LEUCAENA LEUCOCEPHALA AS A SOURCE OF PROTEIN FOR CALVES REARED IN A RESTRICTED SUCKLING SYSTEM

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Forty crossbred calves (Holstein and Brawn Swiss xZebu) of approximately three to four months of age at the start of the trial were used. A]:1 received molasses/urea plus residual milk after each milking and grazed from eight in the morning to three in the afternoon. The two treatments were 600 g/day of rice polishings or 2.5% liveweight of leucaena forage. No significant differences in the liveweight gains between the two treatments were observed nor were symptoms of toxicity. Therefore it is concluded chat leucaena at 2% of liveweight could provide a good supplement for calves reared in restricted suckling systems after grazing.

Key words: Restricted suckling, calf rearing, leucaena

In milk production systems in the tropical regions of Mexico, Zebu and Zebu crosses using larger breeds such as Brown Swiss and Holstein are generally used in dual-purpose systems. Thus the incomes from the sale of milk and of calves for fattening are equally important. One of the principal problems found in such systems is related to the growth of calves, since poor gains and high mortality rates up to weaning are obtained with these animals. Under these management systems the amount of milk taken by the calf from the mother is restricted as cow and calf are separated during the greater part of the day in order to increase the quantity of saleable milk. This problem is growing since in the majority of cases the calves are confined during the day in closed corrals where they usually have no access to pasture and they receive no additional supplement. This is reflected in the low rate of growth and increased susceptibility to disease which affects the development of the calves. This could give rise to problems in obtaining adequate compensatory growth in later fattening periods (Escobar 1977).

In order to resolve this problem some farmers use a complementary grazing system based on concentrates or protein supplements which permit greater liveweight gains , but generally this type of feed is scarce , expensive and competes with non-ruminant- species thus increasing costs of production and the dependence on intermediaries. A good alternative to substitute this protein supplement is the use of Leucaena leucocephala, tree legumes which, due to their high content of protein (Jones 1979), their ease of cultivation and high yields/ha (Brewbaker et al 1972) would allow the substitution of protein supplement and thus an important reduction in cost of rearing the calves.

The objective of the present experiment was to study the possibility of substituting Leucaena leucocephala forage for the traditional protein supplements in restricted suckling rearing systems.

Materials and Methods

Location: The situation and climatic characteristics of the region where this trial was carried out were described by Alvarez et al (1980). The trial took place between September and November inclusive in 1979, that is during the rainy season.

Pastures: The pastures used were Bermuda cross 1 (*Cynodon pleistostachius*) fertilized with nitrogen as urea in 4 applications per year. Various pastures were available to allow rotational management with rest periods fluctuating from three to four weeks between pastures. The calves in this trial always grazed with priority before a group of milking cows although the calves did not have a special pasture available but used pastures from the whole production unit, thus allowing them to consume the best forage and avoiding severe parasite infestations. Stocking rate was estimated to be three animal units/ha (one animal-unit being equivalent to one animal of 400 kg liveweight).

The leucaena was sown 24 months previously. It was sown by machine in rows separated by 90 cm, each row being a continuous stream and using approximately 20 kg of seed/ha of native leucaena varieties. The leucaena was cut daily and given to the calves in feeding troughs to which the calves had access when confined from the afternoon until the following day. The leucaena was offered at a rate of 2.5% of estimated liveweight of the calves. The calves in addition had access to a molasses/urea (2.5%) mix in the calf pens.

Animals: Forty calves (males and females) of Holstein and Brown Swiss x Zebu in which the proportion of European genes was around 75% were used. The calves were approximately three to four months old at the start of the trial and were reared according to a system of restricted suckling. Liveweight fluctuated between 75 and 100 kg.

Treatments: The calves were distributed to two treatments according to race, age and sex. The treatments were:

a) 600 g/calf/day of rice polishings
b) 2.5% liveweight of leucaena forage

In addition all the calves received approximately 0.5 kg of molasses/urea at 2.5%, the milk remaining after each milking, salt and minerals, and had access to grazing from 8 - 15.00 hours daily.

Procedures: : The mothers of the calves in the two treatments received similar treatment and were milked mechanically twice daily (at 4 am and 4 pm approximately). The calf was utilized to stimulate milk letdown, allowing suckling for some seconds before attaching the milking machine, after milking the calves were allowed to suckle the residual milk outside the milking parlour. Finally the cows were separated from their calves until the next milking. The calves from the two treatments were taken to pasture together from eight in the morning until around three in the afternoon. They were then separated by treatment and confined in calf pens with concrete floors and roofs where their respective (Beds were offered in controlled form.

Measurements and analysis: The calves were weighed every two weeks after morning milking, daily liveweight gains were determined by linear regression of liveweight against time, individual liveweight gains were compared by analysis of variance. The trial lasted 79 days.

Results and Discussion

The liveweight gain results during each experimental period are shown Table 1. No significant differences in liveweight gains between the two treatments were observed. The leucaena was capable of supporting liveweight gains similar to that of the protein supplement. No toxicity syptons were observed in the calves, probably due to the low proportion of leucaena in the ration eg the basal diet being direct grazing of pasture.

Table 1:
Performance of calves with leucaena or rice polishings as protein supplement [1]

	Leucaena	.6 kg rice polishings	F
Number of calves	20	20	
Liveweight kg			
Initial	102.2	101.4	
Final	158.0	157.9	
Daily gain[2] kg	.681	.713	.45 NS

[1] Duration 79 days
[2] Adjusted by regression for weight/time

The consumption of residual milk was estimated to be about two to three litres daily in these calves and this could have had a beneficial effect in supplying a good source of by-pass nutrients to the duodenum and explain the high rates of gain (0.68 to 0.715 kg/calf/day). Alvarez et al (1977) reported a similar beneficial effect in young cattle fed on diets based on molasses/urea and rice polishings.

In the two treatments a tendency for higher liveweight gain in calves entering the trial with greater liveweights was found, probably suggesting that this type of calf responds more efficiently to forage/pasture rations and to supplementary non protein sources due to a better rumen development, but the trends were observed with leucaena and the protein supplement and no treatment differences in this aspect were detected.

Conclusions

Leucaena leucocephala offered at 2.5% liveweight to calves reared in restricted suckling systems with grazing appears to be a good supplement for calf rearing allowing acceptable rates of liveweight gain. The economic analysis showed a gain in favour of the utilisation of Leucaena leucocephala such that it is possible to reduce the cost of protein supplement by more than 50% and produce the supplement in the same farm.

References

Alvarez FJ, Saucedo G & Arriaga A 1979 Produccion de leche y came en el tropico humedo Tecnico FIRA Banco de Mexico SA

Alvarez F J, Wilson A & Preston T R 1977 Leucaeana leucocephala as a combined source of protein and roughage for steers fattened on molasses/urea Tropical Animal Production 2:288-291

Brewbaker J L, Plucknett D L & Gonzalez V 1972 Varietal variation and yield of Leucaena leucocephala (Kao Haole) in Hawaii Hawaii Agricultural Experimental Station University of Hawaii Research Bulletin No 166

Escobar 0 1977 Comportamiento productivo de novillos de cria y rejagueria en el tropico humedo Produccion Animal Tropical 2:229 Resumen

Jones R J 1979 The value of Leucaena leucocephala as a feed for ruminants in the tropics World Animal Review No 31

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