PREVALENCE OF ONION SMUT, UROCYSTIS MAGICA, AND LOSSES IN ORGANIC SOILS OF SOUTHWESTERN QUEBEC IN 1970

R. Crête[1] and L. Tartier[2]

Abstract

A field survey revealed that onions (Allium cepa) grown on 21 of 44 farms (48%) inspected in southwestern Quebec were affected by smut. The area affected comprised 585 of the 1382 acres surveyed or 42%. The mean smut infection was 4.3%. In 1970 losses due to onion smut were evaluated at $55,000 to $60,000. The main pesticides used to control onion maggot or smut were diazinon 5-G. and ethion-thiram 5-G.

Resume

Cette enquête a révélé la présence du charbon de l'oignon sur 21 des 44 fermes visitées, soit 48 pour cent. La superficie affectée par le charbon était de 585 acres sur 1382 acres échantillonnées, soit 42 pour cent, L'infection moyenne du charbon Qtait de 4.3 pour cent. En 1970 les pertes causées par cette maladie ont été évaluées entre $55,000 et $60,000. Les principaux pesticides employés pour réprimer la mouche ou le charbon ont été le diazinon 5-G et l'éthion-thirame 5-G.

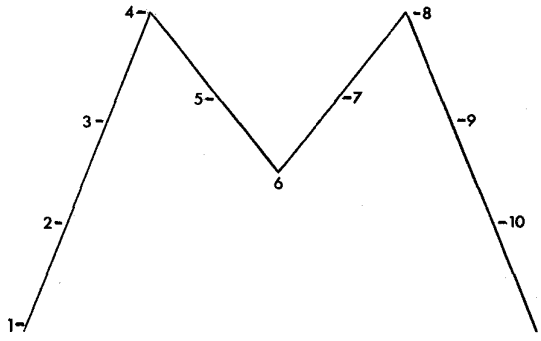
Introduction

Onion smut caused by Urocystis magica Pass. ap. Thum. was reported to be destructive in truck gardens around Montreal in 1922 and 1923 (1). In the Ste. Clothilde area smut was reported in 1960 (4), and in the period 1965-70 it has become increasingly prevalent (3,5,6,7). The importance of this disease may have been underestimated in the past because losses caused by smut have not been evaluated.

In 1970 a systematic survey was undertaken to determine the prevalence, distribution, and losses due to onion smut in the organic soils of Quebec, and to collect data related to onion production, such as acreage in culture, varieties grown, and pesticides employed for the control of onion maggot and smut.

Materials and methods

Previous observations and experiments (2) indicated that the most appropriate time to begin the survey was 6 or 7 weeks after seeding. At this time emergence of onions (Allium cepa L.) is complete and the stand has not yet been affected by smut. Forty-four onion growers were selected, representing 60% of the growers throughout the organic soil area. Close to 70% (1382 acres) of the onion producing area was surveyed, beginning on June 10. For each 10- to 15-acre field, a group of 10 samples was taken following an inverted W pattern:



The sampling sites were approximately equidistant from each other along the sampling pathway; at each site all the plants in 1 ft of row were carefully uprooted and placed in a numbered paper bag. The 10 bags from each field were placed in a plastic bag and kept in a portable cooler. For each grower, the surveyor immediately completed a form recording the name, address, onion varieties grown, acreage in culture, and pesticide treatments used for the control of

[1] Phytopathologist, Research Station, Canada Department of Agriculture, St. Jean, Quebec.

[2] Phytopathologist, Research Service, Quebec Department of Agriculture, Institut de Technologie Agricole, St. Hyacinthe, Quebec.

maggot or smut. The onion samples were then taken to the laboratory and each plant was examined by transparency for smut infection.

Results

The data recorded are summarized in Tables 1 to 4. In a few cases estimates are given because precise figures could not be obtained. The large number (21) of varieties or hybrids grown is somewhat unusual. Due to the limited seed supplies of the main variety, Autumn Spice, in 1970 many growers were forced to use other varieties.

More onion growers used a furrow treatment than a seed treatment, and the most commonly used pesticides were diazinon 5-G and ethion-thiram 5-G (Table 3).

Smut was found on 21 of the 44 farms (48%), totalling 585 acres or 42% of the 1382 acres surveyed (Table 4). The mean smut infection was 4.3%.

Losses:

At the time the survey was carried out the mean number of onion plants per foot of row was 13, representing approximately 400,000 plants per acre. Based on our results, the losses may be calculated as follows:

No. of plants per acre	400,000
No. of acres affected by smut	585
Mean smut infection (%)	4.3
No. of bulbs per lb (approx.)	5
Estimated farm value[3] ($/lb)	0.03

Estimated loss:

$$\frac{400{,}000 \times 585 \times 4.3}{5 \times 100} = 1{,}993{,}680 \text{ lb}$$

1,993,683 x $0.03 = $59,810

Using the actual % smut infection figures for the fields surveyed, the total loss in those fields amounted to 1,885,920 lb or $56,577.

