

THE HARMFUL FAUNA OF PEAR IN ECOLOGICAL CONDITIONS OF BUCHAREST IN 2012

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Abstract

*Pears provide high-quality fruit for eating or processing, but they are susceptible to wide range of pest. The observation regarding pests from pear culture under ecological agricultural system were made in the orchard of University of Agronomic Sciences and Veterinary Medicine of Bucharest. The aim of the researches was to study the harmful fauna of pear (*Pyrus communis* L.) following a classical methodology. There were carried out observations on pest attack in pear plots, together with determination of the useful insect. The identification of the biological collected material was made in the Entomology Laboratory of Central Phytosanitary Laboratory. Weather conditions during spring season were favorable for certain pest emergence and development. Data on the abundance and diversity of insects found in the canopy of pear orchard are presented. Main species recorded in the spring of 2012 were: *Epitrimerus pyri* Nalepa, 1981 (Acari-Eriophyidae), *Eriophyes pyri* Pagenst, 1857 (Acari-Eriophyidae), *Cacopsylla pyri* (L.) (Homoptera-Psyloidea), *Cacopsylla pyricola* (Förster) (Homoptera-Psyloidea), *Epidiapis leperii* (Signoret, 1869) (Homoptera-Diaspididae).*

Key words: pear varieties, Romania, insects.

INTRODUCTION

The aim of this study is identification of harmful fauna in a pear orchard from south-east of the country, in the condition of this year. It is very well known that *Pyrus* L. species are susceptible to presence of some pest that could lead to a poor and low quality production. A better knowledge of local specific pest of pear and also of beneficial insects and their relationship could prevent or reduce losses and costs for culture.

MATERIAL AND METHOD

Survey was carried in a modern four year old pear orchard planted with the cultivars Fetel Abe, Williams, General Leclerc, Conference, Kaiser, Bankreta, Lukosova, Red Favoritka. Planting distance was 2 m within the row and 4 m between the rows. Two complementary sampling methods, foliar inspections and yellow sticky

traps, were used in this study in our work field. Yellow sticky traps were placed 1,5-2 m above the ground in tree canopy using one trap/15-20 tree. Insect pest and natural enemy populations were monitored weekly. Sampling for harmful organisms and predators began in late March and has continued till end of June. A part of the specimens collected directly from plants or captured by traps were either prepared and mounted on microscopic slides in Hoyer's medium or stored in alcohol 70% or kept dried. In the laboratory, insects were counted and dissection were made with the help of Leica MZ 12₅ stereomicroscope. Microscopic slides were observed at Zeiss Axio Imager. A1. microscope.

RESULTS AND DISCUSSIONS

The structure of insects collected on yellow sticky traps (fig. 1) has comprised a varied number of systematic groups, such as:

Thysanoptera (36%), Diptera (30%), Hemiptera (22%), Coleoptera (5%), Hymenoptera (6,9%) and Lepidoptera (0,1%) (Table 1).

Complementary after examination of detached pear leaves, branches or fruit in laboratory were detected and identified mites, such as: *Eriophyes pyri* Pagenst, *Epitrimerus pyri* (Nal.), *Tetranychus urticae* (Koch), scale insects as: *Epidiasis lepperii* (Signoret), *Quadraspidiotus perniciosus* (Comstock), jumping plant lice insects: *Cacopsylla pyri* (L.), *Cacopsylla piricola* (Föster), aphids: *Aphis pomi* De Geer.

Table 1. Structure of the insect fauna captured by sticky traps, in 2012- spring

Insect orders	No. of specimens	Abundance (%)
Thysanoptera	181	36
Diptera	152	30
Hemiptera	111	22
Hymenoptera	35	6.9
Coleoptera	28	5
Lepidoptera	1	0.1
Total	508	100

