

MALLEE REGION

BIODIVERSITY IN Grain & Graze™

Profit through knowledge



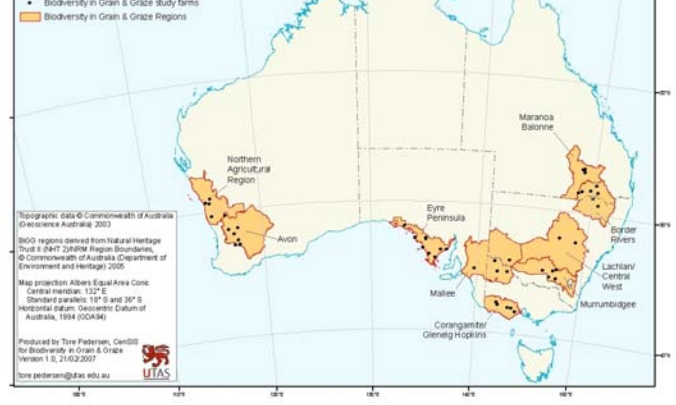
INTRODUCTION

Forty-seven mixed farms within nine Grain & Graze regions around Australia are taking part in an exciting project which focuses on the biodiversity benefits provided to the community from producers with mixed farming systems and the benefits that biodiversity can bring to farming systems.

This industry funded project is the first of its kind, collecting biological information about a range of organisms from different land uses on mixed farms across Australia.

The Mallee Region surveyed a total of 5 farms from Victoria (3), South Australia (1) and New South Wales (1).

Biodiversity in Grain & Graze Study farm locations



PADOCK TYPES

Each farm had 4 paddocks which represented a different land use. These paddocks were monitored in autumn and spring for 2006 and 2007. Each paddock had a different land use or 'treatment'.

Crop, Rotation (pasture phase), Pasture (perennial pasture), Remnant



CARABIDAE
Clivina sp.

Food: Predator of small insects, especially in sandy soils
 Distribution: SA: Mallee

Preliminary Results for the Mallee Region

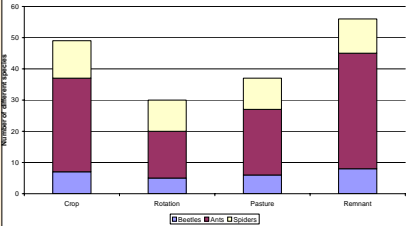
Invertebrates

Pitfall trapping was used to collect ants, beetles and spiders within each paddock type in all five farms. This enables comparison between sites and different habitats.

Spring Results

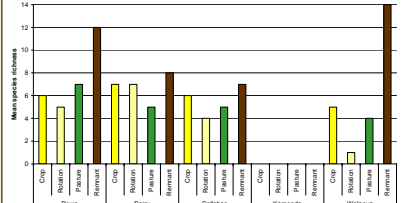
Eighty-one different beetles, ants and spiders were identified from the spring 06 survey. Ants were the largest group with 48 different types identified. Only eight of these were found in all four paddock types, and one quarter of them only occurred in the remnant vegetation. Remnant vegetation (37) and crop (30) recorded the highest numbers of different ants overall. Numbers of different beetles was similar across all paddock types, but no beetle was recorded in all four paddocks and 4 of the 8 beetles found in the remnant were not found in any other paddock type. A third of all spiders (6/18) were found in all paddock types.

Total species richness, Beetles, Ants, Spiders, Mallee, Spring 2006



All farms had more ants in remnants than other paddock types, but there were differences between farms.

Mean ant species richness, Mallee, Spring 2006



Linking the data on land management within farms for all 47 properties and over all four sampling times will allow us to explore these relationships in greater detail.

Vegetation

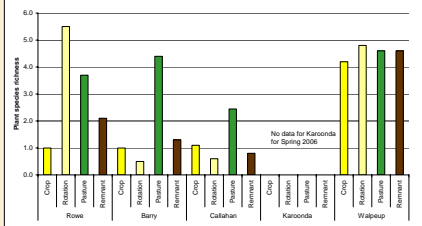
Vegetation surveys in all paddock types provide us with information on plant species diversity (the number of species found in a given area), vegetation structure (the height of the vegetation and the presence of trees, shrubs, grasses and ground cover) and the amount of litter and bare ground in each paddock type.

These factors are important as the vegetation provides habitat for many of the other organisms that we are collecting information on (birds, invertebrates, soil biota).

Spring Results

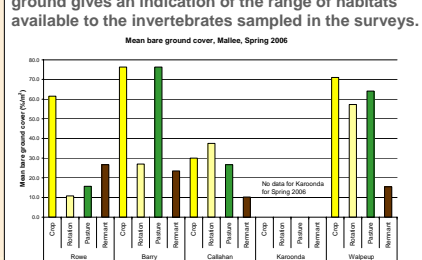
The number of different species found in 1 x 1 m quadrats at the site was very low in spring 2006. This is likely to be due to lack of rainfall, time since herbicide application, time since grazing, stocking rate and vegetation type.

Mean plant species richness (m²), Mallee, Spring 2006



Different plant and animals show different preferences for ground cover. Some plants regenerate in bare patches, where competition is reduced, while others require a moss, lichen or herbaceous ground cover for germination. Different invertebrates have different habitat requirements.

Mean bare ground cover, Mallee, Spring 2006



Soil Biological Activity

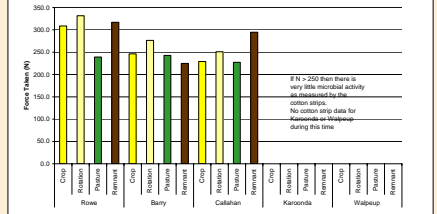
Soil biological activity is vital for nutrient cycling. There are many methods that can be used to measure biological activity. We chose to use a simple method, the cotton strip assay.

This method involves burying strips of cotton fabric in the soil and leaving them to degrade over a two week period. Once removed the loss of tensile strength from the strip can be measured by pulling the fabric apart and recording the amount of force needed to tear the fabric. If the cotton strips break easily, it is assumed that the cellulose consuming bacteria and fungi are active. The results are compared to controls, strips that have not been buried. This method provides a relative measure of activity between the different paddock types on the farm.

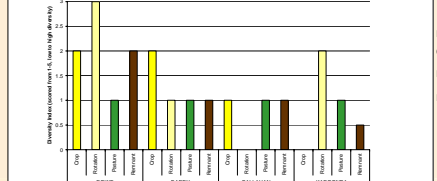
Results

Across the country, the greatest amount of decomposition was found in the crop paddocks. Microbial activity is determined, in part, by the nutrient levels in the soil, soil moisture and soil acidity. The two years of the study were extremely dry, therefore little activity was recorded outside the crop paddock for most regions.

Microbial Decomposition, Mallee, Spring 2006



Fungal diversity was higher in crop and rotation paddocks in the Mallee region. However, using all samples from across the country, there is no clear relationship between fungal diversity and microbial activity measured from the cotton strips.



Penicillium sp.
The Chemistry Laboratory of Natural Resources 2001



Pasture
Crop
Remnant
Rotation