SUMMARY

Key words: wheat, *Tilletia,* artificial infection, resistance

Wheat is currently the most important cultivated crop with a large importance in the food industry. The extended areas sown with wheat and the attention that is given for this crop is due to: the high content of carbohydrates and proteins from the seeds, the ratio between those which correspond with human organism, long preservation of the seeds, high ecological plasticity and possibilities of integral mechanization of the culture (Axinte et al., 2006).

The success of the cereal cultures is often conditioned by the appearance of different pathogens that, through their attack can produce the decrease of the production potential of the cultivated species under the level of the ensured agricultural conditions. In many cases the yield losses can be estimated (Hulea et al., 1975; Bărbulescu et al., 2000) having values of 10-15% from the potential harvest but sometimes can be higher compromising the all cultures on big areas.

Trough the wheat diseases, the most popular disease nowadays id dwarf bunt (*Tilletia controversa*), common bunt (*Tilletia spp*.) and head blight (*Fusarium spp*) which can produce significant yield losses (Goates, 1996).

This pathogen that produce common bunt, attacks the young wheat plants but the symptoms are not clearly shown until after heading (R.D. Wilcoxson and E.E. Saari, 1996). Due to the large area cultivated with wheat in our country it is important to give a special attention to this disease.

The doctoral thesis named **"Contributions regarding the study of the parasitic and saprophytic microflora from the wheat culture in Moldavia, with special attention at the *Tilletia* genus"** is dived in two parts and has five chapters.

In the first part is presented the bibliographic study which comprises the description of the pathogens from *Tilletia* genus and the general aspects regarding the research methods used for study them and the second part comprises the description of the natural condition where the researches were made, the used material and research methods and the obtained results.

Chapter I – **The actual stage of researches regarding the pathogen *Tilletia sp***. comprises a large documentation about the description of the pathogens from the *Tilletia* genus, the taxonomy, morphology, life cycle and the symptoms that are produce by them. In this chapter are also presented the main research methods used for the study of this pathogens and the actual stage of researches made in our country.

The *Tilletia* genus is a part of the *Tilletiaceace* family and is characterised by the fact that the teliospores by their germination usually form a aseptates promycelium where is formed a single generation of primary sporidia which can be fusoformis of filiformis (Dumitraş Lucreţia, 1991).

The taxonomy of the *Tilletia* species was study by many authors and after a large number of studies regarding the classification of this species, nowadays is accepted the classification> *Tilletia caries* (DC.) Tul. (sin. *T. tritici*), family *Tilletiaceae,* order *Ustilaginales,* classs *Teliomycetes,* subphylum *Basidiomycotina* (Viorica Iacob, 2002).

Chapter II – **Description of the natural conditions where the researchers were made** presents information about the topography, vegetation and soil from the area of Ezareni farm and also the climatic condition from the experimental years.

The experiments were placed at the Ezareni farm from USAMV Iassy in two agricultural years (2011-2012 and 2012-2013). In the agricultural year 2011-2012, the temperatures exceeded the multiannual average with $1,1^0$C and the precipitations recorded negative aberrations almost in every month compared with the multiannual average, this year being considerate droughty.

In the agricultural year 2012-2013, the mean temperatures recorded values with $0,9^0$C bigger than the multiannual average and the precipitations recorded positive aberrations in every month compared with the multiannual average, this year being consider a good year for the wheat culture.

In chapter III are presented the objectives, the material and the research method which conducted to the elaboration of the doctor thesis. The main objective of the doctoral thesis is the evaluation of the resistance of 24 wheat varieties at the common bunt pathogen. For this, the researches were concretized in:

- The resistance evaluation of 24 wheat varieties provided from different EU countries and Romania by artificial infection with *Tilettia* spp in laboratory;
- The resistance evaluation of the studied varieties at other pathogens in conditions of artificial infection with *Tilletia* ssp in field in the agricultural years 2011-2012 and 2012-2013;
- Establishing the prevent and control measures of the pathogens from the wheat cultures.

The biological material used in the researches was 24 wheat varieties originating from Romania and import. This varieties were provided by ITCSMS from Iassy and Vaslui areas.

For the artificial of the wheat kernels with teliospores of *Tilletia caries* (DC.) Tul. we used probes with infected spikes provided by The Phytosanitary Directions from Covasna, Valcea and Vaslui. The researches from the laboratory were made in The Research Laboratory from Phytopatology Discipline form USAMV Iassy.

In order to evaluate the resistance of the studied material at the pathogen *Tilletia caries*, the wheat varieties were cultivated in the field in the agricultural years 2011-2012 and 2012-2013 at the Didactic farm Ezareni.

The experience was place in both year after randomized complete blocs with 4 repetitions. For placing the experiments in the field we followed the experimental technique rules and we applied the specific culture technology of the wheat.

During the vegetation period, it were made observations and measures regarding:

- The frequency of the infected spikes;
- Number of tillers;
- Plant height;
- Number of infected kernels.

