



Original article (Orijinal araştırma)

**Ichneumonidae (Hymenoptera) from Northeastern Anatolia Region
(Erzurum, Aşkale)¹**

Kuzeydoğu Anadolu Bölgesi (Erzurum, Aşkale)'nden Ichneumonidae (Hymenoptera) türleri

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Abstract

This study examined material from the family Ichneumonidae collected from Turkey (Aşkale, Erzurum Province) between 2015-2017. Nineteen species belonging to Acaenitinae, Anomaloninae, Banchinae, Campopleginae, Collyriinae, Cremastinae, Cryptinae, Diplazontinae, Ichneumoninae, Tryphoninae and Pimplinae were recorded. Additional collecting locations and distribution of Turkey with maps are given for each species. Also, the areas of expansion in the world are given. Four species are new records for the Turkish fauna; *Campoletis holmgreni* Tschek, 1871, *Hellwigia elegans* Gravenhorst, 1823 (Campopleginae), *Hemichneumon subdolos* Wesmael, 1857 and *Bathyplectes rufigaster* Horstmann, 1977 (Ichneumoninae).

Keywords: Aşkale, Erzurum, Hymenoptera, Ichneumonidae, new records, Turkey

Öz

Bu çalışmada, 2015-2017 yılları arasında Aşkale merkez ilçeden toplanan Ichneumonidae türleri incelenmiştir. Çalışma sonucunda, Acaenitinae, Anomaloninae, Banchinae, Campopleginae, Collyriinae, Cremastinae, Cryptinae, Diplazontinae, Ichneumoninae, Tryphoninae ve Pimplinae altfamilyalarına ait ondokuz tür tespit edilmiştir. Her bir tür için, ilave yayılım alanları ve haritaları ile birlikte Türkiye'deki dağılımları, dünyadaki dağılım alanları da verilmiştir. Dört tür Türkiye faunası için yeni kayıttır; *Campoletis holmgreni* Tschek, 1871, *Hellwigia elegans* Gravenhorst, 1823 (Campopleginae), *Hemichneumon subdolos* Wesmael, 1857 ve *Bathyplectes rufigaster* Horstmann, 1977 (Ichneumoninae).

Anahtar sözcükler: Aşkale, Erzurum, Hymenoptera, Ichneumonidae, yeni kayıtlar, Türkiye

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Introduction

Hymenoptera (sawflies, wasps, ants and bees) are one of four megadiverse insect orders, comprising more than 153,000 described and possibly up to one million undescribed extant species (Grimaldi & Engel, 2005; Aguiar et al., 2013). As parasitoids, predators and pollinators, Hymenoptera are fundamental in all terrestrial ecosystems and are of substantial economic importance (Quicke, 1997; Grimaldi & Engel, 2005).

The Hymenopteran family, Ichneumonidae, is particularly species-rich, and one of the largest and most diverse insect families in the world (Riedel & Magnusson, 2014). This family includes 1579 genera and 24,281 described species (Yu et al., 2012). Townes (1969) estimated that there could be about 60,000 ichneumonid species in the world, and subsequently Gauld (1997) revised this figure upwards to potentially more than 100,000 species.

The Ichneumon wasps include some of the most important parasitic species so that they are important in the suppression of harmful species especially caterpillars (Lepidoptera) (Kasparyan, 1981).

In Turkey, there was no detailed information available on Ichneumonidae until 1995. Kolarov (1995) listed 383 ichneumonid species in a catalog of the Ichneumonidae of Turkey. Over the past 22 years, many studies have been conducted on this group. Each study contributed to the enrichment of the fauna. Relatively recently, the number of recorded Ichneumonidae species was 1228 (Kolarov et al., 2017). However, with more recent contributions (Çoruh et al., 2018; Riedel et al., 2018) and this paper, the number of Ichneumonidae fauna of Turkey has reached to 1257 species and 287 genera.

The aim of this study is to determine Ichneumonidae species found in various habitats on Erzurum, Aşkale.

Material and Methods

Study area

Aşkale district (39°92'02" N, 40°69'47" E) in Erzurum Province, situated in the Northeastern Anatolia of Turkey (Figure 1), was selected as the study area (Figure 2). Aşkale is west of Erzurum and ranges from sea level up to 1625 m. There are Dumanlı, Güllü, Merşem and Kop Mountains on the borders of Aşkale.

