REPRINT INFORMATION – PLEASE READ!

For updated information please call 13 25 23 or visit the website www.deedi.qld.gov.au

This publication has been reprinted as a digital book without any changes to the content published in 2003. We advise readers to take particular note of the areas most likely to be out-of-date and so requiring further research:

- Chemical recommendations—check with an agronomist or Infopest www.infopest.qld.gov.au
- Financial information—costs and returns listed in this publication are out of date. Please contact an adviser or industry body to assist with identifying more current figures.
- Varieties—new varieties are likely to be available and some older varieties may no longer be recommended. Check with an agronomist, call the Business Information Centre on 13 25 23, visit our website www.deedi.qld.gov.au or contact the industry body.
- Contacts—many of the contact details may have changed and there could be several new contacts available. The industry organisation may be able to assist you to find the information or services you require.
- Organisation names—most government agencies referred to in this publication have had name changes. Contact the Business Information Centre on 13 25 23 or the industry organisation to find out the current name and contact details for these agencies.
- Additional information—many other sources of information are now available for each crop. Contact an agronomist, Business Information Centre on 13 25 23 or the industry organisation for other suggested reading.

Even with these limitations we believe this information kit provides important and valuable information for intending and existing growers.

This publication was last revised in 2003. The information is not current and the accuracy of the information cannot be guaranteed by the State of Queensland.

This information has been made available to assist users to identify issues involved in macadamia production. This information is not to be used or relied upon by users for any purpose which may expose the user or any other person to loss or damage. Users should conduct their own inquiries and rely on their own independent professional advice.

While every care has been taken in preparing this publication, the State of Queensland accepts no responsibility for decisions or actions taken as a result of any data, information, statement or advice, expressed or implied, contained in this publication.
**Bug Identifier**

There are two ways for you to use this section.

1. **Search for an unknown insect pest or beneficial that you want to identify** – simply browse through the pages of the relevant insect type or stage. For example, if you find an egg on a nut and want to identify it, go to the egg pages starting on page 158, and see all of the commonly-found eggs pictured together. This makes quick identification easier.

   Eggs and scales ........................................... Go to pages 158 to 165
   Tiny insects and mites ................................. Go to pages 166 to 172
   Grubs and caterpillars (larvae) ......................... Go to pages 173 to 186
   Moths and butterflies ..................................... Go to pages 187 to 194
   Bugs and beetles ........................................... Go to pages 195 to 202
   Flies and wasps ............................................. Go to pages 203 to 206
   Ants and spiders ........................................... Go to pages 207 to 208

2. **Search for a known insect pest or beneficial for the photographs of its relevant stages** – first find the pest or beneficial in the list below and use the page references provided:

**Pests**
- Bananaspotting bug ........................................ 159 (egg); 195 (nymph and adult)
- Bizarre looper .................................................. 179 (larva); 194 (moth)
- Black citrus looper ............................................. 168
- Broad mite ............................................................. 167
- Brown looper ...................................................... 181 (larva); 193 (moth)
- Brown tufted caterpillar ........................................ 180

**Nut stemborer** ......................................................... 163 (egg)
- Olearia scale .......................................................... 162
- Orange fruitborer ................................................. 177 (larva); 190 (moth)
- Pencilled blue butterfly ....................................... 176 (larva); 190 (butterfly)
- Queensland fruit fly ............................................. 203
- Redbanded thrips .................................................. 167
- Redshouldered leaf beetle ...................................... 196
- Rutherglen bug ..................................................... 199 (nymph and adult)
- Sigastus weevil ....................................................... 182 (larva); 199 (adult)
- Variegated hairy caterpillar ................................... 179 (larva); 192 (moth)
- Yellow peach moth ................................................ 175 (larva); 191 (moth)

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- Assassin bug .......................................................... 165 (egg); 200 (adult)
- Brown lacewing .................................................... 183 (larva)
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**Macadamia flower caterpillar** ................................ 158 (egg); 173 (larva); 187 (adult)
- Macadamia leafminer ............................................ 175 (larva); 188 (adult)
- Macadamia mussel scale ......................................... 161
- Macadamia nutborer ............................................... 158 (egg); 173 (larva); 187 (adult)
- Macadamia twig-girdler ........................................... 174 (larva); 188 (adult)
- Macadamia white scale ............................................ 161
- Mango planthopper ................................................. 164 (egg); 169 (nymph); 194 (adult)
- Predatory mealybug ladybird .................................. 185 (larva); 201 (adult)
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- Wasp ectoparasite .................................................. 172, 185, 186 (larva)
Macadamia flower caterpillar (Cryptoblabes hemigypsa) egg

- Found on flowers.
- Damage shown on page 80.
- Major pest.

