Observations on Monilinia Twig and Blossom Blight of the Lowbush Blueberry in the Maritime Provinces1

C. L. Lockhart[2], R. W. Delbridge[3] and D. McIsaac[4]

Lowbush blueberry fields in Nova Scotia, Prince Edward Island and New Brunswick were surveyed to determine the incidence of Monilinia twig and blossom blight. The disease was more serious in fields having wet soil throughout early May and in localities with extended wet periods. It was considered a serious threat in 40% of the lowbush blueberry fields, and a potential threat to an additional 43%.

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Les bleuetibres de Nouvelle-Ecosse, de l'Ile-du-Prince-Edouard et du Nouveau-Brunswick ont été inventoribes afin de determiner l'incidence de pourriture sclbrotique. La maladie btait plus sévère dans les champs au sol mouillé durant le dbbut du mois de mai et dans les localités subissant des pbriodes de pluies prolongbes. Elle est considérée comme une menace sérieuse dans 40% des bleuetibres et comme une menace potentielle pour un autre 43%.

Introduction

Twig and blossom blight caused by ***Monilinia vaccinii-corymbosi*** (Reade) Honey is an economic disease of the lowbush blueberry ***(Vaccinium myrtilloides*** Michx., ***V. angustifolium*** Ait. ***f. angustifolium*** Aalders and Hall and ***V. angustifolium*** f. ***nigrum*** Wood) Boivin) and highbush blueberry (***V. corymbosum*** L.) (2,5,8). The fungus and disease cycle have been described (1,2). The disease was first reported on lowbush blueberry in Charlotte County, New Brunswick in **1952** when **24** fields were surveyed, four had over **50%** of the blossoms and twigs infected **(2).** In **1956 13** fields in New Brunswick and two in Cumberland County of Nova Scotia were severely infected (2).

In Nova Scotia the disease has become a major concern to lowbush blueberry growers, especially during springs with above normal rainfall. This paper reports on surveys of Monilinia twig and blossom blight in Nova Scotia for **1980-82,** Prince Edward Island in **1980** and **1982** and New Brunswick in **1982,** with observations on factors influencing disease development.

Materials and Methods

Lowbush blueberry fields were observed at **7-10** day intervals from early May until mid June of each year, primarily in Cumberland County, Nova Scotia in order to follow the development of blossom and twig blight. During the first **3** weeks of June **1980-82** a general survey of Nova Scotia fields was conducted in the counties of Cumberland, Colchester, Halifax and Hants with Antigonish and Pictou added to the survey in **1981-82.** Yarmouth was only included in the **1981** survey. In **1980** and **1982** surveys were carried out in lowbush blueberry fields in Prince Edward Island, and in Elgin County, New Brunswick in **1982.** Ten sites in a field were selected at random in a semi-circle and the percent infection determined by counting the number of infected twigs and blossoms per **100** shoots in each site. Field sizes varied from one to **40** ha.

During the first three weeks of May observations were made periodically on the apothecial development in lowbush blueberry fields in Cumberland County where the disease was known to be a recurring problem.

Precipitation records collected at Kentville, Nappan, Parrsboro, Truro and Yarmouth were obtained from the local weather stations or the Scientific Services Section of Atmospheric Environment Services, Regional Office, Bedford, Nova Scotia. The Parrsboro weather station is located in a lowbush blueberry growing area in Cumberland County with Kentville, Nappan and Truro being on the outskirts of the main lowbush blueberry growing area. Leaf wetness information was obtained from a **CR21** micrologger and probe installed on May **6, 1982** in the Westchester Station field located in Cumberland county (P. Dzikowski, personal communication).

Results

Mature apothecia of ***M. vaccinni-corymbosi*** were first observed in lowbush blueberry fields on May **4** and **18** in Cumberland County in **1982,** on May **13, 1980** but none were seen in **1981** (Table **1**). Vegetative and flower buds began to break during the first week of May, while immature apothecia were observed as early as April **29** in **1981.**

Infections of lowbush blueberries, caused by ascospores of ***M. vaccinni-corymbosi*** were observed on May **28, 1980,** May **21,**

