APPLE WEEVIL

With a note on garden weevil

Department of
Primary Industries and Regional Development
GOVERNMENT OF WESTERN AUSTRALIA

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Strategic levy investment
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This is No. 6 in a series of 9 tutorials on IPDM in olives

The others are:

1. Principles and practices of Integrated Pest and Disease Management
2. Monitoring for pests, diseases and beneficial species; including symptoms and possible causes, identification/diagnostic services
3. Biosecurity, including pests and diseases not present in Australia
4. Black scale: biology, damage and management
5. Olive lace bug: biology, damage and management
7. Anthracnose: life cycle, conditions conducive, symptomatology and damage, and management
8. Peacock spot: life cycle, conditions conducive, symptomatology and damage, and management
9. Cercospora leaf mould: life cycle, conditions conducive, symptomatology and damage, and management

It is an output from the Hort Innovation project OL17001 An Integrated Pest and Disease Management Extension program for the Olive Industry

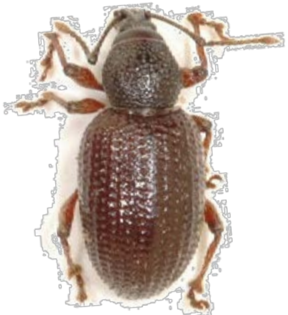
GARDEN WEEVIL, NOT A PEST OF OLIVES?

Garden weevil causes the same damage in olive groves as apple weevil. Because it occurs only occasionally in groves, it is regarded as a minor pest.

APPLE WEEVIL IN OLIVE GROVES

- Damage
- Origin
- Seasonality
- Diurnal behaviour
- Defining the pest status
- Management:
  - Organic
  - “Conventional”
- Summary & Future

