STRAWBERRY GREEN PETAL DISEASE IN QUEBEC AND THE MARITIME PROVINCES, 1971-72[1]

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Abstract

A coordinated strawberry green petal survey was made in first production year commercial fields of Redcoat, Sparkle and Cavalier in Quebec and the Maritime Provinces in 1971 and 1972. The general low level of infection (less than 3%) and low calculated losses, indicated that the disease was not of economic importance. The first reported presence of green petal in the Terrebonne-Deux Montagnes area of Quebec suggests a westward spread of the disease.

Résumé

Une enquête coordonnée sur la maladie du pétale vert du fraisier dans les plantations commerciales d'un an des variétés Red Coat, Sparkle et Cavalier a été poursuivie au Québec et dans les provinces maritimes en 1971 et 1972. Le peu d'infection généralement observée (moins de 3%) et le peu de pertes estimées ont mis en évidence la faible importance économique de cette maladie. Les premières observations du pétale vert du fraisier dans la région de Terrebonne-Deux-Montagnes laissent entrevoir que cette maladie se propage vers l'Quest du Québec.

Introduction

Green petal of strawberry, suspected of being caused by a Mycoplasma-like microorganism (4), was first reported in Canada in 1955 (1) and is now found generally distributed throughout the Maritime provinces and eastern Quebec. The prevalence of the disease varies from year to year and from area to area. In some years the levels of infection indicated the disease to be of major economic importance (5,6). Since annual strawberry production in these regions approaches 14 million quarts, a coordinated survey was conducted in 1971 and 1972 to determine the incidence and possible economic implication of green petal on the strawberry industry in Quebec and the Maritimes.

Methods

The survey was conducted at peak harvest time (between June 23 and July 13, depending on area) in commercial fields of strawberry (Fragaria chiloensis var. ananassa Bailey) in their first year of fruit production. Redcoat was the main cultivar surveyed and the cultivars Sparkle and Cavalier were also examined in areas where significant acreages were being grown. An attempt was made to survey no less than 10% of the acreage (with a minimum of 5 fields for each cultivar) of the first year fruiting fields of each cultivar in each area. The selection of areas and the random selection of fields were made by the cooperators in each province. Within a field, ten sampling sites, each consisting of 10 linear feet of matted row, were selected at random on a line running diagonally across the field. The number of infected plants was counted at each of the 10 sampling sites, and the total number of plants was counted at two of the sites to provide an average number of plants per site for the field. The prevalence of green petal in a region or province was expressed as a weighted mean % based on the acreage and

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Table 1. Strawberry green petal survey in Eastern Canada, 1971

Province	Area	Cultivar	First year acreage	Surveyed acreage	% Infection
Quebec	Terrebonne-Deux Montagnes	Redcoat	270	12.8	0.2
		Sparkle		6.0	0.1
	St. Hyacinthe	Redcoat	239	23.2	0.8
	Montmorency and Orleans Is.	Redcoat	500	26.2	0.1
	Bellechasse	Redcoat	190	13.2	0.3
New Brunswick		Redcoat		96.2	0
		Cavalier		29.5	0
		Sparkle		1.0	0
Nova Scotia	Annapolis	Redcoat	18.0	7.2	0.4
		Cavalier	1.6	0.7	0
		Sparkle	0.1	0.1	0
	Colchester-Pictou	Redcoat	9.0	7.0	0.9
		Cavalier	2.7	2.7	0.4
	Cumberland	Redcoat	19.0	16.0	0.6
		Sparkle	1.0	1.0	0
	Kings	Redcoat	10.0	2.8	0.4
		Cavalier	4.0	2.1	0.1
		Sparkle	3.7	1.9	0.7
	Yarmouth	Redcoat	2.2	1.2	0
		Cavalier	0.7	0.6	0
		Sparkle	0.5	0.4	0.2
Prince Edward Island		Redcoat	100.0	19.3	2.4
		Cavalier	17.0	6.0	1.9
		Sparkle	14.0	3.8	9.0

incidence of the disease in each field surveyed in the region (3), as follows:

$$\text{mean} = \frac{\Sigma\ (\%\ \text{diseased plants} \times \text{field acreage})}{\text{total acreage of fields}}$$

Yield losses were calculated on the basis that a plant showing symptoms of green petal bears no marketable fruit and that the percentage of infected plants is therefore directly related to fruit loss. Two methods were used in attempting to calculate losses due to green petal. In the first, the average percent infection for each province was calculated using the method of Grainger (3). The provincial production figures supplied by Statistics Canada were considered to be lower than potential production by an amount equal to the percentage green petal calculated for the province. In the second method, losses in the cultivar Redcoat were determined on a per acre basis for the various areas surveyed. These were calculated by multiplying the percentage infection for the area by the average yield per acre for that area. Average yield figures were based on yield data obtained from producers in each area.

Results and discussion

The results of the 1971 survey, summarized in Table 1, show a low level of green petal throughout the surveyed areas. In New Brunswick, for example, a few infected plants were observed in 8 of the fields surveyed but none were within the sampling sites. Of interest also, was the presence of green petal in the Terrebonne-Deux Montagnes area of Quebec. Although the percentage infection was low, the disease had not been reported previously in that area, indicating that the disease may be slowly spreading westward. Prince Edward Island is the only area in which the percentage infection might be considered significant but even there the most severely affected cultivar, Sparkle, was grown on a relatively small acreage.

