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# REGENERATION OF WOODY SPECIES FOLLOWING CHAINING OF BELAH WOODLAND IN WESTERN NEW SOUTH WALES

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## ABSTRACT

*Regeneration and survival of trees and shrubs was monitored over a five-year period following the chaining of an area of Casuarina pauper (belah) woodland on Nanya Station in western New South Wales. Chaining occurred in July 1991, and following very high rainfall from August 1992 to January 1993 widespread regeneration of woody species occurred. There was no regeneration of C. pauper. Alectryon oleifolius ssp. canescens regenerated from root suckers, while Myoporum platycarpum and ten other perennial woody species regenerated from seed. Over a further three years of below average rainfall the more palatable species declined while the less palatable, in particular Eremophila sturtii, Dodonaea viscosa ssp. angustissima, Senna artemisioides subspp. and Olearia pimeleoides, showed a significant increase over pre-chaining levels. These results are consistent with an assessment on the adjacent Ennisvale Station where an area was chained in 1970 prior to three years of above average rainfall. The implications of clearing for long-term vegetation change are discussed.*

## INTRODUCTION

Large areas of semi-arid woodland in western NSW have been partially or totally cleared in the past by chaining or ring barking. The objective of this has been to increase herbage production, a response thought to arise from increased availability of soil water and perhaps nitrogen (Tunstall *et al.* 1981). Beckmann (1993) questioned the benefits of this clearing and reported experiments that demonstrate that while clearing may initially substantially increase the amount of grass, heavy grazing removes this. For long-term sustainability of rangeland grazing, the maintenance of perennial species is critical. Chaining has contributed to the damage to Australia's woodlands, of which 35% have been cleared or severely modified since European settlement (Campbell 1994). Clearing has also been implicated in the increase in woody weeds such as *Dodonaea*, *Senna* and *Eremophila* spp.

## METHODS

In July 1991 an area of *Casuarina pauper* (belah) woodland was chained on Nanya Station in western NSW. This provided the opportunity to monitor the effects of chaining on the survival and regeneration of woody perennials. The numbers of tree and shrub species regenerating were monitored annually by means of ten 250 m × 2 m belt transects across the 25 ha site. Data were compared to those from an adjacent unchained site. A similar assessment of the numbers of trees and shrubs was made on an area of the adjacent Ennisvale Station on which belah woodland had been chained in 1970, prior to three years of above average rainfall.

## RESULTS

In the twelve months following chaining only 160 mm of rain fell and no regeneration was recorded. In the following six months, however, 468 mm of rain fell, including 250 mm (the long-term annual average) during December 1992 and January 1993. This resulted in dense growth of spear grass and widespread regeneration of woody species. The only significant change in the ground layer species occurring was an increase in exotic species from one to eight. Changes in the numbers of woody species from July 1993 and comparison with unchained belah are shown in Figure 1.

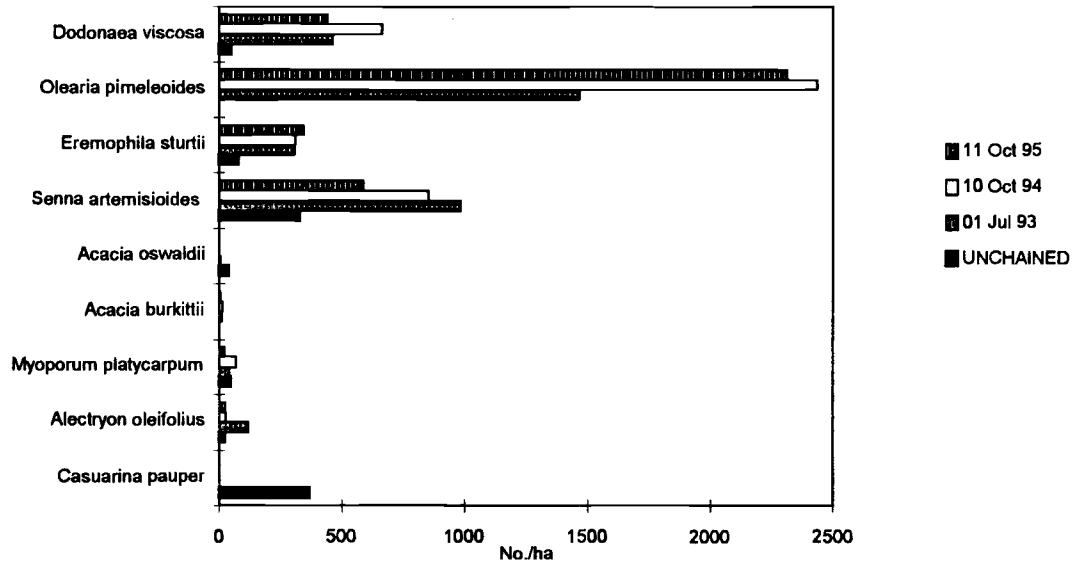


Figure 1. Regeneration of trees and shrubs in belah woodland following chaining, Nanya Station.

## DISCUSSION

No *Casuarina pauper* survived the chaining or regenerated over the five-year period. *Alectryon oleifolius* ssp. *canescens* regenerated from root suckers and another ten perennial woody species regenerated from seed. The less palatable species, in particular *Eremophila sturtii*, *Dodonaea viscosa* ssp. *angustissima*, *Senna artemisioides* subsp. and *Olearia pimeleoides*, showed a significant increase over pre-chaining levels. Following low rainfall in 1994-95 more palatable species such as *A. oleifolius* and *M. platycarpum* declined. Data from the adjacent Ennisvale Station, chained in 1970 and assessed in 1994, showed a similar pattern of species change. These results suggest that the widespread clearing and thinning of belah woodlands which has occurred, particularly in the late 1960s, may have contributed significantly to the increase in woody weeds in these areas. In addition, the process has the potential to radically change the tree dominance over large areas of semi-arid woodland.

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