

Pests of Pome and Stone Fruit and their Predators and Parasitoids

A Pocket Guide



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AGRICULTURE  VICTORIA



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INTRODUCTION

This guide is intended to assist in the identification of pest and beneficial insects and mites found in orchards. The first visible sign of pest activity is usually plant damage such as; fruit with bored holes, leaves rolled or webbed together, or trunks with lumpy galls.

Damage is usually characteristic of particular pests, for which a key is provided within this guide. When damage is noticed, it is important to find and identify the pest, as control strategies for different insects vary. Pests will occur either as immature (e.g. grubs or caterpillars), or as adults (e.g. weevils and beetles). Keys to both of these stages are provided.

The pest species in this guide are represented by specimen records from Victoria (unless indicated by an asterisk (*) in individual species pages). For further information and details about the Australian distribution of these species, refer to the Australian Plant Pest Database (APPD) available through Plant Health Australia.

Website:  planthealthaustralia.com.au

Email:  appd@phau.com.au



INTRODUCTION

Also included in this guide are beneficial insects and mites that are valuable for pest management. At the rear of the guide are colour photographs of each of the species included in the keys that can be used to confirm identity. If in doubt, specialist entomologists should be consulted for confirmation.

For the purpose of this book, pome fruit includes apple, pear and quince; stone fruit includes apricot, cherry, nectarine, peach, plum, etc.

Things to consider when identifying insects and mites

- Some insects or mites change in appearance as they develop. You need to know all life stages of the pest or its predator / parasitoid.
- It is important to know how to distinguish between male and female as sometimes they look very different.
- Usually you will need a 10 X magnification hand lens to see mites and thrips.



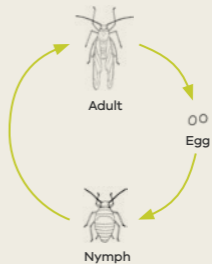
Life Cycles

- Most insects and mites go through a number of different life stages – some are said to have incomplete life cycles where the young usually look similar to adults. Others are said to have complete life cycle where they undergo large changes in appearance.

INCOMPLETE LIFE CYCLE

Examples

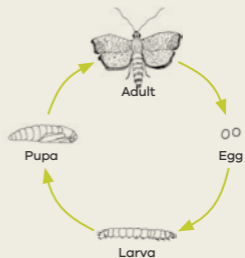
- Two-Spotted Spider Mite
- Predatory Mite
- Apple Dimpling Bug
- Longtailed Mealybug
- European Earwig
- Aphid



COMPLETE LIFE CYCLE

Examples

- Codling Moth
- Fuller's Rose Weevil
- Ladybird Beetle
- Parasitic Wasp
- Hover Fly
- Lacewing





How do you know you have an adult

Adult insects usually have wings.



Moth



Fly



Beetle



Winged Aphid



Weevil



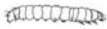
Bug



Grasshopper

Immature insects don't have wings.

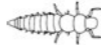
Nymphs appear like miniature adults. Larvae have soft, wormlike bodies with or without legs. Larvae of moths are caterpillars, larvae of flies are maggots, and larvae of beetles and weevils are grubs.



Caterpillar



Weevil Grub



Ladybird Grub



Nymph



Fruit Fly Maggot



Pear And Cherry Slug

Mites don't have wings.



Two-Spotted Spider Mite



Blister Or Rust Mite



Tydeid Mite





IDENTIFICATION KEYS

How to use Identification Keys

Below is an example of a typical key found in this guide. Each step in the key is numbered and consists of at least two parts. You should read each part and then decide which one best describes your specimen and follow the instructions given.

If your specimen is a moth,
go to this species key

Step number	Illustration of Character
<p>1. Wings covered in overlapping scales – Moths</p> <p>➤ See Key 6</p>	
<p>Wings bare or hairy, never with scales</p> <p>➤ Go to 5</p>	
<p>2. Hindlegs with enlarged thighs – Crickets and Grasshoppers</p> <p>➤ See colour section page 63</p>	

If specimen has this character, go to this step

Page on which photo of this species appears

Second half of step
with alternate character



Which Identification Key to use

If you have an insect
or mite specimen

▶ Answer question A below.

If you have
plant damage

▶ Go to Key 10

A. Does the specimen have wings?

Yes ↓

No ▶ go to B

Go to Key 1 or follow options below

Is it a beetle or weevil?

No ↓



Yes ▶ go to Key 4

Is it a fly?

No ↓



Yes ▶ go to Key 5

Is it a moth?

No ↓



Yes ▶ go to Key 6

Is it a bug or aphid?

No ↓



Yes ▶ go to Key 7

Is it a lacewing?

No ↓



Yes ▶ go to Key 8

Is it a wasp or sawfly?

No ↓



Yes ▶ go to Key 9

Other insect?

▶ go to Key 1



B. Which Identification Key to use

Is the specimen a larva?
(grub, caterpillar
or maggot)

No ↓



Yes → go to Key 2

Is it a mite?

No ↓



Yes → go to Key 3

Is it a bug, aphid,
mealybug or scale?

No ↓



Yes → go to Key 7

Is it elongated, with
pincer-like forceps
on the end of the
abdomen?

No ↓



**Yes → see colour
section page 73**

Is it elongated, yellowish
and smaller than 2mm?

No ↓



**Yes → see
colour section
page 71,72**

Does it have hind legs
with enlarged thighs
for jumping?



**Yes → see
colour section
page 74,75**



KEY 1

Adult insects

1. With hard wing covers in place of fore-wings. Wing covers completely or partly cover the abdomen and meet in a straight line down the middle of the body

➤ [Go to 2 below](#)

Fore-wings not modified as wing covers. If fore-wings are thickened, then they are still flexible and do not meet in a straight line

➤ [Go to 3 below](#)

2. Abdomen with prominent, pincer-like forceps at end – Earwigs

➤ [See colour section page 73](#)

Abdomen without forceps – Beetles and Weevils

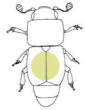
➤ [See Key 4](#)

3. One pair of wings present, hind wings reduced to tiny club-like structures – Flies

➤ [See Key 5](#)

Two pairs of wings present, hind wing may be concealed beneath protective forewings

➤ [Go to 4](#)





KEY 1

4. Wings covered in overlapping scales.
Scales are flat hairs on wings – Moths

➤ [See Key 6](#)

Wings bare or hairy, never with scales

➤ [Go to 5 below](#)



5. Hindlegs with enlarged thighs for jumping
– Crickets and Grasshoppers

➤ [See colour section pages 74, 75](#)

Hindlegs not modified for jumping

➤ [Go to 6 below](#)



6. Insects smaller than (<) 2 mm, long thin body and with hair-fringed wings. Usually yellow or grey brown, found in flowers or petals or on maturing fruit. You will need 10 X magnification to see thrips – Thrips

➤ [See colour section pages 71, 72](#)

Insects usually larger than (>) 2 mm,
and without hair-fringed wings

➤ [Go to 7](#)





KEY 1

7. Mouthparts with chewing jaws

➤ [Go to 8 below](#)



Mouthparts not with chewing jaws, but forming a cylindrical, sucking tube beneath head

– Aphids, Scales, Mealybugs, Bugs.

➤ [See Key 7](#)



8. Wings with many veins and crossveins, forming a close network over some or all the wing surface. Wings like cellophane lace – Lacewings

➤ [See Key 8](#)



Wings with large spaces between veins
– Wasps and Sawflies

➤ [See Key 9](#)





KEY 2

Larvae of Moths, Beetles and Weevils, Flies, Sawflies and Lace Wings

1. Larvae dark green to orange, slimy slug-like up to 13 mm long, with head (or front) end of body wider than rest of body. Feeding on upper surfaces and skeletonising leaves
– Pear and Cherry Slug



➤ [See colour section page 99](#)

Larvae not as above

➤ [Go to 2 below](#)

2. Larvae without any legs

➤ [Go to 3 below](#)



Larvae with legs

➤ [Go to 7](#)



3. Head not distinct, body gradually pointed towards front end – Fly maggots

➤ [Go to 4](#)



Head distinct. Body not pointed towards front end

➤ [Go to 5](#)



KEY 2

4. Fully grown maggots about 5 mm long.
Usually in decaying fruit – Ferment Fly

➤ [See colour section page 79](#)



Fully grown maggots about 9 mm long
with creamy white cylindrical body.
In fruit – Fruit Fly

➤ [See colour section page 78](#)



Fully grown maggot larger than 9 mm
with dark flattish body. Usually light green
with dorsal stripe. Predator on aphids
and mites – Hover Fly

