Observations on the occurrence of European Canker in New Brunswick

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European canker *(Nectria galligena* Bres.) was found to be widespread throughout New Brunswick apple orchards following a survey of orchards in all regions. Severity of canker varied between sites. Although distinct differences in the amount of canker was not always consistent between cultivars, differences due to rootstocks showed more of a trend. Trees on more vigorous rootstocks such as B.A. and M106 usually show more cankers.

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Une étude menée au Nouveau-Brunswick a révélé que le chancre européen du pommier (*Nectria galligena* Bres.) est largement répandu dans les vergers de la province. La sévérité du problème varie selon les endroits. Bien que la presence de chancres ne semble pas toujours dépendre du cultivar, certains porte-greffes pourraient accentuer le problème. Les porte-greffes vigoureux tels B.A. et M106 rendent habituellement leurs scions plus susceptibles au chancre.

Introduction

European canker (*Nectria galligena* Bres.), a disease common to most apple-growing areas of the world, was first reported in North America in Nova Scotia and New York in 1899 (1). Spores are known to be washed by rain or blown by wind into openings or wounds in the bark. Infections have been noted to occur in winter-damaged bark, pruning cuts, burrknots and through leaf-scars. After leaf drop in the fall, the open scars become sites for infection and these can be observed as infected buds and spurs in the following growing season. Observations in New Brunswick indicate that most cankers originate from this type of leaf scar infection and progress to perennial cankers which destroy tree productivity through girdling of trunks and scaffold limbs. The fruit rot stage of the disease has not been observed here. Although canker has been of some concern in New Brunswick since at least the 1960's. the increasing prevalence of disease in young orchards has resulted in great concern among commercial apple producers during the past five years.

Differences between cultivars in canker susceptibility have been reported in California orchards (2). In British Coliumbia the Summerland McIntosh and Harrold's Red Delicious were found to be susceptible to buildup of canker, whereas Spartan and Golden Delicious showed some tolerance (3). Interstock cultivar was reported to have little effect on tree mortality whereas scion cultivar was a highly significant factor. Moore in England reported differences in susceptibility of apple rootstocks to European canker as early as 1934 (4).

Materials and Methods

A preliminary assessment of European canker was conducted in three commercial apple orchards during the winter of 1981-82. In 1982 a follow-up survey was conducted in demonstration blocks in each of the five major apple-growing regions of the Province. Each block consisted of about 300 trees with four cultivars, and five rootstocks in various combinations. Seven trees of each cultivar/rootstock combination comprised one sample plot and each plot was replicated three times. All trees were approximately the same age having been planted between 1975 and 1978.

In addition, in 1983, two research orchard blocks at the Fredericton Research Station were surveyed for the presence of canker on the trunks of 12-year-old McIntosh on six different rootstocks. Cultivar/rootstock plots consisted of 6 trees replicated nine times in block 1 and 10 trees replicated nine times in block 2. All McIntosh (Mac) were of the Summerland strain except for one spur McIntosh (Dewar strain). Rootstocks surveyed were Beautiful Arcade (BA), Malling 106 (M106), Ottawa #5 (05), Malling 26 (M26) as well as interstem Ottawa #3 on Beautiful Arcade (03/BA) and Beautiful Arcade on Malling 26 (BA/M26).

Table 1. Cultivar/rootstock effect on prevalence of European Canker in three N.B. orchards.

Orchard	Cultivar / Rootstock	Age (Yrs)	No. of trees with Canker*
1	Spur Mac / M111	6	29
1	Cort. / M7	6	19
1	Mac / Rob. 5	18	45
1	Cort. / Rob. 5	18	19
2	Mac / Rob. 5	20	43
2	Cort. / Rob. 5	20	17
2	Mac / M7	6	20
3	Cort. / M7	10	12
3	Spur Mac / M111	10	15

*50 trees of each cultivar/rootstock were rated for disease.

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Table 2. Rootstock effect on prevalence of European Canker in five regional apple plantings.

