Common seasonal pests: your handy guide to prevent the spread of animal and plant pests, diseases and weeds.

Department of Agriculture and Food, WA
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Common Seasonal Pests

Your handy guide to prevent the spread of animal and plant pests, diseases and weeds
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Front cover photo: Mediterranean fruit fly (photo by Scott Bauer, USDA). Back cover photos: European Red Mite (left) and Catasarcus weevil (right)
Common Seasonal Pests

Your handy guide to prevent the spread of animal and plant pests, diseases and weeds
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Introduction

Each year, we encounter a number of animal and plant pests, diseases and weeds that concern us when they make their regular seasonal arrival. These rogues damage our properties and can be quite costly to control.

You can’t barricade your property from all risks but you can be aware of what they are, how to recognise them and how to manage them. You can take positive steps to protect your property, animals, plants, and even the health of your family and the neighbours.

This “Common Seasonal Pests” publication provides easy identification of the most common pests around the home and garden. Highlighted also are some of the more important pests of quarantine concern to Western Australia.

It is hoped that “Common Seasonal Pests”, with its practical information, will readily assist you in locating the contact point for any of your animal or plant pest, disease or weed enquiries.

If in doubt, it’s best to look, check and ask an expert for advice and identification.

Plant and insect sampling kits are available from your local Department of Agriculture and Food office for those occasions when you want to identify an unfamiliar plant, disease or insect. Identification services are generally free of charge to home gardeners. The Department of Agriculture and Food’s personnel cannot provide advice based on a description of the pest or symptoms only. For the correct specimen procedures please refer to page 95 for details.

In Western Australia, legislation is in place to protect our agriculture and natural resources from invasive animals and plants.

As a landholder and community member, it is wise to become familiar with your responsibilities, so that you can help prevent the introduction and spread of declared animal and plant pests, diseases and weeds.

If you see any unfamiliar animal and/or plant pest, disease or weed, contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

You will find more information by visiting the website at www.agric.wa.gov.au.
The following pests are not yet established in Western Australia.

Please report these and any other suspected quarantine pest immediately to the Department of Agriculture and Food.
Apple scab  
*Venturia inaequalis*

**What does apple scab look like?**
Leaves show black spots on upper or lower leaf surface. Spots later turn olive green or black and velvety. Older spots on the upper surface give infected leaves a blistered, scabby appearance. 
On fruit, infections are initially small, black, and circular. As spots enlarge, the central area becomes black and corky, bordered by a greyish-white band. Fruit infected early in development becomes scabbed; infection on nearly mature fruit shows small spots with little distortion.

**What damage can apple scab cause?**
Apple scab is not established in Western Australia. The fungus infects the aerial parts of the apple tree. Scab-infected fruit is unmarketable. Several outbreaks of apple scab have occurred in Western Australia but each outbreak of the disease has been successfully eradicated.

**When am I likely to see this pest?**
During the growing season when there are leaves and fruit on the tree.

**What if I find apple scab?**
Contact the Department of Agriculture and Food who will ask you to send a live specimen to be positively identified. Send some leaves, fruit in a tightly sealed bag or container, to avoid fungal spore contamination of the environment (apple scab spores can drift up to 16 km in the wind). See ‘Sending specimens for identification’, page 95.

**Where do I seek advice?**
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘apple scab’ in the search facility and click ‘go’.
Asian gypsy moth
*Lymantaria dispar*

What does a gypsy moth look like?
Caterpillars are hairy, grow up to 60 mm long and have two rows of large spots along the back, usually consisting of five pairs of blue and six pairs of red running from head to rear.
Adult male moths are tan to brown with irregular black wing markings, feather-like antennae, and a wingspan of 37–50 mm. Females are larger, with a wingspan of up to 62 mm. They are whitish with faint darker, wavy bands across the wings. The female moth is a strong flier.

What damage can gypsy moth cause?
Serious economic and ecological damage if introduced, affecting native and introduced tree species. Because the female moth lays its eggs indiscriminately on imported objects (eg cars, machinery, shipping containers etc), the risk of its introduction to Australia is on-going.

When am I likely to see this pest?
Eggs and caterpillars are seen in spring. All of the damage occurs during the caterpillar stage, as the insects feed on leaves and defoliate trees and bushes. The pupal or cocoon stage begins in January or February. Adult moths emerge from the dark brown pupal cases in 10–14 days. The moth flies until the end of March. They are unlikely to be active in winter.

What if I see an Asian gypsy moth?
If you suspect an Asian gypsy moth incursion contact the Pest and Disease information Service for advice (see below).

Where do I seek advice?
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au”.

Do you want to know more?
More information is available at http://www.agric.wa.gov.au. Type ‘Asian gypsy moth’ in the search facility and click ‘go’.
Asian longicorn/longhorn beetle
*Anoplophora glabripennis*

**What do Asian longicorn beetles look like?**
Adults are black, shiny, 20–35 mm long and 7–12 mm wide. Females are generally larger than males. Each wing-cover has about 20 white spots. Antennae are black with white rings, about body-length on females and double body-length on males. Feet are plate-shaped. Larvae are off-white, up to 50 mm long, soft bodied with a hard, brown head.

**What damage can Asian longicorn beetles cause?**
Larvae feed and tunnel under bark. Adults emerge from the bark just above the original egg-laying sites through the summer leaving large, circular shot holes, 10 mm wide. They then fly to the upper foliage to feed, mate and lay eggs. They pose a threat to our natural bush, parklands and pome fruit orchards.

**When am I likely to see this pest?**
All year round on imported timber and wooden objects (pallets, packing materials, furniture, live trees). Once in Australia, larvae may spend 1–2 years in trees but generally emerge as adults in summer. Adults are strong fliers and may fly for 2–3 days.

**What if I find Asian longicorn beetle?**
If you suspect an Asian longicorn beetle incursion contact the Pest and Disease information Service for advice (see below).

**Where do I seek advice?**
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

**Do you want to know more?**
Type ‘*Anoplophora glabripennis*’ into a search facility (eg http://www.google.com.au) and click on ‘search’.
Bumblebee
*Bombus terrestris*

**What does a bumblebee look like?**
Bumblebees are large, hairy social bees. The bumblebee is black with one yellow/ochre band across the front of the thorax and another across the abdomen. The tip of the abdomen is buff or white. Workers range from 8-22 mm in length.

**What damage do bumblebees cause?**
Bumblebees are not present in Western Australia but would compete with native nectar feeding fauna, reduce seed production of native plant species and increase seed production of introduced plants, or “sleeper weeds”. They also sting, and are a potential threat to the environment and primary production.

**When am I likely to see this pest?**
Bumblebees are not established in Western Australia but have established in Tasmania.

**What if I find bumblebees?**
Contact the Department of Agriculture and Food with a description of the insect (size, colour, appearance, noise when flying), the date, time and location of the sighting, and any information on the habitat, host plant or flower and weather conditions.

**Where do I seek advice?**
Call the Pest and Disease Information Service on freecall 1800 084 881. E-mail info@agric.wa.gov.au

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘bumblebees’ in the search facility and click ‘go’.
Cane toad

*Bufo marinus*

**What does a cane toad look like?**
Cane toads are heavily built, with rough, warty skin and are typically 10-15 cm long. They range from dull brown, yellowish to blackish on top and mottled brown underneath. Cane toads have large glands behind the head, and the call of the male is a broken brrrrrrr sound like a telephone dial tone.

**What damage can cane toads cause?**
They destroy beneficial insects like dung beetles and present an economic threat to beekeepers, particularly in spring. They also threaten native reptiles and mammals. Dogs or cats that bite cane toads can die from cane toad poison.

**When am I likely to see this pest?**
Cane toads can enter Western Australia from interstate by hitching a ride on camping gear or vehicles, so make sure you check any pot plants, garden equipment and tyres when entering the State, as these toads are prohibited in Western Australia.

**What if I find a cane toad?**
These animals are prohibited in Western Australia, so make sure you contact the Pest and Disease Information Service on freecall 1800 084 881.

**Where do I seek advice?**
Contact the Department of Agriculture and Food as soon as possible.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘cane toad’ in the search facility and click ‘go’.
CITRUS CANKER

Citrus canker
Xanthomonas axonopodis pv citri

What does citrus canker look like?
Symptoms appear on fruits, leaves and twigs and consist of small, round blister-like lesions. Lesions are raised, crater-like, tan to brown and surrounded by an oily, water-soaked margin or a yellow ring or halo. On fruits, lesions appear scab-like or corky and a yellow halo may be absent. On leaves, lesions can be seen on both sides.

What damage does citrus canker cause?
Severe infection can lead to defoliation, dieback, blemished fruit and premature fruit drop. The disease affects plants from the genera Citrus, Fortunella and Poncirus. The Asian strain of the disease is most virulent and affects grapefruit, lime, mandarin, tangerine, satsuma plums and kumquat. Citrus canker also affects trifoliate orange rootstock.

When am I likely to see this pest?
The disease occurs in any season on younger trees when there is a flush of new growth. However, the disease becomes sporadic as trees reach full fruit development and produce fewer new shoots.

What if I find citrus canker?
Contact the Department of Agriculture and Food who will ask you to send a specimen to be positively identified. Send some leaves, fruit in a tightly sealed bag or container, to avoid fungal spore contamination of the environment. See ‘Sending specimens for identification’, page 95.

Where do I seek advice?
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

Do you want to know more?
More information is available at http://www.agric.wa.gov.au. Type ‘Citrus canker’ in the search facility and click ‘go’.
Citrus longicorn beetle
Anoplophora chinensis

What do citrus longicorn beetles look like?
Citrus longicorn beetle is easily confused with the Asian longicorn beetle (page 8). It is 21–37 mm long with shiny black hard outer wings (elytra), marked with 10–12 white spots. Males are generally smaller than females, and have their abdomen tip entirely covered by the elytra in contrast to the partially exposed abdomen of females. The male’s antennae are twice as long as the body. The female’s antennae are only slightly longer than the body. Antennae are black with white rings. Larvae are off-white, up to 50 mm long, soft bodied with a brown head.

What damage do citrus longicorn beetles cause?
The pest is a threat to natural areas as well as fruit trees and woody ornamental plants. Citrus longicorn beetle attacks healthy trees. Larvae feed and tunnel on the woody portion of the host plant trunk.

When am I likely to see this pest?
Pests can enter Australia on imported live trees, timber and wood pallets or packing materials. For this reason timber products from overseas must be treated. Citrus longicorn beetles take about one year to reach adulthood and generally emerge as adults in summer.

What if I find citrus longicorn beetle?
Send a live specimen to the Department of Agriculture and Food. See ‘Sending specimens for identification’, page 95.

Where do I seek advice?
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

Do you want to know more?
Type ‘Anoplophora chinensis’ into a search facility (eg http://www.google.com.au ) and click on ‘search’.
CODLING MOTH

Codling moth
Cydia pomonella

What does a codling moth look like?
It is the caterpillar and damage that are most often seen. The caterpillar burrows into pome fruits (apples and pears) and eats the seeds out of the core. Secondary rots may then develop. Adult codling moths are dull brown and about 1 cm long with a dark patch and metallic bronze markings at the end of each wing. Grubs reach up to 2 cm long when fully grown. Pupae are dark orange-brown and about 1 cm long.

What damage can codling moth cause?
Codling moth is the most damaging insect pest of apples and pears, and can tunnel into every single fruit on a tree. Damaged fruit may fall prematurely and is unmarketable with tunnels filled with larval excreta. Codling moths prefer apples, but they will also attack pears, nashi, quince and crab apples (the pome fruits).

When am I likely to see this pest?
Spring to autumn.

What if I find a codling moth?
If you find an apple or other pome fruit with a excreta-filled tunnel reaching into the core and the seeds are chewed, take it to the nearest Department of Agriculture and Food office immediately. See ‘Sending specimens for identification’, page 95. It is illegal to bring fruit into Western Australia from the eastern states or from overseas.

Where do I seek advice?
Contact the nearest office of the Department of Agriculture and Food or the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘codling moth’ in the search facility and click ‘go’.
European house borer (EHB)
*Hylotrupes bajulus* Linnaeus

What does a European house borer look like?
The adult is brownish-black and slightly flattened, ranges from 8–25 mm in length, with antennae about half as long as the body. The larvae live in dead limbs of living or dead pine trees and in untreated pine products. The adult beetle emerges from infested trees. People often confuse the native longicorn beetles (15–50 mm in body length) with EHB (8–25 mm), but native longicorn beetles are generally bigger and have relatively longer antennas. EHB has only been detected in seasoned untreated pine in Western Australia. The larvae live within timber for anything from 2–12 years.

What damage can European house borer cause?
EHB can destroy structural timber by tunnelling and weakening its strength.

When am I likely to see this pest?
Generally the larvae are not seen. The most visible evidence to indicate that untreated pine is affected is the presence of oval shaped exit holes running with the woodgrain and frass (a mixture of fine wood dust and excrement). You may hear a soft scraping sound as EHB larvae eat through the timber. The adult beetle emerges from the timber between September and March.

What if I see a European house borer?
Send a preferably live specimen to the Department of Agriculture and Food. See ‘Sending specimens for identification’, page 95.

Where do I seek advice?
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

Do you want to know more?
EUROPEAN WASP

European wasp
*Vespula germanica*

**What does a European wasp look like?**
With distinct bright yellow and black markings, yellow legs and black antennae, the European wasp is slightly larger than a bee.

**What damage can European wasps cause?**
They are a serious pest in orchards and vineyards in summer and are attracted to raw meat at barbeques and pet bowls. European wasps can enter opened beer or soft drink cans resulting in life-endangering stings to the inside of the mouth and throat. Additional to being agricultural pests, European wasps are serious environmental pests and can impact on human health.

