Technote

No: 30

November 1983

Toxicity Experiments of Rubberbush Fed to Cattle and Sheep

(Calotropis procera)

B. L. Radunz, District Veterinary Officer Katherine, G. Wilson, Veterinary Officer Alice Springs and G. Beere, Stock Inspector Katherine

SUMMARY

Rubberbush (*Calotropis procera*) did not cause acute toxicity when fed to sheep and cattle during the Wet Season months of January to March. At Katherine it was fed at the same dose rates that caused significant clinical and pathological changes in sheep in the Sudan in Africa.

INTRODUCTION

Rubberbush (*Calotropis procera*) is a coarse shrub native to tropical Asia and Africa (Everist 1974) which has naturalized in the Kimberley District of Western Australia, the "Top End" of the Northern Territory and a few areas of Northern Queensland (Chippendale and Murray 1963). Everist (1974) considered that 'the plant was unpalatable and no definite cases of poisoning had been noted in Australian literature although some reports state that it is sometimes eaten by cattle with no ill effect'. However, Mahmoud, Adam and Tartour (1979) reported that in the Sudan the plant is suspected of causing ill-thrift and sometimes death in sheep and goats, and acute toxicity following the feeding of fresh leaves to sheep. In West Africa, sheep and goats eat the flowers and withered leaves, but avoid the fresh leaves where possible (Watt and Breyer - Brandwijik 1962). Although in the Northern Territory sheep have been killed by extracts of the leaves in quantities which they might normally eat, further studies with whole leaves did not kill sheep at equivalent doses (Hall 1969). Hall also reported that goats eat the plant with no apparent effect in the Northern Territory.

In Northern Australia cattle graze rubberbush extensively in the Dry season and often plants are totally denuded of flowers and leaves.

The plants grows extremely well in Northern Australia and has been considered to be a suitable plant for a potential wood alcohol industry. The leaves, a by-product of the proposed industry, could provide protein supplementation to cattle in the Dry season when native pastures are low in crude protein.

FEEDING TO SHEEP

METHOD

Although sheep are not grazed in northern Australia, a feeding experiment was carried out with sheep over a period of 60 days. Two sheep were fed a basal diet of cracked rice and chaffed legume hay. Fresh *Calotropis procera* was also fed at a rate of 5 g/kg live weight for 30 days and at 10 g/kg live weight for a further 30 days. Initially, the sheep would not eat the hammermilled *Calotropis procera* leaves and it was necessary to dose by stomach tube for the first two weeks. However, during the last six weeks of the experiment the leaves were eaten readily.

RESULTS

Neither sheep showed abnormal clinical signs and at day 61 an autopsy showed no gross pathological changes. Histological examination of the liver and kidney also showed no significant findings.

DISCUSSION

Mahmoud, Adam and Tartour (1979) reported that sheep in the Sudan fed at a similar rate showed toxic signs characterized by inappetence, diarrhoea, dyspnoea, alopecia and loss of condition within 30 days and described the histological and clinical pathological changes. The sheep in our study did not show similar clinical or pathological changes.

FEEDING TO CATTLE

The aim of this study was to determine if feeding the fresh leaves of *Calotropis procera* is toxic to cattle when fed at a significant proportion of the diet for 12 weeks.

METHOD

Eight Brahman cross steers, 10 to 12 months old, were weighed and allocated randomly into four groups of two animals (three treatment and one control). The cattle were fed a basal diet of 3 kg of equal parts of ground rice and chaffed legume hay and had free access to pasture hay. *Calotropis procera* leaves and flowers were collected, hammermilled and fed at low (L), medium (M), or high (H) rates of 2.5 g/kg, 5.0 g/kg and 10.0 g/kg live weight respectively. The steers were weighed weekly for 84 days and the consumption rate adjusted. All cattle ate the *Calotropis procera* readily.

The liveweight gain of the control group ranged from 20-22 kg. The low weight gain was attributed to the adverse environmental conditions in the yards. The liveweight gain of the L, M and H groups ranged from 19-23 kg, 11-18 kg and 18-28 kg, respectively. *Calotropis procera* comprised 10% (L), 20% (M) and 40% (H) of the diet excluding the hay component. Although the group of two steers fed the high rate had the highest weight gain, it is not possible to make any conclusions regarding the animal production potential of *Calotropis procera* leaves owing to the small size of the sample.

After 84 days all steers were autopsied; liver and kidney samples were fixed in 10% formalin and examined microscopically.

RESULTS

No significant histological changes were found. Some animals showed mild megalacytosis and upper nephron nephrosis, but similar changes were observed in the control animals.

DISCUSSION

The experiment over a 84 day period feeding *Calotropis procera* to beef cattle weaners at doses ranging from 2.5 g/kg to 10.0 g/kg live weight per day did not result in clinical or pathological changes.

CONCLUSION

These observations at Katherine indicated that (when fed to sheep and cattle during the Wet season months of January to March) *Calotropis procera* did not cause the acute toxicity at the same dose rates that caused significant clinical and pathological changes in sheep in the Sudan in Africa. Field observations in the Northern Territory also indicate that the plant is not toxic to grazing cattle and goats. It is postulated that either the toxic principle is not present in the variety of *Calotropis procera* found in northern Australia, or that the environmental conditions do not favour production of the toxic principle. In Africa (Watt and Breyer-Brandwijik 1962) and in India

(G. Calley, pers. comm., 1981), cattle and sheep avoid eating the plant. Cattle in Sulawesi in Indonesia commonly graze rubberbush, (D. Thomson, pers. comm., 1981). It is postulated that rubberbush in northern Australia and Indonesia lacks the toxic principle and that the toxic principle may be associated with the palatability of the plant.

REFERENCES

Chippendale, G.M. and Murray, L.R. (1963) - Northern Territory Administration Animal Industry Branch, Extension Article No. 2,85-88.

Everist, S.L.. (1974) - Poisonous Plants of Australia. 2nd edn. p 99-100.

Hall, W.T.K. (1969) cited by Everist, S.L. (1974)

Mahmoud, O.M., Adam, S.E.I. and Tartour (1979), ¬'The Effects of Calotropis procera on Small Ruminants', J. Comp. Path., 89,241-263.

Watt, J.M. & Breyer-Brandwijik, M.G. (1962) - The Medical and Poisonous Plants of Southern and Eastern Africa, 2nd edn., p. 121.

Please visit us at our website:

www.nt.gov.au/d

Department of Regional Development, Primary Industry, Fisheries and Resources

ISSN 0158-2755

Serial No.

Agdex No. 400/647