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New Records and Little-Known Ichneumoninae (Hymenoptera: Ichneumonidae) from Turkey, with Description of the Male of *Melanichneumon glaucatoriops* Heinrich

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ABSTRACT

In the present paper 10 Ichneumoninae species are recognized, mainly collected in the eastern part of Turkey. Of these, six species are new for the Turkish fauna, *Diphyus inopinus* Heinrich, 1972 is new as well Asia Continent. With this study, the number of known Ichneumoninae from Turkey increased to 178 species. The hitherto unknown male of *Melanichneumon glaucatoriops* Heinrich, 1972 is described. The zoogeographical characterizations of the recorded species are given.

Key words: Ichneumonidae, Ichneumoninae, new records, fauna, Turkey.

INTRODUCTION

Despite the fact that more species of Coleoptera have been described, there is growing evidence that the Hymenoptera is probably the most species rich of all insect orders, the number of species might reach more than half a million (Gaston and Gauld, 1993). The biggest hymenopteran family is the Ichneumonidae with some 40 generally recognized subfamilies and more than 23. 331 described species (Yu *et al*., 2005). Ichneumonids have been used successfully as biocontrol agents and given the largely undocumented fauna there is huge potential for their utilization in managed biocontrol programs (Gupta, 1987).

The subfamily Ichneumoninae is a very large group of Ichneumonidae with more than 1700 described species in the Palaearctic region (Yu *et al*., 2005). This is the second largest subfamily of Ichneumonidae with 373 genera. Ichneumoninae are koinobiont or idiobiont endoparasitoids of Lepidoptera (Rasnitsyn and Siitan, 1981). They lay eggs in the larvae or pupae of the host species. The emergence is always from the pupae. The males may be found on different flowers. The females search on foot for hosts in shrubs and leaf litter (Kolarov & Ghahari, 2008).

It is easy to recognize the members of the subfamily by colorful appearance. Front wing 2.2 to 21 mm. long. Clypeus usually separated from face by a groove. Mandible with two teeth or one. Labial and maxillary palpi with 5 and 4 segments respectively.

Propodeum usually rather long, nearly always with well developed carinae. Middle and hind tibiae each with 2 apical spurs. Areolet always present, medium in size to moderately large, nearly always pentagonal. Second recurrent vein with two bullae. Abdomen dorsoventrally depressed (flattened from top to bottom, wider than high). First abdominal segment with spiracle beyond middle, strongly expanded at and beyond spiracle, without glymma. Ovipositor sheath shorter than apical depth of abdomen.

Although some authors (Fahringer & Friese, 1921; Fahringer, 1922; Heinrich, 1978 and Hilpert , 1992) recorded some species from Turkey, studies on this subfamily were very restricted previously in Turkey. However, several contributions were conducted in last few years (Özbek *et al*., 2003; Coruh *et al*., 2005; Riedel, 2008; Riedel *et al*., 2010; Çoruh & Özbek 2011; Çoruh *et al*., 2011). With this contribution, the species and genera of Ichneumoninae occurring in Turkey have increased to 178 and 52 respectively.

The objectives of the present study are to determine the new species existing and contribute to species richness in the some part of Northeast Anatolia.

MATERIAL AND METHODS

Study site

This study area includes three collecting sites: Bayburt, Erzincan and Erzurum (Fig. 1).

Fig.1. Map of study area.

Bayburt has the goegraphic coordinates of 40º 16'N latitude and 40º 15'E longitude. Average altitude of Bayburt is 1550 m above sea level and it has humid and cold climatic conditions. The trees found are predominantly *Pinus sylvestris* L., *Pinus nigra* Arnold. and *Populus* sp. (Atalay, 1994). In addition, the grandland plants are *Acer monspessulanum* L., *A. biserrata* M., *Alchemilla pseudocartalinica* Juz., *A. tinctoria*

L., *Ammi visnaga* (L.), *Arctium minus* (Hill), *Astrantia maxima* Pallas, *Centaurea macrocephala* Muss., *Chaerophylum aureum* L., *Cotinus coggyria* Scop., *Heracleum sphondylium* L., *Irıs pseudacarus* L., *Pimpinella corymbosa* Boiss., *Potentilla crantzii* (Grantz), *Primula elatior* (L.), *Senecio platyphyllus* DC., *Seselis libanotis* (L.) W. Koch, *Silene saxatilis* Sims, *Tanacetum punctatum* (Boiss. & Noe) and *Zosima absinthifolia* (Went.) (Serin, 2008; Çoruh & Çoruh, 2008; Çoruh, 2010).