Sandpine (Amsinckia), activator

- Male crawlers present in some areas.
- Female crawlers present in some areas.

Macadamia nutborer (Cryptophlebia ombrodelta) eggs

- Found on nuts, nut stalks, flowers and occasionally leaves.
- Damage shown on page 106.
- Major pest.

Macadamia felted coccid (Eriococcus ironsidei)

- Found on leaves, branches and flowers.
- Damage shown on pages 12 and 88.
- Major pest.

Macadamia white scale (Pseudaulacaspis brimblecombei)

- Found on leaves and nuts.
- Damage shown on pages 14 and 116.
- Minor pest.

Latania scale (Hemiberlesia lataniae)

- Found on leaves, branches and nuts.
- Damage shown on pages 14 and 116.
- Occasionally important in some areas such as northern NSW.

Green vegetable bug (Nezara viridula) eggs

- Found mainly on leaves.
- Damage shown on page 150.
- Occasionally important in some areas.

Macadamia mussel scale (Lepidosaphes macadamiae)

- Found mainly on leaves.
- Minor pest.
**Long soft scale (Coccus longulus)**

Found on leaves and twigs.
Minor pest.

**Oleander scale (Aspidiotus nerii)**

Found mainly on leaves.
Minor pest.

**Lycaenid butterfly (hairyline blue butterfly – Erysichton lineata lineata) eggs**

Found in flowers.
Damage shown on page 94.
Minor pest.

**Nut stemborer (Paranepsia amydra) egg**

Found on leaves and nuts.
Damage shown on pages 64 and 138.
Minor pest.

**Mango planthopper (Colgaroides acuminata) egg mass**

Found on nut stalks.
Incidental insect causing little if any damage.

**Assassin bug (Pristhesancus plagipennis) egg mass**

Found anywhere on tree.
General predator of many pests; particularly fruitspotting bug, bananaspotting bug and nutborer.

**Lacewing (Mallada signata) egg**

Found anywhere on tree.
General predator of most pests, particularly aphids, mealybugs, scales, caterpillars and thrips.

**Syrphid fly (Melanastoma agrolas) egg**

Found mainly on flowers.
Predator of aphids and thrips.

**Flower thrips (Scirtothrips sp.)**

Found on leaves, flowers and nuts.
Damage shown on pages 16, 84 and 128.
Sometimes a major pest.

**Greenhouse thrips (Heliothrips haemorrhoidatis)**

Found mainly on nuts.
Damage shown on page 128.
Minor pest.

**Citrus flat mite (Brevipalpus lewisi)**

Found mainly on nuts.
Damage shown on page 130.
Minor pest.

**Black citrus aphid (Toxoptera citricida)**

Found on leaves and flowers.
Damage shown on pages 20 and 100.
Common, but rarely causes major damage.
**Flower thrips (Scirtothrips sp.)**

Found on leaves, flowers and nuts. Damage shown on pages 16, 84 and 128. Sometimes a major pest.

**Greenhouse thrips (Heliothrips haemorrhoidatis)**

Found mainly on nuts. Damage shown on page 128. Minor pest.

**Redbanded thrips (Selenothrips rubrocinctus) nymphs**

Found mainly on nuts. Damage shown on page 128. Minor pest.

**Broad mite (Polyphagotarsonemus latus)**

Found on leaves, flowers and nuts. Damage shown on pages 18, 92 and 130. May be a major pest in nurseries and young trees.

**Citrus flat mite (Brevipalpus lewisi)**

Found mainly on nuts. Damage shown on page 130. Minor pest.

**Mango planthopper (Colgaroides acuminata) nymphs**

Found on nut stalks. Incidental insect causing little if any damage.

**Black citrus aphid (Toxoptera citricida)**

Found on leaves and flowers. Damage shown on pages 20 and 100. Common, but rarely causes major damage.

**Phytoseiid predatory mite**

Found on leaves, flowers and nuts. Predator of mites and thrips.
**Predatory thrips (Scolothrips sexmaculatus)**

- **Beneficial**
- Found on leaves, flowers and nuts.
- Predator of mites and thrips.

