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Control Diseases and Insect Pests of Apples and Pears

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Control Diseases and Insect Pests of Apples and Pears

COOPERATIVE EXTENSION SERVICE
SOUTH DAKOTA STATE COLLEGE, BROOKINGS
U. S. DEPARTMENT OF AGRICULTURE
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Occasionally in providing useful information it is necessary to use trade names. The information given herein is supplied with the understanding that no discrimination is intended and no endorsement by the South Dakota Cooperative Extension Service is implied.
Control Diseases and Insect Pests of Apples and Pears

By Dean Martin, Extension Horticulturist, and Gale Mast, Extension Entomologist

Production of high quality fruit in home plantings depends on the control of several insect pests and diseases. The information in this circular is designed to assist the home grower produce good quality fruit. Carefully follow the spray schedule. Elimination of one or two sprays from the schedule or haphazard application of spray materials, usually results in low-quality diseased or insect-damaged fruit.

Keep farm and home fruit plantings small, just large enough to supply fruit for the family. Many plantings are too large to be taken care of adequately. For home use, it is far better to have two or three properly maintained trees than a neglected large orchard.

For spraying equipment, small power sprayers are best to use, although hand operated ones such as the trombone-type sprayers are much lower in cost. The latter type of sprayer will spray branches 25 to 30 feet from the ground but care has to be taken to see that all surfaces are completely covered by the spray. A sprayer with an adjustable nozzle is desirable.

SPRAYING FOR EFFECTIVE DISEASE AND INSECT CONTROL

1. Do not eliminate any sprays given in the schedule. Apply all sprays at the proper time.

2. Apply all sprays to trunk, branches, leaves, and fruit. Thorough coverage is essential. Spray trees until a noticeable amount is dripping from the tree. The table in this section gives the approximate amount of spray needed for various sizes of fruit trees in full leaf.

3. Observe limitations on spray materials. Do not apply sprays containing malathion and methoxychlor within 7 days of harvest. If other insecticides are included, follow directions on the container to avoid harmful residues. Ferbam should not be used on apples within 7 days of harvest; there is no time limitation on the use of captan.

4. Do not spray fruit trees in bloom with insecticides. Protect the beneficial, pollinating insects such as bees, which are in the trees at the time.

<table>
<thead>
<tr>
<th>Approximate age of tree</th>
<th>Height (feet)</th>
<th>Spread (feet)</th>
<th>Gallons to apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 to 4 years</td>
<td>5-8</td>
<td>3-6</td>
<td>½-1</td>
</tr>
<tr>
<td>5 to 10 years</td>
<td>8-12</td>
<td>4-9</td>
<td>1-3</td>
</tr>
<tr>
<td>10 to 15 years</td>
<td>12-18</td>
<td>8-15</td>
<td>4-8</td>
</tr>
<tr>
<td>Over 15 years</td>
<td>18</td>
<td>15</td>
<td>8-10</td>
</tr>
</tbody>
</table>
Many chemical companies are selling "all-purpose" fruit sprays which come in one package and are ready to be mixed with water as directed on the container labels. These mixtures usually contain the insecticides, methoxychlor and malathion, plus a fungicide such as captan or ferbam. Other insecticides and fungicides are used in all-purpose fruit sprays sold under various brand names. Most of them are satisfactory if the directions on the package are carefully followed. Ingredients for "all-purpose" spray mixtures may be purchased separately and mixed as directed in the following table. It is usually more economical to prepare your own mixture, although not as convenient.

Addition of a spreader-sticker material to the spray mixture may increase the effectiveness of the spray. Instructions on the label of such materials should be closely followed.

