

APHIDS (HOMOPTERA: APHIDIDAE) HARMFUL TO THE PLUM TREE (*PRUNUS DOMESTICA* L.) AND THE COMPLEX OF ENTOMOPHAGOUS INSECTS

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INTRODUCTION

The aphids are distinguishable in the fauna of insects in plum tree orchards, especially in mixed orchards from particular gardens in which chemical control is never done, owing to numerical abundance of each species and to a great number of species. The purpose of this study was to identify the harmful aphids to the cultivated plum tree (*Prunus domestica* L.) and the predator and parasitoid species identified in colonies of respective aphids.

MATERIAL AND METHOD

The study material was represented by the species of harmful aphids (Insecta, Homoptera: Aphididae) to the cultivated plum tree (*Prunus domestica* L.) and by the predator and parasitoid insects fauna that feed on the respective aphids. The biological material was collected in 2002, 2003 and 2004 from cultivated plum trees in particular garden, situated on the territory of Iassy and Vaslui counties, in which chemical control and care work was never done. In this way a favorable background to the evolution of species was preserved, keeping the predator-prey and host-parasitoid bio-systems so necessary for the equilibrium of an ecosystem. The samples were collected directly (in bowls of collection), through shaking-up of the young offshoots and with the use of the Möericke trap from 33 locations from Iassy county and 33 locations from Vaslui county. Some adult insects were obtained in laboratory from mummies and pupae collected in the field. The collected and obtained insects were identified and situated systematically after the relations existing between them were established.

RESULTS AND DISCUSSIONS

We identified on *Prunus domestica* L. 14 species of aphids (Figure 1). We signalized in our researches 60,68% from the total of the identified species in the research done until now on *Prunus domestica* L. (Blackman & Eastop, 2000; Ciochia & Boeriu, 1996; Hullé et al., 1998; Nafria et al., 1984). *Ovatus insitus* and *Aphis fabae* are signalized for the first time in science (new relation) as species that infest *Prunus domestica*. The presence of *Ovatus*

insitus specie on the plum tree can be consider as an accident but since we found this species on the plum tree in three different locations determine us to think that sometimes feeds on the plum tree.

From those 14 species of aphids that attack the plum tree, only 5 species of aphids were attacked by predator and parasitoid insects. The species of aphids in the colonies of which we identified predators and parasitoids are: *Brachycaudus cardui* L., *Brachycaudus helichrysi* Kalt., *Hyalopterus pruni* Geoff., *Myzus persicae* Sulz. and *Phorodon humuli* Scrk.

Brachycaudus cardui L. is a dioecic holocyclic species. The primary host is the plum tree, the blackthorn tree and more rarely the sweet cherry tree and the apricot tree. The secondary hosts are very various, but Compositae are preferred (Hullé et al., 1998). The predator insects that we identified in the colonies of *Brachycaudus cardui* are: *Adalia bipunctata*, *Coccinella septempunctata*, *Oenopia conglobata*, *Scymnus subvillosus*, *Semiadalia undecimnotata* (Coccinellidae), *Episyrphus balteatus*, *Metasyrphus corollae* (Syrphidae), *Chrysopa formosa* (Chrysopidae), *Leucopis glyphinivora*, *Leucopis melanopus* (Chamaemyiidae), *Aphidoletes aphidimyza* (Cecidomyiidae), *Cantharis fusca* and *Cantharis livida* (Cantharidae). From parasitoid insects we identified *Aphidius transcaspicus* and *Praon volucre* (Aphidiidae).

Brachycaudus helichrysi Kalt. is a migratory and dioecic species. In the colonies of this species we identified the following predator species: *Adalia bipunctata*, *Coccinella septempunctata*, *Oenopia conglobata*, *Scymnus subvillosus* (Coccinellidae), *Episyrphus balteatus*, *Metasyrphus flaviceps* (Syrphidae) and *Chrysopa flavifrons* (Chrysopidae).

