ASCOCHYTA DISEASES OF PEAS IN PRINCE EDWARD ISLAND IN 1966

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Leaf and pod spot caused by Ascochyta pisi Lib. has been the most frequently encountered of the ascochyta diseases of pea in Canada and has been reported on garden, canning or field peas in every province since 1921. Mycosphaerella blight caused by Mycosphaerella pinodes (Berk. & Blox.) Vest. (Didymella pinodes (Berk. & Blox.) Petr.; imperfect state, Ascochyta pinodes L. K. Jones) has been found in the field or in seed from every province except Prince Edward Island and Newfoundland. In 1962 M. pinodes caused severe pod spot of 'Chancellor' field peas in Manitoba (4) and has since been prevalent in that province on the A. pisi-resistant variety 'Century' (formerly 'Creamette'). Mycosphaerella blight caused the complete destruction of a 20-acre field of canning peas near Florenceville, New Brunswick in 1964 (5). Footrot caused by A. pinodella L. K. Jones (Phoma medicaginis var. pinodella (Jones) Boerema) has been reported in Ontario (2, 4), British Columbia (7), Quebec (3, 7) and Alberta (5) since 1955. Jones, however, isolated all three species from pea seed grown in Eastern Canada, chiefly in Ontario, in 1925-26 (6). Records in this laboratory of seed tests performed on commercially grown peas in the years 1944 to 1949 indicated that the three Ascochyta species occurred in seed grown in every province from Quebec to British Columbia. A. pisi was the predominant species encountered.

A number of comniercial fields of peas grown for freezer-processing in Prince Edward Island were surveyed for ascochyta diseases August 10-12, 1966. In a 100-acre field of Rogers 'Perfected Freezer' peas planted June 18 near Brookfield, P. E. I. and examined one week before harvest, approximately 40% of the plants examined exhibited somewhat sunken purplish lesions partially girdling the stems at the defoliated lower nodes. Incidence of the disease was less apparent in an adjoining field of 'Dark Skin Perfection' peas planted 11-12 days later. Similar symptoms were encountered in fields of 'Dark Skin Perfection' near Sherwood, P. E. I. The foliage and pods of affected plants appeared to be completely healthy except for a trace of rust on a few leaves. Symptoms of infection by A. pisi were not found in the fields examined.

Lasioned stems which were surface sterilized, sectioned and plated on pea agar consistently yielded pycnidium-forming colonies which resembled those of A. pinodes isolated from pea seed grown in Manitoba and Ontario. Isolates were obtained from both purplish lesions at the nodes and from tan-centered, dark brown, elognate lesions on the internodes. They were not, however, recovered on PDA from segments of more extensive sunken black lesions girdling the lower stems and upper roots of many plants in a field at Sherwood.

The pathogenicity of single-spored isolates was tested on peas in a growth room at 20°C with flourescent and incandescent lighting of 2000 ft-c and a relative humidity of 80-90% (95-100% for 48 hr. after inoculation). Symptoms on pycnidiospore-inoculated foliage of 2-week-old 'Improved Laxton's Progress' garden pea and 'Chancellor', 'Arthur' and 'Century' field peas were similar for all isolates and were indistinguishable from those of isolates from Manitoba-grown seed. Pycnidia formed on necrotic leaf tissues were brown to black, globose to subglobose and measured 91 × 78μ to 250 × 200μ. Pycnidiospores of one P. E. I. isolate fit Jones' (6) description of A. pinodella, measuring 6.7 - 10.5 × 2.1 - 4.2μ, av. 8.2 × 3.0μ. Pycnidiospores of the other isolates were slightly larger but were intermediate in size between those of A. pinodella and A. pinodes. Size and septation of pycnidiospores of all isolates were highly variable, with the proportion of continuous to uniseptate spores varying among pycnidia of the same isolate. Such variable intermediate-spored isolates have been frequently isolated from pea seed in recent years and have been considered to be variants of A. pinodes. All were very similar in colony growth on agar.

The source of inoculum in the P. E. I. fields is unknown; samples of the Alberta-and Idaho-grown seed used in planting the crops examined, were not available for testing. The fields have been continually cropped to peas for several years, thus providing conditions highly favorable for survival and spread of the pathogen in debris.

Ascochyta spp. were not recovered from surface soil collected from between the rows of peas at Brookfield and Sherwood and assayed by a dilution plating method that has been used successfully in isolating A. pinodes and A. pinodella from other soils (unpublished results).

In the fields surveyed, the lack of symptoms on the foliage and pods, as well as the restricted

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nature of the lesions at the lower nodes and the absence of pycnidia in the necrotic tissues, indicated that the plants were infected during the seedling stage and that further development of the disease in the crop was prevented by the unusually dry weather that prevailed in the province during July and August, Precipitation in July was 30% below normal (1). It is significant that peas seeded in mid-June, when precipitation was higher than normal, exhibited a higher incidence of disease than those seeded at the end of the month. Samples of seed harvested from the fields in late August and plated on pea agar after surface sterilization yielded 0-2% A. pinodes.

The abundance of infected plants in the field together with the virulence of the pathogens and the prolific production of pycnidia in lesioned tissues under controlled conditions indicated that severe losses could have been encountered in the crops examined under more favorable weather conditions.

The employment of good cultural practices, including 3-or 4-year crop rotations and removal of pea vines from the fields following harvest, should be emphasized to growers in areas where peas for freezing and canning are becoming more widely grown. Seed treatment with captan or thiram where seed infection with A. pinodes is suspected is also recommended (8).

literature cited

1. Canada Department of Transport. 1966. Monthly record. Meterological observations in Canada, July, 1966.
2. Conners, I. L., (Compiler). 1955. 34th Ann. Rept. Can. Plant Dis. Survey 1954. p. 69.
3. Creelman, D. W. (Compiler). 1960. 38th Ann. Rept. Can. Plant Dis. Survey 1958. p. 61.
4. Creelman, D. W. (Compiler). 1963. Summary of the prevalence of plant diseases in Canada in 1962. Can. Plant Dis. Survey 43: 61-130.
5. Creelman, D. W. 1965. Summary of the prevalence of plant diseases in Canada in 1964. A compilation. Can. Plant Dis. Survey 45: 37-83.
6. Jones, L. K. 1927. Studies of the nature and control of blight, leaf and pod spot, and foot-rot of peas caused by species of Ascochyta. N. Y. State Agr. Expt. Sta. Bull. 547. 46 p.
7. Shoemaker, R. A. and D. W. Creelman (Compilers). 1958. 37th Ann. Rept. Can. Plant Dis. Survey 1057, p. 64.
8. Wallen, V. R., T. F. Cuddy and P. N. Grainger. 1967 Epidemiology and control of Ascochyta pinodes on field peas in Canada. Can. J. Plant Sci. (In press).