

**Original article (Orijinal araştırma)**

**Studies on the fauna of Agathidinae (Hymenoptera: Braconidae) in the Western Black Sea Region of Turkey<sup>1</sup>**

Batı Karadeniz Bölgesi Agathidinae (Hymenoptera: Braconidae) Faunası üzerinde araştırmalar

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**Abstract**

This study was conducted to determine Agathidinae (Hymenoptera: Braconidae) fauna and to contribute to the distributional data of species in the Western Black Sea Region between 2001 and 2003. The study samples obtained from 25 different localities were collected using a sweep net during the day. Sixteen species were identified belonging to 3 genera. Ten species were recorded from the region for the first time: *Agathis lugubris* (Foerster, 1862), *A. malvacearum* Latreille, 1805, *A. nigra* Nees von Esenbeck, 1814, *A. rufipalpis* Nees von Esenbeck, 1814, *A. tibialis* Nees, 1812, *A. syngenesiae* Nees von Esenbeck, 1814, *A. varipes* Thomson, 1895, *Bassus dimidiator* (Nees, 1834), *B. tumidulus* (Nees, 1812), *D. caesa* (Klug, 1890).

**Keywords:** Agathidinae, Braconidae, West Black Sea Region, Turkey

**Öz**

Batı Karadeniz Bölgesi'nin Agathidinae (Hymenoptera: Braconidae) faunasını saptama amacı ile yapılan bu araştırmada 2001-2003 yılları arasında 25 farklı lokaliteden atrapla örnek toplanmıştır. Çalışma kapsamında 3 cinse ait 16 tür tespit edilmiştir. Saptanan örneklerden Batı Karadeniz Bölgesi için 10'u yeni kayıttır: *Agathis lugubris* (Foerster, 1862), *A. malvacearum* Latreille, 1805, *A. nigra* Nees von Esenbeck, 1814, *A. rufipalpis* Nees von Esenbeck, 1814, *A. tibialis* Nees, 1812, *A. syngenesiae* Nees von Esenbeck, 1814, *A. varipes* Thomson, 1895, *Bassus dimidiator* (Nees, 1834), *B. tumidulus* (Nees, 1812), *D. caesa* (Klug, 1890).

**Anahtar sözcükler:** Agathidinae, Braconidae, Batı Karadeniz Bölgesi, Türkiye

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## Introduction

Western Black Sea Region which is located in the north-west part of Turkey conforms 7% of the total area of the country. The area includes Bartın, Bolu, Düzce, Karabük, Kastamonu, Sinop, Zonguldak provinces; Küre, Ilgaz, Koroğlu, Bolu Mountains and Sakarya, Kızılırmak rivers. This region of Turkey consists of forests (67% of the area) and agricultural fields and meadows (33%) (Mayer & Aksoy, 1998).

Braconidae species are parasitoids of agriculture and forest pests. The Agathidinae is a moderately large subfamily of Braconidae with about 1200 described species (Yu et al., 2012). The agathidin wasps include very potential biocontrol agents so that they are important in the suppression of harmful species especially caterpillars (Lepidoptera). In Turkey, there was no detailed information available on Agathidinae until 1992. In Turkey, the first studies on agathidins were carried out by Zettel & Beyarslan (1992), Çetin & Beyarslan (2001).

In this study, our aims were to contribute to the fauna of Agathidinae and add new distributional records to this subfamily.

## Material and Methods

In the present study, agathidin species were collected from 25 localities in 7 provinces in western Black Sea Region between 2001 and 2003 (Figure 1). The sampling areas were mostly rural areas and they had different herbaceous and other favoured plant species for the adults of Agathidinae. Specimens caught with a sweep net were transferred by aspirator and killed with ethyl alcohol. All the agathidin specimens were pinned and put into collection boxes. They were deposited in the Entomological Museum, Trakya University, Department of Biology, Turkey. The works of Simbolotti & van Achterberg (1992, 1999) were used for taxonomical examination and identification of the materials. Localities sampled in the region and their coordinates, altitudes, habitat types and collecting dates were given in Table 1.

