



Original article (Orijinal araştırma)

Ichneumonidae (Hymenoptera) fauna of Kovada Lake National Park, Isparta, Turkey¹

Kovada Gölü Milli Parkı (Isparta, Türkiye) Ichneumonidae (Hymenoptera) faunası

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Abstract

This study examined the Ichneumonidae (Hymenoptera) fauna of Kovada Lake National Park, Isparta, Turkey. Ichneumonidae specimens were collected between April 2010 and October 2014 by sweep net and malaise traps at six stations. In total, 455 individual Ichneumonidae within 10 subfamilies were collected. Among these, 22 genera and 31 species were identified. Six species are new records for Turkey, *Lissonota frontalis* (Desvignes, 1856), *Bathythrix strigosa* (Thomson, 1884), *Hemiteles similis* (Gmelin, 1790), *Diadromus albinotatus* (Gravenhorst, 1829), *Chorinaeus scrobipalpa* Aeschlimann, 1983 and *Trieceles bellulus* Kusigemati, 1984.

Keywords: Hymenoptera, Ichneumonidae, Isparta, Kovada Lake National Park

Öz

Bu çalışma, Isparta İli Kovada Gölü Milli Parkı Ichneumonidae (Hymenoptera) faunası incelenmiştir. Ichneumonidae örnekleri Nisan 2010 ile Ekim 2014 yılları arasında atrap ve malaise tuzağı ile toplanmıştır. Toplam 10 altfamilyaya ait 455 birey toplanmıştır. Bunlardan 22 cins ve 31 tür teşhis edilmiştir. Teşhis edilen türlerden 6 tanesi Türkiye için yeni kayıttır. Bu türler; *Lissonota frontalis* (Desvignes, 1856), *Bathythrix strigosa* (Thomson, 1884), *Hemiteles similis* (Gmelin, 1790), *Diadromus albinotatus* (Gravenhorst, 1829), *Chorinaeus scrobipalpa* Aeschlimann, 1983, *Trieceles bellulus* Kusigemati, 1984.

Anahtar sözcükler: Hymenoptera, Ichneumonidae, Isparta, Kovada Gölü Milli Parkı

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Introduction

Parasitic Hymenoptera, a large insect group having a wide significance in terrestrial ecosystems (Shaw & Hochberg, 2001), constitute a specialized group of Hymenoptera, one of the mega insect orders (Stevens et al., 2007). The family Ichneumonidae with about 25,285 described species is the most diverse family of Hymenoptera (Yu et al., 2016). This family consist of 39 subfamilies (Quicke, 2015). Despite their abundance and importance in ecosystems as biological pest control, the taxonomy, ecology, and distribution of many groups of Ichneumonidae is still unknown (Riedel & Turrisi, 2013).

The number of Ichneumonidae species in Turkey has been recorded as 1,293 species in 57 genera (Yu et al., 2016). As a result of many studies (Özgen et al., 2010; Okyar et al., 2012; Çoruh & Özbek, 2013; Çoruh & Kolarov, 2013, 2016; Çoruh et al., 2013, 2014a, b, 2016, 2018, 2019; Riedel et al., 2014; Kolarov et al., 2014a, b, 2015, 2016, 2018; Çoruh & Çalmaşur, 2016; Özdan & Gürbüz, 2016; Riedel 2018a, b; Sarı & Çoruh, 2018) many new specimens have been added and the numbers of ichneumonid fauna of Turkey have now reached to about 1,268 species.

Kovada Lake, is located within the boundaries of the city of Isparta in southern Turkey. Kovada Lake and its surrounding were declared as Kovada Lake National Park in 1970 (Alkan, 2009). in 1992, Kovada Lake National Park was defined as a first level protected area. The area is 6,534 ha including its surroundings (Aslan & Karaca, 2012). The national park is located in the Mediterranean phytogeographic region. Kovada Lake National Park has a rich diversity of flora and fauna.

Although many studies have been concluded on Kovada Lake National Park, there have been no studies conducted on the Ichneumonidae fauna. Therefore, the aim of this study was to survey the Ichneumonidae fauna of the Kovada Lake National Park.

