Original article (Orijinal araştırma)

Contribution to the knowledge of Ichneumonidae (Hymenoptera) of Bursa Uludağ National Park area including new records

Bursa Uludağ Doğal Park alanı Ichneumonidae türlerine yeni kayıtlarla birlikte katkılar

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Abstract

In order to record species of the family Ichneumonidae (Hymenoptera) in Bursa Uludağ National Park area, this study was conducted between 2018-2019. Specimens belonging to the subfamily Campopleginae and Cryptinae were collected from three localities on natural vegetation, flowering plants and weeds. Determinations were made for 21 species, Acrolyta rufocincta (Gravenhorst, 1829), Campoletis thomsoni (Roman, 1915), Diadegma glabriculum (Holmgren, 1859), Dichrogaster heteropus (Thomson, 1896), Mesoleptus congener (Förster, 1876), Phygadeuon hercynicus Gravenhorst, 1829, Phygadeuon lapponicus Thomson, 1884, Phygadeuon nitidus Gravenhorst, 1829 and Thaumatogelis audax (Olivier, 1792) are recorded for the first time from Anatolia, Turkey.

Keywords: Campopleginae, Cryptinae, Ichneumonidae, natural park area, new records, Uludağ

Öz

Bu çalışma, Bursa Uludağ Doğal Park alanı’nin Ichneumonidae (Hymenoptera) türlerini tespit etmek amacıyla 2018-2019 yılları arasında yapılmıştır. Campopleginae ve Cryptinae altfamilyalarına ait türler doğal alanlar, çiçekli bitkiler ve yabancı otların hakim olduğu üç farklı lokaliteden toplanmıştır. Teşhisı yapılan 21 türden, Acrolyta rufocincta (Gravenhorst, 1829), Campoletis thomsoni (Roman, 1915), Diadegma glabriculum (Holmgren, 1859), Dichrogaster heteropus (Thomson, 1896), Mesoleptus congener (Förster, 1876), Phygadeuon hercynicus Gravenhorst, 1829, Phygadeuon lapponicus Thomson, 1884, Phygadeuon nitidus Gravenhorst, 1829 ve Thaumatogelis audax (Olivier, 1792) türleri Anadolu, Türkiye için yeni kayıt durumundadır.

Anahtar sözcükler: Campopleginae, Cryptinae, Ichneumonidae, doğal park alanı, yeni kayıtlar, Uludağ

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Introduction

The family Ichneumonidae is an important group in the order Hymenoptera in terms of number of species, species diversity and potential for use on biological control.

Ichneumonidae is a rich family, with 1601 genera and 25,285 species (Yu et al., 2016). A catalogue of the Turkish Ichneumonidae (Hymenoptera) was the first comprehensive study in Turkey (Kolarov, 1995). With the contributions detailed below this has increased the known diversity of the family in Turkey to 1 282 species. (Çoruh, 2017, 2019a, b; Kolarov et al., 2017; Narmanlioğlu & Çoruh, 2017; Çoruh et al., 2018, 2019; Riedel et al., 2018; Sarı & Çoruh, 2018; Özdan & Gürbüz, 2019; Vas, 2019a, b; Çaylak & Çoruh, 2020; Kiraç & Gürbüz, 2020; Kolarov et al., 2020).

The aim of this study was to collect and determine specimens from Bursa Uludağ National Park Area (BUNPA) that will contribute to the knowledge of the Ichneumonidae fauna of Turkey.

Materials and Methods

Uludağ, 36 km south of Bursa (Figure 1), is one of the Turkey's popular winter recreation areas. Uludağ has a natural park because it has a rich flora and fauna. Mount Uludağ (Great Mountain) is 2,543 m high (Table 1).

Uludağ National Park Area has extraordinary natural features, forests, flora and fauna. This flora has including specific endemic plants. Vegetation data from where the insects were collected are given in Table 3.

The study area sampled of three localities (Alaçam, 40°07'34.7"N, 29°17'31.2"E; Cevizdibi, 40°08'13.9"N, 29°17'35.1"E; and Gözede, 40°09'13.6"N, 29°17'26.1"E; Figure 2).