Hyalopterus pruni Geoff. is a migratory and holocyclic species. In some cases fundatrices can develop continually on the plum tree without migrating on other plants. The predator insects identified in colonies of *Hyalopterus pruni* are: *Adalia bipunctata*, *Calvia quatuordecimpunctata*, *Coccinella septempunctata*, *Exochomus quadripustulatus*, *Hippodamia tredecimpunctata*, *Oenopia conglobata*, *Propylaea quatuordecimpunctata*, *Scymnus apetzi*, *Scymnus frontalis*, *Scymnus subvillosus*, *Semiadalia undecimnotata*, *Stethorus punctillum* (Coccinellidae),

Episyrphus balteatus, *Melanostoma mellinum*, *Metasyrphus corollae*, *Metasyrphus latifasciatus*, *Metasyrphus luniger*, *Metasyrphus nitens*, *Paragus tibialis*, *Sphaerophoria scripta*, *Syrphus ribesii*, *Syrphus vitripennis* (Syrphidae), *Chrysopa carnea*, *Chrysopa formosa*, *Chrysopa perla*, *Chrysopa septempunctata*, *Chrysopa flavifrons* (Chrysopidae), *Leucopis caucasica*, *Leucopis glyphinivora*

(Chamaemyiidae), *Aphidoletes aphidimyza* (Cecidomyiidae), *Anthocoris nemoralis*, *Anthocoris nemorum* (Anthocoridae), *Cantharis fusca* and *Cantharis livida* (Cantharidae). The parasitoid insects are: *Ephedrus persicae*, *Ephedrus plagiator*, *Lysiphlebus fabarum*, *Praon dorsale*, *Praon volucre* and *Trioxys angelicae* (Aphidiidae).

