

CONTRIBUTIONS TO APHIDIINAE (HYMENOPTERA: BRACONIDAE) FAUNA OF TURKEY WITH NEW RECORDS

Serdar AKAR, Özlem ÇETİN ERDOĞAN*

Trakya University, Faculty of Science, Department of Biology, 22030, Edirne

*Corresponding author: e-mail: cetinozlem@hotmail.com

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Abstract: Samples were collected from eight different habitats by using either a sweeping-net and Malesian trap in Edirne province of European Turkey in the Spring, Summer and Autumn of 2014. A total of six genera and 27 species have been identified. Of these, nine species (*Aphidius eadyi* Starý, Gonzales & Hall, 1980, *A. rosae* Haliday, 1834, *A. picipes* (Nees, 1811), *Binodoxys acalephae* (Haliday, 1833), *Ephedrus persicae* Frogatt, 1904, *Lysiphlebus confusus* Tremblay & Eady, 1978, *Praon abjectum* (Haliday, 1833), *P. pubescens* Starý, 1961, *P. yomenae* Takada, 1968) are new records for the Edirne Aphidiinae fauna and seven of them (*Aphidius smithii* Sharma & Subba Rao, 1959, *A. microlophii* Pennachio & Tremblay, 1987, *Lysiphlebus fritzmuelleri* Mackauer, 1960, *Praon athenaeum* Kavallieratos & Lykouressis, 2000, *P. flavinode* (Haliday, 1833), *P. nonveilleri* Tomanović & Kavallieratos, 2003, *P. uroleucon* Tomanović & Kavallieratos, 2003) are new records for Turkish Aphidiinae fauna.

Key words: Braconidae, Aphidiinae, fauna, Edirne, Turkey.

Türkiye Aphidiinae Faunasına (Hymenoptera: Braconidae) Yeni Kayıtlar ile Katkılar

Özet: Edirne ili Aphidiinae faunasını tespit etmeye yönelik 2014 yılı ilkbahar, yaz ve sonbahar mevsimleri içinde yapılan bu çalışmada örnekler atrap ve Malezya tuzakları kullanılarak sekiz farklı habitattan toplanmıştır. Aphidiinae altfamilyasına ait 6 cins ve 27 tür saptanmıştır. Tespit edilen türlerin 9'u (*Aphidius eadyi* Starý, Gonzales & Hall, 1980, *A. rosae* Haliday, 1834, *A. picipes* (Nees, 1811), *Binodoxys acalephae* (Haliday, 1833), *Ephedrus persicae* Frogatt, 1904, *Lysiphlebus confusus* Tremblay & Eady, 1978, *Praon abjectum* (Haliday, 1833), *P. pubescens* Starý, 1961, *P. yomenae* Takada, 1968) Edirne Aphidiinae faunası için, 7'si (*Aphidius smithii* Sharma & Subba Rao, 1959, *A. microlophii* Pennachio & Tremblay, 1987, *Lysiphlebus fritzmuelleri* Mackauer, 1960, *Praon athenaeum* Kavallieratos & Lykouressis, 2000, *P. flavinode* (Haliday, 1833), *P. nonveilleri* Tomanović & Kavallieratos, 2003, *P. uroleucon* Tomanović & Kavallieratos, 2003) Türkiye Aphidiinae faunası için yeni kayıttır.

Anahtar kelimeler: Braconidae, Aphidiinae, fauna, Edirne, Türkiye.

Introduction

Over 600 species of aphid parasitoids are described worldwide (Yu *et al.* 2012). All members of the subfamily Aphidiinae are solitary and koinobiont endoparasitoid of aphids, and can be considered as important biological control agents (Shaw & Huddleston 1991).

To date, a total of 252 species of Aphidiinae have been reported from the West Palearctic region and 241 species from Europe (Yu *et al.* 2012).

Although some studies have been conducted on the species of Aphidiinae occurring in Turkey, distribution data of this subfamily have been limited to tritrophic records (Düzgüneş *et al.* 1982, Erkin 1983, Karaat & Göven 1986, Avcı & Özbek 1991, Atakan & Özgür 1994, Elmalı & Toros 1994, Özder & Toros 1999, Ölmez & Ulusoy 2003, Aslan *et al.* 2004, El-Malı *et al.* 2004, Güz & Kılınçer 2005, Şahbaz & Uysal 2006).

The first detailed faunistic study of the Aphidiinae fauna of Turkey was carried out by Çetin Erdoğan *et al.* (2008) in the Marmara region of Turkey. They reported a total of 18 species for the region. There are also other studies regarding the Aphidiinae fauna of Turkey. For example, Tomonovic *et al.* (2008) determined eight Aphidiine species from Turkey, and Çetin Erdoğan *et al.* (2010) found 12 species from the Black sea region to date, 47 Aphidiinae species have been recorded from Turkey (Çetin Erdoğan *et al.* 2008, Tomonović *et al.* 2008, Çetin Erdoğan *et al.* 2010, Yu *et al.* 2012).