Materials and Methods

Sampling and collection

This study is based on Ichneumonidae specimens gathered from April to October in 2010-2014. Specimens were collected by sweep net and malaise traps from six stations in Kovada Lake National Park (KLNP) in Isparta Province (Figure 1). The plastic pot of the malaise trap was half full of 95% ethyl alcohol and the samples were collected every 15 d. One trap was placed in each site. The ichneumonid specimens which were taken from the malaise traps separated from other insects under the Ziess Discovery V8 microscope. All the specimens are labeled and deposited at the Biology Department of Süleyman Demirel University, Isparta.

Study sites

Station I (37°38.861' N, 30°52.213' E, 909 m): It is at the lowest altitude of the selected areas. The vegetation is characterized by *Anthemis* sp. (Asteraceae), *Astragalus* sp. (Fabaceae), *Avena* sp. (Poaceae), *Cirsium sintonisii* Freyn. (Asteraceae), *Malva sylvestris* L. (Malvaceae), *Rubus* sp. (Rosaceae), *Salix* sp. (Salicaceae), *Scorzonera suberosa* C. Koch. (Asteraceae), *Tamarix* sp. (Tamaricaceae), *Triticum* sp. (Poaceae), and *Veronica* sp. (Scrophulariaceae). *Pinus nigra* Arnold (Pinaceae) and *Platanus orientalis* L. (Platanaceae) surround this area. Depending on the spraying of existing orchards around the station, it is an area exposed to chemicals. In addition, vegetation is damaged due to anthropogenic effects.

Station II (37°37.392' N, 30°52.414' E, 914 m): The vegetation is characterized by *Alkanna tinctoria* Tausch. (Boraginaceae), *Lamium* sp. (Lamiaceae), *Muscari* sp. (Hyacinthaceae), *Paliurus spina-christi* Miller (Rhamnaceae), *Quercus coccifera* L. (Fagaceae), *Trifolium stellatum* L. (Fabaceae), and *Veronica* sp. (Plantaginaceae). This area is exposed to chemicals due to the spraying of nearby cherry and apple orchards.

Station III (37°38.626' N, 30°52.137' E, 932 m): The dominant plant species are *Pinus nigra* Arnold. (Pinaceae), *Quercus coccifera* L. (Fagaceae) and *Styrax officinalis* L. (Styracaceae).

Station IV (37°37.846' N, 30°52.130' E, 956 m): The vegetation consist of *Cedrus libani* A.Rich (Pinaceae), *Daphne sericea* Wahl (Thymelaeaceae), *Eryngium kotschy* Boiss. (Apiaceae), *Euphorbia* sp. (Euphorbiaceae), *Muscari* sp. (Liliaceae), *Ornithogalum* sp. (Liliaceae), *Juniperus* sp. (Cupressaceae), *Paliurus spina-christi* L. (Rhamnaceae), *Pinus nigra* Arnold (Pinaceae), *Pistacia terebinthus* L. (Anacardiaceae), *Quercus coccifera* L. (Fagaceae) and *Vicia cracca* L. (Fabaceae).

Station V (37°37.243' N, 30°52.086' E, 985 m): *Astragalus* sp. (Fabaceae), *Euphorbia* sp. (Euphorbiaceae), *Ornithogalum* sp. (Liliaceae), *Pinus nigra* Arnold (Pinaceae), *Quercus coccifera* L. (Fagaceae), *Quercus cerris* L. (Fagaceae), *Silene* sp. (Caryophyllaceae), *Styrax officinalis* L. (Styracaceae), *Verbascum* sp. (Scrophulariaceae) and *Vicia cracca* L. (Fabaceae) are the dominant plants.

Station VI (37°36.331' N, 30°53.717' E, 909 m): This area is a cherry orchard and exposed to insecticide in May-July. Other notable plant species are *Anthemis* sp. (Asteraceae), *Avena* sp. (Poaceae), *Convolvulus arvensis* L. (Convolvulaceae), *Malva sylvestris* L. (Malvaceae), *Taraxacum* sp. (Asteraceae), *Verbascum* sp. (Scrophulariaceae) and *Vicia* sp. (Fabaceae).