Conclusions

Onion smut constitutes an increasing threat to onion growers in the organic soils of southwestern Quebec. In 1970 smut affected 48% of the farms or 42% of the area surveyed and caused losses estimated at $55,000 to $60,000.

The survey also permitted other noteworthy observations: some growers were uncertain about the acreage in culture, the rate of seeding, the rate of pesticide treatment used, and the purpose of such treatment. There is a strong indication that growers prefer furrow treatments to seed treatments because of convenience of application, not because of greater efficacy of the treatment. A great number of onion growers are not aware of the smut problem.

Table 1. Distribution and acreage of onion varieties grown in organic soils in southwestern Quebec in 1970

Number of growers	Variety	Approximate acreage
37	Autumn Spice	776
7	Copper Gem	145
7	Nugget	107
6	Epoch	45
6	Trapp No. 2 & No. 6	64
4	Autumn Splendor	45
3	Aristocrate	39
3	Sunburst	6
2	Yellow Globe	45
2	Mustang	36
2	Premier	22
2	Pronto	13
1	Buccaneer	10
1	Rocket	5
1	Encore	3
1	Fiesta	3
1	Exporter	3
1	Spartan Era	3
1	White Spanish	3
3	Red onions	9
		1382

Table 2. Distribution of onion growers according to acreage in culture in 1970

Number of growers (approx)	Number of growers surveyed	Number of acres in culture
40	17	1- 10
14	8	11- 25
15	15	26- 50
2	2	51–100
2	2	101 or more
73	44	

Acknowledgments

The authors gratefully acknowledge the assistance of G. Samoisette, J. Daneau, D. Gagnon, L. Morency, T. Simard, and P. Sauriol.

[3] K.M. Hunter, CDA Production and Marketing Branch, Ottawa, personal communication.

Table 3. Distribution of growers and acres treated with pesticides to control onion maggot or smut in 1970

No. of growers	Acres treated	Treatment *	Smut observed: No. of growers	Smut observed: Acres affected	Smut observed: Mean % smut
		A - *Seed treatments*			
3	57	Thiram 75-W + diazinon 50-W	3	57	7.0
4	119	Thiram 75-W (seed) + diazinon or Dasanit granular (furrow)	2	25	2.1
3	19	Diazinon 50-W	0	0	0.0
		B - *Furrow treatments*			
12	375	Diazinon 5-G	5	95	4.0
6	168	Dasanit 15-G	4	146	1.5
8	326	Ethion-thiram, 5-G	4	156	14.7
8	169	VC-13, 5-G, or VC-13, 5-G + thiram 10-G	2	15	0.2
1	80	Diazinon 50-EC	1	50	1.2
		C - *Treatment unknown*			
4	61		2	41	4.8
		D - *No treatment*			
1	8		0	0	0.0

* Most of the onion seed sold in the area is treated with thiram 75-W at 1 or 2 tablespoons/lb. A number of growers use this treatment if the seed has not been treated.

Table 4. Distribution of onion growers in relation to smut severity and acres affected in 1970

Number of growers	smut (%)	Acres (No.)	Acres (%)
23	0	797	58
7	<1	131	10
6	1-5	200	14
6	6-10	118	8
0	11-20	0	0
2	21-30	136	10

Literature cited

1. Conners, I.L. 1967. An annotated index of plant diseases in Canada. Canada Dep. Agr. Publ. 1251. 381 p.

2. Crête, R., L. Tartier, et T. Simard. 1971. Lutte chimique contre le charbon de l'oignon Urocystis magica Pass. en sol organique en 1969 et 1970. Phytoprotection (In preparation).

3. Crête, R., L. Tartier, et T. Simard. 1971. Diseases of vegetables in the organic soils of southwestern Quebec in relation to climate in 1969 and 1970. Can. Plant Dis. Surv. 51 (In press).

4. Simard, J., R. Crete, and T. Simard. 1960. Vegetable diseases on muck soils in the Montreal area in 1960. Can. Plant Dis. Surv. 40:72-74.

5. Simard, T., and R. Crete. 1965. Vegetable diseases in muck soils south of Montreal in 1965 and their relationship to climate. Can. Plant Dis. Surv. 45:113-115.

6. Simard, T., R. Crete, and L. Tartier. 1966. The relationship between climate and foliar diseases of muck grown vegetables in 1966. Can. Plant Dis. Surv. 46:129-130.

7. Simard, T., R. Crête and L. Tartier. 1968. Climate and disease development on muck-grown vegetables south of Montreal, Quebec, 1968. Can. Plant Dis. Surv. 48:124-127.