**When am I likely to see this pest?**
Mainly from December to June. They gravitate to meat in pet bowls and barbeques.

**What if I find a European wasp?**
Detection of wasps relies on reports from the public. European wasps have not yet established in Western Australia, so call the local office of the Department of Agriculture and Food. Nests are shaped and sized like a soccer ball, and are usually found underground, or in wall cavities, roof voids and hollow trunks.

**Where do I seek advice?**
European wasp nests are treated and removed free of charge by the Department of Agriculture and Food. Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au. Advice is also available from your local council.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘European wasps’ in the search facility and click ‘go’.
EXOTIC FRUIT FLIES

Queensland, papaya and melon fruit flies
_Bactrocera tryoni, Bactrocera papayae and Bactrocera cucurbitae_

What do exotic fruit flies look like?

Queensland fruit fly: The adult fly is 6-8 mm long. The thorax is red-brown, with two yellow shoulder patches. The abdomen is dark-brown. The wings are clear.

Papaya fruit fly: The thorax of the papaya fruit fly is dark brown; the abdomen is red-brown with a distinct ‘T’. There are two yellow shoulder patches and the wings are clear.

Melon fruit fly: The thorax of the melon fruit fly is red-brown, with two yellow shoulder patches and a yellow strip in the middle of the thorax. The abdomen is red-brown, with a distinct ‘T’. The wings have dark black patches.

What damage can exotic fruit flies cause?
Exotic fruit flies attack a wide range of hosts. Queensland fruit fly attacks a wide range of fruit and vegetables. Look for unusual patterns such as fruit fly attacking green...
tomatoes or undamaged avocados. Papaya fruit flies attack most
commercial fruit including bananas, citrus, chillies, guava, papaya,
mango, tomato, stone and pome fruit. Melon fruit flies attack cucurbit
crops such as cucumber, pumpkin, watermelon, marrow and gourds. It
has also been recorded attacking avocado, beans, pomelo, granadilla,
papaya, peach, and the stems of tomatoes.

**When am I likely to see these pests?**
All year when fruits are present.

**What if I see exotic fruit flies?**
If possible send a live specimen to be positively identified to the
Department of Agriculture and Food. See ‘Sending specimens for
identification’, page 95.

**Where do I seek advice?**
Contact the Pest and Disease Information Service on freecall 1800 084
881 or E-mail info@agric.wa.gov.au.

**Do you want to know more?**
More information is available at http://www.agric.wa.gov.au or at
www.google.com.au. Type ‘exotic fruit flies’ in the search facility and
click ‘go’.
Horsetails
*Equisetum spp*, *Equisetum arvense*

**What does a horsetail look like?**
Horsetail is an erect non-flowering perennial herb with ribbed or grooved annual stems 10–60 cm high, and tuber-bearing creeping rhizomes (underground stems). The stems are jointed and two types are formed: green vegetative hollow stems and white, fertile stems. The green stems can be higher than 50 cm and 1.5–5 mm in diameter. Some species have whorls of solid 3–4 angled branches, rising below the cup nodal sheaths. Fertile stems grow to more than 30 cm tall and up to 8 mm in diameter, terminating in a long-stalked spore-producing cone.

**What damage can horsetails cause?**
Horsetail is an invasive garden escape’ plant that grows mainly in damp places. It is difficult to eradicate and can be a major pest in irrigated horticulture or irrigated paddocks and wetlands. Horsetails reduce crop yields by producing inhibitory substances that depress the growth of neighbouring plants. It is also poisonous to stock.

**When am I likely to see this pest?**
Horsetails are perennial. They actively grow and propagate from early spring to late autumn.

**What if I see horsetails?**
Horsetails are a declared weed and it is the landowner’s responsibility to control them.
Send a live specimen to be identified to the Department of Agriculture and Food. See ‘Sending specimens for identification’, page 95.

**Where do I seek advice?**
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

**Do you want to know more?**
ORIENTAL FRUIT MOTH (OFM)

Oriental Fruit Moth (OFM)
*Grapholita molesta*

What does an oriental fruit moth look like?
The adult is a small greyish, mottled moth about 6-7 mm long, with a wingspan of about 10-15 mm. Its wings are held roof-like over its body. Eggs are flat, oval and whitish, and are laid singly on twigs or the undersides of leaves near growing terminals, or on water sprouts. Newly hatched larvae are 1.5 mm long and are cream - coloured with a black head. Older larvae have a brown head capsule, are slightly pink, and grow to about 9-13 mm long.

What damage can oriental fruit moth cause?
OFM is a serious pest of peaches and nectarines also causing economic damage on other commercial fruits such as apricots. In recent years its incidence on apples has increased. OFM damage in pome fruit is difficult to distinguish from codling moth damage. Young trees can suffer distortion of growing shoots and stems. Fruit quality may be reduced.

When am I likely to see this pest?
September to February.

What if I see oriental fruit moth?
If possible send a live specimen to be positively identified to the Department of Agriculture and Food. See ‘Sending specimens for identification’, page 95.

Where do I seek advice?
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

Do you want to know more?
RED IMPORTED FIRE ANT

Red imported fire ant
Solenopsis invicta

What does a red imported fire ant look like?
Small ants with a reddish brown head/thorax and darker brown/black tail. Worker ants vary in size from 2-6 mm. Red imported fire ants (RIFA) have a fiery sting which blisters and pustules develop at the site of the stings. They make unusual mounds that can be up to 30 cm high with no obvious entrance hole. There is often green vegetation protruding from the mound.

What damage can RIFA cause?
RIFAs are an urban and human health pest, but also have a significant impact on agriculture and the environment. As an urban pest, RIFA thrive in backyards, school grounds, golf courses street verges and on the edges of waterways. RIFA stings can require medical attention, with severe cases requiring hospitalisation. They commonly invade indoors and can also injure pets. RIFA chew electrical insulation and cause extensive damage to electrical devices. When building mounds, they excavate huge amounts of soil, causing structural problems under paving, driveways, and retaining walls. They also damage many cultivated plants. They have been found in Queensland and can be transported in pot plants and shipping containers.

When am I likely to see this pest?
All year round.

What if I find a red imported fire ant?
A nationwide survey is underway to detect any RIFA in Australia. You can assist by submitting suspect ant specimens to the Department of Agriculture and Food. Collect specimens away from the nest, spraying first, to reduce the risk of being stung. Stick a dozen or so to some sticky tape. See ‘how to send insects for identification’, page 95.

Where do I seek advice?
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘red imported fire ant’ in the search facility and click ‘go’.
Indian ringneck parakeet  
*Psittacula krameri*

**What does an Indian ringneck parakeet look like?**
The Indian ringneck is a long-tailed, grass-green, red-beaked parrot, 37-43 cm in length and weighing 95-143 g. They come in many colour variations, due to breeding. Mature males have narrow black and pink collars.

**What damage can Indian ringneck parakeets cause?** The Indian ringneck is a moderate agriculture pest. Free living populations could threaten the environment and agriculture in Australia. Native parrot species are potentially at risk from competition for nest hollows. Agricultural crops such as sunflower and other oilseeds would be at risk from attack by the ringnecks. Horticulture crops, particularly fruit and viticulture, would also suffer damage.

**When am I likely to see this pest?**
All year round. Indian ringnecks may only be imported and kept in this State under permit. They are social birds, often in small groups, though they can form flocks of hundreds at roosts and food sources. They are very vocal birds, calling loudly while in flight and when roosting. They have a variety of distinctive, screeching calls, including a shrill kee-ak. Their flight is swift and direct with rapid wing beats.

**What if I see an Indian ringneck parakeet?**
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

**Where do I seek advice?**
As above.

**Do you want to know more?**
Salvinia
*Salvinia molesta*

**What does salvinia look like?**
Salvinia is a free-floating aquatic fern, made up of pairs of oval, green to brown leaves connected by a horizontal stem. The top of each leaf has many tiny, hair-like structures that split then rejoin at the tips to form an eggbeater-like structure. Under the water, each plant has another leaf that looks like a small bunch of brown roots.

**What damage can salvinia cause?**
Salvinia disrupts the use of waterways for recreation, boating, fishing and swimming. It helps accumulate litter and promotes water stagnation that encourages breeding of disease-carrying pests, providing a good habitat for larval development (eg mosquitoes).

**When am I likely to see this pest?**
Any time of the year.

**What if I find salvinia?**
Report any plant that you suspect, could be salvinia, to the Pest and Disease Information Service on freecall 1800 084 881. It is illegal to cultivate, sell or transport it, and any known plants must be destroyed.

**Where do I seek advice?**
Call the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘salvinia’ in the search facility and click ‘go’.

Alternatively, ask the Department of Agriculture and Food for the brochure “Wetlands not Weedlands”.

**RED-EARED SLIDER TURTLE**

**Red-eared slider turtle**  
*Trachemys scripta elegans*

**What does a red-eared slider turtle look like?**  
The red-eared slider is a freshwater turtle with a distinctive red stripe behind each eye. The red stripes may fade as the turtle ages, however, the finer, pale stripes around the head will remain. The undersides of the red-eared sliders are pale yellow with dark smudges. Turtles can live for about 40 years, and grow to about 30 cm in length. Unlike native turtles, the red-eared slider turtle can retract its head straight back into its shell; native species withdraw their heads to the side. You will see them in the water floating at the surface and sometimes out on the land where they lay their eggs and bask.

**What damage can red-eared slider turtles cause?**  
The turtle is very aggressive, and will out-compete native species for food and space in our waterways and lake systems. Large specimens can inflict a painful bite. The turtle has few natural predators in Australia and is a declared pest.

**When am I likely to see this pest?**  
Red-eared slider turtles are more active in the warmer seasons. You are most likely to see them during the day between October and May. One red-eared slider turtle was trapped in a suburban Perth wetland in early 2006.

**What if I see a red-eared slider turtle?**  
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

**Where do I seek advice?**  
As above.

**Do you want to know more?**  
Sparrow

What does a sparrow look like?
Slightly larger than a welcome swallow with a wedge-shaped finch-like bill, sparrows are small brownish birds. They hop across the ground, and are often found around human settlements or searching for food at bird aviaries.

What damage can sparrows cause?
Sparrows damage cereal and fruit crops in spring and summer, while their droppings can spoil crops, animal feed and stored grain. Their nests block gutters and down pipes, damaging buildings, and they are pests in human eating areas. Sparrows may also compete with native animals for food and nesting sites.

When am I likely to see this pest?
Sparrows could be seen at any time of the year. They are most likely to be seen at sea ports, but could also turn up in other locations like bird aviaries or food shops.

What if I find a sparrow?
These birds are prohibited in Western Australia, so make sure you contact the Pest and Disease Information Service on freecall 1800 084 881.

Where do I seek advice?
Contact the Pest and Disease Information Service as soon as possible.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘sparrow’ in the search facility and click ‘go’.
Starling
*Sturnus vulgaris*

**What does a starling look like?**
Starlings are stocky birds with fine, pointed beaks and short tails. They are about 21 cm long, and have glossy black feathers with a multi-coloured sheen, sometimes with spots. They are usually seen in flocks that turn quickly in a tight group. Starlings move across the ground by waddling, and feed in open grassland, although they are found in both urban and rural areas.

**What damage can starlings cause?**
Starlings attack soft fruits and cereals and destroy feed by defecating on it. They also nest in houses and tree holes, have helped kill roost trees and probably lead to the decline of native species.

**When am I likely to see this pest?**
Starlings could be seen at any time of the year. They are most likely to be seen in south-east coastal areas of the State, but could turn up in other areas.

**What if I find a starling?**
These birds are prohibited in Western Australia, so make sure you contact the Pest and Disease Information Service on freecall 1800 084 881.

**Where do I seek advice?**
As above.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘starling’ in the search facility and click ‘go’.
Water hyacinth
*Eichhornia crassipes*

**What does water hyacinth look like?**
Water hyacinth is a free-floating aquatic plant, with the spongy bulbous leafy bases helping it to float. Its leaves are about 5 cm in diameter, with long feathery roots and attractive large light purple flowers with a yellow centre.

**What damage can water hyacinth cause?**
Water hyacinth can block boat traffic, prevent swimming and fishing, as well as prevent sunlight and oxygen from getting into the water. Decaying plant matter reduces oxygen in the water, reducing fisheries, shading out submersed plants, crowding out plants, and reducing biological diversity.

**When am I likely to see this pest?**
Any time of the year, but flowering mainly in summer.

**What if I find water hyacinth?**
Water hyacinth is illegal to cultivate, sell or transport, and any known plants must be eradicated. Dry it out on newspaper and dispose of it with other green waste. Be vigilant for declared aquatic plants and report any plant that you suspect could be water hyacinth to the Pest and Disease Information Service on freecall 1800 084 881.

**Where do I seek advice?**
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘water hyacinth’ in the search facility and click ‘go’. Alternatively, ask the Department for the brochure “Wetlands not Weedlands”.

WATER HYACINTH
West Indian drywood termite
_Cryptotermes brevis_

What do drywood termites look like?
Drywood termites are exotic pests that appear similar to other termites (white ants) but the entire colony is contained within the timber being attacked. It is impossible to protect timber against attack using barriers as we use against native termites. The material ejected from the timber is a granular frass/excreta (about 1 mm in size like grains of sand, not fine dust), and can be seen especially under furniture or wood panelling. Look for damage to furniture without the evidence of the normal termite 'workings' or galleries.

What damage can they cause?
Drywood termites are very destructive timber pests in buildings, roof timber and furniture. They attack lower density timbers such as pine, spruce, native hoop pine, cedar and the sapwood of hardwoods, including eucalyptus species. They are most likely to occur in wooden objects imported from other countries, especially southern Africa, southern USA, Hawaii, South America and South East Asia.

When am I likely to see this pest?
All year round.

What if I find a drywood termite?
Submit samples of granular termite frass, termite soldiers or termite wings to the Pest and Disease Information Service. See ‘Sending specimens for identification’, page 95.

