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STUDY OF *MAIREANA PYRAMIDATA* AS AN INCREASER SPECIES IN GAWLER RANGES, SOUTH AUSTRALIA, USING PERMANENT VEGETATION MONITORING POINTS

A. Friedel[A], *S. Lawson*[A], *D. Oag**[B] *and J. Stringer*[B]

[A]Rural Solutions SA, Department of Primary Industries and Resources, 12 Tassie Street Port Augusta, SA 5700.

[B]Pastoral Program, Land & Biodiversity Services, Department of Water, Land, Biodiversity and Conservation, 9 Mackay Street, Port Augusta, SA 5700.

INTRODUCTION

Increaser species are useful indicators of rangeland condition. In the Gawler Ranges District of the South Australian Pastoral Zone, *Maireana pyramidata* (blackbush) is commonly considered an increaser species, as it is not preferentially grazed by stock. Blackbush may eventually dominate due to a reduction in competition from palatable species. These areas usually occur near watering points on pastoral stations, with blackbush inhabiting bare areas created by grazing. In 1991 and 1992 pastoral lease assessments were carried out as required by the *Pastoral Land Management and Conservation Act, 1989.* As part of this process permanent vegetation monitoring points (photopoints) were established within approximately 1.5 km of domestic stock waterpoints in each paddock on individual pastoral leases. Belt transects (Jessup transects) form a component of these monitoring points and were revisited in 2006 and 2007 as part of the second round of pastoral lease assessments. These Jessup transects results have been analysed in this paper to illustrate how blackbush populations have changed over the last 15 years in the Gawler Ranges and discusses any effect these changes have had on other common chenopod species.

METHODOLOGY

Jessup transects were established at photopoints in the first round of assessments and constitute the quantitative aspect of photopoints. Jessup transects consist of a permanent and repeatable 4m by 100m quadrat. Within the quadrat perennial vegetation numbers are recorded and compared with any previous visits. The total counts are the basis for comparison and trend analysis in this study. Photopoints that had been visited in both the first round of Gawler Ranges Pastoral Lease assessments (1991-1992) and in the second round (2006-2007) and had blackbush present at any assessment were selected for study. These criteria gave us 134 photopoints scattered throughout 13 pastoral stations. This reduced the total study sites to 130, as four were not visited in the second round. Total plant numbers were also collected for the other main chenopods that blackbush is commonly found with; pearl bluebush (*Maireana sedifolia),* low bluebush (*Maireana astrotricha)* and bladder saltbush (*Atriplex vesicaria).* This was undertaken in order to identify whether a change in blackbush numbers correlated with a change in the numbers of other chenopods.

RESULTS

Maireana pyramidata (blackbush)

Blackbush was present at 83% of the 130 sites at the first assessment. At 22.2% of these sites blackbush was the dominant species and at 30.5% sites it co-dominated with other perennial shrubs. At the second assessment 97.7% sites had blackbush present, an increase of 14.7%. At 21.3% sites blackbush was the dominant perennial species and at 35.4% sites blackbush co-dominated with other perennial shrubs. This shows that dominance had reduced by 0.9%, or essentially remained stable between assessments. Co-dominance has increased by 4.9%, and again shows no great increase in the density of blackbush.

At first assessment 5 sites existed where blackbush was the only study species in the Jessup transect. 20% had 342 plants, 20% had 77 and 60% had less than (<) 8 plants, indicating sites in very poor condition. At the second assessment were 9 sites where blackbush was the only study species present. 11.1% site had 348 plants (slight increase), 11.1% site had 135 (increase from 77) and 77.8% had fewer than 30 plants present.

Of the 22 sites where blackbush was present only at the second assessment, 54.6% had only one blackbush plant present, 22.7% had 2-5 plants present, 9.1% had 6-10 plants present, and 13.6% sites had greater than (>) 11 plants present. This indicates that the emergence of blackbush at a site is not occurring at an accelerated rate.

Behaviour of other species

As blackbush is considered an increaser species under certain circumstances it is relevant to analyse any changes found in the density of other chenopod shrubs that occur with blackbush. Table 1 below indicates any changes for bladder saltbush, low bluebush and pearl bluebush in relation to a change in density of blackbush.

Table 1: Percentage of sites with a change in plant density between assessment 1 and assessment 2, Gawler Ranges.

	Atriplex vesicaria			***Maireana astrotricha***			***Maireana sedifolia***		
Maireana pyramidata	Increase	Decrease	Stable	Increase	Decrease	Stable	Increase	Decrease	Stable
Increase	53.9	69.2	100	54.5	76.9	44.4	79.4	61.1	40
Decrease	38.5	25	0	36.4	15.4	44.4	14.7	27.8	40
Stable	7.6	5.8	0	9.1	7.7	11.2	5.9	11.1	20

Bladder saltbush, low bluebush and pearl bluebush presence at sites remained relatively stable between assessments. At assessment 1, 83.9% of sites had bladder saltbush, 33.1% of sites had low bluebush and 47.7% with pearl bluebush. At assessment 2, bladder saltbush sites had reduced to 79.2% (decrease of 4.7%), low bluebush had reduced by 0.8% to 32.3% and pearl bluebush remained the same at 47.7%. This result shows that in the fifteen years between assessments sites where these species are present in any density have changed very little.

Where low bluebush and pearl bluebush have increased or decreased in density at sites the change was less than 15%. These two species are long-lived and do not recruit readily. Table 1 shows that sites where low bluebush and pearl bluebush are increasing or remaining stable outweigh sites where numbers are reducing. At the majority of sites that are increasing in numbers (54.5% and 79.4% respectively) blackbush is also increasing. Where low bluebush and pearl bluebush are decreasing blackbush is mostly increasing, although at 27.8% of pearl bluebush sites blackbush is also decreasing. There are some sites where a reduction in all bluebush numbers is occurring.

Bladder saltbush numbers have changed dramatically at some sites. It is shorter lived than bluebush species and recruits more readily. The dramatic results of bladder saltbush numbers can partly be attributed to this change in age cohorts. Of the 52 sites where bladder saltbush reduced in numbers 64.4% of sites had a loss of over 25% of individual plants. At these sites blackbush increased at 64.7%, decreased at 26.5% and remained stable at 8.8%. At sites where bladder saltbush increased in individual numbers 67.3% also had a large increase of approximately 40% in plants numbers. At these sites blackbush increased by 54.3%, decreased by 40% and remained stable at 5.7% of sites.

Table 1 shows that at those sites where bladder saltbush has increased, blackbush also increased at 53.9% of those sites, and 38.5% showed a reduction in blackbush density. However where bladder saltbush has decreased, blackbush has increased at 69.2% of sites while only 25% of sites showed a reduction in blackbush.

CONCLUSION

Analysis of this data has identified a number of emerging trends. Blackbush is increasing in numbers throughout the Gawler Ranges. Recent monitoring, however, has shown that it has not taken on the characteristics of an increaser species at the distance from water where photopoints are established. At

sites where blackbush was not initially present only small numbers of individual plants have colonised 15 years later. The shrubs that commonly occur with blackbush and the changes in their densities also show that blackbush is not necessarily being replacing them. Sites where blackbush is increasing are often also experiencing an increase in low bluebush and pearl bluebush. At sites where blackbush has increased there has often been a reduction in palatable decreaser species such as bladder saltbush. Improved densities of decreaser species can at some sites be explained by recent rainfall events and not necessarily a reduction in total grazing pressure. While this data is valid, better results will come from repeated visits over a longer period.