A NOTE ON THE USE OF CASSAVA (MANIHOT ESCULENTA) AS A COMBINED PROTEIN AND ROUGHAGE SOURCE FOR GROWING CATTLE FED MOLASSES/UREA[1]

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A trial was carried out with two groups of four weaned calves to study the effect of giving 200 g/d of cottonseed meal as a supplement to the basal diet of molasses/urea (2.5% of liveweight) and cassava forage (4% of liveweight as fresh forage). The rate of weight gain was increased from 191 to 488 g/d and feed conversion was improved from 11.5 to 6.43 by supplementation with the cottonseed meal.

Key Words: Cattle, molasses/urea, cassava forage, cottonseed meal

Cattle diets based on liquid molasses/urea must be supplemented with sources of roughage to maintain rumen function and with bypass protein to stimulate voluntary intake and complete the host animals requirement for amino acids (Preston and Leng 1980). In the conventional molasses/urea system used in Mauritius the principle source of roughage has been sugar cane tops and, to a lesser extent, elephant grass. Bypass protein has been supplied by fish meal or by combinations of cereal and oilseed byproducts.

The use of acacia forage (*Leucaena leucocephala*) to act as a combined source of roughage and protein was first described by Hulman et al (1978). The aerial part of the cassava plant (*Manihot esculenta*) has similar characteristics to acacia and was used successfully in a molasses/urea diet in the Dominican Republic (Ffoulkes and Preston 1978),

Based on the above findings, it was thought that cassava forage might have application as a protein/roughage source for commercial fattening of cattle in Mauritius,

The first observation trial was set up to simulate the feeding system employed by Ffoulkes and Preston (1978), The preliminary results were most disappointing with very low rates of liveweight gain, This paper describes the effects of providing an additional source of bypass protein in the form of cottonseed meal.

Materials and methods

Cassava Plantation: The local sweet variety of cassava was planted at the Savannah Sugar Estate with 75 cm between rows and 23 cm between plants within the row, This gave a population of approximately 50,000 plants/hectare. Only a

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small amount of fertiliser was used for the crop establishment. After an establishment period of 5 months the plot yielded about 44,500 kg of fresh forage/ha with a mean composition of 36% leaves and petioles and 64% stems and branches (fresh basis). Subsequent harvests at 3 month intervals yielded about 25,000 kg/ha with 55% leaves and petioles and 45% stems and branches,

Animals and Diets: Four male and four female crossbred cattle (Friesian X Creole X Zebu) aged 4-6 months were allocated to two groups. m e diets consisted of molasses containing 2.5% urea fed a the slightly restricted level of 2.5% of bodyweight; the fresh cassava forage was given at the rate of 4% of bodyweight. The experimental treatments consisted of 0 or 200 g/d of cottonseed cake per animal. The animals also had free access to a mineral mixture containing dicalcium phosphate and sodium chloride.

The cassava forage was harvested at between 3 and 5 months of regrowth and consisted of the aerial part of the plant cut at approximately 10-15 cm above ground level. The forage was chopped in a stationary forage harvester and was fed with the molasses (and protein supplement according to treatment)in the same feed trough. The animals were weighed at intervals of 14 days and their rations adjusted according to these weights. They were housed in an enclosed building with a concrete floor (about 6 m /animal). The trial lasted for 99 days.

Result and Discussion

The protein (N x 6.25) and crude fibre contents of the cassava forage at two stages of regrowth are compared with some other local forages in Table 1. The nitrogen content of cassava forage at three months of growth was comparable with

Table 1:
Chemical composition of the cassava forage compared with other local forages

	DM, %	Composition of the DM, %	
		N x 6.25	Crude fibre
Cassava forage			
3 - 4 months	19.2	16.6	24.4
6 months	22.2	9.0	35.1
Elephant grass	21.2	12.4	27.8
Whole sugar cane	35.1	2.56	24.5
Sugar cane tops	32.1	5.83	31.9
Setaria grass	22.5	4.7	35.9
Leucaena	34.6	19.3	32.7

that for acacia. It is obvious that the nutritive value of the cassava forage decreases with the stage of growth. This emphasises the importance of harvesting this forage at the optimum stage which is considered to be at 3-4 months.

