Apple pests and dieases

All information taken from Garden Organic web site except sections on canker and greenfly and other aphids.

Apple Scab and Pear Scab

Scab is a widespread fungal disease of apples and pears. Causing mainly blemished fruit, its effects are tolerated by gardeners, though commercially, fruit may be unmarketable. The disease is caused by two closely related fungi; *Venturia inaequalis* affecting apples and related ornamental species such as Pyracantha, Cotoneaster, Viburnum and Sorbus, and *Venturia pirina*, affecting only pears.

Typical symptoms

Apples

- **Leaves:** browny/green blotches appear first on the underside of leaves in spring. As leaves unfold, both surfaces may show symptoms. Young lesions are velvety brown to olive green and have feathery, indistinct margins. These may expand and run into each other, mainly along the veins and may develop a blistered appearance. When infections are numerous on young leaves, they become curled, dwarfed and distorted. Leaves may drop prematurely. Some crab apple species may have more severe symptoms, the variety 'John Downie' is very susceptible to scab.
- **Fruit:** dark spots on the skin look much like those on the leaves initially. As the fruit enlarges, these then develop into brown corky patches. A severe infection can cause fruit to crack if the apple is still growing. These wounds may cause the fruit to rot through a secondary infection.
- **Twigs:** small blister like swellings burst to produce brown/green pustules in spring. The cracked bark may then provide sites for further infection by the fungus causing canker.

Pears

- **Leaves:** scabby spots similar to those on apples appear on shoots, leaves, fruit and buds.
- **Fruit:** dark brown spotting can be more severe than on apples, causing infected fruit to grow deformed and deeply cleft.
- **Twigs:** conspicuous swellings which later burst. Infection occurs frequently on bud scales.

Life cycle

The fungus overwinters in fallen infected leaves, fruit and in infected twigs. In the spring, given a moist environment, spores released from these sources are blown or splashed onto newly emerging leaves causing infection. As the fungus develops, further spores are produced and the infection continues to spread throughout the growing season. Scab attacks are worst in cool, wet periods in spring and early summer.

Prevention and control

Treatment is the same for apples and pears, although it needs to start earlier in the season for pears because shoot infections are more serious.

- **Garden hygiene:** Remove badly infected fruitlets during thinning in June and remove mature fallen fruits in the autumn. Remove all fallen leaves in the autumn and compost them. If this is impractical, mow the ground below the trees to shred the leaves and increase the rate at which they are taken down into the soil. Watering fallen leaves with diluted urine, or any other high nitrogen liquid (nettle brew, liquid manure) will also help to kill the spores and speed up the decomposition rate.
- **Cultural control:** Pick-off and destroy any leaves and fruit left on the tree in the winter. Prune-out and burn diseased twigs. Prune trees regularly to maintain an open centre. This will increase air circulation and rapid drying of leaves which in turn discourages scab development.
- **Resistant varieties:** Both apple and pear cultivars vary considerably in their resistance to scab. They can also lose their resistance with time. Contact a specialist fruit nursery for details of current resistant varieties.

  Some scab resistant apples are:

  - Ashmead's Kernel
  - Ellison's Orange
  - Fortune
  - Discovery
  - Egremont Russet
  - Grenadier
  - Kidd's Orange Red
  - Limelight
  - Lord Derby
  - Red Devil
  - Reverend Wilkes
  - Saturn
  - Sunset
  - Winter Gem

  Resistant pears:

  - Buerre Hardy
  - Bristol Cross
  - Catillac
  - Gorham
  - Jargonelle
  - Conference is partially resistant.

- **Susceptible varieties:** Some apples that are particularly susceptible to scab:

  - Cox's Orange Pippin
  - Gala
  - James Grieve
  - Laxton’s Superb

  Susceptible pears:

  - Williams
  - Bon Crétien

Apple Powdery Mildew

Apple powdery mildew, *Podosphaera leucotricha*, is a serious and common fungal disease of apples. It also infects pear, quince, peach, medlar and the ornamental, *Photinia*, but with less serious effects. The disease can reduce both vigour and cropping.

