PHD DISSERTATION

„Contributions to the study of biology, ecology and control of principal pests of cereal crops in the conditions of Vaslui County”

Doctoral student:Eng. PĂUNEȚ Petru
Doctorate coordinator: Prof. TĂLMACIU Mihai PhD.
Prof. FILIPESCU Constantin PhD.

Cereal grains, especially wheat is the most important cultivated plant, the most widespread in the world, cultivated in over 100 countries and is a leading commercial source. The importance of wheat is given by:

• the chemical composition of grains and the ratio of carbohydrates and protein in relation to body requirements;

• high ecological plasticity, being grown in different climates (subtropical, mediteranean, oceanic, continental steppe) on different soil types as fertility level,

• the possibility of complete mechanization of crop production and obtaining cheap;

• can storage, transport and storage without altering.

Cereal straw uses are many and varied. The berries are used for a range of milling products which are manufactured a wide assortment of breads, pasta, pastries and biscuits which are staple foods for 35-55% of world population, providing 50-55% of calories consumed throughout the world, together with other cultivated cereals.

Following processing of large wheat mills resulting large amounts of bran, which is a valuable concentrates (rich in proteins, fats and minerals) and high in vitamins containing germs, which is a natural polyvitamin but uses lipids with cosmetics.

Straw remaining after harvest can be used for cellulose, feed or bedding volume for various types of animals, organic fertilizer after composting period as such or incorporated into soil after harvest, and by briquetting can be used as fuel. Agricultural importance is given by the

full mechanization of culture, early release of land and summer tillage are possible, being a good run for most crops, after the early varieties, the siting of successive crops in some areas.

Addressing the world food problem depends directly and decisively increasing agricultural production through rational use of productive resources and technical and social modernization agriculture - the main branch of the global food economy. Therefore the effort of all countries is facing increasing food availability of mankind.

Agriculture is a branch of material production, the plant with green and under the "guidance" human transformation is the kinetic energy of the sun, the energy potential - organic matter, the only form of energy available to human and animal body, is the basic branch national economy which provide raw materials for food and consumer goods industry.

In current conditions, increased production of cereals and especially wheat production is possible only through intensive culture system by applying modern technology to work and soil fertility in accordance with the requirements of cultivated varieties, irrigation, prevention and control Integrated disease and pest, weed, through mechanization, to ensure timely execution of work in optimal conditions.

Technological particuliarities of cereal grain crops are determined by the diversity and complexity of agro-pedo-climatic factors that contribute to achieving higher yields in terms of quantity and quality.

In the last decade due to changes in land structures, most farms in the country and especially in Moldova, have done the necessary investments to implement modern technologies recommended by experts in research and education units, for which serious disturbances occurred bio the main crops namely weed infestation increasing emergence, spread and growth potential to attack many species of pathogens and pests, emphasizing particularly cereals bugs which caused real disasters in wheat crops in Moldova the period 1995 to 1997. Given these negative aspects, we propose that in terms of research area Husi - Vaslui to address the following issues:

- mapping of the order *Coleoptera* pest namely *Zabrus tenebrioides* Goeze – family *Carabidae* (corn ground beetle); *Oulema (Lema) melanopa* L. (cereal leaf beetle); *Chaetocnema arridula* Gyl. (cereal stem flea beetles); *Phyllotreta vittula* Redt. (barley flea beetle) – family *Chrysomellidae*; *Anoxia villosa* Gyll. (scarab beetles); *Melolontha melolontha* L. (common cockchafer); *Anisoplia austriaca* Herbst.; *Anisoplia segetum* Herbst.; *Anisoplia agricola* Poda (scarab beetle cereals); *Rhizotrogus aequinoctialis* L. (april beetle); *Amphimallon solstitialis* L. (european june bug) – family *Scarabaeidae*; *Agriotes obscurus* L.; *Agriotes lineatus* L.; *Agriotes ustulatus* L. (Striped elaterid beetle) – family *Elateridae*; *Opatrum sabulosum* L. (darkling beetle) – family *Tenebrionidae.*

- contributions to the study of biology, ecology, pest plants and how contested the main pest in cereals

- contribute to the knowledge structure carabide species and their analysis of environmental parameters (abundance, constancy, dominance and index of ecological significance) in cereal grain crops

- agrophytotechnical integrated control measures, physical, mechanical, biological and chemical.

