

Insect control for apples and pears in the home orchard

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Home gardeners raise fruit trees for several reasons. Some enjoy the challenge of producing their own fruit; others prefer growing varieties not available commercially. Still others just enjoy the fresher fruit. Regardless of the reasons, home gardeners must realize having fruit trees carries the responsibility of controlling pests that affect those trees. Home gardeners should avoid planting more trees than they can care for. Neglected or undermanaged fruit trees become a source of pest insects and a problem for neighbors.

Good pest management requires frequent spraying, fertilizing, weed control, and irrigation. Home fruit production requires more time and expense than many home gardeners are willing to commit. For those willing to work, the following information will help control insect pests of apples and pears.

Pests

Codling moth

Codling moth is the major pest of apples and pears. Its larva is the common apple worm. If unsprayed, apple trees will have 50 to 85 percent wormy fruit most years. Damage is less severe on pears. The insect overwinters as a larva under the bark of apple trees or in orchard trash.

Adult moths emerge in May. Seldom seen in an orchard, moths are active during twilight. As many as three generations may develop in a season, but the first generation is critical. Most failures in codling moth control result from poor control of the first generation. When good control occurs early, later generations will be greatly diminished unless unsprayed trees grow in your immediate vicinity.

For the home orchard, malathion and permethrin are effective insecticides for this pest. Apply the first spray to apple and pear trees from May 25 to May 30 in the Treasure Valley or in Lewiston. Apply insecticide about 10 days after

full petal fall or 17 to 21 days after full bloom. In other areas of Idaho, make the first application when the fruit is $\frac{3}{4}$ inch in diameter.

Kaolin clay is a natural treatment that acts as an insect repellent; however, you may need to apply it earlier and more frequently. The clay film apparently acts as an irritant to the adult moth and makes the fruit less desirable as an egg laying site.

Aphids

Rosy apple aphid is the most damaging aphid species on apples. Aphids cluster on the undersides of fruit spur leaves, where they distort leaf and stem growth and cause severe leaf curling. Direct aphid feeding causes misshapen and dwarfed fruits.

The rosy apple aphid overwinters in the egg stage, hidden in cracks in tree bark or in bud axils (where buds break out from the branch). Newly hatched rosy apple aphids appear on very young growth in early spring. Young aphids are dark green but turn a rosy brown when mature. This aphid is a springtime pest on apple trees, migrating to weed hosts by early summer. It returns to apple trees in fall to lay eggs on terminal growth.

Dormant oil sprays applied in early spring at the prepink stage just before bloom help control these aphids. Other treatments include malathion, permethrin, insecticidal soap, and azadirachtin (neem oil).

The apple aphid, or green apple aphid, also overwinters as an egg on apple tree bark. It hatches slightly later in spring than the rosy apple aphid and remains on apple trees throughout the growing season. Apple aphid feeding retards growth of new shoots. Heavy infestations may cover foliage and fruit with honeydew. A sooty fungus grows on the honeydew, turning fruit black.

Dormant oil sprays applied in early spring just before buds turn green effectively control both aphid species. If you do not use a dormant spray, apply malathion or permethrin for aphids just before the tree blooms (prepink) and again, if



needed, immediately after blossoms fall (petal fall). DO NOT spray insecticides on blossoming trees, because insecticides kill bees necessary for pollination.

Other prepink treatments include insecticidal soap, azadirachtin, Kaolin clay, and *Beauveria bassiana*. Summer sprays of azadirachtin or insecticidal soap may be needed if aphids remain.

Scale

Scale insects are serious pests of neglected and poorly managed fruit trees. Heavy infestations on apple and pear trees can cause spotting on fruit or kill entire limbs. After attaching itself to the twig or fruit, the scale secretes a whitish gray, waxy, protective covering, then grows to the size of a pinhead.

Young crawlers (immature), produced in early summer, spread rapidly to establish feeding sites on fruit and new growth. Crawlers secrete waxy coverings as they mature. Ladybugs, lacewings, and parasitic flies and wasps help control scale insects.

The waxy covering protects the scale insect from traditional insecticide sprays. A dormant oil spray is effective against this pest because oil acts as a suffocating agent. Adding lime-sulfur to dormant oil sprays aids in scale control. Malathion and azadirachtin sprays can control scale crawlers after they emerge from eggs in late June or early July.

Pear psylla

The pear psylla is a pest of pears only. It prefers cool weather and succulent foliage. Populations build up in early spring and early summer. Injurious populations persist throughout the season if not controlled early. Besides weakening the tree by sucking plant juices, this pest produces honeydew that causes a black, russetlike injury (a roughened, scaly patch on the skin) when it contacts the fruit.