Adult specimens of Ichneumonidae were collected from various habitats that flowering plants, weeds and open areas of BUNPA by sweep net in the summers of 2018 and 2019. Some of the specimens were collected from blackberry gardens. Each locality had different altitude and vegetation. The most common plants were Allium paniculatum L., Epilobium angustifolium L., Galium elongatum C. Presl, Hypericum perforatum L., Medicago polymorpha L., Mentha longifolia (L.), Polypodium vulgare L., Raphanus raphanistrum L., Trifolium repens L. and Vicia cracca L.

| Locality | Year | Date       | Altitude (m.) |
|----------|------|------------|---------------|
| Alaçam   | 2018 | 20.VI.2018 | 1100          |
|          |      | 21.VII.2018| 1450          |
|          |      | 08.VIII.2018| 1700          |
|          | 2019 | 08.VI.2019 | 1200          |
|          |      | 20.VII.2019| 1500          |
|          |      | 19.VIII.2019| 1600         |
| Cevizdibi| 2018 | 22.VI.2018 | 800           |
|          |      | 15.VII.2018| 830           |
|          |      | 02.VIII.2018| 850          |
|          | 2019 | 29.VI.2019 | 820           |
|          |      | 17. VII.2019| 830          |
|          |      | 24. VIII.2019| 840        |
| Gözede   | 2018 | 24.VI.2018 | 670           |
|          |      | 17.VII.2018| 650           |
|          |      | 05.VIII.2018| 610          |
|          | 2019 | 28.V.2019  | 620           |
|          |      | 18.VII.2019| 640           |
|          |      | 06.VIII.2019| 630         |
Figure 1. Map of study area.

Figure 2. Study area (Alaçam, Cevizdibi and Gözede).
Collected insect specimens were pinned, labeled and deposited in the Entomological Museum, Erzurum, Turkey (EMET). Photographs were taken of the specimens by the Leica CLS stereomicroscope connected computer at 50x magnification.

All ichneumonid specimens were collected by first author. Specimens were identified by Dr. Janko Kolarov and the second author. Plant species were pressed and identified by Dr. İrfan Çoruh according to Davis (1965-1988) and deposited in the herbarium of Atatürk University, Faculty of Agriculture, and Department of Plant Protection.

Turkey distribution data for the species was obtained from the literature. Global distribution and associated plants data mainly followed Taxapad (Yu et al., 2016).

The newly recorded species are indicated with an asterisk (*) in the text.

Results

Two hundred and sixty-three specimens belonging to 21 species in 12 genera in two subfamilies were collected in BUNPA. Nine of these are reported here for the first time for Ichneumonidae fauna of Turkey. With these additions, 1291 species are now recorded for Turkey.

Subfamily Campopleginae Förster, 1869

 Campoletis agilis (Holmgren, 1860) (Figure 3a)

Material examined. BUNPA: Cevizdibi, 830 m, 15.VII.2018, 6 ♀♂; Gözede, 17.VII.2018, 650 m, 4 ♀♂, 06.VIII.2019, 630 m, 7 ♀♂.

Associated plants. Peucedanum oreoselinum (L.).

Distribution in Turkey. Giresun (Kolarov et al., 2016) (Figure 6a).

Global distribution. European and Western Palearctic Region.

Remarks. This species was collected from Giresun Province. Previously, it had only been reported from the Black Sea Region (Giresun).

 Campoletis crassicorns (Tschek, 1871) (Figure 3b)

Material examined. BUNPA: Cevizdibi, 850 m, 02.VIII.2018, 5 ♀♂; Gözede, 620 m, 28.V.2019, 7 ♀♂.

Associated plants. Peucedanum oreoselinum (L.).

Distribution in Turkey. Adana, Burdur, Erzurum and Giresun (Kolarov & Beyarslan, 1995; Çoruh et al., 2013; Çoruh et al., 2016; Çoruh et al., 2018) (Figure 6b).

Global distribution. European and Western Palearctic Region.

