

Disease-Resistant Apple Cultivars

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Disease infection is a major limitation to growing apples in Missouri. Several cultivars with apple scab immunity or resistance are currently available for planting. Although these cultivars can reduce pesticide usage, apples are susceptible to other diseases and insect pests. All cultivars listed below are immune or resistant to apple scab. When temperatures are near 100 degrees F in August during the daytime and are very warm at night, the flesh of early-ripening cultivars often softens and results in poor fruit quality. Thus, apple cultivars that would be harvested at this time are not recommended for planting in Missouri. Also, some cultivars listed below have not yet been evaluated in Missouri and may have unidentified limitations to fruit production.

Figure 1. Planting apple cultivars that are resistant to prevalent diseases may eliminate the need to apply fungicides. (Sketch by Barbara Barkwell Long)

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Apple cultivars

- **Liberty**

An older cultivar, released in 1978, that has broad resistance to apple scab, fire blight, cedar apple rust and powdery mildew and, therefore, is highly recommended for planting. It has red fruit with a yellow background color that generally ripens around Sept. 10 in central Missouri.

- **Bonita**

A newer cultivar that that is untested in Missouri. Apples are pink to red with a yellow background color. The flesh is firm, crisp, and juice with a sweet-tart flavor. Fruit ripens around September 10.

- **RubyRush**

A new release from New Jersey that has resistance to fire blight and cedar apple rust. These red apples are juicy and aromatic with a crisp texture. Fruit ripens in mid-September.

- **Crimson Gold**

Trees of this cultivar have medium vigor and are resistant to apple scab but may be susceptible to other

diseases. Apples have a reddish-orange blush with a yellow background color, have a sweet/acidic flavor and ripen around early September.

- **Crimson Crisp**

Trees produce medium size, red apples with a firm, crisp texture and a tart flavor. Fruit is harvested a few days before Liberty and at the same time as Crimson Gold.

- **Galarina**

This cultivar has high tolerance to scab and powdery mildew, but its susceptibility to other diseases has not been evaluated in Missouri. Its fruit is reddish-orange and resembles that of Gala. These sweet apples are harvested in mid- to late September.

- **Freedom**

A scab-resistant cultivar released by the New York State Agricultural Experiment Station breeding program. Trees are only moderately resistant to fire blight and powdery mildew. The fruit has a spicy flavor and an orangish-red peel. In wet growing seasons, it may be susceptible to black rot.

- **Smerelda**

A recent cultivar release from Italy. Its smooth, green apples are tart and resemble Granny Smith fruit. The harvest period begins in late September. Trees have a compact growth habit.

- **Story**

This cultivar originates from France. These sweet-flavored apples have a red blush when harvested in early October. Trees are susceptible to powdery mildew.

- **Nova Spy**

A cultivar introduced by the Nova Scotia Research Station. Its red apples are sweet and are good for fresh eating and baking. Fruit ripens in early October, about five days after Story.

- **Florina (Querina)**

An introduction from France with Jonathan parentage. It has moderate resistance to powdery mildew but is susceptible to cedar apple rust. The dark red, medium-size fruit has a sweet/tart flavor and ripens in October.

- **Winecrisp**

A cultivar release from the University of Illinois. The apple peel is a dark red with a dull or “scarfy” fruit surface. The flesh has a sweet-tart, spicy flavor with a firm texture. Fruit ripens in early October after Florina.

- **Enterprise**

An older, but reliable cultivar that ripens in late October. It is immune to scab, resistant to fire blight and cedar apple rust, and moderately resistant to mildew. The fruit is tart and is medium to large with red color, and the peel tends to be tough.

- **Goldrush**

This cultivar is immune to apple scab and moderately resistant to powdery mildew and fire blight but susceptible to cedar apple rust. The fruit ripens in October after Enterprise. It has medium to large yellow fruit with sweet/acidic flavor that tends to mellow when cold-stored.

Common disease symptoms

- **Apple scab**

Apple scab is caused by a fungus that infects the fruit and the foliage of trees under cool, humid conditions in spring. Young, velvety brown lesions can be seen on the underside of leaves. With time, individual lesions may coalesce and infect the upper and lower leaf surfaces. A severe infection of the leaves can cause premature defoliation, which reduces tree growth and yield. Scab lesions on the fruit are brown and corky. As the fruit enlarges, it may grow unevenly, resulting in misshapen, cracked fruit. Fruit losses from apple scab can be severe on susceptible cultivars.

- **Cedar apple rust**

Because native stands of eastern red cedar (*Juniperus virginiana*) are common in Missouri, cedar apple rust is another frequent disease. Eastern red cedar serves as an alternate host to the disease. Under rainy conditions in spring, galls on the cedar branches produce orange, gelatinous horns that release spores. Wind can carry the spores as far as a mile to infect the young leaves and blossoms of apple trees. After infection, orange-brown lesions appear on the upper sides of the foliage or on fruit. On susceptible cultivars, cedar apple rust can cause defoliation and loss of fruit quality. Goldrush, Pixie Crunch, and Florina are susceptible to cedar apple rust and should be avoided in areas where this disease is prevalent.

- **Fire blight**

Fire blight is a devastating bacterial disease that occurs throughout Missouri. This disease infects apple blossoms, fruit, branches and leaves. Infected tissue appears black, as if scorched by fire. The “shepherd’s crook” symptom, in which the shoot tips are bent over, is a key indicator of the disease. Whole branches or trees may be lost after fire blight infection. Fire blight infection favors temperatures higher than 65 degrees F and moisture. Enterprise and Liberty cultivars are resistant to fire blight.

- **Powdery mildew**

Powdery mildew is caused by a fungus that infects blossoms, fruit and leaves. Whitish, felt-like patches can be seen on the underside of foliage. Infected floral buds open five to eight days later than healthy ones. Later, the developing fruit often exhibits russetting, which appears as brown, corky netting on the surface of small apples. Powdery mildew infection favors cool temperatures and high humidity.

Summer diseases and insects

Although some apple cultivars have resistance to apple scab, cedar apple rust, fire blight and powdery mildew, they are still susceptible to summer diseases, such as rots, fly speck and sooty blotch, and to insect pests. Black rot symptoms appear as “frog-eye” leaf spots with small light brown lesions surrounded by a dark brown border. Black rot infection on the fruit is a firm dark decay, often present at the calyx-ends of fruit. White rot infections cause soft egg-shaped lesions, which can coalesce to encompass much of the fruit. Bitter rot causes decay in the flesh and appears in a v-shaped pattern, progressing to the core when a fruit is cut in half. Fly speck and sooty blotch occur together on the fruit surface under warm, humid weather conditions. Fly speck is identified by distinct groups of tiny, shiny black spots. Sooty blotch appears as olive

green to black smudges. Both of these diseases are superficial blemishes that can usually be removed from the surface of the apple with mild scrubbing. In contrast to the summer diseases, control of insect pests on disease-resistant apple cultivars may require trapping, mating disruption or insecticide application.

Rootstocks

Most of these scab-resistant cultivars are available from nurseries on dwarfing to semi-dwarfing rootstocks. All rootstocks designated with “G” are resistant to fire blight, including G.11, G.16, G.41, G.210, G.935, etc. M.26 rootstock is very susceptible to fire blight and, therefore, is not recommended for planting in Missouri.