DAMAGE TO OLIVES BY APPLE WEEVIL ADULTS

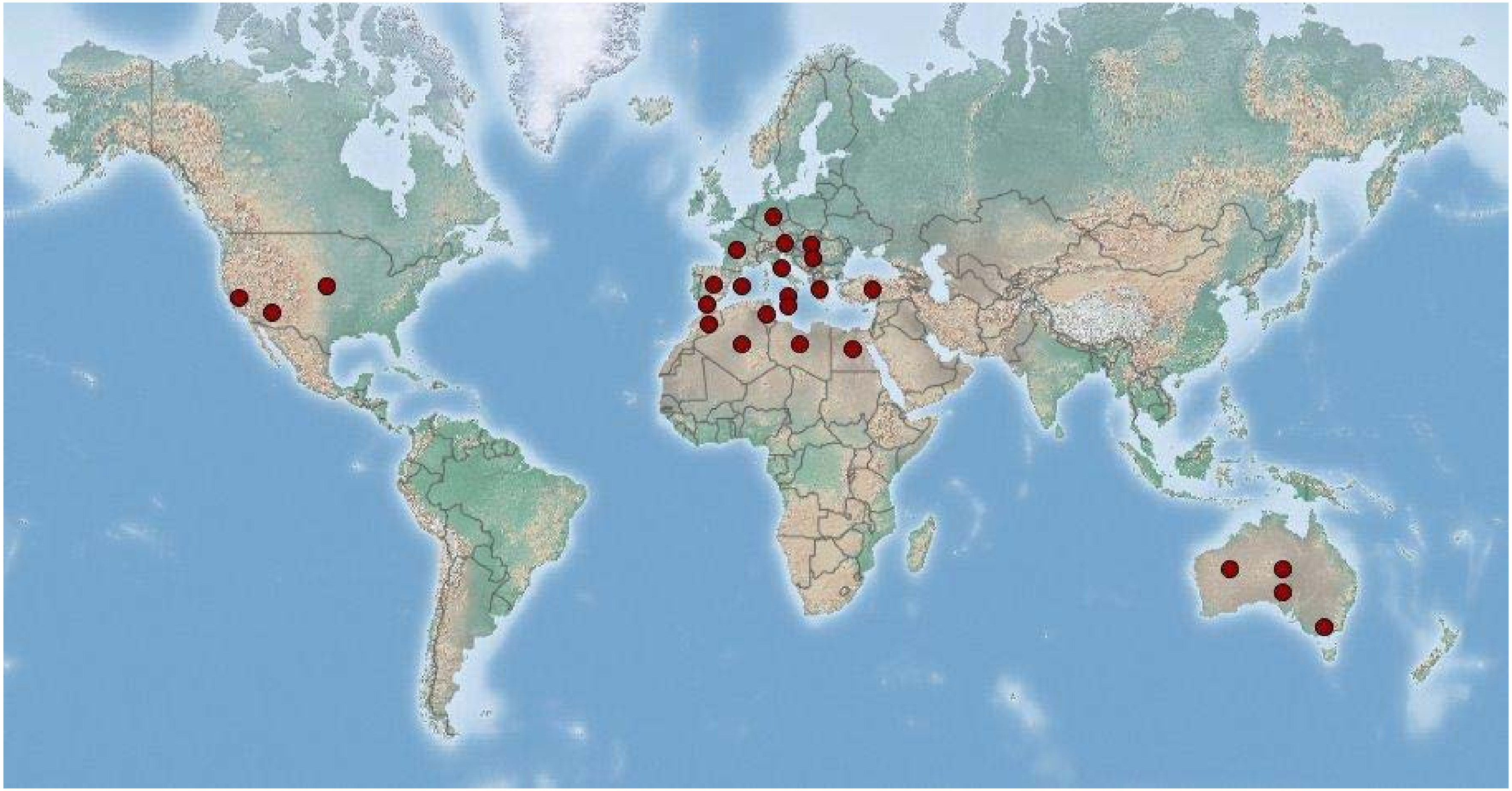


Adults climb trees to chew leaves, with scalloped margins. They also feed on soft bark, growing tips and fruit stalks. Young trees may be killed and mature trees have reduced yield.

DAMAGE TO OLIVES BY APPLE WEEVIL LARVAE

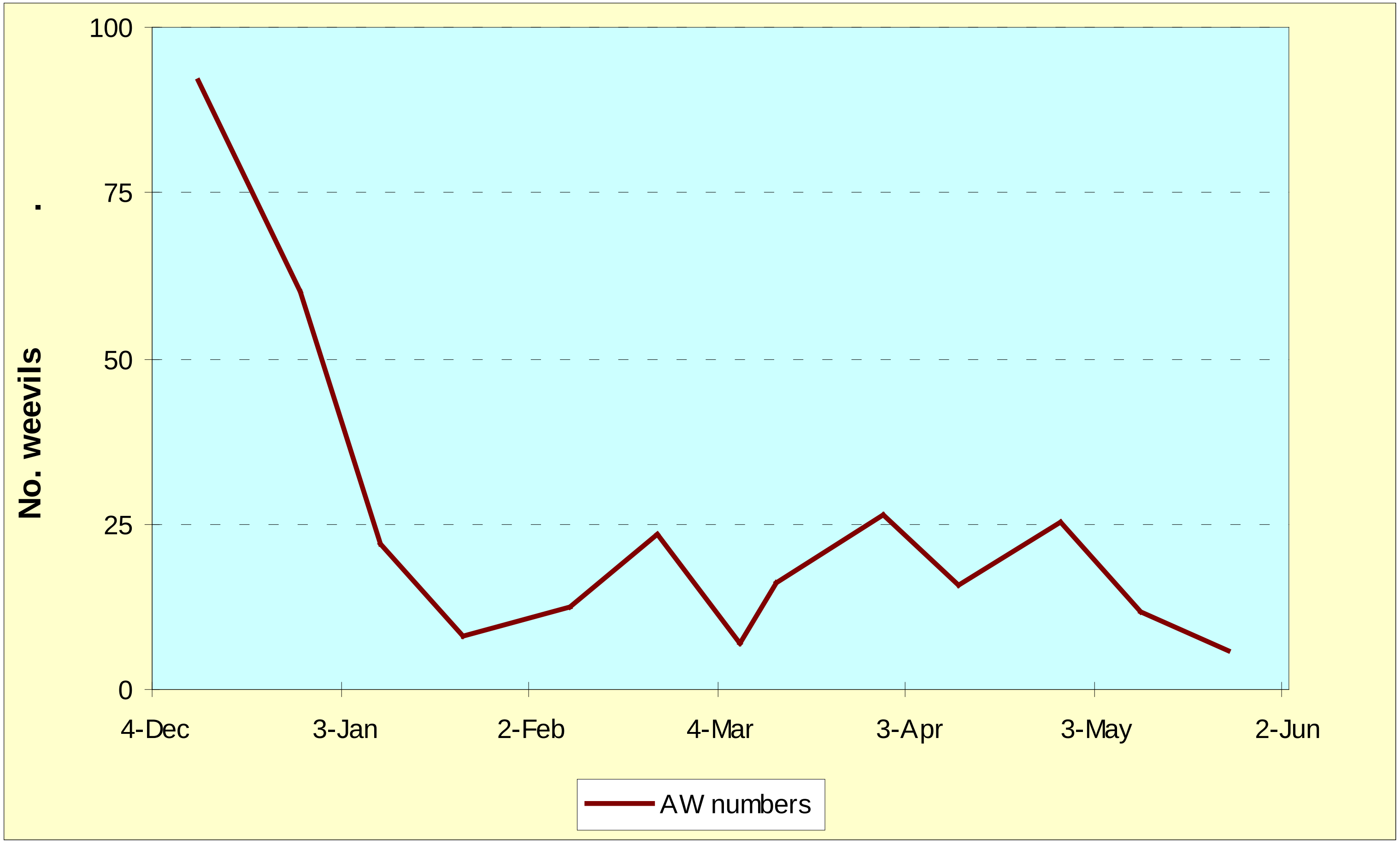
The soil-dwelling larvae are legless grubs with white bodies and brown heads. They feed on plant roots, but there are no reports of adverse effects on olive trees.