➤ [See colour section page 80](#)

5. Fully grown larvae 15 – 20 mm long,
white to yellow. In clay cell in soil
– Fruit-tree Root Weevil

➤ [See colour section page 90](#)

Fully grown larvae smaller than 15 mm.
Not in clay cell in soil

➤ [Go to 6](#)



KEY 2

6. Larvae creamy white with yellow-orange heads and long body hairs
– Garden Weevil or Apple Weevil

➤ See colour section pages 89, 92

Larvae not as above – All other weevils

➤ See colour section pages 88, 90, 91, 92

7. Larvae with long slender conspicuously projecting jaws. Predatory

➤ Go to 8 below

Larvae with simple jaws
(i.e. not conspicuously projecting)

➤ Go to 9



8. Larvae with long body hairs. Larvae carry debris – Green Lacewing

➤ See colour section page 76

Larvae with short body hair. Larvae do not carry debris – Tasman's Lacewing

➤ See colour section page 77



KEY 2

9. Larvae without distinct false legs

➤ [Go to 10 below](#)



Larvae with distinct false legs

➤ [Go to 15](#)



10. Larvae up to 7 mm long, yellowish, slender with light brown head and forked tail
– Driedfruit Beetle (Carpophilus Beetle)

➤ [See colour section page 94](#)

Larvae not as above

➤ [Go to 11 below](#)

11. Larvae creamy coloured. Make galleries in wood – Fruit-tree Pinhole Borer

➤ [See colour section page 95](#)

Larvae not as above – Predatory

➤ [Go to 12 below](#)

12. Larvae covered with white mealy material and long marginal hairs, so they may be mistaken for mealybugs
– Mealybug Ladybird

➤ [See colour section page 98](#)

Larvae not as above

➤ [Go to 13](#)



KEY 2

13. Larvae small (1 – 2 mm). Body pale with hairs and darker markings – Mite-eating Ladybird

➤ [See colour section page 96](#)

Larvae large (> 4 mm).
Body colour not as above

➤ [Go to 14 below](#)

14. Body lightly or often darkly pigmented, and covered with fine velvety pile – Plague Soldier Beetle

➤ [See colour section page 96](#)

Body dark brown with white patches across base of abdomen – Common Spotted Ladybird OR Transverse Ladybird

➤ [See colour section page 97](#)

15. Fully grown larvae brownish, about 40 mm long, densely covered with brown hairs with four tufts or “brushes” of white hairs on its back, and pair of black horn-like tufts projecting from its head – Painted Apple Moth

➤ [See colour section page 87](#)

Larvae not as above

➤ [Go to 16](#)



KEY 2

16. Larvae range in colour from greyish-white, yellowish to pale brown and may be mottled with brown and dark grey. Larvae move with a characteristic looping of the body – Loopers

➤ [See colour section page 85](#)

Larvae not as above

➤ [Go to 17 below](#)

17. Larvae large, 40 – 50 mm long, variable in colour from yellow, various shades of green to brown; black or brown broad and narrow longitudinal stripes often with a broad white stripe along each side of the body – Budworms

➤ [See colour section page 83](#)

Larvae small, up to 20 mm long, (if larger, live in tunnel in trunk). Larvae inside folded leaf or between fruit / leaf or borers living under frass

➤ [Go to 18](#)



KEY 2

18. Very active light green larvae with brown head, up to 20 mm long. Larvae inside folded leaf or between leaves, fruit or fruit / leaf, leaves often skeletonised – Light Brown Apple Moth

➤ [See colour section page 84](#)

Larvae not as above

➤ [Go to 19 below](#)

19. Second year larvae white or reddish brown, up to 40 mm long, in tunnels in trunk. First year larvae slender, greyish, dark headed, up to 20 mm long, in shallow workings under bark – Fruit-tree Borer

➤ [See colour section page 82](#)

Larvae not as above.

Larvae in fruit or twigs

➤ [Go to 20](#)



KEY 2

20. Larvae pinkish-white with mottled brown head, up to 20 mm long (small larvae may have black heads). Feeding inside fruit and on seeds. No anal comb* – Codling Moth

➤ [See colour section page 81](#)

Larvae cream to pale pink, up to 12 mm long. Feeding in twigs or boring in fruit. Anal comb* – Oriental Fruit Moth

➤ [See colour section page 86](#)

(*you need 30 – 40 X magnification to see anal comb)

Comb



Magnified
Comb





KEY 3

Mites

1. Minute (< 0.2 mm) mites with wormlike body and white or yellow colour. Usually you need 20 X magnification to see these mites

➤ [Go to 2 below](#)



Usually larger (> 0.2 mm) mites with globular or oval body of varying colour

➤ [Go to 3 below](#)



2. Mites sheltering under bud scales in winter or forming reddish brown blister like galls on leaf – Pearleaf Blister Mite

➤ [See colour section page 53](#)

No blisters – Peach Silver Mite
OR Apple Rust Mite

➤ [See colour section page 52](#)

3. Body pale green or greenish yellow with a dark spot on each side of body unless overwintering. Overwintering stages orange and inactive – Two-Spotted Spider Mite

➤ [See colour section page 56](#)

Body colour not as above

➤ [Go to 4](#)



KEY 3

4. Body reddish brown to greenish grey, legs orange, front legs much longer than other legs and carried forward in front of head – Bryobia Mite

➤ [See colour section page 54](#)

Not as above

➤ [Go to 5 below](#)

5. Body dark red (males paler) with white spots at the base of six to eight hairs on the back – European Red Mite

➤ [See colour section page 55](#)

Not as above

➤ [Go to 6 below](#)

6. Minute mites (0.1 mm) with golden yellow, shiny elliptical body – Tarsonemid Mite

➤ [See colour section page 59](#)



Larger mites (> 0.2 mm) with colour not as above

➤ [Go to 7](#)



KEY 3

7. Plant inhabiting mites.
Small (0.2 – 0.3 mm) mites

➤ [Go to 8 below](#)

Predatory mites. Larger (> 0.3 mm) mites

➤ [Go to 9 below](#)

8. Body dull orange, cream or brownish with a pale stripe running down the centre of the back. Diamond-shaped body
– Tydeid Mites

➤ [See colour section page 59](#)

Body usually reddish with patterns of dark pigmentation, and flat appearance somewhat resembling spider mites
– False Spider Mites

➤ [See colour section page 59](#)

9. Body pear shaped

➤ [Go to 10](#)

Body not pear shaped

➤ [Go to 11](#)





KEY 3

10. Body smooth and shiny. [Predator on European Red Mite] – Predatory Mite

➤ [See colour section page 58](#)

Body sheen, with dull frosted appearance – Western Predatory Mite

➤ [See colour section page 58](#)

11. Body egg-shaped, about size of Two-Spotted Spider Mite, translucent – Victorian Predatory Mite

➤ [See colour section page 57](#)

Body spherical, larger than Two-Spotted Spider Mite, reddish, fast moving – Chilean Predatory Mite

➤ [See colour section page 57](#)



KEY 4

Adult Weevils and Beetles

1. Head with prominent snout – (Weevils)

➤ [Go to 2 below](#)



Head without prominent snout
– (Beetles)

➤ [Go to 6](#)



2. Large (about 20 mm) buff-grey hard-backed weevils – Fruit-tree Root Weevil

➤ [See colour section page 90](#)

Small to medium (< 15 mm) weevils

➤ [Go to 3 below](#)

3. Weevils with a faint white crescent-shaped mark on each side of wing covers
– Fuller's Rose Weevil

➤ [See colour section page 91](#)

Not as above

➤ [Go to 4](#)



KEY 4

4. Body with curved sides and a pale V mark at rear. Small (6 – 7 mm) weevils.
– Garden Weevil

➤ [See colour section page 92](#)

Body not as above. Large (> 7 mm) weevils

➤ [Go to 5 below](#)

5. Body 12 – 15 mm long with broad white marks along its sides
– Whitefringed Weevil

➤ [See colour section page 93](#)

Body 7 – 10 mm long with grey brown or black body and wings

– Apple Root Weevil or Apple Weevil

➤ [See colour section pages 88, 89](#)

6. Beetles with black head, bronze green or olive green wings and yellow abdomen
– Plague Soldier Beetle

➤ [See colour section page 96](#)

Not as above

➤ [Go to 7](#)



KEY 4

7. Beetles with cylindrical dark brown body covered with yellowish hairs and a "tucked-in" head – Fruit-tree Pinhole Borer

➤ [See colour section page 95](#)

Not as above.

