



## The Backyard Orchardist Fruit Pests: Apple

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### DISEASES

#### Fire Blight

**IMPORTANCE AS A PEST ON APPLE:** high

**OTHER FRUIT HOSTS:** crabapple and pear

**GENERAL INFO:** Fire blight is caused by a bacteria called *Erwinia amylovora*. Some varieties of apples are very susceptible to this disease, such as Jonathan, Jonagold, and Gala. Blossoms, terminal twigs, and sometimes entire limbs or trees are killed. Environmental conditions favoring infection are moisture during bloom and when average temperature exceeds 60° F. Rain, heavy dew, and insects spread oozing bacteria to flowers, where new infections occur.

**SYMPTOMS:**

- brown blossoms and shoots
- wilted shoots in the shape of a shepherd's crook (shown right).
- infected twigs that retain dead leaves through winter
- oozing cankers in spring



**MANAGEMENT:** Most importantly, all infected shoots, twigs, or limbs should be pruned out of the tree. Cut 12 inches below the canker into healthy wood to be certain that the bacteria are removed, and do not prune during moist conditions, as this can contribute to disease spread. Protect flowers from infection by applying an antibiotic spray just before, or within 24 hours after, a potential wetting event (rain, irrigation, dew). Mix streptomycin and oxytetracycline to prevent resistance.

#### Powdery Mildew

**IMPORTANCE AS A PEST ON APPLE:** moderate-high

**HOSTS:** cherry, nectarine, peach, berries, and grape

**GENERAL INFO:** This fungus attacks leaves, flowers, and fruit. Certain apple varieties (Jonathan, Idared, Gala, Jonagold, Rome) are commonly attacked but others may also be affected in years of moisture and humidity. The fungus overwinters on twigs. Infections begin in late spring, during warm days, cool nights, and some form of moisture. The spores are spread by wind, dew, rain, and irrigation.

**SYMPTOMS:**

- yellowing
- distortion
- stunting
- reduced yield
- white powdery residue (a mixture of fungal mycelium and spores)



**MANAGEMENT:** Most trees can tolerate light infections. Fungicides (lime-sulfur, myclobutanil, or propiconazole) work as preventives, and must be applied prior to infections. Start at open-cluster stage on trees that are prone to infection. They will not "cure" infected tissue. Pruning affected twigs may also be helpful.

## Iron Deficiency

**IMPORTANCE AS A PEST ON APPLE:** moderate

**OTHER FRUIT HOSTS:** nectarine, peach, and berries

**GENERAL INFO:** Iron is a nutrient necessary for the formation of chlorophyll. Lack of chlorophyll means reduced photosynthesis, and reduced tree vigor. Iron deficiency is not caused by a lack of iron in the soil, but rather the soil pH (which ranges from 7.5 to 8.5 in Utah). In high pH, iron is insoluble, and therefore not available for root absorption. Because irrigation water is also very alkaline, trying to manage iron deficiency by reducing soil pH is impossible. Iron deficiency is exacerbated by frequent springtime irrigation or prolonged soil wetness. Some trees are genetically more susceptible to nutrient deficiencies than others.

### SYMPTOMS:

- interveinal chlorosis (yellowing between veins)



**MANAGEMENT:** To prevent or treat iron deficiency, chelated iron (in the form of FeEDDHA, such as Miller's Ferriplus) can be applied to the soil or foliage, but results are temporary. (Chelated products are readily absorbed and are not affected by soil pH.) Soil applications should be made in the spring, and worked into the root zone. For minor deficiencies, one application will last all season. Foliar sprays (0.1%) with a spreader-sticker provide quick results but must be reapplied at approximately 10- to 21-day intervals. The drawback of foliar sprays is that staining of fruit can occur. To accurately diagnose nutrient deficiencies, the USU Analytical Lab (435-797-2217) can test foliar and soil samples.

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## Crown Rot and Root Rot

**IMPORTANCE AS A PEST ON APPLE:** low-moderate

**OTHER FRUIT HOSTS:** all fruit trees

**GENERAL INFO:** Caused by a soil-borne, fungus-like organism (*Phytophthora*), crown rot and root rot occurs worldwide on almost all fruit trees. *Phytophthora* is present in most soils, but only causes infection under optimal circumstances, which are high soil moisture or standing water, and a susceptible host. Once trees are infected, there is no cure.