**Elachertus ectoparasite larvae**

- **Beneficial**
- Found mainly on nuts.
- External parasite of nutborer.

**Trichogrammatoidea wasp (Trichogrammatoidea spp.)**

- **Beneficial**
- Found mainly on nuts.
- Internal parasite of nutborer.

**Parasitic wasp**

- **Beneficial**
- Found on leaves or nuts.
- Internal egg parasite of fruitspotting and bananaspotting bugs.

**Aphytis parasitic wasp**

- **Beneficial**
- Found on leaves, branches or nuts.
- Internal parasite of latania scale.

**Macadamia nutborer (Cryptophlebia ombrodelta) larvae and pupa**

- **Pest**
- Found on nuts, nut stalks and occasionally flowers.
- Damage shown on page 106.
- Major pest.

**Wasp ectoparasite larva**

- **Beneficial**
- Found on leaves.
- External parasite of leafminer.

**Macadamia flower caterpillar (Cryptoblabes hemigypsa) larva**

- **Pest**
- Found on flowers.
- Damage shown on page 80.
- Major pest.
Kernel grub (Assara seminivale) larva

Found on nuts. Damage shown on page 132. Can be a major pest on occasions.

Macadamia twig-girdler (Neodrepta luteotactella) larva

Found on leaves, branches and nuts. Damage shown on pages 10 and 140. Occasionally important in elevated rainforest areas.

Macadamia leafminer (Acrocercops chionosema) larvae

Found on leaves. Damage shown on page 8. May be a major pest in nurseries and young trees.

Cornelian butterfly (Deudorix epijarbas diovis) larva

Found on nuts. Damage shown on page 138. Minor pest.

Orange fruitborer (Isotenes miserana) larva

Found mainly on leaves and occasionally on flowers and nuts. Damage shown on page 26. Minor pest in nurseries.

Pencilled blue butterfly (Candalides absimilis) larva

Found on leaves, flowers and nuts. Damage shown on pages 30 and 144. Minor pest.

Yellow peach moth (Dichocrocis punctiferalis) larva

Found on nuts. Damage shown on page 124. Minor pest.

Cup moth (Anaxidea lozogramma) larva

Found on leaves. Minor pest.
Macadamia cup moth (Comana fasciata) larva

- Found on leaves.
- Damage shown on page 28.
- Minor pest.

Variegated hairy caterpillar (Anthela varia) larva

- Found on leaves and occasionally flowers.
- Damage shown on page 28.
- Minor pest.

Large bagworm (Oiketicus elongatus) larvae

- Found on leaves.
- Minor pest.

Bizarre looper (Eucyclodes pieroides) larva

- Found on leaves and occasionally flowers and nuts.
- Damage shown on page 30.
- Minor pest.

Doubleheaded hawk moth (Coequosa triangularis) larva

- Found on leaves.
- Minor pest.

Brown looper (Lophodes sinistraria) larvae

- Found on leaves and nuts.
- Damage shown on page 32.
- Minor pest.

Brown tufted caterpillar (Olene mendosa) larva

- Found on leaves and flowers.
- Damage shown on page 32.
- Minor pest.

Hairyline blue butterfly (Erysichton lineata lineata) larva

- Found on flowers.
- Damage shown on page 94.
- Minor pest.

Flower looper (Gymnoscelis subrufata) larva

- Found on flowers.
- Damage shown on page 96.
- Minor pest.

Sigastus weevil (Sigastus sp.) larva

- Found in nuts.
- Damage shown on page 152.
- Confined to a small area of the Atherton Tableland, where it can cause significant damage.

Coccinellid ladybird larvae

- Found mainly on leaves and branches.
- Predator of felted coccid.

Syrphid fly (Melanastoma agrolas) larva

- Found mainly on flowers.
- Predator of aphids, thrips and flower caterpillar.
**Flower looper (Gymnoscelis subrufata) larva**

- Found on flowers.
- Damage shown on page 96.
- Minor pest.

**Sigastus weevil (Sigastus sp.) larva**

- Found in nuts.
- Damage shown on page 152.
- Confined to a small area of the Atherton Tableland, where it can cause significant damage.

**Lacewing (Mallada signata) larva**

- Found anywhere on tree.
- General predator of most pests, particularly aphids, mealybugs, scales, caterpillars and thrips.