➤ [Go to 8 below](#)

8. Thickset beetles about 3 mm long with shortened wing covers – Driedfruit Beetle (Carpophilus Beetle)

➤ [See colour section page 94](#)

Not as above. [Predatory beetles]

➤ [Go to 9 below](#)

9. Beetles with uniformly black wing cases

➤ [Go to 10](#)

Beetles with spotted wing cases

➤ [Go to 11](#)



KEY 4

10. Tiny (< 2 mm) beetles
– Mite-eating Ladybird

➤ [See colour section page 96](#)

Larger (about 3.5 mm) beetles
– Mealybug Ladybird

➤ [See colour section page 98](#)

11. Wing covers orange to yellow-brown
with 18 blackish spots
– Common Spotted Ladybird

➤ [See colour section page 97](#)

Wing covers orange to yellow-brown
with 2 blackish transverse bands
– Transverse Ladybird

➤ [See colour section page 97](#)



KEY 5

Adult Flies

1. Fly smaller than 4 mm. [Fly dark brown]
– Ferment Fly, Vinegar Fly

➤ [See colour section page 79](#)

Fly larger than 5 mm

➤ [Go to 2 below](#)

2. Fly reddish brown with yellow markings.
Female has a pointed abdomen with a
needle sharp retractable egg-laying organ
(ovipositor) at the tip. Fly about 7 mm long
– Queensland Fruit Fly

➤ [See colour section page 78](#)

Fly yellowish with black body markings,
wings mottled with distinct brown bands
extending to the wing tips. Fly about 5 mm
long – Mediterranean Fruit Fly

➤ [See colour section page 78](#)

Fly colour not as above. Female has
broadly rounded abdomen. Fly larger
than 7 mm – Hover Fly

➤ [See colour section page 80](#)



KEY 6

Adult Moths

1. Large moths, about 60 mm across outspread wings, satiny white forewings and darker hindwings – Fruit-tree Borer

➤ [See colour section page 82](#)

Small moths, less than 50 mm across outspread wings, colour variable

➤ [Go to 2 below](#)

2. Buff moth with a wing span of about 18 mm for female and slightly less for male. Viewed from above, moth at rest is bell shaped. Males have two tone colour – Light Brown Apple Moth

➤ [See colour section page 84](#)

Moths not as above

➤ [Go to 3](#)



KEY 6

3. Female moth wingless, thickly covered with short, brown hairs; male measures about 25 mm across outspread wings, dark brown forewings marked with black, and orange hindwings with a broad black outer band – Painted Apple Moth

➤ [See colour section page 87](#)

Moths not as above

➤ [Go to 4 below](#)

4. Moths large, with wingspan of about 40 mm, varying in colour but generally buff to reddish brown with darker markings on forewings and a black area on the outer margin of hindwings – Budworms

➤ [See colour section page 83](#)

Moths smaller, with wingspan < 20 mm

➤ [Go to 5](#)



KEY 6

5. Greyish-brown moth about 18 mm across the outspread wings with a conspicuous bright copper patch at tip of each forewing – Codling Moth

➤ [See colour section page 81](#)

Greyish moths about 12 mm across the outspread wings, front margins of forewings have narrow light or white bars – Oriental Fruit Moth

➤ [See colour section page 86](#)

Greyish moths 16 – 18 mm across the outspread wings with dark grey and black markings on wings – Apple Looper or Twig Looper

➤ [See colour section page 85](#)



KEY 7

Bugs, Aphids, Scales and Mealybugs

1. Active insects. Forewings when present overlapping flat over the body when folded, partly hard or leathery but with soft tips

➤ [Go to 2 below](#)



Sluggish insects. Forewings when present not overlapping when folded

➤ [Go to 5](#)



2. Large insects (adults 12 mm, nymphs 8 mm) with shoulders pointed sideways. Nymphs dark red and brown. Predators – Spined Predatory Shield Bug

➤ [See colour section page 70](#)

Small insects (< 5 mm), not as above. Mainly plant feeding

➤ [Go to 3 below](#)

3. Silvery-brown insects about 5 mm long – Rutherglen Bug

➤ [See colour section page 69](#)

Pale to dark green insects of variable size, 2 – 8 mm.

➤ [Go to 4](#)



KEY 7

4. Pale green insects about 2 – 3 mm
– Apple Dimpling Bug

➤ [See colour section page 67](#)

Pale to yellow green insects about
5 – 8 mm – Green Mirid

➤ [See colour section page 68](#)

5. Adult female 5 mm oval, flattened insect
covered with white waxy substance
and may have long filamentous tail.
[Very small 0.5 – 2.0 mm pink crawlers
dispersing over twigs, leaves and fruits]
– Longtailed Mealybug

➤ [See colour section page 66](#)

Otherwise

➤ [Go to 7](#)

6. Fleshy insects covered with scales
or woolly material

➤ [Go to 7](#)

Free-living insects, not covered with
scales or woolly material, body with
a pair of tubes near rear end

➤ [Go to 9](#)



KEY 7

7. Females purplish-brown sluggish insects covered with white woolly material massed in colonies on lateral growth and on older wood, produce large quantities of sticky secretion ('honey dew')
– Woolly Aphid

➤ [See colour section page 63](#)

Not as above

➤ [Go to 8 below](#)

8. Small grey, brownish grey or almond black scales about 2 mm across, each with a central nipple, on twigs and fruit (if larger greyish scales on bark are lifted, a lemon-yellow soft-bodied creature nearly the size of a pinhead will be found underneath) – San José Scale

➤ [See colour section page 65](#)

Brown convex scales on undersides of twigs increasing rapidly in size to 5 mm diameter and becoming covered with white mealy secretion to give frosted appearance – Frosted Scale

➤ [See colour section page 64](#)





KEY 7

9. Shiny black aphids with large quantities of sticky exudate produced which becomes covered with black sooty mould – Cherry Aphid

➤ [See colour section page 62](#)

Not as above

10. Shiny, dark brown aphids
– Black Peach Aphid

➤ [See colour section page 61](#)

Small amber-brown aphids changing to pale green. [Winged adults have dark blotch in the middle of the abdomen]
– Green Peach Aphid

➤ [See colour section page 61](#)

Greenish black aphids – Cowpea Aphid

➤ [See colour section page 60](#)

Yellow to dark green and almost black, often carrying a mealy or waxy bloom
– Cotton or Melon Aphid

➤ [See colour section page 60](#)



KEY 8

Adult Lacewings

1. Small (about 8 mm), brown insect.
Wings hairy – Tasman's Lacewing

➤ [See colour section page 77](#)

Large (about 15 mm), green insect.
Wings clear and glassy, less hairy
– Green Lacewing

➤ [See colour section page 76](#)



KEY 9

Adult Wasps and Sawflies

1. Large (about 5 mm), glossy black "sawfly" wasp – Pear and Cherry Slug

➤ See colour section page 99

Minute (< 2 mm) wasps.

[Parasitic] – Parasitic wasps

➤ See colour section pages 100 – 103



KEY 10

Damage symptoms

The following key is based on major damage symptoms to identify the possible common insect or mite pest responsible. It should, however, be borne in mind that in many cases similar symptoms are caused by diseases, physiological disorders or physical damage.

- | | | |
|---|------------|---|
| A. Fruits affected | Yes | ➤ <u>See Key 11</u> |
| | No | ➤ Go to B below |
| B. Leaves affected | Yes | ➤ <u>See Key 12</u> |
| | No | ➤ Go to C below |
| C. Roots, trunks, limbs and shoots affected | Yes | ➤ <u>See Key 13</u> |
| | No | ➤ Go to D below |
| D. Flowers affected.
Turn brown and shrivel
– Thrips | Yes | ➤ <u>See colour section pages 71, 72</u> |
| | No | ➤ <u>Go to E</u> |



E. Entire tree makes little or no growth. Yes

Roots with lumps, small galls. Smooth swellings on roots which become rough and cracked with age. Parts near surface have long white cottony threads in a tangled mass (Apple)
– Woolly Aphid

➤ See colour section page 63

➤ **Go to F below**

F. Seedlings affected. Yes

Leaves and stems chewed
– Black Field Cricket

➤ See colour section page 74



KEY 11

Fruits Affected

1. Fruit deformed. Fruit with pronounced dimples. Small raised scabby areas within the dimple – Apple Dimpling Bug

➤ [See colour section page 67](#)

2. Fruit covered with honey dew and sooty mould – Aphids OR Mealybugs

➤ [See colour section pages 60 – 62, 66](#)

3. Fruit covered with grey, brown or black scales about 2 mm across, each with a central nipple – San José Scale

➤ [See colour section page 65](#)