* Campoletis thomsoni (Roman, 1915) (Figure 3c)

Material examined. BUNPA: Cevizdibi, 800 m, 22.VI.2018, 3 ♀♀, 830 m, 17.VII.2019, ♀; Gözede, 610 m, 05.VIII.2018, 7 ♀♂.

Global distribution. Palearctic Region.

Remarks. This is new species record for Turkey.
Figure 3. Collected species: a) Campoletis agilis; b) Campoletis crassicornis; c) Campoletis thomsoni; d) Casinaria albipalpis; e) Diadegma glabriculum; f) Diadegma mediterraneum; g) Hyposoter didymator; h) Acrolyta rufocincta.
Contribution to the knowledge of Ichneumonidae (Hymenoptera) of Bursa Uludağ National Park area including new records

*Casinaria albipalpis* (Gravenhorst, 1829) (Figure 3d)
Material examined. BUNPA: Alaçam, 1100 m, 20.VI.2018, 5 ♂♂, 1500 m, 20.VII.2019, 9 ♂♂.
Associated plants. *Picea* sp. and *Quercus robur* L.
Distribution in Turkey. Anatolia (locality name unknown) (Riedel et al., 2010).
Global distribution. Palearctic Region.

*Diadegma glabriculum* (Holmgren, 1859) (Figure 3e)
Material examined. BUNPA: Uludağ: Alaçam, 1450 m, 21.VII.2018, 5 ♀♀; Cevizdibi, 830 m, 15.VII.2018, ♀; Gözede, 610 m, 05.VIII.2018, 4 ♀♀, 630 m, 06.VIII.2019, ♀.
Global distribution. European, Western Palearctic and Nearctic Region.
Remarks. This is new species record for Turkey.

*Diadegma mediterraneum* (Constantineanu, 1930) (Figure 3f)
Material examined. BUNPA: Uludağ: Alaçam, 1200 m, 08.VI.2019, 8 ♀♀; Gözede, 650 m, 17.VII.2018, 5 ♀♂.
Distribution in Turkey. Erzincan, Erzurum and Kahramanmaraş (Kolarov & Beyarslan 1995; Çoruh et al., 2005, 2014a, 2016) (Figure 6c).
Global distribution. European and Western Palearctic Region.
Remarks. This species was collected from Kahramanmaraş (Marat) Province in 1995 and Erzurum Palandöken Mountain in 1987 as a female. It has not been recorded again.

*Hyposoter didymator* (Thunberg, 1822) (Figure 3g)
Material examined. BUNPA: Uludağ: Alaçam, 1500 m, 20.VII.2019, 8 ♀♀; Gözede, 650 m, 05.VIII.2018, 4 ♀♀.
Associated plants. *Angelica sylvestris* L., *Heracleum sphondylium* L. and *Peucedanum oreoselinum* (L.).
Distribution in Turkey. Adana, Ankara, Aydın, Çankırı, Eskişehir, Hatay and Istanbul (Kolarov 1989, 1995; Yaşarakıcı & Kornoşor, 1990; Özdemir & Kilinçer, 1990; Sertkaya et al., 2004; Sertkaya & Bayram 2005; Kaya & Kornoşor, 2008; Şimşek et al., 2015; Shaw et al., 2016) (Figure 6d).
Global distribution. Australasian and Palearctic Region.
Remarks. The species was obtained from 89 hosts, mostly in the Noctuidae (Lepidoptera).

Subfamily Cryptinae Kirby, 1837

*Acrolyta rufocincta* (Gravenhorst, 1829) (Figure 3h)
Material examined. BUNPA: Uludağ: Alaçam, 1600 m, 19.VIII.2019, 7 ♀♀; Cevizdibi, 850 m, 02.VIII.2018, 5 ♀♀.
Associated plants. *Daucus carota* L., *Euphorbia nicaensis* All. and *Senecio jacobaea* L.
Global distribution. European and West Palearctic Region.
Remarks. This is new species record for Turkey.
Agrothereutes fumipennis (Gravenhorst, 1829) (Figure 4a)

Material examined. BUNPA: Uludağ: Cevizdibi, 830 m, 15.VII.2018, 7 ♀♂, 830 m, 17.VII.2019, 3 ♀♀, 12 ♂♂, 840 m, 24.VIII.2019, 6 ♀♀.