### SYMPTOMS:

- slow growth
- sparse, yellowing foliage
- small fruit
- wilting in hot weather
- sudden plant death where leaves remain attached
- when bark is scraped away, necrotic brown tissue (infected) clearly delineated from healthy cream-colored tissue (shown above right)



**MANAGEMENT:** Plant healthy trees only in well-drained areas. Do not replant in areas where root and/or crown rot occurred previously. *Phytophthora* can spread by root-to-root contact, so treating adjacent healthy trees with phosphorus acid (Agri-Fos, Fosphite) will help prevent infection.

## Apple Mosaic Virus

**IMPORTANCE AS A PEST ON APPLE:** low

**OTHER FRUIT HOSTS:** none

**GENERAL INFO:** Apple mosaic virus is an uncommon and easily prevented disease that is spread by grafting of diseased scion (buds, twigs, or roots).

**SYMPTOMS:**

- slow tree growth and low fruit yields
- distinctive, random pattern of chlorosis (yellowing) on leaves

**MANAGEMENT:** Plant virus-free plants, and use virus-free grafting scion. Diseased trees do not need to be removed, but should not be used as a source for scion material.



## Bitter Pit

**IMPORTANCE AS A PEST ON APPLE:** low

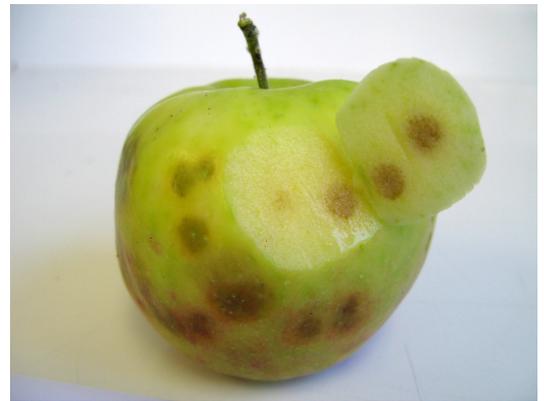
**OTHER FRUIT HOSTS:** none

**GENERAL INFO:** Bitter pit is a disorder of apple fruit caused by a deficiency of calcium, and symptoms are usually seen after harvest. Granny Smith, Jonathan, and Red Delicious are a few susceptible varieties. Rome Beauty, Macintosh, Gala, and Fuji are less susceptible.

**SYMPTOMS:**

- brown, sunken lesions on the skin
- brown, spongy tissue below the skin surface (shown at right)

**MANAGEMENT:** Maintain trees at a moderate level of vigor. (Do not over-fertilize, as vigorous trees can be more susceptible.) Maintain even soil moisture, do not over-thin, keep trees at annual bearing, do not excessively prune at dormancy, and do prune in summer.



## INSECTS

### Codling Moth

**IMPORTANCE AS A PEST ON APPLE:** high

**OTHER FRUIT HOSTS:** crabapple and pear

**GENERAL INFO:** Codling moths are the adults of the common “worms” that infest apples. These moths emerge from overwintering sites in the spring and lay their eggs on and near developing fruits. There are up to 3 generations per season, from spring to late summer.

**SYMPTOMS:**

- Frass (sawdust-like excrement) on the outsides of the fruit
- Small holes in fruit; and if still present, white larvae in fruit
- Fruit drop
- Rot is sometimes associated with entry/exit holes

**MANAGEMENT:** The key to successful management by the home orchardist is accurately timed insecticide sprays. Codling moth activity is regulated by temperature and spray timing varies from year to year. To find out when codling moth is active in your area of the state, contact your local county Extension agent or subscribe to the [USU IPM Tree Fruit Advisory](#). Insecticides include carbaryl, malathion, gamma-cyhalothrin, acetamiprid, and spinosad.



## Spider Mites

**IMPORTANCE AS A PEST ON APPLE:** moderate

**OTHER FRUIT HOSTS:** all fruits

**GENERAL INFO:** Mites are very small arthropods that are more closely related to ticks than insects. Spider mites overwinter as adults at the base of trees, or in ground cover, and may become a problem during hot, dry conditions in mid and late summer when they reproduce rapidly. They remove sap and chlorophyll from leaves causing a stippling appearance.

