

Nutritive value of buffel grass pasture for cattle

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- Regardless of pasture type, nutritive value is determined by the intake of digestible nutrients, where intake is in turn related to various attributes of diet quality, e.g. digestibility, availability of nutrients for utilisation of the rumen microbial population such as degradable N, fermentable carbohydrates, minerals and vitamins. Animal production (e.g. growth rate) provides an indirect estimate of nutritive value.
- Animal production is linearly correlated with intake of metabolisable energy, irrespective of pasture type

Animal production (annual growth rates) on buffel pastures

Author	Period	Country	Stocking rates	Liveweight gain (kg)
Mayer et al. (1972)	1963-71	Brigalow softwood scrub ("Tartus") - improved pasture/forest country -green panic/buffel	variable stocking rate	180
Walker et al. (1987)	1968-72	Brigalow/Dawson gum (Brigalow RS)	1 steer per 0.7-2.5 ha	140-180
Jeffery (pers. comm.)	1982-96	Brigalow/Dawson gum (Brigalow RS)		Sum.*0.7(0.4-1.6) Aut.*0.4(0.0-0.9) Win.*0.1(-0.3-0.2) Spr.*0.8(-0.1-1.1)

*kilograms per day

- Results above would suggest no major change over years but seasonal effects cannot be isolated. Walker *et al.* (1987) reported decline in production over 4 years following pasture establishment
- Animal production not related to total pasture attributes, e.g. total presentation yield, providing pasture availability is adequate.
- Animal production related to amount of green buffel material (primarily green leaf).
- 't Mannelje (1974) - over total year, exponential (increasing to maximum during summer) relationship between animal growth and green material in diet.
- Walker *et al.* (1987) - good linear correlation in winter, poor correlation in summer
- McLennan, Hendricksen *et al.* (MRC DAQ.100; unpublished) - linear relationship between growth rate of cattle and amount of green buffel grass leaf in pasture.
- Reliance on green grass leaf indicates production maximised by management designed to maximise this component of the pasture, for instance appropriate stocking rates.
- Cattle grazing buffel pastures during the winter/spring respond to supplements based on grain and protein meals (Jeffery *et al.*, Brigalow Res. Stn report; McLennan *et al.*, MRC DAQ.100), but not to urea-based supplements (Graham *et al.* 1983).
- Growth during this period limited by low intake of metabolisable energy and protein, which cannot be rectified by providing a rumen-degradable source of N to stimulate higher intake of pasture.

- Green grass leaf provides additional energy (higher digestibility) and protein for growth

In the above attributes, buffel grass is no different from other tropical grass pastures.

References

Walker, B., Hodge, P.B. and O'Rourke, P.K. (1987). Effects of stocking rate and grass species on pasture and cattle productivity of sown pastures on a fertile brigalow soil in central Queensland. *Trop. Grassld.* 21: 14-23.

Graham, T.W.G., Wood, S.J., Knight, J.L. and Blight, G.W. (1983). Urea and molasses as a winter supplement for weaner steers grazing an improved pasture in central Queensland. *Trop. Grassld.* 17: 11-20.

Mannetje, L.'t (1974). Relationships between pasture attributes and live weight gains on a subtropical pasture. *Proc. X11 Internat. Grassld Congr., Moscow, 1974.* 3: 882-892.

Mayer, B.G., Arthur, B.A. and Rudder, T.H. (1972). Returns from pasture in the brigalow lands. *Qd Agric. J.* 98: 179-182.

Issues and discussion

Comments by Stuart McLennan:

- Seasonal changes in nutritive value are typical of tropical grasses growing in regions with distinct seasonal rainfall.
- Annual growth rates – 160 to 180 kg depending on stocking rate and pasture age.
- Cattle growth rates correlated with green grass (leaf) availability.
- Cattle growth rates limited by low intake of digestible energy (DE), especially in winter/spring, and low protein intake.
- Cattle growth responds to additional DE intake, e.g. supplement which may allow digestible levels to be achieved.
- Assessing the impact of introduced tropical pasture plants in northern Australia – benefit/cost analysis for buffel grass.