Where do I seek advice?
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘drywood termites’ in the search facility and click ‘go’.
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AFRICAN BLACK BEETLE

African black beetle
*Heteronychus arator*

What does an African black beetle look like?
The adult is shiny black and cylindrical, slow moving, around 15 mm long and can fly. Larvae are soil dwelling, 25 mm white curl grubs with three pairs of legs on the thorax, a prominent brown head with black jaws. Pupae are straw-coloured, cylindrical and 15 mm long.

What damage can African black beetles cause?
These pests cause significant economic damage to horticultural crops such as young vines, olives and potatoes. They can affect young ornamental trees, such as blue gums and young thin wooded plants such as proteas. They attack newly sown pastures and lawns, particularly kikuyu, couch and tufted perennial grasses such as perennial rye.

When am I likely to see this pest?
Mid-summer through to winter.

What if I find an African black beetle?
Prior to and after planting, monitoring should be undertaken. There is also a range of control options that can be investigated. If damage is suspected in lawns, try pulling on dead grass. If the dead grass is pulled out of the ground easily then it is probably because the roots have been eaten by the larvae which may indicate that control measures may be required. Try a soil wetter or fertiliser before opting for chemical control.

Where do I seek advice?
Your local plant nursery can assist you.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘African black beetle’ in the search facility and click ‘go’.
Weevils

What do weevils look like and what damage do they cause?

Garden weevil (adults) are about 7 mm long, dark greyish brown and have a pale white V stripe across the rear. The abdomen is noticeably bulbous. They have a characteristic weevil ‘snout’, and when disturbed, they remain still, pretending to be dead. They attack vines, strawberries, root vegetables, asparagus and ornamentals, as well as causing severe damage to foliage and fruit on apple and nectarine trees.

Fuller’s rose weevil is an 8 mm long dull grey-brown weevil with a broad snout. This insect is a defoliating pest of grapevines, citrus and ornamental trees.

Apple weevil (adults) are about 8 mm long and shiny dark-reddish brown with a slightly bulbous abdomen. They are flightless and all are females. They attack young and mature grapevines, fruit and foliage of apple trees, summer fruit trees and olives and ornamentals.

When am I likely to see this pest?
Spring to autumn. These weevils are active at night and are best found using a torch.
What if I find weevils?
Larvae of all these weevils feed on the roots of plants. Removing weeds will lessen their presence. Avoid moving soil, fruit, tree prunings, machinery, bins or other equipment from infested to non-infested areas to confine weevils to infested parts of the orchard. Do the same when travelling from one orchard to another.
All the adults of these weevils are flightless so re-inestation is quite slow if good control is achieved. Registered sprays should be applied in October to kill adult weevils before they lay eggs. Sprays should be applied to the butts of shrubs or vines. The adults are active at night and sprays can be applied at night to kill adult weevils in dense garden beds.

Where do I seek advice?
Your local plant nursery can assist you.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘garden weevil’ in the search facility and click ‘go’.
Cabbage white butterfly
*Pieris rapae*

**What does a cabbage white butterfly look like?**
The adult butterfly has cream wings with one or two black spots on each wing. Wingspan is 30-40 mm. They fly by day and lay singular, bullet shaped eggs on leaves. Grubs hatch from eggs and are pale green and slow moving and grow up to 30 mm long. Mature grubs pupate in yellow-green smooth cocoons attached to the leaves or stems.

**What damage can cabbage white butterfly cause?**
Caterpillars of cabbage white butterfly can consume all parts of brassica leaves and flowers. They cause irregular areas on edges of leaves and can wipe out entire seedlings and young plants.

**When am I likely to see this pest?**
Numbers steadily increase over the warmer months.

**What if I find a cabbage white butterfly?**
Monitor for eggs or grubs on plants in the cabbage family. Control can be achieved by using chemical or biological insecticides which are available from hardware stores and nurseries.

**Where do I seek advice?**
Your local plant nursery can assist you.

**Do you want to know more?**
More information is available at [www.agric.wa.gov.au](http://www.agric.wa.gov.au). Type ‘cabbage white butterfly’ in the search facility and click ‘go’.
Diamondback moth
*Plutella xylostella*

What does a diamondback moth look like?
The adult moth is 8-10 mm long and folds its wings over its body, forming a tent-like shape. Wings are light brown with three pale diamond shapes. Grubs hatch from eggs and are pale yellowish-green. They wriggle violently and drop from the plant when disturbed. Mature grubs (10-12 mm long) pupate in white mesh cocoons attached to the leaves or stems.

What damage can diamondback moths cause? Diamondback moth is a major caterpillar pest of brassica and crucifer vegetable crops and, in some seasons, canola crops in Australia. Only the caterpillars (grubs) cause damage by feeding on leaves, buds, flowers and seed-pods of brassica species. The level of damage varies greatly and depends upon the plant growth stage, the numbers, size and density of grubs.

When am I likely to see this pest?
Populations are lowest during the colder months. Large flights of egg-laying moths occur in spring; each female can lay up to 200 eggs. Numbers steadily increase over the warmer months, then diminish at the end of autumn.

What if I find a diamondback moth?
Control this pest at the grub stage by using chemical or biological insecticides which are available from hardware stores and nurseries.

Where do I seek advice?
Contact the Pest and Disease Information service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘diamondback moth’ in the search facility and click ‘go’.
**FERMENT/VINEGAR FLY**

**Ferment/vinegar fly**  
*Drosophila* spp.

### What does a ferment/vinegar fly look like?  
**Ferment flies** are often confused with Mediterranean fruit fly, but are much smaller (3 mm compared to 4-5 mm). They have a tan to brownish black body with distinctive red eyes.  
**The ferment/vinegar fly** is a small, yellowish fly with distinct red eyes and is seen around rotting fruit. The larvae feed on the bacteria and yeast found in rotting fruit and can cause great problems for wineries and fruit-juice producers. The ferment/vinegar fly is not actually a fruit fly as it does not feed on fruit directly, just the yeasts associated with rotting fruit.

### What damage can ferment/vinegar fly cause?  
The ferment/vinegar fly tend to be more of a nuisance, but can contaminate food with bacteria. The flies are attracted to all fresh and rotting fruit and vegetables. This includes bananas, grapes, peaches, pineapples, tomatoes and potatoes. Fermenting liquids such as beer, cider, vinegar, and wine can also attract ferment/vinegar fly.

### When am I likely to see this pest?  
Ferment/vinegar flies are present all year round but more likely to be a problem in summer/autumn.

### What if I find a ferment/vinegar fly?  
Sanitation is the key to control. Elimination of larval food and developmental sites is very important. Unless you eliminate the breeding site, ferment/vinegar fly will continue to be a problem. If adults are present, this means that larvae are developing in fermenting material nearby. Breeding sites include fruit bowls, garbage bins or juice spilled under a refrigerator. Reduce adult numbers by constructing a trap by placing a paper funnel (rolled from a sheet of notebook paper) into a jar which is then baited with a few ounces of cider vinegar, or other fermenting material.

### Where do I seek advice?  
Contact the Pest and Disease Information service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

### Do you want to know more?  
More information is available at www.agric.wa.gov.au. Type ‘flies’ in the search facility and click ‘go’.
What does a white cedar moth look like?
It is the larvae (caterpillars) that are the biggest problem. Large numbers of dark brown hairy caterpillars strip the leaves off cape lilac (also known as white cedar) trees and can invade indoors. Adult white cedar moths are grey/brown with a wingspan of over 40 mm. Grey coloured eggs are laid in clusters on cape lilac, or under shadecloth, and hatch as brown/black hairy caterpillars with a yellow stripe.

What damage can white cedar moths cause?
These are serious pests of the cape lilac tree only, and can invade homes, cars and out-buildings. They have at least two generations per year.

When am I likely to see this pest?
Late spring to autumn.

What can I do if I find a white cedar moth?
The caterpillars feed at night and descend to the ground to hide during the day. Control treatments, such as trunk banding and spraying should start in October, and you need to monitor trees for the pest on a weekly basis. There are very simple control measures that can be implemented to stop populations increasing, from as little as $5 per tree per year or simply have the tree removed.

Where do I seek advice?
Your local council, local plant nursery or licensed pest control operator can assist you.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘white cedar moth’ in the search facility and click ‘go’.
Mediterranean fruit fly
_Ceratitis capitata_

**What does a Mediterranean fruit fly (Medfly) look like?**
Most people initially find the larvae (maggots) of Mediterranean fruit fly. The larvae are white with a flat, pointed head, and are about 1 mm long when they hatch. They quickly grow to 8 mm. The adult fly is 3-5 mm long, light brown and slightly smaller than a housefly. The wings have distinct brown bands, the abdomen is brown and the middle has irregular patches of black and silver.

**What damage can Medfly cause?**
Medfly is known to infest over 200 fruit and vegetable species. In Western Australia, stone fruit, pome fruit, citrus, loquats and guavas are particularly susceptible. The larvae feed on the flesh of the fruit, causing it to decompose. When fully grown, larvae stop feeding and leave the fruit and burrow into the soil. Control needs to start when fruit are half-size.

**When am I likely to see this pest?**
Medfly are found year round. They are likely to become a problem for backyard growers in spring and summer.

**What if I find a Medfly?**
Contact the Department of Agriculture and Food for information on
control methods. Fly-infested or unwanted fruit can be destroyed by soaking it in water, topped with a layer of kerosene for 4-5 days. Medfly larvae can survive in water for a few days unless their oxygen supply is cut off. The kerosene layer prevents oxygen exchange between the air and water.

Freezing, cooking or pureeing fruit are other methods of disposal. Burial is not recommended. If you are finding maggots in crops such as green tomatoes, green capsicums, passion fruit and avocados, you may have Queensland fruit fly on your property and this should be reported to the Department of Agriculture and Food.

Where do I seek advice?
Report any suspicious flies to your nearest Department of Agriculture and Food office or the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘Mediterranean fruit fly’ in the search facility and click ‘go’.

Bait for Medfly.
Australian plague locust
*Chotoicetes terminifera*

**What does an Australian plague locust look like?**
Adults are between 24 and 40 mm long; the females are larger than the males. They vary in colour from light to dark shades of green to brown. Adult features are the dark blotch at the outer edge of the hind wing and the cadmium red colouration on the inside of the hind legs. After emergence locusts are small wingless nymphs, then hoppers. They develop into adults with wings within four to eight weeks.

**What damage can Australian plague locusts cause?**
The wingless hopper stage damages mainly pastures and lawns. They tend to avoid established green crops. Adult locusts can form swarms and fly into other areas, damaging pasture, ripening cereal, lupin and pulse crops, grapevines, fruit trees and native tree seedlings. If crops have completely dried off before locusts begin flying, the possibility of damage is considerably less.

**When am I likely to see this pest?**
Spring to autumn.

**What if I find an Australian plague locust?**
Australian plague locusts are not declared pests, so as a landholder, you are responsible for their control. Consult your local hardware store or chemical retailer for effective chemicals. Look out for and control young hoppers from September to October. By December, they are too big and difficult to control and will cause serious damage.

**Where do I seek advice?**
Advice on the control of Australian plague locusts is available from the Pest and Disease Information Service on freecall 1800 084 881 or E-mail: info@agric.wa.gov.au.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘Australian plague locust’ in the search facility and click ‘go’.
WINGLESS GRASSHOPPER

Wingless Grasshopper
*Phaulacridium vittatum*

What does a wingless grasshopper look like?
The wingless grasshopper is grey and 13-18 mm long. Most have short, undeveloped wings but some have functional wings and are capable of wind assisted flight. Some wingless grasshoppers have a pair of white stripes on each side of the thorax, while others don’t. Immature grasshoppers are very small, (about the size of a matchhead) and difficult to see. Damaged capeweed petals are often an indication of an infestation.

What damage can wingless grasshoppers cause?
Wingless grasshoppers are summer pests that cause most damage when eating green feed in the late nymphal and adult stages. They attack pastures, young and mature grapevines, orchards, vegetable gardens and native trees (especially if newly planted). They can completely defoliate and kill newly planted cuttings and rootlings.

When am I likely to see this pest?
Look out for and control young wingless grasshoppers in October.

What if I find a wingless grasshopper?
Wingless grasshoppers are not declared pests, so as a landholder, you are responsible for their control.

Where do I seek advice?
Advice on the control of wingless grasshoppers is available from the Pest and Disease Information service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘wingless grasshoppers’ in the search facility and click ‘go’.
SLATERS

Slaters

What do slaters look like?
Slaters are also known as woodlice, sowbugs and pillbugs, and are crustaceans completely adapted to living on land. Slaters grow through a series of moults with the juveniles looking like small versions of the adults.

What damage can slaters cause?
Slaters are scavengers, feeding mainly on decaying organic matter. They help break down organic matter and can be beneficial to the garden at low population densities. But at high population densities, they can damage new seedlings and ripe fruit in contact with the ground, such as strawberries. They can damage orchids in pots by feeding on roots and damaging the growing tips of the plants.

When am I likely to see this pest?
All year, but particularly spring and summer.

What if I find a slater?
Greater use of mulch and compost in gardens, and regular watering, favours the development of dense slater populations. Try to reduce compost, and rake it frequently in the middle of warm dry days. Reduce the amount of harbourages by removing empty pots and stacks of timber, bricks and rocks. Registered pesticides can be used to protect susceptible plants or where high populations occur.

Where do I seek advice?
Your local plant nursery can assist you.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘slaters’ in the search facility and click ‘go’.
**SLUGS**

**Slugs**

**What do these slugs look like?**

Slugs do not have shells and so generally live in areas of high humidity. The black-keeled slug is a uniform black to grey and up to 50 mm long and is slow-moving. The reticulated slug is a pale fawn colour with dark brown to grey markings. It is also slow moving.

**What damage can slugs cause?**

These introduced pests can damage a wide range of plants from seedling ornamentals to vegetable and broad acre crops such as canola.

