

APPLICATION ABSTRACTS

The case for prescribed burning to control shrubs in eastern semi-arid woodlands

K.C. Hodgkinson and G.N. Harrington

Native shrubs that have increased in density in eastern semi-arid woodlands and lowered the carrying capacity of the land, can be controlled by periodic prescribed burning. Shrub increase is a natural phenomenon which prior to pastoral settlement, was only held in check by wildfires. Since settlement fire frequency has been reduced and shrubs have increased.

The best time to prescribe a fire is soon after episodic shrub establishment events because fire kills nearly all shrub seedlings, irrespective of species, together with a varying proportion of adult shrubs. The 'wet' periods that cause shrubs to increase also promote abundant grass growth, thereby providing an opportunity to burn. To ensure sufficient fuel to carry a fire throughout the burn area, it may be necessary to reduce stock numbers temporarily.

Other methods of shrub control (goat grazing, herbicides and mechanical clearing) have limited application. Prescribed burning is the only known method for broad-scale control with the potential to return an economic benefit. However, adoption of prescribed burning is likely to be slow because economic benefits are realised only over a long term (10-20 years), graziers have little experience and infrequent opportunities to learn about prescribed burning and are reluctant to accept the associated risks.

At times when it is possible to prescribe a burn the danger of wildfire is also present. Relevant State Government departments and graziers are urged to collaborate in regional planning so that prescribed burning can be safely carried out at the optimal time.

The effect of different pasture management strategies in north-west Queensland on liveweight gain and wool growth rate of several groups of young sheep.

R.G.A. Stephenson, D.A. Pritchard, P.M. Pepper and P.T. Connelly

Poor growth and survival of weaner sheep grazing dry season pastures adversely affects the overall productivity of pastoral breeding enterprises. The effect of different pasture management strategies on weight gain and wool production of young (weaner) sheep was examined immediately after weaning during the dry season of north-west Queensland. The pasture management strategies were designed to mimic various industry situations, while the performance of four different progeny groups was compared.

The three pasture treatments were: a harvested (c. 8% of pasture harvested and baled) and spelled, a spelled, and a continuously grazed paddock. Significant differences in total pasture and composition occurred between paddocks with more forbs in the spelled paddocks. The change in the percentage forbs that occurred between the beginning and the end of the grazing period was significantly greater in the harvested paddock than in the other paddocks indicating preferential selection and intake by sheep. Marked improvements (c. 100%) in weaner growth rates occurred in the spelled paddocks. Greasy wool production by ewes from the harvested paddock was significantly greater than by those from the other paddocks.

The superior wool growth of two progeny groups suggests that improved productivity of breeding flocks in the tropics is possible if superior sheep can be identified. The results also highlight the importance of preferential management of pasture for weaners so that productivity advantages can be exploited.

Vegetation changes after fire on two land systems in arid north-west New South Wales

W.E. Mulham

A sequence of high summer rainfall years in arid New South Wales pastoral country can lead to the build-up of dense stands of grasses such as Mitchell grass (*Astrebla* spp.) and wiregrass (*Aristida* spp.). As these dry out they create a fire hazard. Prescribed burning over relatively large areas before the danger period is seen as a means of reducing the risk of extensive wildfires and providing refuge for wildlife and stock.

For Mitchell grass pastures, burning while soil moisture levels are adequate for regrowth of Mitchell grass, appears to have little long-term effect on pasture growth or composition. In these pastures, where time of rainfall and amount of germinating rains are the major factors influencing botanical composition, burning can be used to increase diversity of herbage species for grazing animals. Reduction of cover on this landscape is unlikely to lead to accelerated erosion.

In contrast, prescribed burning on dune-system vegetation would appear to have little to commend it. The main grasses (species of *Aristida* and *Enneapogon*) do not respond readily after burning and most of the trees and shrub species are susceptible to fire. Their removal would leave the somewhat unstable system exposed to erosion.

The effect of proportion of sown grasses on pasture and animal production from fertilized pastures on the Northern Tablelands of New South Wales.

