NORTH-WESTERN JOURNAL OF ZOOLOGY 8 (1): 31-40
Article No.: 111143

http://biozoojournals.3x.ro/nwjz/index.html

A review of the genus *Ascogaster* Wesmael, 1835 (Hymenoptera, Braconidae, Cheloninae) in Turkey, with a new host record for *Ascogaster bicarinata* (Herrich-Schäffer, 1838)

Mitat AYDOGDU* and Ahmet BEYARSLAN

Trakya University, Faculty of Sciences, Department of Biology, 22030 Edirne, Turkey.
*Corresponding author: M. Aydogdu, E-mail: maydogdu75@hotmail.com

Received: 29. December 2010 / Accepted: 25. October 2011 / Available online: 07. November 2011 / Printed: June 2012

Abstract. The aim of this study is to determine the presence of *Ascogaster* species in the research area and thus provide more data on the *Ascogaster* species of Turkey. A total of eighteen adult parasitoid species were collected between 1980 and 2008, and two of these are reported for the first time from Turkey. *Ascogaster bicarinata* (Herrich-Schäffer, 1838) was reared from a new natural host *Archips rosana* (Linnaeus, 1758) (Lepidoptera: Tortricidae). In this paper an illustrated identification key for the *Ascogaster* genus of Turkey is given. The classification and biology of *Ascogaster* are reviewed and the faunal relationships between Palaearctic and Turkey species are discussed.

Key words: *Ascogaster*, new natural host, key to species, new records, *Ascogaster bicarinata,* Turkey.

Introduction

The Braconidae family of parasitoid wasps constitute one of the most species-rich families of insects. Most taxonomists who study this group would agree that a rough and probably highly conservative estimate of about 40-50,000 species worldwide is reasonable as an extrapolation from the current described number of roughly 12,000 species. Among extant groups, the sister group of the Braconidae is the Ichneumonidae, an equally diverse group (Sharkey and Wahl 1992, Quicke et al. 1999). *Ascogaster* species are a large cosmopolitan genus with circa 165 described species worldwide with approximately 55 species being found in the Palaearctic region (Yu et al. 2006). The important morphological characteristics which distinguish Cheloninae from all other subfamilies of Braconidae is the possesion of a complete posterior mesopleural carina (broadly interrupted in front of the mid coxae) and heavily sculptured rigid metasoma by the fusion of tergites 1,3. Two tribes of the Cheloninae subfamily are represented in the Palaearctic region; the Phanerotomini tribe, in which the metasoma is divided by crenulate sutures into three tergites and body colour is testaceous, and the Chelonini tribe, in which the metasoma is entire with no trace of sutures and the body color is generally black. The Chelonini tribe is represented in the Palaearctic region by two genera *Ascogaster* and *Chelonus*. A typical member of *Ascogaster* species can be distinguished by the first submarginal cell which is always divided from the first discal cell by vein Rs+M. Eyes without setae, if present, are very minute and cannot be seen without high magnification. The clypeus often has apical tubercules in *Ascogaster*, however this is rarely observed in *Chelonus* (Huddleston 1984, Shaw 1997).

The cosmopolitan genus *Ascogaster* is mainly parasitic on Microlepidoptera (especially Tortricidae) (Huddleston 1984) but species of this genus also adopted a parasitic lifestyle on members of some other insect orders, i.e. Coleoptera, Diptera and Hymenoptera. *Ascogaster* is one of the major group of insect parasitoids containing a large number of species which are effective enough to exert a definite effect on their host insect populations. Moreover, increasing cases of their regulatory impact on important plant pests have been reported, making the members of the genus important agents in biological control applications (Huddleston 1986, Yu et al. 2006).

The Anatolian peninsula (Asia Minor is a region of Western Asia) is bounded by the Black Sea to the north, the Mediterranean Sea to the south, the Aegean Sea to the west, and the sea of Marmara to the northwest, which separates Anatolia from Thrace (includes the western most part of Turkey) in the European continent. Anatolia's diverse topography, regional landscape variables and its varied range of climates has fostered similar plant and animal species richness and diversity (Wales 2010).

The Palearctic species of the *Ascogaster* were revised and keyed by Huddleston (1984). The author reported a total of 29 species, three of which were described as being new to science. Only a

few researchers have studied the *Ascogaster* fauna of Turkey (Aydogdu & Beyarslan, 2006, 2007, Beyarslan 1985, Beyarslan & Inanç 1990, Beyarslan et al. 2002, Gültekin & Güçlü 1997, Huddleston 1984, Papp 1994) and in particular, these studies included only the Western regions of Turkey. As a result our knowledge of the distribution of *Ascogaster* species in Anatolia is still unsatisfactory. In response to this knowledge gap this paper presents new information about the parasitoids from a wide range of habitats at differing altitudes in Turkey. An illustrated identification key to the Turkey species of the genus is presented, this will be of use to biological control workers, taxonomists and museum workers for the identification of the genus.

As well as studies of their distribution, very few studies have been done on the biology of *Ascogaster*. The European Leaf Roller (ELR), *Archips rosana* (L.) (Lepidoptera: Tortricidae), recorded for the first time for Turkey in 1901 (Staudinger & Rebel 1901), is a native species to the Palaearctic region and has a global distribution except for the far east and Siberia. It feeds on many host plants, including fruit trees, forest trees and some weeds. Therefore, *A. rosana* is an economically important pest in Turkey (Doğanlar 2007, Özdemir et al. 2005). The main goal of our research is to observe how parasitoid complex limit *A. rosana* pests on the *Prunus domestica*. Numerous experiments have shown that pest populations often flourish in the absence of predators and parasitoids, which are often killed by pesticide applications used to control the pest. Due to the indiscriminate nature of chemical pesticides, more numerous non target insect species are dispropotionally effected in comparison to less numerous target pests (Costea et al. 2002).

