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G97-1330 Apple Scab

Diane A. Merrell

University of Nebraska - Lincoln

Donald Steinegger

University of Nebraska - Lincoln, dsteinegger1@unl.edu

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G97-1330-A

Apple Scab

Diane A. Merrell, Extension Assistant
Donald Steinegger, Extension Horticulturist

Apple scab disease, its symptoms, disease cycle, and cultural and chemical control are discussed; varieties of apples and crabapples are listed according to their degree of resistance.

Apple scab, caused by the fungus *Venturia inaequalis*, occurs worldwide wherever apples are grown. Scab is one of the most important diseases of apples and crabapples in Nebraska. Disease development is favored when wet and humid weather prevails from late April through June. The disease causes decreased yield, lower fruit quality, defoliated trees, and reduced tree vigor. Nearly every year, the disease defoliates susceptible varieties of ornamental crabapple. Repeated infection reduces their aesthetic value in landscape plantings and predisposes them to further injury from other stresses.

Symptoms

The first visible symptoms generally are small, discrete, olive to greenish-black lesions on the undersides of the leaves. Lesions are about one-fourth inch in diameter with an indefinite feathery margin. With time, the color darkens as the size of the lesions increases (Figure 1). While early infections tend to be on the underside of the leaf, later in the season the spots can be seen on either side. Leaves with large numbers of lesions often become distorted, show dead or dying tissue, yellow and drop prematurely from the tree. Similar lesions can appear on the leaf petiole. Lesions on the apple fruits are superficial, and the enlarging tissues beneath them give the lesions a cracked or “scabby” appearance and misshape the fruit (Figure 2). Though the fruit may appear unsightly, the unblemished portion is not affected and is safe to eat.

Host Range

V. inaequalis attacks members of the genus *Malus*. This includes varieties of apple and crabapples, including the common wild crabapples. Scab has also been reported on hawthorn (*Crataegus* spp.), mountain ash (*Sorbus* spp.), firethorn (*Pyracantha* spp.), and loquat (*Eriobotrya japonica*).



Figure 1. Apple scab symptoms on a leaf surface.



Figure 2. Apple scab on fruit.

