VOLUNTARY INTAKE AND PALATABILITY INDICES OF PEDI GOATS FED TANNINIFEROUS *ACACIA KARROO* LEAF MEAL BY CAFETERIA METHOD

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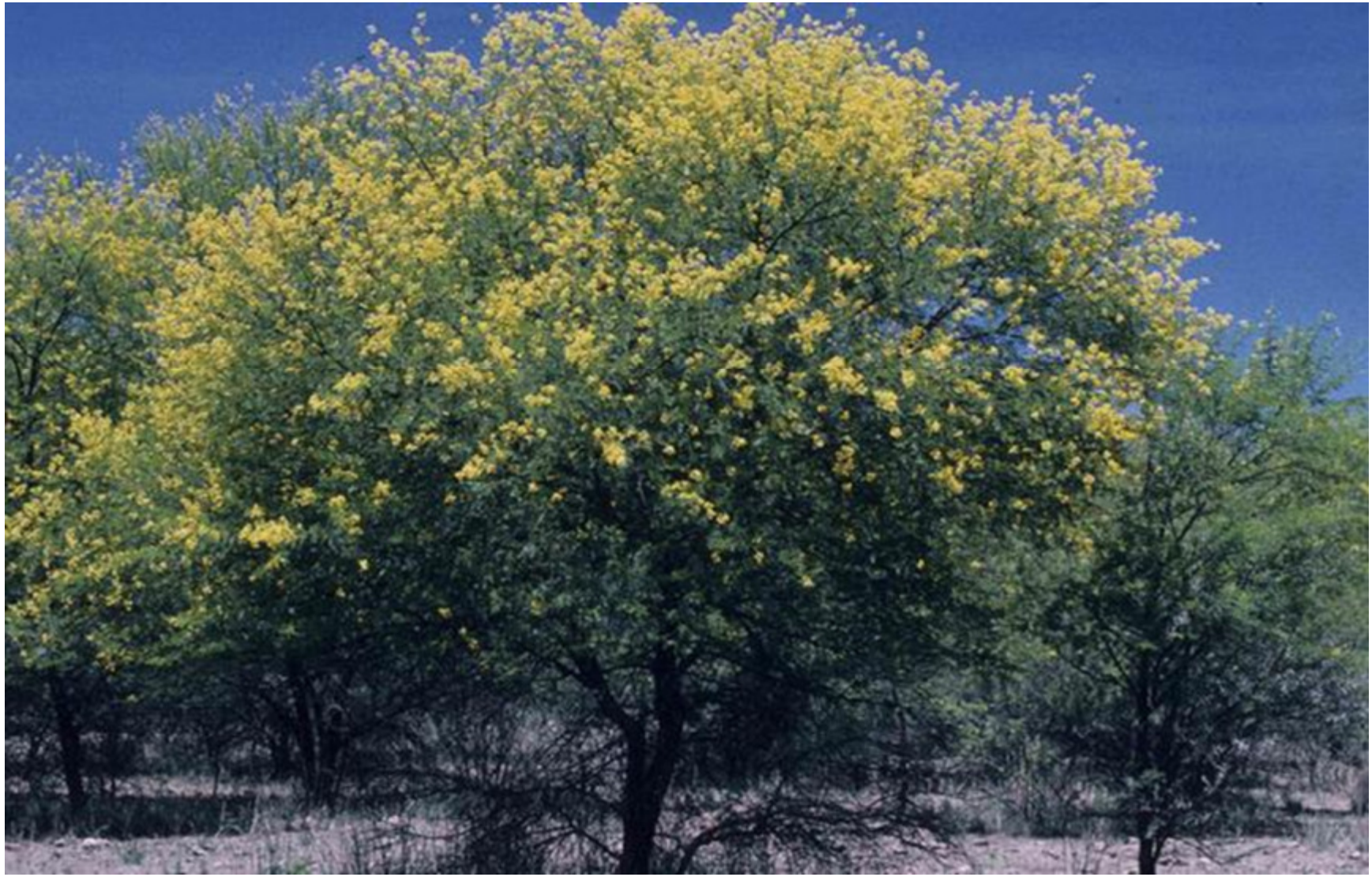
Acacia karroo tree



Outline

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2. Objective
3. Methodology
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Background

- ✓ Goats play multiple roles in the support of the poor in the communal areas of S.A
- ✓ However, their productivity is hindered by shortage of good quality feed (dry season)
- ✓ Browse trees legumes and shrubs have potential as alternate sources of feed for domestic livestock in communal rangeland (Solomon et al., 2007a)
- ✓ *Acacia karroo* (AK) is an important leguminous tree in communal rangelands and can provide enough nutrients for goats (Aganga et al., 2000)
- ✓ However, AK contains ANFs such as condensed tannins (Ngambu et al., 2012)

AK – National Weed List

– Encroacher of the natural rangeland

- ✓ CTs may lower feed intake (FI) by reducing palatability (Reed, 1995)
- ✓ Reduction in FI and palatability is associated with the astringency in the mouth of the animal (drying /puckering sensation)
- ✓ "Palatability" is the stimulation to eat aroused by the feed (physical/chemical) ((Baumont, 1996)
- ✓ DMI is also influenced by palatability (Tamir and Asefa, 2009)
- ✓ Information on DMI and palatability of tannin-rich diet is equivocal.