4. Fruit russeted, skin covered with interwoven network of fine brown corky lines – Plague Thrips

➤ [See colour section page 71](#)

Young stone fruit russeted, skin near calyx ('shuck') covered with interwoven network of fine corky lines. Young apple fruit with 'pansy spot'. Mature stone fruit with silvering on surface – Western Flower Thrips

➤ [See colour section page 72](#)



KEY 11

5. Fruit with bored holes

➤ [Go to 10](#)

6. Fruit with chewed marks

➤ [Go to 12](#)

7. Fruit with puncture marks (females puncture and lay eggs in fruit, maggots hatch and quickly destroy fruit partly by their feeding and partly as a result of the rotting that follows the invasion)
– Queensland Fruit Fly or Mediterranean Fruit Fly

➤ [See colour section page 78](#)

8. Fruit pitted and with gummy exudate
– Rutherglen Bug OR Green Mirid

➤ [See colour section pages 69, 68](#)

9. Fruit decayed or damaged (under tree or in storage) and contain white maggots and or tiny brown or grey flies
– Ferment Fly

➤ [See colour section page 79](#)



KEY 11

10. Small holes. [Generally in rotting or damaged stone fruit, especially late peach and plum varieties]
– Driedfruit Beetle (Carpophilus Beetle)

➤ [See colour section page 94](#)

Relatively large holes (4 mm)

➤ [Go to 11 below](#)

11. No frass or exudate present around entrance hole – Budworms OR Loopers

➤ [See colour section pages 83, 84](#)

Brown, syrupy frass in or around hole.
Tunnel extends to core

– Codling Moth OR Oriental Fruit Moth

➤ [See colour section pages 81, 86](#)

12. Deep chewed depression in fruit. Brown scab tissue at bottom of depression
– Budworms OR Loopers

➤ [See colour section pages 83, 85](#)

Shallow, irregular chewed depression in fruit

➤ [Go to 13](#)



KEY 11

13. Area chewed is in protected site
(e.g. where two fruits are touching
or where leaves give protection)
– Light Brown Apple Moth

➤ [See colour section page 84](#)

Area chewed is exposed, not in protected
site – Weevils OR Wingless Grasshopper
OR Looper

➤ [See colour section pages 88 – 93, 75, 85](#)

Area chewed is usually flesh of damaged
fruit or inside split-stone fruit
– European Earwig

➤ [See colour section pages 73](#)



KEY 12

Leaves Affected

1. Leaves mottled, scorched, bronzed
➤ **Go to 5 below**
2. Leaves distorted
➤ **Go to 7**
3. Leaves with holes or edges chewed
➤ **Go to 8**
4. Leaves skeletonised
➤ **Go to 10**
5. Damage begins lower centre of tree, spreads out and up. Webbing may be present. [Small 0.5 mm green mite with a large dark spot on each side of body] – Two-Spotted Spider Mite
➤ **See colour section page 56**

Damage generally covers the whole area of tree

➤ **Go to 6**



KEY 12

6. Dark red mites with white hairs on their back are present, usually on the upper surface of the leaf. No webbing. Bronzing often mottling – European Red Mite

➤ [See colour section page 55](#)

Brown flattened mites with long, yellowish front legs. Leaves mottling and losing colour – Bryobia Mite

➤ [See colour section page 54](#)

7. Leaves with blister-like galls – Pearleaf Blister Mite

➤ [See colour section page 53](#)

Leaves curled, may be blistered [often with honey dew or sooty mould] – Aphids

➤ [See colour section pages 60 – 62](#)

Leaves with sides bent upwards, giving troughed appearance – Apple Rust Mite

➤ [See colour section page 52](#)

Leaves with yellow spotting and upward bending of sides giving troughed appearance. Mature leaves with silvering – Peach Silver Mite OR Peach Silver Leaf

➤ [See colour section page 52](#)



KEY 12

8. Leaves chewed from edges, ragged appearance. [Orchard ground cover dry]. Weevils often have droppings associated with chewed margins
– Weevils OR Wingless Grasshopper

➤ [See colour section pages 88 – 93, 75](#)

Small holes eaten through or partly through leaves or large ragged holes eaten in leaves – Loopers OR Weevils

➤ [See colour section pages 85, 88 – 93](#)

9. Leaves rolled or webbed together
– Light Brown Apple Moth

➤ [See colour section page 84](#)

Leaves not rolled

➤ [Go to 10 below](#)

10. Hairy caterpillar, about 40 mm long, with white tufts of hair on back and pair of black horn-like tufts on head
– Painted Apple Moth

➤ [See colour section page 87](#)

Dark green to orange slimy slug-like grubs, up to 13 mm long
– Pear and Cherry Slug

➤ [See colour section page 99](#)



KEY 13

Roots, Trunks, Limbs and Shoots affected

1. Roots tunnelled or grooved, chewed
[▶ Go to 3 below](#)
2. Trunk, limb and shoot damaged
[▶ Go to 4](#)
3. Roots severely pitted and channelled.
Feeding roots almost completely absent.
Above ground – tree has poor lateral growth, small leaves, limb dieback, lack of productivity – Apple Root Weevil
[▶ See colour section page 88](#)

Main tap root and lateral roots show severe furrowing. Lateral roots may be completely hollowed out. Damage may only be evident at depths greater than 60 cm. Top of tree may be dying but lower limbs still growing strongly – Fruit-tree Root Weevil

[▶ See colour section page 90](#)

Main roots have grooves. Smaller roots may be grooved, or partly or completely severed. Damage usually evident within 15 cm of soil surface – Apple Weevil, Fuller's Rose Weevil or Garden Weevil

[▶ See colour section pages 89, 91, 92](#)



KEY 13

4. Pinhead sized holes in trunk, limbs.
Fine sawdust in small piles on bark
– Fruit-tree Pinhole Borer.
➤ [See colour section page 67](#)
5. Large pad of webbed gum, frass and
bark fragments covering area of chewed
bark. Pencil-thick tunnel extending into
wood – Fruit-tree Borer
➤ [See colour section page 82](#)
6. Laterals, trunks with lumpy galls
– Woolly Aphid
➤ [See colour section page 63](#)
7. Laterals, shoot tips wilting
➤ [Go to 8 below](#)
8. Shoots and leaves blackened and sticky
– Aphids
➤ [See colour section pages 60 – 62](#)
Shoots tunnelled – Oriental Fruit Moth
➤ [See colour section page 86](#)



KEY 13

9. Trunks, limbs and shoots covered with small grey or brown or black scales, each with a central nipple – San José Scale
▶ [See colour section page 65](#)

10. Undersides of trunks, limbs and shoots covered with large brown convex scales with frosted appearance
– Frosted Scale
▶ [See colour section page 64](#)



SPECIES PAGES

How to use the photograph pages

Photograph pages are set out as shown below. It is suggested that these pages be used as a guide only. The appropriate keys should be consulted for more detailed information.

Fruit-tree Root Weevil (*Leptopius robustus*)



112. Mature larva about to pupate in earthen cell



113. Adult weevil



Pome ●

Stone ●*

Larva J F M A M J J A S O N D

Adult J F M A M J J S O N D

Eggs cream in colour, oval, 1 mm in diameter, and laid in groups between two leaf surfaces. Larvae eat surface of larger roots.

Refer to keys: [▶ 4](#) [▶ 11](#) [▶ 12](#) [▶ 13](#)

Abbreviations:

ERM – European Red Mite

OFM – Oriental Fruit Moth

LBAM – Light Brown Apple Moth

TSM – Two-spotted Spider Mite



Common name Scientific name Red if pest
Green if beneficial

Photographs

Fruit-tree Root Weevil (*Leptopius robustus*)



30mm



Pome



Larva

J F M A M J J A S

Stone



Adult

J F M

S O N D

Eggs cream in colour, oval, 1 mm in diameter, and laid in groups between two leaf surfaces. Larvae eat surface of larger roots.

Refer to keys: 4 11 12 13

Reference to relevant keys

Shaded indicates presence on pome or stone fruit in Australia

Asterisk (*) indicates no pest specimen record from this host in Victoria

Average size of mature adult in mm

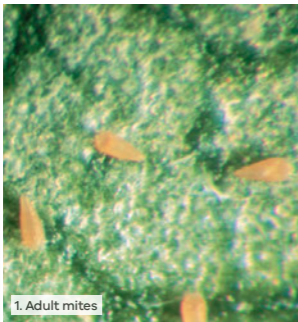
Diagnostic and damage notes

Average size of mature larva or nymph in mm

Shaded months indicate when species is active



Apple Rust Mite (ARM)(*Aculus schlechtendali*) Peach Silver Mite (PSM)(*Aculus fockeui*)



Both mites overwinter as adults under bud scale.