Sampling method and collection

Materials used in this study were collected by sweep net from flowering plants in the summers of 2015 to 2017. Specimens were transferred by aspirator and killed with ethyl acetate. Standard methods were used for preparation of the samples, after which they were deposited in the Entomological Museum, Erzurum, Turkey. The pictures of the specimens were taken by a Leica CLS 50x microscope connected to a computer.

All ichneumonid specimens were collected by first author. Specimens were identified by Dr. Janko Kolarov and Dr. Saliha Çoruh. The terminology used for morphological features mostly follows that of Townes (1969). Distributional data mainly follows that of Yu et al. (2012).

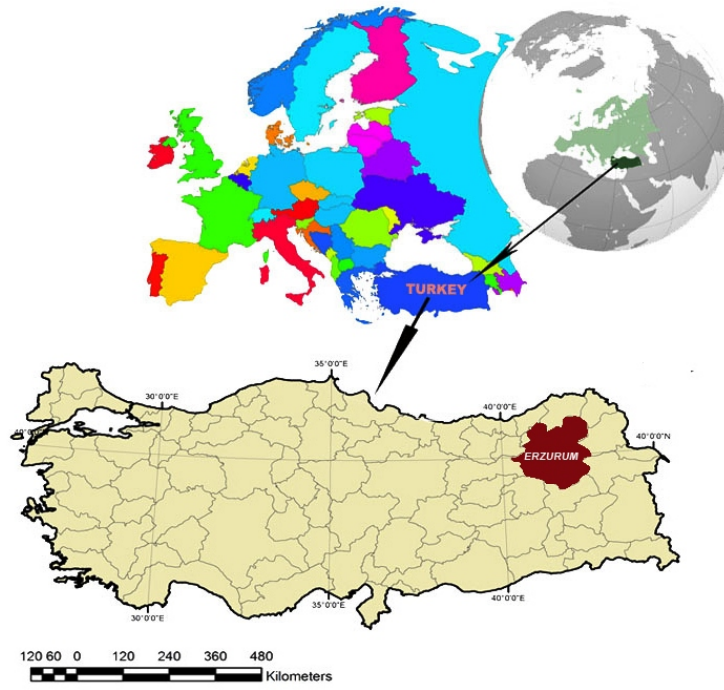


Figure 1. Map of the study area.



Figure 2. Study area.

Results

A total of 185 specimens were collected in Aşkale village during the three summers by Ümit Sarı, with 19 species in 11 subfamilies were recorded. Four species, marked in the text with an asterisk, are new records for the Turkish fauna.

Subfamily Acaenitinae Förster, 1869

Phaenolobus fulvicornis (Gravenhorst, 1829) (Figure 3a)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 25.VI.2015, 1681 m, 11 ♂♂; 39°56'580" N, 40°46'163" E, 1688 m, 21.VII.2016, 2 ♂♂.

Distribution in Turkey: Asia Minor (Kolarov, 1995); Erzurum (Kolarov et al., 2002a); Isparta (Gürbüz, 2005; Gürbüz et al., 2009b); Artvin, Bayburt, Erzurum, Kars (Çoruh & Özbek, 2013); Erzurum (Çoruh et al., 2014b); Bayburt (Çoruh & Çalmaşur, 2016); Rize (Kolarov et al., 2016) (Figure 4a).

General distribution: Palearctic Region.

Subfamily Anomaloninae Viereck, 1918

Anomalon cruentatum (Geoffroy, 1785) (Figure 3b)

Material examined: Aşkale: 39°56'598" N, 40°46'172" E, 12.VI.2015, 1691 m, 5 ♀♀; 39°56'580" N, 40°46'163" E, 08.VIII.2016, 1688 m, 3 ♀♀.

Distribution in Turkey: Afyonkarahisar, Ankara, Çanakkale, Istanbul, Kayseri, Muğla, Tekirdağ, Yozgat (Yurtcan et al., 1994; Kolarov, 1995; Kolarov et al., 1997a; Beyarslan et al., 2006); Afyonkarahisar, Isparta, Muğla (Kolarov et al., 2002b; Gürbüz, 2004); Antalya, Bayburt, Bingöl, Diyarbakır, Erzincan, Erzurum, Iğdır, Kahramanmaraş, Kars (Çoruh et al., 2004); Adıyaman, Batman, Diyarbakır, Elazığ, Malatya, Mardin (Akkaya, 2005); Bolu, Isparta, Kastamonu, Zonguldak (Okyar & Yurtcan, 2007; Buncukçu, 2008; Kirtay, 2008; Birol, 2010); Erzurum, Tunceli (Kolarov et al., 2014b); Erzurum (Kolarov et al., 2016); Bayburt, Erzurum, Kars (Çoruh & Kolarov, 2016); Erzincan, Erzurum, Gümüşhane (Kolarov et al., 2017) (Figure 4b).

