

**Aphidiids (Hymenoptera, Aphidiidae) - parasitoids of aphids
(Hemiptera,
Aphidoidea) of Azerbaijan**

Mustafayeva Gulzar Aligeydar

,Institute of Zoology, Azerbaijan National Academy of Sciences, Baku c, Azerbaijan

Abstract: As a result of many years of research have been identified 16 species of parasitoids which derived from aphids for the fauna of Azerbaijan. An annotated list of parasites (Hymenoptera, Aphidiidae), of aphids of Azerbaijan is given for the first time. All the 16 identified species of the Aphidiidae are new for the fauna of Azerbaijan, 3 species of them were indicated for the first time for the fauna of the South Caucasus.

Keywords: aphids, parasitoids, aphidiidae, trophic connections

INTRODUCTION

Among plant pests, aphids (Hemiptera, Aphidoidea) play big role. They live on trees and bushes; they cover all organs - trunks, leaves, branches. Breeding at high speed, they cause great damage to plants, sometimes even lead to their death.

These sucking pests suck the juices out of the plant, cause premature dying and falling leaves, drying of branches, deformation of leaves, fruits and shoots, decrease in the annual growth of plants, the leaves turn yellow, the fruits do not develop to the end and fall out, trees and shrubs weaken. Pests pollute the leaves, result in the appearance of fungi, thus, the metabolism in plants is disturbed. . They strongly impair the agriculture crops, greatly reduce the quality and quantity of crops, sometimes even lead to a complete loss of the latter. When infecting with this pest, the decorative quality of ornamental and forest-park cultures deteriorates.

An important place is given to the biological method of struggle, the use of natural resources of useful entomophages in integrated systems of plant protection from pests and diseases. However, the natural resources - entomophages are little used in integrated plant protection systems against pests. Therefore, it is very important and actual to study the fauna of parasites of aphids of Azerbaijan as a basis for developing ways of their practical application in integrated plant protection from these pests. The



aphids parazitoids aphidiides (Hymenoptera, Aphidiidae) - were not studied before our studies in Azerbaijan.

MATERIAL AND METHODS OF RESEARCH

The material for this article was collected in 1995-2014 years from early spring to late autumn in the regions of Azerbaijan. The collections were conducted during numerous individual expeditions, also during complex faunistic expeditions of the Institute of Zoology, the National Academy of Sciences of Azerbaijan. Parazitoids of aphids were collected in natural and cultural populations by deducing from the hosts, and also with the help of an entomological nets[2,3]. Part of the parasites were mounted by sticking dry specimens on triangles of thick paper and piercing them with entomological pins. For the determining small species of parazitoids were prepared microscopic preparations . Distribution is given by Staru R., Erdelen J., Akhvledian M.P. [1, 4, 5].

RESULTS AND THEIR DISCUSSION

Parasites play a big role in regulating the number of aphids. As a result of many years of research, 16 species of aphids parazitoids have been registered in Azerbaijan. The trophic connections were established between parazitoids and phytophagous - aphids . These data are given below.

The aphidiides of Azerbaijan were not studied prior to our studies. 16 species of aphidiides (Hymenoptera, Aphidiidae), belonging to 9 genera, have been identified for the first time for the fauna of Azerbaijan. All of these species are new to the fauna of our republic. *Adialytus salicaphis* (Fitch.), *Lysiphlebus fabarum* Marchall, *Aphidius rosae* Haliday are noted for the first time for the fauna of the South Caucasus. These species are in the table below and the text are indicated by a sign *.

Table 1.

Trophic relationships of aphidiides (Hymenoptera Aphidiidae) of Azerbaijan
with their aphids hosts (Hemiptera, Aphidoidea)

Family Aphidiidae Genera and species of aphidiides	Species of aphids
Genus <i>Ephedrus</i> Haliday 1. <i>Ephedrus persicae</i> Froggatt	<i>Dysaphis reaumuri</i> Mordv. <i>Dysaphis devecta</i> Walk. <i>Myzodes persicae</i> Sulz .



