

# Managing Apple Scab in North Dakota Crabapples

**Jared M. LeBoldus**, Extension Plant Pathologist, North Dakota State University

**Esther McGinnis**, Extension Horticulturist, North Dakota State University

**Aaron Bergdahl**, Forest Health Specialist, North Dakota Forest Service

Apple scab, caused by the fungus *Venturia inaequalis*, is a potentially serious disease of fruit trees and woody plants in the rose (*Rosaceae*) family. Crabapples (*Malus* spp.), apples (*Malus* spp.), mountain ash (*Sorbus* spp.), pear (*Pyrus* spp.), cotoneaster (*Cotoneaster* spp.) and hawthorne (*Crataegus* spp.) are all susceptible to this disease. This pathogen affects the leaves and fruits of susceptible hosts, impacting the aesthetic quality of the tree and fruit quality.

## Signs and Symptoms

On mature leaves, the typical early signs of apple scab are round, velvety, olive-green spots measuring up to ½ inch in diameter on leaves and fruit (Fig. 1). Through time, these spots become dark brown to black and may coalesce along leaf veins (Fig. 1). Young leaves may become curled or puckered when infected. Severely infected leaves become yellow by midsummer and prematurely fall off the tree.

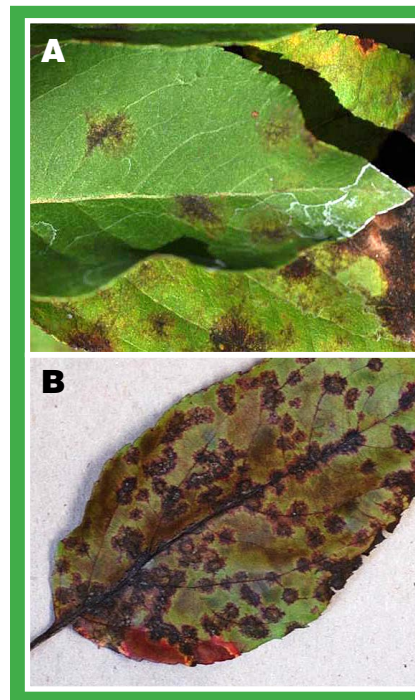
Symptom development on infected fruit is similar to leaves. Olive-green spots appear on the fruit during the spring. These spots turn brown and become corky through time (Fig. 2). Severe infections may result in cracked and deformed fruit.

## Disease Cycle

The fungus that causes apple scab overwinters on infected leaves and fruit that have fallen from the tree. In the spring, spores (ascospores) are ejected forcibly from fruiting bodies (pseudothecia) that have developed on the infected leaves and fruit from the previous growing season. These spores are carried by the wind to newly emerging leaves, flowers, fruit and green twigs.

For infections to develop, spores require several hours of moisture on plant surfaces. These new infections will turn into spots that can produce new spores (conidia) in 9 to 17 days, depending on the environmental conditions. These conidia are spread by wind, splashing water and irrigation to other leaves on the same tree or neighboring trees. This cycle will repeat itself several times throughout the course of the growing season.

This disease is favored by warm, rainy weather in the spring and summer. Trees that lose their leaves prematurely for several years can exhibit decreased growth, fewer flowers and increased susceptibility to winter injury.



**Figure 1.** (A) Flowering crabapple leaf showing typical early apple scab lesions; and (B) severely infected crabapple leaf with black lesions and discoloration at the end of the growing season.



**Figure 2.** (A) Early lesion development on crabapple fruit with greenish, velvety appearance; and (B) infected crabapple fruit with black corky lesion caused by the apple scab fungus.

## Disease Management

**Resistant cultivars** — Planting disease-resistant cultivars is one of the most effective ways to manage apple scab in the landscape. Disease-resistant cultivars are less susceptible to apple scab and, therefore, do not require chemical control to prevent infection. Several resistant cultivars of crabapple are available (Table 1).

**Cultural** — Apple scab overwinters on infected leaves and fruit that have fallen off the tree. Raking and removal of this plant material prior to the first snowfall will eliminate locations where the fungus can survive, reducing the source of spores producing new infections the following spring.

Because dense foliage, nearby susceptible trees and protected sites favor development of apple scab, prune branches from the interior of trees to open the canopy and allow more air movement to promote an environment that reduces the risk of disease development.

Remove highly susceptible trees and avoid planting susceptible species or varieties in areas with multiple susceptible trees to reduce the likelihood of problems. Plant susceptible species in open sites (sunny, open to wind) and avoid directly wetting trees with lawn irrigation. Limit irrigation to the early morning.

Hardiness and suitability to a particular area are of greater importance than disease resistance when selecting an apple tree for North Dakota. Even resistant trees that are stressed can be susceptible to severe infection.

**Chemical** — Protectant fungicides, including chlorothalonil, propiconazole, thiophanate-methyl, captan, myclobutanil and mancozeb, can be used on susceptible cultivars during periods of prolonged wet weather. To control this disease effectively, you first must apply fungicide at the ½-inch green tip growth stage, when leaf buds are swollen and expanded with approximately ½ inch of visible new leaf tissue.

Fungicide application should continue at regular intervals according to the label directions. Wherever pesticides are selected as a management strategy, be sure to read, understand and follow the label instructions. It is the law.

**Table 1.** A list of flowering crabapple cultivars with resistance to apple scab and specific tree characteristics.

Cultivar/Trade Name	Flower Color	Fruit Color	Foliage Color	Tree Form	Height (feet)	Width (feet)	Zone
Gladiator®*	Bright pink	Reddish-purple	Purple-bronze	Upright crown form	20	9	2
Purple Prince	Bright red	Maroon, ½ inch	Purple-bronze	Rounded	20	20	4
Emerald Spire®*	Pink	Sparse red fruit	Copper-green	Dwarf, columnar habit	15	6	2
Marilee®*	Double, large white	Nearly fruitless	Medium green	Stiffly upright	24	10	4
Molten Lava®	White	Orange-red, ½ inch	Dark green	Horizontal weeper	15	12-15	4
Adirondack	White with pink edge	Red to orange-red, ½ inch	Dark green	Upright, columnar	15-18	12-16	4
Donald Wyman	White	Red, ⅜ inch	Dark green	Upright in youth, rounded in maturity	20	25	4
Malus baccata 'Jackii'	White	Purple or maroon-red, ½ inch	Dark green	Upright to rounded	30		3
Adams	Pink	Red, ⅝ inch	Green with reddish tint in spring	Dense, rounded	20-25	20	4

\*Cultivars marked with an asterisk are newer releases and have not been evaluated for long-term disease resistance in North Dakota.

For more information on this and other topics, see [www.ag.ndsu.edu](http://www.ag.ndsu.edu)

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