Associated plants. Peucedanum oreoselinum (L.)

Distribution in Turkey. Erzurum, Isparta and Kastamonu (Çoruh & Özbek, 2005; Gülbüz & Kolarov, 2008; Kolarov & Yurtcan, 2008; Gülbüz et al., 2009a; Çoruh et al., 2014b) (Figure 6e).

Global distribution. Palearctic Region.

Aptesis senicula (Kriechbaumer, 1893) (Figure 4b)

Material examined. BUNPA: Uludağ: Alaçam, 1600 m, 19.VIII.2019, 9 ♀♀; Cevizdibi, 800 m, 22.VI.2018, 3 ♂♂, 840 m, 24.VIII.2019, 5 ♀♀, 4 ♂♂.

Distribution in Turkey. Adana, Mersin, Rize and Tunceli (Bayarslan & Kolarov, 1994; Kolarov et al., 2014, 2016; Çoruh et al., 2014b) (Figure 6f).

Global distribution. European and West Palearctic Region.

Bathythrix pellucidator (Gravenhorst, 1829) (Figure 4c)

Material examined. BUNPA: Uludağ: Alaçam, 1450 m, 21.VII.2018, 3 ♂♂, 1200 m, 08.VI.2019, 3 ♂♂, 5 ♂♂.

Associated plants. Picea spp.

Distribution in Turkey. Ordu and Rize (Çoruh et al., 2014) (Figure 6g).

Global distribution. Palearctic Region.

*Dichogaster heteropus* (Thomson, 1896) (Figure 4d)

Material examined. BUNPA: Uludağ: Cevizdibi, 850 m, 02.VIII.2019, 2 ♂♂, 820 m, 29.VI.2019, 2 ♂♂.

Associated plants. Cornus sp.

Global distribution. European and West Palearctic Region.

Remarks. This is new species record for Turkey.

Dichogaster schimitscheki (Fahringer, 1935) (Figure 3e)

Material examined. BUNPA: Uludağ: Gözede, 610 m, 05.VIII.2018, 4 ♂♂, 640 m, 18.VII.2019, 5 ♂♂.

Distribution in Turkey. Isparta (Kolarov & Gülbüz, 2007; Gülbüz et al., 2009b) (Figure 6h).

Global distribution. European, Nearctic and West Palearctic Region.

Geis agilis (Fabricius, 1775) (Figure 4f)

Material examined. BUNPA: Uludağ: Alaçam, 1100 m, 20.VI.2018, 2 ♂♂; Cevizdibi, 800 m, 22.VI.2018, 4 ♂♂, 820 m, 29.VI.2019, ♂♂.

Associated plants. Lonicera sp., Mentha longifolia (L.), Picea excelsa (Lam.), Prunus sp., Quercus robur L. and Salix sp.

Distribution in Turkey. Trabzon (Kolarov et al., 2016) (Figure 6i).

Global distribution. Palearctic Region.

Remarks. This species has 137 known hosts (Yu et al., 2016).
Figure 4. Collected species: a) Agrothereutes fumipennis; b) Aptesis senicula; c) Bathythrix pellucidator; d) Dichrogaster heteropus; e) Dichrogaster schimitscheki; f) Gelis agilis; g) Gelis exareolatus; h) Mesoleptus congener.
Gelis exareolatus (Förster, 1850) (Figure 4g)

Material examined. BUNPA: Uludağ: Alaçam, 1700 m, 08.VIII.2018, 4 ♂; Gözed, 640 m, 18.VII.2019, 14 ♂.

Distribution in Turkey. Ankara (Kolarov, 1987; Öncüer, 1991; Kolarov, 1995) (Figure 6j).

Global distribution. Palearctic Region.

Remarks. This species was recorded from Ankara in 1925 by Kolarov (1987).