Typical symptoms

A white powdery coating appears first on leaves and shoots, as well as flower buds in spring. Blossom may be affected, causing it to wither and drop. Leaves are distorted, becoming narrow and folded, turn brittle and then fall. Early infections may mark the fruit skin with a 'russet' effect.

Life cycle

The fungus overwinters in buds. Spores are produced in spring on emerging leaves, flowers and shoots and spread by wind. Infected flowers will not set any fruit. The development of this disease is affected by climatic conditions. A harsh winter will reduce the risk of infection; it spreads most rapidly in summer when warm, sunny days are accompanied by humid nights.

Prevention and control

- **Pruning:** In winter, prune out any shoots and buds that have been infected with mildew. Shoots will appear silvery/grey, and buds distorted. Cut back to several buds below the infection. In spring, carefully remove infected leaves and shoots. Prune directly into a bag to prevent spores from spreading. Check trees weekly through the season and carry on cutting out infection. On small trees this can be a very effective method of controlling mildew, if done thoroughly. Prune trees regularly to permit good air circulation. Prunings should be buried in an active compost heap or sent to your local council's green waste recycling centre.
- **Cultural control:** Mulch in spring with bark, compost or straw under trees to stop soil drying out. Water trees in dry weather. Avoid applying too much nitrogen (horse manure, compost etc) in the growing season; excess vegetative growth is more susceptible to infection.
- **Variety choice:** Varieties vary in their degree of resistance to mildew. Avoid susceptible varieties when planting new trees.

  Trees we have found to be less susceptible to mildew are:

  - Allington Pippin
  - Arthur Turner
  - Brownless Russet
  - Court Pendu Plat
  - Crawley Beauty
  - D'Arcy Spice
  - Discovery
  - Early Victoria
  - Fortune
  - Golden Noble
  - Grenadier
  - Jupiter
  - King Edward VII
  - King of the Pippins
  - Lord Derby
  - Redsleeves
  - Rev. W Wilks
  - Upton Pyne
  - Worcester Pearmain

- Golden Reinette

Susceptible to mildew:

- Cox's Orange Pippin
- Crispin
- Golden Delicious
- Jonathan
- Lane's Prince Albert

- **Chemical control - a last resort:** u sulphur has traditionally been used to control mildew, and is accepted under organic standards. It is not harmless to the environment, however, and should not be used regularly. Some varieties are particularly sensitive to sulphur and will not tolerate it. Beauty of Bath, Cox's Orange Pippin, and Newton Wonder will be damaged by sulphur. If you cannot get information about a particular variety, test spray a single shoot and look for scorching or leaf fall within 24 hours.

  Potassium bicarbonate is an effective fungicide which has recently gained official government approval under the 'Commodity Substance Approval Scheme' (26 July 2005) – however this might be short lived due to the phasing out of the European pesticide regulations approvals, and any products under this scheme could be banned. Currently it does not have organic approval in the EU or UK. But there is nothing to stop organic gardeners, who are not selling produce with an organic logo, giving it a try – alongside the other cultural practices recommended too. Until then, potassium bicarbonate can be used to control powdery mildew. A maximum dilution of 20g/litre (approx 3oz per gallon) is allowed. However, a regular spray of a weaker solution (2.5-5g/litre) at 7-10 day intervals seems to work better. Always do a spray test on a few singular leaves, as bicarbonate may scorch leaves. This has been reported in a previous issue of The Organic Way, Issue 182

Bitter Pit

This is not a disease, but a common disorder of apples. It can show up when the fruit is still on the tree towards the end of the season, but most commonly appears during storage.

Typical symptoms

The first signs are widespread shadowy spots showing just below the fruit skin. These form into dark, slightly sunken areas or pits, up to a few millimetres in diameter. Directly beneath each pit a small patch of the fruit tissue turns brown and corky in appearance, and similar brown patches eventually develop scattered through the apple flesh. When the condition is severe it affects the entire apple, giving it an unpleasant bitter taste. Hail damage causes similar symptoms on the skin, but without brown spots inside the fruit.

What is the cause?

