ABSTRACT

Sugar beet, in its vegetation stage, is attacked by numerous pathogens. It is considered that 30% of the sugar beet production is affected by these attacks (Cioni and Maines, 2010). Naturally, people's interest in the knowledge, prevention and control of pathogens of sugar beet is becoming more obviously. Therefore, within the sugar beet crop areas, one of the factors that are contributing to the productivity growth has been and remains the protection of the plants.

The doctoral thesis "***Study of sugar beet pathogens of the central area of Moldova conditions***" is structured into eight chapters. The first part shows a summary of bibliographic data and a description of the sugar beet pathogens, while the second part presents the climate of the experiment' years, research material and methods and results of own research on the subject of the thesis.

Chapter I is divided into five chapters and presents the origin, importance, sugar beet requirements for growing technology and the status of sugar beet crops around the world and in our country. This chapter presents as well the common data about the importance of pathogens in sugar beet.

Chapter II shows the current status of research concerning the main sugar beet pathogens, on the world and nationally. Once the first sugar beet factory was built and also through crops extention, significant damages caused by pathogens started to be recorded. Thereby control problems arises, that led to important written records of diseases of these plants and to severe controls within all growing countries to prevent the spread of pathogens and to ensure and maintain a healthy crop with high production potential.

Chapter III lists the most important pathogens found in sugar beet crop. Their detailed description accompanied by genuine images, their symptoms and their epidemiology being helpful to determinate the disease easier, offering a real support to the specialist from the field.

Chapter IV highlights research objectives, material and research methods. The main objectives behind the development of this study are as follows:

- increase knowledge and study of pathogens that affects the sugar beet, in the climate of the central area of Moldova;

- description of the biology, ecology and epidemiology of the studied pathogens of sugar beet;

- listing of the identifying methods of sugar beet pathogens;

- highlighting of some of the new pathogens in this culture which through their action may decrease the quantity and quality of production;

- comparative study of sugar beet crops resistance to pathogens in the areas of Brasov, Barsa, Libero, Merak, and Victor, in terms of culture -without irrigation- in the central area of Moldova;

- evaluating the attack of *Cercospora beticola* Sacc. fungus under the studied conditions;

- establishing principles and methods of integrated protection for sugar beet.

The experience was located at the experimental field within Ezăreni Farm from U.S.A.M.V. ”Ion Ionescu de la Brad”, Iasi and the settlement of variety was based on blocks method, in three repetitions of bi-factorial type. The first factor is the variety (Barsa, Brasov, Libero, Merak, Victor) and the second is given by azote fertilization (F_1 – no fertilization, F_2 - fertilization N_{180}, F_3 - fertilization N_{140}, F_4 - fertilization N_{100}, F_5 - fertilization N_{80}).

For the placement of experience the basic technological elements were respected, the previous sugar beet crop being corn. Fall plowing was done at 30 cm depth, and preparation of seedbed was made in spring working with the disk harrow.

In the Chapter IV are presented as well the classic and modern methods used to determine and identify the pathogens encountered in seed and sugar beet culture.

Chapter V shows the natural conditions in which the research was conducted, being structured in six chapters describing the follows: geographically settlement and socio-economic situation, geomorphology and hydrology, climatically conditions, ecologically factors, soil characterization and spontaneous flora in the area of the experiment.

Chapter VI is a review of principles and methods of integrated protection for sugar beet. Integrated control requires a constant adaptation of the control system to environmental conditions and specific conditions in each field. This modern method of combating the attack of pathogens is achieved by combining the main agro technical, biological, physical and chemical control methods.

Chapter VII presents the results of sugar beet pathogens and it is structured in four chapters. Are presented and described the saprophytic and parasitic micromycetes identified on sugar beet, also the phytopathogenic bacteria encountered in this culture.

Also, given the importance of *Cercospora beticola* pathogen, in this chapter are presented as well the results concerning the identification methods used, the evolution of *Cercospora beticola* attack in those five sugar beet varieties analyzed and the influence of fertilization on the degree of *Cercospora beticola* fungus attack.

Not at least, in this chapter it is presented the data on the production of roots and sugar content in sugar beet varieties attacked by *Cercospora beticola*. Observations focused on the timing of the onset and epidemic evolution occurring *Cercospora beticola* fungus under natural conditions of infection, and knowledge of the behavior of those five sugar beet varieties to the attack of pathogen, depending on climate conditions.

Within the last part of the doctoral thesis are presented the conclusions and recommendations (Chapter VIII), which summarizes the contributions and implications of results for sugar beet pathogens on the studied conditions.

Research conducted in the period 2008-2011 on sugar beet led to a ten fungal reports, five of them being parasites: *Botrytis cinerea* Pers., *Fusarium sp.*, *Sclerotinia sclerotiorum* (Lib.) de Bary, *Alternaria tenuis* Ness, *Cercospora beticola* Sacc., and the other five being saprophytic fungal: *Penicillium* sp., *Cladosporium* sp., *Mucor* sp., *Trichotecium roseum* (Pers.) Link., *Volutella roseola* - Cooke.

From identified micromycetes, the *Volutella roseola* - Cooke fungus is new for the country and Moldova, and *Beta vulgaris* L. represents a new host of the fungus *Trichotecium roseum* (Pers.) Link. in our country.

Diagnosis of sugar beet pathogens requires relatively simple activities, but a precise diagnosis is made based on laboratory results. Thus, compared with conventional methods for identifying pathogens, using PCR can be obtained a rapid and precise identification of the fungus *Cercospora beticola* Sacc. in the early stage of vegetation.

In this last chapter are also presented the conclusions on the evolution of *Cercospora beticola* attack in those five sugar beet studied varieties. Considering the degree of attack values of *Cercospora beticola* Sacc. fungus, in terms of no-treatment with pesticides, the fungus attack was extremely aggressive. The hybrids with the best resistance at the attack were the imported ones (Libero, Merak and Victor).

In 2009, the highest attack of the C*ercospora beticola* fungus was for Brasov and Barsa varieties with values of 50,90% and 50,20%, and for varieties Libero, Merak and Victor the

degree of attack values were 40,20%, 40,90% and 39,90%.

Observations made in 2010 regarding development of *Cercospora beticola* pathogen attack showed higher values and an earlier onset of the attack, compared with the previous year due to favorable climatic conditions for development of the fungus.

A powerful agricultural production is not achieved without preventing detrimental factors of crops, such as pathogens. Regular exchange of agricultural products in recent times due to customs liberalization, contributed to the spreading pathogens of crops.

The plant protection problem is thus becoming more acute, especially in the current trend towards organic crops without chemical treatments. This requires extensive work to identify pathogens in crops and knowledge of their biology.