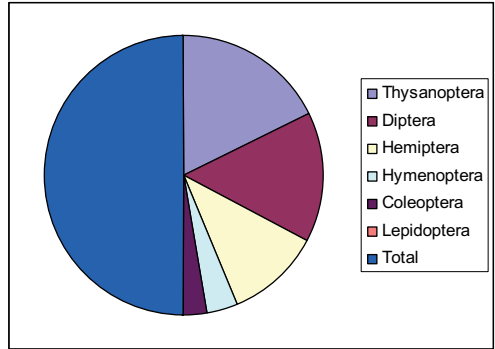


Fig. 1. The structure of insects captured by sticky traps, at USAMV, 2012-spring

Some of the identified insects are very important pest of the pear culture and they can be classified as key factors for orchard development in this year. Having regard the great number of individuals found on trees in this category are name *Epitrimerus pyri*, *Eriophyes pyri*, *Epidiaspis leperii*, *Cacopsylla pyri* and we present some date related with their biology and few morphological characters useful for identification.

Epitrimerus pyri (Nal.) with common name pear rust mites occurs in most pear-growing areas of the world. They cause by their feeding discoloration of the leaf tissue, young green twigs or fruit peel as russetting (photo 1). Badly russeted fruit are not suitable for fresh marketing, so this mite could be an important pest for pear. The pear rust mites overwinter under loose bark, in crevices and under the loose scale of dormant bud [7]. The mites feed and oviposit first in the scars of the buds, then move on the leaves and flower receptacles/ young fruit. Feeding of the offspring and subsequent generation leads to browning of undersides of leaves and russet of fruit [7]. These mites have elongate body with two pairs of legs at the anterior end and they are microscopic side (0,17-0.25 mm). Also, they are fusiform and have the prodorsal shield more or less triangular in shape (photo 2). The color is yellowish to brownish-orange [1].



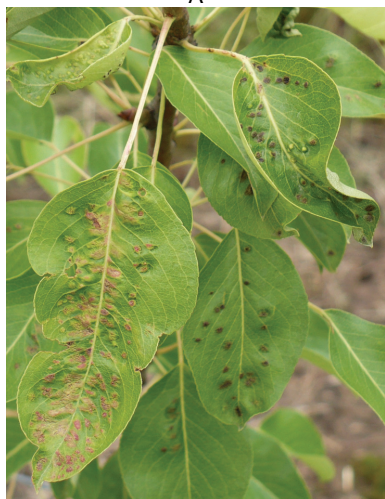
Photo 1. Russeted fruit



Photo 2. *Epitrimerus pyri* (adult)



A



B

Photo 3. Leaves with blisters A (green) and B (red and necrotic)

Eriophyes pyri Pagenst may affects pears, apple, quince and other pomaceous plants [6]. Pear leaf blister mite, also known as pear bud mite is an eriophyid mite which damages flower buds, ovaries and fruits, provoking their decease and falling out during strong infestation. They produce blisters on the undersides of pear and apple leaves, especially younger foliage, usually in a row along the mid vein [1]. The blisters are tiny green swellings at first (photo3A), later expanding and turning pinkish or red on the lower surface of the leaf blade [4]. There may be damage to the fruit which appear as pale pustules around the calyx fruit or sunken, russeted areas and occasionally fruit may drop early [6]. At heavy infestation

the whole leaf becomes covered with blisters and undergoes deformation, finally blackens (photo 3B), withers and is shed. In these formation the leaf tissue between the two epidermal layers becomes spongy and dies [2].



Photo. 4 *Eriophyes pyri* (adult)

The mite is yellowish, slender and worm-like (photo 4), body annulated [9] and measuring 200-230 microns long. The feather claws are 4-rayed; the dorsal shield has a distinct design of a broken median ridge flanked by a pair of longitudinal ridges, with the ends curving and joining posteriorly; the dorsal setae are directed forward [4].

