

Incidence of Stem Canker on Highbush Blueberry in New Jersey

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ABSTRACT

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In 1980 and 1981, highbush blueberries in New Jersey were inspected for stem canker caused by *Botryosphaeria corticis*. Thirty-two percent of the 6,625 plants examined had stem canker. The high incidence of stem canker in the two cultivars grown most frequently in New Jersey, Bluecrop and Weymouth, and the known ability of the fungus to develop new pathogenic races are a cause of great concern. Survey results indicate the need to determine the pathogenic races present in New Jersey and to include resistance to *B. corticis* in northern as well as southern cultivars.

Stem canker on highbush blueberry, *Vaccinium corymbosum* L., is a disease caused by the fungus *Botryosphaeria corticis* (Demaree & Wilcox) Arx & Muller (2,5). Symptoms vary greatly on cultivars from small red flecks to large swollen cankers with deep fissures and cracks developing on the susceptible cultivars Concord, Collins, and Bluecrop in New Jersey (1).

The disease was first described by Demaree and Wilcox on highbush blueberry in North Carolina (2). Surveys of the southern blueberry-growing areas determined that stem canker was widespread in both rabbiteye, *V. ashei* Reade, and in southern highbush, *V. australe* Small (2). Stem canker was present in cultivated plantings and in the wild, indicating the fungus occurred naturally in the South.

Plants obtained from North Carolina by commercial growers and planted in New Jersey were inspected in 1940 by USDA plant pathologists and found to be free of canker (6). A survey of 491 ha of blueberry plants in 1951 demonstrated the presence of stem canker in New Jersey

(3). The survey was confined to blueberry fields either containing some plants originally propagated in North Carolina or adjacent to fields where canker was found. Stem canker was present in eight fields representing 111 ha. Five fields totaling 74 ha had three diseased plants or fewer in each field. One field of 32 ha had 16 diseased plants. Disease incidence was moderate in only two fields or in less than 1% of the total area examined. No stem canker was found on wild highbush blueberries in New Jersey, reinforcing the theory that the disease was introduced from North Carolina.

Stem canker did not receive any further attention in New Jersey until 1975, when an apparent increase in the Hammonton,

NJ, growing area was noted. Our study was initiated to determine the current incidence of stem canker in New Jersey highbush blueberries.

METHODS

In 1980, 2,700 plants on 17 farms distributed among the various growing areas of Atlantic and Burlington counties of New Jersey were inspected. Five hundred plants surveyed in 1980 were inspected again in 1981. An additional 3,825 plants on 15 farms were inspected in 1981. Groups of 25 plants in a row were selected at four widely separated locations in a given planting for a total of 100 plants inspected per planting site. No attempt was made to evaluate disease severity, and therefore, one or more cankers per bush counted as one diseased plant.

RESULTS

Nine cultivars in 65 plantings on 26 different blueberry farms were inspected and 32.5% of 6,625 plants inspected had stem canker (Table 1). The disease was found in 25 of 34 Bluecrop and Weymouth plantings surveyed with percent occurrences ranging from 1 to

Table 1. Incidence of blueberry stem canker caused by *Botryosphaeria corticis* in highbush blueberry cultivars in New Jersey

Cultivar	No. plantings examined	No. plantings in incidence range group (%)					Total no. plants examined	Stem canker (%)
		0	1-25	26-50	51-75	76-100		
Bluecrop	22 ^a	5	9	2	3	3	2,225	26.7
Weymouth	12	4	2	1	3	2	1,200	34.1
Collins	9	2	2	2	0	3	900	41.3
Berkeley	8 ^a	4	0	2	2	0	900	27.0
Concord	6	0	0	0	2	4	600	88.3
Wolcott	5	4	1	0	0	0	500	0.2
Blueray	1	0	0	1	0	0	100	34.0
Jersey	1	1	0	0	0	0	100	0.0
Rubel	1	1	0	0	0	0	100	0.0
Totals	65	21	14	8	10	12	6,625	32.5

^a In one planting of Bluecrop and in one of Berkeley, 125 and 200 plants, respectively, were surveyed instead of the 100 examined in all other plantings.