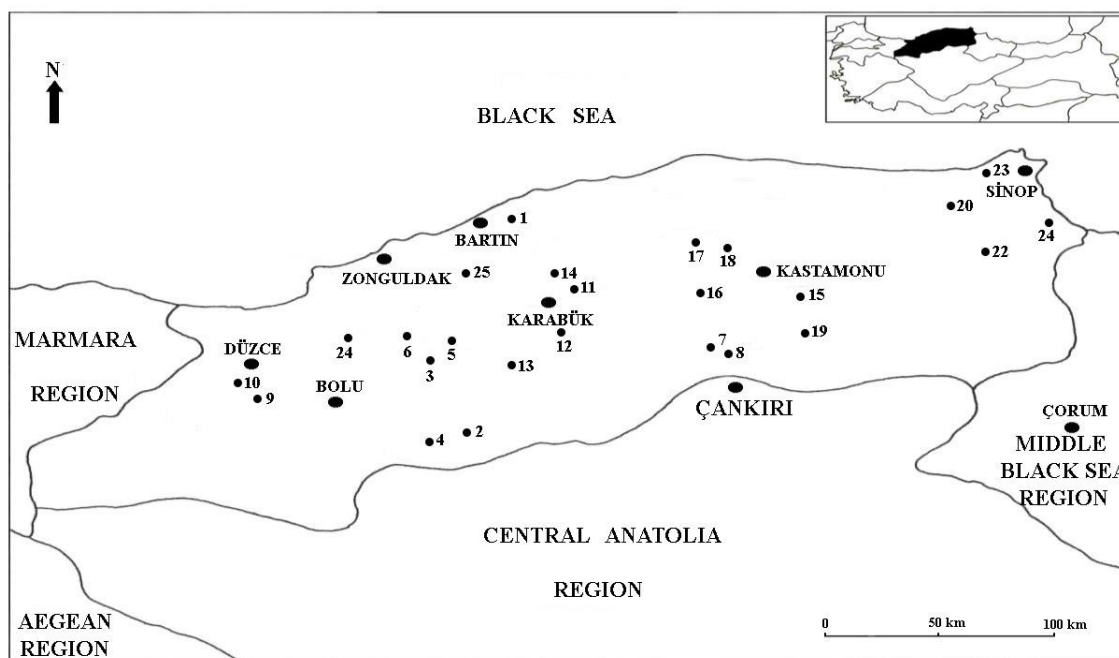


Figure 1. The map of the localities sampled in the study area.

Table 1. Localities sampled with their coordinates, altitudes, habitats, and collecting dates

