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

For apple scab evaluation, evaluators used between two and five replicates per accession in a completely randomized design. The soil type is silt loam (Beckerman et al. 2009). For Japanese beetle evaluation, raters examined 43 cultivars of 5–7 year old crabapples in LaPorte County, IN nursery during a severe outbreak in 1994 and 1995 as well as a replicated study of 42 cultivars in Lexington, KY (Spicer et al. 1995).

Apple Scab Rating

Cultivars were rated for apple scab severity on a scale of 0 to 3 with 0 = highly resistant to immune, no scab; 1 = resistant but with a trace of scab; 2 = susceptible to minor scab infection but without defoliation; and 3 = highly susceptible to

Figure 1. Apple Scab

Figure 2. Apple scab with great black lesions.
ID-217-W Crabapples Resistant to Apple Scab...

scab and extensive defoliation. Cultivars were then placed into one of three Classes: Class I (0 rating); cultivars with high resistance to scab; Class II (>1 - 2 rating): cultivars with moderate resistance to apple scab; and Class III =3 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 the 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 except in 2012 and 2018. 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, just before bloom, after bloom (to protect pollinators) and then every two weeks after until new growth has ceased.

In contrast, adult Japanese beetles have a more spotty distribution in the state. Hot spots, or regions where damaging numbers of beetles occur, will vary each year. 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.

References


Table 1. Classes of Crabapple Cultivars Based on Their Resistance to Apple Scab. Updated 2018

<table>
<thead>
<tr>
<th>Class I High Resistance</th>
<th>Class II Moderate Resistance</th>
<th>Class III Susceptibility</th>
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</thead>
<tbody>
<tr>
<td>Adirondack</td>
<td>Adams</td>
<td>Adams</td>
</tr>
<tr>
<td><em>M. Baccata</em> ‘Jackii’</td>
<td>Brandywine</td>
<td>Candied Apple</td>
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<td>Bob White</td>
<td>Candymint</td>
<td>Indian Magic</td>
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<tr>
<td>Centennial</td>
<td>Centurion</td>
<td>Indian Summer</td>
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<td>David</td>
<td>David</td>
<td>Profusion</td>
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<td>Dolgo^</td>
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<td>Robinson</td>
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<td><em>M. Floribunda</em></td>
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<td>Madonna</td>
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<td>Prairiefire</td>
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<td><em>M. Yunnanensis</em> ‘Veit-</td>
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*Not recommended for planting because of susceptibility to fireblight.

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

<table>
<thead>
<tr>
<th>Class I High Resistance</th>
<th>Class II Moderate Resistance</th>
<th>Class III Susceptibility</th>
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<tr>
<td>Ann E.</td>
<td>Candymint Sargent</td>
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*Not recommended for planting because of susceptibility to fireblight.

^Not recommended for planting because of large fruit.
Table 3. Crabapple Cultivars Not Recommended for Wide Scale Planting in Indiana

<table>
<thead>
<tr>
<th>Cultivar</th>
<th>Apple Scab</th>
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*1 = highly resistant, 2 = moderately resistant, 3 = highly susceptible