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# THE INFLUENCE OF DIFFERENT GRAZING STRATEGIES ON THE PATTERNS OF VERTEBRATE FAUNA IN A TROPICAL SAVANNA WOODLAND

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## INTRODUCTION

The tropical savannas of northern Australian are characterised by high climatic variability, with corresponding impacts on annual resource availability. The native biota is adapted to these patterns, but variability in rainfall and forage production is a major challenge to the cattle industry. Despite this variability, many properties tend to set-stock, sometimes exceeding their 'safe' long-term carrying capacity and causing resource degradation. Typically, resource degradation refers to the impact on productivity and profitability of grazing enterprises, though the manner in which native fauna changes with different management strategies is a significant issue from a conservation perspective. In this paper we examine variation in the composition of the vertebrate fauna over a six-year period in a large grazing trial being conducted in tropical savanna woodlands in north-eastern Queensland.

## METHODS

In 1997, a grazing trial was established on Wambiana Station (20° 34' S 146° 07' E) near Charters Towers in North Queensland, in order to examine ways of better managing for rainfall variability. The objective was to test, at a paddock scale, the relative impacts on resource condition and animal production of five grazing strategies – light stocking, heavy stocking, variable stocking, variable-SOI stocking and rotational spelling. The trial had a replicated design using ten, 100 ha paddocks, each with similar proportions of three land types dominated by open *Eucalyptus* and *Acacia* woodland.

In addition to the standard pasture condition assessments undertaken during the trial, sites for monitoring vertebrate fauna were established in 1998 to provide pre-treatment baseline data. Sixteen sites were sampled using standardised one-hectare quadrats, representing two land types (box *Eucalyptus brownii* and ironbark *E. melanophloia* open woodlands) in two replicates of four of the grazing treatments (heavy, light, variable, rotational). These sites, and an additional eight sites in box woodlands were re-sampled in 2003/4. Mammals, reptiles, birds, amphibians, ants, vascular plants, vegetation structure and other habitat attributes were recorded within each quadrat plot.

## RESULTS

A total of 98 species comprising 64 birds, 20 reptiles, 4 amphibians and 10 mammals have been recorded to date within the grazing trial. Examination of the dry season bird sample indicates that the composition of the avifauna has changed markedly from the baseline to the resample (Figure 1). Species such as Rufous Whistler and Red-backed Fairy-wren were less abundant in the resample, and Weebill and Striated Pardalote more abundant.

The lower mean dissimilarity (Bray-Curtis index using both the baseline and resample scores) in the heavily grazed sites compared to the light and rotational and variable (category=mid) stocking treatments (Fig. 2) suggests the imposition of more conservative grazing regimes has resulted in a greater degree of change in the fauna composition. Some preliminary trends indicate that species that have declined across the trial since the baseline survey (e.g. fairy-wrens) were in fact still abundant in the lightly grazed treatments.

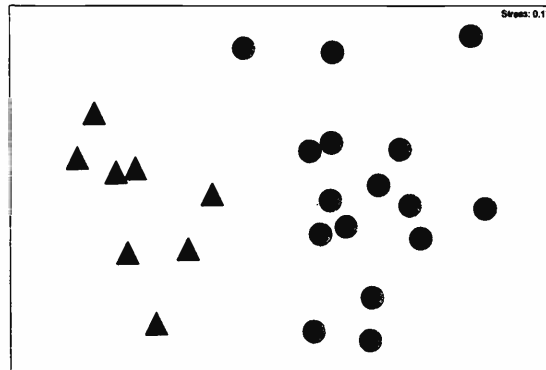


Figure 1. Two-dimensional ordination (multidimensional scaling) indicating the change in bird species composition (dry season sample only) between sample sites between the baseline survey (solid triangles) and the resample (grey circles) in the *Eucalyptus brownii* woodland.

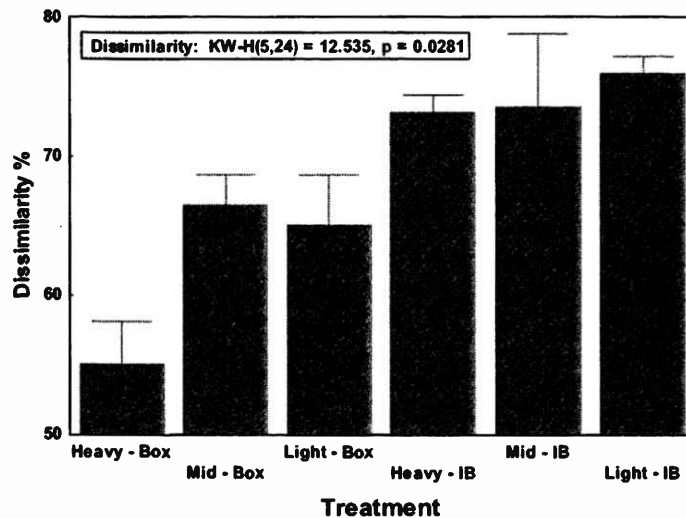


Figure 2. Mean compositional dissimilarity (Bray-Curtis) for each vegetation type and treatment using bird species composition (dry season sample only) data.

## DISCUSSION

The pattern of change in the vertebrate fauna abundance and composition across the Wambiana grazing trials is likely due to the imposition of the grazing treatments, combined with climatic variation. However there are marked differences manifesting between the extreme and more moderate stocking strategies. The implication of this is that conservative grazing does have biodiversity benefit. These data also suggest that the local decline of some species may be useful indicators of management that is gradually impacting on native wildlife.

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