

## APPLICATION ABSTRACTS

### Seedling Growth on Mulga Soils and the Ameliorating Effects of Lime, Phosphate Fertilizer and Surface Soils from Beneath Poplar Box Trees

R.G. Silcock

Buffel grass seedlings are far more responsive to applied phosphate fertilizer in very acid mulga soils than most other native and introduced grasses tested. However, its success in colonising areas beneath poplar box trees, which other grasses do not share, is not due entirely to the higher available phosphorus or the pH *per se* of the soils beneath these trees. The indications are that buffel grass is very sensitive to a pH-dependent ion such as  $Al^{+++}$  which is present in toxic amounts in mulga soil but not in the less acid soils beneath box trees. Liming mulga soils will not help seedlings of most species to establish more easily, even for legumes like *Stylosanthes fruticosa*. Weedy grasses such as *Aristida armata* (branched wiregrass) are not significantly affected in their seedling growth by the level of available phosphorus in mulga soils. Hence the use of phosphate fertilizers to stimulate seedling growth, particularly early tillering, of desirable grasses should disadvantage branched wiregrass seedlings.

### Nutrient Deficiencies in Central Australian Semi-desert Rangelands, with Reference to Decline in Range Condition

M.H. Friedel, K.M. Cellier and K.P. Nicholson

This study investigated the possibility that a reduced supply of plant nutrients was a cause of pasture deterioration. Only phosphorus appeared to be more deficient under degraded pastures than it was under healthy ones, but the evidence was not conclusive.

On the other hand, nitrogen and phosphorus were likely to stimulate plant growth whether or not the rangelands were degraded and, in certain circumstances, so were sulphur and calcium. Broad-scale fertilization of rangelands is not economically feasible at present but localised application is realistic for important small areas. However, if any of the tested nutrients were applied to the rangelands, a disproportionate increase in an undesirable species could occur.

### Effects of Spring Wildfires on *Astrebla* (Mitchell grass) Grasslands in North-west Queensland Under Varying Levels of Growing Season Rainfall

J.C. Scanlan

During the late 1970's, wildfires started by lightning strikes burnt out large areas in the Mitchell grass country. As there was little published information on the effect of fires on pasture condition and productivity, the opportunity to study this aspect was taken.

Burnt areas exhibited increased pasture production when post-fire, summer rainfall was high, while production was depressed by low rainfall. The nitrogen content of new tillers followed the reverse trend.

At no site did fire kill Mitchell grass plants, and in fact it was beneficial in that flowering and seed set was promoted and more tillers were produced. An area burnt during the growing period at one site gave equivalent production to an unburnt area and the material was of much higher quality.

The effect of wildfire on subsequent animal production and the role of burning during the growing season require further research to determine appropriate management strategies.

## **The Effects of Sulphur and Phosphorus on the Yield and Composition of some Indigenous and Naturalized Legumes on the North-West Slopes of New South Wales**

*G.M. Lodge*

Superphosphate application to natural pastures containing legumes has been suggested as a means of overcoming shortages of winter and spring forage on the North-West Slopes of New South Wales. However, the expected yield responses and the sulphur and phosphorus content of deficient plants of the individual pasture legume species have not been determined. With fertilizer application potentially larger yields could be expected if *Trifolium* species rather than *Medicago* species were the dominant pasture legumes. For the species studied the ratio of nitrogen to sulphur in the plant tops was a useful indicator of sulphur deficient plants. The critical sulphur and phosphorus percentages and nitrogen to sulphur ratios presented provide a useful guide to assist agriculturalists in diagnosing deficiency and deciding on the most beneficial use of fertilizer in these natural pastures.

## **Seasonal Changes in the Nutritive Value of Some Native Pasture Species in North-western Australia**

*A. McR. Holm and G.J. Elliot*

The nutritive value of nine important pasture species of the highly regarded Mitchell grass plains, and the extensive curly spinifex-ribbon grass pastures (Pindan), was assessed in the Kimberley cattle country near Fitzroy Crossing.

Regular sampling over two years confirmed the superior value of the Mitchell grass pastures, but also revealed that although during the dry season some species contain sufficient protein for maintenance of cattle, all tested species are deficient in phosphorus. During the wet season most species contain adequate protein, however, some species are deficient in phosphorus for growth of cattle.

The study suggests that phosphorus and possibly protein supplements are necessary for optimum cattle production on these pastures.

## **Vegetation Changes and Animal Productivity Under Sheep and Goat Grazing on an Arid Belah (*Casuarina cristata*) – Rosewood (*Heterodendrum oleifolium*) Woodland in Western New South Wales**

*A.D. Wilson and W.E. Mulham*

Merino sheep and feral goats were grazed either separately or together in a belah-rosewood woodland. This was to test the theory that goats would obtain much of their forage from trees and shrubs and thereby increase animal productivity over that obtained from sheep alone. The goats obtained some of their forage needs from accessible foliage of trees, but also competed with the sheep for pasture plants; as a result mixed grazing did not increase animal production. The sheep produced almost as much meat per unit area as the goats. Also, under dry conditions, the sheep did poorly when in competition with goats. Finally, the woody weed shrubs were not affected by the presence of the goats. From these results it is apparent that no advantage in animal productivity or in shrub eradication can be gained from grazing belah woodlands with sheep and goats together.

## **An Evaluation of Large Scale Aerial Photography for Assessing Range Condition in Central Australia**

*B.D. Foran and K.M. Cellier*

Colour aerial photography taken from low flying, light aircraft has been used to survey the effects of management on forest lands and rangelands. In this study on three important rangeland types in central Australia: Open Woodland, Mitchell grass Grassland and Mulga with annual grasses and forbs, its suitability for assessing range condition, was investigated.

The methods were successful on one pasture type – Mitchell Grassland. This was attributed to the ease of recognition of Barley Mitchell Grass on the photographs and its importance as an indicator of range condition in Mitchell Grassland. The failure of the methods on Open Woodland and Mulga Annual resulted from inconsistencies between observers in recognizing plant species that were indicators of range condition. A comparison between the cost of ground and aerial survey, showed that ground survey was cheaper and faster to use.

### **The Digestion of Mulga Nettle (*Halorhagis odontocarpa*) by Sheep**

*N.P. McMeniman, I.F. Beale and G.M. Murphy*

Grazing sheep always appear to grow faster and produce more wool when they have the opportunity to eat forbs as well as grasses. The digestion of mulga nettle, one of the forb species that grows in south-west Queensland mulga country, was studied to determine the extent to which the protein in this plant contributes to the protein absorbed by the animal.

The results showed that under the conditions of experiment a large percentage of the protein in the plant is broken down in the rumen and is not available for subsequent intestinal digestion.

### **Production and Water Use of a Wiregrass (*Aristida* spp.) Pasture in South Western Queensland**

*A.J. Pressland and K.J. Lehane*

Growth of wiregrasses (*Aristida* spp.), which abound in most of the mulga lands of western Queensland and are of low value was rapid in summer and slow in winter. Flowering occurred within 30 days of rain sufficient to promote growth. Compared with other native mulga grasses, wiregrasses rapidly produce much leaf and stem, and have the potential to produce a great number of seeds.