Material and Methods

Sample collection

This study included Turkey *Ascogaster* specimens, and samples were collected by using a standard insect sweeping-net in various localities within Turkey between 1980 and 2008. Chelonines were sorted out of the collection and properly prepared for taxonomic study. Sampling locality, habitat, altitude, date of collection and number of individuals as male and female are provided for each species. All the specimens have been deposited in the Entomology Museum of the Department of Biology, Trakya University, Edirne.

Species identification

We used a Lucida camera attached to a stereomicrosope for identification and drawing of the species. Pertinent literature was used for the determination of species (Huddleston 1984, Tobias et al. 1986). References were used to identify the known distributions of the species in the world (Aydogdu & Beyarslan 2006, 2007, Beyarslan 1985, Beyarslan & Inanç 1990, Beyarslan et al. 2002, Huddleston 1984, Papp 1994, Tobias et al. 1986, Yu et al. 2006). An illustrated key is provided for the species of *Ascogaster* in Turkey. The collecting places (provinces) of species are shown on the map in Figure 1.

Leafroller sample collection

Leafroller samples were been taken from infested *Prunus domestica* L. trees in Edirne city (northwestern part of Turkey). The larvae of *A. rosana* (L.) was kept under laboratory conditions at 25 ± 1 ^{0}C and 70% relative humidity. During the season the infested leaves were collected and the reared parasitoids were identified.

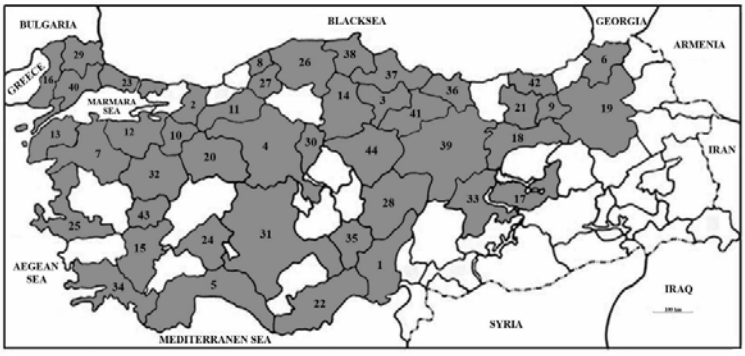


Figure 1. Collecting places of *Ascogaster* species in Turkey:
1–Adana, 2–Adapazarı, 3–Amasya, 4–Ankara, 5–Antalya, 6–Artvin, 7–Balıkesir, 8–Bartın, 9–Bayburt, 10–Bilecik, 11–Bolu, 12–Bursa, 13–Çanakkale, 14–Çorum, 15–Denizli, 16–Edirne, 17–Elazığ, 18–Erzincan, 19–Erzurum, 20–Eskişehir, 21–Gümüşhane, 22–İçel, 23–İstanbul, 24–Isparta, 25–İzmir, 26–Kastamonu, 27–Karabük, 28–Kayseri, 29–Kırklareli, 30–Kırıkkale, 31–Konya, 32–Kütahya, 33–Malatya, 34–Muğla, 35–Niğde, 36–Ordu, 37–Samsun, 38–Sinop, 39–Sivas, 40–Tekirdağ, 41–Tokat, 42–Trabzon, 43–Uşak, 44–Yozgat.

Results

Key to species

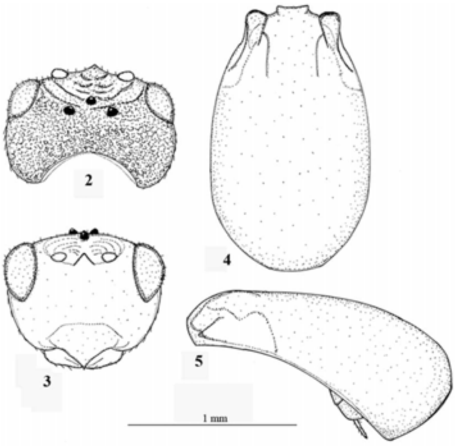
1. Anterior margin of clypeus with one or two large denticles medially (Figs 3, 6, 10, 17) ………………...**2**

- Anterior margin of clypeus with very small denticles medially or without (Figs 31, 34, 35, 41)………………………………………………………………………………………….**7**

2. Clypeus with single apical tooth (Fig. 3); hypopygium short, rarely projecting beyond apex of metasoma (Fig. 5)……………………………………………………………………………**3**

- Clypeus with two median apical teeth (Figs 10, 17); hypopygium generally long, projecting beyond apex of metasoma (Fig. 11) (but generally not in *bicarinata,* Fig. 15)…………………………………………………………………………………………….**4**

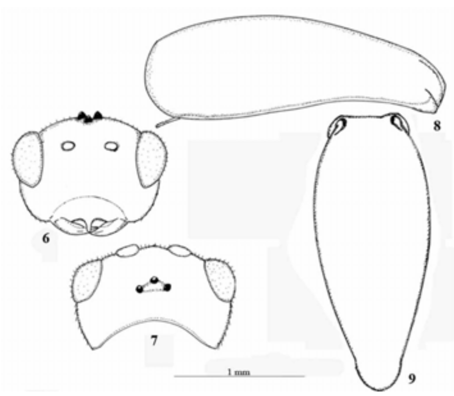
3. Apical border of clypeus produced into a strong dentata tubercle, temple about 1.5 times length of eye in dorsal view, ocelli small, OOL= 3.5,4.0 OD (Figs 2, 3); metasoma oval, rather broadly rounded posteriorly, 2.6 - 2.7 times as long as high in apical third (Figs 4-5)……………………………………………………………………......***A. dentifer* Tobias, 1976**



Figures 2-5.