General distribution: Palearctic Region.

Subfamily Banchinae Wesmael, 1845

Lissonata (Loxonota) flavovariegata (Lucas, 1849) (Figure 3c)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 05.VII.2015, 1681 m, 2 ♂♂; 39°56'580" N, 40°46'163" E, 07.VII.2015, 1688 m, 7 ♂♂, 3 ♀♀; 39°56'598" N, 40°46'172" E, 21.VI.2016, 1691 m, 2 ♂♂, 4 ♀♀.

Distribution in Turkey: Bolu, İzmir, Konya (Kolarov, 1995; Kolarov et al., 2002); Çankırı, Kırşehir, Nevşehir, Yozgat (Özdemir, 1996); Ankara, Bayburt, Erzincan, Erzurum, Kars, Trabzon (Pekel, 1999); Erzincan, Erzurum, Giresun, Gümüşhane, Ordu (Kolarov et al., 2017) (Figure 4c).

General distribution: Palearctic Region.

Subfamily Campopleginae Förster, 1869

**Campoletis holmgreni* (Tschek, 1871) (Figure 3d)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 09.VIII.2015, 1681 m, 1 ♂, Leg. Ümit Sarı.

General distribution: Palearctic Region.

Remarks: This species is new record from Turkey.

**Hellwigia elegans* Gravenhorst, 1823 (Figure 3e)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 08.VII.2015, 1681 m, 1 ♂; Leg. Ümit Sarı.

General distribution: Palearctic Region.

Remarks: This species is new record for Turkey.

Subfamily Cremastinae Förster, 1869

Cremastus pungens Gravenhorst, 1829 (Figure 3f)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 05.VII.2015, 1681 m, 2 ♀♀, Leg. Ümit Sarı.

Distribution in Turkey: Erzurum (Pekel, 1998; Pekel & Özbek, 2000); Tekirdağ (Beyarslan et al., 2006); Elazığ, Eskişehir, Kayseri, Malatya, Yozgat (Kolarov & Yurtcan, 2009); Batı Anadolu (Bozdağlar (Anlaş et al., 2009); Hatay (Çoruh & Özbek, 2013) (Figure 4d).

General Distribution: Palearctic Region.

Pristomerus rivalis Narolsky, 1987 (Figure 3g)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 09.VIII.2015, 1681 m, 2 ♂♂; 39°56'598' N, 40°46'172" E, 21.VIII. 2016, 1691 m, 2 ♂♂, Leg. Ümit Sarı.

Distribution in Turkey: Erzurum (Pekel & Özbek, 2000) (Figure 4e).

General distribution: Palearctic Region.

Remarks: This species was collected for the first time in Palandöken Mountain in 1996, since then, it has not been found again in Turkey.

Temelucha pseudocaudata Kolarov, 1982 (Figure 3h)

Material examined: Aşkale: 39°56'566" N, 40°46' 156" E, 05.VII.2015, 1681 m, 2 ♀♀, Leg. Ümit Sarı.

Distribution in Turkey: Erzurum (Pekel, 1998; Pekel & Özbek, 2000; Çoruh et al., 2014b) (Figure 4f).

General Distribution: Palearctic Region.

Subfamily Collyriinae Cushman, 1924

Collyria coxator (Villers, 1789) (Figure 3i)

Material examined: Aşkale: 39°56'598' N, 40°46'172" E, 12.VI.2015, 1691 m, 15 ♀♀; 39°56'566" N, 40°46'156" E, 09.VIII.2015, 1681 m, 12 ♀♀; 39°56'598' N, 40°46'172" E, 21.VII.2016, 1691 m, 2 ♂♂, 3 ♀♀, Leg. Ümit Sarı.

Distribution in Turkey: Ankara, Istanbul (Kolarov, 1995); Erzurum, Kars (Çoruh et al., 2005a); Batman, Diyarbakır, Elazığ, Mardin (Akkaya, 2005); Isparta (Gürbüz, 2005; Gürbüz et al., 2009b); Afyonkarahisar, Konya (Özdemir & Güler, 2009); Sivas, Yozgat (Korkmaz et al., 2010); Erzurum (Çoruh et al., 2014b; Kolarov et al., 2014b); Afyonkarahisar, Aksaray, Amasya, Ankara, Ardahan, Çanakkale, Çorum, Düzce, Edirne, Elazığ, Erzurum, Eskişehir, Karaman, Kars, Kastamonu, Kayseri, Kırıkkale, Kırklareli, Kırşehir, Konya, Malatya, Nevşehir, Niğde, Sivas, Tekirdağ, Tokat, Yozgat, Zonguldak (Yurtcan & Kolarov, 2015) (Figure 4g).

