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Comparison of different methods for Evaluating of resistance to *Cercospora beticola* in sugar beet under field, greenhouse and in *vitro* conditions

S. ABBASI[1], A. ALIZADEH[1], M. MESBAH[2] and E. MOHAMADI GOLTAPEH[1]
1- College of Agriculture, Tarbiat Modarres Univ., Tehran, 2- Sugar Beet Seed Institute, Karaj

ABSTRACT

Twelve sugar beet cultivars exhibiting different levels of resistance to Cercospora leaf spot were used in order to compare different methods for evaluating resistance to Cercospora leaf spot in sugar beet under field, greenhouse and *in vitro* conditions. The field experiments were conducted in the Ghaemshahr and Dezful regions. The following resistance components to the disease were studied under controlled conditions in greenhouse: incubation period, percent of infected leaves, the number of necrotic spots per cm^2, lesion diameter and number of conidia produced on necrotic spots. Incubation length was determined by two different methods. In both of them degree–days, from 5 °C up, was used instead of time to record the incubation period. In the first method degree-days cumulation during the time between inoculation and appearance of necrotic spots in fifty percents of plants, was considered as incubation period and in the other method appearance of fifty percents of the final number of necrotic spots was used to determine the incubation period and in the other method appearance of fifty percents of the final number of necrotic spots was used to determine the incubation period. In the laboratory experiments levels of resistance of the cultivars were determined by estimation of disease severity on detached leaf disks laid in rows on top of 1.5% water agar in Pyrex plates. Based on the results, all the resistance components were involved in host resistance significantly. With few exceptions, by increasing in level of resistance, the number of spots per cm^2, lesion diameter, percent of infected leaves and spore yield were decreased and incubation length was increased. The results of this study indicated that there is a high correlation between the different evaluation methods. So, the evaluation of resistance would be reliable using each one of these methods. On the other hand, according to

the quantitative nature of resistance, evaluation of resistance in a region would be valid for other regions and it is not necessary to repeat the experiments in all regions. So, the field evaluations of resistance to Cercospora leaf spot can be confined to the regions having the most suitable climatic conditions for development of the disease; According to the results, because of its warm and humid environment, the Ghaemshahr region is the best area for this purpose.

Keywords: *Cercospora beticola*, Cercospora leaf spot, Sugar beet, Resistance components.

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Address of the authors: Engg. S. Abbasi, Dr. A. Alizadeh and Dr. E. Mohamadi Goltapeh, College of Agriculture, Tarbiat Modarres Univ., Tehran, Iran; Dr. M. Mesbah, Sugar Beet Seed Institute, Karaj, Iran