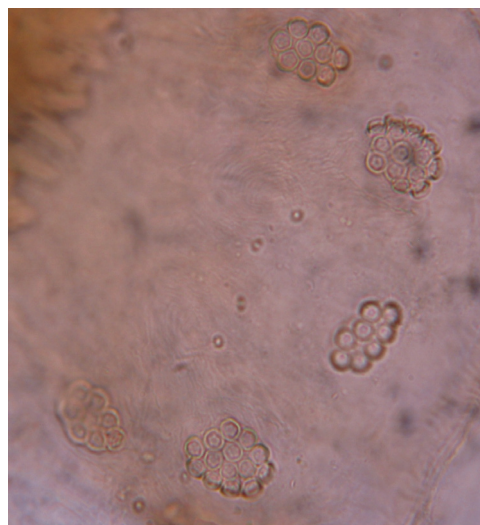


Photo. 5. Groups of perivulvar pores in *Epidiasps leperii*

Epidiaspis leperii (italian pear scale) can be found on twigs, branches and trunk and does not infest leaves or fruit. Adult female presents a scale light grey or white, with a yellow or brown central or sub central exuvium; body light pink, becoming dark red brown toward the end of the egg laying period. The following morphological characters showed on microscopic slide are important for scale diagnosis: median lobes close together, never apically divergent, second lobes tending to be reduced, third lobes never developed as more than a minute point; perivulvar pores in four or five well developed groups (photo 5) [3].

E. leperii causes pitting of the young stems of pear, apple and plum [3]. Heavy infestations cause distortion and death of branches,

especially on pear and plum. At the feeding sites of *E. leperii* plant tissue stops growing, making the branches become deformed so that they break easily at these points [5].

Cacopsylla pyri has winter form dark brown, legs brown with femora very dark brown; end of abdomen also very dark brown, wing veins brown black, wing are held to body in a roof manner and project 0,7 mm beyond body.. Summer form with head, thorax and abdomen sclerites, wing pads, antenna and legs yellow-orange, membranes colorless to pale yellow; dorsal surface of body and wing pads with short simple seta. Circumanal ring of nymphs consist in one row of wax pores, forewing-pad margins with one capitate seta (photo 6C) [8].