**When am I likely to see this pest?**

Use a torch to inspect areas at night time from April to October. Slugs are rarely seen active during the daytime. Slugs tend to be a bigger problem on clay soils which retain moisture. In crop situations, outbreaks can occur after unusually wet summers.

**What if I find slugs?**

Slugs are controlled by baits, which should be applied in early April before they have a chance of laying eggs. Most baits can be toxic to dogs and cats.

**Where do I seek advice?**

Control products are available from your local plant nursery or hardware store.

**Do you want to know more?**

More information is available at www.agric.wa.gov.au. Type ‘slugs’ in the search facility and click ‘go’.
Common garden snail
*Helix aspersa*

**What does a common garden snail look like?**
Common garden snails are large, brown snails with shell diameters exceeding 30 mm in mature specimens. The brown shell has alternating dark and lighter brown spiral bands, and the body is dark grey. They are mainly found in cultivated and irrigated areas containing exotic plants. Common garden snails hide in shady protected areas, under creepers or hedges, climb trees or other vertical surfaces and spend the summer in a sealed, inactive state.

**What damage can common garden snail cause?**
Common garden snails damage a broad range of seedlings, garden plants and vegetables. They are a significant pest of citrus, damaging fruit, leaves and removing the bark from small branches. They occur in vineyards and deciduous fruit tree orchards, usually feeding on leaves but occasionally damaging young fruit.

**When am I likely to see this pest?**
April to October.

**What if I find a common garden snail?**
Abundant ground cover and vegetation growth provide ideal moisture levels, shelter and harbourages for snails and slugs to thrive. Practice good garden hygiene, control weeds and remove harbourages to reduce the problem. Use cultural and biological methods, and baits to control snails. Baits are best applied in April to kill snails before they get a chance to lay eggs. Baits can also be applied opportunistically in summer when thunderstorms activate snails. Most baits can be toxic to dogs and cats.

**Where do I seek advice?**
Your local plant nursery can assist you.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘snails’ in the search facility and click ‘go’.
Green snail
*Helix aperta*

**What does a green snail look like?**
The shell of mature green snails can become dark brown, but this colour is uniform without any bands of different colour. Green snails rarely exceed 25 mm in shell diameter, while immature snails have a yellow-green shell and a creamy coloured body.

**What damage can green snails cause?**
Green snails can damage most vegetables, cereals, lupins, grasses and some native Australian plants, particularly in autumn. They thrive in open grassland situations and inhabit areas of natural bush.

**When am I likely to see this pest?**
April to October.

**What if I find a green snail?**
Green snails are a quarantine concern outside the Perth metropolitan area. If you suspect you have green snails on your property, take a specimen and contact the Department of Agriculture and Food for confirmation. See “Sending specimens for identification’ page 95.

**Where do I seek advice?**
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail: info@agric.wa.gov.au. Control is similar to that of the common garden snail.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘snails’ in the search facility and click ‘go’.
Small pointed snail
*Cochlicella barbara*

What does a small pointed snail look like?  
The small pointed snail has a greyish-brown conical shell with brown bands of varying width, and is usually less than 10 mm long.

What damage can the small pointed snail cause?  
This snail can be a minor crop and pasture pest usually in autumn. It can contaminate grapes at harvest. Over summer, it remains inactive under the shelter of ground debris or in crops where it can contaminate them during harvest.

When am I likely to see this pest?  
April to October.

What if I find a small pointed snail?  
Pointed snails are not always attracted to and controlled by baits. Plants can be protected by application of registered sprays containing copper.

Where do I seek advice?  
Control products are available from your local plant nursery or hardware store. Most baits can be toxic to dogs and cats.

Do you want to know more?  
More information is available at www.agric.wa.gov.au. Type ‘snails’ in the search facility and click ‘go’.
White Italian snail
*Theba pisana*

What does a white Italian snail look like?
The shell is creamy-white, usually less than 20 mm in diameter, and usually with fine brown concentric lines of varying thickness. The umbilicus of the shell is obscured.

What damage can white Italian snails cause?
White Italian snails thrive in areas of alkaline sandy soils with high calcium content, mainly near the coast. They damage pastures and cereal crops, and contaminate harvested grains and grapes. In pastures, they compete with farm animals for vegetative growth, and their slime can reduce pasture palatability to stock.

What if I find a white Italian snail?
Send a sample to the Department of Agriculture and Food for confirmation – see ‘how to send specimens for identification’ (page 95). Apply baits in April before snails have a chance to lay eggs. In open paddocks, removal of standing vegetation by grazing reduces survival over summer.

Where do I seek advice?
Contact the Department of Agriculture and Food for crop situations and your local plant nursery in urban areas.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘snails’ in the search facility and click ‘go’.
Vineyard snail
*Cernuella virgata*

**What does a vineyard snail look like?**
The vineyard snail is similar to the white Italian snail. The spiral banding can be more pronounced and the 'umbilicus' (the hole about which the shell spirals) appears as an open circular hole, not partly obscured as in the white Italian snail.

**What damage can vineyard snails cause?**
The vineyard snail inflicts damage similar to that of white Italian snails, including contamination of harvested grain.

**When am I likely to see this pest?**
April to October.

**What if I find a vineyard snail?**
The distribution of vineyard snails in Western Australia is very limited. If you think it occurs on your property, send specimens to the Department of Agriculture and Food (see 'Sending specimens for identification' page 95) for confirmation.

**Where do I seek advice?**
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au. Apply baits in April to prevent snails laying eggs. In open paddocks, removal of standing vegetation by grazing reduces survival over summer.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘snails’ in the search facility and click ‘go’.
**CITRUS LEAFMINER**

**Citrus leafminer**  
*Phyllocnistis citrella*

**What does a citrus leafminer look like?**  
Citrus leafminer is about 2 mm long and silvery white in colour, and has wings fringed with long hairs. Eggs are found on the underside of leaves, while the moths fly at night and are rarely seen. The caterpillars are flat and yellow and 3 mm long when fully grown. They feed under the outer leaf surface, piercing the cells with their knife-like mouth parts and sucking the sap, leaving a silvery snake-like mine lined with a trail of excreta.

**What damage can citrus leafminer cause?**  
Tiny caterpillars of the citrus leafminer moth attack soft new growth of citrus trees, distorting leaves and leaving snake-like 'mines' under the leaves. Severe infestations can retard the growth of young trees, while infestations on older trees cause unsightly damage but not significant yield losses.

**When am I likely to see this pest?**  
Citrus leafminer is active all year, with highest numbers being found in spring and autumn.

**What if I find citrus leafminer?**  
Reduce infestations on garden trees by limiting the production of susceptible new leaves when leafminer numbers are highest. Prune growth flushes, fertilise in late winter to promote strong spring growth, don’t overwater in autumn, and don’t fertilise during summer. Use of white oil also helps.

**Where do I seek advice?**  
Your local plant nursery can assist you.

**Do you want to know more?**  
More information is available at www.agric.wa.gov.au. Type ‘citrus leafminer’ in the search facility and click ‘go’.
Aphids
*Aphididae, various species*

**What do aphids look like?**
Aphids are small, soft-bodied insects that grow up to 1-4 mm. They are sap suckers and form colonies on the new shoots of a wide range of garden plants. Species range from yellow to green to black. Colonies include mostly wingless and some winged individuals.

**Black citrus aphid**
*Toxoptera citricidus*

**What damage can aphids cause?**
Many garden plants are attacked by aphids include roses, all citrus, hibiscus, impatiens and vegetables. Aphids can stunt the growth of plants, cause wilting and buds to drop, resulting in poor flower and fruit set. Heavy feeding will cause leaves to become distorted.

**When am I likely to see this pest?**
Numbers are highest in spring.

**What if I find aphids?**
A range of chemicals are registered for aphids control in home gardens – check with your local hardware store or nursery. Commercial brands of garlic and chili sprays are available if you want to avoid the use of synthetic poisons. Garlic acts as a repellent to further aphid attack. Blasting aphids with a jet of water from your garden hose also works, but repeat every 2-3 days.

**Where do I seek advice?**
Your local plant nursery can assist you.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘aphids’ in the search facility and click ‘go’.
What scales look like?

Scales are broadly divided into two types: the soft scales and the hard scales. The soft scales are those whose outer covering appears to form an integral part of the insect, while the covering of the hard scales can be lifted off to expose the insect beneath. Scales are pests of citrus. The waxy covering protects them from desiccation and predators.

Cottony cushion scale mainly attacks wattles, along with roses, citrus and mulberries.

**White wax scale** is 6 mm long, and is covered by a soft waxy cover. The insect underneath is a uniform dull red.

**Pink wax scale** is similar to the white wax scale, but the covering is pink 3-4 mm long. Adult pink wax scale can be similar in appearance to white wax, but the wax is hard.

**Soft brown scale** is 2-5 mm long, brown, oval and flattened.

**Cottony cushion scale** is 5 mm long, reddish brown with black legs and usually covered by a white, mealy secretion.

**Red scale** is 2 mm, females are round in shape and males are oval protected by a hardened reddish brown scale.

**Black scale** is 3-5 mm long. Black scale are often found on olive trees.

**Mealybugs** are scale-like insects which are free living, and completely mobile although sluggish in movement. Mature females produce a mass of mealy filamentous material into which the eggs are laid. An oval, flattened, reddish or bluish insect is revealed when the mealy covering is removed. The average length of mature insects is around 5 mm.
What damage can they cause?
The main hosts of scale in the home garden are citrus trees and most perennial plants, but pears and a wide variety of ornamental trees and shrubs may be infested. Scale insects are sap suckers like aphids. They insert a needle-like sucking tube into the plant and draw out the sap, and then excrete it as honeydew. A black fungus known as sooty mould often develops on this honeydew, reducing photosynthesis and discolouring the fruit.

When am I likely to see this pest?
All year round.

What if I find wax scales?
Scale insects can be controlled using products such as petroleum oil. However, oils can damage plants so consult your local nursery to find out what is safe to use.

Where do I seek advice?
Control is dependent on timing, so contact your local plant nursery.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘wax scales’ in the search facility and click ‘go’.
AUSTRALIAN CITRUS WHITEFLY

Australian citrus whitefly
*Orchamoplatus citri*

What does a citrus whitefly look like?
The adult whitefly is about 1 mm long, and both pairs of wings and the body are covered with a white and soft, feathery coating of waxy secretion. The insects may cluster on young shoots and leaves or fly in clouds when disturbed. Another indication of infestation is the presence of eggs and other immature stages sticking to the undersides of the leaves.

What damage can citrus whitefly cause?
Lemon trees are the favourite host of the whitefly, but all citrus are liable to attack. Apart from the sap sucking habits of the insect, the sooty mould on the fruit is a concern. The mould grows on the sweet sugary material secreted by the whitefly. Ash whitefly can be confused with Australian citrus whitefly but generally occurs around late autumn and will not require control.

When am I likely to see this pest?
Spring and autumn.

What if I find a citrus whitefly?
There is a range of control methods available. See the Website below for more information.

Where do I seek advice?
Your local plant nursery can assist you.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘Australian citrus whitefly’ in the search facility and click ‘go’.
Whitefly
*Aleyrodidae*

**What does a whitefly look like?**
Whiteflies are usually first noticed when they rise in a cloud from a tree or shrub when disturbed. Their eggs may be seen on the backs of the leaves of the host plant and are often confused with scales. The pupae of the native species are black and look like fly specks.

**What damage can whitefly cause?**
Severe infestations can occur on some native eucalyptus and bottle brushes, vegetable crops (eg tomatoes) and tree crops (eg citrus). Whiteflies and scales frequently occur together.

**When am I likely to see this pest?**
There are several generations of whitefly a year. The greatest populations usually occur in spring and autumn. All growth stages can often be found on trees at one time.

**What if I find whitefly?**
These flies are of little importance and any trouble they may cause is on a few backyard trees. However, white oil sprays applied for scale control help keep the whitefly in check. The spray should be applied in spring, and a second treatment after 2 or 3 weeks may be advisable in the case of severe outbreaks. If you have a problem controlling whitefly with oils and an integrated approach does not work contact the Department of Agriculture and Food or your local plant nursery.

**Where do I seek advice?**
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au or your local plant nursery.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘flies’ in the search facility and click ‘go’.
**What do thrips look like?**
Thrips are small, slender, soft-bodied insects, just visible to the naked eye.

**What damage can thrips cause?**
Thrips pierce plant cells with their mouthparts and feed on plant juices. The collapse of plant cells can result in the formation of deformed flowers, leaves, fruit, stems and shoots. Thrips can attack ornamentals, vegetables, strawberries, and fruit tree crops such as citrus, avocado, pomefruit and stonefruit. Some species, such as western flower thrips, also vector plant viruses such as tomato spotted wilt virus (TSWV). TSWV can kill lettuce, tomato, capsicum, chilli and ornamental plants (eg asters, chrysanthemum and dahlias).

**When am I likely to see this pest?**
Thrips tend to be highly secretive and can be found in flowers, between touching fruit, or deep in the leaves of vegetables such as lettuce and broccoli. Thrips are present year round, but are more active during spring and autumn.

**What if I find thrips?**
Not all thrips are a problem. Thrips such as Cuban laurel thrips, which are found on *Ficus*, cause unsightly damage to leaves but are not usually a problem.

**Where do I seek advice?**
There are many different species of thrips and their identification is difficult. Your local plant nursery can provide control advice.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘thrips’ in the search facility and click ‘go’.
Azalea lace bug
*Stephanitis pyrioides*

What does an Azalea lace bug look like?
Lace bugs have clear, lacy wings. Adults are 4-6 mm in length, juvenile lace bugs are smaller, wingless and spiny. Both are mottled black and tan in colour.

What damage can lace bugs cause?
Lace bugs suck the sap from the undersides of azalea and rhododendron leaves, causing leaf stippling and leaf bleaching. The nymphs produce a sugary substance known as honeydew. Sooty mould (a black fungus) often develops on the honeydew, reducing photosynthesis. Other pests such as thrips and mites can cause similar damage. Lace bug damage can be distinguished from these by the presence of cast skins.