A. dentifer Tobias:
2 – head, dorsal aspect;
3 – head, frontal aspect;
4 –metasoma, dorsal aspect;
5 – metasoma, lateral aspect.

- Apical border of clypeus truncate, medially with a large dentata tubercle, temple about equal to eye in dorsal view, ocelli small, OOL=4.0 OD (Figs 6,7); metasoma rounded posteriorly, 3.2 - 3.5 times as long as high in apical third (Fig. 8)…………… ***A. abdominator* (Dahlbom, 1833)**



Figures 6-9.

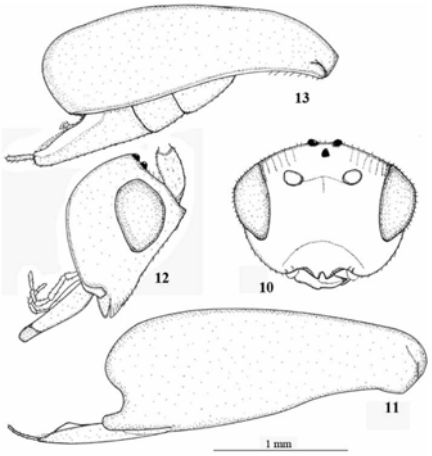
A. abdominator (Dahlbom):
6 – head, dorsal aspect;
7 – head, frontal aspect;
8 –metasoma, lateral aspect;

A. kasparyani Tobias:
9 – metasoma, dorsal aspect.

4. Metasoma strongly narrowed distally (Fig. 9)................................... ***A. kasparyani* Tobias, 1976**

- Metasoma widened or dorsoventrally flattened distally (Fig. 14)…………………………………**5**

5. Labiomaxillary complex not exerted (Fig. 10); metasoma with bifurcate flange posterioventrally, hypopygium long, narrow in lateral view (Fig. 11)….***A. excisa*** **(Herrich-Schäffer, 1838)**

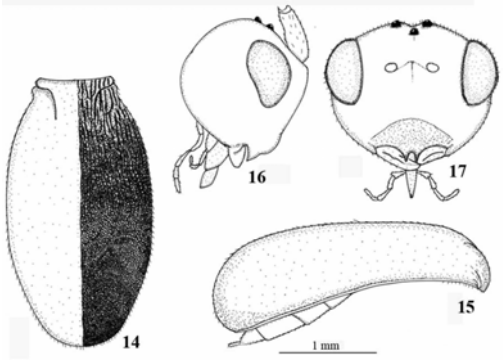


Figures 10-13.
A. excisa (Herrich,Schäffer):
10 – head, frontal aspect;
11 – metasoma, lateral aspect;
A. caucasica Kokoujev:
12 –head, lateral aspect;
13 – metasoma, lateral aspect.

- Labiomaxillary complex exerted (Figs 12, 16); metasoma with no bifurcate flange posterioventrally, hypopygium shorter, broader (Figs 13, 15) ….……**6**

6. Labiomaxillary complex strongly exerted, longer than malar space (Fig 12)……...……..….***A. caucasica*** **Kokoujev, 1895**

- Labiomaxillary complex weakly exerted, not longer than malar space (Figs 16, 17) ……..…….…….…… ***A. bicarinata*** **(Herrich-Schäffer, 1838)**



Figures 14-17.
A. bicarinata (Herrich,Schäffer):
14 – metasoma, dorsal aspect;
15 – metasoma, lateral aspect;
16 – head, lateral aspect;
17 – head, frontal aspect.

7. Ovipositor slender, long; sheaths slender; radius emmited from distal third of pterostigma…..……...……...……...……**8**

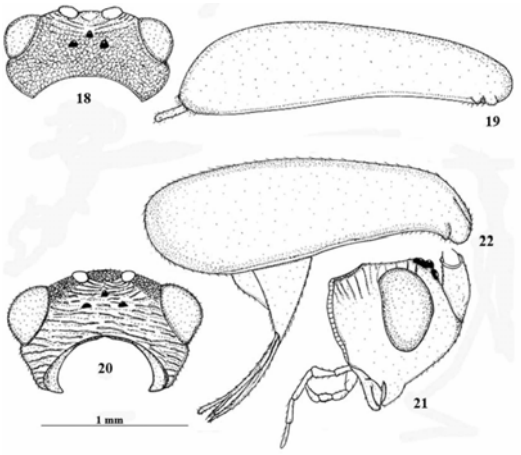
- Ovipositor short, thick, abruptly narrowed shortly before apex; sheaths short, wide; radius generally emmited from about middle of pterostigma…….……..**12**

8. Face completely irregularly rugose, head pale in colour, sometimes completely so except for ocellar triangle……..……..…….....……**9**

- Face punctate, sometimes regularly reticulate, rugose, head black……....……...**11**

9. Head rounded, not strongly contracted behind eyes; temple rounded, slightly shorter than eye in dorsal view (Fig.18); metasoma 3.5 - 4.0 time as long as high in apical third (Fig. 19)……..……..…….....……**10**

- Head broad, strongly contracted behind eyes; temple straight, about half length of eye in dorsal view (Figs 20, 21); metasoma 3.2 - 3.3 time as long as high in apical third (Fig. 22)…….…….....… ***A. gonocephala*** **Wesmael, 1835**



Figures 18-22.