So far, only 14 species from Edirne and surrounding areas have been listed in the studies of Tomonović *et al.* 2008, Çetin Erdoğan *et al.* 2008 and 2010. The aim of the present study is to contribute to the knowledge of the

Aphidiinae fauna of the Edirne province by evaluating the materials collected from different localities.

Materials and Methods

The study area included 126 localities in Edirne between April and September 2014 (Fig. 1, Table 1). Adult wasps were collected mainly from herbaceous plants in a variety of different habitats such as open habitats, pine forest, oak forest, fruit gardens, clover fields, agricultural fields. Samples were collected by Malaise traps and a standard sweeping net. The specimens were identified using the keys by Stary (1976), Tobias (1995), Tomonović *et al.* (2003) and Kavallieratos *et al.* (2001, 2005). Adult Aphidiinae species from Serbia (provided by Dr Z. Tomonovic) were used as comparison material. Information on the general zoogeographic distribution of Aphidiinae follows Yu *et al.* (2012). All specimens are deposited in the collection of the Department of Entomology, Trakya University, Edirne, Turkey.

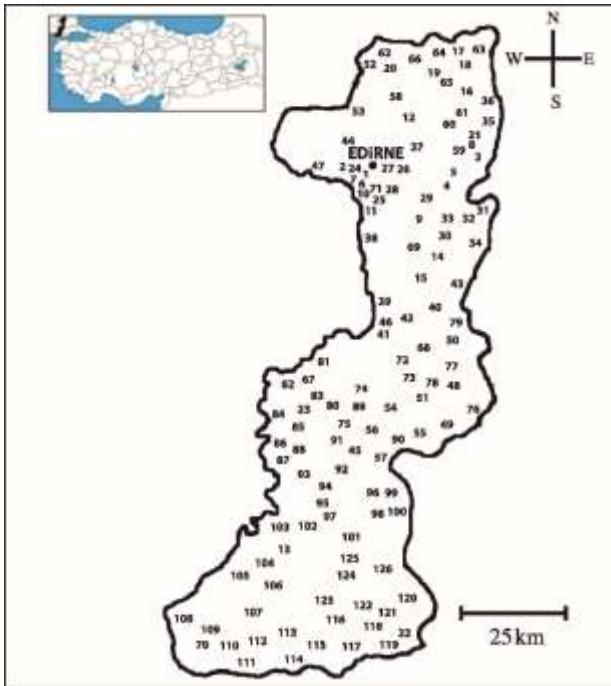


Fig. 1. Map reference for the collection sites (Numbers denote the names of the sites in the Table 1).

Results

Genus *Aphidius* Nees, 1819

Aphidius colemani Viereck, 1912

Material: **22:** 264m, 07.06.2014, ♂.

Aphidius eadyi Stary, Gonzales & Hall, 1980

Material: **6:** 46m, 26.07.2014, ♀.

Aphidius ervi Haliday, 1834

Material: **1:** 62m, 06.04.2014, ♂, 10.04.2014, ♂, 03.05.2014, ♂, 02.06.2014, 2♀♀, 02.07.2014, 2♀♀,

2♂♂, 24.07.2014 ♀, ♂; **3:** 153m, 20.05.2014, 6♀♀, 2♂♂, 21.05.2014, 2♀♀, 3♂♂, 23.05.2014, ♀, 2♂♂, 25.05.2014, ♀, ♂, 10.06.2014, 7♀♀, 7♂♂, 14.06.2014, 3♀♀, 2♂♂, 17.06.2014, ♂, (Light trap), 18.06.2014, 6♀♀, 6♂♂, 01.07.2014, 2♂♂, 08.07.2014, 4♀♀, ♂, 14.07.2014, ♀; **2:** 40m, 03.05.2014, ♂; **4:** 107m, 22.05.2014, 34♀♀, ♂; **5:** 116m, 22.05.2014, ♂; **6:** 46m, 10.06.2014, ♀, ♂; **7:** 47m, 28.05.2014, ♀; **8:** 204m, 28.05.2014, ♀, 31.05.2014, ♀; **10:** 34m, 29.05.2014, 34♀♀, 2♂♂; **11:** 42m, 29.05.2014, 48♀♀, 3♂♂; **12:** 144m, 01.06.2014, 86♀♀, 28♂♂; **13:** 97m, 01.06.2014, ♂; **14:** 68m, 03.06.2014, 9♀♀, 3♂♂; **16:** 260m, 04.06.2014, ♀; **17:** 403m, 04.06.2014, 2♀♀; **19:** 485m, 05.06.2014, 8♀♀, 2♂♂; **22:** 264m, 07.06.2014, 3♀♀; **23:** 23m, 08.06.2014, ♀, 30.07.2014, ♀; **26:** 105m, 10.06.2014, 2♀♀, 4♂♂; **27:** 76m, 10.06.2014, 43♀♀, 26♂♂; **28:** 78m, 10.06.2014, 64♀♀, 14♂♂; **29:** 129m, 10.06.2014, 3♀♀, ♂; **30:** 79 m, 11.06.2014, ♀, ♂; **31:** 109m, 11.06.2014, 45♀♀, 11♂♂; **32:** 68m, 11.06.2014, 2♀♀, ♂; **33:** 85m, 11.06.2014, 47♀♀, 10♂♂; **34:** 54m, 11.06.2014, 9♀♀, 2♂♂; **36:** 256m, 13.06.2014, ♀, ♂; **39:** 41m, 13.06.2014, 3♀♀, 5♂♂, 30.07.2014, ♂; **41:** 23m, 13.06.2014, 6♀♀, 2♂♂; **42:** 90m, 13.06.2014, ♂, **43:** 43m, 18.06.2014, 53♀♀, 17♂♂; ♀♀; **45:** 19m, 21.06.2014, ♀, 2♂♂; **46:** 39m, 21.06.2014, 2♀♀; **48:** 111m, 03.07.2014, ♀, 2♂♂; **49:** 103m, 03.07.2014, ♂; **50:** 22m, 03.07.2014, 2♀♀, 2♂♂; **51:** 64m, 03.07.2014, ♂, 13.07.2014, ♂; **52:** 196m, 05.07.2014, ♂; **53:** 60m, 05.07.2014, 3♀♀; **55:** 252m, 07.07.2014, ♂; **56:** 36m, 07.07.2014, 7♀♀, 2♂♂; **57:** 62m, 07.07.2014, 4♀♀; **58:** 149m, 09.07.2014, ♂; **59:** 134m, 08.07.2014, 4♀♀, 7♂♂, 13.07.2014, ♀; **60:** 166m, 15.07.2014, ♀.