Low levels of infection were again encountered in 1972 (Table 2). Green petal was recorded in all areas of Quebec surveyed and the highest percentage of infected plants was observed in the Terrebonne-Deux Montagnes area where the disease had been observed for

Table 2. Strawberry green petal survey in Eastern Canada, 1972

Province	Area	Cultivar	First year acreage	Surveyed acreage	% Infection
Quebec	L'Assomption	Redcoat	96	13.2	0.1
	Terrebonne-Deux Montagnes	Redcoat	232	31	2.2
	St. Hyacinthe	Redcoat	203	22	0.6
	Yamaska	Redcoat	106	13.3	1.5
	Montmorency	Redcoat	545	34.6	<0.1
	Bellechasse	Redcoat	248	10.9	0.6
New Brunswick	York	Redcoat		33.0	*
		Cavalier		2.5	0
		Sparkle		0.5	0
	Carleton	Redcoat		5.5	0
	Victoria	Redcoat		3.8	*
		Cavalier		0.8	0
	Madawaska	Redcoat		5.2	0
	Restigouche	Redcoat		6.0	0
	Gloucester	Redcoat		16.0	0
	Kent	Redcoat		4.5	0
	Westmorland	Redcoat		12	0
	Queens	Redcoat		28	0
		Cavalier		1.2	0
Nova Scotia	Annapolis-Kings	Redcoat	27.8	6.5	0.6
		Cavalier	4.7	1.6	0.5
		Sparkle	3.2	1.0	0.6
	Colchester-Pictou	Redcoat	9.5	5.0	0.3
		Cavalier	0.5	0.5	0
		Sparkle	2.0	1.0	3.0
	Cumberland	Redcoat	7.0	5.5	0
	Lunenburg	Redcoat	5.3	5.0	0.8
		Cavalier	0.3	0.3	0.9
		Sparkle	0.3	0.2	1.3
		Redcoat	2.9	2.5	1.6
		Cavalier	0.1	0.1	0
		Sparkle	0.9	0.5	0.9
Prince Edward Island		Redcoat	50.0	17.8	1.1
		Cavalier	8.5	4.1	0.5

* Green petal present in samples but percentage not calculated.

the first time in 1971. Although low numbers of infected plants were recorded in New Brunswick in 1972, the severe winterkill in many fields prevented the calculation of percentage infection. In Nova Scotia, green petal was recorded in all areas of the province except Cumberland County. Disease incidence in Prince Edward Island was down from that recorded in 1971. Severe winterkill in Eastern Canada in 1972 resulted in plant losses estimated at 50%, with losses in some fields reaching 90%. It is probable that this situation influenced the levels of green petal recorded in 1972.

Although the methods used for calculating losses in yield due to green petal might be considered approximations, they do serve to illustrate percent infection in terms of yield loss. In Table 3, for example, a 2.4% infection level in Prince Edward Island in 1971 resulted in a calculated loss of 41,311 quarts, and in Quebec in 1972 a level of infection of less than 1% resulted in a loss

Table 3. Estimated yield loss in strawberry production in Eastern Canada due to green petal disease in 1971 and 1972

Province and year	Total production ('000 qt)	Avg % infection	Potential total production without green petal ('000 qt)	Yield loss ('000 qt)
Quebec				
1971	7,830	0.3	7,854	24
1972	4,930	0.7	4,965	35
Nova Scotia				
1971	2,500	0.5	2,513	13
1972	1,200	0.5	1,206	6
Prince Edward Island				
1971	1,680	2.4	1,721	41
1972	270	1.1	273	3

Table 4. Estimated per acre losses in the cultivar Redcoat due to green petal in 1971 and 1972

Province and area	Avg yield (qt/acre)	Loss in yield (qt per acre) in: 1971	1972
Quebec			
St. Hyacinthe	6,500	53.3	38.4
Terrebonne-Deux Montagnes	7,000	13.3	156.8
L'Assomption	6,042	12.5	5.9
Yamaska	5,938		88.5
Montmorency	3,750	4.2	1.9
Bellechasse	3,750	10.0	22.1
Nova Scotia			
Annapolis-Kings	8,280	29.2	48.0
Colchester-Pictou	7,000	60.0	19.6
Lunenburg	9,000		72.0
Yarmouth	7,750	0	122.5
Prince Edward Island	4,200	100.8	44.5

of 33,753 quarts. Table 4 illustrates the variability in losses per acre in the various areas surveyed. In the Terrebonne-Deux Montagnes area of Quebec, for example, calculated losses in 1972 were 157 quarts per acre while in Montmorency losses were negligible. Loss calculations on an area basis serve to illustrate the importance of the disease to the economy of specific areas and in this respect are probably more meaningful than are figures for provinces as a whole.

The low level of green petal observed in 1971 and 1972 and the losses sustained suggest that this disease is not of major importance in the production of strawberries in Quebec and the Maritime Provinces. Several workers (2,6) have observed higher levels of infection in the cultivar Sparkle than in the cultivar Redcoat in commercial plantings. Since Sparkle has now been largely supplanted by Redcoat and other cultivars, this change in cultivars may have contributed to a lower disease incidence. It may well be, however, that a combination of factors such as availability of disease inoculum, leafhopper populations, susceptible cultivars, and climatic conditions might produce an optimum set of conditions whereby a high level of infection could occur, as has been reported in the past.

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