

# Botanical diversity of shelterbelts and its contribution to vertebrate conservation and pest management

Ronald S Bonifacio<sup>1,2</sup>, CM Kinross<sup>2</sup> and GM Gurr<sup>2</sup>

<sup>1</sup>Faculty of Rural Management, The University of Sydney, PO Box 883, Orange, NSW, 2800  
email: rbonifac@orange.usyd.edu.au

<sup>2</sup>Faculty of Rural Management, Charles Sturt University, Leeds Parade, Orange, NSW, 2800



King Parrot  
(*Alisterus capularis*)  
Photo: R Bonifacio

## Introduction

Shelterbelts are composed of linear vegetation planted for the protection of crops and livestock. Some of the ecosystem services of shelterbelts are: protection of crops and livestock from weather, water table and salinity management, timber production and aesthetics.

Shelterbelts may also constitute valuable habitat for conservation of vertebrates. Some of these species may help suppress agricultural pests.

## Rationale of the Study

The prime focus of wildlife conservation has been on the establishment and protection of national parks, which cover only an estimated 3.2% of world land area (Pimental et al. 1992). Conversely, 95% of the terrestrial environment is used for agriculture, forest plantation and human settlements.

National parks will never adequately represent the full range of habitats for effective wildlife conservation. The focus of conservation efforts therefore should be shifted to private landowners in an agricultural landscape. Initiatives must be taken to improve habitats in farms (e.g. through the establishment of shelterbelts) for the ecosystem services provided by biodiversity to remain viable.

## Objectives of the Study

The major objectives of the research are to:

- Test whether botanical diversity of shelterbelts influences usage by birds and bats; and
- Explore the extent to which birds and bats found in shelterbelts are significant predators of arthropod pests of the trees or adjacent crops/pastures.

## Materials and Methods

- 6 young (5-10 yr old) shelterbelts on farms in Orange, Molong and Cummoock in central NSW were selected.



Lesser Long-eared Bat  
Photo: Nicholas Birks  
(<http://www.nre.vic.gov.au/notes>)

- The sample area was 3,000 m<sup>2</sup> of each shelterbelt.
- A 15-minute area search technique is being used in the survey of birds. Identification of bird species is by sight and call.
- A 15-minute survey of bats is being employed using the AnaBat system to record and identify bat species. Mist netting and harp trapping are being used to trap birds and bats for faecal collection. Faecal materials will be analysed for arthropod prey fragments.
- Diversity indices (Hill's diversity number) will be used to test for correlation between vegetation diversity (trees and shrubs) and the faunal diversity (birds and bats).
- The effect of shelterbelt complexity on bird and bat diversity will be determined using the habitat complexity score (Freudenberger 2001).
- The effect of landscape variables such as isolation, surrounding paddock trees and surrounding water bodies will be measured using topographic maps and GIS tools.

## Preliminary Results

- 51 species of birds were observed to be using the shelterbelts. One species, the diamond firetail (*Emblema gutatta*), listed as vulnerable in NSW and near threatened at the national level, was observed using the shelterbelts in Belgravia.
- 13 possible species of bats were identified using the AnaBat recorder and comparing it to the reference calls released by the NSW NPWS.



The diamond firetail retrieved from mist nets in Belgravia.  
Photo: R Bonifacio

## Conclusion

Preliminary results indicate that shelterbelts do contribute to the conservation of birds and bats as shown by the rich diversity of bats and birds found using them.

The actual services (e.g. commuting corridors, foraging ground and others) provided by shelterbelts to birds and bats will be clarified as data are generated and analysed.

## References

- Freudenberger, D 2001, *Bush for the Birds: Biodiversity enhancement guidelines for the Saltshaker Project, Boorowa, NSW*, Consultancy report to Greening Australia ACT & SE NSW, Inc., CSIRO Sustainable Ecosystems, Canberra, Australia.
- Pimentel, D, Stachow, U, Takacs, DA, Brubaker, HW, Dumas, AR, Meaney, JJ, O'Neil, JAS, Onsi, DE & Cprzilius, DB 1992, Conserving biological diversity in agricultural/forestry systems, *Bioscience*, vol.42, no. 5, pp. 354-362.



Australian Government

Rural Industries Research and  
Development Corporation

## Acknowledgements

This project is funded by RIRDC. The farms included in this study are: Belgravia, Kangarooobie, Hillview, Fernleigh, Killamont, Iona, Inglewood, Geneffe, Merriburra and Kabadah. The authors thank the landowners/farm managers of the above properties.