A. disparilis Tobias:
18 – head, dorsal aspect;
19 – metasoma, lateral aspect;

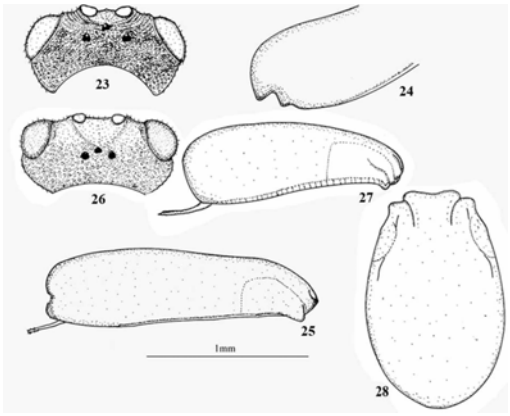
A. gonocephala Wesmael:
20 – head, dorsal aspect;
21 – head, lateral aspect;
22 – metasoma, lateral aspect.

10. Hind coxa always strongly, longitudinally striate; ocelli small, OOL=3.8,4.0 OD (Fig. 18)……..……..……..…..…….***A. disparilis*** **Tobias, 1986**

- Hind coxa largely smooth punctate; ocelli small, OOL=3.0,3.5 OD……..…….***A. klugii*** **(Nees von Esenbeck, 1816)**

11. Temple at least equal to eye in dorsal view (Fig. 23); metasoma emarginate posterioventrally (Figs 24, 25) ……..……....……***A. annularis*** **(Nees, 1816)**

- Temple shorter than eye in dorsal view (Fig. 26); metasoma slightly emarginate posterioventrally (Figs 27, 28).....…….***A. grahami*** **Huddleston, 1984**



Figures 23-28.

A. annularis (Nees):
23 – head, dorsal aspect;
24,25 – metasoma, lateral aspect;

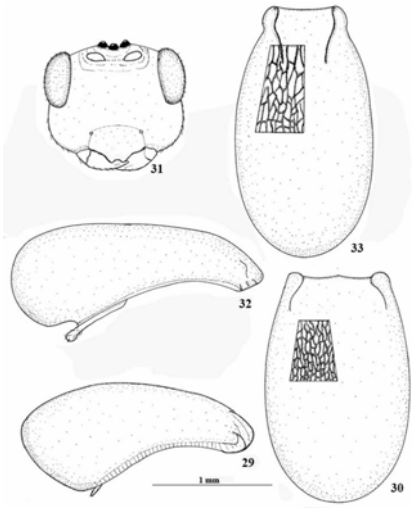
A. grahami Huddleston:
26 – head, dorsal aspect;
27 – metasoma, lateral aspect;
28 – metasoma, dorsal aspect.

12. Face generally completely smooth, punctate, scupture of clypeus not contrasting strongly with that of face, face sometimes finely and regularly reticulate, rugose; clypeus rounded apically or two small distinct dentate tubercles……..…..……**13**

- Face completely, strongly irregularly rugose, never finely reticulate, sculptere of clypeus often smooth, punctate in contrast to that of face; clypeus generally with a single medial tubercle (except *armata*)……..……..……**14**

13. Mandible at base with a deep, semisircular depression, clypeus rounded; metasoma oval, 1.5 times as long as its maximum width, reticulate, rugose at base, rugose, punctate apically, ovipositor short and slim at base (Figs 29, 30)…….***A. varipes*** **Wesmael, 1835**

- Mandible at base with a vertical, parellel, sided depression, clypeus two small distinct dentate tubercles (Fig. 31); metasoma oval, 1.8 times as long as its maximum width, coarsely irregularly reticulate, rugose, ovipositor short and thick at base (Figs 32, 33) …….. ***A. bidentula*** **Wesmael, 1835**

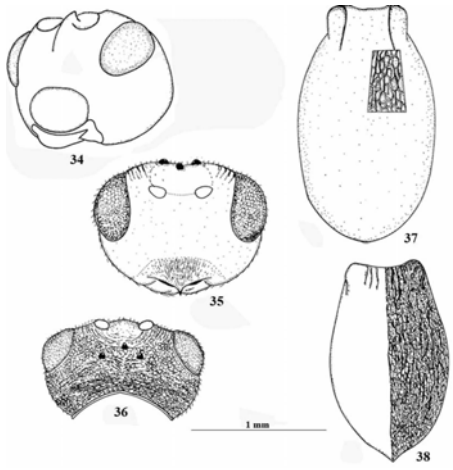


Figures 29-33.

A. varipes Wesmael:
29 – metasoma, lateral aspect;
30 – metasoma, dorsal aspect;

A. bidentula Wesmael:
31 – head, frontal aspect;
32 – metasoma, lateral aspect;
33 – metasoma, dorsal aspect.

14. Antenna very short, 22 segmented……..……..…….***A. brevicornis*** **Wesmael, 1835**
- Antenna longer, generally more than 30 segmented……..……..…...**15**
15. Interantennal carina strongly raised into an erect triangular flange between scapes, clypeus rounded (Fig. 34)……..……..……***A. armata*** **Wesmael, 1835**
- Interantennal carina present but never strongly raised into an erect triangular flange between scapes, clypeus produced with a single medial tubercles (Fig. 35, 41).....**16**
16. Temple equal in length to eye in dorsal view (Fig. 36); metasoma short, oval, larger specimens the apex is often rounded, particularly in specimens of smaller produced into a tubercle (Figs 37, 38)…….…....***A. quadridentata*** **Wesmael, 1835**
- Temple generally conspicuously longer than eye in dorsal view (Fig. 39), metasoma longer, without tubercle at apex (Fig. 40)……...…….……...……..…….**17**

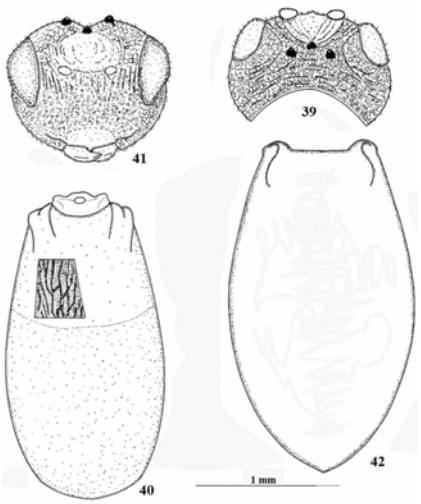


Figures 34-38.