*Mesoleptus congener (Förster, 1876) (Figure 4h)

Material examined. BUNPA: Uludağ: Alaçam, 1500 m, 20.VII.2019, 4 ♀, 5 ♂; Gözed, 670 m, 24.VI.2018, 5 ♂, 630 m, 06.VIII.2019, 3 ♂, 4 ♂.

Global distribution. European and West Palearctic Region.

Remarks. This is new species record for Turkey.

Mesoleptus incessor (Haliday, 1838) (Figure 5a)

Material examined. BUNPA: Alaçam, 1600 m, 19.VIII.2019, 4 ♂; Cevizdibi, 830 m, 17.VII.2019, 4 ♂; Gözed, 670 m, 24.VI.2018, ♂.

Associated plants. Angelica sylvestris L., Euphorbia nicaeensis All., E. virgata Waldst, Heracleum sphondylium L. ve Picea excelsa (Lam.).

Distribution in Turkey. Anatolia (locality name unknown) (Jussila et al., 2010).)

Global distribution. Palearctic Region.

Figure 5. Collected species: a) Mesoleptus incessor; b) Phygadeuon hercynicus; c) Phygadeuon nitidus; d) Phygadeuon lapponicus; e) Thaumatogelis audax.
Contribution to the knowledge of Ichneumonidae (Hymenoptera) of Bursa Uludağ National Park area including new records

Figure 6. Distribution in Turkey of species: a) Campoletis agilis; b) Campoletis crassicornis; c) Diadegma mediterraneum; d) Hyposoter didymator; e) Agrothereutes fumipennis; f) Aptesis senicula; g) Bathyrhix pellucidator; h) Dichrogaster schimitscheki; i) Gelis agilis; j) Gelis exareolatus.

*Phygadeuon hercynicus* Gravenhorst, 1829 (Figure 5b)

Material examined. BUNPA: Alaçam, 1100 m, 20.VI.2018, 2 ♂♂, 1200 m, 08.VI.2019, 3 ♂♂; Gözede, 630 m, 06.VIII.2019, 3 ♂♂.

Associated plants. *Angelica sylvestris* L.

Global distribution. European and West Palearctic Region.
Remarks. This is new species record for Turkey.

*Phygadeuon nitidus* Gravenhorst, 1829 (Figure 5c)

Material examined. BUNPA: Alaçam, 1600 m, 19.VIII.2019, 4 ♂♂; Cevizdibi, 850 m, 02.VIII.2018, 5 ♂♂; Gözede, 650 m, 17.VII.2018, 2 ♂♂, 640 m, 18.VII.2019, 5 ♀♀.

Global distribution. European and West Palearctic Region.

Remarks. This is new species record for Turkey.

*Phygadeuon lapponicus* Thomson, 1884 (Figure 5d)

Material examined. BUNPA: Alaçam, 1700 m, 08.VIII.2018, 7 ♂♂.

Associated plants. *Salix* sp.

Global distribution. Palearctic Region.

Remarks. This is new species record for Turkey.

*Thaumatogelis audax* (Olivier, 1792) (Figure 5e)

Material examined. BUNPA: Gözede, 610 m, 05.VIII.2018, 2 ♂♂.

Associated plants. *Deschampsia cespitosa* (L.)

Global distribution. European and West Palearctic Region.

Remarks. This is new species record for Turkey.

**Discussion**

In Turkey, there was no detailed information available on Ichneumonidae until 1995. Three hundred and eighty-three Ichneumonid species are listed in catalog for Turkey complied by Kolarov (1995). Most of studies have been conducted in Thrace, Eastern Anatolia and Mediterranean Regions of Turkey. With the new records reported here, this number is now 1,291. Previous studies have shown that 124 of the 1,288 species were obtained from economic pests in different orders (Figure 7) (Sarı, 2017).

![Figure 7. Ichneumonidae species obtained from different pests.](image-url)
In total, 263 specimens were collected during the summers of 2018 and 2019. Among these, *A. rufocincta*, *C. thomsoni*, *D. glabriculum*, *D. heteropus*, *M. congener* (Förster, 1876), *P. hercynicus*, *P. lapponicus*, *P. nitidus*, and *T. audax* are new record for the Turkish fauna.