Overhead presentation

Current knowledge of the nutritional status of buffel grass pastures for cattle

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Nutritive value of buffel grass

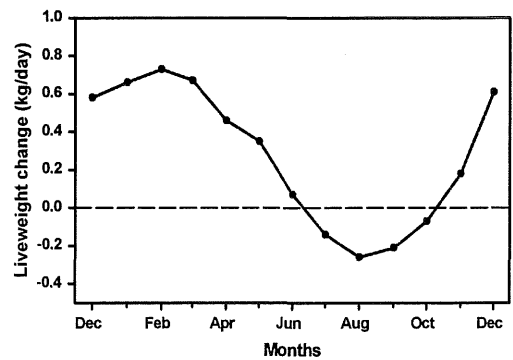
Nutritive value of pasture = $\text{voluntary intake} \times \text{concentration of digestible energy, proteins, minerals \& vitamins}$

Intake is a function of the composition of the pasture (diet), for instance the digestibility

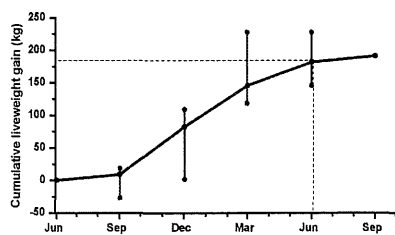
Thus pasture management to maximise animal production should target procedures which will provide high quality plant material and also (as a consequence) promote high intakes by animals

Annual growth rates on buffel pastures

Mayer et al. (1972)	1963-71	variable stocking rate	180 kg
Brigalow softwood scrub ("Tartarus") - improved pasture/forest country - green panic/buffel			
Walker et al. (1987)	1968-72	1 steer / 0.7-2.5 ha	140-180 kg
Brigalow/Dawson gum (Brigalow Research Station)			
Jeffery (pers. comm.)	1982-96		180 kg
Brigalow/Dawson gum (Brigalow Research Station)			



Quarterly growth rates (with range) for steers grazing buffel grass pastures 1982-1996 at Brigalow Research Station; annual growth rate 180 kg (range 120-240) (M. Jeffery, pers. comm.)

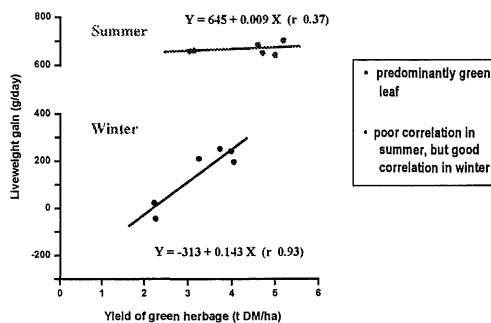


Pasture / stocking rate effects (Walker et al. 1987)

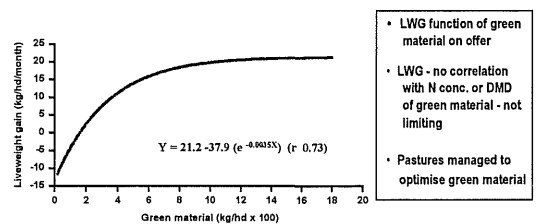
Pasture	Stocking rate (steers/ha)			Pasture means
	0.4	0.7	1.4	
Rhodes grass	168	161	134	149
Buffel grass	178	177	141	159
Green panic	193	178	151	168
SR means	180	172	142	

- Main effects during winter
- Decline over 4 years

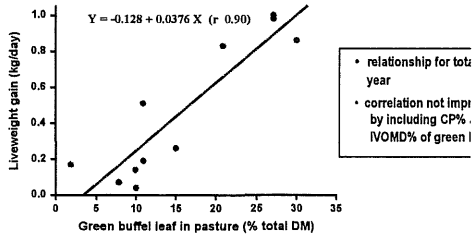
Relationships between growth rate of cattle and yield of green herbage (after Walker et al. (1987))