- ✓ The objective of this study was to determine the effects of dietary level of *Acacia karroo* leaf meal on voluntary feed intake, palatability and preference rankings of Pedi goats

METHODOLOGY

- ✓ The study was conducted at the University of Limpopo experimental farm
- ✓ 5 goats were housed individually with 5 feeding trough each, in a cafeteria feeding approach described by Larbi *et al*. (1993)
- ✓ Each goat had free access to the diet of their choice and position of trough was randomized each day to avoid "habit reflex"
- ✓ The experiment lasted for 23days , consisting of a 15-day adaptation period and 8 days of data collection

EXPERIMENTAL DIETS

Diet code	Diet description
$S_{80}A_{20}$	A mixture of 80% Seteria hay and 20% *Acacia karroo*
$S_{75}A_{25}$	A mixture of 75% Seteria hay and 25% *Acacia karroo*
$S_{70}A_{30}$	A mixture of 70% Seteria hay and 30% Acacia karroo
$S_{60}A_{40}$	A mixture of 60% Seteria hay and 40% *Acacia karroo*
$S_{50}A_{50}$	A mixture of 50% Seteria hay and 50% *Acacia karroo*

- ✓ DM, OM, CP and Ash (AOAC,2005)
- ✓ Fibre components (Van Soest et al., 1994)
- ✓ Total phenolic contents (Folin-Ciocalteus method and expressed as tannic acid equivalent-Makkar et al., 1993)
- ✓ CTs content (Butanol-HCl method and expressed as leucocyanidin equivalent- Porter et al., 1993)
- ✓ Mineral elements were analyzed by AOAC method using the Atomic Absorption Spectrophotometer

MEASUREMENT AND STATISTICAL ANALYSIS

- ✓ A daily RPI was calculated for each diet by dividing the amount consumed by that of the highest value, and multiplying the result by 100 (Larbi *et al.*, 1993)

- ✓ These daily RPI values obtained for each diet were subjected to ANOVA (SAS, 2008) with feeds as treatments and individual animals as replicates in a CRD.

- ✓ The diets were ranked based on these calculations with the highest consumption value being the most preferred and vice versa

Results and discussion

Nutritive value of dietary mixtures of *Seteria verticillata* grass hay and *Acacia karroo* leaves

Nutrient	$S_{80}A_{20}$	$S_{75}A_{25}$	$S_{70}A_{30}$	$S_{60}A_{40}$	$S_{50}A_{50}$	SEM
DM	95.24^{c}	95.86^{b}	94.05^{e}	95.21^{d}	97.01^{a}	0.000
OM	91.52^{e}	91.56^{d}	91.60^{c}	91.67^{b}	91.75^{a}	0.000
CP	8.90^{e}	9.16^{d}	9.34^{c}	9.84^{b}	10.37^{a}	0.13
Ash	8.47	8.43	8.39	8.32	8.24	0.11
Fat	1.12^{e}	1.20^{d}	1.28^{c}	1.45^{b}	1.61^{a}	0.04
ADF	47.03^{a}	46.12^{b}	45.21^{c}	43.39^{d}	41.57^{e}	0.67
NDF	69.90^{a}	67.91^{b}	65.91^{c}	61.93^{b}	57.94^{e}	0.42
CT	0.41^{e}	0.51^{d}	0.61^{c}	0.82^{b}	1.02^{a}	0.017
TP	0.39^{e}	0.49^{d}	0.58^{c}	0.78^{b}	0.98^{a}	0.003

Relative Palatability Index (RPI) rankings and average daily intake (g/kg $W^{0.75}$) of experimental diets by Pedi goats using cafeteria method

Diet	DMI (g/kg $W^{0.75}$)	RPI (%)	Preference ranking
$S_{80}A_{20}$	14.59^{c}	23.65^{c}	5
$S_{75}A_{25}$	20.00^{bc}	31.97^{c}	4
$S_{70}A_{30}$	30.14^{b}	53.07^{b}	3
$S_{60}A_{40}$	44.16^{a}	81.83^{a}	2
$S_{50}A_{50}$	52.38^{a}	96.91^{a}	1
SEM	4.413	5.725	

Prediction of dry matter intake (DMI) and relative palatability index (RPI) of Pedi goats offered mixtures of *Seteria verticillata* grass hay and *Acacia karroo* leaf meal

Factor	Y-variable	Formulae	r^2	P
DMI (g/goat/day)	RPI	Y =1.702x + 2.601	0.71	<0.0001
OM (%)	RPI	Y = 1.821x + 2.601	0.71	<0.0001
CP (%)	RPI	Y = 8.913x + 9.983	0.72	<0.0001
NDF (%)	RPI	Y = 2.463x – 1.135	0.71	<0.0001
ADF (%)	RPI	Y = 3.021x + 0.412	0.71	<0.0001
CT	RPI	Y =34.047x + 28.643	0.61	<0.0001
TP	RPI	Y = 34.353x + 30.266	0.58	<0.0001

IMPLICATION

- ✓ High voluntary DMI of Diets $S_{60}A_{40}$ and $S_{50}A_{50}$ suggests that tannin-rich diets do not always depress intake
- ✓ Reduced palatability in tannin-rich plants may be related to the type than the amount of tannins present in browse species
- ✓ Nutrient content could be a definitive predictor of intake and palatability of forage-rich diets
- ✓ Palatability studies could be used in designing supplemental feeding programs for ruminants in the tropics

THANK YOU!