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Assessing the Contribution of Mixed Farming Systems to Biodiversity across Australia's Sheep-Wheat Zone: The Grain & Graze Participatory Research Model

Kerry L. Bridle
University of Tasmania, Australia

Peter McQuillan
University of Tasmania, Australia

Dave Green
University of Tasmania, Australia

Janet Smith
University of Tasmania, Australia

Margy Fitzgerald
University of Tasmania, Australia

See next page for additional authors

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Presenter Information

Kerry L. Bridle, Peter McQuillan, Dave Green, Janet Smith, Margy Fitzgerald, and Ted Lefroy

Assessing the contribution of mixed farming systems to biodiversity across Australia's sheep-wheat zone the grain & graze participatory research model

Kerry Bridle, Tasmanian Institute of Agricultural Research, University of Tasmania, Private Bag 98, Hobart, 7001, Tasmania, Australia. kerry@utas.edu.au, Peter McQuillan, Dave Green (School of Geography and Environmental Studies UTAS), Janet Smith, Margy Fitzgerald, and Ted Lefroy (Centre for Environment UTAS).

Key words : biodiversity , mixed farming systems , participatory research

Introduction The Australian sheep-wheat zone exists in a highly fragmented landscape where remnant patches of native vegetation may be isolated, in poor condition or non-existent. Research within Australia and overseas have shown that the impact of cropping systems on biodiversity values is generally greater than that of pasture systems, due to the conversion of native perennial vegetation to exotic annual monocultures. The Biodiversity in Grain & Graze (BiGG) project is the first national project in Australia to attempt to collate biodiversity data on birds, surface invertebrates (beetles, ants, spiders), vegetation and soils using consistent methods over a two year period. The project aims to document what exists on mixed farms, in different land use types, with the major outcome to inform farmers, catchment managers and the funding bodies (research and development corporations) of the relative importance of mixed farmers in providing and managing biodiversity benefits on farm.

Materials and methods Nine Grain & Graze regions exist across Australia's sheep-wheat zone. Within each region there is a regional biodiversity field officer who is responsible for collecting the biodiversity data in the field, and for collating and forwarding the data and samples on to the national co-ordinator based at UTAS. Regional field officers were also responsible for approaching five farmers who are considered to have representative mixed farms within the region. Field officers, in consultation with the farmers, identified land use types on each farm: a cropped paddock, a crop in rotation (break crop/pasture phase), a perennial pasture paddock and an area of remnant vegetation. Each field officer was responsible for collecting vegetation data for each paddock (using quadrats along line transects and condition assessment sheets), soil samples (for nutrient analyses), contents of pitfall traps (for invertebrate surveys) and cotton strips (used as a surrogate measure of microbial activity). Each officer was also responsible for interviewing the farmer in order to find out what they already knew about the biodiversity values of their properties, what they would like to know and to collect paddock management histories for all four paddocks surveyed. The officer liaised with Bird's Australia registered atlasers who undertook the bird surveys. The surveys were carried out in autumn (March-May) and spring (September-November) in 2006 and 2007.

The national co-ordinator was responsible for creating a field data manual containing all the information needed for the on-farm surveys. Most of the field officers had had no formal training in ecological data collection, therefore a training workshop on field data techniques was held prior to the first sampling period in autumn 2006.

Results and discussion Data quality was variable from region to region. However, all regions were able to send consistently adequate invertebrate samples, bird surveys, and cotton strip samples. Vegetation data were variable depending on the knowledge of the field officer and on their relative isolation from collegial support such as plant ecologists or taxonomists. Over 200,000 individuals were counted from invertebrate samples from the 2006 data collection periods, resulting in more than 800 morpho-species being identified, including rare species. Unsurprisingly species richness for plants, invertebrates and birds was greater in remnant vegetation than in any of the other land use types. However, several rare birds were sighted outside the remnant vegetation, highlighting the need for paddock, farm and landscape scale studies on biodiversity outcomes in farming landscapes.

The engagement of farmers, catchment management agencies, national project staff and the research and development corporations has been critical to the relative success of this project. Good baseline data have been collected as a result of this project which will help to engage and inform all land managers, farmers and agencies, on management practices that promote biodiversity in these production landscapes.