasonal scarcity of nutrients, affects reproductive performance in such a way that, even supplying high value diets afterwards, it is impossible to re-establish normal performance, even if the heifer weight is apparently high enough for normal reproductive activity (Perón 1984) (Table 1).

Table 1. Effect of nutritional level on reproductive behaviour (Perón, 1984).

	Nutritional level	
	Medium	Low ¹ - Medium ²
Puberty		
Age (days)	595	764
Weight (kg)	290	278
Average daily gain (g)	443	295
Progesterone level (ng/ml)		
Before puberty (35 d.)	1.06	0.77
During oestrus cycle	7.42	5.04
Feeding cost/heifer (\$)	68.08	193.76

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¹406 days at a live weight gain of 173 g/day

²118 days at a live weight gain of 525 g/day

This latter author used low nutritional levels in 3/4 Holstein, 1/2 Holstein and 1/4 Holstein x Zebu heifers for 406 days and then a medium-high level for 118 days. He noticed that heifers reached puberty at higher ages and weights and the feeding cost was three times more than for those normally fed.

The effect of growth rate on age at first service and calving age was determined by Rosete and Zamora (1985) (Figure 3). They fixed 320 kg as service weight and daily gains varied from 350 to 600 g. For the highest gain, calving occurred at 27 months of age and, for the lowest, at 39 months.

The former age (27 months) is higher than previously reported for intensively managed herds in temperate areas but is more feasible to achieve in tropical conditions. 27 months is the age considered most adequate at calving for normally reared heifers (Ponce de León 1988).

The effect of age at first calving on total number of calvings is shown in Figure 4.

WEIGHT AT CALVING

It is not possible to analyze age and weight at first calving separately. Roy (1978) suggested different weights for Holstein heifers with different ages, according to the daily liveweight gain. He pointed out that liveweight before calving must be over 500 kg for 2 to 3 years old heifers.

Heifers must have good body condition at calving, with a high liveweight. This is reasonable, considering the relationship between weight at calving, milk production and weight changes in the first stage of lactation.

Low weights at calving are closely related to calving difficulties and subsequent reproductive disorders. This is the main reason for the high percentage of heifers which never reach the second lactation in tropical areas (48 to 63%).

UTILIZATION OF NATURAL RESOURCES

It is a fact that farmers in tropical areas must base their animal production on the utilization of natural resources, basically grasses and sugar cane, and on the agricultural and industrial by-products (Preston and Leng, 1987).

The possibilities of achieving an adequate weight (300-320 kg) and age (16-18 months) of heifers at mating on pasture were discussed by Zamora (1983). However, limited availability of irrigation and the high cost of fertilizers make it impossible to allow an adequate

Figure 3. Effect of growth rate on breeding age (Rosete and Zamora, 1985).