APPLE WEEVIL DISTRIBUTION



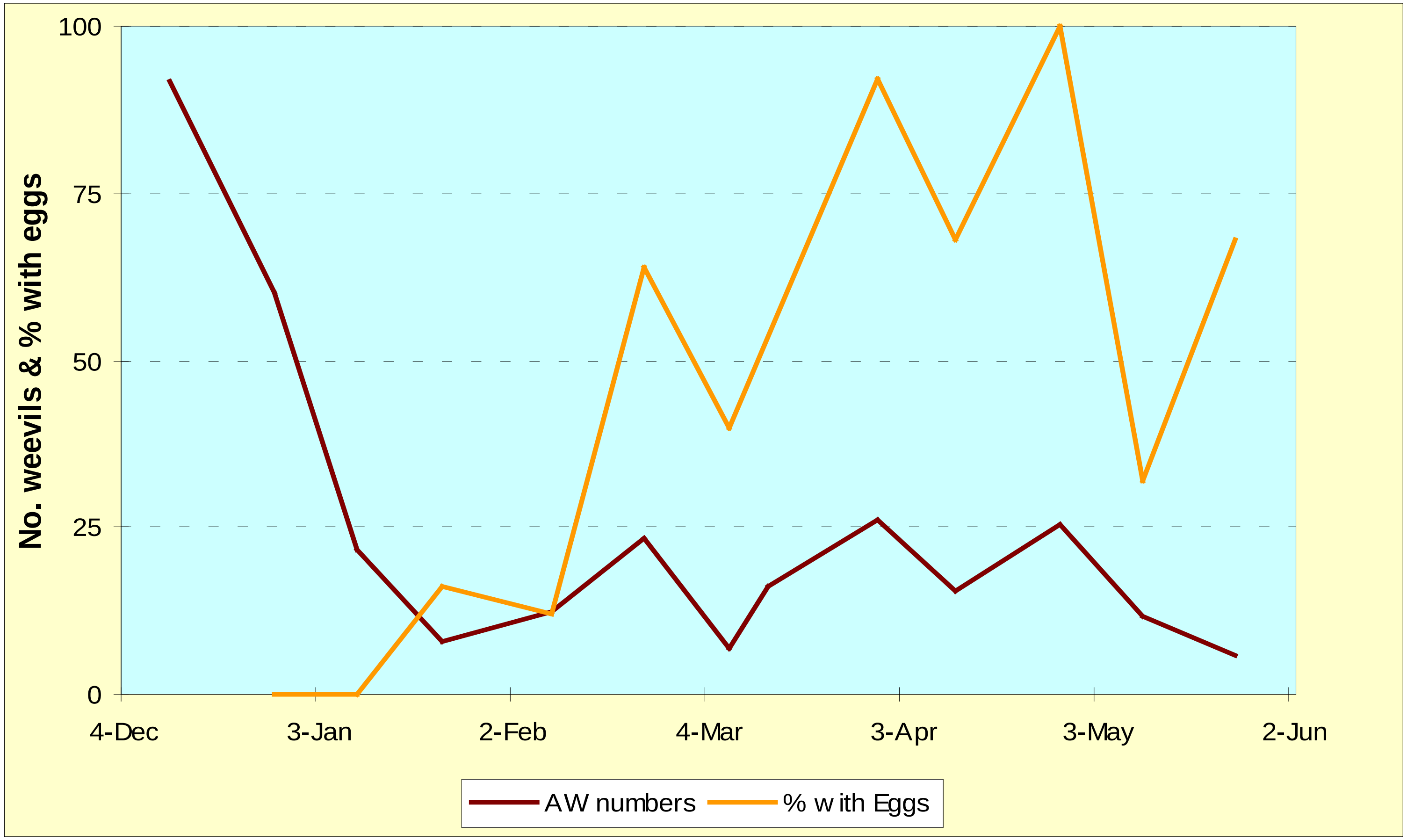
Europe, north Africa, western USA and several states in Australia