After the evaluation of the resistance of the studied wheat material with *Tilletia caries* (DC.) Tul., another study objective of our researches was to identify other pathogens that appeared in the experiments during the two agricultural years.

For this purpose it was necessary the realisation of a macroscopic study of the plants during the vegetation period, sample collection and identification of appeared pathogens. For each identified disease of the studied cultivars we determined: the frequency (F%), intensity (I%) and the attack degree(GA%).

Chapter IV – Results and discussions present the obtained results after the research activity during the doctoral studies. This is divided in more subchapters and presents the obtained results of the resistance evaluation of 24 wheat varieties at the artificial infection with *Tilletia caries* (DC.) Tul in the two agricultural years and identification of other pathogens that appeared in those years.

The climatic conditions from the year 2011-2012 characterized by low temperatures at the sowing date and the long period without precipitations were not favourable for appearance of the pathogens in the wheat culture.

Regarding the infection with *Tilletia caries* (DC.) Tul. from the agricultural year 2011-2012 it can be concluded:

- The frequency of the infected spikes had values of maximum 15%;
- The number of kernels in spike was bigger at the infected variants than at the control variant uninfected;
- The plants from the infected repetition were smaller than the control variant;

- The number of tillers was bigger in the infected variants where the attack degree with Tilletia sp., was higher.

After the observations that were made in the field experience fom the Ezareni Farm in the agricultural year 2011-2012, the attack of mildew, fusarium head blight and wheat rust had different attacks degree:

- In the case of the mildew attack, the highest value was recorded at Glossa variety (6.25%), the other studied varieties showing no characteristic symptoms for this disease. For this disease, it was observed that the most affected varieties were those originating from our country.
- Regarding the attack degree of the fungi from *Septoria tritice* Rob. et Desm., a higher infection was observed at the Arlequin variety with a value of 12.75%;
- The attack of *Puccinia recondita* Rob. et Desm. From the agricultural year 2011-2012 was small with maximum values of the attack of 10%, except of Gruia variety that recorded a value of 18.25%;

The climatic condition from the agricultural year 2012-2013 allowed the normal growth of the wheat plants and also had ensured some favourable conditions for the infection with the pathogen *Tilletia caries* (DC.) Tul..

Analysing the obtained data from the agricultural year 2012-2013 regarding the infection with *Tilletia caries* (DC.) Tul. it can be concluded that:

- The infection frequency had recorded the maximum value of 58.2%;
- The number kernels from the spike were higher at the infected variants than at the control variants;
- The plants from the infected variants had a bigger height than the plants from the control variant;
- The number of tillers was bigger at the variants where the attack with Tilletia sp. was higher;
- In the conditions of the agricultural year 2012-2013 it was observed a large variability of the resistance of the studied wheat varieties to *Tilletia caries* (DC.) Tul..

Regarding the attack of mildew, fusarium head blight and wheat rust, from the observations made in the agricultural year 2012-2013, it can be observed that the attak was different for each pathogen.

For the pathogen *Blumeria graminis* f. sp. *tritici* March, the most resistant cultivars proved to be „Kiskun Serina", „Andalou", „ Crina" that recorded values of the attack degree between 1-5%. The most sensitive cultivar was „Ariseşan" which had a value of 15.17% of the attack degree.

Regarding the attack of the pathogen *Septoria tritici* Rob. et Desm, the most resistant cultivars proved to be "Arieşan", "Arezzo", "GK Kalasz", "Exotic", "Boema", "Dropia", which recorded values of the attack degree under 2%. The most sensitive cultivar for this proved to be "Antonius" with a value of 6.1% of the attack.

For the pathogen *Puccinia recondita* Rob. et Desm. , the most sensitive varieties proved to be "SO 207", "Arlequin" and "Kiskun Gold" with values of the attack degree of 14-17%. A good resistance to this disease proved to have soiurile "Arieşan", "Arezzo", "GK Kalasz", "Exotic", "Boema", "Dropia" which recorded values of the attack degree between 1 an 25.

About the two experimental years we can affirm that in the case of the agricultural year 2011-2012, the climatic conditions were not favourable for appearance of the pathogens, especially *Tilletia caries* (DC.) Tul. and the agricultural year 2013 was favourable for the pathogen.

Regarding the morphological traits that were studied, it can be observed that in the agricultural year 2012-2013 the recorded values were higher at the most studied varieties than those recorded in the year 2011-2012, these values being influenced by the climatic conditions from the two studied years but also by the infection with *Tilletia caries* (DC.) Tul.

The attack of the other observed pathogens were different in the two years, the pathogen *Blumeria graminis* f. sp. *tritici* March being present at six cultivars in the year 2011-2012 and 10 cultivars in the year 2012-2013.

The pathogen *Puccinia recondita* Rob. et Desm. Was present at the most of the studied varieties in both experimental years, with values of the attack of 0.3-18.8% in the year 2011-2012 and 0 -17% in the year 2012-2013.