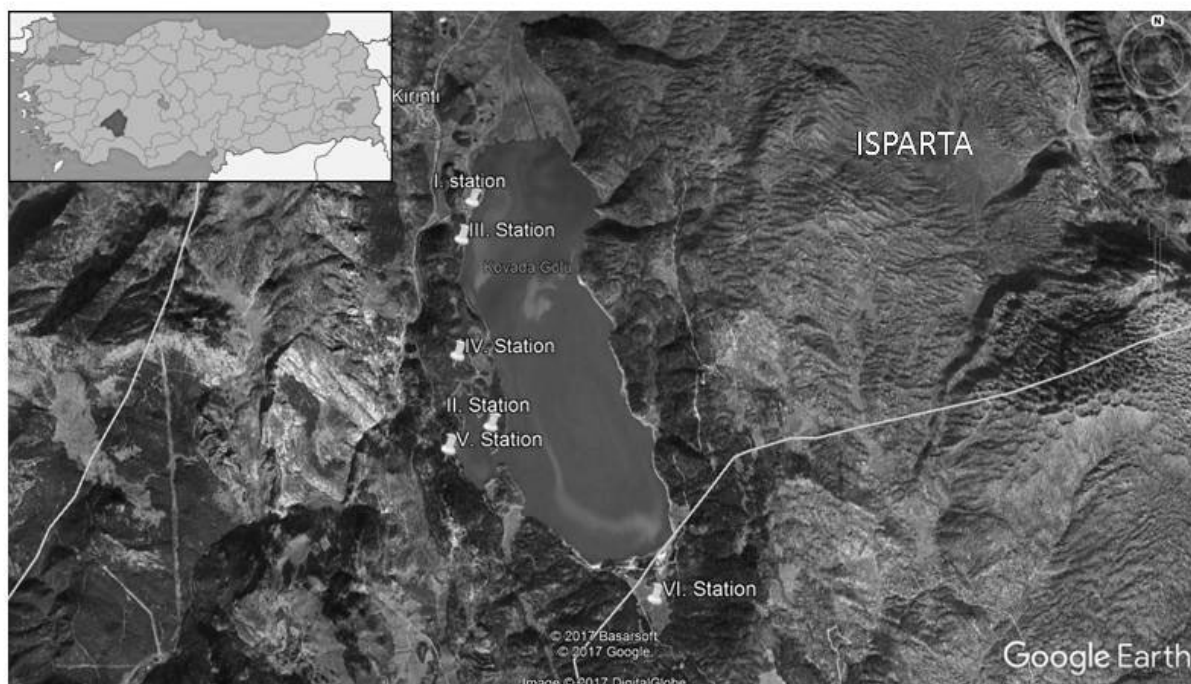


Figure 1. Sampling sites (stations) of Kovada Lake National Park (Anonymous, 2019).

Results and Discussion

In total 31 species in 22 genera were identified from the study areas. Of these six species are new records for the fauna of Turkey. With this study the number of Ichneumonidae species in Turkey increased to 1274.

The collection data, locations and Turkish distribution are given for each species. The newly recorded species is marked with by an asterisk (*) in the text below.

Subfamily Anomaloninae Viereck, 1918

***Anomalon cruentatum* (Geoffroy, 1785)**

Material examined: KLNP, Station II, 18.IX.2010, 1♀; 10.VI.2012, 1♀; 17.VI.2013, 2♂♂; 25.IX.2014, 1♀.

Distribution in Turkey: Adana, Gaziantep, Adiyaman, İçel, Antalya, Kırklareli, Edirne, Tekirdağ, İstanbul (Kolarov et al., 1994); Çanakkale (Kolarov et al., 1997a) Afyon, Muğla (Kolarov et al., 2002); Isparta (Gürbüz, 2004); Antalya, Bayburt, Bingöl, Diyarbakır, Erzincan, Erzurum, Iğdır, Kahramanmaraş, Kars (Çoruh et al., 2004), Adiyaman, Batman, Diyarbakır, Elazığ, Malatya, Mardin (Akkaya, 2005), Bolu, Zonguldak, Kastamonu (Okyar & Yurtcan 2007); Isparta (Gürbüz et al., 2009a, b; Birol, 2010; Özdan & Gürbüz, 2016), Erzurum, Tunceli (Kolarov et al., 2014a), Bayburt, Erzurum, Kars (Çoruh & Kolarov, 2016), Tekirdağ (Beyarslan et al., 2006); Erzurum (Çoruh et al., 2018; Sarı & Çoruh, 2018).