When am I likely to see this pest?
Lace bugs damage plants from spring to autumn. They especially attack plants growing in sunny, exposed situations.

What if I find a lace bug?
The bugs can be found by beating affected foliage over a tray or white cloth. Tolerate lace bug damage where possible. In most cases, lace bugs do not seriously harm plants. Ensure that your plants are healthy and not water stressed. Plants in hot, sunny locations are more likely to be damaged than ones planted in partial shade. If necessary, apply registered systemic insecticides. Damaged foliage can be pruned.

Where do I seek advice?
Your local plant nursery can assist you.

Do you want to know more?
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au
Mites (two-spotted mite, broad mite, citrus bud mite, citrus rust mite)

What do mites look like?
Mites are very small, often less than 1 mm. Mites are not insects, but are related to spiders. Like spiders and ticks, mites have 8 legs, though the nymphs have 6 legs.

What damage can mites cause?
Mites damage leaves and fruit by sucking out the cell contents. This can cause stippling and/or distortion of leaves, leading to leaf drop if populations are high. In citrus, the citrus bud mite causes damage by feeding on the developing fruit.

When am I likely to see this pest?
Mites are present all year round, but are likely to be more active during warmer months.

What if I find mites?
A small number of mites is not a cause for concern, but high populations can damage plants. Spraying with insecticides may cause an outbreak of mites, since natural enemies that keep mites under control are killed off. To treat mites, use mite specific miticides or horticultural oil. Do not use soaps or oils on water-stressed plants or when temperatures are high. Check the...
label and/or test them out on a portion of the foliage several days before applying a full treatment. Good coverage is important.

**Where do I seek advice?**
Your local plant nursery can assist you.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘mites’ in the search facility and click ‘go’.

*Mite damage to grapefruit.*

*Distortion of lemons caused by citrus bud mite. Control of this mite is rarely required.*
Common urban pest ants
There are over 3,000 species of ants in Australia and most are difficult to identify without a microscope and specialist knowledge. There are very effective baits for some pest species while others require control using sprays. Send specimens of pest ants to the Department of Agriculture and Food for identification so that the most effective control methods can be recommended.

What damage can ants cause?
Apart from being a nuisance pest in home and garden, ants can impact on orchards and gardens by protecting honeydew producing insects such as aphids and scales. These sap-feeding insects can damage trees if allowed to increase in numbers, and the protection they gain from predators and parasites by the presence of large numbers of ants allows them to increase to economically damaging levels.

When am I likely to see this pest?
Usually from late spring to early winter.

Where do I seek advice? Advice is not possible without the identity of the ants being known. The Department of Agriculture and Food has a free identification service - see ‘how to send specimen for identification’ (page 95).

Do you want to know more? More information is available at www.agric.wa.gov.au. Type ‘ants’ in the search facility and click ‘go’.
TERMITES

What do termites look like?
Termites are small, soft-bodied, social insects that feed on wood, grass, dead leaves, bark, humus, fungi or the dung of herbivores. They are commonly known as white ants, but are not related to true ants. Workers have no eyes and the antennae are beaded. There is no constriction of the abdomen (as in ants, bees and wasps).

What damage can termites cause?
There are more than 2,300 species of termites of which about 350 occur in Australia, and of these about 12 damage sound timber. Termites also recycle organic materials and aerate the soil. They are an important part in the diet of other animals and their activities provide hollow logs, which are used by birds and mammals for nesting.

When am I likely to see this pest?
Year round, but they tend to be more active under warm, humid conditions. Termite activity is often revealed by the presence of mud channels or galleries in places where timber contacts the ground. Untreated pine and karri timbers tend to be more susceptible than jarrah or treated pine. Moist soils, such as around leaking taps or gutters and also garden beds, will make areas more susceptible to termite activity.

What if I find termites?
This is not necessarily cause for concern as termites are ubiquitous, and have an important ecological role in the environment. If termite activity is associated with building structures (house, shed, pergola etc), leave this undisturbed and contact a pest control professional. Termite damage is more likely to be slow and steady, and significant damage will take weeks rather than days. Termites accidentally collected with firewood will soon perish once removed from the parent colony.
Where do I seek advice?
Seek advice from licensed pest control operator. Note that the suspected occurrence of exotic drywood termites (page 27), or other unusual damage to timber, should be reported to the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au.
Drywood termites nest within wooden structures and do not require contact with the ground. Drywood termites are hard to detect and damage is often significant prior to detection.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘Termite’ in the search facility and click ‘go’.
Honeybee (managed or feral)
*Apis mellifera*

**What does a honeybee look like?**
Bees are a dull shade of yellow or golden brown colour, have black stripes around their body and black legs. Worker bees are 13-17 mm long, while queen bees are much bigger.

**What damage do bees cause?**
Bees are becoming more of a problem in summer months as residential areas extend into native bushland. Swimming pools attract bees, particularly in hot weather, and they will also be located around taps. Bees sting to protect themselves, so avoid them and walk away quietly. Bees can establish their nests in wall cavities, roof voids and occupy tree hollows where they stop native birds nesting. Swarms can arrive at a property and settle on low trees and shrubs. These swarms can be the size of a football and can present a significant human health risk.

**When am I likely to see this pest?**
Large numbers of bees are seen during the spring and summer months when nectar and pollen are abundant and/or they are looking for water. Swarms are frequent in spring to January.

**What if I find bee nests?**
Don’t take any risks with swarms or nests, contact a licensed pest controller to remove swarms or exterminate bee nests.

**Where do I seek advice?**
Licensed pest control operators are best qualified to deal with bee problems. See ‘Pest Control’ or ‘Bee Removalist’ in the Yellow Pages. The Department of Agriculture and Food does not exterminate nests or remove swarms.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘bees’ in the search facility and click ‘go’.
Paper wasp

What does a paper wasp look like?
The yellow paper wasp is slender, 15 mm long with distinct yellow and black stripes and orange-brown antennae. The common paper wasp is similar but with brown, black and yellow stripes on its body and brown antennae. Their nests are a single layer of honey comb often attached under fence capping, patios or under roof tiles.

What damage can they cause?
People are usually stung when pruning, mowing or gardening as they disturb unseen nests. Some people can have an allergic reaction to the stings. Paper wasps prey on pest caterpillars, and aggressively defend their nests particularly in summer and autumn.

When am I likely to see this pest?
All year round but particularly from October to June.

What can I do if I find a Paper Wasp?
Destroy the nests and all the wasps. You can either do this yourself or employ a licensed pest control operator. Paper wasp nests can be found under eaves, fence capping, roof tiles and in dense shrubs. Nests can be sprayed with fly spray at night-time when all the wasps are on the nest and inactive. The nests need to be removed once all the wasps have been killed or they can re-activate via emerging pupae. Seal the nests in a plastic bag and dispose in the bin.

Where do I seek advice?
Contact the Pest and Disease Information Service on freecall 1800 084 881.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘paper wasp’ in the search facility and click ‘go’.
Cockroaches

What do cockroaches look like?
There is only a small number of pest cockroaches in Western Australia. They are differentiated on size, shape and colour:

**German cockroach**
About 12 mm long, beige to light brown with two dark stripes on the back of its head. It is the most widespread and successful cockroach and is commonly found in food storage areas. It seeks warm, moist conditions and prefers to roam at night. German cockroaches rarely fly.

**American cockroach**
The adult body is 30-50 mm long and reddish-brown with a yellowish band behind the head. It lives in warm, moist, dark conditions like sewers, wall, roof and sub-floor voids, around hot water pipes and heating implements. This cockroach readily flies.

**Brown-banded cockroach**
Adults are 13-14 mm long, pale brown with very pale bands across the thorax and abdomen. Unlike other pest species it can live in dry situations and may be active throughout the building rather than being restricted to the kitchen and damp areas.

**Native Australian black cockroach**
The native Australian black cockroach grows up to 35 mm in length and are black with a white margin and wingless. It is primarily an outside
species, but is found inside in the summer months, probably due to the cooler and damper conditions.

**What damage do cockroaches cause?**
Cockroaches can carry disease organisms like *Salmonella*, they may contaminate food and drinks with their droppings, or cause electrical shorts and fires in switches or electrical equipment.

**When am I likely to see the pest?**
All year round, dependent on the species but especially during the warmer months.

**What if I see a cockroach?**
High levels of hygiene are required for effective control. Avoid leaving food and water overnight, store food in tightly closed containers, store garbage in tightly closed containers, fill cracks and crevices that can act as shelter, clean ovens, cupboards and shelves and avoid dropping crumbs and spilling sweet drinks. Use surface sprays, baits or dusts for chemical control.

**Where do I seek advice?**
Contact a pest control operator, chemical retailer or hardware store for control methods.

**Do you want to know more?**
**Portuguese millipede**  
*Ommatoiulus moreletti*

**What does a Portuguese millipede look like?**
These pests have a smooth, cylindrical body, with adult millipedes ranging in colour from slate-grey to black. Juveniles are light brown with a darker stripe along each side. Adult millipedes range from 20-45 mm. They can occur in large numbers, especially after rain, and curl up into a tight spiral when disturbed.

**What damage can they cause?**
Portuguese millipedes are nuisances in autumn and spring when they invade houses and gardens, and can occasionally damage crops such as melons, strawberries, tomatoes and potatoes. They are attracted to lights at night, but cause no harm in small numbers and do not breed inside.

**When am I likely to see this pest?**
Following rain from April onwards with another peak in activity in September/October.

**What if I find a Portuguese millipede?**
Turn off lights close to buildings, and close curtains, blinds and doors to minimise escaping light. Physical barriers can stop millipedes from entering houses. Also, clean away decaying leaves, other garden litter and compost near the house to reduce areas where they might shelter. Biological and chemical control methods are also available.

**Where do I seek advice?**
Contact the Department of Agriculture and Food or your local plant nursery or your local shire/council can assist you.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘Portuguese millipedes’ in the search facility and click ‘go’.
Spiders

What do these spiders look like?

There are several spiders that are commonly encountered, which are of human-health significance. Some of these are described below:

**White tail:** Dark coloured, matt black finish with (legs stout and dark reddish-brown) cylindrical (greyish-brown oval-shaped abdomen) bodies with a distinct white spot on the tip of the dark abdomen. Female spiders can reach 18 mm long.

**Trapdoor:** Are often mistaken for funnel-web spiders, to which they are related. This is an ancient group with the fangs only able to strike downwards, hence they rear up defensively when threatened. The spiders are usually large and black or dark brown.

**Huntsman:** Large brown spiders, flattened with the first 3 pairs of legs at least, bent forwards.

**Black house:** Also known as window spiders due to their messy funnel-like webs often built at window corners. These are dark robust spiders ranging from 9-18 mm. The carapace and legs are dark grey to black, and the abdomen is charcoal grey with a dorsal pattern of white markings.
**Daddy long legs:** Found in thin, tangled webs attached to ceilings and upper walls or corners of rooms, sheds and caves, these spiders grow to about 9 mm with thin, long legs (up to 50 mm).

**Redback:** Black to brown (pea shaped abdomens) medium sized spiders with a median scarlet-red to orange-yellow stripe on the back (and underside) of the abdomen. The stripe is sometimes broken and outlined with fine white markings. They are found all over Australia in dry open forest to shrubland habitats, often associated with rocky areas, logs, stumps or low shrubs, and commonly occur in urban situations. Seek medical advice if bitten.

**Wolf:** Also known as lawn or garden wolf spiders, as this is where we often encounter them. Most wolf spiders are wanderers and some build burrows, either with or without a trapdoor entrance. Species range in size from 1-8 cm across the legs and are distinguished from other ground dwelling spiders by their large eyes used for hunting at night. Most wolf spiders are typically drab brown/grey with variegated black or fawn patterns on them. They are not dangerous to humans, although one species can cause a painful bite, and cause blistering skin lesions and infection. Always wear gloves when gardening.
Garden orb weaver:
Common across Australia, and reaching 20-24 mm in length. They are famed for their large orb (wheel-shaped) webs often seen in the home garden. Garden spider abdomens have a variety of patterns of colour and shape but two features common to these spiders is the red colouring in the leg joints and their ability to change colour to suit their surroundings. They build their webs at dusk and usually remove all but a single strand in the morning when they retreat to surrounding shrubbery where their camouflaged bodies are rarely seen. These spiders are considered harmless to humans and bites are extremely rare.

When am I likely to see spiders?
Spring to autumn.

What if I find spiders?
Most spiders are beneficial and should be left alone. However, redbacks should be controlled in the vicinity of houses and children's play areas. White-tailed spiders are commonly found indoors and their bites have been implicated in causing severe necrosis, although this is not proven. To reduce the risk, keep clothes and shoes off the floor and check bedding before sleep. Use of pressurised surface sprays on the internal corners (skirting, corners and cornices or entrances) of rooms can reduce populations.

Where do I seek advice?
Contact the Museum of Western Australia for further information on spiders or Poisons Information on 13 11 26 for treatment of severe bites.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘spiders’ in the search facility and click ‘go’.
What does a flea look like?
Fleas are parasitic, wingless insects that feed on warm-blooded animals, and are known for their ability to jump. The different species are commonly named for the host they favour eg cat, dog, rat and human fleas. A blood meal is needed before the adult female can lay eggs. The eggs may be laid on the host animal, but they fall to the ground. Usually the eggs are laid at night, so they tend to be in the nest or lair of the host animal. In a short time, a legless larva emerges which feeds on organic material in the soil or nest. Once the larva completes its development it forms into a pupa, an inactive stage. Larvae and pupae can occur deep in the pile of carpets, in cracks and crevices in the floor or in open soil. The adult flea can remain inactive inside the silky pupal cocoon for a long time, until a host is detected, which also explains the sudden appearance of fleas in dwellings that have been empty for long periods. The dormant fleas detect the vibrations of the new occupants and are stimulated to become active and seek a host.