	<i>Brachycaudus helichrusi</i> K.
2. <i>Ephedrus plagiator</i> Nels.	<i>Hyalopterus pruni</i> Geoff. <i>Aphis fabae</i> Scop. <i>Aphis pomi</i> Deg. <i>Hyalopterus pruni</i> Geoffr. <i>Brachycaudus amygdalinus</i> Schau. <i>Brachycaudus helichryse</i> Kalt. <i>Brachycaudus cardui</i> L.
Genus <i>Praon</i> Haliday 3. <i>Praon volucre</i> Haliday	<i>Myzodes persicae</i> Sulz. <i>Macrosiphum rosae</i> Li <i>Aphis pomi</i> Deg.
4. <i>Praon</i> sp.	<i>Dysaphis reaumiri</i> Mordv.
Genus <i>Adialytus</i> Foerster. 5. <i>Adialytus salicaphis</i> Fitch *	<i>Chaitophorus salicti</i> Schrx
Genus <i>Lysiphlebus</i> Foerster. 6. <i>Lysiphlebus ambiguous</i> Haliday	<i>Aphis fabae</i> Scop. <i>Aphis craccivora</i> Koch. <i>Aphis gossypii</i> Glov. <i>Aphis farinosa</i> Gmel.
7. <i>Lysiphlebus fabarum</i> Marchall*	<i>Aphis evonymi</i> F. <i>Pemphigus lichtensteini</i> Tul. <i>Aphis craccivora</i> Koch. <i>Aphis fabae</i> Scop. <i>Aphis gossypii</i> Glov.
Genus <i>Pauesia</i> Quilis. 8. <i>Pauesia pini</i> Haliday	<i>Cinara pinea</i> Mordv.
Genus <i>Aphidius</i> Nees. 9. <i>Aphidina evri</i> Haliday	<i>Acyrtosiphon pisum</i> Harv. <i>Myzodes persicae</i> Sulz.
10. <i>Aphidius rosae</i> Haliday*	<i>Macrosiphum rosae</i> L.
11. <i>Aphidius colemani</i> Viereck (=A. trascaspicus Telenga)	<i>Hyalopterus pruni</i> Geoff.
12. <i>Aphidius</i> sp.	<i>Aphis punicae</i> Pass.
Genus <i>Diaeretiella</i> Stary. 13. <i>Diaeretiella rapae</i> M.Intosh	<i>Brevicorynea brassicae</i> L.
	<i>Myzodes persicae</i> Sulz.



Genus <i>Lipolexis</i> Foerster. 14. <i>Lipolexis gracilis</i> Foerster	<i>Myzus cerasi</i> F. <i>Brachycaudus cardui</i> L. <i>Brachycaudus amygdalinus</i> Schout. <i>Aphis craccivora</i> Koch. <i>Aphis fabae</i> Scop.
Genus <i>Binodoxys</i> Mackauer. 15. <i>Binodoxys angelicae</i> Haliday	<i>Brachycaudus helichrysi</i> K. <i>Aphis pomi</i> Deg. <i>Aphis craccivora</i> Koch.
16. <i>Binodoxys acalephae</i> Marshall	<i>Aphis farinosa</i> Gmel. <i>Aphis craccivora</i> Koch..

Family Aphidiidae.

Genus *Ephedrus* Haliday, 1833.

1. *Ephedrus persicae* Froggatt, 1904.

Inferred from aphids inhabiting on the pear *Dysaphis reaumuri* Mordv., *Dysaphis devecta* Walk; on the plum *Hyalopterus pruni* Geoffr. and *Brachycaudis cardui* Li. It is a parasite of *Myzodes persicae* Sulz. on the peach; *Brachycaudus helichrysi* Kalt. on the sink. The aphids infected with this parasite, have a black color. It is marked for the first time for the fauna of Azerbaijan.

Distribution: found throughout the world.

2. *Ephedrus plagiator* (Nees, 1811).

It was breed from aphids inhabiting the plum and peach - *Hyalopterus pruni* Geoff; from aphids *Aphis fabae* Scop. on corn and sunflower, from *Aphis pomi* Deg. aphids, living on apple tree branches. It is a parasite of many species of aphids. Parasitises more on aphids from the family Aphididae. It was first noted for the fauna of Azerbaijan.

Distribution: Western Europe, Pakistan, China, Japan, USA, Far East, Central Asia

Genus *Praon* Haliday, 1833

3. *Praon volucre* (Haliday, 1833).

Inferred from aphids *Brachycaudus amygdalinus* Schau., *Brachycaudus helichryse* Kalt, *Brachycaudus cardui* L., *Myzodes persicae* Sulz., *Hyalopterus pruni* Geoffr., Living on peach, apricot, almond (June-October). It was inferred in June-July from aphids *Macrosiphum rosae* Li., Living on rosehips, on pink, from aphids *Aphis pomi* Deg. on the apple



tree. Mummified aphids have a light brown color. They are an internal parasite of some species of aphids from the genera *Aphis*, *Brachycaudus*, *Hyalopterus*, *Macrosiphum*, *Myzus*. It was first noted for the fauna of Azerbaijan.