Loc. No	Locality	Coordinate	Altitude (m)	Habitat	Collecting Date
1	Bartın-Çamlık	41° 38' 09"N 32° 20' 15"E	60	<i>Rubus fruticosus</i> L. Gramineae Umbelliferae	30.06.2001
2	Bolu-Aladağ-Kökez	40° 25' 55"N 31° 50' 02"E	1000	<i>Dryopteris</i> sp. <i>Lamium</i> sp. Boraginacea Labiatae Umbelliferae	27.08.2003
3	Bolu-Gerede-Günay	40° 48' 03"N 32° 11' 49"E	1200	Meadow	13.06.2002
4	Bolu-Karacasu-Gölcük	40° 40' 03"N 31° 27' 59"E	1200	Mix forest, meadow	26.08.2003
5	Bolu-Mengen-Kıyaslar	40° 58' 26" N 32° 04' 36"E	700	<i>Pinus</i> (Pinaceae), <i>Salix</i> (Salicaceae), meadow	28.06.2001
6	Bolu-Mengen-Siyamoğlu köyü	40° 59' 50" N 31° 45' 05" E	680	<i>Quercus</i> (Fagaceae) <i>Pinus</i> (Pinaceae), <i>Salix</i> (Salicaceae), meadow	28.6.2001
7	Çankırı-Ilgaz-Derbent Motel	40° 50' 40"N 33° 30' 10" E	1820	<i>Abies</i> sp., meadow	30.08.2002
8	Çankırı-Ilgaz-Kale	40° 57' 23"N 33° 39' 11"E	1000	Fruit garden, meadow	04.07.2001
9	Düzce-Kabalar	40° 40' 10"N 30° 45' 30" E	250	<i>Corylus</i> (Corylaceae), meadow	08.06.2002
10	Düzce-Kabalar-Şifalısu	40° 40' 10" N 30° 45' 30" E	200	<i>Rubus</i> (Rosaceae), <i>Corylus</i> (Corylaceae), Leguminoscea	03.09.2001
11	Karabük-Bostanbükü	41° 12' 54"N 32° 41' 16"E	390	Meadow	28.08.2002
12	Karabük-Çayköy	41° 01' 30" N 32° 39' 20" E	295	Wheat field	28.08.2002
13	Karabük-Eskipazar-Ortaköy	40° 55' 09"N 32° 34' 27"E	870	Meadow	28.08.2002
14	Karabük-Safranbolu-İnceçay-Sarıççek dağı	41° 20' 35" N 32° 36' 50" E	1000	<i>Pinus</i> (Pinaceae), <i>Quercus</i> (Fagaceae), <i>Ulmus</i> (Ulmaceae) forest, meadow	29.06.2001
15	Kastamonu-Akkaya	41° 15' 20" N 33° 51' 45" E	1150	<i>Pinus</i> (Pinaceae) forest, <i>Zea mays</i> (Poaceae), meadow	31.08.2002
16	Kastamonu-Araç-Akgeçit	41° 12' 43"N 32° 56' 41"E	400	Pine forest, meadow	28.06.2002
17	Kastamonu-Daday	41° 28' 43"N 33° 28' 00"E	700	Clover field, meadow	29.08.2002
18	Kastamonu-Daday-İnceğiz-Çiftlik	41° 32' 60"N 33° 19' 60"E	860	Pine forest	29.08.2002
19	Kastamonu-Tosya-Ekinci	41° 00' 55"N 34° 02' 24"E	1000	Fruit garden, meadow	31.08.2002
20	Sinop-Çangal Dağı-Ayancık-Bakırlıazıye	41° 43' 10" N 34° 45' 45" E	10	Mix forest, <i>Senesio</i> sp. (Asteraceae)	02.07.2001
21	Sinop-Demirci	41° 40' 50"N 35° 20' 05"E	21	Fruit garden, clover field, meadow	03.07.2001
22	Sinop-Kabalı	41° 51' 08"N 35° 3' 45"E	70	Fruit garden, meadow	03.07.2001
23	Sinop-Yeniçam	41° 50' 20" N 34° 59' 20" E	25	<i>Populus</i> (Salicaceae), <i>Rubus</i> (Hypericaceae)	06.09.2001
24	Zonguldak-Çukurören	41° 21' 35" N 31° 59' 11" E	70	<i>Quercus</i> (Fagaceae), meadow	29.06.2001
25	Zonguldak-Devrek-Davulga	41° 20' 49" N 32° 05' 45" E	280	<i>Quercus</i> (Fagaceae), <i>Urtica</i> (Urticaceae) <i>Rhododendron</i> (Ericaceae), <i>Trifolium</i> (Fabaceae), <i>Hypericum</i> (Clusiaceae), <i>Umbellifera</i> , (Apiaceae), <i>Prunus</i> (Rosaceae)	29.06.2001