Bitter pit is due to a deficiency of calcium and/or an excess of potassium or magnesium within the apple fruit. The condition develops when the movement of calcium into growing fruits is disrupted, and various complex factors can bring this about. Water stress at critical times in the growing season appears to be a major factor connected with bitter pit, and high applications of nitrogen-rich fertilisers and manures also seem to aggravate the condition.

As an essential plant nutrient, calcium does not move very readily within the apple tree. In conditions when it is needed rapidly, it is directed to leaves and shoots in preference to the fruit. This means that even when soil calcium levels are abundant (few soils are deficient in calcium), there can still be a deficiency of calcium and bitter pit symptoms in the fruit.

Bitter pit is usually worse in seasons with wide fluctuations in rainfall and temperature. It is more common in young, vigorously growing trees. In mature trees it is most likely to occur in larger fruits, and in fruits picked before they are fully mature.

Prevention and control

Bitter pit can usually be prevented with careful management. The aim should be to maintain conditions that allow steady, uniform growth throughout the season as this will avoid rapid fluctuations of calcium in the trees.

- **Avoid water stress**: Keep the tree mulched, applying the mulch early in the season when soil moisture levels are still high. In very dry seasons, irrigate to stop the soil drying out.
- **Correct feeding**: Avoid over-feeding, particularly with nitrogen-rich materials.
- **Variety choice**: Some varieties, especially large fruited cooking varieties, are particularly susceptible. These include Bramley's Seedling, Edward VII, Howgate Wonder, Newton Wonder and Merton Worcester.
- **Calcium sprays**: Commercial growers provide extra calcium to the fruit by using a foliar spray or post-harvest dip. This is not a very practical method for the domestic gardener as the spraying, with calcium chloride, needs to be very thorough and carried out every 10 days from June onwards to be effective.
- **Acid soils**: Apply lime to raise p H to about 6.5. This will help to make calcium available to the roots.

Late summer pruning

Carry out late summer pruning on vigorous/mature trees. There is evidence that summer pruning can be beneficial as it reduces competition for calcium between fruit and shoots. It should be done in August when extension growth has slowed down and terminal bud formation is visible. When late summer pruning is practised only minimal winter pruning is required.

- Cut out all vertical one year old shoots, i.e. any upward or downward pointing shoots.
- Remove some two year old wood where new growth arising from it is very vigorous.
- Remove any 'water shoots', ie new shoots that have arisen in response to branches being removed (unless a replacement branch is needed to fill a gap).

- Cut out most new growth, leaving only a few side shoots that lie in a fairly horizontal plane.

Coping with bitter pit

- Do not pick immature apples if you want to store them as these are more prone to developing bitter pit in store. Check stored fruit regularly and use up any that show early bitter pit symptoms.
- If bitter pit is a serious, recurrent problem do not even try storing the apples; use the fruit as soon as it is picked so that the disorder does not have time to develop. A few pits on the skin at picking time can be removed by peeling and should not affect fruit quality. Preserve the fruit by cooking, freezing, bottling, etc.
- Know your apples - if bitter pit always tends to develop in your maturing fruit while still on the tree, save the fruit by picking it early, still green, to use for cooking and preserving.

Brown rot

Brown rot is a common fungal disease causing damage to many types of fruit trees. The same symptoms are caused by two different species of fungi, *Monilinia fructigena*, infecting apple, pear, almond and quince and *M. laxa* on plum, peach, apricot, cherry and nectarine.

Typical symptoms

The fungus causes brown patches and rot on fruit, often accompanied by blossom wilt, spur blight and wither tip of shoots and flowers.

- **Fruit:** Soft brown patches enlarge to engulf the entire fruit, either on the tree or in storage. The fungus can spread quickly in storage, infecting undamaged fruit by contact. White spore bearing pustules may appear on the brown patches, often in concentric rings. Fruits shrivel and become mummified. They may drop or remain attached to the tree.
- **Blossom wilt:** In spring, blossoms turn brown and wilt. They usually remain attached to the twig. In wet weather, fungal spores multiply and spread quickly, causing more floral infections. Spores can spread to spurs resulting in canker development on the twigs.
- **Spur blight:** Leaves wither on the spur. This may develop into a small canker having tufts of grey fungal growth.
- **Wither tip:** Leaves wither and develop brown lesions, tip droops. Aphids may be present.