SEASONALITY OF ADULT NUMBERS



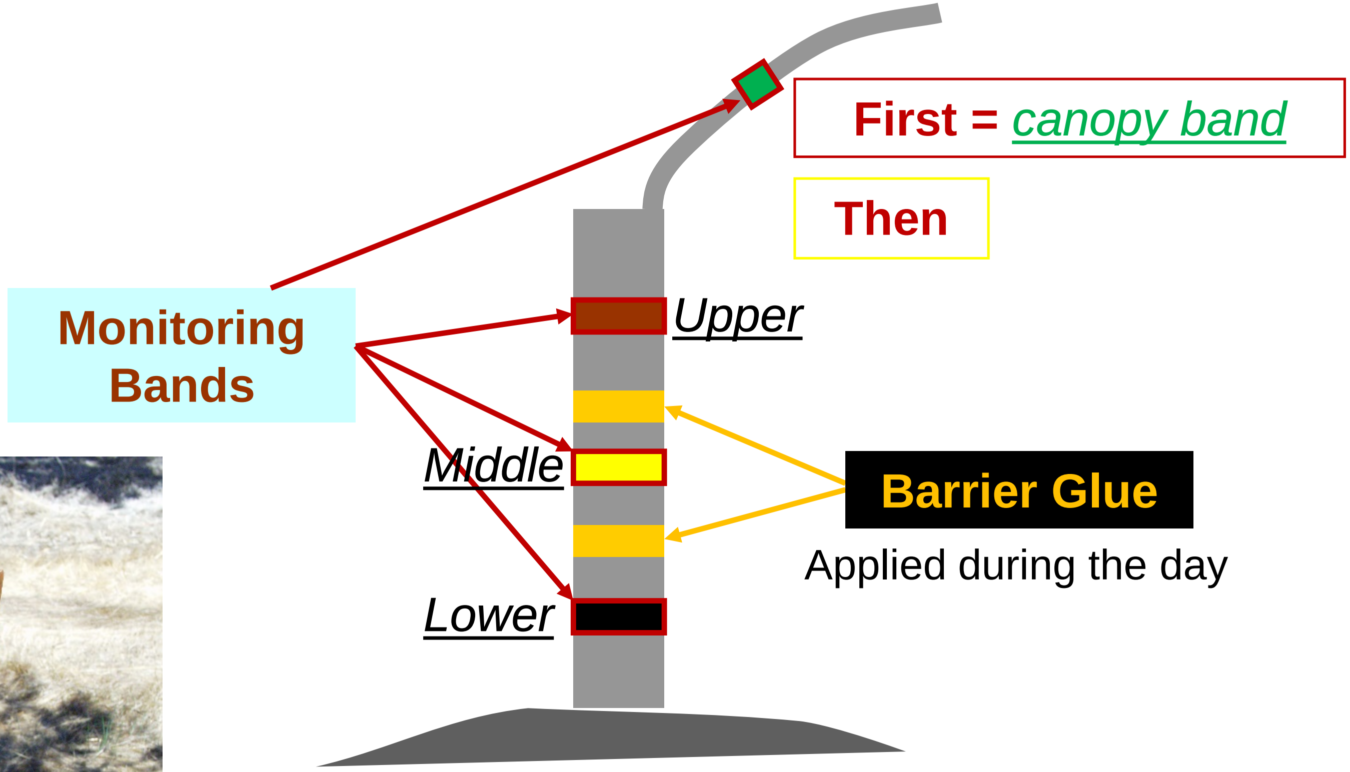
There is one generation per year. Adults emerge from the ground in early summer. They are nocturnal, flightless and covered with short spines. Activity falls in hot weather and adults resume feeding in late summer.

