



## Crabapples Resistant to Apple Scab and Japanese Beetle in Indiana

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The range of form, flower, and leaf color that crabapples can offer has made them one of the most popular small trees in Indiana landscapes. Two defoliating pests, apple scab and Japanese beetle, have also given this plant a reputation of being prone to insect and disease problems. Both these pests are widely distributed in Indiana. Apple scab is a fungal disease that infects leaves throughout the growing season when temperature and leaf wetness favor spore germination. Infected leaves eventually turn yellow and drop prematurely. The Japanese beetle is a flying insect that consumes leaves when it is in the adult stage, from late June through August. Planting crabapple cultivars with “good” resistance to these pests can greatly reduce the need for pesticides.

In this bulletin we place crabapple cultivars into one of 3 classes of resistance/susceptibility to each of these pests: Class I plants are highly resistant; Class II plants are moderately resistant; and Class III plants are highly susceptible. Cultivars with a Class I or II rating for both apple scab and Japanese beetle are likely to require little or no pesticide use to maintain their appearance in the landscape. In contrast, cultivars with a Class III rating for either Japanese beetle or apple scab are likely to require pesticide use to maintain their aesthetic appeal throughout the growing season. These cultivars are listed in table 3.

### Evaluation Process

Our ratings are based on 3 years of field evaluations of 43 cultivars of trees in LaPorte County, Indiana. Most crabapples were planted in 1990 as one-year-old whips. Evaluations used in the study are based on average pest incidence on 10 trees from each variety taken between 1994 and 1996. Years with the greatest pest-associated defoliation were used to produce our lists. For apple scab, these years were 1995 and 1996, and for Japanese beetle they were 1994 and 1995. Japanese beetle ratings were tempered by comparing our findings with those of other researchers.

### Apple Scab Rating

Cultivars were rated for apple scab severity on a scale of 0 to 5 according to the recommendations of the National Crabapple Evaluation Program. Cultivars were then placed into one of three Classes: Class I (0 -1 rating): cultivars with high resistance to scab; Class II (>1 - 3 rating): cultivars with moderate resistance to apple scab; and Class III (>3 - 5 rating): cultivars with high susceptibility to scab (Table 1). Crabapple cultivars classified as highly susceptible to scab were partly to totally defoliated during our study.

### Japanese Beetle Evaluation

Crabapple cultivars were rated in late July to determine the percent defoliation caused by Japanese Beetle. The maximum average defoliation we observed for any cultivar was 50% in any given year. Because a 1995 Kentucky study reported 100% average defoliation in the most susceptible cultivars, we incorporated their findings in our classification scheme. Cultivars with < 5 % defoliation in the Indiana study and < 25% defoliation in the Kentucky study were given a Class I rating. Cultivars consistently experiencing 5-15% defoliation in Indiana and a Kentucky rating of < 50% defoliation were given a class II rating. Finally, cultivars with consistently greater than 15% defoliation in Indiana or those with > 50% defoliation reported in Kentucky studies were given a Class III rating.

### Using the Tables to Meet Your Needs

Although both apple scab and Japanese beetle are serious pests of crabapples, apple scab is the most widespread and chronic problem on crabapples in Indiana. Indeed apple scab has been at epidemic level throughout the state for the past 5 years. To prevent severe scab infection, fungicide sprays should be applied on a regular protectant schedule throughout the growing season, but especially during the early spring months.

In contrast, adult Japanese beetles have a more spotty distribution in the state. Hot spots, or regions where damaging numbers of beetles occur, seem to be short lived, lasting for periods of 3-5 years. Therefore, at any given site in the state, there are likely to be several years when Japanese beetle simply is not likely to damage a crabapple. So even though adult beetles fly in threatening numbers for about 5 weeks, crabapples are likely to require fewer pesticide applications for Japanese beetle than apple scab. We therefore suggest that apple scab be given priority when selecting crabapple cultivars in Indiana.

We believe the three classes accurately reflect cultivar resistance in those years when conditions are optimum for severe scab or Japanese beetle injury. Cultivars are grouped into classes to help nurserymen and homeowners choose cultivars that are less prone to problems. Cultivars in Class III are not recommended for future planting because in Indiana, they are likely to be severely defoliated by either apple scab, Japanese beetle, or both pests. Cultivars in both Classes I and II have sufficient resistance to be recommended for future planting.

Table 1. Classes of Crabapple Cultivars Based on Their Resistance to Apple Scab

<b>Class I High Resistance</b>	<b>Class II Moderate Resistance</b>	<b>Class III High Susceptibility</b>
Ann E.	Canary Adams	Brandywine
Basakatong	Candymint Sargent	Candied Apple
Bob White	Centurion	Indian Magic
Jack	David	Indian Summer
Japanese Flowering	Donald Wyman	Profusion
Louisa	Doubloons	Robinson
Ormiston Roy	Harvest Gold	Snowdrift
Prairie Maid	Jewelberry	Velvet Pillar
Prairifire	Liset	White Candle
Redbud	Madonna	White Cascade
Red Jewel	Mary Potter	
Sargent	Molten Lava	
Silver Moon*	Selkirk	
Sinai Fire	Sentinel	
Sugar Tyme	Silver Drift	
Tea		
White Angel		

\*Not recommended for planting because of susceptibility to fireblight

Table 2. Classes of Crabapples Based on Their Resistance to Japanese Beetle

<b>Class I High Resistance</b>	<b>Class II Moderate Resistance</b>	<b>Class III High Susceptibility</b>
Ann E.	Candymint Sargent	Adams
Bob White	David	Baskatong
Brandywine	Indian Summer	Donald Wyman
Canary	Japanese Flowering	Doubloons
Candied Apple	Molten Lava	Indian Magic
Centurion	Ormiston Roy	Liset
Harvest Gold	Profusion	Madonna
Jack	Redbud	Mary Potter
Jewelberry	Sinai Fire	Prairie Maid
Louisa	Snowdrift	Robinson
Prairifire		Selkirk
Red Jewel		Sentinel
Sargent		Sugar Tyme
Silver Moon*		Velvet Pillar
Silverdrift		White Candle
Tea		
White Angel		
White Cascade		

\*Not recommended for planting because of susceptibility to fireblight

Table 3. Crabapples Cultivars Not Recommended for Wide Scale Planting in Indiana.

<b>Cultivar</b>	<b>Pest Resistance Classification</b>	
	<b>Apple Scab</b>	<b>Japanese Beetle</b>
Adams	3	3
Baskatong	1	3
Brandywine	3	1
Candied Apple	3	1
Donald Wyman	2	3
Doubloons	2	3
Indian Magic	3	3
Indian Summer	3	2
Liset	2	3
Madonna	2	3
Mary Potter	2	3
Prairie Maid	1	3
Profusion	3	2
Robinson	3	3
Selkirk	2	3
Sentinel	2	3
Snowdrift	3	2
Sugar Tyme	1	3
Velvet Pillar	3	3
White Cascade	3	3
White Candle	3	3

\* 1= highly resistant, 2= moderately resistant, 3= highly susceptible

## References

- Edwards, C. R. E., Gibb, T. J., and C. S. Sadof 1995. Japanese beetle. Purdue University Cooperative Extension Service Publication E-75
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- Spicer, P. G., D. A. Potter, and R. E. McNeil 1995. Resistance of flowering crabapple cultivars to defoliation by the Japanese beetle (Coleoptera: Scarabeidae) J. Econ. Entomol 88:979-985

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