A dormant oil application is the best preventive treatment. Permethrin applied at the prepink stage also is effective. If you miss the dormant and prepink periods, try summer sprays of azadirachtin (neem oil), insecticidal soap, or Kaolin clay.

Pear slug

The pear slug is a flattened, slug-shaped, slimy, black sawfly larva. It appears in early summer and skeletonizes pear leaves. Unless damage is severe, specific control aimed at pear slugs is not recommended. On small trees where the leaves can be reached, pick slugs off by hand and destroy them. When control is needed, apply a malathion spray.

Leafrollers

Several species of insects called leafrollers feed on foliage and roll the leaves of fruit trees. When leafrollers attack early in the season, they cut off or feed on fruit, causing deformation.

Dormant or delayed-dormant sprays help control leafrollers. Spray the foliage with malathion or per-

methrin when you first see damage, soon after the trees have finished blooming.

Alternative controls include products containing spinosad, azadirachtin, *Bacillus thuringiensis*, *Beauveria bassiana*, and Kaolin clay.

European red mite and twospotted spider mite

European red mite and twospotted spider mite feed on leaves and fruit. Mites puncture leaf cells and feed on the contents. The leaves become mottled green, then turn bronze or black, and often drop from the tree. European red mite overwinters in the egg stage. Use a dormant spray for control.

Mite control must include preventive measures, such as keeping trees irrigated and fertilized. Natural enemies of spider mites include predatory mites, small ladybugs, and other predatory bugs which are susceptible to many pesticides. Mite populations can be reduced by washing trees with a hose every 2 or 3 days during hot weather.

Alternative controls include insecticidal soap and products containing *Beauveria bassiana*.

Pear rust mite, apple rust mite, and pear leaf blister mite

Pear rust mite, apple rust mite, and pear leaf blister mite cause russetting and scarring of fruit. They turn leaves pale green, then brown between veins.

Natural predators often suppress these mites. Mites can be washed off the trees using a garden hose. Proper tree care, including adequate irrigation, helps prevent large mite populations.

A dormant spray of lime-sulfur is effective for control of overwintering generations.

Caterpillars

Redhumped caterpillars, tent caterpillars, climbing cutworms, and other occasional pests can be treated with permethrin insecticide, but only when you have damaging populations.

Alternative caterpillar control includes *Bacillus thuringiensis* products and azadirachtin (neem oil).

Leafhoppers

Leafhoppers cause little damage to fruit or trees but can be a pest in home orchards in late summer or fall. Malathion, permethrin, insecticidal soap, *Beauveria bassiana*, or Kaolin clay applied 10 days after petal fall will help, but not eliminate, the problem.

Alternative or least toxic controls

Bacillus thuringiensis is a bacterial spore formulation sold as a biological insecticide under trade names such as BT, Thuricide, and Dipel. It is a specific spray that controls only the larvae of butterflies and moths, such as leafrollers, cutworms, and caterpillars. *Bacillus thuringiensis* has not proved effective against codling moth larvae.

Insects must eat the spores before the product can

be effective. Since the product is specific to worms and caterpillars, it does not interfere with biological control from predatory and parasitic insects.

Sunlight quickly breaks down the formulation. You may need to apply product sprays more often than with conventional pesticides.

Products containing *Beauveria bassiana* fungal spores control susceptible insects. The spores need not be consumed by the insect, but they must contact the insect's skin for infection to occur.

Neem oil is a botanical insecticide derived from the neem tree, *Azadirachta indica*. Neem oil has low mammal toxicity and breaks down in a few days. It controls susceptible insects both through direct contact and through ingestion.

Spinosad is produced by a soil bacterium that has insecticidal properties. The substance controls several susceptible insects and does not harm many beneficial or predatory insects. Spinosad must be ingested by the insect to be effective.

Kaolin clay is applied to fruit trees as an insect repellent. When sprayed on leaves and fruit, the clay solution dries to a white film that repels insects.

Pheromone traps

A pheromone is a chemical substance produced by unmated female insects to attract males. Some of these chemicals made artificially are available to help pinpoint the timing of insect activity. In pheromone traps, the attractant is placed on a sticky surface. Traps catch only male insects and indicate future insect activity. For many insect species, the males emerge before the females. Mating takes place when the females emerge. A few days later the females lay eggs. In 3 to 5 days the eggs hatch into larvae that cause worm damage.

Usually 1 to 3 weeks pass between trap catch and fruit damage, depending on temperature. Suggested timing for insect sprays is after egg laying but before larvae hatch, about 1 week after catch.

Traps only indicate male activity. If many unsprayed trees are present in your neighborhood, traps will catch moths the entire season, indicating the need to protect fruit all season.

Using multiple traps to "trap-out" or control moth pests without insecticide sprays has not been effective in field tests, and fruit damage will occur.

