RESEARCHES ON THE SUNFLOWER'S DESEASES FOR THE HYBRIDS GROWN IN FETEŞTI AREA, IALOMITA COUNTY

SUMMARY

Tags*: sunflower, micromycetes seeds, hybrid*

Sunflower, with its high oil content in the seeds (48-52%), is a typical oleaginous plant, sunflower oil is an excellent edible oil, also useful in industrial applications, with a moderate Ionic index, high content of linoleic acid and a reduced level of linolenic acid.

Because sunflower is a very profitable culture economically speaking, sold immediately after harvesting, without the necessary costs of storing production and the fact that it is paid without delay by the beneficiaries, determined farmers to grow the number of the surfaces cultivated with this plant, well above the national culture rotation requirements.

Sunflower is also an important plant from the agro phytotechnique point of view, considered a good forerunner for other cultures that doesn't present the risk of common diseases. Since sunflower culture has become a risky culture in terms of attacks of the pathogen agents, whose incidence and virulence is getting higher year after year, we considered it appropriate to conduct a study on sunflower micromycetes attack that can cause serious damage to the culture.

Through the research conducted in doctoral thesis on the pathogens of sunflower, we believe that we managed to bring a modest contribution to knowledge about the reaction of the sunflower hybrids and zoning them in similar conditions to those analyzed in Fetesti, county of Ialomita. Also, research on micromycetes attack on sunflower inform farmers on attacking ways and their implications in implementing quality indicators of sunflower seeds. We believe that research conducted come to support breeders in order to create new genetic material with resistance or high tolerance towards micromycetes detected attacks.

Studies conducted to develop the doctoral thesis entitled **"Research on diseases of sunflower hybrids grown under Fetesti area, Ialomita county"** were conducted in the

experimental field of location "SC Agrofarm" Fetesti, Ialomita county. Research on identifying spectrum of pathogens, phytotechinque analyze on seeds quality, determinations on the biology of pathogens, behavior of the analyzed hybrids, the clinical picture of disease, determinations regarding the particularities germination were carried out in the Laboratory of Phytopathology of the Faculty of Agriculture and Veterinary Medicine in Bucharest and in the Central Laboratory for quality of seeds and planting material in Bucharest.

Considering the economic importance of the sunflower, the research aimed to identify pathogens in the experimental field where research was conducted, aimed at commercial sunflower hybrids resistance at the pathogens attack and their influence on production and oil concentration. Among the reasons which led to these researches may be included the following:

- the necessity to identify pathogens spectrum frequencies in the area of research and study the level of attack on hybrids;
- the necessity of increasing the range of hybrids grown in the research area by the selection of the most suitable hybrids in similar conditions with the experimental period;
- the necessity to know the frequency of the micromycetes investigated and the effect of the attack on the yields of sunflower and seed indices;
- the necessity to study the efficacy of treatments applied at the sunflower vegetation;
- the necessity of studying the evolution, dissemination, biology of detected pathogens ;
- the necessity of studying the pathology of sunflower seeds with production and quality implications;

Thesis research aim was to know the reaction of various sunflower hybrids cultivated in Fetesti, Ialomita county, at the spectrum of common pathogens for this culture in this area of research , using the classical technology applied in the area. Research conducted in experimental field conditions were extended under laboratory conditions.

Thesis research objectives were:

- Diagnosing diseases of the studied sunflower hybrids and identifying pathogens responsible for their occurrence;

- Description of typical symptoms, common in the experimental field;

- Determination of the incidence and intensity of the attack and calculating the attack degree;

- Observations on the response of hybrids on the attack of the identified diseases; determinations on quality indicators of the sunflower seed;

-Influence of the treatments applied to vegetation phase against the identified pathogens

- Influence of the identified pathogen attack and the administrated treatments, on the production of sunflower hybrids monitored in the research area and calculation of the treatments efficiency ; statistical analysis of the results and correlation the pathogen attack with the calculated level of production;

- setting biological parameters to the most frequent pathogens on sunflower achenes;

The biological material used in the researches made in the doctoral thesis was represented by six commercial sunflower hybrids: PR63F73, Nk Adagio, Tistan, MS Oliva, LG.56.31, Clever.

The doctoral thesis has a volume of 160 pages, divided into four chapters, including 24 tables and 68 figures, from which 20 are tables and 57 original figures.

Chapter I, entitled "Knowledge stage in sunflower diseases" was done on the basis of extensive documentations having as bibliographical sources textbooks, Phytopathology books , specialist publications and scientific articles in the field of sunflower protection , commercial catalogs of the seed producing companies and codices and current information from internet sites, accessed through FAOSTAT, Ministry of Agriculture, Romanian Statistical Yearbook 2015 etc. This chapter presents the current state of knowledge on national as well as international level regarding sunflowers diseases, importance of cultivating sunflower and state of sunflower culture worldwide and in Romania, importance and area of spreading of pathogen agents, their system as it is known in the literature, epidemiology and concepts of disease ecology and data on prophylaxis and disease therapy . The information presented is accompanied by suggestive images.