Aphidius funebris Mackauer, 1961

Material: **1:** 62m, 24.07.2014, ♂; **70:** 10m, 22.08.2014, ♀.

Aphidius matricariae Haliday, 1834

Material: **1:** 62m, 02.07.2014, 2♀♀.

Aphidius microlophii Pennachio & Tremblay, 1987

Material: **1:** 62m, 02.07.2014, ♂; **3:** 153m, 20.05.2014, ♀, 25.05.2014, ♀; **10:** 34m, 29.05.2014, 6♀♀; **12:** 144m, 01.06.2014, ♀; **19:** 485m, 05.06.2014, 2♀♀; **23:** 23m, 30.07.2014, ♀; **31:** 109m, 11.06.2014, 5♀♀; **33:** 85m, 11.06.2014, 2♀♀; **38:** 89m, 13.06.2014, ♂; **57:** 62m, 07.07.2014, ♀, **39:** 41m, 13.06.2014, ♀; **43:** 43m, 18.06.2014, 7♀♀.

Aphidius picipes (Nees, 1811)

Material: **10:** 34m, 29.05.2014, ♀; **40:** 85m, 13.06.2014, ♀; **43:** 43m, 18.06.2014, 2♀♀.

Aphidius rosae Haliday, 1834

Material: **1:** 62m, 21.05.2014, 4♀♀, ♂, 25.05.2014, ♀, ♂, 30.05.2014, ♀, 12.06.2014, ♀; **2:** 40m, 03.05.2014, ♀, ♂; **3:** 153m, 05.05.2014, ♀, 20.05.2014, 5♀♀, 10.06.2014 ♀, 18.06.2014 ♂, 01.07.2014, ♂, 14.07.2014, ♀; **4:** 107m, 15♀♀, **7:** 47m, 27.05.2014, ♀; **8:** 204m, 28.05.2014, ♂; **10:** 34m, 29.05.2014, 5♀♀, ♂; **11:** 42m, 29.05.2014,

6♀♀, ♂; **12:** 144m, 01.06.2014, 21♀♀; **18:** 350m, 04.06.2014, ♀; **21:** 203m, 07.06.2014, ♂, 28.06.2014; **22:** 264m, 07.06.2014, ♂; **24:** 59m, 09.06.2014, ♀; **25:** 51m, 09.06.2014, ♂; **26:** 105m, 10.06.2014, 4♀♀; **27:** 76m, 2♀♀; **28:** 78m, 10.06.2014, 5♀♀, ♂; **31:** 109m, 11.06.2014, 2♀♀, 2♂♂; **32:** 68m, 11.06.2014, ♂; **33:** 85m, 11.06.2014, ♀; **35:** 239m 12.06.2014, ♂; **37:** 125m, 13.06.2014, 5♀♀, ♂; **41:** 23m, 13.06.2014 ♀; **43:** 43m, 18.06.2014, 8♀♀, ♂; **48:** 111m, 03.07.2014, 2♀♀; **50:** 22m, 5♀♀, ♂; **54:** 45m, 07.07.2014, ♀; **56:** 36m, 07.07.2014, 9♀♀, ♂; **57:** 62m, 07.07.2014, ♀; **59:** 134m, 08.07.2014, 2♀♀, ♂; **67:** 19m, 30.07.2014, ♀; **69:** 70m, 01.08.2014, ♀; **71:** 43m, 10.10.2014, ♂.

Aphidius smithi Sharma & Subba Rao, 1959

Material: **59:** 134m, 08.07.2014, ♂.

Aphidius urticae Haliday, 1834

Material: **2:** 40m, 23.05.2014, ♀; **37:** 125m, 27.07.2014, ♀.