At the end of the study 21 species were identified. Among these, seven species belonging to Campopleginae with 90 individuals and 14 species Cryptinae with 173 individuals were recorded. Cryptinae showed (Table 2) a higher density in terms of both number of species and number of individuals. Species were collected at three different altitudes from 610 to 1700 m with most specimens being collected between 610 and 700 m. Specimens were collected from May to August, with most being collected in July. *Agrothereutes fumipennis* was the most commonly trapped species in net and *D. heteropus* the least captured.

Table 2. Data of species: Individual numbers (IN), vertical distribution (VD), seasonal dynamics (SD), geographical regions (GR), zoogeographical regions (ZR), host records (HR), first record of Turkey (FRT) of specimens

| Taxa name | IN | VD | SD | GR | ZR | H | FRT |
|-----------|----|----|----|----|----|---|-----|
| Genus: Campeolepis Förster, 1869 | Campeolepis agilis (Holmgren, 1860) | 17 | A, B | JI, A | BSR | BP, E, WP | x | Kolarov et al., 2016 |
| Campeolepis crassicosmis (Tscheek, 1871) | 12 | A, B | M, A | BSR, EAR, MIR | BP, E, WP | x | Kolarov & Beyarslan, 1995 |
| *Campeolepis thomsonii* (Roman, 1915) | 11 | A, B | J, A | * | E, EP, WP | | New record |
| Genus: Casinaria Holmgren, 1859 | Casinaria albipalpis (Gravenhorst, 1829) | 14 | C, D | J, JI | ? | BP, E, WP | x | Riedel, 2018 |
| Genus: Diadegma Förster, 1869 | Diadegma gracilisculum (Holmgren, 1859) | 11 | A, B, D | JI, A | * | BP, E, NEAR | | New record |
| Diadegma mediterraneum (Constantineanu, 1930) | 12 | A, C | J, A | EAR, MIR | BP, E | | Kolarov & Beyarslan, 1995 |
| Genus: Hyposoter Förster, 1869 | Hyposoter didymator (Thunberg, 1822) | 13 | A, D | J | CAR, MR, MIR | AUS, BP, E, WP | x | Steiner, 1936 |
| Genus: Acrolyta Förster, 1869 | *Acrolyta rufocincta* (Gravenhorst, 1829) | 12 | B, E | A | * | E, WP | x | New record |
| Genus: Agrothereutes Förster, 1850 | Agrothereutes fumipennis (Gravenhorst, 1829) | 28 | B | JI, A | BSR, EAR, MIR | E, EP, WP | x | Çoruh & Özbek, 2005 |
| Genus: Apestis Förster, 1850 | Apestis senicula (Kriechbaumer, 1893) | 21 | B, E | J, A | BSR, EAR, MIR | E, WP | | Beyarslan & Kolarov, 1994 |
| Cins: Bathysthyrach Förster, 1869 | Bathysthyrach pallidator (Gravenhorst, 1829) | 11 | C, D | J, JI | BSR | E, EP, WP | x | Çoruh et al., 2014b |
| Genus: Dichrogastrus Doumerc, 1855 | *Dichrogastrus heteropus* (Thomson, 1896) | 4 | B | J, A | | E, WP | x | New record |
| Dichrogastrus schmittscheki (Fahringer, 1935) | 9 | A | JI, A | MIR | E, NEAR, WP | | Kolarov & Gürbüz, 2007 |
| Genus: Gelis Thunberg, 1827 | Gelis agilis (Fabricius, 1775) | 7 | B, C | J | BSR | E, EP, WP | x | Fahringer, 1922 |
| Gelis exareolatus (Förster, 1850) | 18 | A, E | JI, A | CAR | E, EP, WP | x | Kolarov, 1987 |
| *Mesoleptus congener* (Förster, 1876) | 21 | A, D | J, JI, A | * | | | New record |
| *Mesoleptus incensor* (Haliday, 1838) | 9 | A, B, E | J, JI, A | ? | E, EP, WP | x | Jussila et al., 2010 |
| Genus Phygaereon Gravenhorst, 1829 | Phygaereon hercynicus Gravenhorst, 1829 | 8 | A, C | J, A | * | E, WP | x | New record |
| Phygaereon nuditus Gravenhorst, 1829 | 16 | A, B, E | JI, A | * | E, WP | | New record |
| Phygaereon lapponicus Thomson, 1884 | 7 | E | A | * | E, EP, WP | x | New record |
| Thaumatogelas audax (Olivier, 1792) | 2 | A | A | * | E, WP | x | New record |

