

Native birds in agricultural landscape



Moving towards agricultural sustainability: by promoting biodiversity conservation on farms.

Farming and nature

Bird damage to crops is one of the biggest problems facing growers of a wide variety of arable and horticultural crops. Landowners spend considerable time and money trying to minimise production losses. Yet, control techniques are often economically or environmentally unsustainable or simply ineffective.

Development of effective bird pest management strategies has been hampered by the unpredictability of damage from year to year, and a general lack of understanding of patterns of bird damage (other factors may contribute to damage: e.g, storms) and the ecology of pest species. **Few studies have investigated the factors influencing bird occurrence in agricultural landscapes.**



Farmers need information to better predict patterns of bird movement and abundance so to adopt cost effective and environmentally acceptable control techniques.

Cost and benefits of animal behaviour in agriculture



There are also benefits that nature provides to agriculture. For example, 35% of global food production comes from crops that rely on bees or birds as pollinators. Also, birds contribute to other 'services' such as the control of insect pests, waste disposal and seed dispersal. **However, the extent to which native birds may provide such service to Australian crops is generally unknown.**



Recognising and valuing the benefits that wildlife can provide to growers is a new paradigm shift in managing agriculture sustainably, while conserving wildlife in rural landscapes.

Research on birds in agricultural landscapes

Researchers from Charles Sturt University's Institute for Land, Water and Society have joined forces with Australia's largest almond grower (Select Harvests), the Victorian Department of Sustainability and Environment, and the New South Wales Office of Environment & Heritage, to look at ways to better manage agricultural landscapes to maximise production and conservation gains.

The Robinvale region in northern Victoria is undergoing a period of rapid transformation due to expansion of the horticulture industry. Within this region, there is a perception that populations of some birds have increased due to agricultural development, with certain birds becoming agricultural pests, inflicting damage to local crops. The region also supports a number of rare or threatened birds and other wildlife, and anecdotal evidence suggests **that horticulture may provide important food resources for some endangered birds**. Hence, it is critical to ensure that control measures to limit bird damage are environmentally acceptable, and consistent with conservation aims.



Few studies have investigated the contribution of farmlands to biodiversity.

Focus on endangered species the Regent parrot

The endangered regent parrot has suffered a decline in range and abundance over the last 100 years. The exact size of the population is currently not known, but is estimated to be no more than 2,900 adult birds. Most research to date has focussed on breeding sites, while relatively little is known about the feeding ecology of the bird. Questions such as: what food resources do they require? Where do they forage for food? need to be investigated, to **better understand how Regent parrot's move and survive in farming landscapes.**



Regent parrots may provide ecosystem services to farming.

Why are Regent parrots in almond crops?

Several factors may influence whether a bird feeds in a particular crop, such as the distance between the crop and roosting or breeding habitat, the seasonal availability of other food sources, the energy value of the crop, and predation risk. Also, bird feeding tends to occur mostly at the edges of crops. When the relative costs of foraging (e.g. energy expended or predation risk) outweigh the caloric value and nutrient content of food, alternative food sources may become more profitable. **Commercial crops often provide a supply of high-quality nutritional food that is relatively easy to obtain.**



The importance of farmlands as feeding habitat for the regent parrot has never been investigated: most studies have focussed on remnant vegetation. While the regent parrot may damage almond crops, the bird may also provide benefits to growers by feeding on nuts that have fallen to the ground. These nuts are a potential source for fungal attacks which

Observations and collection of quantitative data on the foraging behaviour of Regent parrots (and other birds), in relation to the availability of different food resources (e.g. almond orchards, vineyards) across the landscape will provide critical information to assist farmers and conservation managers.

Farmers need to know which species to manage.



Radio tracking



In addition to collecting foraging data at specific locations, some **individual Regent parrots will be fitted with radio transmitters** to track their movement across the Robinvale landscape. Detailed resource measurements at particular sites will enable researchers to identify potential drivers of movement patterns and quantify seasonal dietary shifts.

Few studies have investigated the contribution of farmlands to biodiversity.

A bird's eye view of the landscape



A bird's perception of the landscape is very different from humans. **The configuration of land-uses in agricultural landscapes (eg size and shape of crops and distance to native vegetation) is strongly related to bird diversity.**

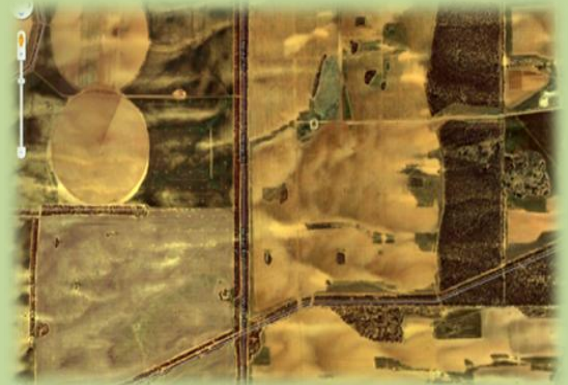
This research will determine the habitat and landscape features that influence bird occurrence in agricultural landscapes. Specific associations between bird occurrence and landscape variables and rates of crop damage may serve as a guide to landscape management to minimize crop damage (e.g. almond planting strategies, or targeting locations for crop exclusion).

Discriminating how the landscape composition and configuration influences crop damage is important for implementing future landscape management techniques.

Landscape manipulation and predictive models

Experience has shown that traditional methods to deter birds from crops are largely ineffective. Habitat manipulation (e.g. crop design, revegetation, provision of other food resources) is thought to be the only cost-effective and long-term biologically sensitive solution to integrate agricultural practices and conservation aims.

Population and behavioural models will be used to assess the impact of proposed changes in land-use on the Regent parrot. Alternative future scenarios will be defined based on past, present and future land-use plans to make predictions of the impacts of future land-use change on birds, and then to formulate criteria to guide management actions.



The outcomes of this research will provide critical information that can be translated into actual on ground changes to agricultural practices.

Maximising production and conservation outcomes

The value of agricultural commodities in Australia is estimated at \$37 billion and is a key sector underpinning the nation's economy. Ecologically sustainable management practices will help secure profitable farming futures. Managing agriculture sustainably while promoting nature conservation means: **developing management strategies that limit production costs** inflicted by animal behaviour, while taking advantage of the benefits that native

The outcomes of this research project will provide new **insights on the cost-benefit** of different **land management strategies** and different **landscape design techniques**. The researchers hope that the lessons learnt can be applied elsewhere in Australia and contribute to the **development of management systems and guidelines** to maximise conservation outcomes in rural landscapes.



Raising the profile of Australian agriculture while promoting conservation: an issue of critical importance for international trade.

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SELECT HARVESTS



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