

## Foreword

Invertebrate pest management is a significant cost to Australian grain production, not only in terms of direct crop damage and control costs, but also indirect costs as vectors for disease. The development of effective insecticide solutions to pest management has revolutionised crop production. However, as a consequence of low cost and effectiveness, the use of prophylactic insecticide applications has become common practice in the grains industry. This practice has led to selective pressure for the development of insecticide resistance for a number of key species such as the redlegged earth mite (*Halotydeus destructor*) where several populations since 2006 have been discovered with resistance to synthetic pyrethroid insecticides. The consequences of insecticide resistance will result in significant increases in costs and reduced crop rotation flexibility in Australian crop production.

To assist the Australian grains industry in managing in-crop pests, the Grains Research and Development Corporation (GRDC) Crop Protection Program is supporting the development of sustainable cost-effective invertebrate pest management strategies through a range of investments, including the development of integrated pest management (IPM) strategies that reduce reliance on the prophylactic use of broad-spectrum pesticides.

The northern region has a strong history of successful IPM research, extension and application across a diverse range of grain crops. To help spread this success and develop parallel models in the other cropping regions, the National Invertebrate Pest Initiative (NIPI) was initiated and supported by growers and the Australian Federal Government through the GRDC.

NIPI, coordinator Dr Gary Fitt, Deputy Chief of CSIRO Entomology, brings together scientists from state government departments, universities, farmer groups and CSIRO to address pest management issues in the Australian grains industry. A central objective of NIPI is the expansion of IPM expertise over a broader range of crops and farming systems.

It is expected that the work of NIPI will result in the production of a set of IPM guidelines for the grains industry that will aggregate past and new research. NIPI is also supporting focused research in south-east Australia and PhD students working on high-priority projects in invertebrate pest management. This program is embracing joint project funding with the cotton and horticultural RDCs to work on relevant, cross-industry issues.

This special issue of the *Australian Journal of Experimental Agriculture*, which has been assembled through the coordination of NIPI, contains 12 papers selected from scientists involved in NIPI and other GRDC funded projects on pest management. These papers provide the reader with a review of recent research and strategic implications for invertebrate pest management in Australian grain production. Papers cover emerging research topics including case studies on IPM systems, the role of beneficial invertebrates in IPM, and managing ecosystem services in broadacre landscapes.

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