Genus *Binodoxys* Mackauer, 1960

Binodoxys acalephae (Marshall, 1896)

Material: **68:** 16m, 30.07.2014, ♀.

Binodoxys angelicae (Haliday, 1833)

Material: **1:** 62m, 25.05.2014, 2♀♀; **17:** 403m, 30.09.2014, ♀

Genus *Diaeretiella* Starý, 1960

Diaeretiella rapae (M'Intosh, 1855)

Material: **1:** 62m, 06.04.2014, ♂, 10.04.2014, ♂, 20.04.2014, ♂, 21.05.2014, ♀, ♂; **3:** 153m, 20.05.2014, ♂; **39:** 41m, 13.06.2014, ♂; **59:** 134m, 13.07.2014, ♀.

Genus *Ephedrus* Haliday, 1833

Ephedrus persicae Frogatt 1904

Material: **3:** 153m, 20.05.2014, ♀; 23.05.2014, ♀, 25.05.2014, 3♀♀, ♂.

Ephedrus plagiator (Nees, 1811)

Material: **51:** 64m, 13.07.2014, ♀; **52:** 196 m, 05.07.2014, 2♂♂.

Genus *Lysiphlebus* Foerster, 1862

Lysiphlebus confusus Tremblay & Eady, 1978

Material: **1:** 62m, 24.07.2014, 16♂♂; **6:** 46m, 27.05.2014, ♀; **31:** 109m, 11.06.2014, 11♂♂; **37:**125m, 13.06.2014, 10♂♂; **47:** 38m, 24.06.2014, ♂.

Lysiphlebus fabarum (Marshall, 1896)

Material: **3:** 153m,11.07.2014, 2♀♀; **6:** 46m, 27.05.2014, 3♀♀; **20:** 354m, 06.06.2014, ♀; **22:** 264m, 07.06.2014, ♀; **26:** 105m, 10.06.2014, ♀; **1:** 62m, 24.07.2014, 2♀♀, 2♂♂; **31:** 109m, 11.06.2014, 3♀♀; **37:**125m, 13.06.2014, 3♀♀; **44:** 41m, 20.06.2014, ♀.

Lysiphlebus fritzmulleri Mackauer, 1960

Material: **6:** 46m, 27.05.2014, 12♀♀, 17♂♂; **9:** 84m, 29.05.2014, 2♀♀, 2♂♂.

Genus *Praon* Haliday, 1833

Praon abjectum (Haliday, 1833)

Material: **64:** 411m, 15.07.2014, ♀.

Praon athenaeum Kavallieratos & Lykouressis, 2000

Material: **9:** 84m, 29.05.2014, 2♀♀; **3:**153m, 27.05.2014, ♀, 14.06.2014, ♀; **43:** 43m, 18.06.2014, ♀.

Praon exsoletum (Nees, 1811)

Material: **1:** 62m, 02.06.2014, ♀; **3:** 153m, 25.05.2014, 3♀♀; **27:** 76m, 10.06.2014, ♀, **39:** 41m, 13.06.2014, ♀; **58:** 149m, 09.07.2014, ♀; **59:** 134m, 08.07.2014, ♂; **60:** 166m, 15.07.2014, ♀; **61:** 196m, 15.07.2014, ♀; **63:** 362m, 15.07.2014, 2♀♀; **64:** 411m, 15.07.2014, ♀; **65:** 317m, 15.07.2014, ♀.

Praon flavinode (Haliday, 1833)

Material: **62:** 452m, 15.07.2014, ♀.

Praon nonveilleri Tomanović & Kavallieratos, 2003

Material: **3:** 153m, 03.06.2014, 9 ♀♀.

Praon pubescens Starý, 1961

Material: **1:** 62m, 24.07.2014, ♀, 13.9.2014, ♀; **53:** 60m, 05.07.2014, ♀.

Praon uroleucon Tomonovic & Kavallieratos, 2003

Material: **1:** 62m, 06.06.2014, ♀; **3:** 153m, 20.05.2014, ♀; **15:** 51m, 03.06.2014, ♀; **66:** 358m, 15.07.2014, ♀.

Praon volucre (Haliday, 1833)

Material: **1:** 62m, 02.07.2014, 2 ♀♀, 24.07.2014, ♀; **3:** 153m, 20.05.2014, 2♀♀, 25.05.2014, 3♀♀, 02.06.2014, 11♀♀, 3♂♂, 02.06.2014, 18♀♀, 13♂♂, 05.06.2014 ♀; **17:** 403m, 04.06.2014, 2♀♀; **19:** 485m, 05.06.2014, ♀; **29:**129m, 10.06.2014, 5♀♀; **34:** 54m, 11.06.2014, 2♀♀; **42:** 90m, 13.06.2014, ♀; **43:** 43m, 18.06.2014, ♀.

Praon yomenae Takada, 1968

Material: **3:** 153m, 20.05.2014, 2♀♀, 01.07.2017, ♀; **13:** 97m, 01.06.2014, ♀; **14:** 68m, 03.06.2014, ♀; **58:** 149m, 09.07.2014, ♀.