G.G. Robinson and P.M. Dowling

It is generally believed that the inclusion of sown grasses improves both pasture and animal production on the Northern Tablelands. We compared pasture and animal production from fertilized pastures containing varying proportions of sown grass. While the amount of pasture on offer was increased this did not affect either liveweight or wool production of sheep grazing on these pastures.

These findings suggest that the inclusion of sown grass is of limited value for wool production when adequately fertilized natural pastures are grazed at commercial stocking rates.

Trends in vegetation cover in the grassland community on the Bogong High Plains, Victoria

H. van Rees, W.A. Papst, K. McDougall and R.C. Boston

Total vegetation cover, cover of individual species and luxuriance were measured at four grazed sites and one ungrazed site on an alpine range in Victoria. There have been no trends in total vegetation cover, cover of individual species and luxuriance over a number of years. This indicates that the composition of the grassland is in a stable state under the present grazing pressure. Whether the amount of vegetation cover found on the High Plains is sufficient for catchment protection remains to be determined.

Seasonal distribution of herbage growth from sandplain mulga country, Charleville

R.G. Silcock, Lynn M. Williams, K.J. Lehane and Flora T. Smith

The pasture available to stock in Queensland mulga country grows primarily in summer. Only in exceptionally wet winters (say > 250 mm of rain) does cool season pasture growth enhance the carrying capacity of mulga country. However, the quality of winter forage is high and can promote excellent lambing percentages and cattle fattening.

Preliminary observations on the effect of removal of Black Bluebush (*Maireana Pyramidata*) and Pearl Bluebush (*M. Sedifolia*) on shrub regeneration, herbage production and erosion potential.

G.J. Tupper and W.J. Muller

Graziers have shown interest in the feasibility of increasing animal production from bluebush (*Maireana* spp.) country by removing some of the bluebush shrubs growing on light erodible soils. The shrubs to be removed would be in excess of drought forage requirements and of the number needed for soil protection. Their removal could lessen rabbit infestation and reduce competition with more useful forage species.

A preliminary experiment was conducted on the western edge of the Riverine Plain of N.S.W. in bluebush communities containing black bluebush (*M. pyramidata*) and pearl bluebush (*M. sedifolia*), to examine the effect of removal of shrub tops, in the presence and absence of grazing, on shrub regeneration, forage production, and erosion potential.

Forage production increased on mounds from which shrubs had been cleared, with no change between shrubs or mounds. But whilst increased animal production would probably result from partial shrub removal, this would have to be offset against the cost to graziers of shrub removal by mechanical means, and the threat of accelerated erosion. Manipulation of shrub communities by grazing management may be a feasible proposition.

The pasture dynamics and management of two rangeland communities in the Victoria River District of the Northern Territory

B.D. Foran, G. Bastin and B. Hill

Rangeland degradation is a problem on several important pasture types in the subtropical rangelands of north west Australia. Destocking of poor condition pastures on eroded red calcareous soils for a period of five years allowed regeneration of pasture species to those levels found in good condition pastures dominated by limestone grass, *Enneapogon* spp. During the experimental period an exotic shrub rubberbush, *Calotropis procera*, which is palatable to cattle, invaded the area with densities of up to 1,000 bushes per hectare. Grazing reduced its rate of increase to 200 bushes per hectare. Management of these red calcareous soils requires a balance between complete destocking which allows pasture regeneration, and strategic heavy stocking in the late dry season which helps restrict the spread of rubberbush. There was no effect of destocking on cracking clay soils dominated by ribbon grass, *Chrysopogon fallax*, and Flinders grass, *Iseilema fragile*.

There is a need to assess and monitor pasture condition and erosion on a district wide basis. Where destocking is necessary, it should be integrated with management strategies of the whole station to ensure that the requirements of both the pasture and the grazing herd are balanced.

The erosion cell — a geomorphic approach to landscape classification in range assessment.