1 Contribution No. 1 781 Agriculture Canada, Research Station, Kentville, Nova Scotia.

2 Agriculture Caneda, Research Station, Kentville, Nova Scotia.

3 Nova Scotia Department of Agriculture and Marketing, Kentville, Nova Scotia.

4 Nova Scotia Department of Agriculture and Marketing, Nappan, Nova Scotia.

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1981 and May 20, 1982 (Table 1). Twig blight infections were found to increase in intensity during late May and early June, usually peaking between the first and second week of June with the highest amount of blossom infections attained by the middle of June. The earlier infections were more severe on V. ***angustifolium*** f. ***nigrum*** than on ***V. angustifolium*** f. ***angustifolium*** or V. ***myrtilloides.***

Twig and blossom blight infections are often found scattered uniformly throughout lowbush blueberry fields. It is not uncommon, however, to find areas or patches where the disease is more abundant in the same general location each crop year. In 1981 under ideal conditions for infections a complete loss of crop occurred in an 8 ha field in Antigonish county. Typical, severe, Monilinia blight infections of leaves and flowers are shown in Figure 1.

In 1980 twig and blossom blight infections were more abundant in lowbush blueberry fields having wet soil throughout the month of May where mummified fruits were exposed to bare soil. Mummyberries lying on fallen leaves or other debris did not develop apothecia but were occasionally observed with apothecial initials. In sandy fields or well drained soils infections were generally very light with the greatest intensity noted along the borders or headlands where blueberries were not burned for pruning purposes and often there was a shading effect from weeds or trees favoring the retention of moisture.

Table 2 shows the results of the survey for 1980-82. During this period 29 to 43% of the lowbush blueberry fields surveyed in Nova Scotia had 5% or more twig and blossom blight infections (Table 2). The disease was less severe in Prince Edward Island in 1980 than it was in 1982. It was present in the three New Brunswick fields examined in 1982.

Data on rainfall for the months of May and June for five locations are shown as weekly precipitation in Table 3 and days of wetness in Figure 2.

We were unable to detect any marked differences between the amount of twig and blossom blight infections in fields treated and not treated with herbicides and fertilizer.

Discussion

Apothecia of M. ***vaccinii-corymbosi*** develop in close relationship with the initiation of growth of the lowbush

Figure 1. Healthy lowbush blueberry shoot on (left) and M. vaccinii-corymbosi infected twig and blossoms (right).

blueberry in the spring in Nova Scotia and ascospores are mature at the time buds swell and begin to open. Normally the ascospores are mature and buds break in the first week of May however apothecia have matured as early as April 21 (2). Pepin (5) in British Columbia and Ramsdell *et al.* (6) in Michigan reported that ascospores were mature when the buds begin to swell in the highbush blueberry.

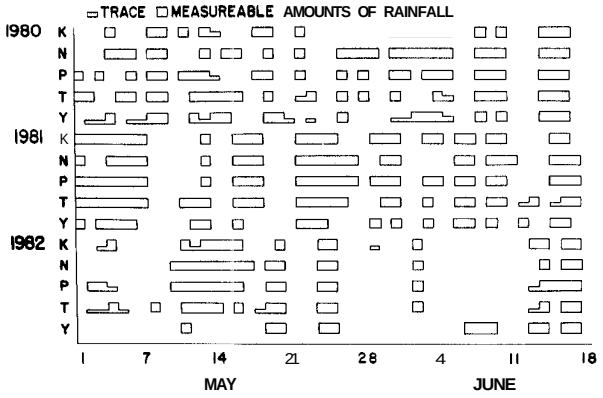

Figure 2. Days of wetness during May and June for Kentville (K), Nappan (N), Parrsboro (P), Truro (T) and Yarmouth (Y).

Table 1. Field observations on *M.* vaccinii-corymbosi apothecia and initial infections of the lowbush blueberry in Cumberland Countv. N.S.

Year	Location	Dates apothecia observed: Immature	Dates apothecia observed: Mature	Twig blight infection
1980	Fox Point	May 7	–	–
	Glasgow Mountain	May 12	–	–
	West Brook	May 13	–	–
	Pigeon Hill	–	May 13	–
	Westchester Station	–	May 13	May 28
1981	Westchester Station	April 29	–	May 21
1982	Westchester Station	May 4	May 4 and 18	May 20

Table 2 Incidence of M. *vaccinii-corymbosi* infected twigs and blossoms.

Year	Province	No. of fields	Final percentage infected shoots					Percent of fields with 5% or more infection
			0	0.1 - 4.9	5.0 - 9.9	10.0 - 24.9	>25.0	
1980	N.S.	36	5	16	7	4	4	42
1981	N.S.	31	5	17	1	3	5	29
1982	N.S.	61	15	20	7	12	7	43
1980	P.E.I.	7	-	3	4	-	-	57
1982	P.E.I.	5	-	3	-	2	0	40
1982	N.B.	3	-	2	1	-	-	33
	Total	143	25	61	20	21	16	-
Percent of Total		100	18	43	14	15	11	-

Table 3. Weekly precipitation records (mm).