Life cycle

Spores overwinter in mummified fruit or in twig and branch cankers. In spring, spores are released to be carried on the wind, by insects or by rain-splash. Blossoms and young

shoots are the first to become infected. The fungus spreads quickly into the spur or branch to form canker. The fungus enters fruit via wounds or cracks created by frost, hail, birds, or insect pests. Careless picking and handling at harvest allows entry of spores that cause post harvest losses in storage. Infection is accelerated in hot and humid conditions two to three weeks prior to harvesting.

Prevention and control

- **Garden hygiene:** Remove all rotting or mummified fruits from trees and collect up fallen fruit from the ground. Burn or take to the local recycling centre. Keep area under trees free of vegetation.
- **Cultural control:** Prune out wither tip and spur blight as soon as it occurs. In winter, cut out cankers and brown lesions on stems and branches.
- **Storage:** Avoid damaging fruit during harvest. Do not store bruised and stalk-less fruit. Use clean containers for storage of fruit. Check stores regularly and remove any fruit with signs of rot.
- **Foliar feed:** Use seaweed extract as a foliar feed to boost the trees' resistance having a beneficial effect. Apply it every 10-14 days from bud-burst to green cluster stage and then again from petal fall to early August.

Canker

A fungal disease that affects twigs and sometimes-larger branches. Usually eneters weak or damaged wood

Prevention and control

- Prune out as much affected wood as possible, preferably removing at least 5cm of good wood too.
- Avoid over pruning trees as this promotes weak sappy canker prone growth.
- Prune to promote good air circulation and remove damaged & rubbing wood. Always make cuts as clean as possible
- The benefits of disposing of infected wood is debatable as the disease spreads by wind blown spores over great distances

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Codling moth

The larva or caterpillar of the codling moth (*Cydia pomonella*) is a serious pest of apples. It occasionally attacks pears.

Typical symptoms

Codling moth larvae, also known as apple maggots, eat into maturing fruit. A single larva enters each fruit through the eye if the fruit is small, but otherwise near the stalk. It initially forms a small cavity below the skin, and then after a few days it burrows into the core leaving a prominent, red-ringed, entry hole blocked by dry 'frass' (maggot droppings). A large proportion of the fruit flesh can be eaten away and the cavity becomes filled with brown frass. After feeding for about 4 weeks, the larva escapes through a small unplugged exit hole. Damaged fruits tend to ripen and drop prematurely.

Codling moth damage should not be confused with apple sawfly damage; sawfly also burrow into the fruit but they produce masses of black, wet frass which is pushed to the outside. Sawfly damage also usually occurs earlier in the season in May or June, on younger fruits.

Description of pest

The larvae are pinkish-white with mottled brown heads, 18-20mm long. The adult moth is mottled grey-brown in colour, about 8mm long and with a wingspan of 15-22mm. It has a large characteristic bronzy-black blotch near the tip of the wings. The adults fly at night, so are seldom noticed.

Life cycle

The female moths lay single eggs on fruits and leaves in June/July. The eggs hatch 10-14 days later and tiny larvae immediately burrow into the fruit and feed for about a month. They then leave the fruit and crawl down the trunk to spin a cocoon under loose bark, tree ties etc. Larvae that reach this stage by the end of July may emerge as adults the same season to give a second infestation during August and September. The majority will not emerge until the following spring.

Prevention and control

- Encourage natural controls: Make your garden a friendly place for a range of helpful creatures by avoiding harmful sprays and providing suitable wildlife habitats. Grow flowers that attract beneficial insects. Small, simple flowers are best, such as members of the Umbelliferae and Compositae families, as well as the poached egg plant (Limnanthes douglasii), Convolvulus tricolor and Phacelia tanacetifolia. Encourage birds to your trees by providing them with some food in the winter. Blue tits are especially adept at searching out and consuming the overwintering moth cocoons. Do not kill earwigs, they will eat codling moth eggs.
- Other methods: Always pick up and remove windfalls soon after they have fallen and remove leaf litter in the autumn. Remove any tree ties in the autumn in case they contain cocoons. Replace with new ones.