**Brown lacewing (Micromus tasmaniae) larva**

- Found anywhere on tree.
- General predator of most pests, particularly aphids.

**Coccinellid ladybird larvae**

- Found mainly on leaves and branches.
- Predator of felted coccid.

**Syrphid fly (Melanastoma agrolas) larva**

- Found mainly on flowers.
- Predator of aphids, thrips and flower caterpillar.

**Wasp ectoparasite larva**

- Found on flowers.
- External parasite of flower caterpillar.

**Predatory mealybug ladybird (Cryptolaemus montrouzieri) larva**

- Found anywhere on tree.
- Predator of hibiscus mealybug.
**Elachertus ectoparasite larvae**

Found mainly on nuts. External parasite of nutborer.

**Wasp ectoparasite larva**

Found on leaves. External parasite of leafminer.

**Macadamia nutborer (Cryptophlebia ombrodelta) moth**

Found anywhere in orchard (night flying). Damage shown on page 106. Major pest.

**Macadamia flower caterpillar (Cryptoblabes hemygypsa) moth**

Found anywhere in orchard (night flying). Damage shown on page 80. Major pest.

**Macadamia twig-girdler (Neodrepta luteotactella) moth**

Found anywhere in orchard (night flying). Damage shown on pages 10 and 140. Occasionally important in elevated rainforest areas.

**Macadamia leafminer (Acrocercops chionosema) moth**

Found anywhere in orchard (day flying). Damage shown on page 8. May be a major pest in nurseries and young trees.

**Kernel grub (Assara seminivale) moth**

Found anywhere in orchard (night flying). Damage shown on page 132. Can be a major pest on occasions.

**Pencilled blue butterfly (Candalides absimilis)**

Found anywhere in orchard (day flying). Damage shown on pages 30 and 144. Minor pest.

**Orange fruitborer (Isotenes miserana) moth**

Found anywhere in orchard (night flying). Damage shown on page 26. Minor pest in nurseries.

**Doubleheaded hawk moth (Coequosa triangularis)**

Found anywhere in orchard (night flying). Minor pest.

**Variegated hairy caterpillar (Anthela varia) moth**

Found anywhere in orchard (night flying). Damage shown on page 28. Minor pest.
Pencilled blue butterfly (Candalides absimilis)

Found anywhere in orchard (day flying).
Damage shown on pages 30 and 144.
Minor pest.

Orange fruitborer (Isotenes miserana) moth

Found anywhere in orchard (night flying).
Damage shown on page 26.
Minor pest in nurseries.

Brown looper (Lophodes sinistraria) moth

Found anywhere in orchard (night flying).
Damage shown on page 32.
Minor pest.

Doubleheaded hawk moth (Coequosa triangularis)

Found anywhere in orchard (night flying).
Minor pest.

Pencilled blue butterfly (Candalides absimilis)

Found anywhere in orchard (day flying).
Damage shown on pages 30 and 144.
Minor pest.

Orange fruitborer (Isotenes miserana) moth

Found anywhere in orchard (night flying).
Damage shown on page 26.
Minor pest in nurseries.

Brown looper (Lophodes sinistraria) moth

Found anywhere in orchard (night flying).
Damage shown on page 32.
Minor pest.

Doubleheaded hawk moth (Coequosa triangularis)

Found anywhere in orchard (night flying).
Minor pest.

Pencilled blue butterfly (Candalides absimilis)

Found anywhere in orchard (day flying).
Damage shown on pages 30 and 144.
Minor pest.

Orange fruitborer (Isotenes miserana) moth

Found anywhere in orchard (night flying).
Damage shown on page 26.
Minor pest in nurseries.

Brown looper (Lophodes sinistraria) moth

Found anywhere in orchard (night flying).
Damage shown on page 32.
Minor pest.

Doubleheaded hawk moth (Coequosa triangularis)

Found anywhere in orchard (night flying).
Minor pest.

Pencilled blue butterfly (Candalides absimilis)

Found anywhere in orchard (day flying).
Damage shown on pages 30 and 144.
Minor pest.

Orange fruitborer (Isotenes miserana) moth

Found anywhere in orchard (night flying).
Damage shown on page 26.
Minor pest in nurseries.

Brown looper (Lophodes sinistraria) moth

Found anywhere in orchard (night flying).
Damage shown on page 32.
Minor pest.

