ABSTRACT OF DOCTOR DISSERTATION

University of Agriculture, Lublin, Poland

INVESTIGATIONS ON *BIPOLARIS SOROKINIANA* (SACC.) SHOEM. AND *DRECHSLERA AVENAE* (EIDAM) SCHARIF STRAINS AND SUSCEPTIBILITY OF OAT (*AVENA SATIVA* L.) LINES TO THESE PATHOGENIC AGENTS

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Key words: oat, susceptibility, strains, *Bipolaris sorokiniana, Drechslera avenae*, anthraquinones, cynodontin, helminthosporin

Field studies carried out in 2000–2002 in the Experimental Station of Cultivars Evaluation in Uhnin (south-eastern Poland) showed that spot blotch caused by *Bipolaris sorokiniana* and *Drechslera avenae* is a common disease of oats in the Lublin region. Cultivars and lines differed in their susceptibility to leaf infection by the pathogens, which was reflected in different values of the disease index for individual genotypes (ranging from 5.65 to 13.31 after three years of investigations).

Field investigations with artificial inoculation of soil and oat kernels with *B. sorokiniana* and *D. avenae* strains, selected as the most pathogenic by the Mishra and Behr (1976) method, were carried out in 2000–2002 on experimental plots in Zamość region. A decrease in number of plants developed from kernels inoculated with *B. sorokiniana* No. 36 and *D. avenae* No. 1, as compared to the control, and the spot blotch symptoms of all oat genotypes analyzed, were observed in each growing season.

In 2000–2002 the decrease in mean number of seedlings due to *B. sorokiniana* and *D. avenae* was greatest in cv. 'Akt' (76.8% and 47.8%, respectively) and smallest in cv. 'Bajka' (18.4% and 13%, respectively). Mean kernel yield decrease for three years of investigations in the experimental combination with *B. sorokiniana* ranged from 35.2% (cv. 'Borowiak') to 84.2% (cv. 'Akt'). In the experimental combination with *D. avenae,* the lowest decrease in kernel yield for three years of studies was 22.8% (cv. 'Bajka') and 18.4% (cv. 'Borowiak').

Investigations carried out in growth chamber confirmed great injuries caused by *B. sorokiniana* and *D. avenae* on leaves and seedlings of oat genotypes tested, as well as differences in susceptibility of analyzed cultivars and lines to these pathogens. *Bipolaris sorokiniana* proved more pathogenic to oat seedlings, and *D. avenae* to oat leaves. The most susceptible genotype was cv. 'Akt' and the least susceptible – cv. 'Bajka'. Mycological analysis of kernels obtained from oat plants developed from grain subjected previously to artificial infection with *B. sorokiniana* and *D.*

avenae under field conditions, detected a considerable number of both pathogens isolates. Reisolation of fungi from roots and leaf sheaths of seedlings in growth chamber, confirmed their infection with *B. sorokiniana* and *D. avenae*.

Investigations on growth and sporulation of *B. sorokiniana* and *D. avenae* strains on four different media in temperature of 11°C and 24°C, showed differences in morphological features, growth rate and production of pigments on some media between isolates. For growth and sporulation of *B. sorokiniana* and *D. avenae,* the temperature of 24°C was favourable. The MPA medium (20 g maltose, 2.5 g peptone, 20 g agar per 1 l) was the most suitable one for colony growth of *D. avenae,* while the rye medium was the best for *B. sorokiniana*.

Qualitative analyses of anthraquinone derivatives produced by *D. avenae* strain No. 1 showed that in the mixture of anthraquinones produced by the strain two compounds appeared: cynodontin and helminthosporin.

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