General Distribution: Eastern Palearctic, Europe, Oriental, Western Palearctic (Yu et al., 2016).

Subfamily Banchinae Wesmael, 1845

***Exetastes adpressorius* (Thunberg, 1824)**

Material examined: KLNP, Station II, 17.VI.2010, 1♀.

Distribution in Turkey: Edirne (Kolarov & Beyarslan, 1994b); Ankara, Kırıkkale, Kırşehir (Özdemir, 1996); Bayburt, Erzurum (Pekel, 1999); Tunceli (Kolarov et al., 2014a); Erzurum (Çoruh & Çalmaşur, 2016; Çoruh et al., 2018).

General Distribution: Eastern Palearctic, Europe, Nearctic, Western Palearctic (Yu et al., 2016).

***Lissonota (Lissonota) culiciformis* Gravenhorst, 1829**

Material examined: KLNP, Station II, 18.IX.2010, 1♀.

Distribution in Turkey: Erzincan (Pekel et al., 2000); Isparta, Burdur (Kolarov & Gürbüz, 2006); Isparta (Gürbüz et al., 2009b); Erzincan (Çoruh et al., 2014b).

General Distribution: Eastern Palearctic, Europe, Nearctic, Western Palearctic (Yu et al., 2016).

****Lissonota (Lissonota) frontalis* (Desvignes, 1856)**

Material examined: KLNP, Station II, 17.VI.2010, 1♀.

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

***Lissonota (Lissonota) fundator* (Thunberg, 1824)**

Material examined: KLNP, Station III, 17.VI.2010, 1♀; 25.V.2014, 1♀.

Distribution in Turkey: Isparta, Burdur (Kolarov & Gürbüz, 2006); Hatay (Gürbüz et al., 2008); Isparta (Gürbüz et al., 2009a); Hatay (Gürbüz et al., 2011).

General Distribution: Eastern Palearctic, Europe, Nearctic, Western Palearctic (Yu et al., 2016).

***Lissonota (Loxonota) histrio* (Fabricius, 1798)**

Material examined: KLNP, Station II, 18.IX.2010, 1♀.

Distribution in Turkey: Erzurum (Pekel & Özbek, 2000); Diyarbakır, Elazığ, Mardin (Akkaya, 2005); Isparta (Gürbüz et al., 2009a); Ordu (Kolarov et al., 2016); Erzurum, Rize (Kolarov et al., 2017).

General Distribution: Eastern Palearctic, Europe, Nearctic, Western Palearctic (Yu et al., 2016).

Lissonota (Lissonota) proxima Fonscolombe, 1854

Material examined: KLNP, Station V, 16.XI.2010, 1♀.

Distribution in Turkey: Isparta (Özdan & Gürbüz, 2016).

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

Lissonota uncinata Holmgren, 1860

Material examined: KLNP, Station III, 16.XI.2012, 1♀.

Distribution in Turkey: Adana (Kolarov & Beyarslan, 1994b).

General Distribution: Europe, Western Palearctic (Yu et al., 2016).

Subfamily Campopleginae Forster, 1869

Dusona intelligator Aubert, 1966

Material examined: KLNP, Station II, 10.VI.2012, 1♀.

Distribution in Turkey: Toros (Kolarov, 1995).

General Distribution: Europe, Western Palearctic (Yu et al., 2016).

Subfamily Cremastinae Forster, 1869

Pristomerus luridus Kokujev, 1905

Material examined: KLNP, Station IV, 1♀.

Distribution in Turkey: Erzurum (Pekel & Özbek, 2000; Çoruh et al., 2014b).

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

Temelucha schoenobia (Thomson, 1890)

Material examined: KLNP, Station I, 4.IX.2010, 1♂.

Distribution in Turkey: Antalya (Kolarov & Beyarslan, 1999); Adana, Adiyaman, Antalya, Aydın, Gaziantep, Hatay, İzmir (Kolarov, 2016).

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

Temelucha discoidalis (Szépligeti, 1899)

Material examined: KLNP, Station V, 24.VI.2012, 1♀.

Distribution in Turkey: Erzurum (Pekel & Özbek, 2000); Ankara (Kolarov & Yurtcan, 2009), Hatay (Çoruh et al., 2013)

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

Subfamily Cryptinae Kirby, 1837

Aritranis longicauda (Kriechbaumer, 1873)

Material examined: KLNP, Station II, 24.VI.2012, 1♀.

