

## The potential of local shrubs as livestock food in central Tanzania

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### Introduction

Two investigations were undertaken in the Dodoma region of central Tanzania in February and March (wet season) 1989 and during September and October (dry season) 1990. The aim was to study the importance of indigenous browse as food for sheep, goats and cattle and to assess their nutritive value.

### Material and methods

Grazing herds were followed on pasture and leaf samples were collected from species preferred by the animals. Analysis of dry matter, ash, crude protein (CP), neutral-detergent fibre (NDF), minerals and soluble and bound phenolics (proanthocyanidins) were made later in the laboratory on the dried samples. Also estimated were the *in vitro* true organic matter digestibility (TDOM) and the content of *in vitro* digestible crude protein (DCP) by a 48-h incubation with rumen fluid followed by 16-h pepsin-HCl digestion.

### Results

Samples taken in the dry season were on average higher in ash, CP and TDOM and lower in NDF and phenolics than in the wet season as a result of being less mature (Table 1). *Cadaba farinosa*, *Ecbolium* sp. and *Maerua* sp. from the wet season and the *Cadaba* and *Cordia* families from the dry season were particularly high in ash (>160 g/kg). High in CP (ca. 250 g/kg) were *Delonix elata*, *Tarrena* sp., *Albizia harveyi* and *Maerua* sp. (wet season) and in the dry season the majority of samples had over 200 g/kg CP. The soluble phenolics (mean = 180 g/kg in the wet season) samples showed less variation than in the dry season with the exception of one unidentified *Acacia* with 400 g/kg. Among the dry season samples (mean = 130 g/kg) *A. nilotica* was the highest (480 g/kg) whereas around one-third of the samples were below 100 g/kg. High values of bound phenolics (>200 absorbance units per g NDF) in the wet season were found in *Lannea stuhlmani*, *D. elata*, *Commiphora*

*trothae* and *Maerua* sp. and in the dry season (>100) in samples from *A. tortilis*, *D. elata* and in a few samples of *Grevia bicolor* and *dumicola*.

Analysis of mineral elements showed that Ca was present in excess of livestock demand, that P, Mg and the microelements Mn, Cu, Mo (wet season) and Co were sufficient and that Na was severely deficient in all samples. Se was found in toxic levels only in one sample of *Cadaba farinosa* from the wet season.

### Discussion

The uniformity of CP digested *in vitro* was tested in a Lucas plot where DCP content was regressed on CP content (Figure 1). Expected DCP contents were calculated for all samples from an assumed true digestibility of CP in normal foodstuffs of 0.90. The metabolic *in vitro* CP residue was not known and therefore ignored. Deviations (negative) from the expected DCP were less for the dry than for the wet season samples (5.2 v. 8.4 units). Highest for the wet season were samples from *Acacia* sp., *A. tortilis* and *Tarrena* sp. (>12) and for the dry season *Cordia gharaf* (three samples), *A. brevispica* and *Blepharispernum zanguebaricum* (>10). The amount of phenolics could not account for more than a maximum of 18% of the variation in deviations from the expected DCP, in either single or multiple regressions.

On the basis of (i) reported preferences by mainly cattle and goats, (ii) reported ease of establishment, and (iii) from values of CP, DCP, TDOM and level of phenolics, the four species shown in Table 2 were suggested as promising for further investigation. The choice was consistent for both seasons. Additional species for further study also includes *Combretum queenzii*, *Commiphora trothae* and the *Crotolaria*, *Heliopsis* and *Jasminum* spp.

### Acknowledgement

The authors wish to acknowledge support from the Swedish International Development Agency (SIDA).

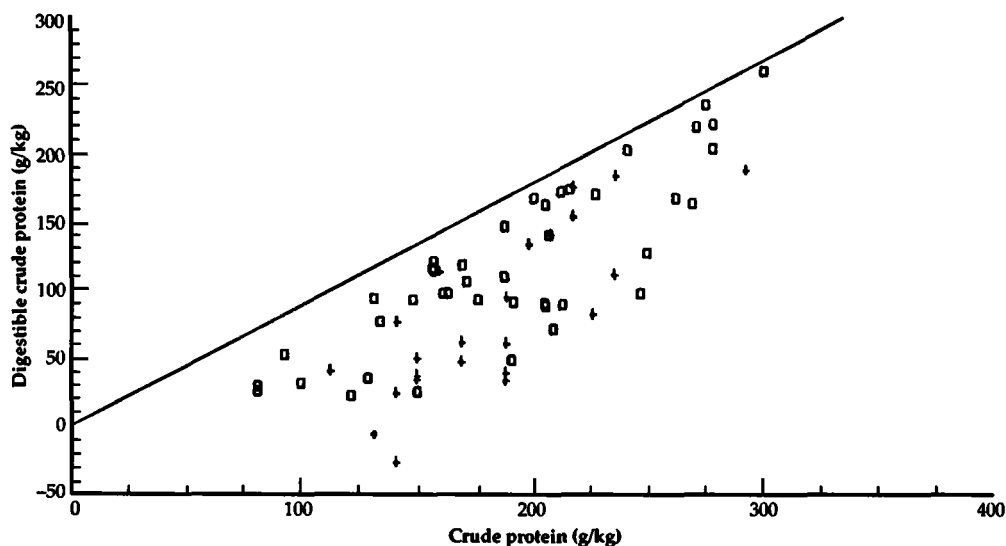


Figure 1 Test of uniformity of crude protein digestion; □ dry season; + wet season; — expected digestible crude protein.

Table 1 Mean values for browse composition from two seasons†

Season	Ash (g/kg DM)	Crude protein (CP) (g/kg DM)	Neutral-detergent fibre (NDF) (g/kg DM)	TDOM (g/kg)	SOLPH (g/kg DM)	BPH A <sub>550</sub>
Wet	90	190	390	680	180	74
Dry	140	210	380	810	130	37

† TDOM = *in vitro* true organic matter digestibility; SOLPH = soluble phenolics; BPH = bound phenolics (proanthocyanidins) in units of absorbance at 550 nm per g NDF.

Table 2 Composition of four promising species harvested in both seasons†

Species	Season	(g/kg)					BPH A <sub>550</sub>	g/kg			(mg/kg)		
		CP	DCP	TDOM	SOLPH	Ca		P	Mg	Na	Mn	Se	
<i>Albizia harveyi</i>	Wet	230	190		130	10	12	1	3	33	54	<1	
	Dry	300	270	860	70	6	9	3	5	115	42	<1	
<i>Cadaba farinosa</i>	Wet	170	120	780	180	8	26	44	12	170	33	12	
	Dry	220	180	860	150	4	20	2	13	103	63	1.3	
<i>Delonix elata</i>	Wet	230	140	750	230	310	15	2	2	25	33	<1	
	Dry	210	130	890	80	186	46	1	4	66	130		
<i>Grevia similis</i>	Wet	170		730	140		19	1	3	37	40	<1	
	Dry	230	180	870	120	10	35	2	4	118	49		

† For abbreviations see Table 1; DCP = *in vitro* digestible crude protein.