Location	Percent trees with canker					
	M9/M111	M26	M111	M106	M7	Ave.
York County	64.9	67.3	71.7	57.4	87.9	67.8
Carleton County	20.4	46.9	58.3	55.6	68.1	49.9
Queens County	31.6	32.3	45.0	37.2	72.4	43.7
Charlotte County	13.6	18.3	17.5	46.7	39.7	27.2
Westmorland County	8.5	25.9	34.3	25.4	45.3	27.8
Ave.	27.8	38.1	45.4	44.5	60.7	

Table 3. Cultivar effect on prevalence of European Canker in five regional apple plantings.

Location	Percent trees with canker			
	Spur Mac	Cortland	Mac	Jerseymac
York County	61.4	72.5	71.7	100.0
Carleton County	35.8	57.5	62.8	37.9
Queens County	30.2	28.9	49.2	50.0
Charlotte County	37.5	17.9	40.0	61.1
Westmorland County	23.0	26.1	42.0	38.6
Ave.	37.6	40.6	53.1	57.5

Results and Discussion

In the preliminary assessment of European Canker conducted in three commercial apple orchards during the winter of 1981-82, there was an apparent difference in the amount of canker between cultivars (Table 1). In orchard one, 90 per cent of the McIntosh on Robusta #5 trees (Mac/Rob. 5) were infected with canker compared to only 38 per cent of the Cortland on Robusta #5 (Cort./Rob. 5). In orchard 2 the ratio was similar with 86 per cent of the Mac/Rob. 5 trees infected compared to 34 per cent of the Cort./Rob. 5. In both of these orchards the trees had sustained considerable winter damage showing up as both southwest injury and limb crotch damage. These areas appeared to have become sites for canker infection. The ability of the Cortland cultivar to minimize winter damage compared to McIntosh may, in part, explain the differences in canker severity between the two cultivars.

From the 1982 survey of the five regional demonstration orchards it was apparent that the amount of canker varied between sites ranging from an average of 27.2% trees infected in south-western N.B. (Charlotte County) to 67.8% trees infected in York County (Table 2). No distinctive differences in the number of trees with canker could be detected between cultivars (Table 3). The number of trees having canker varied according to rootstock from an average of 27.8% for Malling 111 with interstem M9 (M9/M111) to 60.7% for trees on Malling 7 (M7) rootstock when considered over all five regional blocks.

In block I of the research orchard at the Fredericton Research Station containing the McIntosh cultivar on six rootstocks, distinct differences in the number of tree trunks with canker infections were noted. Mac/B.A. and Mac/M106 showed significantly more trees with cankers than any other combination present (Table 4). More than 20% of the trees on these rootstocks had cankers while less than 5% of the trees on M26 and BA/M26 rootstocks had cankers. No attempt was made to categorize the severity of canker in this block.

In block 2 containing the McIntosh cultivar on slightly different rootstocks, a similar trend was observed (Table 4). Mac and Spur Mac on BA rootstock and Mac/M106 had significantly more canker than Mac/M26, Mac/03/BA and Mac/BA/M26. These and other observations indicate that European Canker has become a major threat to continued apple production in some N.B. orchards.

Despite the fact that European Canker has been known since the 1800's and research dates back to 1914, the main means of control is through good cultural practices, early detection and prompt removal of cankers. Good tree vigour also plays an important role in resisting and containment of the disease. Resistant varieties and rootstocks are not available to avoid the problem.

Table 4. Cultivar/rootstock effect on prevalence of European Canker, Fredericton Research Station, 1983.

Cultivar/ rootstock	Block 1		Block 2	
	No. trees examined	%trees with cankers	No. trees examined	%trees with cankers
Mac/BA	53	22.6 a[1]	72	33.3 a'
Spur Mac/BA	50	14.8 ab	74	28.9 ab
Mac/M106	46	21.1 a	72	18.9 b
Mac/05	53	7.4 bc	—	—
Mac/M26	51	3.7 bc	84	4.4 c
Mac/03/BA	—	—	80	1.1 c
Mac/BA/M26	39	1.9 c	82	0.2 c

[1]Values followed by the same letter do not differ significantly at the 5% level (Duncan's Multiple Range Test).

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