A. armata Wesmael:
34 – head, frontal aspect;

A. quadridentata Wesmael:
35 – head, frontal aspect;
36 – head, dorsal aspect;
37, 38 – metasoma, dorsal aspect.

17. Metasoma rather narrow, almost parellel-sided in dorsal view (Fig. 40), pale yellow in proximal third ……..……...……..…….***A. rufipes*** **(Latreille, 1809)**
- Metasoma elongate oval, strongly narrowed posteriorly in dorsal view (Fig. 42), black…….…….…….…….***A. dispar*** **Fahringer, 1934**



Figures 39-42.

A. rufipes (Latreille):
39 – head, dorsal aspect;
40 – metasoma, dorsal aspect;
41 – head, frontal aspect;

A. dispar Fahringer:
42 – metasoma, dorsal aspect.

Tribe: Chelonini Förster, 1862
***Ascogaster* Wesmael, 1835**

***Ascogaster abdominator* (Dahlbom, 1833)**
Chelonus abdominator Dahlbom, 1833:165. Holotype ♀, Sweden: 'Esperod', Fallèn colln (ZI).

Distribution: Palaearktik.

Material examined: Eskişehir, Sündiken, Asarlık, pine forest, 1676 m, 09.VII.2007, 3♀♀; Trabzon, Çaykara, Uzungöl, pine forest, 1123 m, 04. VII.2004, 1♀. Antalya, Isparta, Kastamonu, Kırklareli, Ordu (Beyarslan 1985, Aydogdu & Beyarslan 2007).

***Ascogaster annularis* (Nees, 1816)**
Sigalphus annularis: Nees von Esenbeck, 1816 Mag. Ges. Nat. Fr. Berl. 7:264, ♂.

Distribution: Palaearktik, Avustralya: Java.

Material examined: Elazığ, Baskil, Hacımustafa, orchard, 1436 m, 04.VI.2007, 1♀; Gümüşhane, Kelkit, Gürüz Dağı, Rosaceae, 1871 m, 02.VII.2004, 1♀. Edirne, Kütahya (Beyarslan et al. 2002, Aydogdu & Beyarslan 2007).

***Ascogaster armata* Wesmael, 1835**
Ascogaster armatus Wesmael, 1835 Nouv. Mem. Acad. Brux. 9:233, ♀♂.

Distribution: Palaearktik.

Material examined: Adana, Antalya (Beyarslan 1985).

***Ascogaster bicarinata* (Herrich-Schäffer, 1838)**
Chelonus bicarinatus Herrich-Schäffer, 1838 Faunae Insect. German.: 154, ♀.

Distribution: Palaearktik.

Material examined: Ankara, Beypazarı, Akkavak, crop field, 527 m, 08.VI.2007, 2♀♀, 1♂; Artvin, Yusufeli, Küplüce, orchard, 842 m, 01.VII.2005, 1♀; Bartın, Amasra, Kurucaşile, Rosaceae, 129 m, 27.V.2007, 2♀♀; Elazığ, Baskil, Hacımustafa, orchard, 1436 m, 04.VI.2007, 6♀♀, 4♂♂; Sün, pasture, 1123 m, 12.VI.2008, 1♂; Erzincan, Ekşisu, pasture, 1205 m, 15.VI.2008, 1♂; Kayseri, Talas, Başakpınar, crop field, 1421 m, 06.VI.2007, 2♀♀, 2♂♂; İncesu, Örenşehir, orchard 1058 m, 14.IX.2006, 2♀♀; Kırıkkale, Irmak, orchard, 654 m, 16.IX.2006, Sivas, Kangal, Yeşildere, crop field, 1600 m, 01.VI.2007, 3♀♀, 2♂♂; Tepeönü, pasture, 1306, 01.VI.2007, 1♀; Ulaş, Yağdonduran, crop field, 1630 m, 01.VI.2007, 2♀♀; Zara, Ağalıkçay, crop field, 1427 m, 31.V.2007, 3♀♀, 1♂; Zara, Bulakbaşı, pasture, 1297 m, 31.V.2007, 1♀; Malatya, Akçadağ, Darıca, crop field, 1540 m, 05.VI.2007, 7♀♀; Yozgat, Kabaktepe, pine forest, 1380 m, 29.V.2007, 1♀; Akdağmadeni, Gökdere, Rosaceae 1194 m, 30.VII.2007, 2♀♀. Adana, Amasya, Balıkesir, Bilecik, Bolu, Bursa, Çanakkale, Çorum, Karabük, Kastamonu, Kırklareli, İstanbul, Ordu, Samsun, Tekirdağ, Tokat (Beyarslan and İnanç, 1990; Aydogdu and Beyarslan 2007).

***Ascogaster bidentula* Wesmael, 1835**
Ascogaster bidentulus Wesmael, 1835 Nouv. Mem. Acad. Brux. 9: 230, ♀.

Distribution: Palaearktik, Oriental.