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Table 2. Incidence of blueberry stem canker caused by *Botryosphaeria corticis* in New Jersey highbush blueberry plantings examined in both 1980 and 1981

Field no. ^a	Cultivar	Incidence (%)	
		1980	1981
1	Bluecrop	60	72
2	Bluecrop	63	5
3	Weymouth	67	62
4	Berkeley	68	60
5	Concord	67	89

^aThe same plants were inspected both years in each planting.

98% for Bluecrop and from 3 to 83% for Weymouth. Stem canker was present in seven Collins plantings on one of two farms surveyed. Disease incidence appeared to be correlated with the age of the planting; there was 11% disease in the youngest planting and 99% in the oldest planting. A Weymouth planting 30+ yr old adjacent to a 28-yr-old Collins planting did not have any detectable stem canker despite being highly susceptible to canker.

Berkeley is a susceptible cultivar ranked with Bluecrop and Weymouth under North Carolina conditions (4). Stem canker was found in four of eight plantings surveyed, with disease incidence ranging from 35 to 77%. Disease incidence in Concord ranged from 65 to 100% in the six widely separated plantings surveyed in Burlington County; Concord was the only cultivar in this county with more than a negligible amount of stem canker. Fortunately, this very susceptible cultivar is of no economic importance in New Jersey.

Wolcott, a cultivar developed for North Carolina with resistance to race 5 of *B. corticis* (4), is economically unimportant in New Jersey. Wolcott appears to be resistant to the stem canker races prevalent in New Jersey because only one of 500 plants inspected had

cankers.

In 1981, five plantings previously examined in 1980 were surveyed to determine disease spread (Table 2). Stem canker levels increased in two plantings and decreased in three. In one Bluecrop planting, a significant drop in canker incidence from 63 to 5% was noted. As mentioned previously, one or many visible cankers were used as criteria for judging a diseased bush. It is possible that the large number of diseased plants found in 1980 had one or very few cankers per bush and these were removed in the normal pruning operation. The Bluecrop planting where stem canker incidence dropped from 63 to 5% was rechecked after the plants had received commercial pruning in the fall of 1981 and two additional plants with stem canker were found. It was evident at this inspection that a single pruning cut could eliminate visible cankers in six of seven bushes found diseased.

The identity of the fungal causal organism, *B. corticis*, was confirmed through microscopic examination of the fungus fruiting bodies found on representative cankers. The fungus matched the description given by Demaree and Wilcox (2). Isolates made from cankered blueberry canes on potato-dextrose agar and oatmeal agar produced typical pycnidia and conidia of *B. corticis* as described previously (4,5).

DISCUSSION

Stem canker has increased significantly in New Jersey in the 30-yr interval between surveys conducted in 1951 and 1980-1981. The potential of this fungus disease to cause loss has been demonstrated in North Carolina, where the Wolcott acreage once comprising 75% of the total is now greatly reduced because of its susceptibility to existing races of *B. corticis* in North Carolina. Bluecrop and Weymouth are planted on about 60% of the 3,279 ha of highbush blueberries

grown in New Jersey. Both of these cultivars are susceptible to *B. corticis* under North Carolina conditions; our results indicate the disease is progressing in these two very important cultivars in New Jersey. Incidence of stem canker in these two cultivars and the known ability of the fungus to develop new pathogenic strains creates a potentially serious situation for blueberry production in New Jersey.

This study points out the need to determine the pathogenic races of the fungus in New Jersey and to incorporate resistance to *B. corticis* in the breeding program. Genetic resistance is one important practical means of control in the field (5). Under New Jersey conditions, judicious pruning may reduce the debilitating effects of the disease; planting cultivars propagated from stem canker-free plants should also help reduce spread.

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