Mean values for animal performance are given in Table 2. Results on the treatment without cottonseed meal were relatively poor (290 g/d) and there was a highly significant improvement when the limited quantity (200 g/d) of cottonseed cake was fed. This was particularly noticeable in the results for feed conversion.

Table 2:

Mean values for animal performance on molasses/urea supplemented with cassava forage, with or without cottonseed meal (one group of 4 animals per treatment)

	Without cottonseed	With cottonseed	$SE_{\bar{x}}$
Liveweight, kg			
Initial	104	81	
Final	133	127	
Daily gain	0.292	0.488	±.079*
Feed intake, kg/d			
Cassava forage	4.72	4.17	
Molasses	2.96	2.60	
Urea	0.089	0.078	
Cottonseed cake		0.20	
Minerals	0.06	0.06	
Total DM	3.36	3.14	
Consumption index[1]	2.88	3.02	
Conversion[2]	11.5	6.43	

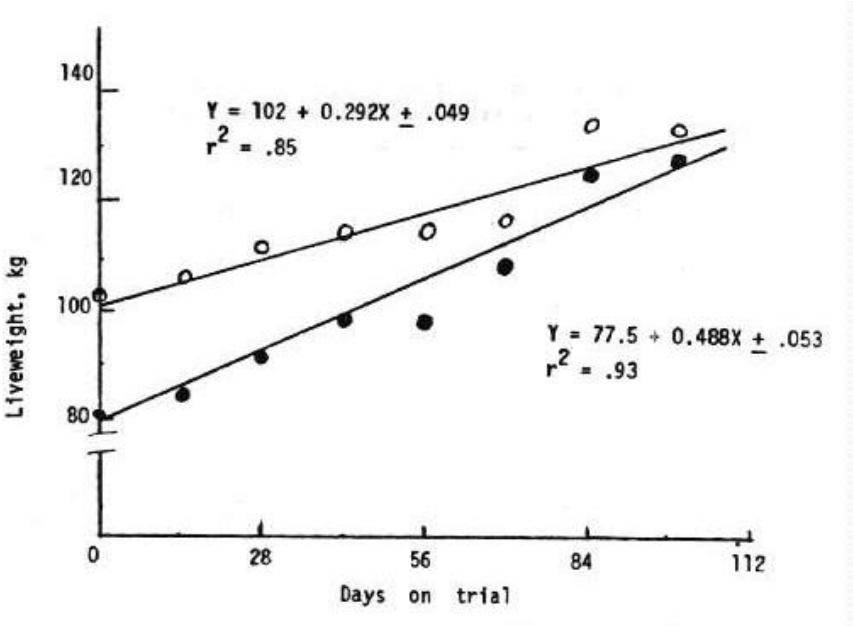
[1] (Daily DM intake/liveweight)100

[2] Feed DM/Liveweight gain

*P <.05

Growth rate was more uniform in the cottonseed supplemented group (r^2 =.93 vs .85) indicating the obviously superior nutritive value of this diet (see Figure l). There were no apparent health problems on either diet. These results are different from those reported by Ffoulkes and Preston (1978) in the Dominican Republic where apparently there wee no significant improvement in performance when 400 g/d of soybean meal wee added to the basal diet of molasses/urea and cassava forage. It is interacting to note two important differences between these findings. Intake of molasses was lower and the rate of liveweight gain on the control (without soybean) treatment was much higher in the trial in the Dominican Republic compared with the data described in this paper, This observation of consistently higher voluntary intake of molasses in Mauritius and the lower than expected rates of liveweight gain have been commented on in other papers from this country. The reasons for the poorer performance are not known, however, it is an important problem which requires more fundamental research in order to find a satisfactory solution.

Figure 1:
Growth curves for cattle fed molasses/urea and and cassava forage with (!) or without (") 200 g/d of cottonseed meal



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