## Results

### Agathidinae

#### *Agathis* Latreille, 1804

##### *Agathis anglica* Marshall, 1885

**Material Examined:** Loc. 6, 10♀♀, 2♂♂; Loc. 8, 1 ♀; Loc. 25, 1♀.

**Distribution in Turkey:** Adana, Aegean Region, Afyon, Amasya, Antakya, Artvin, Bartın, Bayburt, Bolu, Bursa, Çankırı, Diyarbakır, Edirne, Elazığ, Erzincan, Erzurum, Gaziantep, Gümüşhane, Hakkari, Isparta, İçel, Kahramanmaraş, Karaman, Kayseri, Kırklareli, Konya, Malatya, Nevşehir, Niğde, Ordu, Rize, Samsun, Sivas, Şanlıurfa, Tokat, Trabzon, Yozgat, Zonguldak (Zettel & Beyarslan, 1992; Simbolotti & van Achterberg, 1999; Çetin & Beyarslan, 2001; Beyarslan et al., 2002a, b; Güçlü & Özbek, 2002; Çetin Erdoğan & Beyarslan 2009; Çetin Erdoğan et al., 2009; Çetin Erdoğan, 2013; Çetin Erdoğan, 2014; Çetin Erdoğan & Beyarslan, 2016).

**Distribution** Palaearctic, Oriental (Yu et al., 2012).

##### *Agathis fulmeki* Fischer, 1957

**Material Examined:** Loc. 1, 4 ♂♂; Loc. 6, 2♀♀, 5 ♂♂; Loc. 25, 1♀.

**Distribution in Turkey:** Amasya, Aegean Region, Bartın, Bilecik, Bolu, Bozcaada, Bursa, Edirne, Erzurum, Kırklareli, Malatya, Ordu, Yozgat, Zonguldak (Çetin & Beyarslan, 2001; Beyarslan et al., 2002b; Güçlü & Özbek, 2002; Çetin Erdoğan, 2013; Çetin Erdoğan & Beyarslan, 2016).

**Distribution:** Palaearctic (Yu et al., 2012).

##### *Agathis fuscipennis* (Zetterstedt, 1838)

**Material Examined:** Loc. 6, 4 ♀♀; Loc. 7, 1 ♀.

**Distribution in Turkey:** Afyon, Amasya, Artvin, Bilecik, Bolu, Bozcaada, Bursa, Çankırı, Elazığ, Erzurum, Gümüşhane, İçel, Kırklareli, Kütahya, Malatya, Tekirdağ, Tunceli (Zettel & Beyarslan, 1992; Simbolotti & van Achterberg, 1999; Çetin & Beyarslan, 2001; Beyarslan et al., 2002a; Çetin Erdoğan & Beyarslan, 2009; Çetin Erdoğan, 2013).

**Distribution:** Palaearctic (Yu et al., 2012).

##### *Agathis lugubris* (Foerster, 1862)

**Material Examined:** Loc. 1, 1 ♂, 4 ♂♂; Loc. 2, 1♀; Loc. 5, 2 ♂♂, 2 ♀♀; Loc. 7, 5 ♀♀; Loc. 11, 1 ♀; Loc. 13, 1 ♂; Loc. 14, 2 ♀♀; Loc. 17, 1♂; Loc. 25, 4 ♂♂.

**Distribution in Turkey:** Antalya, Aegean Region, Bayburt, Bursa, Bozcaada, Erzurum, Kütahya (Zettel & Beyarslan, 1992; Çetin & Beyarslan, 2001; Beyarslan et al., 2002a,b; Güçlü & Özbek, 2002; Çetin Erdoğan & Beyarslan, 2009).

**Distribution:** Palaearctic (Yu et al., 2012).

### ***Agathis malvacearum* Latreille, 1805**

**Material Examined:** Loc. 6, 8 ♀♀, 4 ♂♂; Loc. 5, 1 ♀; Loc. 11, 1 ♀; Loc. 14, 2 ♀♀; Loc. 15, 1 ♀; Loc. 19, 1 ♀; Loc. 20, 1 ♀; Loc. 25, 4 ♀♀.