<table>
<thead>
<tr>
<th>Materials</th>
<th>Amount to be added to water</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 gallon</td>
</tr>
<tr>
<td>Methoxychlor, 50% wettable powder</td>
<td>3 tablespoons</td>
</tr>
<tr>
<td>Malathion, 25% wettable powder</td>
<td>2 tablespoons</td>
</tr>
<tr>
<td>Malathion, 50% emulsion conc.</td>
<td>2 teaspoons</td>
</tr>
<tr>
<td>Ferbam, 76% wettable powder</td>
<td>2½ tablespoons</td>
</tr>
<tr>
<td>OR</td>
<td></td>
</tr>
<tr>
<td>Captan, 50% wettable powder</td>
<td>2½ tablespoons</td>
</tr>
</tbody>
</table>

**SANITATION IN FARM AND HOME FRUIT PLANTINGS**

Planting reliable, disease-free stocks is the first essential for good fruit production. Use of resistant varieties in areas where certain diseases are present helps cut down losses. Plant only recommended varieties. Maintaining plants in a strong, vigorous growing condition lessens disease and insect attacks. Promptly remove all dead wood and prune out unhealthy limbs. Destroy all possible breeding and hibernating places likely to harbor insects and disease. Follow recommendations listed for specific diseases and insects, as some cannot be controlled by spraying.

Remember, the use of the proper materials in a spray program can only be successful if they are properly applied at the right time. Thoroughness and timeliness of control are essential in reducing pest damage to a minimum.
Insects and diseases of apples and pears are present at different times. This chart shows that spraying for insect and disease control should be timely and thorough, beginning in April and continuing to September 15. Trees should also be sprayed following rain to keep them covered with the protective spray materials.
DESCRIPTION OF DISEASES AND INSECTS

Cedar-apple Rust

The first symptoms of this disease occur on the upper surface of apple leaves as small, light yellow spots, which gradually enlarge and become orange or brown. At this time the orange-brown spots are also seen on the lower surface of the leaves. Leaves may be attacked when they are quite young. Fruits are affected similarly; the yellow-orange spots are most noticeable at the calyx end (opposite stem end). Rust will ultimately affect the vitality of the tree if it is not properly controlled.

Cedar-apple rust is caused by a parasitic fungus. To complete its life cycle, the fungus first attacks apple trees, then it lives on the cedar tree (Juniperus spp). Since rust is a serious menace to both kinds of trees, they should never be grown close together. The severity of rust can be reduced if cedar and apple trees are planted at least one-fourth mile apart. Keeping these plantings separated limits the spread of the fungus and interrupts its life cycle.

Fungicides such as Ferbam, Zineb, or Thiram afford some control of the rust fungus. Apple varieties vary in the susceptibility to rust.
Cedar-apple rust symptoms on apple.

**Apple Scab**

This disease attacks both foliage and fruit. Faint olive-green circular spots occur on the leaves. These enlarge and become dark green to almost black in color. Heavily infected leaves may become curled or distorted. On the fruit, spots are similar but often the skin breaks, forming the typical scab-like areas. As the disease progresses, these areas enlarge and often coalesce. Severely infected fruits are corky, malformed, or cracked. Under certain conditions, similar disease symptoms are found on blossoms and young twigs.

Control of apple scab depends entirely on the timeliness and thoroughness of fungicide applications.

Fire blight is especially severe in this area of the United States. It is caused by bacteria which attack blossoms, fruit spurs, new leaves at the tips of branches, and twigs. Once the bacteria get inside the trees, they travel to the larger

Apple scab on leaf. The spots are black.

Apple scab on the fruit.
branches, the trunk, and other parts of the tree. Small branches and fruit first become limp, then turn brown or black and shrivel. These twigs appear to have been scorched by fire, hence the name, fire blight. Larger branches often have dark, sunken cankers which ooze in wet weather. These cankers enlarge as the season progresses.

The disease is spread by rain and splashing water. Bacteria was present in the ooze which comes out of cankers and other infected parts. Bees and other insects carry it to healthy trees in the process of pollination.

Spraying, as a general rule, is ineffective in the control of fire blight. The only effective control of fire blight is pruning out all infected twigs and branches. Remove diseased portions well below (6 to 12 inches) the area infected. Make sure that the pruning knives and other equipment used in the operation are disinfected after each cut. A good disinfectant to use is ¼ ounce of cyanide of mercury and ¼ ounce of bichloride of mercury and three quarts of commercial glycerin and 1 quart water. (Use caution in applying, as this mixture is poisonous.) Burn all prunings immediately. Antibiotic sprays, such as streptomycin (Agrimycin-100, Agristrept, Phytomycin), show some promise in fire blight control, but they are somewhat expensive.
If fire blight continues to be severe, plant resistant varieties and use resistant understock for all newly planted trees. Some of the most susceptible apples are Transcendent Crab, Beacon, Cortland, Wealthy, and Virginia Crab. Most resistant are McIntosh, Duchess, Haralson, Patten Greening, Northwestern Greening, and Dolgo Crab.

