

Producing fruit that is not heavily damaged by pests requires planning. Though integrated pest management tactics such as cultural, biological, and physical measures are used, insecticide and fungicide sprays are typically required to produce acceptable quality fruit. Home gardeners are often more tolerant of minor blemishes and small losses than those who produce fruit commercially. This spray guide is designed to give good, but not perfect results.

The most effective and economical strategy for maintaining a healthy orchard is taking proper care of plants through site selection, watering, pruning, and cleanup. Apples have more pest problems than any other fruit grown in Kansas. Cedar-apple rust, scab, powdery mildew, and fireblight can cause serious damage to susceptible cultivars, with cedar-apple rust being the most harmful. Choosing resistant varieties eliminates the need for fungicide sprays for these diseases. Apples that are resistant

or very resistant to cedar-apple rust are listed in Table 3 along with ratings for other diseases. Less serious diseases such as sooty blotch and fly speck cause surface blemishes and can be tolerated by home orchardists.

The number one insect pest in Kansas is the codling moth, recognized in its larval form as the worm in the apple. There is no resistance for this pest, and sprays are often necessary to harvest acceptable fruit.

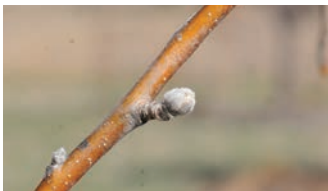
Once formed, fruit can be bagged to avoid spraying. For varieties that are not disease resistant, you will need to spray to prevent leaf diseases until petal fall. There are bags made specifically for bagging fruit called Japanese apple bags. Small paper lunch bags will work. Cut them down to 6 inches and make a slit to slip over the stem of the apple. Place bags over individual fruit when they are about the size of a quarter (about three weeks after petal fall), securing them with twist ties.

Once bagged, no additional sprays are needed. The bags prevent fungal diseases and insect attacks. Remove bags three weeks before harvest to allow apples to color. You can learn how to bag apples by watching this video: <https://www.youtube.com/watch?v=sbbmgJ5F1wc>.

This publication includes two spray tables: one for trees without resistance to cedar-apple rust (Table 1) and another for trees with resistance (Table 2). Table 3 shows the susceptibility of apple cultivars to cedar-apple rust, apple scab, powdery mildew, and fireblight.

The tables give common chemical names of active ingredients in products recommended for control. For trade names, days to harvest, and maximum number of applications per year, refer to *Fruit Pesticides, Active Ingredients, and Labeled Fruits (MF3431)*. This companion publication will be revised every year to reflect label changes.

**Table 1. Spray schedule for apple trees without resistance to cedar-apple rust**

| Growth Stage                                                                                                             | Target Organism                | Control      | Comments                                             |
|--------------------------------------------------------------------------------------------------------------------------|--------------------------------|--------------|------------------------------------------------------|
|  <p>Dormant</p>                       | scale and mites                | dormant oil  | Spray only if these have been a problem in the past. |
|  <p>Leaf appearance to petal fall</p> | rust, scab, and powdery mildew | myclobutanil | Apply every 10 to 14 days.                           |

| Growth Stage                                                                      | Target Organism                                         | Control                                                             | Comments                                                                                |
|-----------------------------------------------------------------------------------|---------------------------------------------------------|---------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
|  | rust, scab, powdery mildew, plum curculio, codling moth | myclobutanil + malathion, acetamiprid, lambda-cyhalothrin, or CYD-X | Use only one insecticide with myclobutanil. Apply every 10 to 14 days.                  |
| Petal fall through May                                                            |                                                         |                                                                     |                                                                                         |
| From June 1 on                                                                    | codling moth, sooty blotch, fly speck, fruit rots       | captan + malathion, acetamiprid, lambda-cyhalothrin, or CYD-X       | Use only one insecticide with captan. Apply every 2 weeks until 3 weeks before harvest. |

Common chemical names of active ingredients are given. For trade names, see *Fruit Pesticides, Active Ingredients, and Labeled Fruits (MF3431)*.

**Table 2. Spray schedule for apple trees with disease resistance to cedar-apple rust**

| Growth Stage           | Target Organism                    | Control                                                       | Comments                                                                                                                |
|------------------------|------------------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|
| Dormant                | scale and mites                    | dormant oil                                                   | Spray only if these have been a problem in the past.                                                                    |
| Petal fall through May | plum curculio, codling moth        | malathion, acetamiprid, lambda-cyhalothrin, or CYD-X          | Use only one insecticide. Apply every 10 to 14 days.                                                                    |
| From June 1 on         | sooty blotch, fly speck, fruit rot | captan + malathion, acetamiprid, lambda-cyhalothrin, or CYD-X | Apply every 2 weeks until 3 weeks before harvest. Captan can be omitted if fly speck and sooty blotch can be tolerated. |

Common chemical names of active ingredients are given. For trade names, see *Fruit Pesticides, Active Ingredients, and Labeled Fruits (MF3431)*.

**Table 3. Apple cultivars resistant to cedar-apple rust**

| Cultivar       | Cedar-Apple Rust | Apple Scab             | Fireblight             | Powdery Mildew   |
|----------------|------------------|------------------------|------------------------|------------------|
| Akane          | Resistant        | Moderately susceptible | Resistant              | Resistant        |
| Arkansas Black | Resistant        | Moderately susceptible | Resistant              | Resistant        |
| Empire         | Resistant        | Very susceptible       | Resistant              | Susceptible      |
| Granny Smith   | Resistant        | Susceptible            | Very susceptible       | Very susceptible |
| Jonamac        | Resistant        | Susceptible            | Susceptible            | Susceptible      |
| Jonafree       | Resistant        | Very resistant         | Very resistant         | Susceptible      |
| Liberty        | Very resistant   | Very resistant         | Resistant              | Resistant        |
| McIntosh       | Very resistant   | Very susceptible       | Susceptible            | Susceptible      |
| Paulared       | Resistant        | Susceptible            | Very susceptible       | Susceptible      |
| Red Delicious  | Very resistant   | Susceptible            | Resistant              | Resistant        |
| Redfree        | Resistant        | Very resistant         | Moderately susceptible | Resistant        |
| Williams Pride | Resistant        | Very resistant         | Resistant              | Resistant        |

Choose cultivars resistant to diseases common in your area.

## Apple Problems



Cedar apple Rust



Apple scab



Powdery mildew



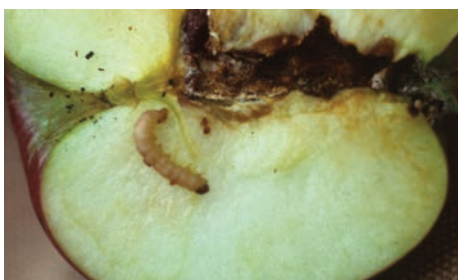
Fruit rots



Sooty blotch



Fly speck



Codling moth larva



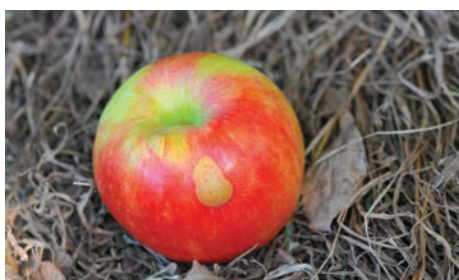
Codling moth adult



Scale on apple



Plum curculio adult



Plum curculio damage



Spider mite damage

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**Photo credits**

Plum curculio adult, E. Levine, The Ohio State University, Bugwood.org

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