Discussion

In this study, the fauna of Aphidiinae within 126 localities and 8 different habitats in Edirne province between April-September 2014 have been investigated. As a result, 27 species of Aphidiinae belonging to 6 genera (*Aphidius*, *Binodoxys*, *Diaeretiella*, *Ephedrus*, *Lysiphlebus*, *Praon*) from 71 localities were determined. Our lack of records in 55 localities may be due to collecting period in this localities made in an appropriate season.

Table 1. Collection sites and geographic coordinates in Edirne (for map reference see Figure 1).

Locality No	Locality	Coordinate	Locality No	Locality	Coordinate
1	T.Ü. Balkan Yerleşkesi	41°38'41" N 26°37'20" E	64	Lalapaşa-Kalkansöğüt	41°58'30" N 26°48'29" E
2	Hadımağa	41°41'34" N 26°33'53" E	65	Lalapaşa-Sarıdanışment	41°52'20" N 26°50'19" E
3	Süloğlu-Büyük Gerdelli	41°44'21" N 26°56'47" E	66	Lalapaşa-Çallidere	41°56'26" N 26°43'15" E
4	Havsa-Musulca	41°40'13" N 26°52'15" E	67	Meriç-Hasırcıarnavut	41°16'47" N 26°27'04" E
5	Havsa-Arpaç	41°04'08" N 26°53'09" E	68	Uzunköprü-Yeniköy	41°16'19" N 26°41'05" E
6	Merkez	41°39'48" N 26°35'01" E	69	Havsa-Abalar	41°33'14" N 26°44'39" E
7	Kent orman	41°39'41" N 26°32'29" E	70	Enez-Sultaniçe	40°37'05" N 26°00'12" E
8	Süloğlu	41°46'16" N 26°52'52" E	71	Karaağaç	41°39'25" N 26°29'37" E
9	Havsa-Oğulpaşa	41°35'50" N 26°44'50" E	72	Uzunköprü-Değirmenci	41°18'38" N 26°41'55" E
10	Bosnaköy	41°37'16" N 26°34'01" E	73	Uzunköprü-Merkez	41°17'01" N 26°41'01" E
11	Üyükütatar	41°32'18" N 26°36'48" E	74	Uzunköprü-Çiftlikköy	41°14'46" N 26°36'20" E
12	Lalapaşa- Kavaklı	41°47'31" N 26°45'29" E	75	Uzunköprü-Balaban	41°04'59" N 26°32'13" E
13	İpsala-Korucuköy	40°53'44" N 26°29'20" E	76	Uzunköprü-Gazimehmet	41°12'15" N 26°56'04" E
14	Havsa- Kuzucu	41°30'01" N 26°48'59" E	77	Uzunköprü-Bayramlı	41°19'18" N 26°48'59" E
15	Havsa- Şerbettar	41°28'09" N 26°45'55" E	78	Uzunköprü-Başağıl	41°14'52" N 26°48'52" E
16	Süloğlu-Tatarlar	41°50'00" N 26°53'29" E	79	Uzunköprü-Sazlımalkoç	41°20'49" N 26°53'29" E
17	Lalapaşa-Vaysal	41°55'44" N 26°51'44" E	80	Uzunköprü-Karayayla	41°15'19" N 26°34'32" E
18	Lalapaşa-S.danişment	41°53'55" N 26°54'10" E	81	Meriç-Rahmanca	41°17'39" N 26°29'23" E
19	Lalapaşa- Hacıdanışment	41°54'44" N 26°49'47" E	82	Meriç-Karayusuflu	41°15'53" N 26°29'23" E
20	Lalapaşa-Doğanköy	41°55'36" N 26°42'00" E	83	Meriç-Olacak	41°13'00" N 26°28'42" E
21	Süloğlu-S.Barajı	41°47'35" N 26°54'44" E	84	Meriç-Kadıondurma	41°10'25" N 26°20'38" E
22	Keşan-Korudağ	40°41'26" N 26°43'25" E	85	Meriç-Subaşı	41°09'19" N 26°22'04" E
23	Meriç	41°11'13" N 26°25'05" E	86	Meriç-Küplü	41°06'09" N 26°20'37" E
24	Merkez-Binevler	41°39'54" N 26°36'17" E	87	Meriç-Adasarhanlı	41°04'58" N 26°21'55" E
25	Tayakadın	41°35'13" N 26°40'00" E	88	Meriç-Küçükaltıağaç	41°06'48" N 26°27'08" E
26	Demirhanlı	41°41'45" N 26°43'49" E	89	Uzunköprü-Çobanpınar	41°10'34" N 26°33'51" E
27	Hıdırağa	41°44'10" N 26°39'48" E	90	Uzunköprü-Kırköy	41°07'15" N 26°44'13" E
28	Köşenköy	41°39'38" N 26°41'20" E	91	Uzunköprü-Balaban	41°04'54" N 26°32'22" E
29	Havsa- Habiller	41°40'14" N 26°48'23" E	92	İpsala-Karaağaç	41°03'16" N 26°32'39" E
30	Havsa	41°33'34" N 26°49'56" E	93	İpsala-Balabancık	41°02'10" N 26°23'51" E
31	Havsa-Bostanlı	41°36'37" N 26°58'27" E	94	İpsala-Sultan	41°00'36" N 26°28'24" E

Table 1. Continued.