SEASONALITY OF GRAVID ADULTS



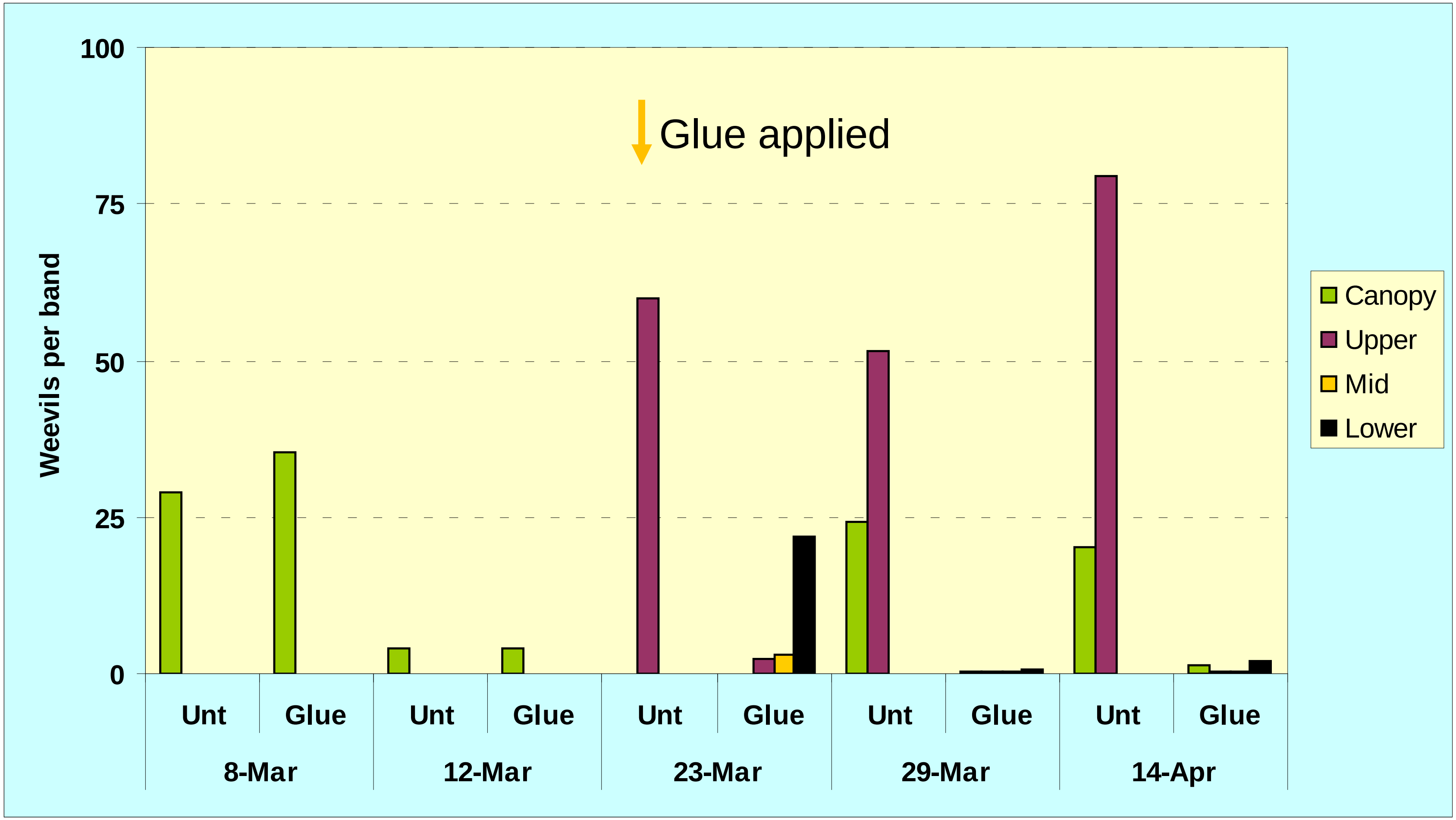
The percentage of females with eggs increases in late summer to late autumn-early winter.

