

Leucaena production in arid Botswana

F.P. WANDERA¹, M. KARACHI², S. MANGOPE¹ AND B.M. LEFOFE¹

¹ Department of Agricultural Research, Private Bag 0033, Gaborone, Botswana, E-mail: wpeter@gov.bw,

² Egerton University, PO Box 536, Njoro, Kenya

Introduction

The value of browse species as a source of nitrogen for grazing animals is restricted to wet seasons, with protein deficiencies being experienced by September (in dry winter season) in southern Africa (Moleele 1998). This is when highly productive planted browse species would become useful to supplement the dietary protein requirement of grazing animals (Morris and Du Toit 1998). Further, browse species can provide partly for protein requirement of intensive production systems, such as in feedlots and dairies. This paper reports work on the introduction and screening of *Leucaena* spp. for Botswana conditions.

Materials and methods

Leucaena species and a hybrid were evaluated for cold tolerance, productivity and quality at Morale for 3 seasons. The site (circa 23°S, 27°E) receives erratic rainfall that averages 450 mm between October and May. Its temperature range is 30–22°C mean max and 17–3°C mean min, with absolute max and min of 40 and –6°C, respectively. The soils are haplic acrisols with a pH (H₂O) of 6.7, organic carbon 0.3%, available P 3 ppm, total N 0% and Ca 1.7, Mg 0.6 and K 0.7 meq/100 g. Rainfall during the experimental period amounted to 554, 284 and 323mm for 1996–97, 1997–98 and 1998–99 growing seasons. Cold tolerance was rated on a scale of 0–5 (0 = no leaf death and 5 = maximum leaf death), 1 month after freezing temperatures (0–5°C) were recorded. Dry matter of edible component was determined by drying in forced draught oven at 65°C to a constant weight. The dry material was hammer-

milled to pass through a 1 mm sieve for nitrogen, calcium, phosphorus, fibre and digestibility analyses.

Results

There was no correlation between cold tolerance and productivity in this genus (Table 1). Chemical composition shows that the high-yielding accessions also had high N value (>3.2%) and equally high dry matter digestibility (55.6–57.3%), showing characteristics of high feed value. *L. leucocephala* dominated in production of high edible dry matter with high feed value. Termites and wild animals were a problem during establishment.

Conclusion

L. leucocephala was productive under arid conditions prevailing in Botswana and can therefore be used to offset protein deficiency in grazing animals in such environments. Its medium to low cold tolerance indicates that the edible dry matter should be conserved for feeding in dry winters.

References

- MOLEELE, N.M. (1998) Encroacher woody plant browse as feed for cattle. Cattle diet composition for three seasons at Olifants Drift, south-east Botswana. *Journal of Arid Environments*, **40**, 255–268.
- MORRIS, C.D. and DU TOIT, L.P. (1998) The performance of Boer goats browsing *Leucaena leucocephala* in Kwa Zulu-Natal, South Africa. *Tropical Grasslands*, **32**, 188–194.

Table 1. Cold tolerance, dry matter yield and feed value of some *Leucaena* accessions in Botswana.

Species	Acc. No.	Cold-tolerance rating	Mean yield (kg/ha)	N (%)	Ca (meq/100g)	P (ppm)	NDF (%)	DMD (%)
<i>L. pallida</i>		2.5	1749	3.46	1.28	0.17	29.0	50.8
<i>L. leucocephala</i>	K 88A	3.0	1979	3.46	1.68	0.22	36.0	47.4
<i>L. esculenta</i> ssp. <i>paniculata</i>	79/92	3.0	1795	3.84	0.94	0.19	30.5	50.1
<i>L. leucocephala</i> cv. Cunningham	K500	3.5	2229	3.25	1.67	0.16	34.4	57.3
<i>L. leucocephala</i>	95/20	3.5	1847	–	–	–	–	–
<i>L. leucocephala</i> cv. Taramba	K636	5.0	1728	–	–	–	–	–
<i>L. diversifolia</i> × <i>L. leuco.</i> (Kx3, F4)	4/95	5.0	2099	3.63	0.95	0.16	29.1	55.6
LSD (P < 0.05)			135	0.80	0.67	0.06	12.1	8.7