General distribution: Holarctic Region.

Subfamily Cryptinae Kirby, 1837

Aritranis director (Thunberg, 1822) (Figure 3j)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 09.VIII.2015, 1681 m, 5 ♂♂; 39°56'598" N, 40°46'172" E, 12.VI.2015, 1691, 3 ♂♂; 39°56'566" N, 40°46'156" E, 30.VII.2016, 1681 m, 4 ♂♂, Leg. Ümit Sarı.

Distribution in Turkey: Antalya, Burdur, Isparta (Gürbüz & Kolarov, 2008); Isparta (Gürbüz et al., 2009b); Rize, Trabzon (Çoruh et al., 2014a); Isparta (Özdan, 2014; Özdan & Gürbüz, 2016) (Figure 4h).

General distribution: Palearctic Region.

Remarks: This species is new for the Eastern Anatolia and Erzurum.

Cryptus viduatorius Fabricius, 1804 (Figure 3k)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 25.VI.2015, 1681 m, 4 ♂♂, 3 ♀♀; 39°56'598" N, 40°46'172" E, 12.VI.2015, 1691 m, 4 ♂♂, 3 ♀♀; 39°56'580" N, 40°46' 163" E, 21.VII.2016, 1688 m, 6 ♂♂, 5 ♀♀; 39°56'566" N, 40°46'156" E, 30.VII.2016, 1681 m, 12 ♂♂, 3 ♀♀, Leg. Ümit Sarı.

Distribution in Turkey: Istanbul (Kolarov, 1995); Bilecik, Bursa (Kolarov et al., 1997b); Isparta (Gürbüz & Kolarov, 2008); Erzurum (Çoruh & Çoruh, 2008); Isparta (Gürbüz et al., 2009a; Özdan, 2014); Rize (Çoruh et al., 2014a); Erzurum (Çoruh & Kolarov, 2016; Kolarov et al., 2016) (Figure 4i).

General distribution: Palearctic Region.

Subfamily Diplazontinae Viereck, 1918

Diplazon laetatorius (Fabricius, 1781) (Figure 3l)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 03.VII.2015, 1681 m, 1 ♀; 39°56'598" N, 40°46'172" E, 21.VIII.2016, 1691 m, 2 ♀♀, Leg. Ümit Sarı.

Distribution in Turkey: Edirne, İstanbul, Kırklareli, Tekirdağ (Yurtcan et al., 1999); Afyonkarahisar, Ankara, Bolu, Burdur, Eskişehir, Isparta, Konya, Nevşehir (Özdemir, 2001); Artvin, Erzincan, Erzurum, Şanlıurfa, Trabzon (Çoruh, 2011); Adana, Hatay, Osmaniye (Gürbüz et al., 2011); Adana, Adıyaman, Afyonkarahisar, Aydın, Denizli, Erzincan, Erzurum, Isparta, İçel, İzmir, Kahramanmaraş, Kırklareli, Muğla, Sinop, Zonguldak (Kolarov, 2015) (Figure 4j).

General distribution: Afrotropical, Australasian, European, Holarctic, Nearctic, Neotropical, Oceanic, Oriental Regions.

Remarks: This species was obtained from pupae of *Episyrphus balteatus* (De Geer 1776) (Diptera: Syrphidae) in the University Campus, Erzurum in 2005.

Subfamily Ichneumoninae Latreille, 1802

Anisobas hostilis (Gravenhorst, 1820) (Figure 3m)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 03.VII.2015, 1681 m, 2 ♂♂; 39°56'598" N, 40°46'172" E, 21.VI.2016, 1691 m, 21.VIII.2016, 4 ♂♂, Leg. Ümit Sarı.

Distribution in Turkey: Tekirdağ (Yurtcan et al., 1999); Erzurum (Özbek et al., 2003); Kars (Riedel et al., 2010) (Figure 4k).

General distribution: Europea and West Palearctic Region.

**Bathyplectes rufigaster* Horstmann, 1977 (Figure 3n)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 9.VIII.2015, 1681 m, 5 ♀♀; 39°56'598' N, 40°46'172" E, 21.VI.2016, 21.VIII.2016, 1691 m, 5 ♂♂, Leg. Ümit Sarı.