Locality No	Locality	Coordinate	Locality No	Locality	Coordinate
32	Havsa-Köseömer	41°35'13" N 26°56'00" E	95	İpsala-İbriktepe	41°01'52" N 26°30'30" E
33	Havsa-Osmanlı	41°35'15" N 26°50'20" E	96	İpsala-Kozköy	41°01'50" N 26°36'51" E
34	Havsa-Yolageldi	41°30'26" N 26°56'54" E	97	İpsala-Pazardere	41°58'12" N 26°34'45" E
35	Süloğlu-Keramettin	41°47'37" N 26°59'06" E	98	Keşan-Çobançeşmesi	40°57'36" N 26°39'52" E
36	Süloğlu-Çeşmeköy	41°52'08" N 26°58'36" E	99	Keşan-Altıntaş	41°00'00" N 26°42'48" E
37	Hacıumur	41°43'14" N 26°47'54" E	100	Keşan-Karasatı	40°58'27" N 26°41'23" E
38	Orhaniye	41°30'57" N 26°39'22" E	101	Keşan-Beğendik	40°55'53" N 26°33'25" E
39	Uzunköprü-Saçlımüsellim	41°25'16" N 26°38'01" E	102	İpsala-Turpçular	40°57'25" N 26°25'55" E
40	Uzunköprü-Kırcasalih	41°23'55" N 26°47'50" E	103	İpsala-Sarıcaali	40°58'34" N 26°22'42" E
41	Uzunköprü-Eskiköy	41°20'34" N 26°37'43" E	104	İpsala-Ahır	40°53'53" N 26°22'01" E
42	Uzunköprü-Meşeli	41°23'21" N 26°43'24" E	105	İpsala-Yenikarpuzlu	40°50'00" N 26°17'23" E
43	Havsa-Tahal	41°25'22" N 26°51'28" E	106	İpsala-Koyuntepe	40°46'15" N 26°18'45" E
44	Merkez-Büyükdöllük	41°45'16" N 26°34'54" E	107	Enez-Işıklı	40°42'32" N 26°17'33" E
45	Uzunköprü-Altınyazı	41°04'28" N 26°34'19" E	108	Enez	40°43'03" N 26°04'59" E
46	Uzunköprü-Çakmakköy	41°22'17" N 26°40'08" E	109	Enez-Yenice	40°41'45" N 26°09'02" E
47	Yenikadın	41°41'16" N 26°2'21" E	110	Enez-Küçükkevren	40°37'52" N 26°11'10" E
48	Uzunköprü-Sipahi	41°13'14" N 26°53'02" E	111	Enez-Abdurrahim	40°38'44" N 26°16'32" E
49	Uzunköprü-Yağmurca	41°10'08" N 26°51'37" E	112	Enez-Hasköy	40°39'59" N 26°19'34" E
50	Uzunköprü-Muhacırcadı	41°20'21" N 26°53'59" E	113	Keşan-Çelebi	40°41'14" N 26°21'12" E
51	Uzunköprü-Çöpköy	41°12'50" N 26°49'43" E	114	Keşan-Yaylaköy	40°37'59" N 26°24'07" E
52	Lalapaşa-Uzunbayır	41°55'28" N 26°35'16" E	115	Keşan-Koruklu	40°39'26" N 26°25'31" E
53	Suakacağı	41°50'40" N 26°35'05" E	116	Keşan-Suluca	40°41'29" N 26°27'33" E
54	Uzunköprü-Kavacık	41°10'45" N 26°40'36" E	117	Keşan-Mecidiye	40°37'29" N 26°34'47" E
55	Uzunköprü-Süleymaniye	41°07'29" N 26°49'46" E	118	Keşan-Çeltik	40°41'07" N 26°34'31" E
56	Uzunköprü-Karapınar	41°06'42" N 26°37'56" E	119	Keşan-Sazlıdere	40°39'52" N 26°42'00" E
57	Uzunköprü-Alıçköyü	41°04'41" N 26°04'41" E	120	Keşan-Bahçeköy	40°47'04" N 26°40'19" E
58	Lalapaşa-Çömlekakpınar	41°50'03" N 26°38'30" E	121	Keşan-Çamlıca	40°45'44" N 26°40'05" E
59	Süloğlu-Küküler	41°43'41" N 26°54'02" E	122	Keşan-Mercan	40°44'52" N 26°35'56" E
60	Süloğlu-Yağcılı	41°47'31" N 26°47'57" E	123	Keşan-Orhaniye	40°45'12" N 26°23'55" E
61	Süloğlu-Taşlısekban	41°47'46" N 26°52'42" E	124	Keşan-Karahisar	40°45'57" N 26°30'37" E
62	Lalapaşa-Hamzabeyli	41°57'54" N 26°39'34" E	125	Keşan-Boztepe	40°51'00" N 26°31'45" E
63	Lalapaşa-Ömeroba	41°56'30" N 26°43'14" E	126	Keşan-Yenimuhacı	40°51'37" N 26°41'20" E

Table 2. Aphidiinae of Edirne and their distributions within habitats. The species new to the Edirne fauna are marked with (*) and new to the Turkish fauna are marked with (**).

