22.EFFECTS OF ANNUAL PLANTS ON THE ESTABLISHMENT OF SHRUB SEEDLINGS ON A NATURE RESERVE IN THE WEST AUSTRALIAN WHEATBELT

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Summary

We carried out an experiment in which seeds of the shrub *Allocasuarina campestris* were planted into a disturbed area on Durokoppin Reserve, 20km north of Kellerberrin. Seeds were planted into quadrats which were either left without further manipulation, weeded to remove all seedlings of annual species, or planted with seeds of an introduced annual, *Ursinia anthemoides*. Significantly fewer *Allocasuarina* seedlings established in the "annuals added" treatment. Heavy mortality of seedlings occurred in early summer when the winter rains ceased, and by the following autumn virtually all seedlings in the control and "annuals added" treatments had died. Seedlings in the "annuals removed" treatment were significantly larger at the start of the summer than survivors in the other treatments, and approximately 30% survived until rains commenced again in autumn. We suggest that annuals significantly reduce the growth of shrub seedlings and prevent them from reaching an adequate size and root length to allow them to survive the summer rain-free period. This has important implications for attempts to re-establish natural vegetation in disturbed areas with high cover of annual species.

(This work commenced in May 1988 and was completed in Nov 1987. A manuscript on this work has been submitted to OECOLOGIA).

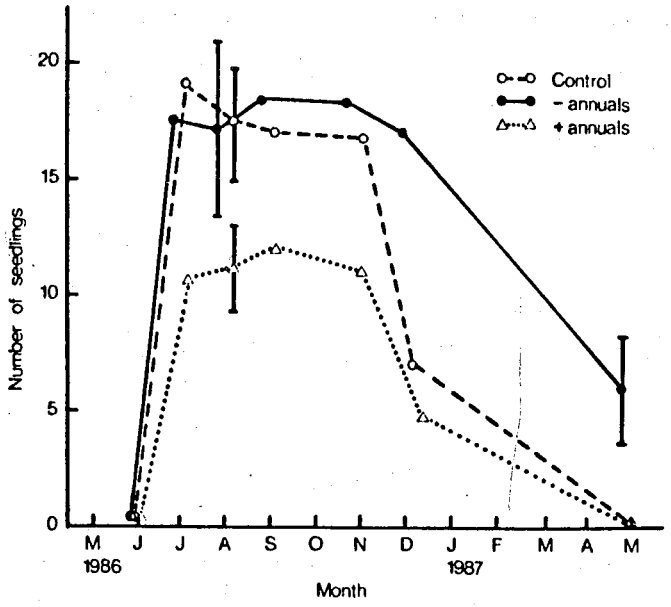

Fig 1. Numbers of live seedlings of *Allocasuarina campestris* present in experimental quadrats from May 1988 to May 1987 (mean + 1 S.E., n = 4). Open circles, control; closed circles, annuals removed; open triangles, annuals added.

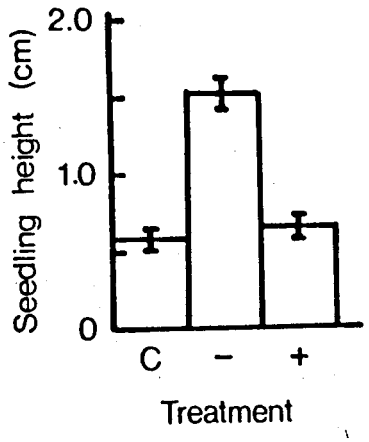

Fig 2. Height (cm) of surviving seedlings of *Allocasuarina campestris* in control (C), annuals removed (-) and annuals added (+) quadrats (Mean + 1 S.E., totals from 4 replicates).

Publications

Beckmann, R. 1987 Preserving nature amid the wheat fields. Ecos 53: 29-31.

Hobbs, R.J. and Atkins, L. 1987 The effect of disturbance and nutrient addition on native and introduced annuals in plant communities in the Western Australian wheatbelt. Journal of Ecology, (In press).

23. A NEW APPROACH TO THE STUDY OF RURAL DIEBACK OF EUCALYPTS: A REPORT ON THE INITIATIVE BY CSIRO DIVISION OF ENTOMOLOGY.

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Introduction

Repeated defoliations by herbivorous insects, particularly by pasture breeding Christmas beetles (Scarabaeidae) are reported to be the prime cause of dieback of eucalypts in partially cleared savannah woodlands of south-east Australia (Carter *et al.* 1981). It has been proposed that outbreaks of such herbivores are caused by the lack of natural enemies in parkland and cleared areas, compared with woodlands, where a more complex plant and insect community is present (Davidson 1982).