What damage can fleas cause?
Fleas are not generally associated with disease transmission in Australia, but it’s best to locate and treat the host animal/s. If the source of the infestation is not treated, the problem will continue. Dogs often show they have a flea problem by frequent scratching, but cats can carry heavy infestations without obvious signs. The eggs of cat fleas have a sticky coating which sticks to the fur. Hundreds of their pearl-like bodies may be shed wherever the animal shakes or grooms itself.

When am I likely to see this pest?
Any time of the year.

What if I find fleas?
Flea larvae develop where animals sleep or spend a lot of time. Infestation within and around houses may require treatment by a licensed pest control operator. Thoroughly vacuum carpeted areas. Minor infestations can be controlled
by treating the infested floor surfaces and furnishings with pressurised surface sprays. Entire rooms can be sealed and treated with specialised “flea bombs”, which provide extended periods of control with a single treatment. Outdoor areas can be treated with spray applications of proprietary products.

Do not contaminate animal drinking vessels, food containers or feed with insecticide residues. Animals should be treated with either tablets and pour-ons available from your veterinarian or insecticidal washes or flea collars. The active life of the flea collar depends on the chemicals in them and the length of the animal’s fur. Flea collars are less effective on long-haired animals.

Where do I seek advice?
Consult your local veterinarian for fleas on animals. Infestations within and around houses may require treatment by a licensed pest control operator.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘fleas’ in the search facility and click ‘go’.
**Stickfast flea**  
*Echidnophaga gallinacea*

**What does a stickfast flea look like?**
The small wormlike larvae feed on organic material, and shelter in the surface dust and litter on the soil. After several moults, they grow to about 3 mm, cease to feed and burrow down into the soil to a depth of about 15 cm. They spin silken cocoons and develop into adult fleas. The adult fleas then emerge, burrowing their way to the surface and search for a host. Poultry show evidence of infection on the comb, wattles and face. With a heavy infestation, the greater part of the head may appear black. In autumn when fowls moult, fleas may sometimes be seen under the wings, on the breast and around the vent.

**What damage can stickfast fleas cause?**
The stickfast flea is found on all classes of poultry and on native birds. Dogs, cats, horses, rabbits and numerous native animals spread the flea, which has been reported as affecting humans. Young chickens or ducklings are most at risk from stickfast fleas, with some dying as a result of severe infestation.

**When am I likely to see this pest?**
In summer.

**What if I find a stickfast flea?**
You can get rid of stickfast fleas by smearing a non-burning greasy substance such as petroleum jelly over the infected parts of the birds. Other chemical options are available. Clean out the fowl shed, remove all loose items of equipment and litter. Clean up all debris in the yards and burn this rubbish and the litter. The floor of the night quarters of the birds needs to be concrete and kept clean.

**Where do I seek advice?**
Contact your local veterinarian or a licensed pest control operator.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘stickfast flea’ in the search facility and click ‘go’.
Sheep body louse
Bovicola ovis

What do lice look like?
Adults are about 1.6 mm long with a pale brown body and dark bands in adults. They often cling to wool fibres close to the skin surface and will move away from the light when exposed. Immature lice are smaller, lighter in colour and have less obvious bands on their body.

What damage can lice cause?
Severe infestations of lice in sheep can result in considerable fleece damage usually in autumn and winter.

When am I likely to see this pest?
Check for lice during the 6 months before shearing. They are hard to detect on sheep with short wool as shearing removes at least half the population. Checking for lice on sale sheep and treating infested animals is the responsibility of flock owners. After eradication, check sheep at every opportunity and prevent re-introduction (ensure sheep proof boundary fences; quarantine and check introduced sheep for lice).

Where do I seek advice?
You don’t have to report lice or fleas to the Department of Agriculture and Food. Consult your local pet shop or veterinarian.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘sheep lice’ in the search facility and click ‘go’.
**TICKS**

**Ticks**

**What do ticks look like?** Ticks are blood sucking external parasites. Females grow to 25 mm long when fully engorged. They are usually reddish-brown and firm, and resemble tough, leathery sacs of fluid. They belong to the spider family and have eight legs at the adult stage. In south-western Australia the main ticks affecting pets and people are the kangaroo tick, *Amblyomma friguttatum*, and the brown dog tick, *Rhipicephalus sanguineus*.

**What damage can ticks cause?**

Ticks are parasites which climb onto the host and suck the blood for several days. Ticks can produce inflammation of the skin and possible allergic reactions at feeding sites. Tick-induced complications include anaemia, tick-typhus, Q-fever and tick-bite paralysis. However, these complications are rare.

**When am I likely to see this pest?**

All year round but ticks are more active in the warmer month.

**What if I find ticks?**

If a tick is found on yourself or your pet, apply a volatile liquid, such as methylated or surgical spirit or suffocate the tick with Vaseline (over a few hours). This may make the tick withdraw. Ideally though, one can acquire a pair of fine-pointed tweezers and lever the tick slowly and deliberately out without squeezing the tick’s body. Disinfect the wound and remove any tick parts left behind.

**Where do I seek advice?**

For tick control and management, contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au. To obtain advice on health complications due to ticks, contact your local doctor or veterinarian, whatever is appropriate.

**Do you want to know more?**

More information is available at www.agric.wa.gov.au. Type ‘ticks’ in the search facility and click ‘go’.
Pigeon
*Columba livia*

**What does a pigeon look like?**
Pigeons are around 33 cm long, and are usually blue-grey, although they can vary in colour from pale pink to black, often mixed with white. Pigeons have white underwings, orange eyes, black bills and red/purple legs and feet.

**What damage can pigeons cause?**
Pigeons can foul buildings, statues and other structures with droppings all year round. They are also generally regarded as potential health hazards to humans in urban environments, and while not usually agricultural pests, they do occasionally interfere with crops.

**When am I likely to see this pest?**
Pigeons can be present at any time of the year.

**Where do I seek advice?**
Combining control options can be more effective. These options include:
- Limiting food availability
- Trapping
- Exclusion (netting, plastic curtains, spikes)
- Baiting
- Scaring devices
- Removal and humane destruction of nests and eggs
Licensed pest control operators with bird experience can advise on the available options.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘pigeon’ in the search facility and click ‘go’.
Western silvereye
*Zosterops lateralis*

What does a western silvereye look like?
Western silvereyes are small (6.5-12 cm long) birds with a conspicuous ring around the eye. The head and wings are olive-green and the back is yellowish-olive.

What damage can western silvereyes cause?
Although western silvereyes can be useful for insect control in ornamental home gardens, they can be a pest in orchards and grape plantings by damaging the fruit.

When am I likely to see this pest?
The birds are seen alone, in pairs or in small flocks during the breeding season (August to February), but in large flocks in the winter months.

What if I see a western silvereye?
Combining control options can be more effective. These options include:
- Exclusion (netting, plastic curtains, spikes)
- Scaring devices
- Repellent chemical sprays

Where can I seek advice?
Licensed pest control operators with bird experience can advise on the available options.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘western silvereye’ in the search facility and click ‘go’.
Rainbow lorikeet
*Trichoglossus haematodus*

**What does a rainbow lorikeet look like?**
The rainbow lorikeet is a small, brightly coloured parrot 26-31 cm in length and weighing 120-130 g. Male, female and immature birds all look similar, with young birds slightly duller in colour. Lorikeets are quite noisy, continuously screeching. They have a swift direct flight with rapid whirring wing beats.

**What damage can rainbow lorikeets cause?**
In the metropolitan area, they are increasing in numbers and are damaging a range of fruits in gardens and orchards. Rainbow lorikeets aggressively protect feeding and nesting resources, potentially excluding native species. They also pose a potential disease risk to wild and captive parrots because they are carriers of Psittacine beak and feather disease.

**When am I likely to see the pest?**
In Perth, rainbow lorikeets occur in open woodlands with mature exotic vegetation, often in association with rivers or lakes. The trees common to the long-established suburbs in which rainbow lorikeets thrive include the lemon-scented gum, coral tree, fig, date palm, cotton palm and Norfolk Island pine.

**What if I see a rainbow lorikeet?**
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au

**Where do I seek advice?**
As above.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type rainbow lorikeet in the search facility and click ‘go’.
Fox
_Vulpes vulpes_

**What does a fox look like?** Foxes are small and dog-like, reddish in colour with whitish underparts. They have bushy tails that are usually tipped with white or black.

**What damage can foxes cause?** Foxes cause economic losses by preying on free-range poultry, and occasionally on young lambs and kid goats. They have caused the decline of many small to medium-sized species of Australian native mammals.

**When am I likely to see this pest?** Most foxes are seen during the late summer/early autumn when they become more mobile; cubs emerge in late spring. The best option is to control foxes before they become a problem.

**What if I find a fox?** Combining control options can be more effective, and these options include:

- Baiting
- Husbandry methods
- Exclusion fencing
- Trapping
- Fumigation

Foxes are widespread in both cities and towns. There is no obligation or need to contact the Department of Agriculture and Food when foxes are found.

**Where do I seek advice?** Contact the nearest Department of Agriculture and Food office, or the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au

**Do you want to know more?** More information is available at www.agric.wa.gov.au. Type ‘fox’ in the search facility and click ‘go’.
RABBITS

Rabbits, wild and domestic
Oryctolagus cuniculus

What does a rabbit look like?
Wild rabbits are typically grey-brown with a pale belly. Domestic rabbits may be almost any colour.

What damage can rabbits cause?
Wild rabbits compete directly with livestock and many native animals for food, particularly in winter. They tend to graze near refuge areas, resulting in severe localised degradation of both pasture and bush reserves, and significant soil erosion. Domestic rabbits can be a nuisance in neighbouring gardens when they are not in their hutches.

When am I likely to see this pest?
Wild rabbit numbers are highest in late winter and spring.

What if I find a rabbit?
Wild rabbits are widespread, so you don’t have to contact the Department of Agriculture and Food when you find them. However, all landholders are legally obliged to control wild rabbits. Control methods include:
• Baiting
• Warren fumigation
• Rabbit-proof fencing
• Warren ripping
• Destruction
• Cage-trapping
• The use of ferrets

Persistence and using the best control method for the situation are keys to success. An approach combining some options will give the best long-term result.

Myxomatosis and Rabbit Haemorrhagic Disease (RHD) (formerly called RCD) continue to cause rabbit population declines but should be followed up with other controls to remove any survivors. Domestic rabbits can be cage-trapped.

Where do I seek advice?
For wild rabbits, contact the nearest Department of Agriculture and Food office, or the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au
For domestic rabbits, contact your local shire. Cage traps are available for sale – see ‘traps’ in the Yellow Pages.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘rabbit’ in the search facility and click ‘go’.
RATS AND MICE

Rats
*Rattus* spp.

Mice
*Mus domesticus*

What do rats and mice look like?
There are different types of introduced rats and mice. Brown rats are grey-brown above and white or grey below, with a head and body length of 240 mm and a tail of 200 mm. Black rats are dark grey/brown and slightly smaller than brown rats, with a head and body length of 190 mm and a tail of 230 mm. Mice are light brown to black above and white to pale below; head and body length of 60-95 mm and a tail of 75-95 mm.

What damage can rats and mice cause?
Rats and mice can cause considerable losses to agriculture in spring and summer by eating recently sown and/or germinating seedlings, seed heads of maturing cereals, canola, lupins and stored grain. They also damage electrical wiring, buildings, farm machinery and foodstuffs.

When am I likely to see this pest?
Rats and mice can be present at any time, but they can be more often found inside buildings in cold wet months.

What if I find rats and mice?
Rats and mice can be trapped or baited. When numbers are small, use spring-back type traps, and set them undercover at right angles to walls, with the trigger adjacent to the wall. Bait with vegetable oil, peanut paste or pumpkin seeds. Poisoning, using baits containing anticoagulants, which are available from retail stores are used for larger infestations. Make sure you observe recommended safety precautions and be careful of secondary poisoning of pets if they eat affected rats/mice. Control can also be carried out by licensed pest control operators.
**Where do I seek advice?**
Licensed pest control operators or your local government environment officer. See ‘Pest Control’ in the Yellow Pages.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘rats’ or ‘mice’ in the search facility and click ‘go’.
AZALEA PETAL BLIGHT

Ovulinia petal blight
caused by the fungus
Ovulinia azaleae

What does petal blight
look like?
Tin, pale or whitish spots
appear on coloured petals
and rust-colored spots on
white petals. These enlarge
rapidly and infected tissue
becomes soft and watery
so that the whole blossom
collapses.

What damage can
petal blight cause?
Petal blight damages flowers, especially on azaleas near the coast. Petal
blight occurs more frequently on mid to late-season cultivars than early
ones. The disease also occurs on rhododendrons.

When am I likely to see this pest?
It is most likely to be found when the plant is flowering.

What if I find a petal blight?
Pick and destroy infected flowers and avoid overhead watering. This
fungus survives in the soil, so it is important to replace the ground litter
with uncontaminated mulches. In late winter/early spring, treat with an
application of a registered fungicide.

Where do I seek advice?
Your local plant nursery can assist you.

Do you want to know more?
More information is available at www.agric.wa.gov.au.
Downy mildew caused by *Plasmopara viticola*

**What does downy mildew look like?**
Downy mildew of grapes starts as small green or yellow translucent spots, eventually spreading over entire leaf, stem, flower or fruit. Infected plants usually look brown or bronze. After suitable warm humid nights, a dense, raised, white cottony growth develops on the underside of the yellow oilspots.

**What damage does downy mildew cause?**
Downy mildew destroys leaves, stems, flowers and fruits of many plant species, particularly green parts of a grapevine.

**When am I likely to see this pest?**
Usually during spring, summer and autumn.

**What if I find downy mildew?**
You need to manage downy mildew, and this is dependent on good monitoring of favourable weather conditions for primary and secondary infection events and of disease progress in the vineyard.