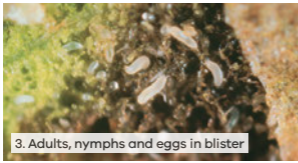
ARM: Feeding causes upward bending of leaves. Useful as an alternative food source for predatory mites in orchards. **PSM:** Early signs of damage are yellow spotting and upward bending of sides of leaves.

Heavy mite feeding causes silverying of mature leaves. This may be confused with the disease, peach silver leaf.

Refer to keys: [3](#) [12](#)



Pearleaf Blister Mite (*Eriophyes pyri*)



Pome ●

Stone ●

Nymph J F M A M J J A S O N D

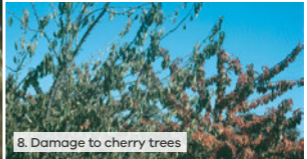
Adult J F M A M J J A S O N D

Found mainly on pear. Eggs spherical and pearly white. Adults overwinter under bud scale of both fruit and leaf buds, and in early spring they start to feed on unfolding leaves and this causes blisters in leaf tissue. Reddish blisters may also be seen on skins of young fruit.

Refer to keys: [3](#) [12](#)



Bryobia Mite (*Bryobia rubrioculus*)



12mm
0



Pome ●

Stone ●

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

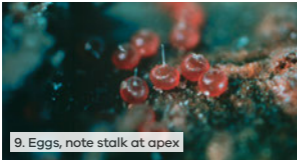
Eggs are similar to those of ERM but differ by their spherical rather than flat shape, lack of striations and lack of stalk.

Overwinters in egg stage. Heavy infestations cause severe mottling of foliage, similar to that of ERM, and adverse effects on fruit size and colour. Old leaves are affected more than young ones.

Refer to keys: [3](#) [12](#)



European Red Mite (ERM)(*Panonychus ulmi*)



9. Eggs, note stalk at apex



10. Adult male with shed skin



11. Adult female



12. Damage to apple leaf

0.6mm
0



Pome ●

Stone ●

Nymph J F M A M J J A S O N D

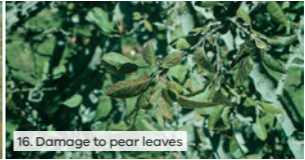
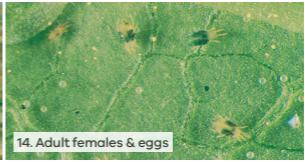
Adult J F M A M J J A S O N D

Larval and nymphal stages are similar in shape to adult female, but smaller and paler. Eggs overwinter on bark of branches and spurs, or around calyx of fruit, and hatch in early spring. Heavily infested leaves show fine mottling on upper surface.

Refer to keys: [3](#) [12](#)



Two-spotted Spider Mite (TSM)(*Tetranychus urticae*)



0.6mm
0



Pome ●

Stone ●

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

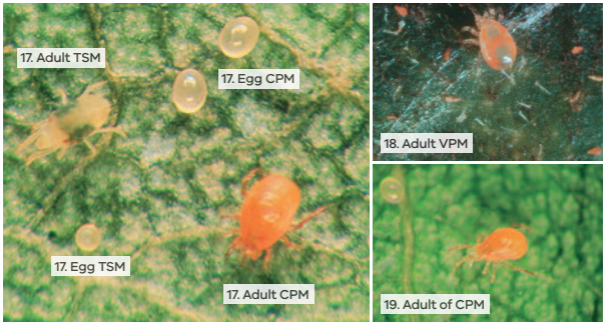
Males smaller, less abundant and more elongate with less prominent spots than females. Males can be distinguished from predatory mites by small red 'eye spots' towards front of the body. In late autumn females change colour to orange before over-wintering. Leaves become mottled or bronzed and drop prematurely.

Refer to keys: [3](#) [12](#)



Chilean Predatory Mite (*Phytoseiulus persimilis*)

Victorian Predatory Mite (*Euseius victoriensis*)



Nymph **J F M** A M J J A **S O N D**

Adult **J F M A** M J J A **S O N D**

Chilean Predatory Mite: Predator of TSM. These mites move rapidly with their bodies raised above the leaf surface on long legs. Eggs laid on undersides of leaves among colonies of prey.

Victorian Predatory Mite: General predator on a wide range of food including plant feeding mites such as rust mites.

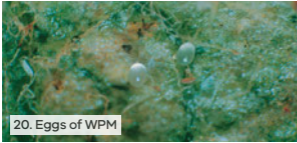
Refer to key: 3



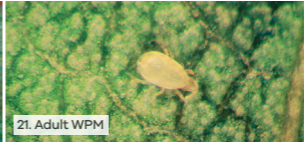
Western Predatory Mite

(*Galendromus occidentalis*)

Predatory Mite (*Galendromus pyri*)



20. Eggs of WPM



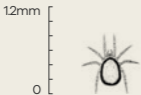
21. Adult WPM



22. Adult WPM with adult TSM



23. Adult PM feeding on ERM.
Eggs of predator are also seen



Nymph **J F M** A M J J A **S O N D**

Adult **J F M A** M J J A **S O N D**

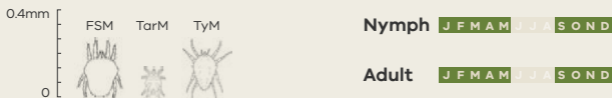
G. occidentalis: Predator of TSM and less effectively of immature stages of ERM. Mated females overwinter in same sheltered sites as TSM.

G. pyri: Predator of ERM. Very similar to *G. occidentalis*, but can be distinguished by its smooth shiny body. Overwinter in bark and under bud scales of host trees.

Refer to key: **3**



False Spider Mites, Tarsonemid Mites, Tydeid Mites



False Spider Mites (Tenuipalpidae): Incidental, not regarded as harmful or beneficial. Flat, somewhat resembling spider mites and often reddish coloured with patterns of dark pigmentation. Eggs elliptical and usually red or orange, nymphs and larvae also red or orange. These mites lie pressed to leaf with their legs extended in front and to sides posteriorly in a characteristic pose.

Tarsonemid Mites: Incidental, not regarded as harmful or beneficial. Tiny, golden yellow mites with shiny elliptical bodies. Appear to feed on detritus, pollen and fungi and found mainly on undersides of leaves.

Tydeid mites: Incidental, not regarded as harmful or beneficial. These have diamond-shaped body, short pale legs, and dull orange, cream or brownish with a pale stripe running down centre of back. Feed on fungi, dead plant and insect material. They may provide an alternative food source for predatory mites.



Cowpea Aphid (*Aphis craccivora*)

Cotton or Melon Aphid (*Aphis gossypii*)



24. Adult and nymphs of Cowpea Aphid



25. A colony of Cowpea Aphid



26. Nymphs of Cotton Aphid



Pome ● CA, CMA

Nymph J F M A M J J A S O N D

Stone ● CA*

Adult J F M A M J J A S O N D

Cowpea Aphid: Migrate from inland areas. Aphids settle on young growth of crops such as apple and quickly produce colonies of active young. Plants become stunted and leaves distorted. Produce honeydew.

Cotton/Melon Aphid: Adults blackish green, nymphs dusky green to orange. Produce honeydew.

Refer to keys: [7](#) [11](#) [12](#) [13](#)



Black Peach Aphid (*Brachycaudus persicae*) Green Peach Aphid (*Myzus persicae*)



27. Nymphs & wingless adult of Black Peach Aphid



28. Wingless adult of Green Peach Aphid



29. Winged adult of Green Peach Aphid



Pome ● GPA

Stone ● BPA, GPA

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Black Peach: Overwinters low down on roots, in cracks and crevices in limbs and trunk, or below ground on butts. Twigs die back, buds open prematurely, flowers may fall.

Green Peach: Leaf damage may be seen as soon as leaves unfold. Affected leaves turn yellow, shrivel and fall. Laterals may die.