**Distribution in Turkey:** Adıyaman, Aegean Region, Ankara, Artvin, Edirne, Elazığ, Erzurum, Konya, Malatya, Mardin, Mersin, Niğde, Sivas, Trabzon, Tunceli (Nixon,1986; Simboloti & van Achterberg, 1999; Çetin & Beyarslan, 2001; Beyarslan et al., 2002b; Güçlü & Özbek, 2002; Çetin Erdoğan & Beyarslan, 2009; Çetin Erdoğan et al., 2009; Çetin Erdoğan, 2013; Çetin Erdoğan, 2014; Çetin Erdoğan & Beyarslan, 2016).

**Distribution:** Palaeartic, Nearctic (Yu et al., 2012).

### ***Agathis nigra* Nees von Esenbeck, 1814**

**Material Examined:** Loc. 24, 1 ♂.

**Distribution in Turkey:** Aegean Region, Aksaray, Antakya, Edirne, Elazığ, Erzurum, Gümüşhane, Isparta, İçel, Kırklareli (Zettel & Beyarslan, 1992; Çetin & Beyarslan, 2001; Beyarslan et al., 2002b; Güçlü & Özbek, 2002; Çetin Erdoğan & Beyarslan, 2009; Çetin Erdoğan & Beyarslan, 2016).

**Distribution:** Palaeartic (Yu et al., 2012).

### ***Agathis rufipalpis* Nees von Esenbeck, 1814**

**Material Examined:** Loc. 6, 1 ♀; Loc. 7, 2 ♀♀; Loc. 21, 1 ♀.

**Distribution in Turkey:** Aegean Region, Antakya, Antalya, Artvin, Bilecik, Bozcaada, Burdur, Bursa, Edirne, Elazığ, Erzurum, Isparta, Kırklareli, Malatya, Şanlıurfa (Zettel & Beyarslan, 1992; Çetin & Beyarslan, 2001; Beyarslan et al., 2002a, b; Çetin Erdoğan & Beyarslan, 2009; Çetin Erdoğan, 2013; Çetin Erdoğan, 2014).

**Distribution:** Palaeartic (Yu et al., 2012).

### ***Agathis tibialis* Nees, 1812**

**Material Examined:** Loc. 6, 1 ♀.

**Distribution in Turkey:** Kayseri (Kohl, 1905).

**Distribution:** Palaeartic (Yu et al., 2012).

### ***Agathis syngenesiae* Nees von Esenbeck, 1814**

**Material Examined:** Loc. 10, 1 ♀; Loc. 19, 1 ♀; Loc. 21, 10 ♂♂, 11 ♀♀; Loc. 20, 1 ♀; Loc. 22, 03.07.2001, 1 ♂; Loc. 23, 06.09.2001, 1 ♂.

**Distribution in Turkey:** Adana, Aegean Region, Balıkesir, Bozcaada, Bursa, Çanakkale, Edirne, Erzurum, Gaziantep, İçel, İstanbul, Kırklareli, Şanlıurfa, Tekirdağ (Zettel & Beyarslan, 1992; Nixon,1986; Çetin & Beyarslan, 2001; Beyarslan et al., 2002b; Güçlü & Özbek, 2002).

**Distribution:** Palaeartic (Yu et al., 2012).

***Agathis varipes* Thomson, 1895**

**Material Examined:** Loc. 6, 1 ♀.

**Distribution in Turkey:** Aegean Region, Isparta, Sivas, Tunceli, (Zettel & Beyarslan, 1992; Beyarslan et al., 2002b; Güçlü & Özbek, 2002; Çetin Erdoğan, 2013; Çetin Erdoğan & Beyarslan, 2016).