G. Pickup

At the landscape level land degradation produces a mosaic of erosion cells. Each cell consists of a sediment production zone from which soil is lost, a sediment transfer zone which eroded soil materials gradually cross but where there is no long term accumulation, and a sink, where much of the eroded sediment is eventually deposited. Grazing is likely to accelerate erosion in the production zone and sometimes the transfer zone but not in the main sinks under most circumstances. A number of developments have occurred since the paper was written. It is now set up as a mathematical model and can be used to forecast patterns of erosion and deposition as the land becomes more degraded. Research is also underway to integrate the erosion model with an animal behaviour model which predicts the distribution of grazing animals in a paddock. This way areas where erosion risk and high grazing pressure coincide may be identified and perhaps separated by relocation of watering points.

Effectiveness and economics of destruction of rabbit warrens in sandy soils by ripping.

D.H. Wood

The paper reports on the practicability and success of reducing rabbit numbers in sand-dune habitat in far-western New South Wales by ripping warrens using a hydraulically operated ripper on the rear of a relatively small [50,700 kW (68 hp) diesel] wheeled tractor.

Ripping was the only treatment used and warrens of four holes or less were left untreated to simulate such small warrens being missed in a pest control operation.

A drop of 87% in the number of active holes (an index of rabbit numbers) resulted from four rip treatments, 56% of the residual population being in the "missed" small warrens. This compared with a 14% decrease in number of active holes in comparable untreated areas.

The results indicate that it is possible to control rabbit numbers in arid sandy sheep-grazing country by ripping their warrens. The economics of the technique indicate that the expense of ripping would be more than covered by the returns from increased wool production which might be expected with the reduction in rabbit numbers. Also a greater stability in numbers of sheep carried would result.

The population structure and density of central Australian trees and shrubs, and relationships to range condition, rabbit abundance and soil.

M.H. Friedel

Two pasture types in central Australian rangelands, open woodland and mulga annual, are showing signs of developing "woody weed" problems reminiscent of those in western New South Wales and Queensland. Evidence to date indicates that management using fire should be introduced as soon as possible, to maintain herbage production. Grazing management may be important to obtain adequate fuel loads sometimes, but is not implicated by this study as a major factor in woody plant increase.

In the calcareous shrubby grassland pasture type, regeneration of trees and shrubs is depleted in proportion to the abundance of rabbits. Without rabbit control, the present landscape is likely to lose its important woody plant resources permanently, as mature plants die out. Similar processes have been observed elsewhere, particularly in South Australia.

Bluebush in the bluebush rise pasture type seems to be stable under current management. Although rabbits are present, they are not disrupting regeneration. It is reported from South Australia where the situation is similar, that bluebush is protected by its unpalatably high salt content. Consequently, management in bluebush pastures should focus on the herbage rather than the shrubs.

Influence of 1080 bait colour on acceptability by target species and removal by non-target animals.

Ashok K. Rathore

Compound 1080 is so highly toxic to most mammals that opposition to its use has developed. Particular public concern has been expressed about the possibility of poisoning non-target species. The studies described in this paper explored the potential for reducing the effects on non-target species of 1080 baiting using dyed baits, and using a reduced concentration in baits prepared for rabbits. The dyeing had useful effects in reducing non-target species' interest in the baits. The trials also showed that rabbits could be killed as effectively with much lower concentrations of 1080.

The growth and survival of young mulga (*Acacia aneura* F. Muell) trees under different levels of grazing.

R. F. Brown

The growth of low mulga in a mulga woodland pasture near Charleville was monitored over four years and under five grazing intensities ranging from extremely heavy grazing to no grazing at all. At the end of the four years, nearly all the ungrazed trees had grown above the limit of sheep browsing and their future growth seemed unlikely to be influenced by subsequent sheep grazing. In contrast, the grazed trees were no taller at the end of the four years than they had been at the start, even under very light grazing. About one in three trees died, but this was related to protracted dry spells rather than to grazing. From the growth rates recorded, it appears that destocking for a minimum of two "good" years (either consecutively, or protected from grazing in the intervening years to preserve the new growth) is needed to ensure that low mulga develops into taller forms to provide timely replacement of scrub cut for drought fodder.