Biodiversity research in Australian mixed farming systems

Kerry Bridle, Ted Lefroy, 10 other researchers, 9 regional project staff and 47 farmers

Grain & Graze™ Profit through knowledge

BiGG = 'Biodiversity in Grain & Graze', http://www.grainandgraze.com.au
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AIM

The aim of the Biodiversity in Grain & Graze (BiGG) project is to understand and quantify the role that biodiversity plays in supporting production on mixed farms and the role that farm management can play in supporting the viability of native biota and ecosystem processes.

METHODS

4 land use classes x 47 farms x 4 sampling times
9 regions: average of 5 farms/region
Sampling: autumn, spring 2006, 2007
Land use classes: crop, 'rotation' (break crop/pasture phase), perennial pasture and 'remnant' (native vegetation)

Data

Biodiversity surveys: birds; surface invertebrates (beetles, ants, spiders); vegetation; and soil fungi
Farmer interviews and GIS layers
Data collection: Grain & Graze regional project officers
Data collation/analysis/interpretation: University of Tasmania

RESULTS

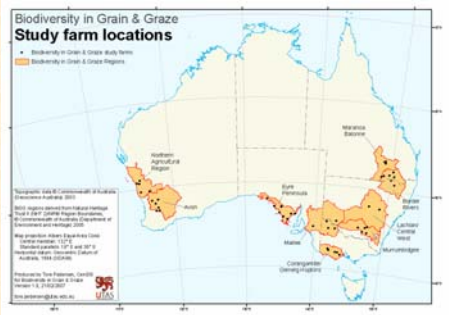
- 181 bird species (33 listed threatened species)
- >500 plants species
- >230,000 invertebrates

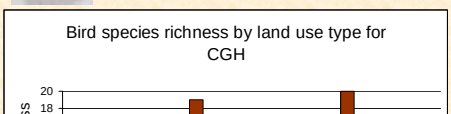
- Farms with a greater proportion of native vegetation and perennial pastures were more biodiverse than those dominated by cropping.

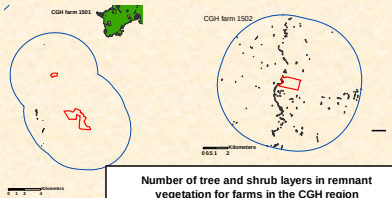
•Birds, ants and soil fungi were more diverse in native vegetation than crop/rotation paddocks.
•Species diversity of spiders and beetles was not significantly different between land use types, but the dominance of functional groups and the presence of particular species differed.

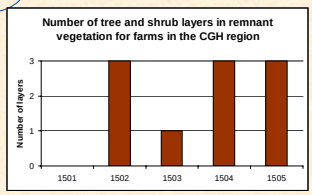
•Predatory beetles and spiders and insectivorous birds were found in all 9 regions indicating the potential for adoption of integrated pest management (IPM) on all farms.

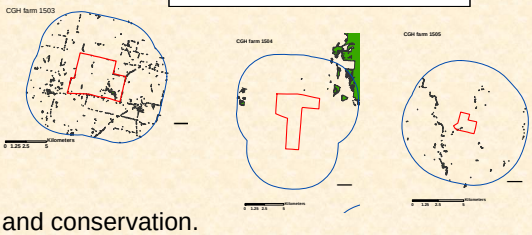
•Native vegetation patches were often small, fragmented and isolated, (mean area of native vegetation on farm ranging from 3-20%).
•Remnant vegetation patches with less structural complexity supported fewer species of birds and invertebrates.
•Birds responded to local and landscape scale features. More birds were recorded on farms with a large area of native vegetation (>10 ha patch) within 5 km of the farm boundary than those that were isolated from other remnants.











SUMMARY

Australian mixed farms contribute to the national conservation estate by:
•Maintaining native vegetation of conservation significance
•Providing habitat for rare species of birds and invertebrates
Perennial pastures are an important component of mixed farming systems for production and conservation.
Before this project, awareness of biodiversity on mixed farms was generally limited to remnant vegetation patches.
•BiGG confirms the value of native vegetation to stakeholders
•BiGG has demonstrated that farmers can alter their land management practices to encourage biodiversity in other land use types.
•Small changes can yield potential production rewards e.g. through the adoption of IPM, or enhancing condition of existing remnants.
The BiGG project has collected the first nationally consistent biodiversity data set for selected taxa on mixed farms.
This data set is a valuable benchmarking tool.

UTAS · mla Meat & Livestock Australia · Australian Government Land & Water Australia · australian wool innovation · GRDC Grains Research & Development Corporation · Natural Heritage Trust

Grain & Graze (www.grainandgraze.com.au) is a national program aimed at boosting farm profitability across the mixed farming zone of southern Australia, while minimising impact on the environment. The program is a collaboration between four leading Research and Development Corporations – Land & Water Australia, Grains Research and Development Corporation, Meat and Livestock Australia and Australian Wool Innovation Limited. Over 60 industry and land care groups, research providers and regional catchment management authorities (CMAs) from nine regions are involved in research focusing on cropping, pastures, livestock, profitability, feedbase management, whole-farm economics, biodiversity, social issues, soil and water.