

Pasture Quality and Animal Requirements (Part 1. Supplementary Feeding of Grazing Livestock in the Top End of the NT)

D. Ffoulkes, Principal Research Officer, Darwin

INTRODUCTION

Supplements are given to livestock to rectify nutrient deficiencies in the feed. The type of supplement and quantities required depend on the extent of these deficiencies and on the level of animal production (i.e. maintenance, growth, pregnancy, lactation etc).

The purpose of this Agnote is to help answer the question: Which are the important nutrients to supplement grazing cattle and when?

NUTRIENT REQUIREMENTS OF PRODUCTIVE BEEF CATTLE

It is difficult to accurately define the total nutrient requirements of animals because they vary according to many factors, such as sex, age, breed, productivity and environment, all of which will vary from herd to herd, and from station to station. Estimates of these requirements are therefore an approximate value based on a representative liveweight for each class of stock at a given level of productivity. This has been done in Table 1 for some major nutrients which are needed by various classes of stock at moderate levels of productivity.

Table 1. Approximately daily nutrient requirements** of productive beef cattle

Stock class and live weight LW (kg)	Feed intake			Protein required		Materials			
	Dry matter		*Green			P	Ca	Na	S
	% LW	kg	kg	%	g	g	g	g	g
Weaners 150	2.7	4.0	11.5	11	445	12	14	4	4
Yearling 250	2.3	5.8	16.5	11	620	15	17	6	6
Steers 400	1.9	7.7	11.9	9	690	15	16	5	8
Wet cows 350	2.3	8.2	23.5	9	750	24	24	13	14
Dry cows 450	1.5	6.7	19.0	6	390	12	12	7	7
Bulls 600	2.0	12.0	31.5	8	926	20	20	12	11

* assuming 65% moisture content of feed. ** from NRC (1976)

NUTRIENT LEVELS IN TOP END PASTURES

The levels of nutrients found in pastures vary greatly between season, species, stage of growth and soil type. Representative values for the Top End of cut pastures (see Wesley-Smith 1972), plus the level required for liveweight maintenance by grazing cattle, are shown in Table 2.

Table 2. Average Pasture Quality at Katherine and Adelaide River

	Pasture composition (% dry matter)				Maintenance level required
	End of Wet		End of Dry		
Crude protein	3-6	8-10	1-3	4-10	7
Phosphorus	0.03-0.05	0.09-0.14	0.02	0.04	0.12-18
Digestibility	30	45-60	30	40-50	approx 50

Native pasture quality data derived from analyses of plucked leaves of three native perennial grasses near Adelaide River, (see Eggington 1986), is presented in Table 3.

Table 3. Average seasonal nutrient content (% dry matter) of leaves of three native grasses in the Top End

Season	Protein	P	Ca	Na	S
Wet	6.3	0.09	0.26	0.02	0.09
Dry	4.3	0.06	.038	0.04	0.07

Nutrient levels in the first two months of the Wet season are generally better than the average values shown above.

AVAILABILITY OF NUTRIENTS FOR PRODUCTIVE STOCK

The availability to the animal of nutrients from pasture depends on the plant fraction selected by the animal, the chemical nature of the nutrient, and the digestibility of the plant material. These and other variables make prediction difficult, though "digestibility" is the best single guide.

A comparison of the average gross nutrient levels supplied by the Wet and Dry season native pasture grasses (Table 3), with the levels required by grazing cattle (Table 1), is presented in Table 4.

Table 4. Average nutrient levels in native pasture grazed as a % of the requirements of productive beef cattle

Season and stock class	Protein	P	Ca	Na	S
Wet Season:					
Weaners	57	30	74	20	90
Yearlings	59	35	89	19	87
Steers	70	46	125	31	87
Wet cows	69	31	89	13	53
Dry cows	108	50	145	19	86
Bulls	82	54	156	20	98
Dry Season:					
Weaners	39	20	109	40	70
Yearlings	40	23	130	39	68
Steers	48	31	183	62	67
Wet cows	47	21	130	35	41
Dry cows	74	34	212	38	67
Bulls	56	36	228	40	76

LIKELY NUTRIENT DEFICIENCIES

From Table 4 the following comments can be made.

Protein

There are likely to be all-year-round deficiencies in total protein for productive stock grazing on native pastures. In the Dry season, the content of total protein in the pastures is only 40% of requirements for young growing stock. Note that protein contains about 16% nitrogen (N) which is the critical nutrient in this case. However, true protein is needed for high levels of animal production especially for young stock.

Phosphorus

Phosphorus deficiency is extensive in native pastures throughout the year.

Phosphorus is closely associated with metabolic calcium. It also plays an essential part in the energy processes that occur in those tissues of the animal's body which require energy and protein. For this reason, phosphorus supplementation is most effective in the Wet season when livestock are likely to consume higher levels of energy and protein. Where phosphorus is lacking in the feed there is a high demand on skeletal reserves and prolonged deficiencies can lead to brittle bones or 'peg leg' later in the Dry season.

With the exception of lactating breeders and severe cases of 'peg leg', it is unlikely that there will be a response to supplementary phosphorus in the Dry season on native pastures unless levels of other nutrients, particularly energy and protein, are adequately supplied as well.

Calcium

Calcium deficiency is only likely to occur in young growing cattle on Wet season pastures.

Sodium

Sodium content in native pastures is very low throughout the year causing animals to crave for salt. Serious deficiencies occur in the Wet season, with lactating cows being most affected.

Sulphur

Native pastures are also deficient in sulphur. Sulphur is needed by cattle to make protein from simple sources of N, i.e. urea, and should be provided when N fertilisers are used in the form of loose mixes or lick-blocks for supplementing protein requirements.

Trace minerals

Whilst this Agnote has only been concerned with major nutrients some mention of trace minerals is warranted. The importance of trace mineral deficiencies will increase as the level of the major nutrients in the feed approaches the animal's requirements. Copper and cobalt have been marginal in grazing cattle in some areas of the Top End (see Wesley-Smith and Ford, 1982; Wesley-Smith, 1990).

SIGNS OF NUTRIENT DEFICIENCIES IN CATTLE

Nutrient deficiencies in cattle are commonly exhibited by:

- poor condition;
- animals licking each other, posts etc;
- eating soil;
- dull, woolly coats;
- general listlessness;
- sunken eyes;
- poor productivity.

CONCLUSION

In this Agnote, the levels of major nutrients in native pastures have been compared with nutrient requirements of various classes of productive stock. Despite the ability of animals to select the choicest plants, the comparison indicates that there are likely to be deficiencies in the major nutrients throughout the year. These may be corrected by better nutrition from improved pasture, crop stubbles etc, and/or by supplementary feeding.

SOURCES OF INFORMATION AND FURTHER READING

Anon (1986) A review of phosphorus requirements of grazing cattle in North Australia. NT Department of Business, Industry and Resource Development Technical Bulletin No. 100.

Eggington, A.R. (1986) Chemical composition of Monsoon tall grass pastures on the Murrumbidgee Land System of the Northern Territory. Technical Bulletin No. 91, NT Department of Primary Industry, Fisheries and Mines.

NRC (1979) *Nutrient Requirements of Beef Cattle*, National Research Council. Washington, D.C.: National Academy of Science.

Wesley-Smith, R.N. (1972) Liveweight gains of Shorthorn steers on native and improved pastures at Adelaide River, Northern Territory. *Australian Journal of Experimental Agriculture and Husbandry* 12:566-72.

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Published: Thursday 14 May 1998.

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