

EPIDEMIC EVOLUTION OF CERCOSPORA LEAF SPOT (*CERCOSPORA BETICOLA* SACC.) UNDER EZARENI FARM CONDITIONS

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Abstract

This study presents the evolution of Leaf spot caused by *Cercospora beticola* on sugar beet plants (*Beta vulgaris* L.) cultivated on Ezareni Farm conditions from U.S.A.M.V. "Ion Ionescu de la Brad", Iasi.

Infections caused by this pathogen occurs each year with a different intensity mainly dependent on climatic conditions, at this losses are contributing: the variety cultivated, the moment of infection, harvesting age, also presence of abiotic stress factors or other diseases.

The study of this pathogen was due to the fact that, the differences between cultures treated properly and those inadequately (by reducing the number of treatments, optimal timing of intervention failure, wrong application of plant protection products etc.). This differences are often 10-15% higher compared with estimated production and for untreated cultures reach values of 30-35% [Cioni, F., Maines, G., 2010].

The experience were conducted during 2009, at the experimental field from Ezăreni Farm. The biological material for study consisted in five sugar beet varieties and hybrids and the settlement of cultivar were based on block method, in three repetitions. Studied varieties showed different levels of resistance to the fungus *Cercospora beticola* Sacc attack. Observations and determinations consisted in a frequent register of the pathogen *Cercospora beticola* Sacc. on sugar beet leaves, aiming the frequency (F%), intensity (I%) and degree of attack (GA%). As criteria for assessing this pathogen attack level was used a scale with six classes of intensity attack, corresponding to intervals of intensity attack percentage (Rafaila, C., 1980).

Key words: *Cercospora* leaf spot, sugar beet, degree of attack.

The most important foliar disease of sugar beet (*Beta vulgaris* L.) is *Cercospora* leaf spot, caused by *Cercospora beticola* Sacc. Losses caused by this pathogen appear insignificant at first, but in reality the damages registrer are significant loss in root weight and reduction of sugar in sugarbeet (Windels, C. E. Și colab., 1996). The most important damage in the sugar beet harvest is recorded when weather conditions favors an early and rapid development of the parasite, formation on short intervals of new generation of conidia, also when the varieties for cultivation are susceptible.

In order to establish the optimal time for the treatments is very important to follow the epidemic evolution of the pathogen (Shane, WW, Teng, P.S., 1992).

The pathogens that cause infections, such as *Cercospora beticola* Sacc., in the formation proces of conidia, as the only form of propagation of this fungus are particularly important (Vereilssen, J., Schneider JHM, 2004). Regarding the various stages of development of this fungus, environmental conditions have an important role (Dumitras, L., 1975). Knowing the biological parameters of the fungus is possible to act at the right time with optimal treatments and also to use

an optimum number of spraying necessary to combat the parasite.

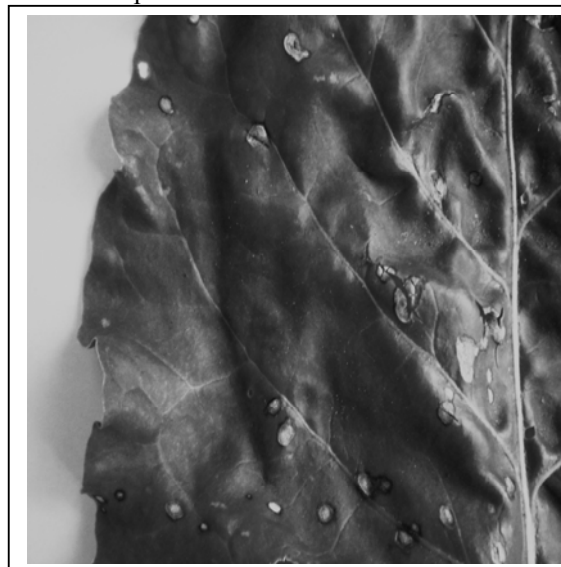


Figure 1 Symptoms of *Cercospora beticola* Sacc.