General distribution: Europea and West Palearctic Region.

Remarks: This species is new record for Turkey.

Colpognathus divisus Thomson, 1891 (Figure 3o)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 05.VII.2015, 1681 m, 3 ♂♂; 39°56'598' N, 40°46'172" E, 12.VI.2015, 1691 m, 2 ♂♂; 39°56'566" N, 40°46'156" E, 30.VII.2016, 4 ♂♂; 39°56'598' N, 40°46'172" E, 21.VIII.2016, 3 ♂♂, Leg. Ümit Sarı.

Distribution in Turkey: Erzurum, Rize, Trabzon (Kolarov et al., 2014a; Çoruh, 2017) (Figure 4l).

General distribution: Palearctic Region.

**Hemichneumon subdolos* Wesmael, 1857

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 05.VII.2015, 1681 m, 1 ♂, Leg. Ümit Sarı.

General distribution: Palearctic Region.

Remarks: This species is new record from Turkey.

Subfamily Pimplinae Wesmael, 1848*Itoplectis maculator* (Fabricius, 1775) (Figure 3p)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 03.VII.2015, 1681 m, 2 ♂♂; 39°56'598' N, 40°46'172" E, 21.VIII.2016, 1691 m, 2 ♀♀, Leg. Ümit Sarı.

Distribution in Turkey: Ankara, Eskişehir, Kırşehir, Konya, Nevşehir, Yozgat (Özdemir & Kılınçer, 1990); Adana, Balıkesir, İçel (Kolarov & Beyarslan, 1994); Çanakkale (Kolarov et al., 1997a); Erzurum (Kolarov et al., 1999); Afyonkarahisar, Balıkesir, Denizli, Muğla (Kolarov et al., 2002b); Çanakkale, Edirne, İstanbul, Kırklareli, Tekirdağ (Yurtcan, 2004); Artvin, Bayburt, Erzurum, Gümüşhane, Kars, Rize (Çoruh, 2005); Çanakkale, Edirne, İstanbul, Kırklareli, Tekirdağ (Yurtcan & Beyarslan, 2005); Kastamonu (Okyar & Yurtcan, 2007); Hatay (Gürbüz et al., 2008); Isparta (Kırtay, 2008; Birol, 2010; Eroğlu et al., 2011); Erzurum, Trabzon (Kolarov et al., 2016); Erzurum (Kolarov et al., 2017) (Figure 4m).

General distribution: Palearctic Region.

Remarks: This species was collected feeding on *Daucus carota*.

Pimpla spuria Gravenhorst, 1829 (Figure 3r)

Material examined: Aşkale: 39°56'566" N, 40°46'156" E, 03.VII.2015, 1681 m, 4 ♂♂, 1 ♀; 39°56'598' N, 40°46'172" E, 21.VIII.2016, 1691 m, 2 ♂♂ 5 ♀♀, Leg. Ümit Sarı.

Distribution in Turkey: Ankara (Özdemir & Kılınçer, 1990); Adana, Adıyaman, Edirne, Gaziantep, Hatay, Kırklareli, Şanlıurfa, Tekirdağ (Kolarov & Beyarslan, 1994); Balıkesir, Bilecik, Bursa, Çanakkale (Kolarov et al., 1997b); Çanakkale (Kolarov et al., 1997a); Erzurum (Kolarov et al., 1999; Çoruh, 2016); Afyonkarahisar, Denizli, Manisa, Muğla, Uşak (Kolarov et al., 2002b); Çanakkale, Edirne, İstanbul, Kırklareli, Tekirdağ (Yurtcan, 2004); Çanakkale, Edirne, İstanbul, Kırklareli, Tekirdağ (Yurtcan & Beyarslan, 2005); Isparta (Gürbüz, 2005); Adana (Boncukcu, 2008); Eskişehir (Eroğlu et al., 2011); Erzurum, Tunceli (Kolarov et al., 2014b) (Figure 4n).

General Distribution: Oriental and Palearctic Region.