Vertical distribution: A, 0-750 m; B, 751-1000 m; C, 1001-1250 m; D, 1251-1500 m; and E, 1501-1750 m. Seasonal dynamics: M, May; J, June; JI, July; and A, August. Geographical regions: AR, Aegean Region; BSR, Black Sea Region; CAR, Central Anatolia Region; EAR, Eastern Anatolia Region; MR, Marmara Region; and MIR, Mediterranean Region. Zoogeographical regions: AUS, Australasian; E, Europe; EP, Eastern Palearctic; NEAR, Nearctic Region; and WP, Western Palearctic.
Considering distribution by regions, it was found that the species were collected mostly from Mediterranean Region and at least from the Marmara Region. While *A. fumipennis*, *A. senicula*, *C. crassicornis* and *H. didymator* and were collected three different regions, *C. agilis*, *D. schimitscheki*, *G. agilis* and *G. exareolatus* were collected only one region in previous studies. When considering previous records, *H. didymator* has been collected from seven cities, *A. senicula* and *C. crassicornis* from four cities, and *C. agilis*, *D. schimitscheki*, *G. agilis* and *G. exareolatus* from collected only one city. In contrast, *H. didymator* has been recorded in 50 countries worldwide. With this study, Bursa has been added to list of localities each species. Although *C. thomsoni* and *P. lapponicus* occur in the Palearctic region, they were recorded for the first time in Turkey with this study. *Campodeus agilis*, *D. schimitscheki*, *G. agilis* and *G. exareolatus* have been collected from only one province in Turkey and Bursa became the second known locality for these species with this study. Weeds were also detected in study areas and these weeds are shown in Table 3. Based on all these data, we can say that results of study provide new information and scientific value to scientists who work and want to work in this field.

Table 3. Weeds species in study area

| Name of weed | Localities |
|--------------|------------|
|              | Alaçam    | Cevizdibi | Gözede |
| *Prunella vulgaris* L. | ✓          |           | ✓       |
| *Polypodium vulgare* L. | ✓          |           |         |
| *Epilobium angustifolium* L. |            |           |         |
| *Sonchus asper* (L.) Hill | ✓          |           |         |
| *Nepeta nuda* L. | ✓          |           |         |
| *Globularia trichosantha* Fisch. & C.A.Mey. | ✓          |           |         |
| *Medicago polymorpha* L. | ✓          |           |         |
| *Galium elongatum* C. Presl | ✓          |           |         |
| *Mentha longifolia* (L.) L. | ✓          | ✓         |         |
| *Dactylis glomerata* L. | ✓          |           |         |
| *Malva sylvestris* L. | ✓          |           |         |
| *Silene vulgaris* (Moench) Garcke | ✓          |           |         |
| *Onobrychis gracilis* Besser | ✓          |           |         |
| *Securigera varia* (L.) Lassen | ✓          |           |         |
| *Matricaria chamomilla* L. | ✓          |           |         |
| *Hypericum perforatum* L. |            | ✓         |         |
| *Anthemis cretica* L. | ✓          |           |         |
| *Trifolium repens* L. | ✓          | ✓         |         |
| *Plantago lanceolata* L. | ✓          |           |         |
| *Raphanus raphanistrum* L. | ✓          |           |         |
| *Vicia cracca* L. | ✓          |           |         |
| *Allium paniculatum* L. | ✓          |           |         |

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