ASSESSING DIURNAL BEHAVIOUR OF ADULT APPLE WEEVILS IN OLIVES



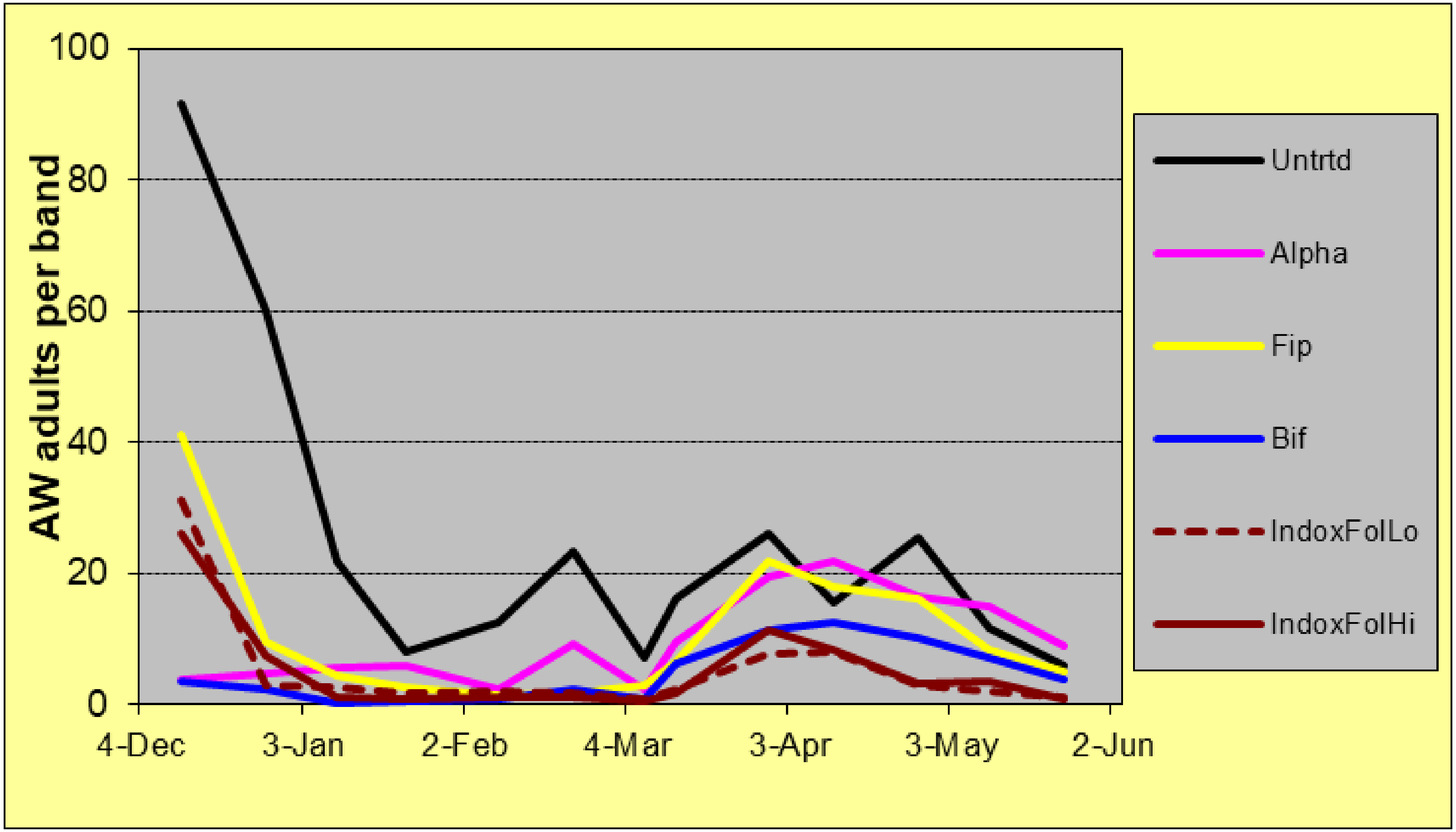
We placed monitoring bands and applied trunk barrier glue as shown in diagram and image.

