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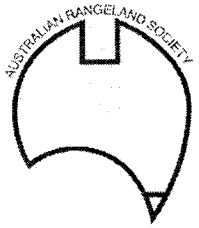

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SILVER-LEAVED IRONBARK (*EUCALYPTUS MELANOPHLOIA*) RECRUITMENT IS AFFECTED BY MANAGEMENT IN CENTRAL QUEENSLAND

P. Jones and A. Sullivan

Queensland Beef Industry Institute, DPI, LMB 6 EMERALD Q 4720

ABSTRACT

The *Aristida/Bothriochloa* (A/B) native pasture community of Central Queensland is a large, predominantly cattle producing region with small areas of degradation (Weston *et al.* 1981). The area is deficient in production and ecological knowledge, and studies are now assisting to develop sustainable resource management practices. This paper reports on the tree and shrub monitoring of a project aiming to gain an understanding of the regions ecology and communicate pasture management knowledge to land users. The main findings are:

- regular burning had no affect on survival of silver-leaved ironbark seedlings
- burning can prevent lignotuber regeneration in cleared areas
- timing of burning is important for seedling control
- burning has little effect on the size or density of existing woody plants

METHODS

The treatments were imposed in autumn 1994 and recorded in spring of 1995, 1997 and 1999. Clearing of the mature, open woodland was achieved with Hexazinone (Velpar) stem injection. A 120 hectare grazing trial includes low, medium and high grazing pressure paddocks under treed and cleared treatments replicated twice. An ungrazed, interspersed burning trial has replicated one hectare areas that were either burnt regularly or not burnt; under treed and cleared treatments. The burns were done in the spring of 1997, 1998 and 1999 with a headfire, after recordings had been made. The cleared and treed not burnt treatments were also burnt in spring 1998 to remove a large amount of dead grass accumulation. Tree and shrub species, size, density and stem basal area are monitored in permanent transects (Back *et al.* 1997) in the two trials. Summer rainfalls well above average in 1996/97 and 1998/99, and well below average in 1995/96 and 1997/98 were received.

RESULTS

Silver-leaved ironbark, gum-topped bloodwood (*Corymbia erythrophloia*) and prickly pine (*Bursaria incana*) are the main woody species with silver-leaved ironbark comprising over 80% of both basal area and density. The large decrease in tree basal area and density caused by chemical clearing has been maintained for five years. Total basal area and density were stable from 1995 to 1999 in all treatments (see Table I and Table II). Grazing pressure had no affect on the size, density or recruitment of woody plants.

Density declined markedly in the cleared treatments in 1997 because many silver-leaved ironbarks appeared to be dead and were not recorded. However, the lignotubers were still alive and resprouted in 1999 in the cleared plots that were either grazed or not burnt treatments. Burning suppressed lignotuber regeneration in the cleared treatments, however seedling recruitment occurred in the treed treatments and was not affected by burning (see Table III). Burning had no affect on either the size or density of existing woody plants, or mortality rates from 1997 to 1999 in treed or cleared plots.

Table 1. Total woody plant density and basal area in the grazing trial.

	Treed		Cleared	
Year	**Density Plants/ha**	*Basal area* m2/ha	**Density** Plants/ha	*Basal area* m2/ha
1995	**2085**	7.667	656	1.127
1997	**1997**	6.134	286	1.208
1999	**1901**	6.102	557	1.317

Table 2. Total woody plant density in the burning trial.

	Treed		Cleared	
Year	**Burnt Plants/ha**	*Not burnt* Plants/ha	**Burnt Plants/ha**	**Not burnt Plants/ha**
1995	**2264**	1549	477	690
1997	**1901**	1433	389	432
1999	**1804**	1500	367	842

Table 3. Recruitment of silver-leaved ironbark in the burning trial.

	Treed		Cleared	
Year	**Burnt Plants/ha**	*Not burnt* Plants/ha	**Burnt Plants/ha**	**Not burnt Plants/ha**
1997	**33**[1]	42[1]	8[2]	38[2]
1999	**63**[1]	63[1]	8[2]	71[2]

[1] (1 – recruitment from seedlings)
[2] (2 – recruitment from lignotubers)

DISCUSSION

The main management implication is that burning is difficult to manage for seedling control and that recruitment by lignotubers is encouraged by tree clearing. Silver-leaved ironbark seedling recruitment in the treed plots probably occurred in the 1996/97 summer prior to the first burn, and again in the 1998/99 summer. The 1997 and 1998 burns did not kill the seedlings which emerged in the 1996/97 summer. In the cleared plots, recruitment is from lignotubers and the lack of seedling regeneration is probably due to a limiting seedbank. The seed source had been removed; the seedbank is short lived; the seed has poor transport mechanisms and external sources are limited by infrequent flowering and seeding. This preliminary study indicates that even a burn within 12 months of a germination will not control the seedlings. Silver-leaved ironbark will only be controlled by fire as a seedling and opportunities for burning can prevent tree and shrub populations increasing.

This study shows that the timeframe for burning for seedling control is small and may necessitate autumn or winter burning. While autumn or winter burning is desirable for safety of operators, it then leaves the area prone to weed invasion and subject to soil erosion with the first summer storms. Burning is accepted as having a role in preventing tree and shrub populations thickening. In this study while burning in cleared treatments prevented lignotuber regeneration; it did not affect seedlings and burning had no effect on size or density of existing woody plants in cleared or treed areas.

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