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Cover Page Footnote

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Studies
IN THE
MULGA
PASTORAL
ZONE

THE GRAZING OF
Wandarrie Grass Associations

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THE establishment of the Wiluna office of the North-West Branch marked the commencement of a series of investigations into the pastures of the mulga zone. Unlike the agricultural areas where a fund of knowledge exists on the growth habits of the pastures, the pastures of this area were completely unknown. The preliminary investigations had to be aimed at forming an understanding of the reactions of the various plants to rain, to temperature and seasonal conditions and to grazing in an area of extremely low rainfall reliability.

The problem which faces the pastoralist is how to achieve maximum use from the range of vegetation available, under all conditions of rainfall, especially in those years of less than average rainfall which occur very frequently.

The experimental work carried out has led to a better understanding of some of these pastures and in particular their reactions to periods of low rainfall. It is with the Wandarrie grass associations that this article will deal.

Fig. 1.—A degenerate Wandarrie association

475
DESCRIPTION OF THE ASSOCIATIONS

Wandarrie grasses occur over most of the deeper and sandier soils of the mulga zone. In the ungrazed state the association consists of an upper storey of trees, a middle storey of shrubs and a ground storey of perennial tussocky Wandarrie grasses.

The Wandarrie grasses are: Broad Leaf Wandarrie, \( \text{Danthonia bipartita} \), Creeping Wandarrie \( \text{Eragrostis lanipes} \) and two Wire Wandarrie grasses \( \text{Eragrostis eriopoda} \) and \( \text{Eriachne helmsii} \). These four species occur with the annual Windgrass \( \text{Aristida arenaria} \) and form the bulk of the feed available to the sheep. During periods of winter rainfall alone, such plants as Mulla-mulla \( \text{Ptilotus spp.} \) and Crowfoot \( \text{Erodium sp.} \) can replace Windgrass as the annual species present.

consequently been continuously and preferentially grazed by the sheep. So much so that the associations are generally unproductive. In many cases the trees have been killed, the shrubs have been eaten out and the grass cover consists mainly of Windgrass and Wire Wandarrie grasses. Both these species are undesirable in a pasture since they are unpalatable and Windgrass in addition is low in nutritive value.

Being an annual species Windgrass is unable to respond to small quantities of rain since it must go through the processes of germination before it produces growth available to the sheep. On the other hand perennial grasses can "compete" with evaporation for water more effectively and produce some growth on quite small falls of rain—that would be inadequate for a Windgrass pasture.

The relatively deep soils of the Wandarrie associations provide adequate storage of water for use by the plants in their growing period. In this respect they are superior to the remainder of the mulga scrub in which the shallow soils commonly encountered are unable to store sufficient water for vigorous plant growth.

This greater water storage ability of the Wandarrie soils has permitted more growth in the association and they have

This distinction between annuals and perennials has helped in the evaluation of the relative worth of the different species of the association.

The experiments described below detail initial investigations into these pastures. The observations made enabled grazing trials to be undertaken from which recommendations for the rehabilitation of these pastures can be made.
The following initial experiments were carried out:

(a) The Effect of Enclosure on a Wandarrie Association.

Ten acres of degenerate Wandarrie country were sheep, cattle and vermin-proof fenced in 1956.

An assessment of the composition of the grass pasture was made using the step point method and the three step point method. Of the plants present, Windgrass represented over 70 per cent., Broad Leaf Wandarrie 8 per cent. and Creeping Wandarrie 13 per cent. With only two years without grazing this ratio had changed considerably, less than 50 per cent. of the plants present were Windgrasses, Wire Wandarrie grasses made up about 5 per cent. and Broad Leaf and Creeping Wandarrie grasses made up about half the pasture available.

Since the mulga zone has a tendency towards winter rainfall dominance, the pastoralist should be able to recognise this feature in his pastures.

The seeding habits of each species were also different. All species seeded with summer rains. Both the useful species needed a period of vegetative growth before maximum seed set took place. This vegetative growth period was at least ten weeks, or until the water supplies in the soil were nearly depleted. On the other hand Windgrass and Wire Wandarrie grass were able to set seed and grow vegetatively immediately after a rain.

Response to winter rain in all species was the same. Seed set accompanied leaf growth immediately after the rain. Seed production of the Wire Wandarrie grasses under these conditions was very low and in amount comparable to the low vegetative growth.

(b) The Effect of Cutting on the Production of Wandarrie Grass.