Distribution in Turkey: Isparta (Gürbüz & Kolarov, 2008; Gürbüz et al., 2009b).

General Distribution: Europe, Western Palearctic (Yu et al., 2016).

Mesostenus albinotatus Gravenhorst, 1829

Material examined: KLNP, Station I, 07.VIII.2010, 1♂.

Distribution in Turkey: Turkey (Sedivy, 1959); Erzurum (Çoruh & Çoruh, 2008); Isparta (Gürbüz & Kolarov, 2008; Gürbüz et al., 2009b); Rize (Çoruh et al., 2014a); Erzurum (Çoruh et al., 2014b; Kolarov et al., 2016).

General Distribution: Eastern Palearctic, Europe, Nearctic, Western Palearctic (Yu et al., 2016).

* *Bathythrix strigosa* (Thomson, 1884)

Material examined: KLNP, Station V, 17-22.V.2011, 1♀.

Hosts: *Diprion pini* Linnaeus, 1758 (Hymenoptera: Tenthredinoidea), *Taleporia tubulosa* (Retzius, 1783) (Lepidoptera: Psychidae) (Yu et al., 2016).

General Distribution: Europe, Western Palearctic (Yu et al., 2016).

Dichrogaster saharator (Aubert, 1964)

Material examined: KLNP, Station III, 16.10.2010, 1♀.

Distribution in Turkey: Çanakkale (Kolarov et al., 1997a); Isparta (Kolarov & Gürbüz, 2007).

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

Dichrogaster schimitscheki (Fahringer, 1935)

Material examined: KLNP, Station V, 07.X.2012, 1♀.

Distribution in Turkey: Isparta (Kolarov & Gürbüz, 2007; Gürbüz et al., 2009b).

General Distribution: Europe, Nearctic, Western Palearctic (Yu et al., 2016).

Eudelus simillimus (Taschenberg, 1865)

Material examined: KLNP, Station III, 04.IX.2010, 1♀.

Host: *Tortrix viridana* (Linnaeus, 1758) (Lepidoptera: Tortricidae).

Distribution in Turkey: Turkey (Sedivy, 1959); Ankara (Kolarov, 1995).

General Distribution: Europe, Western Palearctic (Yu et al., 2016).

**Hemiteles similis* (Gmelin, 1790)

Material examined: KLNP, Station II, 24.VI.2012, 1♀.

General Distribution: Eastern Palearctic, Europe, Nearctic, Western Palearctic (Yu et al., 2016).

Subfamily Ichneumoninae Latreille, 1802

Heterischnus truncator (Fabricius, 1798)

Material examined: KLNP, Station VI, 16.XI.2010, 1♀.

Distribution in Turkey: Istanbul (Kolarov, 1995); Çanakkale (Kolarov et al., 1997a); Istanbul (Yurtcan et al., 1999); Erzurum (Özbek et al., 2003); Giresun, Trabzon (Kolarov et al., 2014b); Trabzon (Çoruh et al., 2019).

General Distribution: Palearctic, Europe (Yu et al., 2016).

**Diadromus albinotatus* (Gravenhorst, 1829)

Material examined: KLNP, Station II, 24.VI.2012, 1♀.

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

Subfamily Mesochorinae Forster, 1869

Mesochorus fulgurans Curtis, 1833

Material examined: KLNP, Station I, 07.VII.2010, 1♀; 23.VI.2014, 1♀.

Distribution in Turkey: Rize (Çoruh et al., 2014b; Riedel et al., 2014), Isparta (Özdan & Gürbüz; 2016).

General Distribution: Eastern Palearctic, Europe, Oriental, Western Palearctic (Yu et al., 2016).

Subfamily Metopiinae Forster, 1869

Exochus flavifrons Boheman, 1863

Material examined: KLNP, Station II, 18.IX.2010, 2♂♂.

Distribution in Turkey: Erzurum (Çoruh & Kolarov, 2012; Çoruh et al., 2014b); Rize (Çoruh et al., 2014a).

General Distribution: Europe, Western Palearctic (Yu et al., 2016).