Traps are available for codling moth, oriental fruit moth, pandemis moth, and other leafrollers. Pheromone traps are available from farm stores, garden stores, and farm chemical dealers.

Spraying fruit trees

Effective control results from the proper application of an appropriate pesticide at the correct time. No one chemical will adequately control all pests of apples and pears. The control of susceptible stages of any pest requires correct timing of treatments

according to pest development. Skips and misses in spray application result in insects and mites damaging fruit, particularly for the codling moth.

Proper timing of application and thorough coverage of twigs, branches, leaves, and fruit are as important as the chemical used. Spray both upper and lower leaf sides until they begin to drip. An average 10-year-old fruit tree will need 4 or 5 gallons of dilute spray to thoroughly wet all foliage. Dwarf trees require less spray.

If these applications do not control pest insects, have trees sprayed professionally.

Spray timing

Dormant (February-April)

Dormant oil is a special weight oil that suffocates eggs and scale insects. Apply during late winter or early spring (February-April) when trees are dormant. This spray controls aphids, mites, pear psylla, and scales. It is necessary every year on badly infested trees. Do not apply dormant oil when temperatures are below 45°F or when freezing temperatures are expected within 24 hours. Do not apply after the trees begin to leaf out.

Prepink

Prepink spray consists of an appropriate insecticide (not dormant oil) applied just before the buds reach the pink stage before bursting. This spray is useful for controlling aphids, scales, and some caterpillar pests. It is usually applied from mid to late April, unless dormant oil has been applied. If pest problems continue, use a prepink spray. CAUTION: To prevent killing bees and other pollinators, DO NOT use pesticides during the bloom period.

Petal fall

Apply petal fall spray just after blossoms have fallen from the trees.

Postbloom or summer

Postbloom or summer sprays are usually applied about 21 days after full bloom, generally in late May for the first spray. Use insecticides appropriate for the pest. When multiple pest problems occur, appropriate insecticides may be mixed and applied as one spray or purchased as mixed sprays. These are necessary for controlling codling moth and summer populations of aphids and pear psylla. Codling moth control requires repeat sprays every 10 to 14 days through the season.

Spray guide: Home garden apples and pears in Idaho

| Time of application | | Target pests | Materials | Comments |
|---------------------|-------|--|--|---|
| Dormant | Apple | Scales, aphid eggs, mite eggs | Superior oil & lime-sulfur | Tree must be in dormant stage |
| | Pear | Pear psylla, scales, aphid eggs, mite eggs | Superior oil & lime-sulfur | Use enough to cover entire tree |
| Prepink | Apple | Aphids | malathion permethrin insecticidal soap azadirachtin <i>Beauveria bassiana</i> Kaolin clay (Surround) | Organophosphate insecticide Synthetic pyrethroid insecticide Potassium salts insecticide Botanical extract insecticide Microbial (fungus) insecticide Clay film insect repellent |
| | Pear | Pear psylla | permethrin | Synthetic pyrethroid insecticide |
| Postbloom or summer | Apple | Codling moth | malathion permethrin Kaolin clay (Surround) | Organophosphate insecticide Toxic to bees Clay film insect repellent |
| | | Leafhoppers | malathion permethrin insecticidal soap <i>Beauveria bassiana</i> Kaolin clay (Surround) | Organophosphate insecticide Synthetic pyrethroid insecticide Good contact with insect needed Microbial (fungus) insecticide Clay film insect repellent |
| | | Aphids | azadirachtin (neem) insecticidal soap | Botanical extract insecticide Good contact with insect needed |
| | | Leafrollers | malathion permethrin <i>Bacillus thuringiensis</i> Kaolin clay (Surround) spinosad | Observe minimum time to harvest Observe minimum time to harvest Microbial (bacteria) insecticide Clay film insect repellent Bacterial extract insecticide |
| | | Scale crawlers | malathion azadirachtin | Apply 10 days after full petal fall Botanical extract insecticide |
| | | Spider mites | insecticidal soap <i>Beauveria bassiana</i> | Good contact with insect needed Microbial (fungus) insecticide |
| | | Pear | Codling moth | malathion permethrin Kaolin clay (Surround) |
| Pear | Pear | Leafrollers | malathion permethrin azadirachtin (neem) <i>Bacillus thuringiensis</i> <i>Beauveria bassiana</i> Kaolin clay (Surround) | Observe minimum time to harvest Observe minimum time to harvest Botanical extract insecticide Microbial (bacteria) insecticide Microbial (fungus) insecticide Clay film insect repellent |
| | | Aphids | azadirachtin (neem) insecticidal soap | Botanical extract insecticide Good contact with insect needed |
| | | Pear psylla | insecticidal soap azadirachtin Kaolin clay (Surround) | Good contact with insect needed Botanical extract insecticide Clay film insect repellent |
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