### SYMPTOMS:

- stippled leaves
- scorched leaves due to heavy feeding (shown at right)
- fine silk webbing that becomes apparent when populations are high



**MANAGEMENT:** Predatory mites that feed on spider mites can provide effective biological control if they aren't harmed by pesticides. Low populations of spider mites can be ignored and are often kept in check by the predatory mites. Spider mite outbreaks often follow pesticide applications that upset the predator-prey balance. Washing down trees or plants with a stiff spray of water or applying insecticidal soap or 1% horticultural mineral oil every 5-7 days until mite densities decline can be effective. Avoid applying soaps or oils during the hot part of the day as some leaf burn may result.

## Woolly Apple Aphid

**IMPORTANCE AS A PEST ON APPLE:** moderate

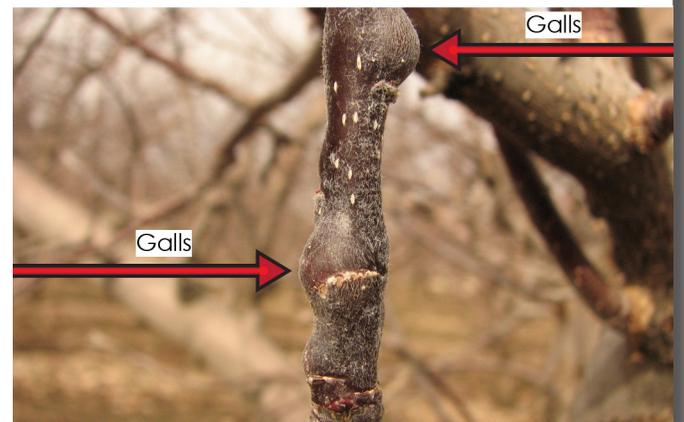
**OTHER FRUIT HOSTS:** none

**GENERAL INFO:** The woolly apple aphid overwinters on roots as well as in protected areas of the canopy. As the weather warms, they move up from the roots, and colonies in the canopy start multiplying. They first become noticeable in late June as sticky, cottony colonies (shown at top right) at the base of leaves, on old pruning cuts, or on cracks and crevices. Their feeding on twigs and roots causes galls (shown lower right). Extreme cold winters will kill most aphids overwintering in the tree canopy.

### SYMPTOMS:

- galls on roots and twigs that sometimes crack
- cottony masses on twigs and wounds
- honeydew
- curled leaves

**MANAGEMENT:** Woolly apple aphids are controlled with broad-spectrum insecticides like carbaryl, malathion, and permethrin applied when colonies are first noticeable in the tree canopy. In order to increase insecticide efficacy, add horticultural oil. Without oil, the insecticide has difficulty penetrating the waxy covering of the colony. Dormant oil sprays are not fully effective because most of the aphid population are on the roots during winter.



## Aphids (Rosy Apple Aphid, Green Apple Aphid)

**IMPORTANCE AS A PEST ON APPLE:** low-moderate

**OTHER FRUIT HOSTS:** none

**GENERAL INFO:** Aphids suck sap from the phloem vessels and reduce tree vigor. They exude sticky honeydew as they feed. Adults feed on leaves as well as apple fruits causing deformities. They overwinter as eggs on apple trees. Rosy apple aphid migrates to alternate weed hosts for the summer.

### SYMPTOMS:

- deformed fruit (caused by rosy apple aphid; colony shown at right)
- curled and sticky leaves
- black sooty mold



**MANAGEMENT:** The home orchardist can usually ignore aphid infestations unless the populations are extremely high, growth of young trees is being stunted, or black sooty mold is staining the fruit. Numerous beneficial insects (e.g., lady beetles, lacewings, and syrphid flies) help suppress aphid populations, so conserve and protect these natural enemies. A 2% oil application when buds start to leaf out will smother eggs. Insecticidal soap or 1% horticultural oil in summer works well.

## Flatheaded Borers (Flatheaded Apple-tree Borer and Pacific Flatheaded Borer)

**IMPORTANCE AS A PEST ON APPLE:** low-moderate

**OTHER FRUIT HOSTS:** cherry and plum

**GENERAL INFO:** Flatheaded borers are beetles (shown at right), usually only a problem on apples stressed by drought conditions, or when pest populations are high. The beetle larvae girdle trunks and can kill limbs and trees. The adult beetles are active in June and July.

### SYMPTOMS:

- sawdust-like frass (insect excrement) on bark
- loose, flaking bark
- large oval exit holes on large limbs or trunk (right)
- dead limbs



**MANAGEMENT:** Apply protective trunk sprays to prevent larvae from entering trees in June and July. Permethrin and carbaryl are effective. Keep trees healthy with optimal watering, fertilization, pruning, and removal of infested limbs and trees.

