Cattle grazing management effects on pasture composition in semi-arid woodlands

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Introduction Manipulating grazing pressure, controlling tree competition and burning are the main options for cattle farmers to manage land in subtropical Australian *Eucalypt* woodlands. These can contain >175 herbaceous and 60 woody species, but only 5 are desirable perennial and productive grass (Silcock *et al.,* 1996). Here we describe the responses of some perennial grasses to cattle grazing pressure, tree competition and spring burning.

Methods Two experiments in *Aristida/Bothriochloa* (wiregrass/bluegrass) native pasture in a poplar box woodland (*Eucalyptus populnea*) in inland Queensland (25^0 45'S; 148^0 25'E) measured the effects of cattle grazing pressure, tree competition and spring burning on pasture composition between 1994 and 2002. Experiment 1 had 3 grazing pressures; low (25% utilisation of end of summer pasture), medium (50%) and high (75%), and 2 tree competition levels; trees killed (stem injected herbicide) and live trees, by 2 replications, in 12 paddocks of 4-30 ha; while experiment 2 had 2 burning regimes; annual spring burn after 25 mm of rain and no burning, with the same 2 tree competition levels, by 3 replications in 12 plots each of 1 ha. Species composition (as a % contribution to total pasture yield) was recorded by visual dry weight ranking of the 6 highest yielding species in 50-354 quadrats ($0.25m^2$)/paddock (experiment 1) and in 50 quadrats (experiment 2) at the end of each summer. Transformed data were analysed by 2-way ANOVA with randomised blocks in the Genstat program.

Results and Discussion In 2002 after 8 years, perennial grasses showed variable responses within the desirable, intermediate and undesirable species groups to the 3 management treatments (Table 1).

Table 1 Effect of grazing pressure, tree competition and burning on composition (%) of desirable[d], intermediate[i] and undesirable[u] grasses in Eucalypt woodland after 8 years (* indicates significant difference P<0.05)

Grass species	Grazing pressure[1]			Tree competition[1]		Spring burning[2]	
	Low	Medium	High	Cleared	Treed	Burn	No burn
Aristida ramosa [u]	29.0	30.9	11.2*	22.1	25.3	5.5*	17.1
Bothriochloa bladhii [d]	2.3	0.2	0.1	1.4*	0.4	7.1*	0.7
Bothriochloa decipiens [i]	9.1*	23.5	18.1	9.6*	24.2	22.0	23.8
Chloris divaricata [i]	2.9	3.2	6.5	5.0	3.4	2.1	0.5
Chrysopogon fallax [d]	1.9	5.0*	2.1	1.2*	4.8	13.0*	4.4
Cymbopogon spp. [i]	4.3*	0.2	0	2.4	0.6	1.0	8.7*
Dichanthium sericeum [d]	6.2	6.9	1.6*	7.2*	2.6	9.6*	2.6
Heteropogon contortus [d]	3.3*	0.6	0	1.5	1.1	8.8*	2.0

[1] experiment 1; [2] experiment 2

Of the desirable species, clearing and spring burning increased *Bothriochloa bladhii* (Forest bluegrass); low grazing pressure and burning increased *Heteropogon contortus* (black speargrass); killing trees and burning increased *Dichanthium sericeum* (Queensland bluegrass) but high grazing reduced it; killing trees reduced *Chrysopogon fallax* (golden beard grass) but medium grazing pressure and burning increased it. High grazing pressure maximised intermediate grasses, like *Chloris divaricata* (windmill grass). Low grazing pressure and killing trees reduced *Bothriochloa decipiens* (pitted bluegrass) but burning did not. Low grazing pressure and no burning increased *Cymbopogon* species (barbwire grasses). High grazing pressure and spring burning decreased the undesirable *Aristida ramosa* (purple wiregrass), but tree competition did not affect it.

Conclusion To improve landscape stability and cattle productivity in this semi-arid Eucalypt community, one can use strategic management to manipulate plant composition, encourage desirable grasses, maintain intermediate species and discourage undesirable components.

References

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