During the research was carried out observations of the dynamics of the main pest of cereal crops thus: In 2005, in Vaslui cereal crops were reported more damage, as follows: The wheat and barley crops :

- *Anisoplia spp* (scarab beetle of cereals) where there has been a weak attack, the number of plants being contested in 5% ,

- *Cephus pygmaeus* (wasp straw), which also saw a weak attack, percentage of attacked plants with values between 2 and 5% - bugs,

- genera belonging *Eurygaster* and *Aelia*, had a low to middle attack, occurring in less than two examples/m^2 culture medium,

- red worm of the straw (*Haplodiplosis marginata*) was detected sporadically in cereal crops, attack almost completely absent,

- Trips wheat (*Haplothrips tritici*) recorded densities of individuals ranging from 5 to 30 copies on average/ear, being weak attack,

- oats beetle (*Lema melanopa*) produced 2-5% damage to plants, attack weak beings,

- Green scale grains (*Schizaphis graminum*), recorded a weak attack, less than 25% attacked plants ,

- beetle hunchback (*Zabrus tenebrioides*), had an attack of 5% attacked plants, which is a weak attack,

- Flies cereals *(Mayethiola destructor, Phorbia spp, Oscinella Frit*) had a weak attack to the middle, with values ranging between 2-5% attack and 20 to 24% on corn crop,

- maize western worm (*Diabrotica virgifera virgifera*), it was reported,

- *Heliothis armigera*, showed a weak attack, plants being contested in 5-14%;

- Sallow beetle (*Opatrum sabulosum*) had values between 2-4 samples/m^2 attack is low ,

- *Ostrinia nubilalis* was below 3% attacked plants, the attack is weak ,

- Green scale of maize (*Rhopalosiphum maydis*), had less than 10% attacked plants, the attack is weak, - *Tanymecus dilaticollis*, the attack vut values between 3 and 20%, while the weak-attack by the powerful medium were also detected in 2005 cereal crops and pests such as excessive hunger ,

- genus *Agriotes* species (cockroaches firecrackers, wire worms), which produced little damage to corn crop,

- *Citellus citellus*, which showed a weak attack on wheat crop and,

- *Cricetus cricetu*s (hamster), which showed a weak attack on wheat crop.

As regards the structure and dynamics of populations collected carabide cereals, observations during 2006-2007, the situation is as follows:

In 2006 the species with the largest number of specimens were *Zabrus tenebrioides* Goeze with 102 copies representing 27,06% of the total; followed by species *Harpalus distinguendus* Dej. 63 specimens representing 16,72% of total; *Pseudophonus rufipes* Mull. 53 specimens representing 14,06% of the total; *Harpalus tardus* 50 specimens representing 13,26% of the total; *Harpalus aeneus* F. 44 specimens representing 11,67% of the total; *Ophonus azureus* F. 32 specimens representing 8,49% of total. Other species had a much smaller number of specimens, with a number of four species (*Bembidion lampros* Herbst., *Metabletus foveatus* Fourcroy, *Pterostichus koyi* Dejean., *Notiophilus rufipes* Curt.) who had only one specimens.

In 2007 the species with the largest number of specimens collected were: *Harpalus distinguendus* Dej. with 58 specimens representing 16,81% of the total; followed by species *Zabrus tenebrioides* Goeze 55 specimens representing 15,94% of the total; *Harpalus aeneus* F. in 52 specimens representing 15,07% of the total; *Harpalus tardus* Canvas. 47 specimens representing 13,62% of total; *Pseudophonus rufipes* Mull. 42 specimens representing 12,17% of total; *Amara aenea* Dejean 29 specimens representing 8,41% of total. Other species had a much smaller number of specimens, with a number of eight species (*Pseudophonus griseus* Panz., *Harpalus rufus* Brüngg., Ophonus sabulicola Panz., *Amara eurynota* Panz., *Amara ovata* F., *Metabletus foveatus* Fourcroy, *Pterostichus unctulatus* L. *Calathus ambiguus* Payk.) who had only one specimens.