## San Jose Scale

**IMPORTANCE AS A PEST ON APPLE:** low-moderate

**OTHER FRUIT HOSTS:** stone fruit trees

**GENERAL INFO:** San Jose scale is the most common scale insect to attack apple. Scales will feed on bark and apple fruit, creating small red halos with white centers. The soft body of the insect is hidden underneath an armored shield. Females produce young that crawl from under the mother scale before settling to feed. The "crawlers" are active in the late spring. If heavy infestations are not controlled, a tree can be killed.

### SYMPTOMS:

- peppery-looking flakes on apple fruit (shown right) which are the scale bodies
- limbs encrusted with small, circular, black and gray armored scales
- small red halos with white centers on apple



**MANAGEMENT:** A 2% oil application at half-inch green stage will kill overwintering immature scales (but not adults). Adults are difficult to kill. To kill crawlers, apply bifenthrin or carbaryl in early June. (Adults die after crawlers hatch.)

## Apple-Leaf Blister Mites

**IMPORTANCE AS A PEST ON APPLE:** low

**OTHER FRUIT HOSTS:** crabapple

**GENERAL INFO:** Blister mites are microscopic mites in the eriophyid group. They burrow under the lower surface of leaves and feed within small galls. Adults overwinter under leaf bud scales and emerge with new leaf growth in the spring. Very high populations can reduce photosynthesis and tree vigor. Trees easily tolerate lower populations.

**SYMPTOMS:**

- “blisters” that start green and turn brown as they age (shown at right)

**MANAGEMENT:** Treat large infestations in early fall, before leaf drop, when mites are migrating from leaves to buds. Insecticide options include carbaryl and lime sulfur.



## Cat-facing Insects

**IMPORTANCE AS A PEST ON APPLE:** low

**OTHER FRUIT HOSTS:** pear and stone fruits

**GENERAL INFO:** Lygus bug, stink bug, and boxelder bug sometimes feed on young fruits with their piercing-sucking mouthparts and cause depressions in the fruits by killing plant cells. These dead cells result in indentations and distortions in fruit shape as the fruits mature.

**SYMPTOMS:**

- scarring that resembles a cat's face with puckered cheeks (shown at right)
- pits and sunken areas on fruits
- reduced fruit quality and storability

**MANAGEMENT:** Usually cat-facing injury is not severe enough in backyard trees to warrant treatment.



## Speckled Green Fruitworm

**IMPORTANCE AS A PEST ON APPLE:** low

**OTHER FRUIT HOSTS:** cherry, pear, and plum

**GENERAL INFO:** In Utah, the speckled green fruitworm is sometimes a pest of fruit trees. Young larvae hatch in spring and begin feeding on new leaves, flowers, and young fruit. They are active for approximately 6 weeks in spring and there is just one generation per year. The larvae can be detected by shaking branches over a tray.

### SYMPTOMS:

- chewed leaves
- early fruit drop
- round, deep holes in fruit (shown at right) that heal as a scar or sunken area

**MANAGEMENT:** A single application of a reduced-risk insecticide such as Bt (*Bacillus thuringiensis*) or spinosad in spring after fruit starts forming, is very effective. There are many brands of insecticides that contain these active ingredients.



## White Apple Leafhopper

**IMPORTANCE AS A PEST ON APPLE:** low

**OTHER FRUIT HOSTS:** cherry and crabapple

**GENERAL INFO:** The white apple leafhopper sucks sap from leaves. The white flying adults can also be a nuisance when picking fruit. The adults are wedge-shaped with wings meeting in a sharp peak over the back. Nymphs are white and flightless.

### SYMPTOMS:

- stippled leaves (yellow specks)
- black spotting on fruit ("tar spots")

**MANAGEMENT:** Best control is achieved when leafhoppers are still in the immature stage (nymphs) in spring. Nymphs feed on the undersides of leaves, so good coverage of lower leaves with insecticides is necessary. Options include carbaryl, spinosad, and insecticidal soap.



**Precautionary Statement:** All pesticides have benefits and risks, however following the label will maximize the benefits and reduce risks. Pay attention to the directions for use and follow precautionary statements. Pesticide labels are considered legal documents containing instructions and limitations. Inconsistent use of the product or disregarding the label is a violation of both federal and state laws. The pesticide applicator is legally responsible for proper use.

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