Refer to keys: [7](#) [11](#) [12](#) [13](#)



Cherry Aphid (*Myzus cerasi*)



30. Adult



31. Parasitised aphid "mummies" and adult parasitoid



32. Damage to leaves



Pome

Stone

Nymph J F M A M J J A S O N D

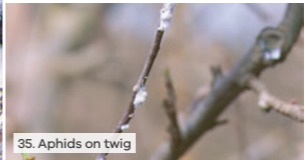
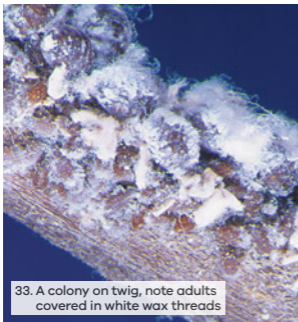
Adult J F M A M J J A S O N D

Aphids shiny black when mature but brown when young. Eggs shiny black. Overwinter as eggs around the bases of buds. Aphids found in masses on curled leaves at tip of young terminal shoots in spring. Aphids produce large quantities of sticky exudate on leaves and fruit which become covered with black sooty mould.

Refer to keys: [7](#) [11](#) [12](#) [13](#)



Woolly Aphid (*Eriosoma lanigerum*)



Pome ●

Stone ●

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Mainly attacks apples. Produce honeydew which attracts sooty mould. Found mainly in cracks in bark, pruning scars or on new growth. Infestations can spread to fruit. Prefers shaded situations therefore is usually found on interior of trees and undersides of lateral growth. Moves down to root systems to overwinter.

Refer to keys: [7](#) [10](#) [13](#)



Frosted Scale (*Eulecanium prunosum*)



Pome ● *

Stone ●

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Adult scales brown, convex and covered with white mealy secretion to give frosted appearance. Eggs white, crawlers straw coloured and oval. Nymphs overwinter on undersides of twigs, and in late winter develop rapidly reaching adult stage in September. Leaves and twigs covered with sticky secretion and black sooty mould.

Refer to keys: [7](#) [13](#)



San José Scale (*Diaspidiotus perniciosus*)



Pome ●

Stone ●

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Scales roughly circular with a central nipple, pale to dark grey or almost black. Male scales smaller. If larger greyish scales on bark are lifted, a lemon-yellow soft bodied creature is found underneath. Twigs and limbs heavily covered with scales show reduced vigour and may die.

Refer to keys: [7](#) [11](#) [13](#)



Longtailed Mealybug (*Pseudococcus longispinus*)



Pome ● *

Stone ● *

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Nymphs pink. First instars stay under their mothers for one to two weeks then move all over the tree although easier to find on backs of leaves. Second and third instars remain on leaves. Late third instars move down to sheltered areas on main limbs where the females continue to develop while males spin cocoons and pupate.

Refer to keys: [7](#) [11](#)



Apple Dimpling Bug (*Campylomma liebkechti*)



3mm
0



Pome ●

Stone ●

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Pest of apples, pears and nashi. Highly active, run and fly when disturbed. Main danger period from early pink to petal fall, damage can occur up to two weeks after petal fall. Young fruits show small raised scabbed feeding punctures around which tissues fail to grow normally leading to bumpy appearance of fruit. This species is not present in Tasmania but similar damage is caused by another mirid bug *Niastama punctaticollis*.

Refer to keys: [7](#) [11](#)



Green Mirid (Creontiades dilutus)



Pome ●

Stone ●

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Nearly two times the size of Apple Dimpling Bug. Highly active, run and fly when disturbed. Ripening fruit punctured by green mirids show pitting of the skin, discoloured areas in the flesh and malformation. If green fruit is attacked, long and persistent columns of gummy exudate are seen from the puncture holes.

Refer to keys: [7](#) [11](#)



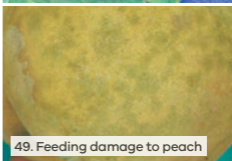
Rutherglen Bug (*Nysius vinitor*)



47. Adult and nymphs



48. Mating pair (male small)



49. Feeding damage to peach



Pome ● *

Stone ●

Nymph **J** F M A M J J A S O N **D**

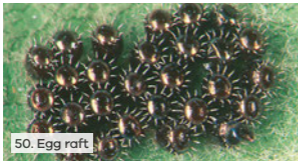
Adult **J** F M A M J J A S O N **D**

These insects are active, run and fly when disturbed. They suck sap from the fruits causing pitting and gummy ooze. Breed on weeds in spring and invade trees as weeds die off anytime from mid-December to early January.

Refer to keys: [7](#) [11](#)



Spined Predatory Shield Bug (*Oechalia schellenbergii*)



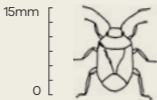
50. Egg raft



51. Newly hatched nymphs



52. Adult



Nymph **J F M A M J J A S O N D**

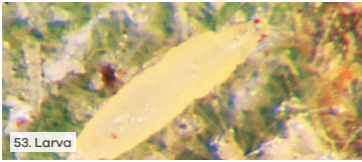
Adult **J F M A M J J A S O N D**

Predator of caterpillars such as budworms. Adults are greyish brown with sideways pointed shoulders. Nymphs are dark red and brown. Eggs are black and laid in "rafts".

Refer to key: **7**



Plague Thrips (*Thrips imaginis*)



53. Larva



54. Adult



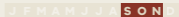
55. Damage to flower bud and stalk



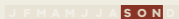
Pome ●

Stone ●

Larva



Adult



Elongate insects with hair-fringed wings. Present from early pink to full bloom. Plague of thrips mid to late September. Small active insects in blossoms, rasping tissues and causing browning and withering of floral parts, fruit may fail to set. All varieties, but Granny Smith most severely affected.

Refer to keys: [1](#) [10](#) [11](#)



Western Flower Thrips (*Frankliniella occidentalis*)



56. Larva



57. Adult



58. Damage

12mm
0



Pome ● *

Stone ● *

Larva

J F M A M J J A S O N D

Adult

J F M A M J J A S O N D

Elongate insects with hair-fringed wings. In stone fruit, early season injury occurs when thrips feed under calyx (shuck) and cause russet before calyx fall, and silvering occurs when thrips feed on surface of mature fruit. In apple, early season injury causes 'pansy spot' on young fruit. This pest is resistant to many insecticides commonly used for thrips control.

Refer to keys: [1](#) [10](#) [11](#)



European Earwig (*Forficula auricularia*)



Pome ●

Stone ●

Nymph **J F M A M** J J A S O N D

Adult **J F M A M** J J A S O N D

Pest of stone fruit and occasionally apples. Nymphs similar to adults except they lack wings. These insects are nocturnal and hide during day inside damaged fruit, under loose bark or debris. They bite into exposed flesh of fruit damaged by hail. They are also beneficial in apple orchards where they are known to prey on soft bodied insects, especially woolly aphids and codling moth eggs.

Refer to keys: [1](#) [11](#)



Black Field Cricket

(Teleogryllus commodus)



61. Adult and nymphal stages



62. Apple chewed by crickets

30mm
0



Pome ● *

Stone ●

Nymph J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Pest of seedlings. Female has long ovipositor. Eggs banana shaped and cream in colour. Adults and late stage nymphs feed on leaves and stems of seedlings and occasionally fallen fruit. The males produce a chirping sound by moving their wings.

Refer to keys: 1 10



Wingless Grasshopper (Phaulacridium vittatum)



Pome ● *

Stone ● *

Nymph J F M A M J J A S C N D

Adult J F M A M J J A S O N D

Adults commonly wingless. Overwinter in egg stage. Grasshoppers swarm in herbage around margins of young non-bearing blocks of trees. Later as this herbage dries out they invade herbage in the orchard and then the trees. Chew holes in leaves, trees may become defoliated when infestation heavy.

Refer to keys: [1](#) [11](#) [12](#)



Green Lacewing (*Plesiochrysa ramburi*)



Larva J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Predator of aphids and scales. Larvae camouflage themselves by lodging shells of their victims on their backs. Larvae have sickle-shaped jaws which they drive into insects or eggs and suck up the contents. To feed on scales they insert their curved jaws under the scale's body and prise them loose.

Refer to keys: [2](#) [8](#)



Tasman's Lacewing (*Micromus tasmaniae*)



69. Empty egg shell



70. Adult



71. Larva feeding on aphid



Larva **J F M A M J J J A S O N D**

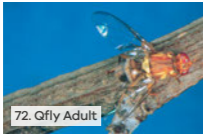
Adult **J F M A M J J J A S O N D**

Predator of scales, aphids and eggs of budworms. Larvae differ from those of green lacewings by being thinner and longer and not carrying their prey remains on their backs. Eggs cream, oval and singly attached by one side to the underside of leaves. Adults fly at night and are attracted to light.