- Trapping: Pheromone traps for codling moths are available to buy. They contain minute quantities of female codling moth pheromone, attractive to male moths which are then trapped on a sticky base. Hang the traps in trees from mid May to September. Each trap will protect up to 4-5 trees. Once trapped, the males are no longer available for mating and the females cannot therefore produce fertile eggs.

  Another approach is to trap the pupae of the moths by providing a suitable site for them to pupate. Cut a 50cm strip of large-core corrugated cardboard. Wrap round

the trunk so the corrugations are vertical, about 45cm above ground level. Put the traps in position in July, remove and burn them in the autumn. This method is most effective on smooth trunks. If your neighbours also have fruit trees, try and encourage them to do the same, otherwise your efforts will have limited effect.

- Chemical control - a last resort: Spraying is the least satisfactory method of control for codling moth. The timing must be exactly right for it to have any effect. You have to catch the caterpillars during the brief period before they disappear into the apple, but as the eggs hatch out over a relatively long period there is no single best time to do this. A derris spray will kill caterpillars only by direct contact, therefore is of limited effectiveness and may kill beneficial insects too. The pheromone trap described above can be used to detect when the first moths are present; this is likely to be in mid June. Start spraying about 10 days after the first moths are caught and then weekly for about 4 weeks.

Greenfly & other Aphids

Mostly a problem on young trees where new growth is distorted by attack

Prevention and control

- Encourage natural controls.
- Manually squash colonies.
- Pinch out worst affected shoots
- Localised spraying of affected areas only as a last resort

Woolly Aphid

A common pest of apple trees, the woolly aphid (*Eriosoma lanigerum*) also infests ornamental crab apple, cotoneaster, hawthorn, pyracantha, sorbus and other related plants.

Typical symptoms

In spring and summer, white fluffy outgrowths occur on tree stems and branches. This sticky "wool" is a protective wax secreted by the breeding colonies of the aphid. The aphids feed mainly on spurs and branches, particularly where the bark is broken. Little damage is done to mature trees, although irregular swellings or galls may develop on twigs and branches; these only become a problem if they crack open and allow entry of

disease organisms such as apple canker. In young trees, galling caused by woolly aphids can cause serious disfigurement.

Description of pest

A small, purplish-brown aphid, densely covered with white, waxy fluff when mature. Often mistaken for a fungus or mildew attack. If touched, the aphid colonies squash to an unpleasant sticky mess, while the disease mildew disintegrates to a white dust.

Life cycle

Young aphids (waxless) overwinter in cracks and under loose bark on trees and shrubs. They become active and start feeding in late March/April and by May, breeding colonies are established under masses of conspicuous fluffy white wax. Several generations occur during the season. Only a few winged aphids are produced so most spread is by wingless aphids crawling, or being blown, from tree to tree. For this reason the problem may not spread far, but will persist on the same trees from year to year. Survival of this species does not involve eggs; it is young wingless aphids that overwinter and carry on the life-cycle into the following year.

Prevention and control

- Encourage natural controls: Make your garden a friendly place for a range of helpful creatures by avoiding harmful sprays and providing suitable wildlife habitats. Grow flowers that attract beneficial insects. Small, simple flowers are best, such as members of the Apiaceae (Umbelliferae) and Asteraceae (Compositae) families, as well as the poached egg plant (Limnanthes douglasii), convolvulus and Phacelia tanacetifolia.

  A small chalcid wasp (*Aphelinus mali*) is a parasite on the woolly aphid and can give effective control if allowed to flourish. Originally introduced in the 1920s, it is now naturalised and is common in southern England. Parasitised aphids will have a tiny hole in the back if the wasps are active, in which case avoid spraying.

- Hand picking: Try to deal with the aphids as soon as they are visible, before numbers build up – scrape off the white woolly colonies, or attack them with a stiff brush.
- Cultural control: Prune out and burn severely infected branches, particularly if there are signs of canker.
- Chemical control - a last resort: Spraying with insecticidal soap can be effective but may need to be done several times. Try spraying at 1 or 2 day intervals, and repeat 2 - 3 times. A high volume, high pressure spray is necessary to get through the protective waxy coat.