**Where do I seek advice?**
Your local plant nursery can assist you.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘downy mildew’ in the search facility and click ‘go’.
Bindii, jo-jo or onehunga

*Soliva pterosperma*

**What does bindii look like?**
A winter growing annual, bindii produces a seed capsule protected by spines and is well known to many householders. Bindii is similar to carrot weed (*Cotula australis*) which flowers in winter, but it flowers later and has no flower stalks.

**What damage can bindii cause?**
It is impossible to walk on a badly infested lawn in bare feet. Bindii also takes away nutrients from the soil resulting in problem areas in your lawn.

**When am I likely to see this pest?**
Plants first emerge with the winter rains in May and germinate for several months. Flowers appear in the spring and continue to form at the base of the leaves (axils) until early December.

**What if I find bindii?**
Bindii can be sprayed with products available from nurseries and hardware stores from mid-June to late September. The smaller the plants, the more easily they are destroyed. Delay spraying until a full emergence has appeared, but not for too long as flowering begins in spring and once the seed spines have formed the lawn will be prickly and uncomfortable for the rest of the season. It is better to have to spray twice than to wait too long. Note: drift from spraying can cause damage to other plants such as roses and grapevines. Follow instructions on the label.

**Where do I seek advice?**
Take care to avoid spray drifting on to garden plants, especially roses and grapevines. Contact your local plant nursery or rural suppliers.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘bindii’ in the search facility and click ‘go’.
What does caltrop look like?
Caltrop has fine fern-like leaves and grows flat against the ground. The leaves are usually a dull greyish-green colour. The tiny flowers are yellow with 5 petals. The woody prickles are similar to doublegee, however caltrop only grows in summer and doublegee grows in winter and spring. Doublegee has a broad leaf similar to English spinach.

What damage can caltrop cause?
Heavy infestations after summer rain can produce an abundance of sharp spiny burrs, which make it very uncomfortable for people and animals alike. It is also a nuisance around farm buildings, townsites, railway yards and recreation areas because of the burrs.

When am I likely to see this pest?
Summer.

What if I find caltrop?
Caltrop is not declared, therefore you are not required to report it to the Department of Agriculture and Food. Small numbers of plants can be eliminated by hand grubbing, or if there are only a few plants on a firm surface, the quickest method of removal is to cut through the central tap root. The plants and seeds may be placed in a bag and disposed of in a bin or they can be dried and then burnt, if permitted by local council by-laws. Carefully pick up any of the spiny seeds that fall from the plant.

Where do I seek advice?
Contact the local shire or town council.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘caltrop’ in the search facility and click ‘go’.
Cape tulip
_Moraea flaccida_ and _Moraea miniata_

**What do cape tulips look like?**
One-leaf cape tulip has a single grass-like leaf 30 cm or more high, while two-leaf cape tulip has 2 or more leaves. Both have salmon pink flowers, with two-leaf being slightly smaller and greater in number.

**What damage can cape tulip cause?**
Cape tulip contains toxic chemicals that can poison livestock and grazing animals (symptoms include loss of appetite, abdominal pain, stiffness of the hind legs, and other problems that can lead to convulsions or paralysis). If your animals have been poisoned by cape tulip, contact a veterinarian. Cape tulip is declared in certain areas of the State.
You can avoid introducing cape tulip to your property by not buying hay that contains cape tulip or other unwanted weeds.

**When am I likely to see this pest?**
Flowering in spring, cape tulip is a serious pasture weed.

**What if I find cape tulip?**
As cape tulip is poisonous it should be controlled. Control advice is available from the Department of Agriculture and Food. Contact the Pest and Disease Information Service on freecall 1800 084 881.

**Where do I seek advice?**
The Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au, farm supply companies, chemical re-sellers and agricultural advisers.

**Do you want to know more?**
More information is available at www.agric.wa.gov.au. Type ‘cape tulip’ in the search facility and click ‘go’.
Doublegees
Emex australis and Emex spinosa

What do doublegees look like?
Doublegees have long spreading stems with smooth oval to triangular green leaves. Inconspicuous red-green flowers form in the leaf axils soon after germination and quickly produce viable seeds.

What damage can doublegees cause?
Treading on a doublegee with bare feet is very painful. The weed has high levels of oxalic acid, which can cause poisoning in sheep. However, the main concern is that it competes strongly with cereal crops and legumes in early growth stages, causing significant reductions in yield.

When am I likely to see this pest?
Spring and summer.

What if I find doublegee?
Doublegees are declared in various locations in Western Australia. Refer to the Department of Agriculture and Food’s ‘declared plants’ web page. If you find doublegee in these areas, report it to the nearest Department of Agriculture and Food office. When buying hay, check that it doesn’t contain doublegee or other unwanted weeds. The best form of weed control is prevention, so take care not to introduce unwanted weeds to your property and always treat weed infestations when they are small to ensure they don’t become established.

Where do I seek advice?
Contact the Pest and Disease Information Service on freecall 1800 084 881 or E-mail info@agric.wa.gov.au, farm supply companies, chemical re-sellers and agricultural advisers.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘doublegees’ in the search facility and click ‘go’.
Common storage pests

Have a good close look at the contents of your pantry, linen and wardrobes every 6-12 months to ensure there are no pests lurking, such as meal moths, grain weevils, flour beetles and cigarette beetles. Dried fruit and milled cereal products are products constantly attacked by insects that live inside each food product they infest.

**Carpet and hide beetles** damage fabrics, furnishings and clothing that contain wool, silk, hair, bristles, fur, or feathers. Synthetic items are resistant to attack, but mixtures of synthetic and natural fibres can be damaged. The adult beetle is a rounded insect about 4 mm long, dark grey with four distinct wavy white bands across the body. Indoors, adults are attracted to light and are often found on window sills.
Control: Protect stored clothes in drawers using moth balls. Carpets often show damage along the edges and under heavy furniture where traffic and cleaning access is reduced. Frequent vacuuming of carpets can reduce populations and residual surface sprays in pressure cans can be used to treat affected areas. The insect is most destructive at the larval or grub stage. It is hairy, with a tapering brush of hairs at the rear, has legs and is quite active.

Cigarette beetles are primarily pests of stored tobacco, but can breed in milled cereal, stored grain and even curry powder, cayenne pepper and paprika. They are oval shaped, reddish-yellow and 2-3 mm long. Females can lay up to 100 eggs, with emerging adults chewing through plastic, paper and cardboard packaging leaving small circular holes.

Control: Protect all condiment products by removing from plastic bags and packaging and place in sealed containers. Alternatively, freezing the products will destroy the beetles.

Clothes moths: Tiny white caterpillars (larvae) eat holes through fabrics but the adult moths do not feed on fabric. Damaged fabrics often have silken cases or silken threads on the surface. Clothes moth larvae feed on animal products such as wool, feathers, fur, hair, upholstered furniture, animal and fish meals, milk powders, bristles, dried hair and leather. Common clothes moths are the webbing clothes moth and the case-making clothes moth. The adults are small (1 cm) buff or straw coloured moths. Adult moths may be found running over the surface of infested garments or materials.

Control: Protect stored clothes in drawers using moth balls. Carpets often show damage along the edges and under heavy furniture where traffic and cleaning access is reduced. Frequent vacuuming of carpets can reduce populations and residual surface sprays in pressure cans can be used to treat affected areas.

Flour beetles infest products such as flour, oatmeal and bran, and can be found in dried fruits, spices and chocolates. They are 3-4 mm long and reddish-brown. Each female lays 400 eggs among food materials, and larvae hatch and feed on food fragments. The rust red flour beetle and the sawtoothed grain beetle are the most common in Western Australia.

Control: Protect all products by removing from plastic bags and packaging and place in sealed containers. Alternatively, freezing the products will destroy the beetles.
**Grain weevils** in Western Australia include the rice weevil (2.5-3.5 mm long and reddish brown with 4 brown spots on the wings) and the granary weevil (2.5-4 mm long and shiny dark brown-black). These weevils are pests of stored grain and seeds. The female chews a small hole into grain or other solid food material, lays an egg and seals the hole with a gelatinous substance. The larvae hatch and feed on the foodstuff until they pupate and then emerge as adults. It’s best to locate the source of infestation and quickly get rid of it.

**Control:** If practical and regulations allow, dispose of heavily infested foods in wrapped, heavy plastic bags or in sealed containers for garbage removal, or bury deep in the soil.

**Itch mites** can be a problem when dried foodstuffs (fruits, seeds, cereal products and pet food), animal feeds or hay infested with the larvae of storage insects are placed in warm, humid environments, allowing large numbers of these predatory mites to develop. After contact with infested produce, skin irritations may develop. If you think you have been attacked by itch mites, remove the infested clothing, shower and put on clean clothing. When the welts appear, try not to scratch them. Seek medical advice to reduce symptoms and decrease the likelihood of skin infections or dermatitis.

**Control:** Keep stored food free of insects, by either oven-drying it, or by storing it at temperatures below 15°C to minimise the development of host larvae.
**Silverfish** cause damage by eating foods or other materials that are high in protein, sugar, or starch. They eat cereals, moist wheat flour, paper on which there is glue or paste, wallpaper and book bindings, starch in clothing, and rayon fabrics. They are frequently found trapped in sinks and bathtubs, in bookcases, around closet shelves, behind skirting boards and window and door frames. The adult silverfish is about 2 cm long including the long tail filaments. The most common house species is covered with smooth glistening silvery scales.

**Control:** A range of silverfish bombs and sprays are available from supermarkets and hardware stores.

**Stored product moths** in Western Australia generally refer to 3 major pests – the Indian meal moth, the Mediterranean flour moth and the tropical warehouse moth. The Indian meal moth is found in home groceries, has a wingspan of 15 mm and is the parent of the pinkish-white grubs found in raisins, dates and figs, and sometimes biscuits, powdered milk and chocolate. They contaminate foodstuff with webbing. Larvae grow to 17 mm long, have a dark head and 3 pairs of legs. The moth lays eggs on or near foodstuffs.

**Control:** All products should be destroyed. Undertake regular cleanouts including vacuuming shelved in the pantry and stored dried product areas.
Managing the garden naturally

When the garden suffers a severe disease or an insect infestation, it may be tempting to seek a quick fix by turning to synthetic chemicals. However, their use can disturb the natural balance between pest insects and diseases and beneficial insects and fungi. To create an ecologically balanced garden, a number of ‘common sense’ steps can be taken.
**Garden design**
- Design your garden to encourage birds, frogs, spiders and other beneficial organisms, and consider the setting up of flowering natives, nesting sites, windbreaks, shelters and ponds.
- Establish zones for plants with similar requirements regarding sunlight, water and fertiliser needs.

**Landfill**
- When you need landfill to establish a garden, make sure that the soil comes from a site with no history of disease or weed problems.

**Plant and soil health**
- Plants are like humans and have requirements for water and food (fertilisers). Healthy plants are naturally resistant to pests and diseases. Periods of water stress can damage plants and provide an entry for pests and diseases. Use mulch to avoid water stress.
- A rich soil including organic matter (compost) will supply nutrients to the plants over a long period of time. Establish a worm farm as a way to obtain rich organic fertiliser. Make sure your pH is around neutral (7) as acid (<7) or alkaline (>7) soil can lead to non availability of nutrients.
- Reduce humid conditions around plants, which are affected by fungal diseases.
- Make sure plants are well ventilated. Do not crowd plants too closely. Thin canopies if plants become too bushy.
- Reduce transmission of fungal diseases between plants and between seasons, by keeping basic hygiene. Do not re-use tomato stakes or compost diseased plants unless you are sure that your composting process is hot.

**Garden and Household Management**
- Try to avoid over use of pesticides, which kill other beneficial insects such as lacewings and ladybirds.
- Snail infestations and populations can be reduced before they lay eggs (April). If practical, chickens and ducks will reduce pests including snails.
- Use garden lights to trap Portuguese millipedes, which breed under mulch.
- Cover compost heaps to reduce cockroaches, flies and food access for mice and rats.
- Weeds should be pulled out before they go to flower and set seeds.
- Keep records of seasonal pest, weed and disease problems and take early control steps.
Why are soil conditioners important?
In the metropolitan area, poor soil structure can affect water and nutrient availability to the plants and make them more prone to pests and diseases. Poor drainage and aeration, due to a number of soil structural problems, can lead to a build-up of harmful soil diseases, such as damping off (caused most commonly by fungi like Fusarium, Pythium and Rhizoctonia) which attack garden plants. Water repellency may lead to uneven water penetration into the soil and dry patches in lawns.
What soil conditioners are available?
Materials that improve moisture and nutrient retention and overcome water repellence are known as soil conditioners. Soil conditioners available to the home gardener include:

- Loam and clay, peat, compost, manure and water-absorbent gels for moisture and nutrient retention
- Soil wetting agents for water repellency

Why does soil pH affect plant pests and diseases?
Soil pH determines the nutrient availability to plants. Some nutrients become ‘tied up’ in the soil at certain pH levels. For example, acid soils can lead to deficiencies of phosphorus, calcium, magnesium and molybdenum, as well as toxic levels of manganese and aluminium. Alkaline soils may lead to deficiencies in iron, manganese, boron, copper and zinc.

How do I measure pH in my garden?
Soil pH test kits are available from many garden centres. These are relatively inexpensive and give home gardeners an approximate reading. If you want more accurate results, take a sample to be tested to a soil laboratory (check in the Yellow Pages) or to a nursery, which provides this service.

How do I correct my soil pH?

Acid soils
To increase the pH by one point, apply dolomite lime at 100 g/m² in sandy soils, and up to 250 g/m² in clay. The effect is probably not noticeable for two to three months.

Alkaline soils
To decrease the pH, iron sulphate is available from nurseries and hardware stores. Follow label instructions for the correct rate. Compared to lime, the effect is immediate.

Where do I seek advice?
Contact your local plant nursery.

