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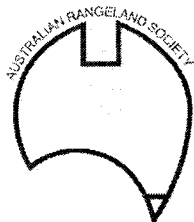
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BLUEBUSH MOUND HEIGHTS - AN INDICATOR OF GRAZING REGIME?

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ABSTRACT

Maireana sedifolia (bluebush) is a common chenopod bush growing throughout arid and semi-arid regions of Australia. At the base of this plant there is usually a mound where smaller, annual species grow preferentially. A survey was conducted to examine the size of the mounds and the vegetation growing on them under different grazing regimes. This survey was conducted at Koonamore Station, South Australia. Comparisons were made between inside a vegetation reserve which has excluded sheep since 1925, and outside the reserve in lightly and heavily grazed areas. Mound heights were measured for bushes in each of the grazing regimes and a survey conducted on plant abundance and lichen cover beneath bushes and in open areas. Mounds were significantly higher in the heavily grazed area. There were more plants growing under the bushes compared with the open areas in all paddocks, and there were more plants inside the reserve for both positions. Lichen cover below the bushes remained the same in all paddocks but the heavily grazed site had significantly lower lichen cover values in the open areas. Results indicate that grazing pressure affects the mound height, the vegetation present and the lichen cover. It is hypothesised that the mounds are developed by the degradation of areas around the bushes rather than just through the accumulation of materials, as previously thought. The importance of such 'safe sites' for annual species is therefore likely to be greater in areas of heavier grazing.

INTRODUCTION

Many chenopod shrubs have mounds associated with their base. It has been observed that there are higher abundances of annual species on the mounds beneath these shrubs than in open areas (J. Facelli, pers. obs.). There are several possible explanations for the existence of these micro-environments under bushes. In arid and semi-arid regions in particular, it could be the result of changes in soil properties or water dynamics. However, a greater abundance of plants beneath a bush may simply reflect patterns of seed accumulation. The base of a bush may act as a seed trap, catching seeds and litter as they move over the ground. Bluebush mounds were previously thought to be just an accumulation of material at the base of the plant.

We are investigating bluebush mound heights and the importance of the mound by comparing abundances of understorey species and lichen cover under bushes and in open areas in different grazing regimes. Our hypothesis is that the mounds are primarily a result of the degradation of the area around the bushes. This is not to suggest that the accumulation of material does not occur, but it is not the sole explanation.

METHODS

A survey was conducted in January 1996 at Koonamore Station, South Australia, in three adjacent paddocks experiencing different grazing regimes. One site, the Koonamore Vegetation Reserve, has had sheep excluded since 1925, the second, a mustering paddock, was heavily grazed, and the third, Finn's, was the southern side of a fence and therefore experienced low grazing pressure. A continuous bluebush stand grows throughout these three regions and any differences measured are likely to be the result of the different grazing pressures.

Ten bluebushes were measured in each of the paddocks. The height of each bush and the distance from the base of the bush to the base of the nearest neighbouring bluebush were measured. The point mid-way between the two bushes was chosen as the base level for measuring the height of the

mounds. This was done by resting a level ruler on the top of the mound and placing another ruler perpendicular to the first one, and measuring the distance to the ground. Each bush was randomly assigned to one of two categories: 'open' or 'under', until there were five of each in each paddock. For the bushes assigned to 'open' the central point for vegetation sampling was mid-way between the first bush and its nearest neighbour, and for 'under' the base of the bush was the central point. Three 20 × 20 cm quadrats were placed 10 cm away from this central point. In each of these quadrats all plants were counted and the lichen cover estimated. The three quadrats were then pooled for each bush.

RESULTS

Mounds are significantly higher in the mustering paddock. There were more plants growing beneath the bluebushes compared with open areas, and there were more plants in both positions inside the reserve than in either of the grazed paddocks. Beneath the bluebushes there was generally less than 25% lichen cover. The lichen cover in the open spaces varied from an average of 30% in the highest grazed area to 80% inside the reserve (Figure 1). The difference between lichen cover in the open and under the bushes was greatest inside the reserve.

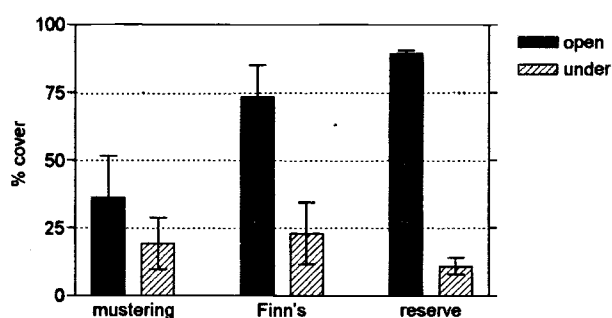


Figure 1. Lichen cover (\pm s.e.) under bluebushes and in open spaces. There was no difference in lichen cover under bluebushes between the different paddocks. In the open spaces there was a greater lichen cover in the areas which were grazed less.

DISCUSSION

The results from this survey indicate that the observed mound differences are related to the grazing pressure on the community. Although there is still likely to be accumulation of material into the mound, which may partially explain its development, the main forming mechanism is the continued degradation of material around the plant. Furthermore, any degradation around the plant is likely to result in more material being available for accumulation on the mound.

Whether the presence of annuals under the bushes is a result of dispersal limitation or differences in the establishment, growth or survival of seedlings could not be detected in this survey. In highly grazed areas, the mound is likely to be a 'safe site' for annual species which would otherwise be eaten or trampled. We are currently looking at the species composition under the bushes and in open areas, and intend to continue to monitor the same site through time to determine whether there are any temporal changes. Current research is focussed on whether plants grow on mounds due to seeds being deposited there or because the germination and survival of seedlings in the micro-environment is different from the open spaces due to the presence of the bushes.

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