	Pine forest	Oak forest	Fruit garden	Clover field	Asteracea field	<i>Populus</i> sp. and <i>Salix</i> sp.	Herbaceous plants in agricultural area	Herbaceous plants of creek side	TOTAL
<i>Aphidius colemani</i>	•								1
<i>Aphidius eadyi</i> *			•						1
<i>Aphidius ervi</i>	•	•	•	•	•	•	•	•	8
<i>Aphidius funebris</i>				•			•		2
<i>Aphidius matricariae</i>							•		1
<i>Aphidius microlophii</i> **		•	•	•	•		•		5
<i>Aphidius picipes</i> *							•		1
<i>Aphidius rosae</i> *	•	•	•	•		•	•		6
<i>Aphidius smithii</i> **		•							1
<i>Aphidius urticae</i>							•		1
<i>Binodoxys acalephae</i> *							•		1
<i>Binodoxys angelicae</i>							•		1
<i>Diaeretiella rapae</i>		•	•				•		3
<i>Ephedrus persicae</i> *			•						1
<i>Ephedrus plagiator</i>							•		1
<i>Lysiphlebus confusus</i> *			•	•			•		3
<i>Lysiphlebus fabarum</i>	•		•	•			•	•	5
<i>Lysiphlebus fritzmuelleri</i> **			•				•		2
<i>Praon abjectum</i> *							•		1
<i>Praon athenaeum</i> **			•				•		2
<i>Praon exsoletum</i>		•	•	•			•	•	5
<i>Praon flavinode</i> **								•	1
<i>Praon nonveilleri</i> **			•						1
<i>Praon pubescens</i> *							•		1
<i>Praon uroleucon</i> **			•				•	•	3
<i>Praon volucre</i>		•	•				•		3
<i>Praon yomenae</i> *			•				•	•	3
TOTAL	4	7	15	7	2	2	21	6	

Among these species, 7 of them (*Aphidius smithii*, *Aphidius microlophii*, *Lysiphlebus* (*Phlebus*) *fritzmuelleri*, *Praon athenaeum*, *P. flavinode*, *P. nonveilleri*, *P. uroleucon*) are new records for Turkish Aphidiinae fauna and 9 of them (*Aphidius eadyi*, *A. rosae*, *A. picipes*, *Binodoxys acalephae*, *Ephedrus persicae*, *Lysiphlebus* (*Phlebus*) *confusus*, *Praon abjectum*, *P. pubescens*, *P. yomenae*) are new records Edirne Aphidiinae fauna.

The number of species of each genus is represented by: *Aphidius*: 10, *Binodoxys*: 2, *Diaeretiella*: 1, *Ephedrus*: 2, *Lysiphlebus*: 3 and *Praon*: 9. These numbers of species

are relatively proper compared to the Palearctic regions. Species of *Aphidius* and *Praon* have a wide distribution in Palearctic and they are represented by more species than the others.

Among the determined species, *Aphidius ervi* appeared to be the most abundant species in Edirne which is recorded from 45 different localities. Large number of *Aphidius ervi* can be explained due to it has a wide host range compared to other species.

In the eight different habitats, it could not be observed the same species but *Aphidius ervi*, *A. rosae* are

ecologically the most tolerant species. *A. microlophii*, *L. fabarum* and *P. exsoletum* are recorded from 5 habitats and also from almost equal localities. Fourteen species (*Aphidius colemani*, *A. eadyi*, *A. matricariae*, *A. picipes*, *A. smithii*, *A. urticae*, *Binodoxys acalephae*, *B. angelicae*, *Ephedrus persicae*, *E. plagiator*, *Praon abjectum*, *P. flavinode*, *P. nonveilleri*, and *P. pubescens*) were observed in only one habitat (Table 2).

The present study shows that nineteen species apparently prefer herbaceous plants in agricultural area and thirteen species prefer fruit garden. Other habitats represented by low number of species. The distributions