Material examined: Kırklareli, İzmir (Beyarslan et al. 2002, Aydogdu & Beyarslan 2007).

***Ascogaster brevicornis* Wesmael, 1835**
Ascogaster brevicornis Wesmael 1835 Nouv. Mem. Acad. Brux. 9: 239, ♀.

Distribution: Palaearktik.

Material examined: Tekirdağ, Şarköy, Güzelköy, orchard, 150 m, 26.VI.2003, 1♀.

***Ascogaster caucasica* Kokoujev, 1895**

Ascogaster caucasicus Kokoujev, 1895:82. Holotype ♀, U.S.S.R.: 'Lagodechi', v. 1881 (AS).

Distribution: Palaearktik.

Material examined: Eskişehir, Çatacık, Geyik Üretme Çiftliği, *Pinus nigra*, 1332 m, 09.VII.2007, 1♀, 1♂; Sündiken, Geriz, Rosaceae, 1266 m, 09.VII.2009, 1♀, 3♂♂; Türkmendağı, Çamlıca, crop field, 1010 m, 08.IX.2008, 1♀; Türkmendağı, Kavacık, *Pinus nigra*, 1230 m, 08.VII.2007, 1♀; Yozgat, Kuşçu, orchard, 1202 m, 29.V.2007, 1♂. Adana, Bolu, Edirne, Çanakkale, Tekirdağ (Beyarslan & İnanç 1990, Aydogdu & Beyarslan 2007).

***Ascogaster dentifer* Tobias, 1976**

Ascogaster dentifer Tobias, 1976: 236. Holotype ♂, U.S.S.R.: Armenia, Kefansky region, Tsav. Wood, 28.06.1971 (AS).

Distribution: Palaearktik.

Material examined: Gümüşhane, Kelkit, Yeniköy, orchard 1474 m, 02.VII.2004, 1♀. Bolu, Kırklareli, Sinop, Tekirdağ, Tokat (Aydogdu & Beyarslan 2007).

***Ascogaster dispar* Fahringer, 1934**

Ascogaster dispar Fahringer, 1934 Opusc. bracon. 3(5,8): 524, ♀, ♂.

Distribution: Palaearktik.

Material examined: Bilecik, Osmaneli, İçmeler, orchard, 800 m, 09.VII.1993, 1♀; Edirne, Meriç, pasture 60 m, 26.VII.2000, 1♀; Kırklareli, Lüleburgaz, Seyitler, pasture, 75 m, 18.VII.2001, 1♂; Sinop, Demirci, pasture, 30 m, 03.VII.2001, 2♀♀, 1♂. Adana, İçel (Beyarslan & İnanç 1990).

***Ascogaster disparilis* Tobias, 1986**

Ascogaster disparilis Tobias, 1986 S.S.C.B. Band III: Hym. IV. Nauka, Lening., 553, ♂.

Distribution: Palaearktik.

Material examined: Samsun (Aydogdu & Beyarslan 2006).

***Ascogaster excisa* (Herrich-Schäffer, 1838)**

Chelonus excisus Herrich-Schäffer, 1838 Faunae Insect. German.: 153, ♀.

Distribution: Palaearktik.

Material examined: Amasya, Merzifon, Tavşandağı, Uzunağaç, beech forest, 1571 m, 27.VIII.2004, 1♀. Edirne (Aydogdu & Beyarslan 2007).

***Ascogaster gonocephala* Wesmael, 1835**

Ascogaster gonocephalus Wesmael, 1835 Nouv. Mem. Acad. Brux. 9: 240, ♂.

Distribution: Palaearktik.

Material examined: Malatya, Çiftlik, *Prunus armeniaca*, 909 m, 18.VII.2007, 1♀; Yozgat, Şefaatli, Karanlıkdere, crop field, 840 m, 29.V.2007, 1♀. Erzurum, Çorum (Gültekin & Güçlü 1997, Aydogdu & Beyarslan 2007).

***Ascogaster grahami* Huddleston, 1984**

Ascogaster grahami Huddleston, 1984 Bull . Br. Mus. Nat. (Ent.) 49 (5): 362, ♀.

Distribution: Oriental, Palaearktik.

Material examined: Artvin, Yusufeli, Demirdöven, cherry orchard, 1463 m, 02.07.2005, 2♀♀, 1♂. Kırklareli (Aydogdu & Beyarslan 2007).

***Ascogaster kasparyani* Tobias, 1976**

Ascogaster kasparyani Tobias, 1976: 233, Holotype ♂, U.S.S.R.; Gruzia, Bogdonovka (AS).

Distribution: Palaearktik.

Material examined: Malatya, Darende, Yazıköy, *Prunus armeniaca*, 909 m, 05.VI.2007, 1♂; Malatya, Doğanşehir, Polatdere, orchard, 1195 m, 02.VI.2007, 1♀: Yozgat, Akdağmadeni, Gökdere, Rosaceae, 1194 m, 30.VII.2007, 1♀.

***Ascogaster klugii* (Nees von Esenbeck, 1816)**

Sigalphus klugii Nees von Esenbeck (1813) 1816 Mag. Ges. Nat. Fr. Berl. 7: 263, ♀ ♂.

Distribution: Palaearktik.

Material examined: Tekirdağ, Muratlı, Arzulu, crop field, 105 m, 09.VI.2001, 1♀.

Turkey (Papp, 1994).

***Ascogaster quadridentata* Wesmael, 1835**

Ascogaster quadridentatus Wesmael, 1835 Nouv. Mem. Acad. Brux. 9: 237, ♀ ♂.