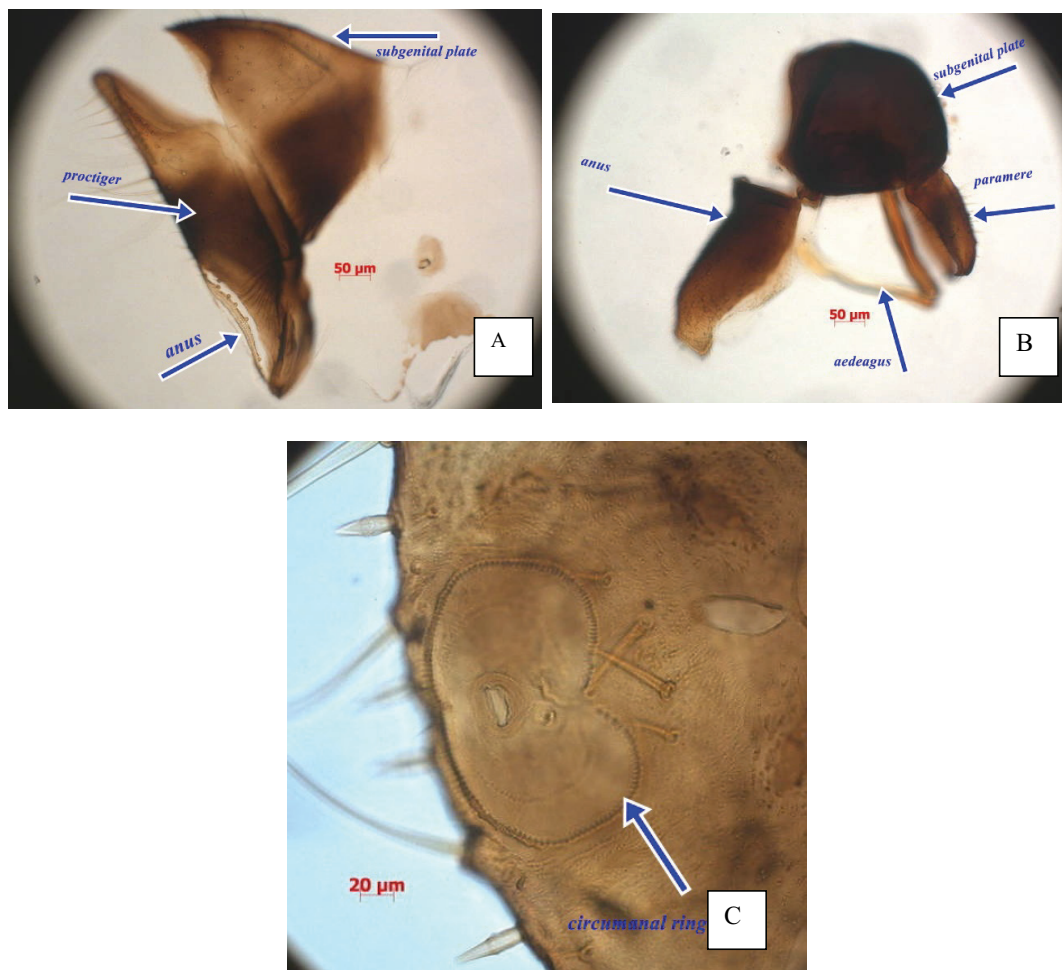


Photo 6. *Psylla pyri*: A female; B male; C nymph

Following our field observation there were identified also beneficial insects in pear tree canopy. They belong to different taxonomic orders, such as: *Dermaptera: Forficulidae* (*Forficula auricularia* L.), *Thysanoptera: Phlaeothripidae* (*Cryptothrips latus* Uzel), *Coleoptera: Coccinellidae* (*Coccinella septempunctata* L., *Coccinella undecimpunctata* L., *Stethorus punctillum* Weise), *Neuroptera: Chrysopidae* (*Chrysopa carnea* Stephens), *Hemiptera: Anthocoridae* (*Orius* spp.), *Acarina: Trombiidae* and *Tideidae*.

CONCLUSIONS

The present study shows that the species diversity is high in pear orchard, placed in south east of the country (Bucharest) and there are harmful insects for pear trees and also beneficial fauna. There were identified pests belong to six systematic groups. Some of the insect could become key-insects for pear culture due to weather's condition, cultivation methods and even period of the time for pest detection. In this spring the problematic pests were eriophyid mites, as *Eriophyes pyri*, *Eptitrimerus pyri*. The beneficial insects present in culture are insufficient for limitation of some specific pest population, so this year having regard especially the attack produced by eriophyid mites should be applied chemical treatments in order to reduce the level of existing population.

ACKNOWLEDGEMENTS

This work was carried out with the support of Central Phytosanitary Laboratory and also financed by POSDRU/CPP 107/DMI 1.5/S/76888 Project.

REFERENCES

- [1] Alford D.V., 1999. *A Textbook of Agricultural Entomology*. Blackwell Science.
- [2] Avizov Z., Harpaz I., 1969. *Plant pests of Israel*. Israel Universities Press.
- [3] Gill R.J., 1997. *The scale insects of California Part. 3. The Armored Scale (Homoptera: Diaspididae)*. California Department of Food and Agriculture Technical Series in Agricultural Biosystematics and Plant Pathology. Number 3.
- [4] Keifer H.H., Baker E.W., Kono T., Delfinado M., Styer W.E., 1982. *An illustrated guide to plant abnormalities caused by eriophyid mites in North America*. United States Department of Agriculture. Agric. Res. Service. Agric. Handbook. No. 573.
- [5] Kostarab M., Kozár F., 1988. *Scale insects of Central Europe*. Akademiai Kiadó. Budapest pp.456.
- [6] Krantz G.W., Walter D.E., 2009. *A manual of acarology, third edition*. Texas Tech University Press.
- [7] Lindquist E.E., Sabelis M.W., Bruin J., 1996. *World crop pests- Eriophyid mites their biology, natural enemies and control*. Elsevier Science B.V.
- [8] White I.M., Hodkinson I.D. 1982. *Psylloidea (nymphal stages), Hemiptera, Homoptera. Handbook for the identification of British Insects*. Vol II. Part. 5 (b).
- [9] Zhi-Qiang Zhang, 2003. *Mites of greenhouses- identification, biology and control*. CABI Publishing.