Exochus thomsoni Schmiedeknecht, 1924

Material examined: KLNP, Station II, 18.IX.2010. 3♀♀; Station VI, 1♀; 05.X.2013, 1♀.

Distribution in Turkey: Erzurum (Çoruh & Kolarov, 2012; Çoruh et al., 2014b); Tunceli (Kolarov et al., 2014a), Erzurum, Rize (Kolarov et al., 2017).

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

Exochus erythronotus (Gravenhorst, 1820)

Material examined: KLNP, Station II, 18.IX.2010, 1♀.

Distribution in Turkey: Aydın (Kolarov et al., 2009), Kars (Çoruh & Kolarov, 2012).

General Distribution: Europe, Western Palearctic (Yu et al., 2016).

* *Chorinaeus scrobipalpa* Aeschlimann, 1983

Material examined: KLNP, Station II, 10.VI.2012, 1♀.

Hosts: *Scrobipalpa nitentella* (Lepidoptera: Gelechiidae) (Yu et al., 2016).

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

**Trieceles bellulus* Kusigemati, 1984

Material examined: KLNP, Station III, 10.VI.2012, 1♀.

General Distribution: Eastern Palearctic (Yu et al., 2016).

Subfamily Pimplinae Wesmael, 1845

Pimpla artemonis Kasparyan, 1973

Material examined: KLNP, Station II, 17.VI.2010, 1♂; 05.V.2013, 1♀; 01.VI.2014, 1♂.

Distribution in Turkey: Edirne, İstanbul (Yurtcan & Beyarslan, 2005); Bayburt, Erzurum, Kars, Rize (Çoruh & Özbek, 2008); Artvin, Erzurum, Isparta, Kars (Çoruh & Kolarov, 2010; Çoruh et al., 2014b).

General Distribution: Europe, Western Palearctic (Yu et al., 2016).

Clistopyga rufator Holmgren, 1856

Material examined: KLNP, Station II, 22.V.2010, 2♀♀; 11.XI.2012, 1♀; Station V, 11.XI.2014, 1♀.

Distribution in Turkey: Edirne (Yurtcan, 2004), Kırklareli (Yurtcan, 2007), Adana (Buncukçu, 2008), Hatay (Gürbüz et al., 2008); Erzurum, Kars (Çoruh & Özbek, 2008); Erzurum (Çoruh, 2010); Kars (Çoruh & Kolarov, 2010).

General Distribution: Eastern Palearctic, Europe, Western Palearctic (Yu et al., 2016).

Zatypota bohemani (Holmgren, 1860)

Material examined: KLNP, Station II, 15.VII.2012, 1♀.

Distribution in Turkey: İstanbul (Kolarov, 1987); Elazığ, İçel, Osmaniye (Kolarov & Beyarslan, 1994a); Edirne (Yurtcan & Beyarslan, 2005), Erzurum, Kars (Çoruh & Özbek, 2008; Çoruh et al., 2014b) Erzurum (Çoruh & Kolarov, 2010); Adana, Hatay (Gürbüz et al., 2008).

General Distribution: Eastern Palearctic, Europe, Nearctic, Western Palearctic (Yu et al., 2016).

Subfamily Tryphoninae Shuckard, 1840

Acrotomus succinctus (Gravenhorst, 1829)

Material examined: KLNP, Station I, 01.V.2010, 1♀; 5.V.2013, 1♀.

Distribution in Turkey: Edirne (Kolarov & Beyarslan, 1994a); Bilecik, Çanakkale (Kolarov et al., 1997b); Tekirdağ (Beyarslan et al., 2006); İzmir (Yurtcan et al., 2006), Isparta (Gürbüz et al., 2009b); Erzurum (Kolarov & Çalmaşur, 2011); Rize (Çoruh et al., 2014a); Elazığ, Sivas (Yaman, 2014).

General Distribution: Europe, Nearctic, Oriental, Palearctic (Yu et al., 2016).

Kovada Lake National Park which covering on area of 6,534 ha has very rich flora and fauna. Considerable research has been conducted on different subjects around the lake. This study focused only on the Ichneumonidae fauna on the western side of the lake. Although KLNP is under threat because of using insecticide in agricultural area, it contains new records for Turkey. Precautions should be taken as soon as possible for protecting these insect populations.

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