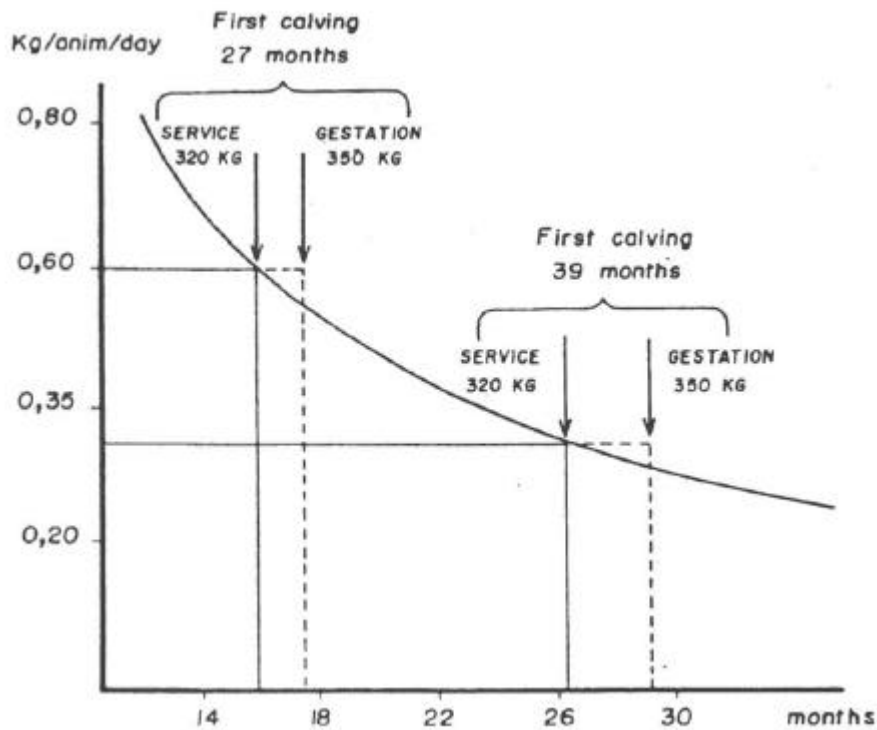
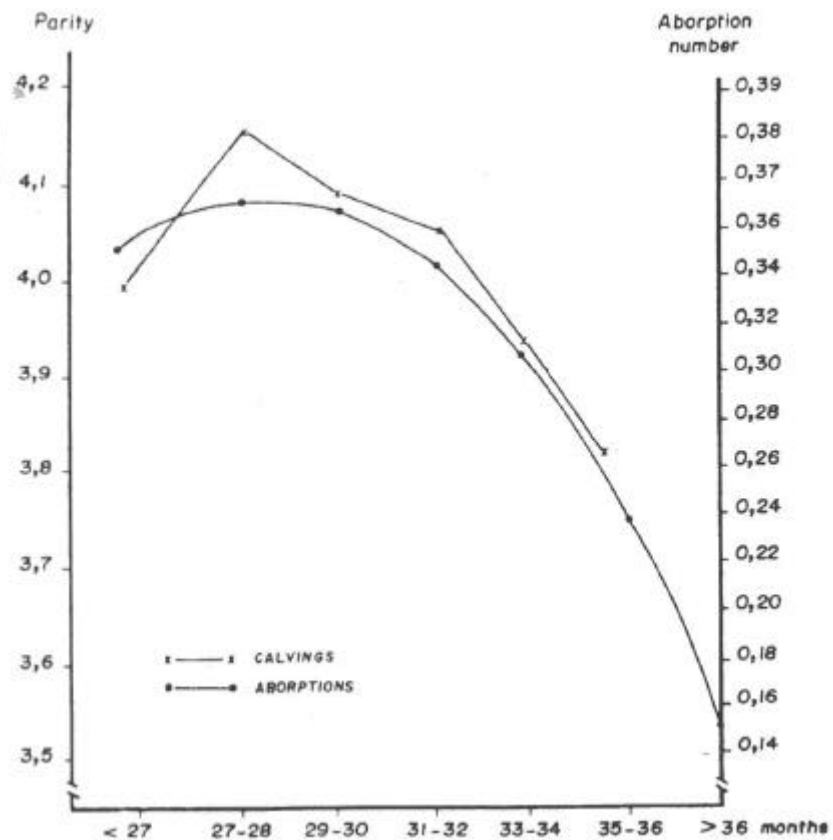


Figure 4. Effect of age at first calving on total number of calvings and abortions (Ponce de León, 1988).



quantity of good quality pasture throughout the year. Hence, it is necessary to use other sources of nutrients in order to supplement the basic diet seasonally or throughout the year. There are large amounts of by-products and other materials that can be used for this purpose. By-products of the sugar cane industry are of major importance in most of countries, together with animal wastes such as poultry manure. Mixtures of these products, as supplements to pasture, have increased the heifers' daily gains to over 500 g (Perón 1984 and Rosete 1989).

On the other hand, sugar cane (whole plant) is successfully fed in the Caribbean area and South America but hitherto mainly with male calves, bulls and cows. In the future, heifer rearing could also depend on sugar cane during part of the year.

The use of legumes, fed as supplementary forage with pasture or sugar cane diets, has increased rapidly in the last 5 years. Relatively high weight gains (600 g/day or even more) have been obtained (Marrero, 1989).

It is not usually considered necessary to manage heifers separately from older cows in small dairy units. In medium and large dairy herds, poor body condition in heifers is frequently found, due to feeding competition. Increases of 10% of total milk yield (0.86 litres/ day), 6% less abortions, 7% less total animal losses and 1.4 months less in calving interval were reported when heifers were managed separately from older cows during their first lactation (Ribas *et al.*, 1989).

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