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EFFECTS OF AN INTRODUCED PASTURE SPECIES ON BIODIVERSITY IN A TROPICAL SAVANNA WOODLAND

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INTRODUCTION

In Queensland, Grazing Land Management packages are becoming widely adopted as a tool for assessing land condition, and the relative “health” of country. Within these packages, land condition indices are based on the extent of perennial grasses, bare ground and woody thickening. However, there is uncertainty whether these factors are also adequate surrogates for biodiversity status. In many cases there is considerable commonality between perceptions of healthy landscapes from both pastoral and biodiversity perspectives (relating to, for example, maintenance of a high cover and diversity of perennial grasses). Conversely these perspectives may substantially diverge. One example is the impacts of introduced pastures on landscape health. Areas with a high cover of palatable, perennial, introduced pasture grass are likely to be considered in good condition by the pastoral sector; but in poor condition from a biodiversity perspective. In this paper we present data from a study in northern Queensland savanna that illustrates this divergence.

METHODS

A flora and fauna survey was conducted in the Dalrymple Shire (20°S, 146°E, Einasleigh Uplands bioregion) between November 2002 and March 2003. A total of 48 one-hectare sites were located on five properties dominated by open *Eucalyptus* woodland on ferrosols (basalts), with the sites sampling a range of condition classes. The native groundcover was dominated by *Heteropogon* spp., *Bothriochloa* spp. and *Dichanthium* spp., but approximately half of the sites contained varying cover of the introduced pasture Indian Bluegrass *Bothriochloa pertusa*, a species considered palatable, perennial and productive. Mammals, reptiles, birds, ants, vascular plants, vegetation structure and other habitat attributes were sampled within each site.

RESULTS

A total of 138 vertebrate species (86 birds, 29 reptiles, 10 amphibians and 13 mammals), 152 species of vascular ground cover plants and 106 species of ant were recorded from the study sites. The relative cover of *B. pertusa* at these sites had a pronounced influence on composition of vertebrates, in particular birds (Fig. 1). Species such as Rufous Songlark, Weebill, Red-backed Fairy-wren, Western Gerygone and Golden-headed Cisticola were less abundant, and Pied Butcherbird, Yellow-throated Miners, Australian Raven, Australian Magpie and Black-faced Woodswallow more abundant, in sites dominated by *B. pertusa*.

The species richness of both vertebrates and plants was significantly greater at sites with low cover (<5%) of *B. pertusa* compared to sites with high cover (>5%). Within the birds, the diversity of some guilds (e.g. ground/understorey insectivores) was markedly lower in high cover sites. The richness of other guilds (e.g. granivores) did not differ, but there was a clear turnover in dominant species (Red-winged Parrot and Zebra Finch were abundant in sites with <5% *B. pertusa*, while Cockatiel and Galah were abundant in sites with >5%).

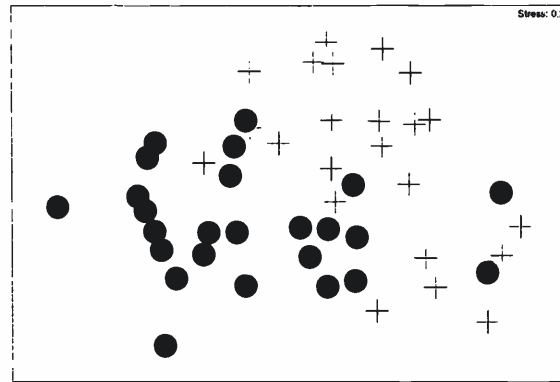


Figure 1. Two-dimensional ordination (multidimensional scaling) indicating the change in bird species composition between sites with <5% (solid circles) and >5% (crosses) *B. pertusa* cover.

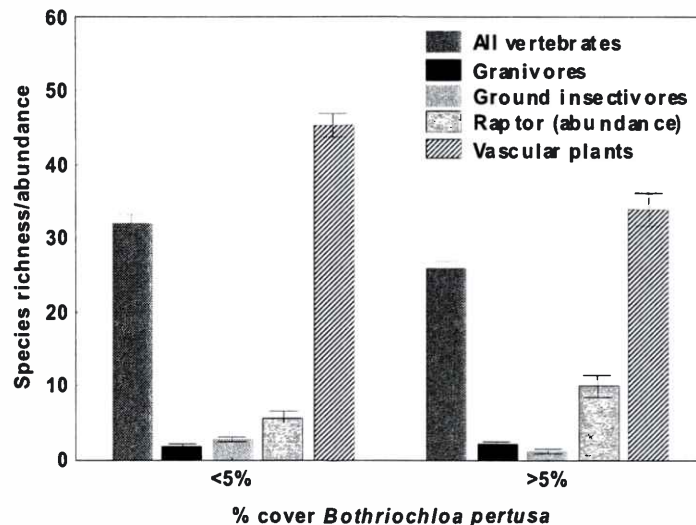


Figure 2. Mean richness or abundance (+/- s.e.) of selected fauna and flora groups at sites with <5% and >5% *B. pertusa* ground cover.

DISCUSSION

The implications of this study are to some extent self-evident – we must be careful about the context when discussing the relationship between land condition and biodiversity. At our sites, the relationship between biodiversity status and “land condition” was dependent on whether a high cover of *B. pertusa* was considered to indicate “good” or “poor” condition. When the condition of sites is assessed from a pastoral perspective the presence of perennial, productive and palatable introduced pasture grasses such as *Cenchrus ciliaris* and *Bothriochloa pertusa* are considered desirable, but this assessment ignores the substantial impacts of these introduced pastures on native biota. If conventional methods for monitoring land condition, including remotely-sensed cover-change analyses, are to be adapted as broader indicators of landscape health (including biodiversity status) in rangelands, then they must be sufficiently flexible to take into account the ecological differences between native and introduced perennial pastures.

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