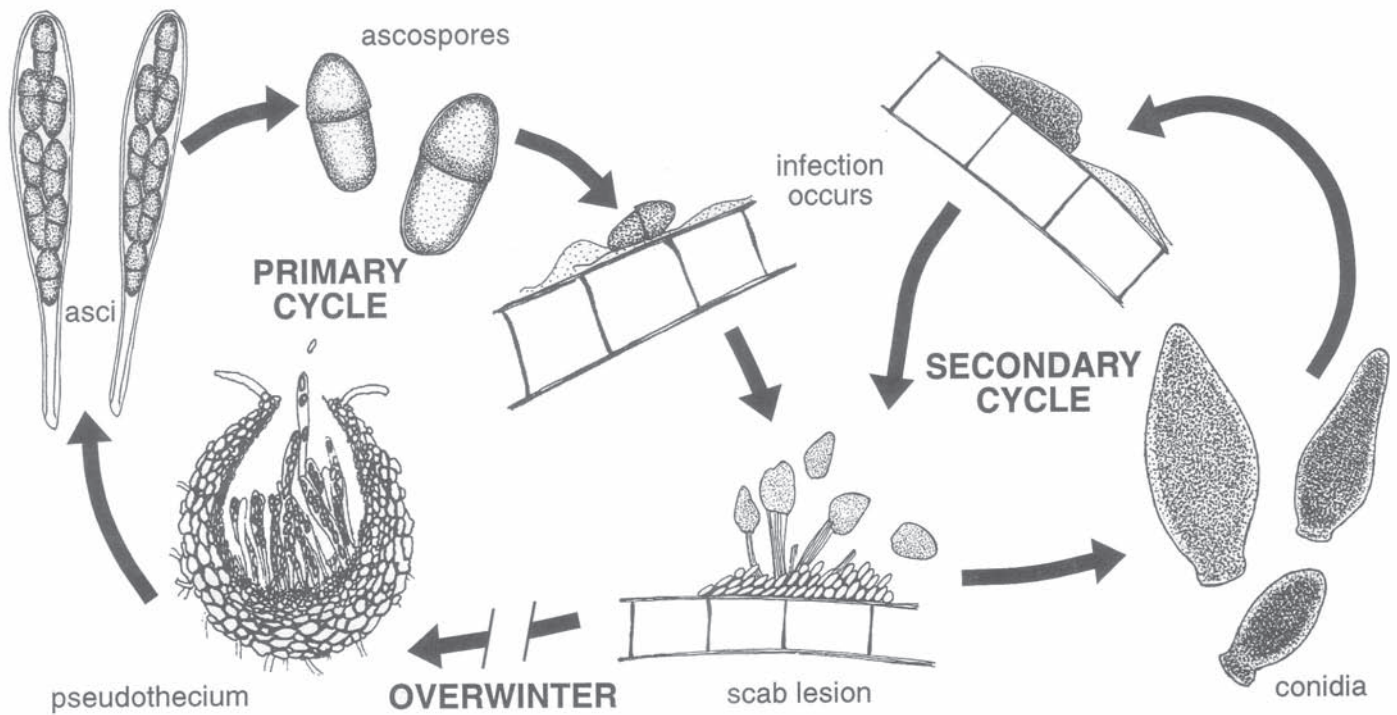


Figure 3. Life cycle of apple scab.

Disease Cycle

V. inaequalis survives the winter in fallen leaves that were infected the previous summer. In the spring the fungus becomes active on the infected leaf debris in structures called pseudothecia and begins to produce other structures called asci that contain ascospores (fungal “seeds”) as shown in Figure 3. The first dispersal of ascospores coincides with the first appearance of green tissue in the apple buds (commonly called “greentip”). Peak spore dispersal usually coincides with bloom. Rain aids in increasing spore production and dispersal. Spores that land on a susceptible leaf or fruit surface and come in contact with a droplet of water will germinate and infect the host. Six to eight hours of free moisture on the leaf surface are necessary for germination and infection to occur. In 7-14 days the first disease symptoms appear as a scab lesion. During the late spring and early summer, another type of spore called conidia are produced in the leaf, petiole and fruit lesions which cause secondary infections. Secondary infections result in more lesions and increased disease severity. As temperatures increase, the fungus becomes less active, resulting in few new infections during summer. A fall infection by the secondary cycle may occur under cool, moist conditions, but fall infections are less damaging than spring infections. However, these infections increase the production of the overwintering structures which are the main source of ascospore inoculum in the spring.

Management

There are several approaches to managing scab, each of which offers some degree of success when used individually. The best long-term management, however, involves integrating multiple tactics.

Resistant Varieties

Apples: Table I shows the disease reactions of apple varieties to scab. Although varieties vary in their susceptibility to *V. inaequalis*, no cultivated commercial variety has sufficient resistance to eliminate the occasional need for chemical spray.

Crabapples: The crabapple varieties listed in Table II are reported to be resistant or moderately resistant to scab.

Table I. Reaction to scab of selected apple varieties

Resistant	Moderately resistant or tolerant		Susceptible
	Redfree	Jonathan	
Prima	Spartan	Granny Smith	
Jonafree	Yellow Delicious	Rome Beauty	
Liberty	Blushing Gold	Winesap	
Freedom	Fuji	Red Delicious	
Gold Rush	Monroe	Jonagold	
Pristine			
Mad-free			
Easy-Gro			
Enterprise			

Sanitation — Cultural Control

Rake and remove leaves from the yard in autumn or winter. Either destroy or thoroughly compost the leaves. In summer, when using sprinklers to irrigate the turf, water early in the morning so turf and trees stay wet for less than four hours. This helps reduce disease activity on both the turf and landscape plants.

Chemical Control

Regular, well-timed fungicide sprays have proven to be the most commercially practical means of controlling scab. Since most homeowners lack adequate spray equipment,

their first line of defense is to consider resistant apples and crabapples.