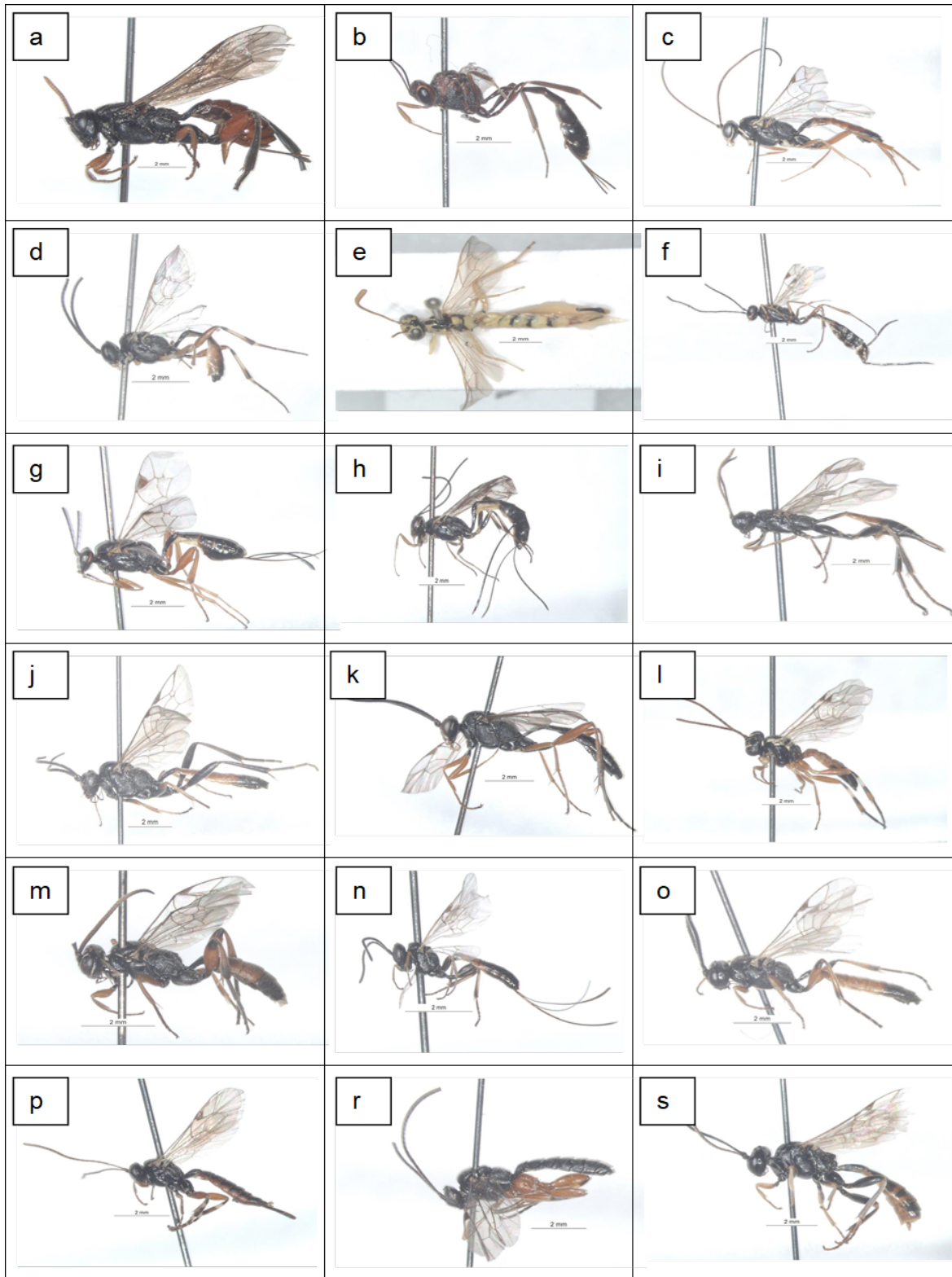


Figure 3. a) *Phaenolobus fulvicornis*; b) *Anomalon cruentatum*; c) *Lissonota (Loxonota) flavovariegata*; d) *Campoletis holmgreni*; e) *Hellwigia elegans*; f) *Cremastus pungens*; g) *Pristomerus rivalis*; h) *Temelucha pseudocaudata*; i) *Collyria coxator*; j) *Aritranis director*; k) *Cryptus viduatorius*; l) *Diplazon laetatorius*; m) *Anisobas hostilis*; n) *Bathyplectes rufigaster*; o) *Colpognathus divisus*; p) *Itopectis maculator*; r) *Pimpla spuria*; and s) *Tryphon (Tryphon) atriceps*.