Distribution: Nearctic, Neotropical, Oceanic, Oriental, Palaearktik.

Material examined: Adapazarı, Hendek, Hüseyinşeyh, Corylus orchard, 220 m, 27.VI.2001, 2♀♀; Ankara, Haymana, Balakhisar, orchard, 1080 m, 20.VII.2007, 2♀♀; Artvin, Yusufeli, Bostancılar, orchard, 833 m, 01.VII.2005, 2♀♀, 2♂♂; Bayburt, pasture, 1562 m, 30.VIII.2004, 1♀, Denizli, Tavas, Tekkeköy, orchard, 1000 m, 27.VI.1998, 1♀; Gümüşhane, Şiran, Arıtaş, pasture, 1300 m, 02.VII.2004, 1♀, 1♂, İstanbul, Gaziosmanpaşa, Tayakadın, 06.VIII.2009, apple orchard, 60 m, 1♀ 2♂♂; İzmir, B. Menderes, Ziraat Fak. Kampüsü, orchard, 50 m, 18.IX.1996, 3♀♀, 1♂; Konya, Yalıhöyük, orchard, 1126 m, 09.IX.2006, 1♀; Niğde, Çiftlik, Sultanpınarı, orchard, 1629 m, 18.VII.2007,

1♀; Bor, Kayı, orchard, 1629 m, 18.VII.2007, 2♀♀, 1♂; Uşak, Banaz, orchard, 820 m, 27.VII.1997, 1♀. Adana, Amasya, Edirne, Balıkesir, Bartın, Bilecik, Bolu, İstanbul, Kastamonu, Karabük, Ordu, Samsun, Tekirdağ (Aydogdu & Beyarslan 2007, Beyarslan & İnanç 1990).

***Ascogaster rufipes* (Latreille, 1809)**

Sigalphus rufipes: Latreille 1809 Genera Crust. Insects. 4: 14, ♀♂.

Distribution: Oriental, Palaearktik.

Material examined: Muğla, Köyceğiz, Yangı, orchard, 100 m, 25.VI.1998, 1♀. Adana, Balıkesir, Edirne, Kırklareli (Aydogdu & Beyarslan 2007, Beyarslan & İnanç 1990).

***Ascogaster varipes* Wesmael, 1835**

Ascogaster varipes Wesmael, 1835 Nouv. Mem. Acad. Brux. 9: 234, ♀♂.

Distribution: Palaearktik.

Material examined: Eskişehir, Çatacık, Geyik Üretme Çiftliği, *Pinus nigra*, 1332 m, 09.VII.2007, 1♀. Kırklareli, İstanbul, Ordu (Aydogdu & Beyarslan 2007).

Discussion

This review is concerned with the Turkey species of *Ascogaster*, a cheloninae braconid genus. According to our own records and according to literature 18 species of *Ascogaster* are known to be present in Turkey. Of these, two species (*Ascogaster brevicornis* and *A. kasparyani*) are the first records for Turkish fauna. *Ascogaster brevicornis, A. disparilis* and *A. klugii* have been recorded from a single locality in Turkey and are considered to be rare in Turkey. *A. disparilis* has previously only been been recorded in Krasnodar, Russia, The discovery of this species in this study represents the second record from Western Palaearctic. Apart from Holarctic, *A. quadridentata* which show broad distribution, *A. bicarinata* which is represented by many samples in the study area, shows broad distribution in Turkey. The broad distribution of *A. quadridentata* appears to have resulted in intraspecific variation in some morphological structures. In some specimens, particularly those of smaller than average size, the metasoma is narrower and flatter in the dorsal view.

The results of this study clearly show that the taxonomy and distribution of *Ascogaster* species is far from being fully recorded even in Turkey which is considered a well documented region. As a result it is recommended a detailed revision of the Turkey *Ascogaster* fauna should be performed.

Since Anatolia and Thrace are placed within the Palaearctic area, the current zoogeographic component and structure of species in this area are regarded as being of Palaearctic fauna. The fact that most of the *Ascogaster* species detected in Turkey up to now are Palaearctic-distributed species shows coherency with this situation. As a result of this study Turkey *Ascogaster* fauna now comprises 33% of the Palaearctic fauna.

Cheloninae is an important group of parasitic wasps. They parasitize significant pests of crops, vegetables and fruit trees pests, and help in the natural control of Lepidopterous pests. Cheloninae wasps are solitary koinobionts endoparasites that is the main feature of their biology. In Turkey, *Archips rosana* (Linnaeus, 1758) (Lepidoptera: Tortricidae) is considered one of the most abundant and damaging tortricid species occurring on fruit crops. The leafrolling-larvae damage the fruit of apple, pear, plum, blueberries, caneberries and other plants, and feed on the leaves of many forest and ornamental trees (Özdemir et al. 2005). In this paper a total of three parasitoid species was obtained by rearing of *A. rosana: Ascogaster bicarinata*, *A. quadridentata* and *A. rufipes*. Our research recorded for the first time globally *A. rosana as* the new natural host of *A. bicarinata.*

A. quadridentata which is a member of Cheloninae subfamily have been used as a biological control agent against many Tortricoid moths in orchards (Tomkins et al. 1987, Wharton et al. 1998). Most of the species, have been identified in fruit orchards within the research area. As a result these wasps do not protect the fruit from damage and its benefit is in reducing tortricoid moth populations long-term. Although this parasitoid can survive in organic and IFP orchards, the tortricoid moth populations should be too low for it to be significant. IFP is defined as: the economical production of high quality fruit, giving priority to ecologically safer methods, minimizing the undesirable side effects and use of agrochemicals, and to enhance the safeguards to the environment and human health.