The list of fungicides in *Table III* is to be used as a guide. It should not be considered a complete list of all chemicals available for control of scab. These products have federal registration, but there is no guarantee of effectiveness by the University of Nebraska, nor is criticism intended for any products not listed. Follow directions carefully. Observe all precautions appearing on the labels. Regardless of fungicide used, effective control will depend on the timeliness and repetition of applications and the degree of coverage obtained on both upper and lower leaf surfaces.

Table II. Scab reaction of selected crabapple varieties. (*Malus* sp. and hybrids)

<i>Variety</i>	<i>Flower color</i>	<i>Host reaction</i>	<i>Comments</i>
Bob White	White	Resistant	Good winter fruit display; fireblight susceptible in western Nebraska
Calocarpa (Red Bud)	White	Resistant	
Centurion	Red	Moderately resistant	Good winter fruit display
David	White	Resistant	
Donald Wyman	White	Moderately resistant	Excellent red fruit; slightly susceptible to fireblight
Indian Magic	Pink	Susceptible in wet years	Good winter fruit display
Indian Summer	Pink	Moderately susceptible	Colorful fall foliage
Jackii	White	Resistant	Colorful fall foliage
Mary Potter	Pink	Moderately resistant	Fireblight susceptible in western Nebraska
Molten Lava	White	Moderately susceptible in wet years	
Ormiston Roy	White	Moderately resistant	Fireblight susceptible in western Nebraska; excellent floral display; persistent fruit
Prairifire	Coral pink	Resistant	
Radiant	Red	Highly susceptible	Not recommended for use in Nebraska
Red Jade	White	Moderately susceptible	Can be highly susceptible in wet years
Red Splendor	Rosy red	Resistant	
Sargent	White	Resistant	Alternant bearing
Sentinel	Whitish-pink	Highly resistant	Good winter fruit display; yellow fall foliage; fireblight susceptible in western Nebraska; effective upright growing
Sugar Tyme	White	Resistant	Good winter fruit display; resistant to fireblight

Table III. A selected list of plant health products (fungicides) for control of apple scab

<i>Active ingredient</i>	<i>Product name</i>	<i>Amount of formulation Tbs or tsp per gal</i>	<i>Remarks</i>
Captan	OrthoHome Orchard Spray	5 Tbs/gal	Spray when new spring growth appears, repeat at 7-day intervals up to bloom. After petal fall, repeat at 10-day intervals. Do not use when blossoms are open. Contains an insecticide harmful to bees.
	Ortho Orthocide Garden Fungicide	3 1/3 Tbs/gal	Apples only. Apply in preblossom, petal fall, and cover applications.
	Dragon Captan Garden Fungicide	2 1/2 Tbs/gal	Apples only. Apply in preblossom, petal fall and cover applications.
	Earl May Fruit Tree Spray	2 1/2 Tbs/gal	Do not use when blossoms are open. Contains an insecticide harmful to bees.
	Dragon Fruit Tree Spray	1 1/2 Tbs/gal	Contains insecticide.
Coppers	Acme Bordeaux Mixture	8 Tbs/gal + 8 Tbs of hydrated lime	Do not spray tender foliage in cool temperatures.
	Hi-Yield Copper Fungicide	Refer to the label	Cooper hydroxide
	American Copper Fungicide	Refer to the label	Copper oleate
Daconil 2787	Ortho Multi Purpose Fungicide	2 1/4 tsp/gal	Crabapples only. Start applications at spring bud break.
	Dragon Daconil 2787	4 Tbs/gal	Crabapples only.
Ferbam	Dragon Ferbam	1 - 1 1/2 tsp/gal	Apples only.
Mancozeb	Green Light Maneb Plus	2 tsp/gal	Crabapples only. Using a spreader sticker is helpful.
Propiconazole	Banner MAXX	1/2 tsp/gal	Crabapples and non-bearing apples only.
	Spectracide Immunex fungicide concentrate	Refer to the label	

This list of fungicides is to be used as a guide and may not be a complete list of products available for the control of this disease. No criticism is intended for fungicides not listed nor endorsement given to those listed by Nebraska Cooperative Extension.

File under: PLANT DISEASES

D-10, Fruits

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