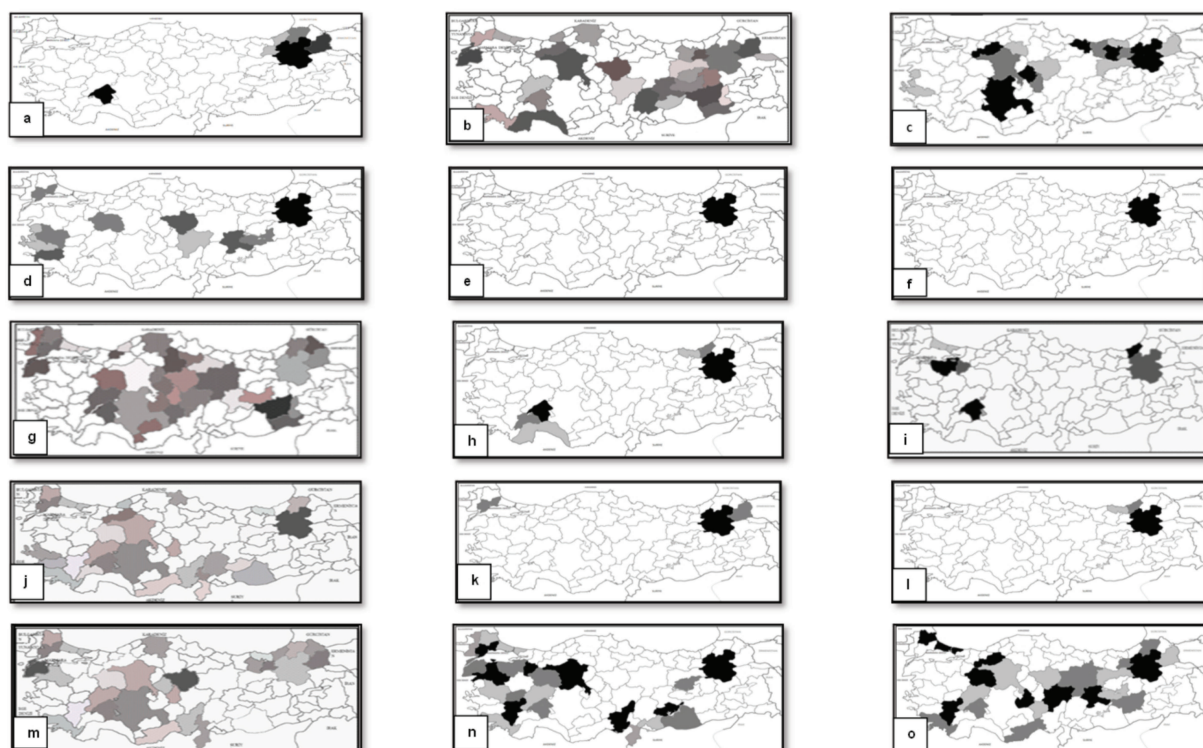


Figure 4. Distribution in Turkey of species: a) *Phaenolobus fulvicornis*; b) *Anomalon cruentatum*; c) *Lissonata (Loxonota) flavovariegata*; d) *Cremastus pungens*; e) *Pristomerus rivalis*; f) *Temelucha pseudocaudata*; g) *Collyria coxator*; h) *Aritrans director*; i) *Cryptus viduatorius*; j) *Diplazon laetatorius*; k) *Anisobas hostilis*; l) *Colpognathus divisus*; m) *Itopectis maculator*; n) *Pimpla spuria*; and o) *Tryphon (Tryphon) atriceps*.

Subfamily Tryphoninae Shuckard, 1840

Tryphon (Tryphon) atriceps Stephens, 1835 (Figure 4o)

Material examined: Aşkale: 39°56'56" N, 40°46'156" E, 05.VII.2015, 1681 m, 2 ♂♂; 39°56'580" N, 40°46'163" E, 21.VII.2016, 3 ♀♀, Leg. Ümit Sarı.

Distribution in Turkey: Erzurum, İstanbul (Kolarov, 1994); Erzurum (Kolarov et al., 1999); Bolu, Eskişehir (Özdemir, 2001); Kırklareli (Yurtcan & Beyarslan, 2002); Sivas (Kasparyan & Shaw, 2005); Bayburt, Erzurum (Çoruh et al., 2005b); Isparta (Gürbüz, 2005; Beyarslan et al., 2006); Afyonkarahisar, Denizli, Muğla (Yurtcan & Beyarslan, 2006); Isparta (Gürbüz et al., 2009a; Eroğlu et al., 2011); Artvin, Bayburt, Diyarbakır, Erzincan, Erzurum, Isparta, Kars (Kolarov & Çoruh, 2012); Aksaray, Ankara, Edirne, Elazığ, İçel, Malatya, Niğde, Sivas, Yozgat (Yaman, 2014) (Figure 4o).