Refer to keys: [2](#) [8](#)



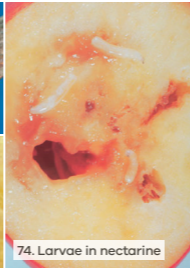
Queensland Fruit Fly or Qfly (*Bactrocera tryoni*) Mediterranean Fruit Fly or Medfly^ (*Ceratitis capitata*)



72. Qfly Adult



73. Medfly Adult^



74. Larvae in nectarine



75. Sting marks in nectarine

12mm
0



Pome ● QF, MF*

Larva J F M A M J J J A S O N D

Stone ● QF, MF*

Adult J F M A M J J J A S O N D

^If found contact local agriculture department^

Eggs are white, banana shaped. Present in winter as low numbers of adults in warmer areas. Larvae have paired black mouth hooks which are used to tear at the fruit tissue. Females puncture and lay eggs in many different fruits. Larvae destroy fruit, partly by their feeding and partly as a result of the rotting that follows the invasion.

Refer to keys: [2](#) [5](#) [11](#)



Ferment Flies, Vinegar Flies (Drosophila spp.)



76. Eggs, note filaments at one end



77. Larva in decayed fruit



78. Adult fly



Pome ●

Stone ●

Larva J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Minor pest of stone and less commonly pome fruit. Waste fruit under trees or in storage can produce swarms of flies which invade packing sheds and canneries and may become a nuisance. Adult flies deposit eggs in cracks of decayed or damaged fruit. Small white maggots develop causing fermentation and breakdown. If ferment fly maggots are found in sound fruit refer to Agriculture department.

Refer to keys: [2](#) [5](#) [11](#)



Hover Fly (Melangyna viridiceps)



12mm
0



Larva J F M A M J J A S O N D

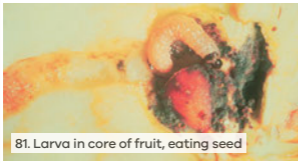
Adult J F M A M J J A S O N D

Predator of aphids and less commonly mites. Adult flies mimic bees and wasps with black and yellow bands across their abdomens. Pupae tear-shaped, brown and found under leaves or in ground litter. Eggs white, oval and laid on their sides near colonies of hosts. Adults feed on nectar and pollen, fly swiftly and hover.

Refer to keys: [2](#) [5](#)



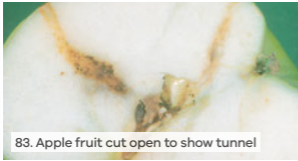
Codling Moth (*Cydia pomonella*)



81. Larva in core of fruit, eating seed



82. Adult moth



83. Apple fruit cut open to show tunnel



84. Frass on pear fruit



Pome ●

Stone ●*

Larva

J F M A M J J J A S O N D

Adult

J F M A M J J J A S O N D

Adults and larvae similar to OFM (p. 86) but adults differ in having a bright copper patch on tips of forewings. Eggs laid singly on or near fruits. Larvae tunnel into fruit, generally to the core where they also damage seeds. Larvae have separate entrance and exit holes in fruit. Larvae overwinter on tree under bark.

Refer to keys: [2](#) [6](#) [11](#)



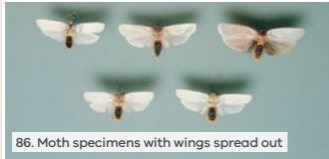
Fruit-tree Borer (*Maroga melanostigma*)



85. Larva taken out of its tunnel



87. Damage to branch, note entry hole



86. Moth specimens with wings spread out

60mm
0



Pome ● *

Stone ●

Larva J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Larvae burrow into wood, emerging at night to feed on surrounding bark. Tunnel entrance is covered by frass, chewed bark and webbing. Feeding by larvae can ringbark branches and weaken limbs, some trees can produce a gum which oozes from the damaged area. Larvae can live up to two years in the branch.

Refer to keys: [2](#) [6](#) [13](#)



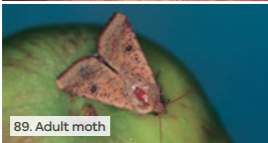
Budworms:

Helicoverpa armigera (Corn Earworm)

Helicoverpa punctigera (Native Budworm)



88. Damage to apple by larva



89. Adult moth



90. Fully mature larva and pupa

60mm
0



Pome ● CE, NB

Larva

J F M A M J J A S O N D

Stone ● CE, NB*

Adult

J F M A M J J A S O N D

Adult moths vary in colour but generally buff to reddish brown with darker markings on forewing and black area at outer margin of pale hindwings. Larvae feed on developing fruit and generally bore clean holes deep into fruit. Fully grown larvae leave plants and pupate in soil near base.

Refer to keys: [2](#) [6](#) [11](#)



Light Brown Apple Moth (*Epiphyas postvittana*)



30mm
0



Pome ●

Stone ●

Larva

J F M A M J J A S O N D

Adult

J F M A M J J A S O N D

Eggs usually laid on upper surfaces of leaves or on stems or fruit. Larvae build webs on leaves and fruit, webbing leaves together, a leaf to a fruit, or folding a single leaf. Larvae can skeletonise leaves and eat shallow irregular-shaped areas in fruits. Severe damage can occur close to harvest in autumn.

Refer to keys: [2](#) [6](#) [11](#) [12](#)



Apple Looper (*Phrissogonus laticostata*)

Twig Looper (*Ectropis excursaria*)



Larvae range in colour from greyish-white, yellowish to pale brown and may be mottled with brown and dark grey. They move with a characteristic looping of body. First signs of infestation are windowed leaf tissue or holes eaten in leaves. Loopers eat small holes in apple fruitlets and graze the exposed surfaces of pears.

Refer to keys: [2](#) [6](#) [11](#) [12](#)



Oriental Fruit Moth (*Grapholita molesta*)



100. Mature larva, pupa & moth



101. Adult moth



102. Damage to peach fruit



103. Wilting of new shoots due to tunneling by larvae



Pome ●

Stone ●

Larva

Adult

J F M A M J J A S O N D

J F M A M J J A S O N D

Mainly peach and nectarine affected. Can attack apples, pears and Nashi. Adults and larvae similar to Codling Moth (p. 81). Larvae tunnel into new shoots early in season and begin to infest fruit from December. Gum will often be found on fruit at the entry point. Larvae tunnel to the stone and around it. Injury to fruit can lead to brown rot infestation.

Refer to keys: [2](#) [6](#) [11](#) [13](#)



Painted Apple Moth (*Teia anartoides*)



104. Larva



105. Adult wingless female with egg mass on cocoon



106. Adult male resting on silken web around cocoon



Pome ●

Stone ●

Larva

Adult

J F M A M J J A S O N D

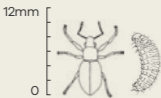
J F M A M J J A S O N D

Infestation is often restricted to single trees or localised groups of trees. Initially skeletonised patches on leaves, with continued grazing resulting in whole leaves consumed. Occasionally green fruits may be grazed, and twigs may be ringbarked. Larval hairs may cause a rash if handled.

Refer to keys: [2](#) [6](#) [12](#)



Apple Root Weevils (*Perperus* spp.)



Pome ● *

Stone ● *

Larva J F M A M J J A S O N D

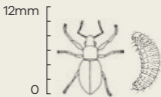
Adult J F M A M J J A S O N D

Eggs laid into the tip of a folded leaf stuck together with a glue-like secretion. Larvae feed on the roots of trees, often ringbarking them. Larvae can remain underground for 2 – 3 years. Adults feed on buds and foliage of trees at night, hiding around trunks during day.

Refer to keys: [4](#) [12](#) [13](#)



Apple Weevil or Curculio Beetle (Otiorynchus cribricollis)



Pome ● *

Stone ●

Larva J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Eggs laid singly possibly on leaves and in loose organic matter. Larvae feed on the roots of trees and possibly orchard floor plants. Adult weevils emerge from soil in November – December and have one generation a year. They scallop leaves and may kill shoots by ringbarking them – especially on seedling trees. Adults also ringbark fruit stalks.

Refer to keys: [4](#) [12](#) [13](#)



Fruit-tree Root Weevil (*Leptopius robustus*)



112. Mature larva about to pupate in earthen cell



113. Adult weevil



Pome ●

Stone ●*

Larva

J F M A M J J A S O N D

Adult

J F M A M J J A S O N D

Eggs cream in colour, oval, 1 mm in diameter, and laid in groups between two leaf surfaces glued together. Larvae eat surface of larger roots. Adults feed on buds and leaves in spring. Typical symptoms are sudden wilting of leaves beginning at tip of branch and sparse growth on one or more limbs of a vigorous tree.