It is obvious that if regeneration of the desirable grasses is to take place, then grazing management should take into account these variations in plant behaviour. Unrestricted grazing will result in severe depletion of the seed supplies and in time will cause a decrease in the number of desirable species.

At the same time useful observations were made on the habits of the grasses.

All the grasses needed a summer rain to germinate but their reactions to winter rain varied. Broad Leaf and Creeping Wandarrie grasses were able to grow actively and set seed with winter rain. This activity was also extended to Windgrass. The Wire Wandarrie grasses were unable to make use of these winter rains to the same extent. A pasture consisting mainly of this species would contribute very little for sheep with winter rain.
necessary to observe in some detail the effect of grazing upon subsequent production of the species in the association. This trial was limited in the first instance to Broad Leaf and Creeping Wandarrie grasses.

Broad Leaf Wandarrie grass when cut, used the available moisture for vegetative growth with the complete exclusion of seed production. Creeping Wandarrie grass, however, did attempt some seed production as well as vegetative growth after cutting.

Heavy grazing could therefore restrict the build up of seed supplies if the plants are grazed before seed has been dropped.

This marked palatability of Broad Leaf and Creeping Wandarrie grasses will influence the grazing management of these associations.

These three trials have furnished information which can be used to form the basis of a sound management programme for Wandarrie associations in a deteriorated condition. The reactions of the components of the association to rain are known in terms of vegetative growth, seedling establishment and seeding habits. The relative worth of each species has been determined by its reaction to the seasonal incidence of rainfall, its palatability and, in case of Windgrass, its fodder value. The effect of grazing upon seed production is known and the susceptible phases of the growth cycle have been discovered.

Since both Broad Leaf and Creeping Wandarrie grasses respond to summer and winter rain, are perennials and are highly palatable, they should be fostered in the association.

Wire Wandarrie grasses and Windgrass should be discouraged since they are both unpalatable and are unable to use all the rainfall received to best advantage.

The management programme should be designed to allow the desirable grasses to become established and to set seed before being grazed. This will allow a seed reserve

(c) The Relative Palatability of the Wandarrie Grasses.

A complete record was made of the plants occurring within a small enclosure. Five sheep were introduced and their grazing preferences observed closely over five days. After grazing the plants were rated for palatability which was taken to be directly proportional to the amount of the material eaten.

Broad Leaf and Creeping Wandarrie grasses were highly palatable at all stages of growth. Every seedling of these species was removed by the end of the grazing period.

The Wire Wandarrie grasses and Windgrass were not grazed at all.

Fig. 4. — Two Creeping Wandarrie plants (Eragrostis lanipes). Without grazing these plants tend to grow more upright as in the photograph.
to be built up and also permit root reserves to be made as a protection against drought.

Grazing trials already in progress have shown that this method of approach is sound. In contrast with an area under paddock grazing conditions, Broad Leaf and Creeping Wandarrie grasses have maintained themselves under controlled grazing while Windgrass has declined. Normal paddock grazing in the same period has resulted in a complete removal of desirable grasses. This pasture has little to offer, whereas the correctly-grazed area is able to offer more for the animal than was possible in its previous condition.

The programme necessary for this change to be made in the pasture is based upon the seasonal incidence of rainfall.

Under conditions of summer rainfall both Broad Leaf and Creeping Wandarrie grasses need at least four months in which to complete the seed-setting process. The association should not be grazed until this has been completed. Grazing may then follow this spelling at an annual rate equivalent to that of continuous stocking.

With winter rains, seed production in Broad Leaf and Creeping Wandarrie grasses takes place rapidly. Grazing should not be permitted for at least eight weeks or until seed-set has been completed. The pasture may then be grazed at normal paddock rates.

This type of grazing management will enable degenerated Wandarrie country to recover to its normal state of high productivity. Once it has recovered it will be necessary for the pastoralist to manage it so that the desirable species remain dominant. This will involve occasional spelling and the avoidance of excessive stocking.

It may be argued that this spelling of paddocks is not possible on a station scale. On the average station, if only two paddocks are left ungrazed during the vital growing and recovery period following rain, the remaining paddocks will have their numbers increased by merely ten per cent.

The argument is also advanced that kangaroos will prevent any recovery in the pastures. In the years when these methods of rehabilitation are most effective and when they are most easily carried out, kangaroos are scattered and not present at levels where they could prevent recovery of the vegetation.

Proper pasture management rather than stock management should be the first concern of the pastoralist. For unless the pastures are preserved through attention to their requirements they will deteriorate to the point where stock management is impossible.

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