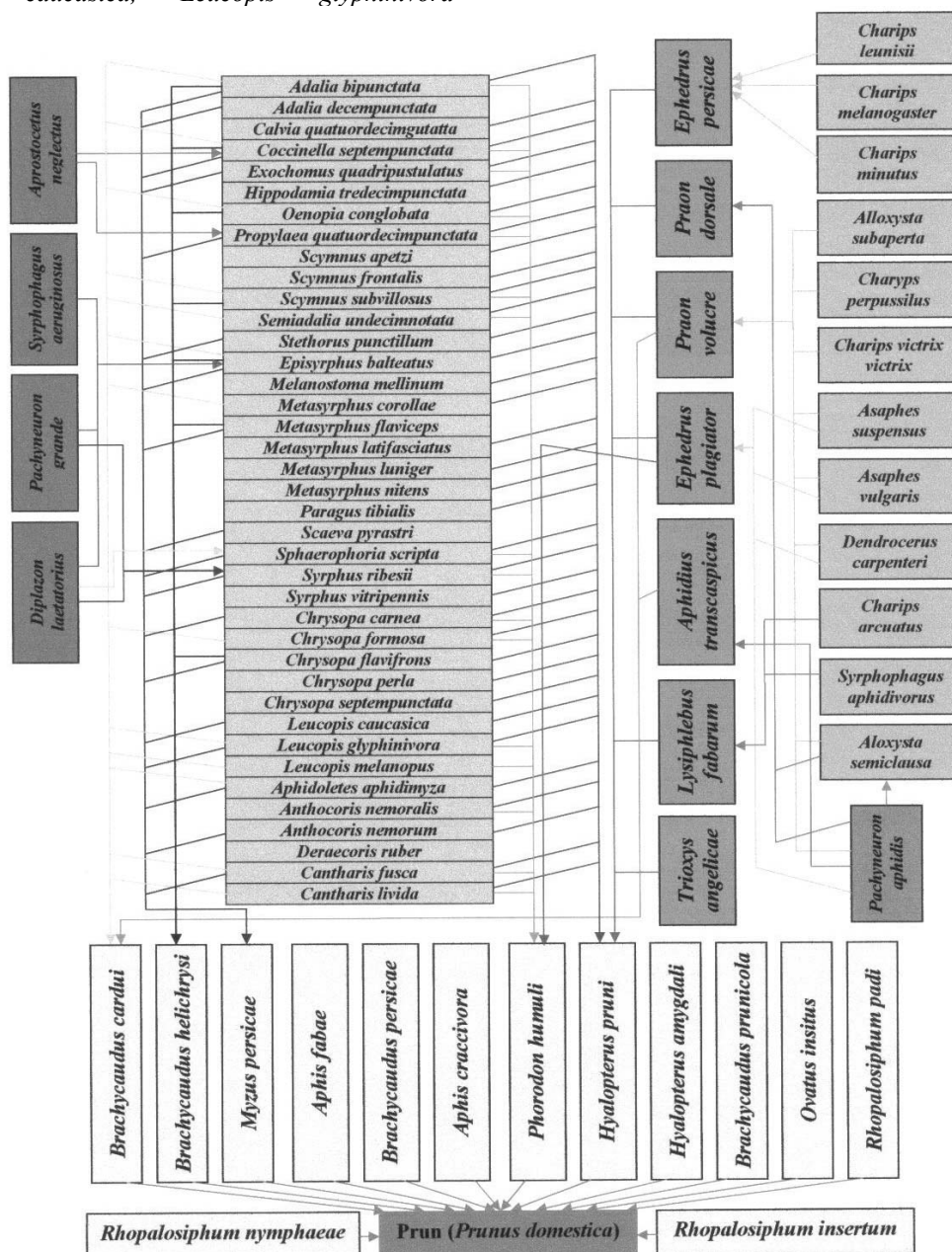


Fig. 1. The trophic network for *Prunus domestica* L.

Myzus persicae Sulz. is a migratory and poliphagous species which attacks over 240 species of plants that belong to 64 botanical families (Săvescu et al., 1982). *Adalia bipunctata*, *Adalia decimpunctata*, *Coccinella septempunctata*, *Exochomus quadripustulatus*, *Propylaea quatuordecimpunctata*, *Stethorus punctillum* (Coccinellidae), *Episyrphus balteatus*, *Metasyrphus flaviceps*, *Scaeva pyrastris*, *Sphaerophoria scripta*, *Syrphus ribesii* (Syrphidae), *Chrysopa carnea*, *Chrysopa flavifrons* (Chrysopidae), *Leucopis*

caucasica, *Leucopis glyphinivora* (Chamaemyiidae), *Aphidoletes aphidimyza* (Cecidomyiidae), *Anthocoris nemorum* (Anthocoridae) and *Cantharis fusca* (Cantharidae) are predator species that we identified in colonies of this aphid.

Phorodon humuli Scrk. is a holocyclic dioecic species (Hullé et al., 1998). The predator species identified in colonies of *Phorodon humuli* are: *Adalia bipunctata*, *Coccinella septempunctata*, *Exochomus quadripustulatus*, *Oenopia globata*, *Propylaea quatuordecimpunctata*, *Scymnus subvillosus*,

Semiadalia undecimnotata (Coccinellidae), *Sphaerophoria scripta*, *Syrphus ribesii* (Syrphidae), *Chrysopa carnea*, *Chrysopa formosa* (Chrysopidae), *Leucopis glyphinivora*, *Leucopis melanopus* (Chamaemyiidae), *Anthocoris nemoralis* (Anthocoridae), *Cantharis fusca* and *Cantharis livida* (Cantharidae). *Ephedrus plagiator* (Aphidiidae) is the only parasitoid species identified in colonies of this aphid.

From pupae of Coccinellidae and Syrphidae collected from plum trees we obtained 4 species of parasitoids. *Aprostocetus neglectus* Dom., was obtained from pupae of *Coccinella septempunctata* L. and *Propylaea quatuordecimpunctata* L. collected from colonies of *Hyalopterus pruni* Geoff. From colonies of *Episyrphus balteatus* De Geer collected from plum trees that exhibited attack with *Hyalopterus pruni* Geoff. we obtained three parasitoid species: *Syrphophagus aeruginosus* Dalm (Syrphidae), *Pachyneuron grande* Thom. (Pteromalidae) and *Diplazon laetatorius* Fab. (Ichniomonidae). Similarly, from plum trees infested with *Hyalopterus pruni* Geoff. we collected pupae of *Sphaerophoria scripta* L. and *Syrphus ribesii* L. from which emerged individuals belonging to *Diplazon laetatorius* Fab. species. From the pupae of *S. ribesii* L. we obtained individuals of *Pachyneuron grande* Thom., too.

In the category of the parasitoids obtained from mummies (parasitized aphids) we identified three categories: primary parasitoids, secondary parasitoids and tertiary parasitoids.