MATERIAL AND METHOD

Experimental field were conducted during the year 2009, designed based on block method with 3 repetition and 5 diferent variants of azote fertilization

(V1 – no fertilization, V2 – fertilization N180, V3 – fertilization N140, V4 – fertilization N100, V5 - fertilization N80), without irrigation. Each plot had a surface area of 9 m² (6 rows 15 m long). Sugar beet was sown in April with 45 cm row spacing, at 18 cm distances.

The biological material was represented by five different varieties and hybrids of sugar beet (Brasov, Barsa Libero, Merk and Victor). The field observations and determinations were in scoring the attack of *Cercospora beticola* Sacc. on sugar beet leaf, aiming the frequency (F%), intensity (I%) and the attack of degree (GA %).

As criteria for assessing the attack level on the plant, was reported the affected surface with the area observed, using a scale with six classes of attack, corresponding to specific percentage ranges of the intensity of the attack (Codrescu Ana, Dumitraș Lucreția, 1980).

RESULTS AND DISCUSSIONS

Based on the observations that were made can be described the onset and development of the epidemic of *Cercospora beticola* Sacc. that affect sugar beet depending on climatic conditions but also on the resistance of cultivated varieties.

In the field, cercospora leaf spot is usually observed after the rows have been completed in shaded areas, that due to the humidity and temperature of the culture. The fungus produces conidia that are dispersed by rain or wind, succeeding in this way to infect also the neighboring cultures.

Under studied conditions the first typical spots caused by *Cercospora beticola* Sacc. were observed in middle of July. The first infections were observed on local varieties of sugar beet, Brasov and Barsa. These infections were achieved through conidia and mycelium of the fungus *Cercospora beticola* Sacc., from the plant remains embedded in soil.

Because of the unfavorable weather conditions for development of the fungus, recorded values regarding degree of attack were very low in the first part of vegetation. The degree attack of *Cercospora beticola* Sacc pathogen in the end of July, also recorded low values, but the frequency attack rate reaches over 50% (fig. 2).

Weather conditions form the middle of august (high atmospheric humidity and precipitation) favored an abundant dispersed and sporulation of conidia, the development of the fungus *Cercospora beticola* Sacc. was very fast and attack degree values were increased, recording a 100% rate of the affected plants frequency.

The highest degree of attack rate occurred in 50.7% for local variety Barsa and the lower degree of attack was 28.42% for the variety Libero.

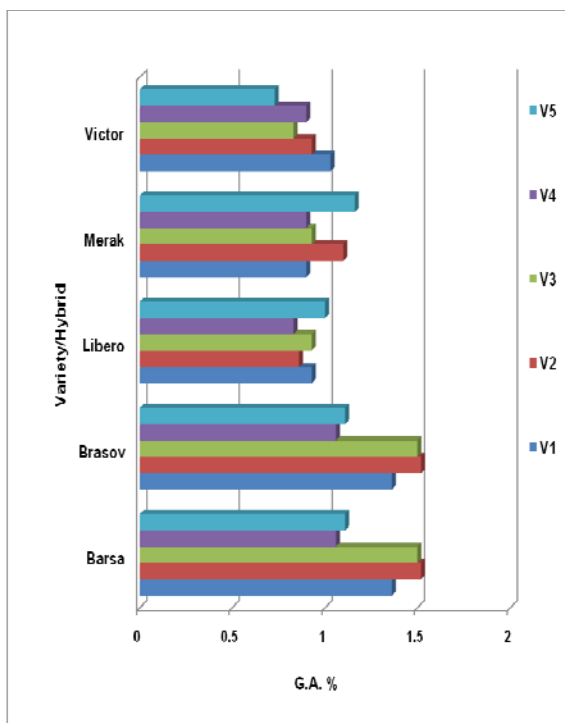


Figure 2 The degree attack of *Cercospora beticola* Sacc. on 31.07.2009

Evolution of the pathogen *Cercospora beticola* Sacc., in early august had a degree of attack with values ranging between 1.5% and 2.06%, to indigenous hybrids and for the two local varieties the degree of attack values are slightly higher, up to 3.1% (fig. 3).