Refer to keys: [4](#) [11](#) [12](#) [13](#)



Fuller's Rose Weevil (*Asynonychus cervinus*)



114. Mature larva



116. Leaves showing adult weevil damage



115. Adult weevil

12mm
0



Pome ●

Stone ●

Larva

Adult

F M A M J J A S O N D

J F M A M J J A S O N D

Eggs oval, about 1.5 mm long, creamy-yellow, and usually laid under loose bark, in curled dead leaves, on timber posts or on the ground. Eggs are laid in masses which contain a glue that causes problems in blocking minisprinklers. Larvae feed on roots but usually do little damage. Adult weevils chew holes around edges of leaves and also attack buds and young shoots, feeding mainly at night but do not attack fruit.

Refer to keys: [4](#) [12](#)



Garden Weevil (*Phlyctinus callosus*)



117. Adults, early instar larvae and eggs



118. Adult weevil & its damage on apple



119. Damage to strawberry leaves

12mm



Pome ●

Stone ●*

Larva J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Adults feed at night. Typical damage includes serrated edges of lower leaves, skeletonisation towards centre of leaves, chew-marks on leaf stalks, and chewing of skin and underlying flesh of fruit. Damage to fruit is sometimes confused with LBAM but is usually on exposed parts of fruit and webbing is absent. Larvae of garden weevil and apple weevil are identical when seen in the field.

Refer to keys: [4](#) [11](#) [12](#)



Whitefringed Weevil (*Naupactus leucoloma*)



Eggs oval, 1 mm long, and laid in masses cemented to litter on soil surface or plant base. Larvae slowly feed on tap roots of plants over winter. Adults emerge during summer to feed on edges of leaves, although not usually causing any significant damage. Adults feed on foliage at night or on overcast days.

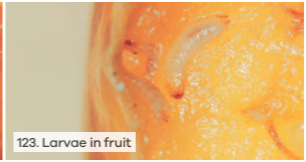
Refer to keys: [2](#) [4](#) [12](#)



Driedfruit Beetles (*Carpophilus* spp.)



122. Eggs laid in fruit



123. Larvae in fruit



124. Adult, *C. hemipterus* (left), *C. davidsoni*



125. Nectarine with surface cracks through which beetle burrow



Pome ●

Stone ●

Larva J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Eggs laid in decaying fruit on tree or on ground. Larvae develop in fruit. Adult beetles burrow into ripening fruit through surface splits or near stem. Adults also spread the fungal disease "brown rot" as they move around. Adults and larvae overwinter in cracks and crevices, under bark, within rotting fruit or in soil.

Refer to keys: [2](#) [4](#) [11](#)



Fruit-tree Pinhole Borer (*Xyleborinus saxeseni*)



Pome ● *

Stone ●

Larva J F M A M J J A S O N D

Adult J F M A M J J A S O N D

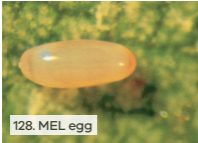
Eggs laid in bark of trees. Larvae tunnel into wood and feed just under bark. Larval faeces form a brownish-yellow pulp which supports growth of ambrosia fungus that older larvae then feed on. Emerging adult borers make characteristic pinholes in bark, leaving behind small piles of sawdust on bark.

Refer to keys: [4](#) [13](#)



Mite-eating Ladybirds (*Stethorus* spp.)

Plague Soldier Beetle (*Chauliognathus lugubris*)



128. MEL egg



129. MEL larva



130. MEL adult with TSM



131. Plague Soldier Beetle larva



132. Plague Soldier Beetle adult



Larva **J F M A M J J A S O N D**

Adult **J F M A M J J A S O N D**

Mite-eating Ladybird: Predator of TSM and ERM. Pupae small, black and flat. Both adults and larvae are voracious predators and found on undersides of leaves in association with their prey.

Plague Soldier Beetle: Larvae are predators of insects; adults nibble on developing fruit of apple and cherries.

Refer to keys: [2](#) [4](#)



Common Spotted Ladybird

(*Harmonia conformis*)

Transverse Ladybird (*Coccinella transversalis*)



12mm
0



Larva **J F M A M J J A S O N D**

Adult **J F M A M J J A S O N D**

Common Spotted Ladybird: Predator of aphids and mites. Eggs usually laid in clusters and are oval shaped. Both larval and adult stages are active predators.

Transverse Ladybird: Predator of aphids (black peach, green peach and cherry aphids).

Refer to keys: [2](#) [4](#)



Mealybug Ladybird (*Cryptolaemus montrouzieri*)



Larva **J F M A M J J A S O N D**

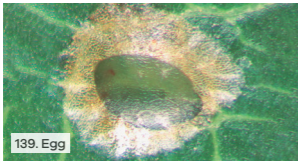
Adult **J F M A M J J A S O N D**

Predator of mealybugs, scales and occasionally aphids. Larvae covered with white mealy material and have long marginal filaments, so they may be mistaken for mealybugs but lack long tail filaments. Eggs yellow and laid singly near cluster of mealybugs or in mealybug egg masses.

Refer to keys: [2](#) [4](#)



Pear and Cherry Slug (*Caliroa cerasi*)



139. Egg



140. Feeding marks of larva



141. Adult "sawfly"



142. Larva

18mm
0



Pome ●

Stone ●

Larva J F M A M J J A S O N D

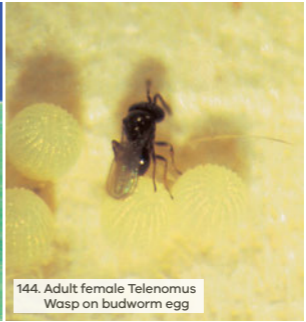
Adult J F M A M J J A S O N D

Adult female has a saw-like ovipositor for slitting the leaf tissue to deposit small oval, flat eggs under epidermis. Larvae feed on upper leaf surface causing curling, shrivelling, scorching and occasionally skeletonising of leaves. Larvae overwinter in a small earthen cell in soil.

Refer to keys: [2](#) [9](#) [12](#)



Braconid Wasps (Braconidae) Telenomus Wasps (Telenomus spp.)



Larva J F M A M J J A S O N D

Adult J F M A M J J A S O N D

Braconid: Parasitoid of larvae, particularly Budworms and LBAM. Females oviposit into young host larvae where they develop, emerging from late-stage larvae to pupate in a silken cocoon.

Telenomus: Parasitoid of eggs of Budworms. Minute black wasps with short abdomens and long wings. Parasitised eggs turn black.

Refer to key: [9](#)



Tetracnemoid Parasite (*Tetracnemoidea sydneyensis*)



Larva **J F M A M J J A S O N D**

Adult **J F M A M J J A S O N D**

Parasitoid of Longtailed Mealybug. Adult wasp dark metallic. Female with flattened antennae and dark front wings. Male with branched antennae. One parasitoid larva in a single host. Parasitised host specimens appear inflated and rigid.

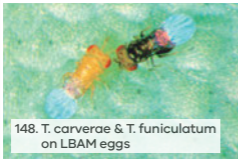
Refer to key: **9**



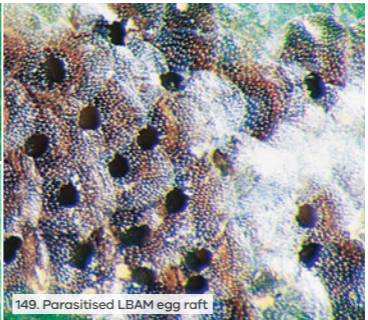
Trichogramma Wasps (*Trichogramma* near brassicae, *T. carverae*, *T. funiculatum*)



147. *T. near brassicae* ovipositing on budworm egg



148. *T. carverae* & *T. funiculatum* on LBAM eggs



149. Parasitised LBAM egg raft

1.5mm
0



Larva

J F M A M J J A S O N D

Adult

J F M A M J J A S O N D

Egg parasitoids of moths such as Budworms, Codling Moth, OFM and LBAM. Eggs deposited by adult female inside freshly laid moth eggs. Wasp larvae then hatch and start to devour contents of moth egg. Wasp larvae pupate and develop into fully formed adult wasps which emerge from moth eggs.

Refer to key: [9](#)



Woolly Aphid Parasite (*Aphelinus mali*)



150. Adult wasp resting on empty black aphid body-shells with round emergence holes

1.5mm
0



Larva **J F M A M J J A S O N D**

Adult **J F M A M J J A S O N D**

Parasitoid of Woolly Aphid. Adult wasp black with base of abdomen yellowish. Parasitised aphids lose their woolly covering and go black. Empty black aphid body-shell with round holes through which the parasitoid has emerged are a guide to activity of the parasitoid in field.

Refer to key: **9**



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Strategic levy investment

**APPLE AND
PEAR FUND**

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