Occurrence of *Myriosclerotinia borealis* on Winter Cereals in Ontario'

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Myriosclerotinia borealis was isolated from winter cereals in an area near the northern limits of production in Ontario. The winter climate may determine the southern latitude for field activity of ***M. borealis*** in Ontario, based on results from Scandinavia at a much more northern latitude where Sclerotinia snow mold is a major problem. Although only **11** fields were affected, they were widely distributed and all of the diseased plants were necrotic. Usually plants were infected with ***M. borealis*** alone but in some fields other snow mold fungi also were observed on necrotic plants.

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On a isolé ***Myriosclerotinia borealis*** sur des céréales d'hiver cultivées dans une region situé aux limites septentrionales de production en Ontario. Le climat hivernal peut determiner la latitude la plus au sud ou M. ***boreelis*** est actif en Ontario, d'après des données provenant de Scandinavie située à une latitude beaucoup plus au nord et ou ***M. borealis*** est maintenant un problème majeur. Même si la moisissure nivale n'a infect6 que **11** champs, ils étaient largement répartis dans toute la region et tous les plants infect& étaient necroses. Généralement, les plants n'étaient infectés que par ***M. borealis*** mais, dans cetains champs, on a observe d'autres champignons causant la moisissure des neiges sur les plants necroses.

Introduction

Sclerotinia snow mold of winter cereals and perennial grasses occurs in the more northerly or colder regions affected by snow mold fungi. The causal fungus, described as ***Sclerotinia borealis*** Bub. & Vleug. in Vleugel, 1917, was placed by Kohn (1979) in ***Myriosclerotinia*** as ***Myriosclerotinia borealis*** (Bub. & Vleug.) Kohn. ***Sclerotinia grarninearurn*** Elenev. ex Solkina was regarded as a taxonomic synonym of S. ***borealis*** by Schumacher and Kohn (1985). who also questioned the validity of ***Myriosclerotinia*** as the appropriate generic designation of this fungus.

Sclerotinia snow mold has been reported from northern Europe (Årsvoll 1975, Jamalainen 1949, Mäkelä 1981), USSR (Tupenevich and Shirko 1939), and Japan (Tomiyama 1955). In North America, sclerotinia snow mold was first reported by M.W. Cormack on grasses at Prince George, B.C., in 1951 (Conners and Savile, 1952) and on winter wheat at Vanderhoof, B.C., in 1953 (Conners and Savile, 1954); the identity of the causal fungus was confirmed by Groves and Bowerman (1955). It was subsequently found on turf grasses in the Peace River region of British Columbia and Alberta (Vaartnou and Elliott 1969), on grasses, winter rye and winter wheat in Saskatchewan (Smith 1972, 1974), and on rye in Manitoba (Smith 1974). In the USA ***M. borealis*** has been found in Alaska (Lebeau and Logsdon 1958), Washington (Sprague et al. 1961) and Minnesota (Stienstra 1974). In eastern Canada ***M. borealis*** was found in Ontario on turfgrass in 1979 (W.L. Seaman and J.D. Smith, unpublished), on winter wheat in 1982 (W.L. Seaman and E.F. Schneider, unpublished), and on winter wheat in Quebec in 1985 (L. Couture, personal communication). Observations on the distribution of ***M. borealis*** on winter cereals in Ontario in 1982-85 are reported herein.

Observations

In 1982 snow mold damage was extensive and severe in southern Ontario (south of latitude 45°28), following snow cover that persisted into late spring. ***M. borealis*** was observed in mixed infections with ***Typhula ishikariensis*** Imai var. ***ishikariensis*** Årsvoll and Smith and ***Microdochiurn nivale*** (Fries) var. ***nivale*** Samuels and Hallett on turfgrass at the Arnprior site where ***M. borealis*** was collected in 1979. In addition ***M. borealis*** occurred on winter wheat (***Triticum aestivurn*** L.em. Thell.) in test plots at Hyndford, Ontario (Table 1); at that location snow mold damage resulted in approximately 80% plant kill; however ***M. borealis*** was associated with less than 1% of the necrotic plants. Also in 1982, necrotic cereal plants from test plots at Kapuskasing, which lies north of the winter wheat production area of Ontario, were 'conspicuously colonized by ***M. borealis,*** with as many as 10 sclerotia per plant. The affected winter cereals from that field included wheat (soft white cultivars Talbot and Fredrick, red cultivars Abe and Monopol), rye (***Secale cereale*** L. cv. Puma), barley (***Hordeurn vulgare*** L. cv. Dover), and triticale (cv. Wintri) (Table 1). Apparently ***M. borealis*** has not previously been reported on triticale. Many of the plants from Kapuskasing also were infected with one or more of the other snow mold fungi, e.g. ***T. incarnata*** Lasch ex Fr., ***T. ishikariensis*** var. ***ishikariensis, T. phacorrhiza*** Reichard ex Fries, and ***M. nivale*** var. ***nivale.*** Mixed infections of S. ***borealis*** and other snow mold fungi have been reported elsewhere (Sprague et al. 1961, Smith 1974). Plants from the other fields in Ontario were infected with ***M. borealis*** alone. ***M. borealis*** also was found on necrotic plants in two fields near Elmvale in Simcoe County, a high snowfall area and the most southerly location at which it was found during the surveys.

Snow cover in 1983 was lost throughout most of southern Ontario because of mild weather and rain during January, re-

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Table 1. Host and distribution of *Myriosclerotinia* borealis observed during spring surveys in Ontario (1982-1985).

County and Location	Crop[a] Affected	Numbers of Fields
Renfrew		
Beachburg	Wheat	3
Douglas	Wheat	1
Hyndford	Wheat	1
Ottawa-Carleton		
North Gower	Wheat	2
Simcoe		
Elmvale	Wheat	2
Cochrane		
Kapuskasing	Wheat, Barley, Rye, Triticale	1

[a] Winter wheat cvs. Fredrick, Abe, Talbot, Monopol; barley cv. Dover, rye cv. Puma, triticale cv. Wintri.

sulting in little or no snow mold damage. In 1984 M borealis was found on winter wheat plants from two fields near Ottawa, and from one field at Douglas and one field near Beachburg (Table 1). In 1985 M borealis was observed on winter wheat in two other fields near Beachburg and again from one of the fields near Ottawa.

M borealis is unique among the snow mold fungi in that it grows more rapidly on a frozen culture medium than on a supercooled liquid medium (Tomiyama 1955). In nature M borealis is an important pathogen of winter cereals in northern Japan at high elevations, where the soil freezes before the plants become snow covered (Tomiyama 1959). and of ley grasses at latitudes of 65-70°N in Finland (Mäkelä 1981).

Our observations of M borealis in Renfrew County at Douglas and Beachburg (latitude ca. 45°28), in the Ottawa-Carleton region (latitude 45°19), and in Simcoe County near Elmvale (latitude 44°35) indicate that its activity is limited to areas near or north of the present northern limit of white winter wheat production in Ontario. In the affected areas M borealis occurred sporadically, usually affecting single plants in a row or in relatively small areas of the fields; plants bearing sclerotia were invariably dead. Within the main area of winter wheat production in Ontario, M borealis was not one of the snow mold fungi reported on fine turf grasses by Fushtey (1980). In more northerly areas with a longer period of snow cover, such as at Kapuskasing (latitude 49°25), where M borealis caused devastating losses to winter cereals in test plots in 1982, the fungus appears to' be well adapted. The possible role of M borealis in overwintering damage to forage and turf grasses in that area and to hard red winter wheat in northwestern Ontario has not been determined.

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