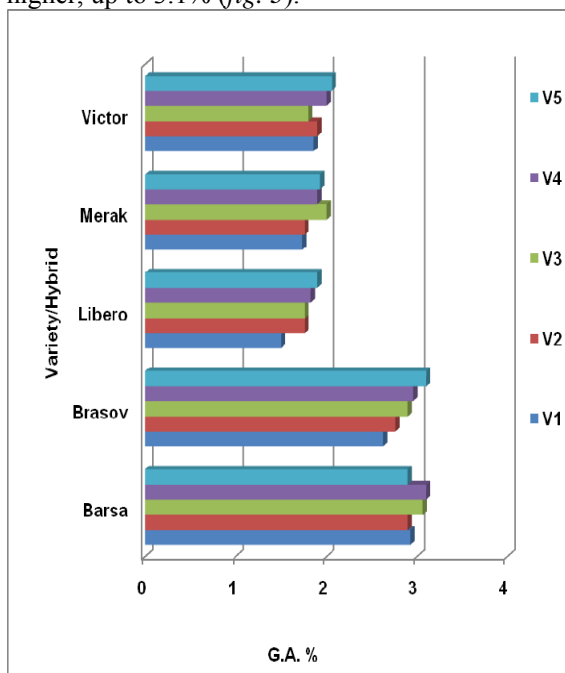


Figure 3 The degree attack of *Cercospora beticola* Sacc. on 04.08.2009

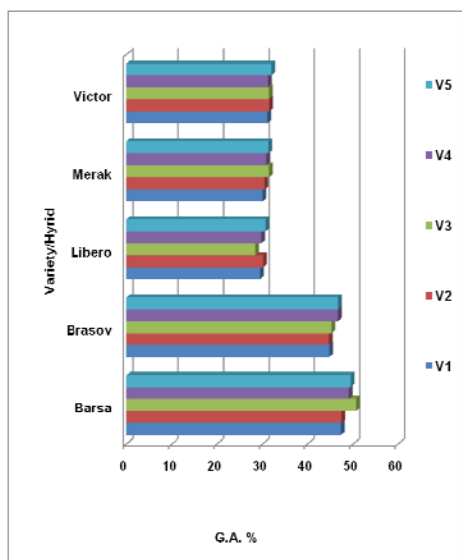


Figure 4 The degree attack of *Cercospora beticola* Sacc. on 26.08.2009

Last assessing to degree of attack was performed in the middle of september (fig. 4), when there were values more than 30% for all studied varieties and hybrids. Maximum intensity level of the attack was registered on the local variety, Barsa.

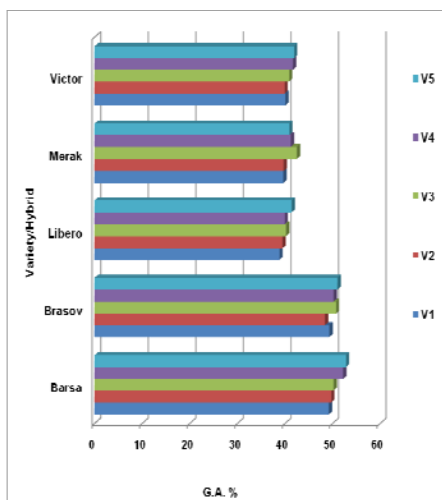


Figure 5 The degree attack of *Cercospora beticola* Sacc. on 16.09.2009

CONCLUSIONS

The highest degree attack, with 52.8% and 51% occurred in domestic varieties Barsa and Brasov.

Under studied conditions and compared to other varieties / hybrids analyzed the best resistance to the attack of fungus *Cercospora beticola* Sacc. was recorded on Libero hybrid, with a minimum average of 39.9% attack rate.

The presence of the fungus *Cercospora beticola* Sacc. was first noted in middle of july, after this period, due to the favorable weather conditions the development of the fungus had a rapid evolution reached by values of the degree attack up to 52.8%; leading to high economic losses by reducing the amount of roots and sugar content.

According with the degree attack of the fungus *Cercospora beticola* Sacc., in terms of any treatment with pesticides, the best varieties for resistance to this attack are all imported hybrids (Libero, Merak, and Victor).

Differentiated fertilization had any significant values.

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