Year	Location	May				June		
		1 - 7	8 - 14	15 - 21	22 - 28	29 - 4	5 - 11	12 - 18
1980	Kentville	1.4	18.2	5.8	1.6	16.2	24.2	37.2
	Nappan	10.9	25.1	19.5	5.9	10.7	14.5	35.6
	Parrsboro	6.4	32.2	11.4	7.8	6.2	15.2	41.8
	Truro	2.8	40.0	35.6	3.2	2.0	16.6	35.6
	Yarmouth	6.8	41.4	4.4	0.5	37.8	17.6	35.2
	Ave.	5.7	31.4	15.3	3.8	14.6	17.6	37.1
1981	Kentville	19.3	7.4	19.2	69.2	15.9	33.0	15.8
	Nappan	13.9	5.7	19.2	46.3	26.2	40.4	3.8
	Parrsboro	17.0	14.2	17.6	36.8	11.8	44.8	12.6
	Truro	24.4	12.2	22.8	42.4	5.2	32.2	11.0
	Yarmouth	19.0	12.4	6.0	40.5	28.4	56.0	9.0
	Ave.	18.7	10.4	17.0	48.0	17.5	41.3	10.4
1982	Kentville	0.4	25.0	6.8	12.4	3.4	0.0	26.4
	Nappan	0.0	38.0	13.5	9.9	6.0	0.0	26.3
	Parrsboro	1.4	19.0	12.8	12.0	7.8	0.0	23.2
	Truro	3.4	23.4	2.4	5.2	2.8	0.0	22.0
	Yarmouth	0.0	7.6	4.4	10.8	0.0	15.8	16.2
	Ave.	1.0	22.6	8.0	10.1	4.0	3.2	22.8

Twig blight infections first appeared on May 20 in 1982, May 21 in 1981 but were not recorded until May 28 in 1980 (Table 1). Based on this information, the wet periods shown in Fig. 2 and the fact that ascospores are mature the first week of May it would appear that between 10 and 17 days are required for twig blight symptoms to show after infection occurs. Repeated attempts to infect lowbush blueberry plants with ascospores or conidia in the greenhouse were unsuccessful but twig blight appeared on lowbush blueberries located in the field on the Research Station at Kentville 11 days following inoculation with ascospores obtained from apothecia collected in a commercial blueberry field (Lockhart, unpublished results). The chance of this being a natural infection was minimal because no other twigs in this location showed blight symptoms. In 1982 evidence indicates that twig blight infections occurred between 10 and 17 days

before symptoms appeared on twigs. Leaf wetness was recorded on the micrologger on May 6 (first day of operation) with an extended wet period from May 10 to 17 (P. Dzikowski, personal communication) in the Westchester station field where the first twig blight symptoms were observed on May 20. Rainfall likely occurred between May 3 and 6 prior to the micrologger installation. Low rainfall amounts were recorded on May 3 and 4 in the surrounding weather stations at Kentville, Parrsboro and Truro but considerable rainfall was recorded for the second week of May (Table 3). Apparently wet periods (Fig. 2) in the first two weeks of May are important to disease development as only 29% of the fields (i.e. 9 of 31 fields) had blight infections over 5% in 1981 when there were less wet days in the second week of May with a period of five days without rain in all locations except Truro. For 1980 and 1982 there was apparently ample precipation in this period (Table 3) for twig blight infections to take place with 42 and 43% of fields (i.e. 15 of 36 fields and 26 of 61 fields) having infection greater than 5% (Table 2).

Twig and blossom blight can be a serious threat to approximately 40% of the lowbush blueberry (6.4 million kg) crop each year. Another 43% of the fields are infected with low levels of twig and blossom blight. Complete crop losses have occurred in areas subject to wet soils and extensive precipitation or foggy weather during early May. Severe infections cause complete defoliation with loss of blossoms (Fig. 1). Growers with a history of Monilinia twig and blossom blight in their blueberry fields are advised to apply recommended fungicides to control the disease blight symptoms at bud break followed by applications at 7-10 day intervals up to midbloom.

The fungicide, triforine has been shown to be effective against the primary stages of the disease (5,7). In two years of fungicide evaluation in Nova Scotia this has been confirmed (3,4).

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