Distribution: Western European countries, Turkey, India, China, Australia, North America, Russian Federation, Middle Asian and South Caucasian countries.

4. *Praon* sp.

Inferred from aphids *Dysaphis reaumiri* Mordv. Which live on the plum. Mummified aphids have a dark brown color.

Genus *Adialytus* Foerster., 1862.

5. *Adialytus salicaphis* Fitch, 1855

It was bred from aphids *Chaitophorus salicti* Schrk., living on the willow branches. This parasite is a specific parazitoids of the genus *Chaitophorus*. It is noted for the first time for the fauna of the South Caucasus.

Distribution: North America, Korea, Western Europe, Ukraine, Central Asia.

Genus *Lysiphlebus* Foerster, 1862.

6. *Lysiphlebus ambiguus* Haliday, 1834

It was bred from the aphids of *Aphis fabae* Scop, living on beets, tomatoes; pictures of *Aphis craccivora* Koch taken by. living on peas, licorice; *Aphis gossypii* Glov. on a water-melon, cucumbers; *Aphis farinosa* Gmel. living on the willow (*Salix*.). Mummified aphids are of a brown color. This parazitoids infects aphids from the genus *Aphis*. It is a new species for the fauna of Azerbaijan.

Distribution: West, Europe, Egypt, Iran, Israel, Central Asia, Moldova, Ukraine, the southern part of the Caucasus, Georgia.

7. *Lysiphlebus fabarum* (Marchall, 1896).*

It is wide polyphagia. Inferred from the aphids of *Aphis evonymi* F., living on corn; of the aphids of *Pemphigus lichtensteini* Tulg., inhabiting a pyramidal poplar; of aphids *Aphis craccivora* Koch, living on clover; *Aphis fabae*, living on potatoes; from aphids *Aphis gossypii* Glov., living on garden crops - watermelon, cotton. The material was also collected with an entomological net. It is a parasite of the genera *Aphis*, *Brachycaudus*, *Hyalopterus*, *Semiaphis*. There is also information about parasitism on aphids from the genera *Pemphigus*, *Chaitophorus* [1]. Mummified aphids have a black-gray color. These are new species for the fauna of the South Caucasus and Azerbaijan.

Distribution: North Africa, Asia Minor, Australia, Mongolia, Western Europe, introduced to the United States.



Genus *Pauesia* Quilis, 19318. *Pauesia pini* (Haliday, 1834)

This parasite is inferred from the aphids of *Cinara pinea* Mordv., which live on the branches of pine. This parasite is a parasitoid of aphids from the genus of *Cinara* [1]. It was noted for the first time for the fauna of Azerbaijan.

Distribution: Countries of Western Europe, Japan, Moldova, Georgia.

Genus *Aphidius* Nees, 18199. *Aphidius evri* Haliday, 1834.

The Parasites of aphids living on pea *Acyrtosiphon pisum* Harv, come out in June, July. Also from the aphids *Myzodes persicae* Sul., living on tobacco. This parasite mainly infects aphids from the genus *Acyrtosiphon*, also sometimes on the aphids of the genus *Macrosiphum*, *Myzus*, *Brachycaudus*. It is marked for the first time for the fauna of Azerbaijan.

Distribution: European countries, North Africa, China, Taiwan, Ukraine, Moldova, Middle Asian countries. Introduced to the USA for use in the biological method of control.

10. *Aphidius rosae* Haliday, 1834*

It was inferred from the aphids *Macrosiphum rosae* L., living on pink In May and June. It is specific parasite of *Macrosiphum rosae*. Infected parasites of mummified aphids have a light-yellow color. It is noted for the first time for the fauna of the South Caucasus.

Distribution: North Africa, North America, Western Europe, Middle Asia.

11. *Aphidius colemani* Viereck, 1912.

It is inferred from aphids *Hyalopterus pruni* Geoff., Living on a plum, apricot, peach. Also it is inferred from aphids inhabiting the peach tree *Myzus persicae* Sulzer, (May-July). Its mummies are brown color. It was inferred from aphids living on cereals (*Schisaphis gramina*). Parasite *Aphis*, *Brachycaudus*, *Dysaphis*, *Hyalopterus*, *Macrosiphum*. Polyphage. It is a parasite of the genera *Aphis*, *Brachycaudus*, *Dysaphis*, *Hyalopterus*, *Macrosiphum*. These are new species for the fauna of Azerbaijan.