With regard to the subfamilies and genera belonging carabide species collected during the observation, noted the following: In 2006 were collected 377 specimens belonging to 17 species carabide, 12 genera and 6 subfamilies, family *Carabidae*. In 2007, 24 species were collected carabide, belonging to 6 genera and 12 subfamilies, family *Carabidae*, with a total of 398 copies.

Integrated pest management in grain crops may be made by applying several methods namely agrophytotechnical methods, physical-mechanical, biological, chemical, etc. Chemical method of control is the most used chemical treatments and is only intended to use warning and product group III and IV toxicity, useful to protect wildlife.

Thus, in our research we followed the dynamics of *Eurygaster sp*p spawns parasitization by the wasp egss *Trissolcus grandis* Thoms., the wheat crop during 2004-2006. In three villages

in the area of research (Husi, Vaslui, Bârlad) were conducted three surveys were analyzed by 100 plants, the percentage of parasitized ponta in this period is between 19% (2004) and 28,9% (2005). The highest percentage of parasites was observed in the Vaslui in 2005 and the lowest in the Husi in 2004.

To assess the structure, dynamics and evolution of harmful bugs attack grain observations were made in the research period from 2004 to 2006. Were systematically executed in the autumn and spring surveys, frame metric 0,5 x 0,5 m in a poll a total square. The data obtained shows that the specimens were collected from 3573 *Eurygaster sp*., namely: 1564 specimens in 2004 with an average density per square meter of 8,6 specimens, 757 specimens in 2005 with an average density per square meter of 4 2 specimens, 1252 copies in 2006 with an average density per square meter of 6,9 specimens.

In 2007, based on observations on the biology and ecology of the pest in cereal crops have been following the effectiveness of insecticides applied to control their products we tested these products on a scheme application but treatments against grain bugs and other pests, depending on the time of their pest and phenological stages of wheat crop in 2007, when I applied chemical treatments.

Regarding the control, treatments were performed for seed treatment products: Tirametox 90 PTS - 3 kg/t seed, Gammavit 85 - 3 kg/t seed; Vitalin 85 PTS - 3 kg/t seed; Procarb - 3 kg/t seed; Supercarb - 3 kg/t seed, Gaucho 70 WP - 3 kg/t seed, Cruiser 350 CS - 10 l/t seed, Promet 400CS - 25 l/t seed; Mospilan WP 70 - 50 kg/t seed.

During the growing season were applied two treatments: first treatment last leaf emergence and early secondto form ear.

Regarding the effectiveness of chemicals in the final phase leaf emergence in 2007 was used products: Fastac 10 EC (0,2l/ha), Karate 2,5 EC (0,3l/ha) şi Fury 10 EC (0,1l/ha); Actelic 50 EC (1,0l/ha), Ecalux 25 EC (1,5l/ha), Sinoratox 35 EC (3,0l/ha) şi Sumithion 50 EC (1,0l/ha); Trebon 30 EC (0,250l/ha) şi Regent 200 SC (0,075l/ha). Best efficacy had an products Sinoratox 35EC (95,6%), Regent 200 SC (94,5%), Sumithion 50 EC (93,8%) and Trebon 30 EC (92,0%).

Earyng wheat during early treatments were applied with different chemicals, namely: three products of synthetic pyrethroids, organo-phosphorous four products and two products of different groups. Considering the ecological, we can say that the efficacy of synthetic pyrethroid products applied (Fury 10 EC, Fastac 10 EC and Karate 2,5 EC) between 88,3% and 90,3%, preferably as they by note setting action threatening their man, animals and environmental pollution.