DIURNAL BEHAVIOUR



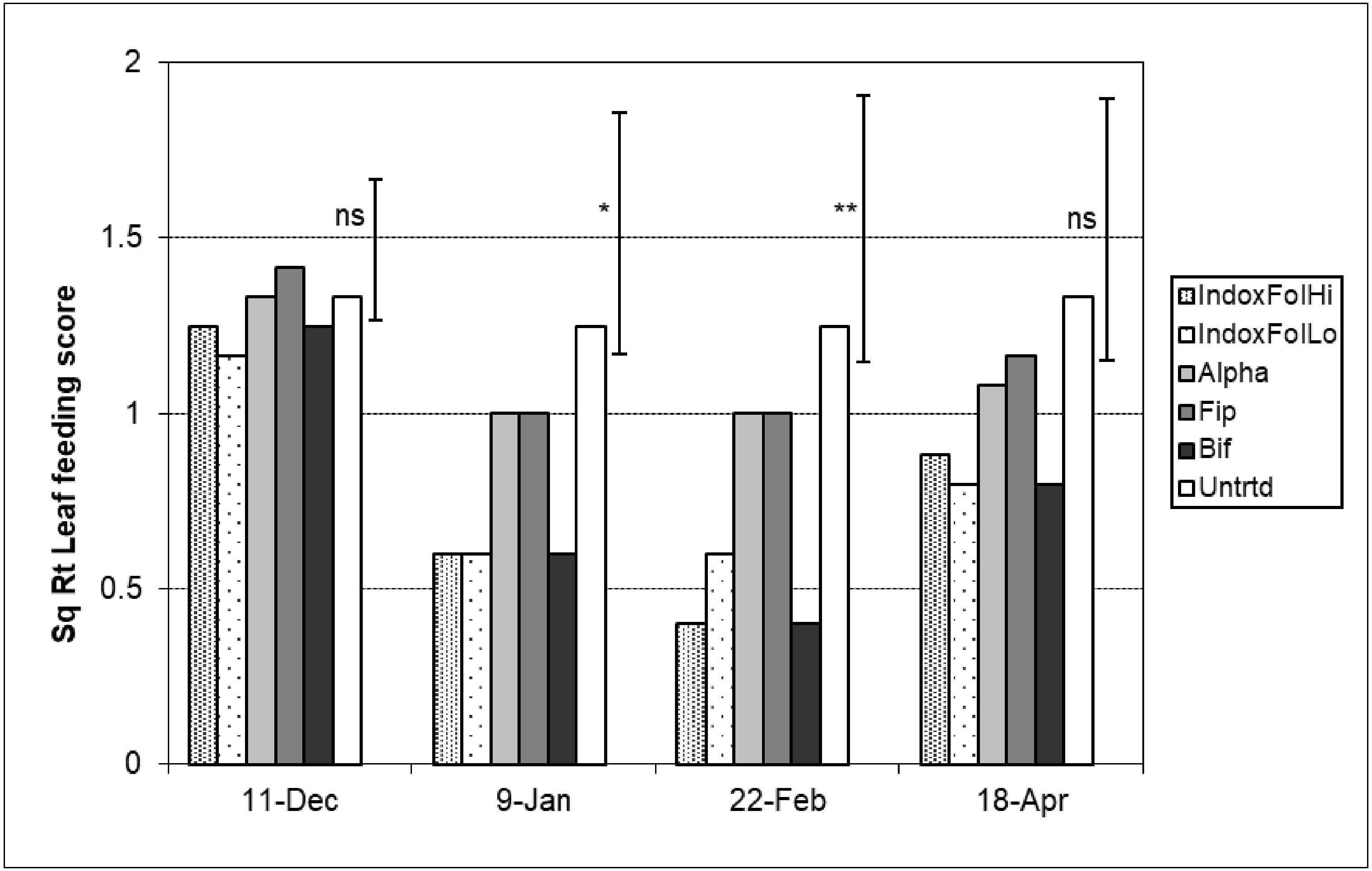
During the day, weevils normally burrow into soil or, if present, shelter in monitoring bands. The trunk barrier glue restricted movement up the trunk to mid, upper and canopy bands.

DEFINING THE PEST STATUS – EFFECT OF INSECTICIDE TREATMENTS



Application of insecticide as a trunk drench (Alpha, Fip and Bif) or foliage spray (Fol) reduced the numbers of weevils in trees compared to no application (Untrtd).