Thus, from mummies of *Brachycaudus cardui* L. produced by *Aphidius transcaspicus* Telenga emerged secondary parasitoids belonging to *Pachyneuron aphidis* Bouché. species. *Ephedrus plagiator* Nees, species obtained as primary parasitoid from mummies of *Phorodon humuli* Scrk., was parasitized by 4 species of secondary parasitoids: *Asaphes suspensus*, *Asaphes vulgaris*, *Dendrocerus carpenteri* and *Pachyneuron aphidis*. *Ephedrus persicae* Frog. species (primary parasitoid) obtained from mummies of *Hyalopterus pruni* Geoff. was parasitized by *Charips leunisii*, *Charips melanogaster* și *Charips minutus* (secondary parasitoids). The most secondary parasitoids were obtained from mummies of *Hyalopterus pruni* Geoff. parasitized by *Praon volucre* Hal.: *Alloxysta semiclausa*, *Alloxysta subaperta*, *Charyps perpussilus*, *Charyps victrix* victrix, *Asaphes suspensus*, *Asaphes vulgaris*, *Dendrocerus carpenteri* and *Pachyneuron aphidis*. *Pachyneuron aphidis* Bouché was identified as tertiary parasitoid, too. We obtained this species from *Alloxysta semiclausa* Kieff. that had parasitized on *Praon volucre* Hal. (obtained from mummies of *H. pruni* Geoff.). *Alloxysta semiclausa* Kieff. and *Pachyneuron aphidis* (secondary parasitoids) were obtained from *Praon dorsale* Hal. (from mummies of *H. pruni* Geoff.). *Charips arcuatus* Kieff. and *Syrphophagus aphidivorus* Mayr (secondary parasitoids) were obtained from

Lysiphlebus fabarum Marshall (from mummies of *H. pruni* Geoff.).

CONCLUSIONS

The trophic network realized for *Prunus domestica* L. following the identification of the species and elucidation of the relations among species, is a very complex network. We identified 14 phytophagous species (aphids), 39 predator species, 7 species of primary parasitoids, 12 species of secondary parasitoids, a species that acts both as secondary and tertiary parasitoid and 4 species of parasitoids of the predator species.

Brachycaudus cardui L. was attacked by 13 predator species and 2 species of primary parasitoids. *Aphidius transcaspicus* Telenga (primary parasitoids) was parasitized by *Pachyneuron aphidis* Bouché (secondary parasitoid).

Brachycaudus helichrysi Kalt. and *Myzus persicae* Sulz. were preferred only by predator species (7 respectively, 18 species of predator insects).

For *Phorodon humuli* Scrk. we identified 16 predator species and only one parasitoid species. This (*Ephedrus persicae* Frog.) was parasitized by 4 species of primary parasitoids.

The richest entomofauna was noted for *Hyalopterus pruni* Geoff. Thus, we identified 34 predator species and 6 species of primary parasitoids. Among primary parasitoids, *Ephedrus persicae* Frog., *Praon dorsale* Hal., *Praon volucre* Hal. and *Lysiphlebus fabarum* Marshall were parasitized by species of insects that acted as secondary parasitoids (3 species, 2 species, 8 species and respectively, 2 species of secondary parasitoids for the species enumerated above).

A special situation was noted for *Pachyneuron aphidis* Bouché species that was identified both as secondary and tertiary parasitoid. As tertiary parasitoid we obtained this species from *Alloxysta semiclausa* Kieff. that had parasitized on *Praon volucre* Hal. (obtained from mummies of *H. pruni* Geoff.).

REZUMAT

Prezentăm în această lucrare speciile de afide dăunătoare prunului de grădină (*Prunus domestica* L.) dar și insectele prădătoare și parazitoide identificate în coloniile respectivelor afide. Pe baza relațiilor trofice stabilite între speciale de afide și insectele prădătoare și parazitoide pe care le-am semnalat hrănindu-se în coloniile acestora, am reușit să realizăm o rețea trofică foarte edificatoare. Este o rețea trofică foarte semnificativă care arată complexitatea relațiilor stabilite într-un ecosistem în care nu s-a făcut combatere chimică și în care nu s-au realizat lucrări de întreținere fitosanitară.

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