Stunt Disease in Rabbiteye Blueberry

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Abstract. Tissue of ‘Garden Blue’ rabbiteye blueberry (Vaccinium ashei Reade) were collected from field-grown plants with typical symptoms of stunt disease in North Carolina. Electron microscopy examination revealed bodies having mycoplasmalike characteristics in the phloem sieve elements indicating that this species can be naturally infected with the stunt disease organism.

Blueberry stunt disease occurs in blueberries from North Carolina to eastern Canada, westward into Michigan, and now appears to be present southwestward into Arkansas (2, 3). The disease affects both cultivated and wild Vaccinium spp. but is economically most important on cultivated highbush blueberry (V. corymbosum L.). Stunt was for many years thought to be caused by a virus (8), but is now considered to be of mycoplasmal etiology (1, 2, 4). The organism is transmitted by the sharp-nosed leafhopper, Scaphytopius magdalenis (Prov.) (6). Plants affected by stunt exhibit a yelowing of leaf margins and between lateral veins, with midrib and lateral veins retaining normal green coloration. Leaves are often cupped and reduced in size, and interveinal areas prematurely follow of leaf margins and between lateral veins. Diseased plants are restricted in size, have shortened internodes, and develop abnormal growth from normally latent buds. Both fruit set and berry size are reduced.

Highbush blueberry cultivars vary in susceptibility to stunt, with none reported to be immune (3). The rabbiteye blueberry (V. ashei Reade), adapted to and commercially grown in southern states, has not been reported to be affected by the stunt disease in nature. Hoffman (5) reported that rabbiteye blueberries ‘Garden Blue’ and ‘Homebell,’ were experimentally infected with stunt when grafted with buds from stunt-infected highbush plants. Stunt symptoms in ‘Garden Blue’ in the later stages of disease development were characterized by a slight reduction in leaf size and internode length and marginal chlorosis, but no leaf cupping.

There is increased interest in growing rabbiteye blueberry in southern states. There have been few diseases reported on this species (7). This investigation was

<table>
<thead>
<tr>
<th>Mother plant no.</th>
<th>No. floricanes/plant from propagules</th>
<th>No. fruit/floricane lateral from propagules</th>
</tr>
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<tbody>
<tr>
<td>Days at 37°C</td>
<td>122 157 183 214 245</td>
<td>Days at 37°C 157 183 214 245</td>
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<tr>
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<td>5 6 6 5 6</td>
<td>20 21 22 22 20 20</td>
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<tr>
<td>4</td>
<td>4 6 6 7 7</td>
<td>25 22 20 22 20 20</td>
</tr>
<tr>
<td>Avg</td>
<td>6 6 6 6 6</td>
<td>21 20 21 20 20 20</td>
</tr>
</tbody>
</table>

Table 1. Number of floricanes per plant and number of fruit per floricanes lateral August 1979 for Thornless Oregon Evergreen plants propagated from cuttings taken from 4 mother plants exposed for various periods to constant 37°C growing conditions and planted in test plots October 1977.


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There is increased interest in growing rabbiteye blueberry in southern states. There have been few diseases reported on this species (7). This investigation was
conducted to confirm the presence or absence of mycoplasmalike organisms in rabbiteye plants showing stunt symptoms in nature. In late June, 1979, a 'Garden Blue' rabbiteye blueberry plant was observed (by C.M.M.) with symptoms of stunt at the Horticultural Crops Research Station at Castle Hayne, N.C. Symptoms were similar to those exhibited by infected highbush plants.

In early July, small (2 x 2 mm) pieces of leaf venal tissue from the affected rabbiteye plant were fixed in vials of 4% glutaraldehyde in 0.05 m cacodylate buffer, pH 7.0, and mailed to the University of Arkansas for further processing (by J.L.D.). The tissue was postfixed in osmium tetroxide, dehydrated, and embedded in Spurr's medium. Then sections were examined by transmission electron microscopy.

In 1980, symptoms were again noted in 'Garden Blue' plant which had previously shown stunt symptoms, and were also observed in a second 'Garden Blue' plant and a 'Tifblue' rabbiteye plant. Symptoms included interveinal chlorosis, a slight necrosis of the leaf tip causing some cupping, shortened internodes, less fruit, reduced vigor, and generally a yellow-green leaf color. In early July, tissue from these plants and from single stunted 'Croatan' and 'Murphy' highbush plants was fixed, processed, and examined as in 1979.

Electron microscopic examination of the phloem cells of tissue from the affected 'Garden Blue' plant collected in 1979 indicated that sieve elements contained bodies (Fig. 1) having characteristics of mycoplasmalike organisms (MLOs). The bodies were membrane bound and were of a size range typical of MLOs. Some of the bodies appeared to be dividing by binary fission. As often observed with stunt infected highbush blueberries, MLOs were not numerous in the phloem cells.

In plant tissue embedded in 1980, extensive examination revealed only a few indistinct bodies resembling MLOs in the 'Garden Blue' plant examined previously, in the 'Tifblue' plant, and in the 'Murphy' highbush plant. MLOs were not seen in the 'Croatan' or second 'Garden Blue' plant. These results are consistent with previous experiences in which it has sometimes been difficult to detect MLOs in plants even though stunt symptoms were pronounced. The results also reinforce the need for a simple confirmational procedure as an adjunct to symptomatology in diagnosing blueberry stunt disease.

Although MLOs were not observed in all blueberry tissue examined, confirmation of mycoplasmalike bodies in rabbiteye blueberry with typical stunt symptoms is an indication that this species can become field-infected with the stunt disease organism. Failure to previously observe stunt in rabbiteye blueberry plantings could be due to various factors. Rabbiteye plants were not considered as being susceptible to stunt and have not been extensively examined for symptoms. Most rabbiteye blueberries are grown south of the geographic area in which stunt has been reported and would not be exposed to infection by the causal organism. It is also possible that rabbiteye is not as susceptible to stunt as other species.

It can only be speculated as to whether stunt could develop into a disease problem in rabbiteye blueberries in mid-south transitional areas where both highbush and rabbiteye blueberries are grown and where stunt is known to occur. As with highbush blueberries, the extent of infection which could develop in rabbiteye would be dependent upon the amount of infection present in both cultivated and wild species in the area, and upon the prevalence of the leafhopper vector. In the mid-south region it may be advisable to periodically examine rabbiteye plantings for symptoms of stunt infection so that protective measures can be instituted if necessary.

**Literature Cited**