Do you want to know more?
More information is available at www.agric.wa.gov.au. Type ‘pH’ in the search facility and click ‘go’.
Correct identification is central to effective control of pests and diseases and for the detection of new exotic pests and diseases which have penetrated our quarantine barrier.

Since many hundreds of animal, plant and insect samples are received by the Department of Agriculture and Food each year, the process for identifying them can be made a lot easier if the specimens are freshly gathered and are undamaged.

Alternatively, electronic copies of photographs can be emailed to the Department at the following address – info@agric.wa.gov.au. Where possible, photos should include a ruler or other common object to give an indication of the size of the specimen.

Details describing where samples are collected assist the identification process.
IMPORTANT

It is not necessary to personally deliver the specimens to the Department of Agriculture and Food. Simply mail to:

Department of Agriculture and Food
Pest and Disease Information Service
3 Baron Hay Court
South Perth WA 6151

OR Locked Bag 4, Bentley Delivery Centre WA 6983

It is important not to mail specimens on a Thursday or Friday. This avoids deterioration while in transit over a weekend.

Also provide these details:

• the locality where the specimens were collected: that is, the address and the wider area, such as name of suburb, town or shire;
• the date when collected;
• the name of the collector and a contact telephone number; and
• a description of the damage caused or other reason for submitting the sample.

SENDING INSECTS, SPIDERS, MITES AND OTHER INSECTS FOR IDENTIFICATION

• Send the specimens live unless recommended otherwise as below.
• Gather 10-20 specimens if the insects are small and if this is practicable. Insects with strong jaws such as ground beetles or plant feeders such as scarab larvae are best sent with a handful of soil or leaves as they may otherwise damage each other in transit (see killing methods below).
• Place the specimens in a plastic or glass vial or small jar, or in a crush-proof box with tissues.
• Containers of live insects should have ventilation holes which are sufficiently small to prevent the escape of the specimens.
• Kill butterflies and moths immediately by freezing for 24 hours or by placing them in an airtight container with a tissue or cotton wool that has been soaked in nail polish remover.
- Also, **kill hard-bodied insects** such as beetles and grasshoppers by freezing for 24 hours.
- **Do not kill** soft-bodied insects such as grubs or caterpillars.
- Leave insect larvae (grubs, caterpillars or maggots) in grain or other seed or fruit as this will help to preserve them.
- Include loosely crumpled facial tissues or similar in the bottom of containers to help prevent damage to fragile insects and absorb any free fluids.
- A preferred method of sending ant specimens is to first spray them with fly spray, then stick to **clear** sticky tape. Stick this to a piece of paper on which are listed the location where caught and the collector’s name and contact details.
- Clues to the identification of the specimens can be found from the plants they feed on. Examples where the specimen may be attached to the host plant include scale insects, mealy bugs and lerps. Where appropriate, send leaves of freshly-damaged plants. (See instructions for sending plant specimens.)

**SENDING PLANT SPECIMENS FOR IDENTIFICATION**

In many cases these will be unfamiliar plants suspected of new weed potential.

- Collect fresh samples of the growing plant.
- Send whole plants where practicable. That is, include part of the root system, leaves (mature and immature) and flowers, seed pods or fruit. If there are presently no flowers or seed heads, wait until the plant is mature.
- Send more than one plant, if possible.
- Keep plant specimens out of direct sunlight.
- Place the plant samples between several sheets of absorbent paper, such as newspaper.
- Enclose the samples and their separating paper with a sheet of cardboard on either side to prevent crushing during transit.
• Seal the sample inside a paper bag (it will ‘sweat’ and deteriorate faster in a plastic bag).
• Label with the locality where collected, date and collector’s contact details.

SENDING ANIMAL SPECIMENS FOR IDENTIFICATION

Although they are less often sent for identification, animals such as frogs, which are suspected of being cane toads, are sometimes caught. Usually, the identification of frogs can be done over the phone by contacting the Cane Toad Hotline on freecall 1800 084 881. In most cases native frogs are misidentified as cane toads and are sometimes killed unnecessarily. If, after a phone call it is necessary to send a frog specimen to confirm its identity, the following procedure should be followed:

If alive:
• Place frog in an escape-proof container.
• Add to the container a wet tissue (frogs can drown if placed in a container full of water with no where to rest) and provide ventilation.
• Label with the following information:
  Location: Where exactly was the animal found? In/near pond, creek, drain etc, at a commercial/residential premises (address details), crossing a road, in a hanging basket etc.
  Number observed: Was the specimen alone or were there a number of them? Were they all adults or were some tadpoles or eggs?
  Date collected: This may be important, especially if it has been a while since the specimen was collected.
  Name and contact number for person collecting the specimen: More information may be required for staff to follow up the sighting.
  Deliver to the nearest office of the Department of Agriculture and Food.

If dead:
• Place frog in a leak-proof container containing 70 per cent alcohol or 7 parts methylated spirit and 3 parts water).
• Label with appropriate information (see above).
• Send or deliver to the Museum or the Department of Agriculture and Food.
There is sometimes a need to determine the identity of other animals. For example, birds are often seen that require identification to determine if they are declared species such as sparrows or starlings. This identification can also be done over the phone (ring the Western Australian Museum tel. 9427 2700, or the Vertebrate Pest Research Section (VPRS) of the Department of Agriculture and Food tel. 9366 2301), if sufficient information is supplied. Dead specimens can also be sent to the Museum or VPRS for identification:

- Preferably, wrap sample in absorbent paper, place in a sealed plastic bag, then a suitably sized box. Alternatively, preserve in 70 per cent alcohol (made up of 7 parts methylated spirit and 3 parts water), in a leak-proof container.
- Label with appropriate information (see above).
- **Send or deliver** to the Museum or VPRS at the following addresses:
  
  Museum
  Terrestrial Vertebrate Section
  Locked Bag 49
  Welshpool DC
  WA 6986

  Department of Agriculture and Food
  Pest and Disease Information Service
  3 Baron Hay Court
  South Perth
  WA 6151

**SENDING SAMPLES OF DISEASED PLANTS**

These situations will mainly apply to suspected diseases of fruit trees or garden plants.

- Where practical, send the whole plant (where it is clearly not a leaf, stem or fruit disease).
- Dig up plants so the roots remain intact. Soil on the roots will keep the plant alive in transit.
- Seal the roots and soil in a plastic bag near the base of the plant, then enclose the whole sample in another plastic bag.

**For suspected fungal or bacterial diseases:**

- Wrap leaves in paper and enclose in a paper envelope.

**For suspected viral diseases:**

- For vegetative plants, collect new growth or whole shoots.
- For potatoes, shoots are better than tubers.
- For grapevines, collect dormant canes (instead of leaves).
- Package leaves to prevent them getting crushed in transit (as for plant specimens in previous section).
- Enter the locality where collected, date and collector’s contact details.
Good garden companions
your friends in the garden
There are many natural “friends” in your garden, and like human friends, they are worthwhile keeping!

Frogs eat mosquitoes, cockroaches, flies and slaters, and are an ‘indicator’ species, which means they are a sign that everything is going well in the garden. They need to be kept moist, and require food, shelter and places to breed. Build a pond to attract frogs and offer them a breeding place.

Numbers of native butterflies have been reduced with clearing of native vegetation. Add local plant species to urban gardens to bring colourful butterflies back into the garden. To attract butterflies, plant coojong, green stinkwood or red-eye wattle (if you are near the coast). Provide plants as a food source for caterpillars to ensure butterflies stay in your garden to breed – include native grasses. This will help butterfly conservation.

Birds are a part of the natural ecosystem, and many are attracted to insects and flowers. Create a diverse community of different insects and flowers by planting local native plant species. One high tree can provide a high perch, which birds love. They also need access to water, and native plants such as wattle produce seeds that some birds can eat. Don’t spray spiders, as birds (willy wagtails) use the webs to construct nests.

Adult lacewings eat pollen and honeydew, and some prey on aphids. Larvae eat aphids, mealybugs, mites, whitefly, scale and moth eggs. Preying mantis eat whatever they can catch, including pests, beneficials (good bugs) and other mantids. They are found on leaves, flowers and the branches of plants. They can blend into the background, making them difficult to see.

Hover fly larvae are often found among large populations of aphids. Adults feed on pollen and nectar, while larvae feed on aphids and other soft-bodied insects.

Ladybirds are found year round, but are seen more in spring and summer. They are found among large pest populations, particularly aphids. Adults and larvae feed on aphids, scales, mealybugs, whitefly and insect eggs.
The garden is a miniature ecosystem, and provides food and shelter for both good bugs and pests. Some beneficial invertebrates (good bugs) in your garden prey on and kill pests, either by living in the body of the host (parasite) or eating whatever they can catch (predator). Parasites attack a particular species of prey while predators consume a wide range of prey. Wasps, however, can be predators as well as parasites. Flies and nematodes are parasites, while ladybirds, hover flies, assassin bugs and preying mantids are predators.

Large numbers of beneficials (good bugs) help reduce pest populations, so help conserve them by:

• Providing food, shelter and water – some plants are excellent “lures” for beneficials, providing both shelter and food. These include plants in the parsley (Apiaceae), sunflower or daisy families (Asteraceae). So plant parsley, dill, caraway, coriander, marigolds, dahlias, daisies, asters, cosmos, calendula, zinnia, sunflowers and native plants and flowers.

• Reducing insecticide use, as beneficial insects are more susceptible to insecticides. If you have to spray, use one that has the least impact on beneficials.

• Leaving a few pests to serve as food for beneficial insects – one way to conserve natural enemies is to leave a few pests as food. Aphids are often a good host for many beneficials including lacewings, ladybirds and syrphids. Aphids populations can be left alone if they are not damaging the plant.

• Identifying beneficial insects – beneficial insects can look similar to pests they feed on, so learn how to identify them. Most are predators and are easy to find, but parasites are smaller and hard to find. Some natural enemies are available and are used by commercial growers on their farms and orchards as part of an integrated pest management program.
ANIMALS AND INSECTS

• Remove food scraps and sources like dog bones and compost heaps. Don’t give foxes, rodents, cats and other feral animals a free feed.

• Become familiar with the normal animals around your area. You’ll then be quickly aware when something unusual and potentially pesty arrives.

• Don’t feed wild animals – they can become reliant on you and/or their numbers can increase to pest proportions for them and for people.

• Learn to identify good insects from bad.

• Don’t leave compost or other garden waste lying around in heaps – it might harbour unwanted pests like cockroaches.

PLANTS

• Weeds – learn to know them, but please don’t grow them.

• Keep records of when pests and disease problems occur. You may be able to avoid growing that flower or vegetable at that time next year, select a different variety to avoid problem in the future. Knowing when a pest or disease is likely to occur can allow you to take preventative action.

• Heavy mulching will reduce the number of weeds.

• After you whipper snip, don’t blow the cuttings onto the road.

• Grow some local native species – help save water and attract insects, birds and lizards to your garden.

• Don’t dump garden waste in bush or rivers. Either compost or take it to the rubbish tip or local greenwaste facility wrapped in black plastic bags.
Arrest those pests

Monthly guide to pest, disease and weed control

January
- Check for insects (e.g., thrips, cabbage white butterfly, spider mites) on vegetables and spray or dust for white fly, caterpillars and aphids.
- Control caterpillars of white cedar moth.
- Control fruit fly and put fly traps through the trees.
- Watch out for European and paper wasps.

February
- Control caterpillars of white cedar moth.
- Control paper nest wasps.
- Control fruit fly and dispose of all fallen fruit.
- Watch out for and control mildew on vines.
- Watch out for and remove weeds before they see
- Watch for scales on citrus.

March
- Control caterpillars of white cedar moth.
- Control paper nest wasps.
- Watch for citrus and glasshouse whitefly, and fruit fly.
- Check vegetables for powdery and downy mildew, and watch for early blight on tomatoes.
- Undertake wild rabbit control before the break of season and planting of crops or other plants.
- Increase monitoring of mice prior to the planting of crops and during the growing season.
- Check for mealybug and scale and control with an insecticidal spray.

April
- Control snails and slugs early with baits before they lay eggs.
- After rain, watch for snails and slugs around new seedlings.
- Watch for millipedes.
- Control new season weeds before they spread.
- Control caterpillars of white cedar moth.
- Control paper nest wasps.
- Spray citrus trees to control scale.
May
Watch for and control caterpillars, snails, slugs and slaters.
Check lawns for bindii weeds and remove or spray.

June
Watch for snail damage on bulbs.
Watch out for scale on indoor plants.
Check lawns for winter weeds and implement control.

July
Check for fruit fly on fruit in season (oranges, grapefruit and mandarins) and look for scale on deciduous fruit trees.
Watch out for and control caterpillars.
Check azaleas for petal blight and spray if necessary.
Check for white cedar moth, thrips and citrus white fly.

August
Watch for caterpillars, snails, slugs, vegetable weevil and aphids.
Watch out for scale and aphids on citrus trees and new roseshoots.
Undertake fox control while the vixen is feeding young cubs, and prior to lambing.

September
Spray bindii in lawns with weed killer.
Check for fruit fly.
Spray for azalea lace bug if azalea leaves show symptoms.

October
Check for fruit fly on fruits in season.
Look for aphids and black spot on roses and shrubs.
Spray for weevils. Check vegetables for caterpillars of diamondback moth and cabbage white butterfly.
Watch out for and control two-spotted mite.
Look out for wingless grasshoppers.

November
Look out for wingless grasshoppers.
Watch out for slugs and slaters.
Check for fruit fly and control with baits.
Check for caltrop and control.
Check for water hyacinth and destroy.

December
Watch for insects and caterpillars on vegetables and dust or spray when necessary.
Check for fruit fly and if present bait and/or spray.
Check grapevines for powdery mildew.
Fruit trees may need bird netting to protect the crop.
Watch for ants and implement control.
Look out for wingless grasshoppers.
Regularly check for salvinia during the year.