In Chapter II, entitled "Presentation of the natural environment in which the research took place," is presented the organizational frame of the researches as well as the characterization of climatic conditions of the years of experimentation.

Chapter III - "Material and methods of research" - includes descriptions and organizing the experiences, work methodology, calculation formulas, the biological material used in experimentation and the equipment used for carried out tests.

Chapter IV - "Results" - includes the results regarding the attack of micromycetes of sunflower hybrids studied in the research location, Septoria helianthi, Puccinia helianthi, Diaporthe helianthi and Sclerotinia sclerotiorum, the influence of treatments upon their attack and the production obtained, the effectiveness of treatments applied. In this chapter are presented determinations performed in vitro of specific micoflora seeds, establishing biological parameters of identified fungus determinations regarding sunflower achenes germination specific features, influence of the attack regarding seed production and quality parameters. The results are interpreted statistically.

Chapter V "Conclusions and Recommendations", presents the conclusions and recommendations resulted from the conducted researches, after analysis and data processing, assessment and observations performed in the experimental field and in the laboratory during the testing years.

Studies and researches regarding the behavior of some hybrids to the attack of pathogens led to the following conclusions:

- Observations regarding the clinical board of detected diseases confirms the characteristic symptomatology. In the case of Sclerotinia sclerotiorum attack was observed that there are situations in which the attack can quickly evolve from the base of the plant to calathidium with the forming of the characteristic mycelium , in this case, the mycelium developed only the ends of the affected plants, the base of the plant and calathidium which denotes a high virulence of the pathogen;
- Septoria attack recorded the highest value of the attack grade at Tristan Clever hybrids at which the conditions of year 2014, the attack value was 8.8% and 5.6%. It was noted the high frequency of pathogen Septoria helianthi with values of 80% in Clever hybrid and F = 70% in Tristan hybrid;
- Low levels of septoria attack were determined at hybrids MS Oliva and LG 56.31 in which, in the backround of year 2014, the attack recorded values below par. Low levels of Septoria attack were noted in untreated version, and at hybrids NK Adagio and PR63F73 in which GA = 1.3% and GA= 1.65%; In the background of 2014 the

version without treatment in vegetation, micromycetes Puccinia helianthi was present in hybrids PR63F73, Tristan and Clever with values between 0.26% PR63F73 hybrid and 2% hybrid Clever. Hybrids NK Adagio, MS Oliva and LG 56.31 were free from the attack of fungus Puccinia helianthi . Application of treatments with Painter(Pictor) product (0.5 l / ha) proved effective in terms of 2015 to combat the fungus Puccinia helianthi in hybrid Tristan (E = 86.6%), LG 56.31 with E = 73.5% PR63F73 (E = 64.5%) and Clever (E = 60%);

- Sclerotinia sclerotiorum fungal attack frequency was 4% and 5% at Clever and LG 56.31 hybrids, under the experimental conditions of the year 2014 . The attack of fungus Sclerotinia sclerotiorum was not determined at hybrids NK Adagio, MS Oliva, Tristan and PR63F73; Aplication of fungicide treatments Painter(Pictor) (0.5 l / ha) reduced pathogen attack in terms of 2015, eliminating attack of white rot (Sclerotinia sclerotiorum) confirming an efficiency of 100%;

- Microbial load of sunflower achenes was made up of specific fungus seeds: Alternaria spp., Stemphylium spp., Rhizopus spp., Aspergillus spp. On hybrid Clever's achenes was detected the presence of Fusarium spp fungus. Quality Ratios of seeds were superior at the samples from treated versions at all hybrids analyzed

- The results obtained from the performed investigations were valued in 3 articles published in professional journals indexed in international databases, category B + and ISI. The bibliography of the doctoral thesis includes 196 sources selected from t Romanian and international professional literature (magazine articles from professional journals, professional books, Internet portals, scientific papers).

The thesis adds major and actual contributions in the field of sunflower protection by data regarding this plant diseases and the possibilities of their control, in the context of climatic conditions during testing and investigated hybrids. Researches performed in the thesis provide an interdisciplinary research of sunflower pathology, phytotechnical analyzes regarding the quality of the seed, determinations regarding the biology of pathogens, behavior of the analyzed hybrids, the pathography of diseases common in sunflower under the area of research, results that can be completed with new data and the interesting results of specialized fundamental research and agricultural practice

The thesis contains data on sunflower hybrids of foreign origin, and the obtained results will be used to expand the range of hybrids grown in the Fetesti area, Ialomita county..