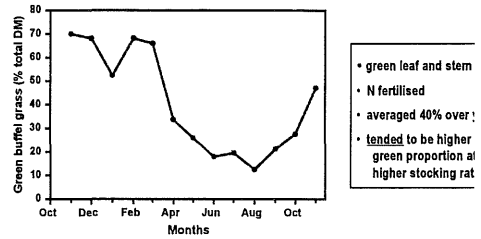
Relationships between growth rate of cattle and yield of green grass (after 't Mannetje (1974))



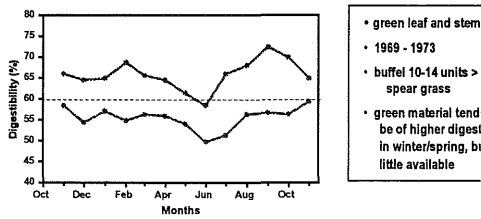
Relationships between growth rate of cattle and proportion of green grass (DM basis) in total pasture (McLennan et al., unpublished)



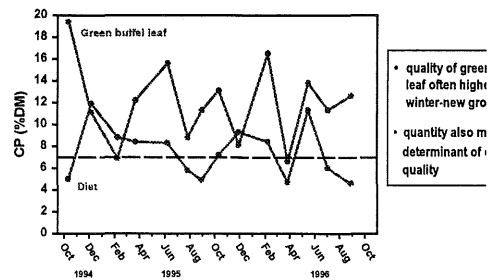
Changes in the proportion of green buffel grass as a percentage of total buffel grass DM (after 't Mannelje (1991))



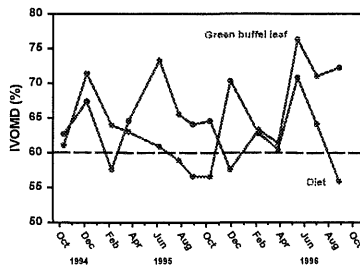
Changes in the digestibility of hand-plucked green buffel grass and green speargrass (DM basis) (after 't Mannelje (1991))



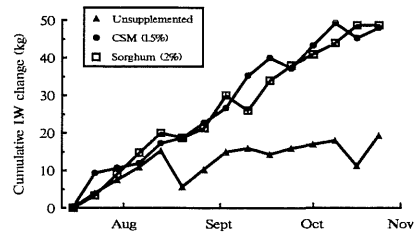
Changes across seasons in the protein content of green buffel leaf and of the diet (McLennan et al., unpublished)



Changes across seasons in the digestibility of green buffel leaf and of the diet (McLennan et al., unpublished)



Liveweight changes of yearling steers grazing buffel grass pastures and given supplements of grain sorghum or cottonseed meal during the 1995 dry season (McLennan et al., unpublished)



Responses to added nutrients

Graham et al. (1983)	Hereford steers 155 kg	Buffel grass - 2.5 steer/ha
	Pasture	0.011 kg/d
	Pasture + urea/molasses	0.126 kg/d
Loxton et al. (1995)	<i>Bos indicus</i> steers 180 kg	Rhodes/GP/buffel -
	Pasture	
	Pasture + cottonseed meal	+32-42 kg
Jeffery et al. (1995)	<i>Bos indicus</i> steers 340 kg	Buffel ± Seca April-Dec
	Buffel	+54 kg
	Buffel / Seca	+ 80 kg
	Buffel + grain	+ 139 kg
McLennan et al. (1997)	<i>Bos indicus</i> steers	Buffel ± Seca Wint/Spring
	CSM:	LWG = 0.273 + 0.453 INTK (% BW) (r 0.91)
	Barley	LWG = 0.288 + 0.361 INTK (r 0.79)

Summation: buffel grass

- Seasonal changes in nutritive value are typical of tropical grasses grown in regions with distinct seasonal rainfall
- Annual growth rates - 160-180 kg, depending on:
 - stocking rate
 - pasture age
- Cattle growth rates correlated with:
 - green grass (leaf) availability
- Cattle growth rates limited by:
 - low intake of digestible energy (DE), especially in winter / spring
 - low protein intake
- Cattle growth responds to additional DE intake:
 - supplement (grain / molasses; balanced for protein)
 - legume (Seca, siratro, lucerne)