The Influence of Germination Temperatures on Seedling Development of Helminthosporium Blights of Oats

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Seed-borne spores and mycelium of Helminthosporium victoriae Meehan and Murphy, the incitant of victoria blight, have been prevalent during the past year on seed lots of the oat varieties derived from Victoria crosses. Seed lots of these varieties grown in both the winter and spring oat humid sections apparently have carried high percentages of the fungus in 1947. Some of these areas reported both disease damage in the field and seed-borne inoculum prior to 1947 (1, 2). Many samples of the spring oat varieties received in 1947 by the Seed Certification Service of the Wisconsin Agricultural Experiment Association of Madison, Wis., carried high percentages of this fungus and presented problems in laboratory evaluation for seed. The germination of a large number of seed lots of these susceptible varieties by the Seed Certification Service indicated that Wisconsin seed oat samples carrying this fungus were infrequent prior to 1947. Cooperative investigations with the Seed Certification Service at Madison in establishing a satisfactory method of evaluating these samples for seed certification initiated the research reported here. H. avenae-Eidam, causing seedling blight and leaf blotch, was found on a few oat samples but was studied comparatively on only one sample.

METHODS AND MATERIALS

Ten samples of oats selected on the basis of plating data were used in the comparisons. The varieties used are listed in Table 1. Samples 17533 and 17547 were from the Alabama Seed Laboratory; the others were obtained from the Wisconsin Agricultural Experiment Association Seed Certification Laboratory from the 1947 crop.

The kernels were plated to determine the bacteria and fungi present. The seed samples were divided down to approximately 100 kernels. The 100-kernel lots were surface sterilized by suspending in coarse-mesh, cotton cloth for 30 seconds in a solution of one-third 95% ethyl alcohol and two-thirds Clorox (5.25% sodium hypochlorite). The surface-sterilized kernels were then placed in Petri plates of potato dextrose agar (1.0% cerulose and 1.7% agar), using 10 seeds per plate and 10 plates per sample. The plates were incubated at approximately 20°C for 4 days, then held for 10 days at 5°C to secure spore development without overgrowth of the mycelium. The bacteria and fungi were recorded, the latter by species in most instances.

Germination of the same seed lots was compared in rolled paper towels and soil, using seed untreated and treated with Semesan Jr. dust. Four replications of 100 kernels each of the untreated and treated seed were germinated at 20°, 24°, 28°, and 32°C for 6 days. The seed lots were treated by dusting them with a slight

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3 Figures in parenthesis refer to “Literature Cited”, p. 1099.