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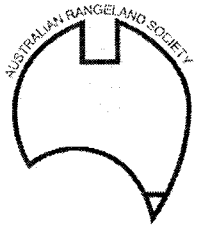

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WEEDS OF GRAZED RANGELANDS OF SOUTH AUSTRALIA

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ABSTRACT

An examination was made of the potential range, abundance and impact of important weeds of grazed rangeland (pastoral) areas of South Australia. Of the 57 weed species known to be present, 25 are already widespread and affecting pastoral production. It is suspected that 11 species could increase their range and abundance significantly and have higher impact. Ultimately, 11 species would be particularly troublesome to pastoralism. The value and validity of such estimates is noted.

INTRODUCTION

Prediction of the spread and potential impact of a weed is valuable to both landholders and governments in determining control strategies and in justifying resources that may be necessary to manage any problem caused by the weed. Ultimate geographic limits can be inferred by an examination of the environment of the native range of the weed, the environment of currently infested ranges, laboratory studies and, if available, growth models (Cousens and Mortimer 1995). The potential impact of a weed is a function of potential spread, abundance and the problems associated with the weed. Quantitative information is most useful in making such predictions. However, advice on weed management is normally needed without delay, not after waiting years for research to be completed (Cousens and Mortimer 1995). In the absence of quantitative information available knowledge, intuition and repeated casual observation are the most useful tools in determining a species' potential. In previous work (Michelmore 1995), I have used these techniques to make estimates of the potential distribution and impact of proclaimed and important weeds in the areas of South Australia that are outside of animal and plant control boards. The boundaries of these boards are based on cadastral divisions, not any natural boundaries such as climate, topography, vegetation, soil or land use. Natural boundaries at the margin between areas that may be cropped occasionally and areas of permanent pastoralism, are normally distinct. This study estimates the potential spread and impact of important weeds in the arid pastoral areas of South Australia.

METHODS

Weed location, density, habitat and impact records for the grazed rangelands for the past 12 years were considered. Species examined included both proclaimed plants and native and introduced weeds that are considered by landholders as important for pastoralism and are often considered in a property weed control program. Potential impact was estimated. Species were grouped according to their current spread, estimate of potential spread and estimate of potential impact.

RESULTS

There are 57 weeds species known to be present and of these, 25 species are already widespread and important. One plant, African rue (*Peganum harmala*), is widespread but is not yet causing losses, although its abundance is still increasing. Nineteen species were regarded as having the potential for significant increases in their range and abundance. Ultimately, it is considered that the total number of important weed species could be 34; of these, 11 would be particularly troublesome.

DISCUSSION

Potential Spread and Abundance

Once introduced to an area, the fate of a colonising species is determined by its fitness - the effect of the environment on the survivorship, growth and reproduction at different stages of the life cycle for

each individual in the population. In determining the potential range of an invading species in the arid pastoral areas it is better to place high regard on the species' ability to tolerate adverse conditions (Michelmore 1995). But high regard should be placed on the species' optimum requirements to help determine potential abundance at certain times and places. The variation of temperature in relation to the timing and incidence of soil moisture can account for high annual differences in the abundance of individual species (Michelmore 1995). For example, in the southern Flinders Ranges and marginal farming areas which received summer rains in 1992, both saffron thistle (*Carthamus lanatus*) and onion weed (*Asphodelus fistulosus*) flourished.

For the arid zone, suitable soil moisture, soil nutrition and disturbance appear to be the most important environmental factors affecting invasion success (Michelmore 1995). The spatial diversity of these attributes across a patchy landscape, combined with temporal factors and chance, determine the ultimate population of an invading species. Managers who look after the pasture and let naturalised weeds look after themselves will generally be sure of sustainable production.

Potential Impact

Weeds have so far had relatively little impact on the economics of agricultural production in arid pastoral areas of South Australia. Weeds do affect the profitability of pastoralism, but in comparison to the impact of weeds on adjacent agricultural areas, and the effects of woody weeds in western New South Wales, losses have been relatively small. South Australia is not exempt from potential problems. I suspect that African rue (*Peganum harmala*), hopbush (*Dodonaea* spp.), innocent weed (*Cenchrus longispinus*), mesquite (*Prosopis* spp.), Noogoora burr (*Xanthium strumarium*), pimelea (*Pimelea simplex*), punty (*Senna artemisioides*), turpentine (*Eremophila* spp.) and winged sea lavender (*Limonium lobatum*) are most likely to spread and have significant impact on agricultural profitability. These plants are all able to cause significant losses to pastoralism, they have the ability to disperse, and there are numerous suitable niches available.

The problem associated with pimelea toxicity currently causes significant losses on many properties. I suspect that the incidence of this plant will continue to increase, and together with this, losses will increase.

Special mention should be made of African rue. I have previously noted (Michelmore 1995) that African rue was considered a minor threat to arid zone pastoral grazing. However, when also considering the pastoral areas adjacent to farming areas, as in this study, the estimate of potential impact is increased - African rue could become a significant problem in that area as many pastures have a high stocking rate and are composed of annuals.

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