Distribution: Asia Minor, Central Asia, European countries, India, Pakistan, South Australia, introduced in the USA (California), England.

12. *Aphidius* sp.

It was inferred from *Aphis punicae* Pass., living on a pomegranate. Its mummified aphids are black-brown. This is a new specie For Azerbaijan.

Genus *Diaeretiella* Stary, 1960.



13. *Diaeretiella rapae* (M. Intosh, 1855).

There were infected with the parasite of aphid of *Brevicorynea brassicae*, living on cabbage, and aphid *Myzodes persicae* Sulz., on a peach. Polyphage. It is marked for the first time for the fauna of Azerbaijan.

Distribution: all over the world.

Genus *Lipolexis* Foerster, 1862

14. *Lipolexis gracilis* Foerster, 1862

They are inferred from aphids *Myzus cerasi* F. in cherries; from aphids *Brachycaudus amygdalinus* Schout living on almonds; from aphids *Aphis craccivora* Koch, on clover and pea; from aphids *Aphis fabae* Scop, on beans. Mummies of aphids infected with parazitoids have a light-brown color. Parasitizes on the aphids of the genus *Brahhaudus*, *Myzus* and *Aphis*. It is new specie for Azerbaijan.

Distribution: Western Europe, India, Pakistan, Ukraine, the Far East, Middle Asian countries, Georgia.

Genus *Binodoxys* Mackauer, 1960.

15. *Binodoxys angelicae* (Haliday, 1833)

It was inferred from aphids *Brachycaudus helichrysi* Kalt, living on a peach; from aphids *Aphis pomi* Deg. living on an apple tree; from aphids *Aphis craccivora* Koch. living on clover. Mummies are brown color. It was first noted for the fauna of Azerbaijan.

Distribution: Asia Minor, countries of Western Europe, Ukraine, Russia, Kazakhstan, Uzbekistan, Tajikistan, Georgia.

16. *Binodoxys acalephae* Marshall, 1896

It was inferred from *Aphids farinosa* Gmel. on the willow; from the aphid *Aphis craccivora* Koch. to licorice; parasitizes on aphids from the genus *Aphis*. Mummies are light brown in color. These are new species for the fauna of Azerbaijan.

Distribution: Countries of Western Europe, Iran, Ukraine, Russia, Georgia, Kazakhstan, Uzbekistan, Tajikistan, Turkey, Iran, Iraq, China, India, Canada

CONCLUSIONS

1.16 species of afidiides (Hymenoptera, Aphidiidae), aphids parazitoids have been identified for Azerbaijan which are new species for the fauna of our republic. The species *Adialytus salicaphis*, *Lysiphlebus fabarum*, *Aphidius rosae* are first indicated for the fauna of the South Caucasus.



2. Afidiidae belong to 9 genera: The genus *Aphidius* Nees differs, it includes 4 species. The genera *Ephedrus* Haliday, *Praon* Haliday, *Lysiphlebus* Foerster, *Binodoxys* Mackauer, each of them has two species. Genera *Adialytus* Foerster, *Pauesia* Quilis, *Diaeretiella* Stary, *Lipolexis* Foerster have one species. Afidiides *Pauesia pini*, *Aphidius rosae* are monophages, and others are oligophages.

REFERENCES

1. Akhvlediani M.P. 1981. Fauna and ecology of parasites of aphids of Eastern Georgia. Tbilisi: Metsniereba, 104
2. Nikolskaya M.N., Yasnosh V.A.. 1966. Afelinids of the European part of the USSR and the Caucasus. Science, M.-L. : Nauka, 294
3. Tryapitsyn V.A., Shapiro V.A., Schepetilnikova V.A. 1982. Parasites and predators of pests of agricultural. Cultures. L: Kolos, 1, 109.
4. Stary, P. 2006. Aphid parasitoids of the Czech Republic (Hymenoptera: Braconidae, Aphidiinae) Praha: Academia, 430.
5. Stary P., Erdelen C. 1982. Aphid parasitoids (Hym, Aphidiidae, Aphelinidae) from the Yemen Arab republic. Entomophaga., 27,1:105-108.

