



Figure 1a,b. Blooming crabapples enhance landscapes; fall fruit provides an important food source for wildlife (Audubon Society of Rhode Island).

DISEASES OF LANDSCAPE PLANTS

Apple Scab of Flowering Crabapples

Flowering crabapples add color and beauty to many home landscapes in Indiana and serve as an important source of food for wildlife (Fig. 1a,b). Unfortunately, flowering crabapples are susceptible to several diseases that result in yellow leaves and defoliation by early summer. One cause of this problem is a fungal disease called apple scab. The same disease is also a common problem on eating apples, (refer to BP-1 [Apple Scab in the Home Fruit Planting](#)). Apple scab can be minimized by using resistant varieties, or with a combination of cultural and chemical controls, resulting in a tree that adds beauty to the landscape throughout the year.



Figure 2. Apple scab symptoms are variable, depending upon the weather and cultivar.

Symptoms and Signs

Signs of apple scab often begin as brown to olive-green, fuzzy spots that appear along the veins of the leaves. In time, spots may become black and velvety and develop fringed margins (Fig. 2). On crabapple fruit, these spots may become corky or cracked (Fig. 3). Symptoms of apple scab include leaf yellowing (chlorosis) and drop. In a “bad” scab year it is not unusual for susceptible trees to suffer near complete defoliation by the end of June (Fig. 4).



Figure 3. Apple scab fruit symptoms, include spotting, bumps, and cracking.

Apple scab is caused by the fungus *Venturia inaequalis*. The fungus overwinters on the fallen, infected leaves. In early spring, ascospores of the fungus are shot into the air when the fallen leaves become wet; spores are then carried by wind to the newly developing apple leaves. Once infection has occurred, a different kind of spore (conidia) is produced; these spores cause additional infections throughout summer and early fall—whenever weather is cool and wet. This cycle repeats itself annually.



Figure 4. Disease resistant crabapple trees do not defoliate to the degree of susceptible trees.

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Managing Apple Scab

Cultural Control: Resistance

The use of resistant varieties is the easiest way of managing scab of flowering crabapples. Many desirable cultivars of resistant flowering crabapples are available; see Table 1 for a listing of cultivars and their scab susceptibility. Cultivars are grouped into classes to help nurserymen and homeowners choose those crabapples that are less prone to apple scab. Cultivars in Class III are not recommended for future planting because of their extreme susceptibility to apple scab. Cultivars in both Classes I and II have sufficient resistance to be recommended for future planting. Resistance to Japanese beetle should also be considered when selecting crabapple cultivars in Indiana; refer to ID-217 ([Crabapples Resistant to Apple Scab and Japanese Beetle in Indiana](#)).

Cultural Practices:

Prune crabapples in late winter to maintain an “open” tree. A well-pruned tree allows better air circulation, faster drying conditions, and provides for better penetration of any fungicide that may be applied.

Since fallen leaves harbor the scab fungus, rake and destroy them before they become brittle and break into tiny fragments that are difficult, if not impossible, to rake. A flail mower which mulches leaves aids in their breakdown and reduces overwintering inoculum (fungus that starts the disease process again next spring).

Urea fertilizer (46-0-0) can be used to aid in decomposition. Use a rate of 4 lbs urea per 10 gallon of water. Apply to leaves as they drop in autumn or apply to fallen leaves in the late winter (February in Indiana). The added nitrogen from the urea promotes the growth of other fungi and bacteria that decompose infected leaves, depriving the apple scab fungus of overwintering substrate. It is important to apply the urea at the right time to aid in the decomposition of leaves, but not provide nitrogen to the tree in autumn, which may prevent it from entering winter dormancy. When in doubt, late winter/early spring application of urea to the fallen leaf litter is best.

Chemical Practices:

The first and most important step before managing a tree disease is to accurately diagnose the problem. With an inaccurate diagnosis, more harm than good can be done, not to mention a loss of time and money. If you are unsure consider sending samples for diagnosis to the Purdue Plant and Pest Diagnostic Laboratory (<https://ag.purdue.edu/departments/btny/ppdl/>).

Table 1. Classes of crabapple cultivars based on their resistance to apple scab. Updated 2018. Note: Cultivars may appear in both classes due to differing reports of resistance at different locations.

Class I High Resistance	Class II Moderate Resistance	Class III Susceptibility
Adirondack	Adams	Adams
<i>M. baccata</i> 'Jackii'	Brandywine	Bechtold's Select
Bob White	Candymint	Candied Apple
Centennial	Centurion	Indian Magic
David	David	Indian Summer
Dolgo^	Donald Wyman	Profusion
<i>M. floribunda</i> selections	Doubloons	Robinson
Golden Hornet	Harvest Gold	Snowdrift
<i>M. halliana</i> selections	Jewelberry	Velvet Pillar
<i>M. halliana</i> 'Parkman'	Louisa	White Candle
Liset	Madonna	White Cascade
Makamik	Mary Potter	
<i>M. x Micromalus</i> 'Midget'	Molten Lava	
Ormiston Roy	Prairifire	
Percifolia	Red Jewel	
Prairie Maid	Selkirk	
Prairie Rose	Sentinel	
Red Jewel	Silver Drift	
Rosseau	Summer Snow	
<i>M. sargentii</i> 'Sargent'	Tea	
Silver Moon	<i>M. zumi</i> 'Calocarpa'	
Strawberry Parfait		
Sugar Tyme		
<i>M. tschonoskii</i> *		
White Angel		
<i>M. x 'Wooster No. 1'</i>		
<i>M. Yunnanensis</i> 'Veitchi'		
*Not recommended for planting because of susceptibility for fireblight.		
^Not recommended for planting because of large fruit.		