References

- Aslan, M.M., Uygun, N. & Starý, P. 2004. A survey of aphid parasitoids in Kahramanmaraş, Turkey (Hymenoptera: Braconidae, Aphidiinae; and: Aphelinidae). *Phytoparasitica*, 32: 255-263.
- Atakan, E. & Özgür, A.F. 1994. Effect of natural enemies on the population development of cotton aphid (*Aphis gossypii*Glov.)(Homoptera: Aphididae).*Proceedings Third Turkish National Congress of Biological Control*,(İzmir, Turkey), pp. 459-470.
- Avcı, Ü. & Özbek, H. 1991. Investigations on the natural enemies of cabbage aphid, *Brevicoryne brassicae* L. (Homoptera: Aphididae) in Erzurum province. *Türkiye Entomoloji Dergisi*, 15: 37-41.
- Çetin Erdoğan, Ö., Tomanović, Ž. & Beyarslan, A. 2008. New aphid parasitoids (Hymenoptera: Braconidae: Aphidiinae) in the region of Marmara. *Acta Entomologica Serbica*, 13: 85- 88.
- Çetin Erdoğan, Ö., Tomanović, Ž. & Beyarslan, A. 2010. New distributional records on the subfamily Aphidiinae (Hymenoptera: Braconidae) in Black Sea Region, Turkey. *Linzer Biologische Beiträge*, 42: 613-616.
- Düzgüneş, Z., Toros, S., Kılınçer, N. & Kovancı, B.1982. The parasites and the predators of Aphidoidea in Ankara. *Turkish Ministry of Agriculture*, Ankara, Turkey (Turkish, with English summary).
- Elmalı, M. & Toros, S. 1994. Investigations on the natural enemies of aphids damaging wheat plants in Konya province. *Proceedings Third Turkish National Congress of Biological Control* (İzmir, Turkey), pp. 13-29. (Turkish, with English abstract).
- El-Malı, M.U., Starý, P., Şahbaz, A. & Özsemerci, F. 2004. A review of aphid parasitoids (Hym., Braconidae, Aphidiinae) of Turkey. *Egyptian Journal of Biological Pest Control*, 14: 355-370.
- Erkin, E. 1983. Investigations on the hosts distribution and efficiency of the natural enemies of the family Aphididae (Homoptera) harmful to pome and stone fruits trees in Izmir province of Aegean Region. *Turkish Journal of Plant Protection*, 7: 29-49.
- Güz, N. & Kılınçer, N. 2005. Aphid parasitoids (Hymenoptera: Braconidae: Aphidiinae) on weeds from Ankara, Turkey. *Phytoparasitica*, 33: 359-366.
- Karaat, S. & Göven, M.A. 1986. General status of natural enemies of green peach aphid (*Myzus persicae* Sulz.) in tobacco areas in southeastern Anatolia. *Proceedings First Turkish National Congress of Biological Control* (Adana, Turkey), pp. 162-172. (Turkish, with English abstract).
- Kavallieratos, N.G., Lykouressis, D.P., Sarlis, G.P., Stathas, G.J., Segovia, A.S. & Athanassiou, C.G. 2001. The Aphidiinae (Hymenoptera: Ichneumonoidea: Braconidae) of Greece. *Phytoparasitica*, 29: 306- 340.
- Kavallieratos, N.G., Tomanović, Z., Starý, P., Athanassiou, C.G., Fasseas, C., Petrović, O., Stanisavljević, Z.L. & Veroniki, M.A. 2005. *Praon* Haliday (Hymenoptera: Braconidae: Aphidiinae) of Southeastern Europe: key, host range and phylogenetic relationships. *Zoologischer Anzeiger*, 243: 181-209.
- Ölmez, S. & Ulusoy, M.R. 2003. A survey of Aphid parasitoids (Hymenoptera: Braconidae: Aphidiinae) in Diyarbakır, Turkey. *Phytoparasitica*, 31: 524-528.
- Özder, N. & Toros, S. 1999. Investigations on the natural enemies of aphid species damaging to wheat plants in Tekirdag province. *Proceedings of the Fourth Turkish National Congress of Biological Control* (Adana, Turkey), pp. 501-512.
- Shaw, M.R. & Huddleston, T. 1991. Classification and biology of braconid wasps (Hymenoptera: Braconidae). *Handbooks for the Identification of British Insects*, 7: 1-126.
- Starý, P. 1976. *Aphid parasites (Hymenoptera, Aphidiidae) of the Mediterranean area*. Transactions of the Czechoslovak Academy of Sciences, Series of Mathematical and Natural Sciences and Dr. W Junk, The Hague, 95 pp.
- Şahbaz, A. & Uysal, M. 2006. Konya ilinde kavaklarda beslenen yaprakbitlerinin (Homoptera: Aphididae) Predatör ve Parazitoitleri. *Selçuk Üniversitesi Ziraat Fakültesi Dergisi*, 20: 119-125. (In Turkish).
- Tomanović, Z., Kavallieratos, N.G., Starý, P., Athanassiou, C.G., Žikić, V., Petrović-Obradović, O. & Sarlis, G.P. 2003. *Aphidius* Nees Aphid parasitoids (Hymenoptera, Braconidae, Aphidiinae) in Serbia and Montenegro, tritrophic associations and key. *Acta Entomologica Serbica*, 8: 15-39.
- Tomanović, Z., Beyarslan, A., Çetin Erdoğan, Ö. & Žikić, V. 2008. New records of Aphid parasitoids (Hymenoptera, Braconidae, Aphidiinae) from Turkey. *Periodicum Biologorum*, 110: 335-338.

21. Tobias, V.I. 1995. *Keys to the Fauna of the USSR III, Hymenoptera V*. Lebanon, NH, USA: Science Publishers (translation from Russian).
22. Yu, D.S., Achterberg, C. & Horstmann, K. 2012. Interactive Catalogue of World Ichneumonoidea Taxonomy, biology, morphology and distribution, *Compact disc (Master version)*, Taxapad.