**Distribution:** Palaearctic (Yu et al., 2012).

***Bassus Fabricius, 1804***

***Bassus calculator* (Fabricius, 1798)**

**Material Examined:** Loc. 1, 1 ♀.

**Distribution in Turkey:** Bartın (Çetin Erdoğan & Beyarslan, 2006).

**Distribution:** Western Palaearctic, (Yu et al., 2012).

***Bassus cingulipes* (Nees, 1812)**

**Material Examined:** Loc. 2, 1 ♀.

**Distribution in Turkey:** Bolu (Çetin Erdoğan & Beyarslan, 2006).

**Distribution:** Palaearctic, Oriental (Yu et al., 2012).

***Bassus conspicuus* (Wesmael, 1837)**

**Material Examined:** Loc. 5, 1 ♀.

**Distribution in Turkey:** Bolu, Malatya (Çetin Erdoğan & Beyarslan, 2006; Çetin Erdoğan, 2013).

**Distribution:** Palaearctic, Nearctic, Oriental (Yu et al., 2012).

***Bassus dimidiator* (Nees, 1834)**

**Material Examined:** Loc. 4, 1 ♀.

**Distribution in Turkey:** Samsun, Erzurum (Zettel & Beyarslan, 1992; Güçlü & Özbek, 2002).

**Distribution:** Palaearctic, Nearctic, Oriental (Yu et al., 2012).

***Bassus tumidulus* (Nees, 1812)**

**Material Examined:** Loc. 9, 1 ♀; Loc. 3, 2 ♂♂; Loc. 4, 1 ♀.

**Distribution in Turkey:** Aegean Region, Antalya, Bozcaada, Burdur, Erzurum, Gökçeada, İçel, İstanbul, Konya, Malatya, Mardin, Sivas, Tekirdağ, (Zettel & Beyarslan, 1992; Çetin & Beyarslan, 2001; Beyarslan et al., 2002a, b; Güçlü & Özbek, 2002; Çetin Erdoğan, 2013; Çetin Erdoğan, 2014; Çetin Erdoğan & Beyarslan, 2016).

**Distribution:** Palaearctic, Oriental (Yu et al., 2012).

### ***Disophrys caesa* (Klug, 1890)**

**Material Examined:** Loc. 12, 1 ♂; Loc. 16, 1 ♂; Loc. 18, 2 ♂♂; Loc. 17, 1 ♂; Loc. 21, 1 ♂.

**Distribution in Turkey:** Adapazarı, Aegean Region, Bayburt, Bilecik, Bursa, Çanakkale, Edirne, Malatya, Niğde, Rize, Sivas, Trabzon (Çetin & Beyarslan, 2001; Beyarslan et al., 2002b; Çetin Erdoğan & Beyarslan, 2009; Çetin Erdoğan, 2013; Çetin Erdoğan & Beyarslan, 2016).

**Distribution:** Palaearctic (Yu et al., 2012).

## **Discussion**

In the present study carried out in Western Black Sea Region. 16 Agathidin species belonging to 3 genera were identified from 25 localities (Agathis 10 species, Bassus 5 species and Disophrys 1 species). *Agathis lugubris* (Foerster, 1862), *Agathis malvacearum* Latreille, 1805, *Agathis nigra* Nees von Esenbeck, 1814, *Agathis rufipalpis* Nees von Esenbeck, 1814, *Agathis tibialis* Nees, 1812, *Agathis syngenesiae* Nees von Esenbeck, 1814, *Agathis varipes* Thomson, 1895, *Bassus dimidiator* (Nees, 1834), *Bassus tumidulus* (Nees, 1812), *Disophrys caesa* (Klug, 1890) are recorded for the first time in Western Black Sea Region.

The highest number of Agathidinae species was found in Bolu province (10 species). Compared with other provinces in the West Black Sea region, Düzce, Bartın and Karabük were found the lowest numbers of Agathidinae species.

In this study, *Agathis* was represented by ten species in the West Black Sea region. All of them were recorded in this study from the region.

Three Bassus species are known from this region, viz. *Bassus calculator*, *B. cingulipes* and *B. conspicuus* (Çetin Erdoğan & Beyarslan, 2006). However, *Bassus dimidiator* and *B. tumidulus* were recorded here for the first time from the West Black Sea Region.

*Disophrys caesa* is recorded as the species in the region belonging to the genus *Disophrys*. According to our data *Agathis lugubris* is the most widely spread species in this region. The species was found in 9 localities. The highest number of specimens (14 females and 12 males) belongs to *Agathis syngenesiae*.

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