Crabapples that are susceptible to apple scab need to be sprayed each year on a regular schedule to prevent infection. The most critical time to apply fungicides is spring (April and May in Indiana). Generally, a minimum of 3 to 4 sprays in the spring are required for adequate control of apple scab.

There are several fungicides available for landscape professionals, and a few available to homeowners (Table 2, 3). Fungicides vary in their formulation and percent active ingredient and those products available to professionals (who have training and licenses) are more effective and/or have a higher percent active ingredient than the products available to homeowners. Keep in mind that landscape

Table 2. Fungicides labeled for nursery and landscape professionals

Trade Name	Common Name	FRAC Code	Protectant or Systemic	REI	Site
Armada	trifloxystrobin + triademfon	11+3	S	12h	N, L, I
Avelyo	mefentrifluconazole	3	S	12 h	G, N, L, I, S
Banner Maxx Propiconazole	propiconazole	3	S	24h	N,L
Broadform	trifloxystrobin + fluopyram	7+11	S	12 h	G, N, L, I, S
Camelot O	copper	M	P	4 h	G, N, L, I, S
Captan	captan	M	P	48 h	G, N
Cleary's 3336; OHP6672	thiophanate-methyl	1	S	12	G,N,L,I
Compass,	trifloxystrobin	11	S	12 h	G, N, L, I, S
Concert II	propiconazole + chlorothalonil	M+3	P+S	12h	N,L
Daconil, PathGuard	chlorothalonil	M5	P	12 h	G,L,I
Disarm, Fame	fluoxastrobin	11	S	12	G, N, L, I, S
Eagle, Systhane,	myclobutanil	3	S	24	G,N, L
Heritage	azoxystrobin	11	S	4 h	G, L, N, S
Mural	azoxystrobin + benzovindiflupyr	7 + 11	S	12 h	G, N,S, L
Orkestra	fluxapyroxad + pyraclostrobin	7 + 11	S	12 h	G, N, L, I, S
Pageant Intrinsic	pyraclostrobin+ boscalid	11+7	S	12 h	G, N, L, I, S
Palladium	cyprodinil + fludioxonil	9+12	S	12 h	G, N, L
Protect DF	mancozeb	M	P	24 h	N
Rubigan	fenarimol	3	S	12	N,L
Spectro 90	thiophanate-methyl + chlorothalonil	M+1	P+S	12	G, N, L
Strike, Bayleton	bayleton	3	S	12	G,N,L
Sulfur	sulfur	M	P	varies	N,L
Terraguard	triflumazole	3	S	12	G, N, L
Torque	tebuconazole	3	S	12	N,L
Tourney	metconazole	3	S	12	N,L
Trinity	triticonazole	3	S	12	G, N, L, I, S
Zyban WSB	thiophanate-methyl + mancozeb	M+1	P+S	24	G, N, L, I

* G = Greenhouse; N = Nursery; I = Interiorscape; L = Landscape; S = Shadehouse

professionals also have access better spraying equipment and experience in applications, often resulting in better disease control with fewer applications than what a homeowner can deliver (Fig. 5).

For effective disease control, fungicides should be applied before symptoms appear, starting when flower buds begin to show pink, just before bloom (Fig. 6). This application at pink stage prevents infections from becoming established. Do not apply any fungicide during bloom to protect bees. Continue spraying at petal fall and then on a 7-to-10 day schedule (7 days during cool, wet weather, 10 days if dry) until dry weather prevails or the terminal bud sets. Usually, one to two sprays after petal fall is sufficient, unless the weather is unusually cool and wet.



Figure 5. Coverage is essential for good disease control(left). Using a protectant fungicide and only covering half the leaf only results in partial protection (middle). Missing a leaf results in no protection (right).



Figure 6. Apple flowering phenology. Pink (top left), king bloom (top right), full bloom (bottom left) and petal fall (bottom right). Most years, trees will have a mixture of blooms at various stages. It is important that pesticide applications avoid ANY bloom to protect bees and other pollinators.

Follow all label directions regarding amounts of pesticide to use, methods of application, and safety warnings. For homeowners, there are also several specially formulated, general purpose garden pesticides that contain the above listed fungicides and one or more insecticides; check the label of such products to be sure they contain one of the recommended fungicides. If using a general-purpose pesticide containing an insecticide, DO NOT spray during bloom; insecticides are toxic to honeybees.

Crabapples provide year-long beauty to landscapes, while providing food and shelter to wildlife. These benefits, along with carbon fixation, erosion control, and storm water mitigation (to name but a few!), far outweigh the minor inconvenience of a few disease problems that can be avoided or managed with a little effort.

For other publication in the Diseases of Landscape Plants series, visit the Purdue Extension Education Store, <https://edustore.purdue.edu/>.

Table 3. Fungicides labeled for homeowners.

Trade Name	active ingredient	FRAC Code	Protectant or Systemic	Efficacy*
BioAdvanced Disease Control	tebuconazole	3	S	E
Bonide Copper Fungicide, Monterey Liquid Copper Fungicide, Liqui-Cop Copper Fungicide Spray	copper	M	P	F
Captan	captan	M	P	E
Cleary's 3336; OHP6672	thiophanate-methyl	1	S	E
Daconil2787, Fungonil	chlorothalonil	M5	P	G
Immunox, Propiconazole	propiconazole	3	S	E
Sulfur	sulfur	M	P	F

*Efficacy: E = Excellent, G = Good, and F = Fair

Note: References to products in this publication are not intended to be an endorsement to the exclusion of others which may be similar. Persons using such products assume responsibility for their use in accordance with current label directions of the manufacturer.