Doubleheaded hawk moth (Coequosa triangularis)

Found anywhere in orchard (night flying).
Minor pest.
Bizarre looper (Eucyclodes pereoides) moth

Found anywhere in orchard (night flying). Damage shown on page 30. Minor pest.

Mango planthopper (Colgaroides acuminata)

Found on leaves, twigs and nuts. Incidental insect causing little if any damage.

Fruitspotting bug (Amblypelta nitida)

Found anywhere in the tree. Damage shown on page 102. Major pest.

Bananaspotting bug (Amblypelta lutescens lutescens)

Found anywhere in the tree. Damage shown on pages 46 and 102. Major pest in Queensland only.

Redshouldered leaf beetle (Monolepta australis)

Found on leaves, flowers and nuts. Damage shown on pages 22 and 86. Major pest in some areas.

Green vegetable bug (Nezara viridula)

Found anywhere on tree. Damage shown on page 150. Sporadic problem but capable of significant damage, particularly in northern NSW.

Leptocoris bug (Leptocoris rufomarginata and L. tagalica)

Found anywhere on tree. Damage shown on page 148. Sporadic problem but capable of significant damage.

Hibiscus mealybug (Maconellicoccus hirsutus)

Found on leaves, twigs and nuts. Damage shown on pages 36 and 146. Generally a minor pest.
**Cicada** (Psaltoda sp.)

Nymphal cases found on trunks and branches. Adults found anywhere. Damage on page 34. Sporadic, but capable of significant damage in individual trees.

**Lace bug** (Ulonemia sp.)

Found on flowers and occasionally leaves. Damage shown on page 98. Minor pest.

**Predatory mirid bug**

Found in flowers. Predator of flower caterpillar.

**Predatory ladybird beetles**

Found anywhere on tree. General predator of aphids.

**Predatory mealybug ladybird** (Cryptolaemus montrouzieri)

Found anywhere on tree. Predator of hibiscus mealybug.

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**Sigastus weevil** (Sigastus sp.)

Found anywhere in tree but mainly on nuts. Damage on page 152. Can cause significant damage in a small area of the Atherton Tableland.

**Rutherglen bug** (Nysius vinitor)

Found in flowers. Incidental insect causing little or no damage.

**Predatory ladybird beetles**

Found anywhere on tree. General predator of aphids.

**Predatory mealybug ladybird** (Cryptolaemus montrouzieri)

Found anywhere on tree. Predator of hibiscus mealybug.

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**Assassin bug** (Pristhesancus plagipennis)

Found anywhere on tree. General predator of most pests, particularly aphids, mealybugs, scales, caterpillars and thrips.

**Predatory ladybird beetles**

Found anywhere on tree. General predator of aphids.

**Predatory mealybug ladybird** (Cryptolaemus montrouzieri)

Found anywhere on tree. Predator of hibiscus mealybug.
Mirid bug (Taylorilygus pallidulus)

- Found mainly in flowers.
- Predator of small insects and eggs, and feeder on pollen and nectar

Queensland fruit fly (Bactrocera tryoni)

- Found anywhere on tree.
- Pest of other crops (not macadamia); often seen sheltering in trees.

Honey bee (Apis mellifera)

- Found in flowers.
- Major pollinator of flowers.

Native bee (Trigona sp.)

- Found in flowers.
- Major pollinator of flowers.

Lacewing (Mallada signata)

- Found anywhere on tree.
- General predator of most pests, particularly aphids, mealybugs, scales, caterpillars and thrips.

Syrphid fly (Melanastoma agrolas)

- Found mainly on flowers.
- Predator of aphids and thrips.

Trissolcus wasp (Trissolcus basilis)

- Found anywhere on tree.
- Parasite of eggs of green vegetable bug.
Tachinid fly (Argyrophyllax proclinata)

Found anywhere on tree. Parasite of yellow peach moth.

Coastal brown ant (Pheidole megacephala)

Found anywhere on tree. May carry mealybugs into the tree and ‘farm’ mealybugs and aphids for honeydew secretions, driving off predators.

Paper wasps (Polistes humilis)

Found anywhere on tree as individual wasps or in nests. General predator of pests, particularly caterpillars.

Lynx spider (Oxyopes sp.)

Found anywhere on tree. Predator of a wide range of pests.

Crab spider (Diaea sp.)

Found anywhere on tree. Predator of a wide range of pests.

Jumping spider (Opisthoncus sp.)

Found anywhere on tree. Predator of a wide range of pests.

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