I SPY

Insects of Southern Australian Broadacre Farming Systems Identification Manual and Education Resource 2nd Edition

IDENTIFIED

Common pest, beneficial and exotic insects of broadacre crops

NPI
NATIONAL INVERTEBRATE PEST INITIATIVE

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About I SPY

I SPY forms part of the invertebrate identification training package developed for broadacre crops in the southern and western grain belt regions of Australia. I SPY has been developed under the National Invertebrate Pest Initiative (NIPI), a project funded through the Grains Research and Development Corporation (GRDC).

I SPY highlights the importance of insect identification and includes key characteristics used for identification of important insect and other arthropod groups (collectively referred to as invertebrates).

The first three sections of I SPY provide a general introduction and cover basic insect taxonomy, external anatomy, key insect orders and identification keys.

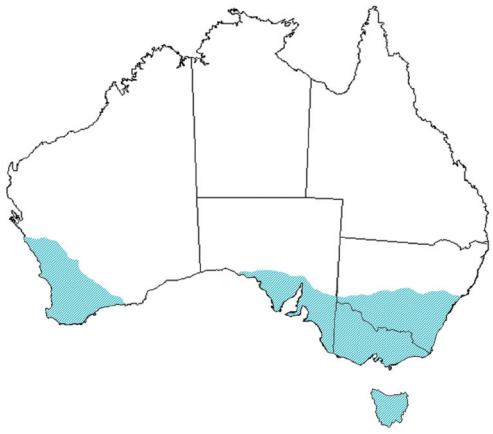
Section four provides detailed information of key invertebrates that are likely to be found in broadacre crops. Each invertebrate group (or relevant species) is covered, with a detailed description of their key characteristics, lifecycle, damage and specific management options that can be employed. This section also covers key biosecurity insect threats, with an emphasis on the diagnostic characters used to differentiate major biosecurity pests from established or native pests.

Integrated pest management (IPM) is discussed in section five. I SPY is not designed as an all encompassing IPM document but rather as a base level manual that introduces the main components, techniques and tools of an IPM program. It outlines management options that can be implemented to assist you to reduce your reliance on broad-spectrum chemicals for pest control in your cropping system. Insecticide modes of action and their impacts on natural enemies are listed, and an IPM decision-making flow chart is presented.

Section six provides information on monitoring, sampling techniques and economic thresholds. A crop monitoring record sheet is also provided, with checklists of insect species by crop type and stage.

Finally, I SPY concludes with a section from Plant Health Australia (PHA) on the significance of biosecurity and surveillance to help support and safeguard our industry for continued market access.

Southern and western regions



Southern Australia includes the southern and western grain growing regions.

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SECTION 1
Introduction

Over 95% of all animals on the earth are invertebrates of one form or another. Invertebrates (animals without backbones) include sponges, corals, sea-stars, insects, mites, spiders, snails, crabs and worms — to name a few. Invertebrates are found in almost all terrestrial and aquatic habitats. Over 80% of all invertebrates are grouped into the single phylum Arthropoda, which includes insects and their allied forms, such as spiders and mites.

The terms invertebrates, insects and arthropods are used interchangeably throughout this manual.

Why do invertebrates become pests?

Many invertebrates are regarded as pests because they can destroy crops and are often costly to control, resulting in significant economic damage.

Invertebrates become pests due to a variety of factors.

- Accidental introduction, e.g. redlegged earth mites from South Africa.
- Native insects adapting to introduced crop plants, e.g. native budworm.
- Changing farming systems, e.g. the use of minimum tillage and increased stubble retention favours the survival of some pests such as weevils.
- Simplified ecosystems/monocultures that favour certain pests and lessen the impact of natural enemies.
- Local climate/seasonal variation that can determine host plant availability and pest population dynamics.
- Chemical performance that can result in secondary pest flare-ups and impact on insecticide resistance.

Why do we need to consider more sustainable management practices?

The long-term prophylactic and routine use of broad-spectrum pesticides in field crops and the over-reliance on chemicals is not a sustainable practice.

Chemical resistance to various insecticide families has already developed in some key pests such as the diamondback moth, corn earworm (cotton bollworm), redlegged earth mite, some aphids and several grain storage pest insects.

This has become a real concern for the grains industry and has highlighted the need to move towards strategic and alternative control options that better target the pests of concern.

Integrating a range of effective and sustainable pest management strategies will remove the reliance on any single method of control in the future.

Why is correct identification and monitoring critical?

- Incorrect identification can lead to costly mistakes. The species you find may be beneficial or of no consequence and regarded as non-target. Once correctly identified, information on the biology, pest status and management can be accurately obtained.
- Correct identification is important for effective control, preventing insecticide misuse and potential increases in incidences of resistance.
- Many pests look similar and can be easily misidentified. For example, redlegged earth mites, blue oat mites, clover mites and Balaustium mites are all similar in appearance and size but they respond differently to insecticides and rates. Misidentification can lead to inappropriate control measures.
- Modified insect behaviour or the introduction of new pests can be recognised early and general awareness and preparedness can be increased.
- Seasonal alerts for irregular and sporadic pests can be given in news outlets such as PestFax/PestFacts.
- Exotic pests can be detected and identified at an early stage.

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Accurate identification, monitoring and recording of pest and beneficial invertebrates are perhaps the most critical skills required to effectively manage pests in a sustainable manner and move towards an integrated management approach. This is the starting point for the I SPY resource manual.

A basic knowledge of the key invertebrate groups (and how to tell them apart) is invaluable when taking those first steps towards correct identification.

I SPY aims to:

- increase awareness and knowledge of major broadacre pest and beneficial species;
- increase the ability of users to identify key invertebrates to order or family level;
- increase familiarity with invertebrate lifecycles and biology;
- increase familiarity with sampling and monitoring techniques as well as record keeping;
- improve understanding of pest control principles;
- increase awareness of the role of biological and cultural pest control;
- increase awareness of biosecurity and surveillance.

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What have I-spyed?

This flow chart can guide you through insect identification using I SPY - either by using the insect identification and plant damage symptom keys or the insect diagnostic features on the species pages.

Have you found an insect? Can you tell if it is a larva or an adult?

No insect but you have damage symptoms to your crop?

If it is a larva, go to **Section 3, page 12**. Here you will find an identification key that will help you identify to order.

If it is an adult, check **Table 3.2** 'Key characters of insects of agricultural importance' on pages 7-11. Here you will find a guide to adult forms of various orders. **Section 3, pages 16 & 17** has keys for adult beetles and moths.

Go to 'Crop Damage Pest Identification Key' in **Section 3**.
Cereals, page 18
Canola, page 20
Pulses, page 22
Pastures & Lucerne, page 24

Follow the page numbers to the order and common species pages.

Refer to key characteristics in the blue boxes on each species page (**Section 4**) to identify your insect. Look for this icon

Found your insect?
Check out the information on monitoring and control.

Go to **Section 5** for IPM information.

Go to **Section 6** for monitoring and economic threshold information.

Not the right insect?
Check the 'Confused with/ or similar to' information on species pages in **Section 4**.

OR

Can you see damage to your crop?

OR

Track down the right insect using the sampling techniques in **Section 6**.

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