**Codling Moth**

Larvae of this pest over-winter in a thick cocoon under the loose bark of apple trees. The adults emerge as small moths which are difficult to see because they are similar in color and appearance to the bark of the trees. Eggs are laid by the adult females on the upper sides of the leaves near apple clusters sometime after the flowers have blossomed.

The hatched worm finds its way to young apples and burrows into fruits often through the calyx end and works its way to the core. After reaching full size, the larva leaves the fruit and spins a cocoon in some sheltered place. Later the same season it will emerge as an adult, or if late in the season, it will remain in the cocoon until the following spring.

**Apple Maggot**

The adult of this apple insect is a small black fly. The females lay eggs just under the skin of apples about mid-summer. The larva or maggot eats its way into the fruit and often

![Codling moth damage caused by the worm tunneling through the fruit.](image)
Apple maggot damage inside fruit.

causes premature fruit drop. Later the maggot emerges full grown, enters the ground, and passes the winter.

Aphids

Aphids are small, soft-bodied insects and feed by injecting tiny, piercing mouth parts into the leaf and cause curling and distortion. Seldom do aphids get larger than $\frac{1}{8}$ inch long. Many aphids secrete an objectionable liquid or honey dew.

Scales

Scales on fruit trees will vary in appearance, but all of them give a "crusted" appearance to the twigs, branches, and trunks. Many times the color of the scales makes it difficult to observe them on the tree. The actual insects are underneath the scales which protect them. The over-wintering stage is the egg beneath the old scale.

San Jose scale on apple branch.

Oyster shell scale on apple branch.

Buffalo treehopper damage on apple branch.
Spider Mites

Spider mites are very small and difficult to see without a magnifying lens. These mites appear as tiny moving specks on the underside of leaves. When infestations are severe, parts of the plants may become covered with webbing spun by the mites. Leaves of heavily infested trees will develop a yellowed, speckled color and eventually may appear bronzed or rusty. Spider mites develop very rapidly during the warmer periods of summer.
### WHEN TO SPRAY | MATERIAL | WHAT TO CONTROL
---|---|---
Pink Bud stage (when fruit buds show pink at the tips). | All-purpose spray mixture* | Apple scab, aphids, cankerworms, mites

When 20% of blossoms are open. Repeat spray during bloom period at 5-7 day intervals. | Antibiotics—(streptomycin and terramycin)—100 parts per million. See container label. Zineb†—1 1/2 lbs. per 100 gal. of spray (2.4 oz., per 10 gal.) | Fire blight

Petal Fall (when most of flower petals have fallen) | All-purpose spray mixture. | Apple scab, cedar-apple rust, codling moth, curculio, aphids, mites, cankerworms

First cover spray (10 days after petal fall) | All-purpose spray mixture | Apple scab, cedar-apple rust, codling moth, curculio, scales, mites, aphids, plant bugs

Second cover spray (10 days after first cover) | All-purpose spray mixture | Apple scab, codling moth, curculio, leaf rollers, mites, aphids

Third cover spray (10 days after second cover) | All-purpose spray mixture | Apple scab, apple maggot, codling moth, aphids, mites

Fourth cover spray (10 days after third cover) | All-purpose spray mixture | Apple scab, apple maggot, codling moth, aphids, mites

Fifth cover spray (10 days after fourth cover) | All-purpose spray mixture | Apple maggot, codling moth, leafhoppers, mites

Sixth cover spray (10 days after fifth cover) | All-purpose spray mixture | Apple maggot, mites, leafhoppers

*Where cedar-apple rust is a problem, use ferbam as the fungicide in the all-purpose mixture.
†Agrimycin and Zineb are compatible with all materials mentioned in manuscript.