General Distribution: Palearctic Region.

Discussion

In "A catalogue of the Turkish Ichneumonidae" (Kolarov, 1995) 383 species were reported. After 1995, the first comprehensive studies conducted in the Thrace Region, and continued in the Eastern Anatolia Region and the Mediterranean Region, increased in the number of species to 1257 species.

When the total number is analyzed, three families, 34 genera and 274 species have been added Turkish Ichneumonidae fauna from Eastern Turkey since 1995 (Figure 5).



Figure 5. Eastern Turkey.

Among the 274 species which have been identified from Eastern Turkey, *Cymodusa (Cymodusa) yildirimi* Kolarov & Çoruh, 2008, *Exochus protuberans* Kolarov & Çoruh, 2009, *Coelichneumon nigritor* Riedel, Çoruh & Özbek 2010, *Coelichneumon problematicus* Riedel, Çoruh & Özbek, 2010, *Ichneumon sexcinctoides* Riedel, Çoruh & Özbek, 2010, *Phaenolobus trochanteralis* Çoruh & Kolarov, 2013 and *Collyria pronotalis* Yurtcan & Kolarov, 2015 were new species for the world. In addition, male of *Phaenolobus cornutus* (Victorov), *Ophion internigrans* Kokujev, *Eucremastus priebei* Kolarov, *Scallama triclisor* Aubert, and *Temelucha pseudocaudata* Kolarov were reported for the first time in Eastern Turkey. Also, *Alcima pictor* Aubert, *Colpotrochia triclisor* (Aubert), *Coelichneumon nigritor* Riedel, Çoruh & Özbek, *Exochus protuberans* Kolarov & Çoruh and *Heterischnus schachti* Diller, 1995 are endemic for the Turkey at now.

As shown in Figure 6a, of the 185 specimens collected, Cryptinae was found to be the most abundant at 28%, and Campopleginae has the least abundant at only 1%. The Ichneumoninae had the greatest species richness with 21% (Figure 6b).

Ichneumonid samples were collected between June and August, being more abundant in July. According to general distribution, 15 species have Palearctic distribution, two have West Palearctic distribution; one Holarctic and one species, *Diplazon laetatorius*, is cosmopolitan. According to these results, the species with Palearctic distribution are the better represented in this area.

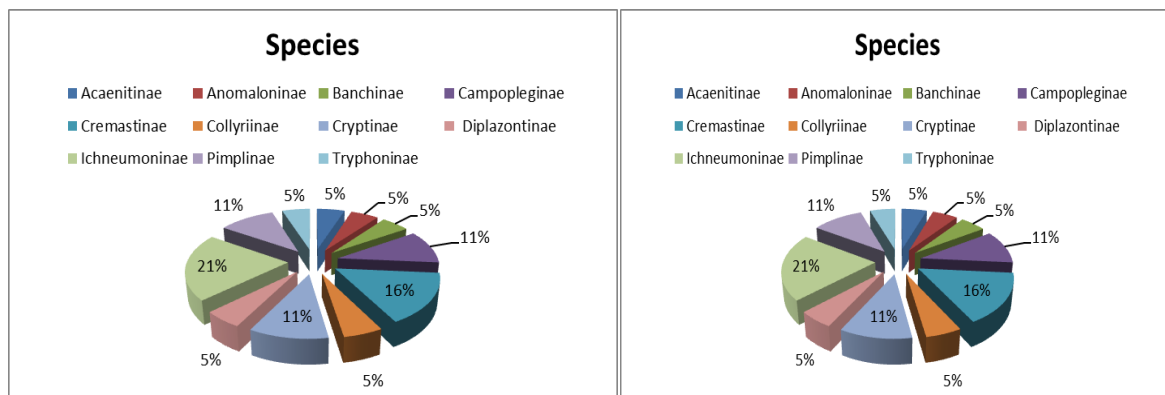


Figure 6. Distribution of subfamilies; a) abundance; and b) richness.

It is important to note that *Bathyplectes rufigaster* was recorded for the first time in Turkey during this study.

It should be noted that, except for *Aritranis director*, all other species have been collected from Erzurum before. *Aritranis director* was collected for the first time from both Erzurum and East Anatolia during this study.

Pristomerus rivalis and *Temelucha pseudocaudata* were found only from Erzurum being two species rare in Turkey.

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