There now exists, for the hymenopterous subfamily Cheloninae, a serious need for a global revision of the most significant species both in natural ecosystems and agricultural land. The underlying reasons for the presence of the identified *Ascogaster* species found in this Turkish study will require special publication.

Acknowledgements. We would like to cordially thank Dr. Mustafa Özdemir (Ankara Plant Protection Research Institute) for identifying Lepidoptera species.

References

Aydoğdu, M., Beyarslan, A. (2006): *Ascogaster disparilis* Tobias, 1986 (Hymenoptera: Braconidae: Cheloninae), the second record for Palaearctic Region from Turkey. Linzer Biologische Beitrage 38 (1): 393-396.

Aydoğdu, M., Beyarslan, A. (2007): Parasitoid species of the genera *Ascogaster* and *Chelonus* (Hymenoptera: Braconidae: Cheloninae) from the Marmara, Western and Middle Black Sea Regions of Turkey. Acta Entomologica Slovenica 15(1): 75-90.

Beyarslan, A. (1985): Die im Mittelmeergebiet der Türkei vertretenen Cheloninae-Arten (Hym.: Braconidae) und ihre Verbreitung. Turkish Journal of Zoology 9(1): 12-19. [in Turkish with German summary].

Beyarslan A., Inanç F. (1990): Taxonomic investigations on the species of Cheloninae (Hymenoptera: Braconidae). X. Ulusal Biyoloji Kongresi 141–151.

Beyarslan, A., İnanc, F., Cetin, O., Aydogdu, M. (2002): Braconidae Species of Turkish Aegean Region. Parasitic Waps: Evolution, Systematics, Biodiversity and Biological Control. International Symposium 14,17. May. 2001, Köszeg, Hungary, George Melika and Csaba Thuroczy (editors), pp. 285-290.

Costea, G., Mustata, G. H., Lozan, A. (2002): Role of Braconidae (Hymenoptera) in limitation of Lepidoptera cabbage pest's populations in Romania. pp: 391-395. In: G. Melika, C. Thuroczy (eds), Parasitic Waps: Evolution, Systematics, Biodiversity and Biological Control. International Symposium 14-17 May 2001, Köszeg, Hungary.

Doğanlar, O. (2007): Distribution of European Leaf Roller, *Archips rosanus* (L.) (Lep.: Tortricidae) Egg Masses on Different Apple Cultivars. Asian Journal of Plant Sciences 6(6): 982-987.

Gültekin, L., Güçlü, Ş. (1997): Bioecology of *Bembecia scopigera* (Scopoli) (Lep.: Sesiidae) pest of sainfoin in Erzurum. Bitki Koruma Bülteni 37 (3/4): 101-110.

Huddleston, T. (1984): The Palaearctic species of *Ascogaster* (Hymenoptera: Braconidae). Bull. Br. Mus. nat. Hist. (Ent.), London, England 49(5): 341-392.

Özdemir, M., Özdemir, Y., Seven, S., Bozkurt, V. (2005): Orta Anadolu Bölgesinde Kültür Bitkilerinde Zararlı Tortricidae (Lepidoptera) Faunası Üzerine Araştırmalar. Bitki Koruma Bülteni 45(1/4): 17-44.

Papp, J., (1994): The dispersion of braconid wasps in oak forest of Hungary (Hymenoptera: Braconidae). Folia Entomologica Hungarica Rovartani Közlemenyek 5: 305-320.

Quicke, D.L.J., Basibuyuk, H.H., Fitton, M.G., Rasnitsyn, A.P. (1999): Morphological, palaeontological and molecular aspects of ichneumonoid phylogeny (Hymenoptera, Insecta). Zoologica Scripta 28: 175–202.

Sharkey, M.J., Wahl, D.B. (1992): Cladistics of the Ichneumonoidea (Hymenoptera). Journal of Hymenoptera Research 1: 15-24.

Shaw, S.R. (1997): Cheloninae. pp. 193-201. In: Wharton et al. (eds), Manual of the New World Genera of the Family Braconidae (Hymenoptera). Special Publication of the International Society of Hymenopterists.

Shenefelt, R.D. (1973): Braconidae 6 Cheloninae. pp. 813-936. In: Vander Vecht, J., Shenefelt, R.D. (eds), Hymenopterorum Catalogus (nova editio). W. Junk, 's Gravenhage, Netherlands.

Staudinger, O., Rebel, H. (1901): Catalog der lepidopteren des palearctischenn faunnengebietes. Berlin pp: 368.

Tobias, V.I., Belokobylskij, S. A., Kotenko A. G. (1986): Keys to The Insects The European part of USSR, 3 (4). MEDVEDEV,G.S. (ed.) New Delhi, Baba Barkha Nath, 900 pp.

Tomkins, A.R., Pennan, D.R., Chapman, R.B. (1987): Owerwintering of codling moth larvae in an abondoned Canterbury apple orchard. New Zealand Entomologist 10: 40-44.

Yu, D.S., Achterberg, C. van, Horstmann, K. (2006): World Ichneumonoidea 2004. Taxonomy, Biology, Morphology and Distribution (Braconidae). Taxapad 2005 (Scientific Names for Information Management) Interactive Catalogue on DVD/CDROM. Vancouver.

Wales, J. (2010): http://en.wikipedia.org/wiki/Anatolia. htm. 14.11.2010.

Wharton, A. R., Marsh, P. M., Sharkey, M. J. (1998): Manual of new World Genera of Braconidae (Hymenoptera). Special Publication of the International Society of Hymenopterists 1: pp.433.