PHYSIOLOGIC RACES OF CEREAL RUSTS IN CANADA IN 1945

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In 1945, surveys were made of the distribution, in Canada, of physiologic races of the following cereal rusts: Puccinia graminis var. Tritici, P. triticina, P. graminis var. Avenae, P. coronata var. Avenae and P. anomala.

As in 1944, a study was also made of cultures originating from aecia occurring on naturally infected barberry and buckthorn in a number of localities in Eastern Canada.

Distribution of Physiologic Races of the Cereal Rusts

Stem rust of wheat was of minor importance in 1945 owing to the widespread presence of resistant varieties. In Man., however, infections upwards of 50% occurred on susceptible wheats. Leaf rust of wheat was generally severe except in Alta., western Sask., and some parts of the Maritime Provinces. In Man. and Sask. and in certain areas in Eastern Canada, wheats, such as Regent, which had been resistant in previous years, showed considerable susceptibility. Stem rust of oats was rather severe in Man. and eastern Sask. and locally in certain other parts of the country. Crown rust of oats occurred sparingly in eastern Sask., was very prevalent in Man., and appeared in epidemic form in many localities in Ont., Que. and the Maritime Provinces. Light to moderate infections of leaf rust of barley occurred in Man. and in scattered localities in Eastern Canada.

No significant change took place in 1945, in the distribution of physiologic races of Puccinia graminis var. Tritici. Race 56 predominated, as in past years, occurring in 60% of the 83 isolates studied. The 2 closely related races 17 and 29 occupied 2nd (11%) and 3rd (9.6%) place respectively. Two races, 118 and 152, that had not been collected previously in the field were each found once in uredinial collections on wheat in the Maritime Provinces. Both these races were encountered several years ago in cultures from aecia on barberries infected in the greenhouse. Other races collected, in order of prevalence, were 19, 38, 49, 32, 39, 80 and 87.

The distribution of physiologic races of P. triticina in 1945 differed from that of the previous year chiefly in the relatively greater number of isolates (26%) identified as race 128. This race was isolated in Canada for the first time in 1944, and its appearance coincided with the diminished leaf rust resistance of Regent and other wheat varieties with a similar type of resistance. Race 128 is scarcely distinguishable on the differential hosts from race 29 (7% of isolates), which has occurred in Canada for a number of years, but it attacks adult plants of Regent more severely than that race. That the increased

susceptibility of Regent, Renown and Coronation in 1945 was chiefly due to the presence of this race is indicated by the fact that 66% of the isolates from these varieties were identified as race 128. This race was most prevalent in Man. (46% of isolates), where Regent and Renown are commonly grown, but its predominance was no doubt exaggerated owing to so many rust collections being obtained on these varieties. Recent greenhouse studies on the reaction of Regent to other physiologic races have indicated that last summer, in certain areas, biotypes (particularly in races 5 and 15, which comprised 5 and 21% of the isolates) occurred capable of attacking this variety severely. In general, it seems clear that strains of leaf rust capable of attacking the above mentioned varieties are becoming prevalent in areas where they are mostly widely grown. Other races isolated were, in order of prevalence, races 9, 3, 29, 76, 1, 38, 11, 2, 101, 113, 81, 103, 32, 52, 65, and 104 among the 203 isolations.

In P. graminis var. Avenae, a further increase took place in 1945, in the prevalence of races 8 (30% of the isolates), 10 (9%) and 11 (9%), which, though distinguishable, may be regarded for practical purposes as one race. Their prevalence, as given above, is probably exaggerated owing to the fact that many rust collections came from the varieties Vanguard and Ajax, which do not harbour races 1, 2, and 5. Nevertheless, races 8, 10 and 11 are now collected so frequently that they must be regarded as of common occurrence. The only other notable feature of the oat stem rust survey was the presence of races 4 (0.6%) and 6 (2.5%). The former was last collected in 1936 and the latter in 1937. Any further spread of these races would be of some concern for the reason that they attack varieties with the White Russian as well as the Richland type of resistance. Other races isolated were races 1 (6%), 2 (24%) and 5 (21%) from 161 isolates.

Ten physiologic races of P. coronata var. Avenae were isolated from uredinial collections of crown rust obtained from many widely separated localities in Eastern Canada and the Prairie Provinces in 1945. Those 10 races and percentage of isolates of each race were as follows: race 1, 8.6%; 2, 19.7%; 3, 20.2%; 4, 5.8%; 5, 22.1%; 6, 20.7%; 24, 0.5%; 34, 1.4%; 38, 0.5%; and 54, 0.5%. They have all been collected in Canada in previous years and the 6 first named races comprised well over 90% of all the isolates, as in former years. There was, however, a considerable change in the relative prevalence of different races. Race 5, which has usually been the least abundant of the 6 common races increased greatly in prevalence and became the predominant race, slightly exceeding races 2, 3 and 6, which have been predominant for several years. Race 34, although of rare occurrence at least in Canada, is of some interest because it heavily attacks Bond, a variety much used (owing to its immunity to most crown rust races) in breeding for crown rust resistance. This race, of which 3 isolates were obtained this year, was not collected in 1943 and 1944 and only occasionally prior to that. In all, 208 collections were studied.

In 1945, 44 collections of P. anomala were studied and from these, 3 distinct races were isolated.