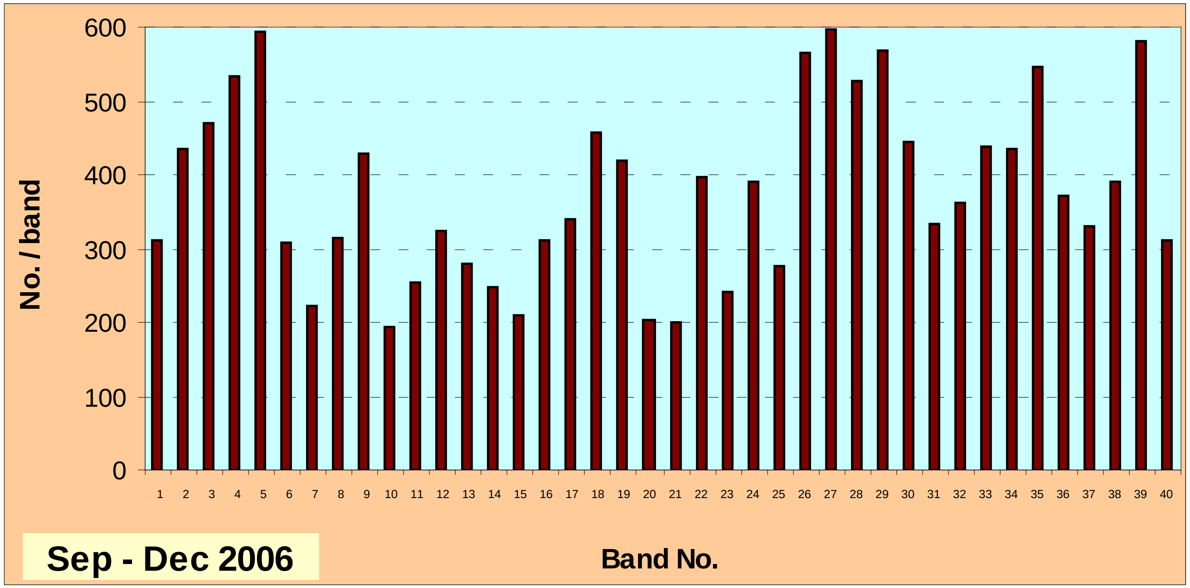
DEFINING THE PEST STATUS- LEAF FEEDING



Application of insecticide as a trunk drench (Alpha, Fip and Bif) or foliage spray (Fol) reduced leaf damage significantly on two occasions compared to no application (Untrtd).

DEFINING THE PEST STATUS- FRUIT DAMAGE

- **<u>Minor</u>** in the trial sites
- Weevils initially feed on **<u>new growth</u>** – away from fruit
- Fruit loss could be **<u>high as the season progresses</u>** in groves with high weevil numbers that can occur



MANAGEMENT: Organic

We compared:

- ✗ **Surround**
- ✗ **Barrier Glue**
- ✗ **Teflon**
- ✓ **Baked artificial fibre trunk bands**
- ✓ **Unbonded artificial fibre trunk bands**
- ✓ **Unbonded fibre + sprays:**
  - ✓ **Chilli**
  - ✓ **Pyrethrum**
  - ✗ **Azamax**
  - ✗ **Abrade**

✓ Efficacious treatments are ticked

MANAGEMENT: Conventional

We compared:

Trunk drench

- ✓ **alphacypermethrin**
- ✓ **bifenthrin**
- ✓ **fipronil**

higher rates were better

Foliar sprays

- ✓ **indoxacarb**
- ✓ **cyazypyr**

✓ Efficacious treatments are ticked

SUMMARY & FUTURE

- Apple weevil adults move in & out of trees daily
- Control in mid to late summer of egg laying weevils is strategic for the longer term
- Improve fibre band efficacy with sprays of chilli or pyrethrum
- Trunk drench insecticide registrations:
    - alphacypermethrin & higher rate
    - Investigate other synthetic chemicals
- Foliage insecticide:
    - Minor use permit for indoxacarb
    - More work with cyazypyr/chlorantraniliprole
- Weevil movement studies & novel control strategies
- Manage larvae – biocontrol with micro organisms
- Review AW management – Europe; USA

REVIEW QUESTIONS

- Q1: How can apple weevil adults be confirmed as the cause of feeding on green bark and scalloped leaves of olive trees?
- Q2: Why do apple weevil adults get trapped in fibre bands placed around the trunks of olive trees?
- Q3: What are the two methods of insecticide application that protect olive trees from damage by apple weevil adults?
- Q4: Why is control of apple weevil adults most strategic after mid summer despite most weevils emerging in early summer?

ANSWERS

- Q1: Apple weevil adults can be observed directly feeding in the canopy of olive trees at night, During the day, single faced cardboard trunk bands can be used to monitor adults or examine the soil around the base of damaged trees.

- Q2: Unlike many other species of pest weevils, apple weevil adults are covered in short spines that trap them in fibre bands.

- Q3: Because apple weevil adults burrow near the base of olive trees, a trunk drench will help control them. Also, adults can be controlled by applying insecticide to the canopy of trees.

- Q4: Adults emerge in early summer, but they do not start laying eggs until mid to late summer. So the next generation of the insects will be reduced if management of these egg laying weevils is undertaken later in the season.

QUESTIONS TO CONSIDER AFTER READING THIS TUTORIAL

- Is apple weevil causing damage to your trees? Young trees can suffer severe damage by low numbers, but mature trees may be able to tolerate some feeding?

- If you are uncertain about the level of damage, protect some trees in a known infested area and compare with nearby trees with no protection – both for the abundance of weevils using trunk bands and the level of tree vigour and fruit loss.

- Depending on the level of damage and whether organic control is preferred, consider the extra cost of implementing physical control such as trunk bands over applying insecticide, especially if the infestation is localised.

CONTRIBUTIONS MADE BY THE FOLLOWING ARE GRATEFULLY ACKNOWLEDGED

GOVERNMENT OF WESTERN AUSTRALIA
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AgriFutures Australia

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Visit dpird.wa.gov.au

Hort Innovation
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For more information on the fund and strategic levy investment visit horticulture.com.au