Erzincan located southwest of Bayburt with an altitude of 1218 m and 39º 44‘N latitude and 39º 29‘ E longitude. Erzincan has mid climatic conditions than Erzurum because of lower altitude.

Erzurum is located east part of Bayburt with 39º 55‘N latitude and 41º 17‘ E longitude. The majority of Erzurum province has high altitude. Most plateaus are around 2000 m above sea level, and the mountainous regions beyond the plateaus are 3000 m and higher. Flat plains are located between the mountains and plateaus. The Palandöken Mountains ranges in southern part of Erzurum between altitudes of 2200 and 3176 m. The diverse topographic and climatic conditions occur in the province increase fauna and flora (Yıldırım & Strumia, 2000). Climate in this province is terrestrial. That is, winters are long and hard; summer is very short and warm. Erzincan and Erzurum has *Pinus sylvestris* L. and *Quercus sp.* as forest plantation (Atalay, 1994) Also, there are *Acer monspessulanum* L., *Achillea biebersteinii* Afan., *A. millefolium* L., *Antemis cretica* L., *Arabis caucasica* Willd., *Astragalus christianus* L., *Carum carvi* L., *Cirsium arvense* (L.), *Coronilla orientalis* Mill., *Cotinus coggyria* Scop., *Eguisetum ramosissimum* Desf., *Ephedra major* Host, *Eryngium billardieri* Delar, *Euphorbia virgata* Waldst. & Kit., *Ferula communis* L., *F. orientalis* L., *Galium incanum* Sm., *Gypsophila bicolor* (Freyn & Sint.), *Hypericum hyssopifolium* Chaix, *H. scabrum* L., *Juniperus communis* L., *Linum mucronatum* Bertol. , *Papaver orientale L*., *Ranunculus cuneatus* Boiss., *Rhus coriaria* L., *Seselis libanotis* (L.) W. Koch, *Trifolium ambiguum* M., *Sisymbrium alatum* K. and *Veronica orientalis* Miller in these areas (Serin, 2008, Çoruh and Çoruh, 2008; Çoruh, 2010).

Sampling method

Material was collected sweeping hand net *during 1996–2005 in Bayburt, Erzincan, and Erzurum provinces,* totally 48 specimens. At the same time, the existing museum specimens were also evaluated. Samples were collected from April to September once a month. The insect samples were killed in ethyl acetate, brought to the laboratory and prepared for identification. Most of the material is housed in the collection of the Entomology Museum Erzurum, Turkey (EMET), some in Riedel’s personal collection. The species are listed in the alphabetic order according the recent Interactive Catalogue of World Ichneumonidae (Yu *et al*., 2005). New distribution areas for previously known species are added. The distributional data and host species are taken from above mentioned catalogue. The zoogeographical characterization is based on the chrotype classification of the Near East fauna, which was proposed by Taglianti *et al*. (1999).

RESULTS

Platylabini

Platylabus vibratorius (Thunberg, 1824)

Material examined: Erzurum, Atatürk University field, 1850 m, 6.VII.1971, 1♂, leg. M. Doğanlar.

Distribution: Western Palaearctic, new for Turkey.

Host: *Bupalus piniarius* (L), *Horisme tersata* (Denis & Schiffermüller) *Pterapherapteryx sexalata* (Retzius), *Thera juniperata* (L.), *Xanthorhoe fluctuata* (L.) (Lepidoptera: Geometridae); *Zygaena filipendulae* L. (Lepidoptera: Zygaenidae).

Ichneumonini

Ctenichneumon castigator (Fabricius, 1793)

Material examined: Erzincan, Tercan, 17.VII.1997, 1♀, leg. S. Çoruh.

Distribution: Palaearctic, known from only Erzurum inTurkey (Riedel *et al*., 2010).

Host: *Biston betularia* L., *Fagivorina arenaria* (Hufnagel) (Lepidoptera: Geometridae); *Agrotis segetum* (Denis and Schiffermüller), *Archanara sparganii* (Esper), *Gortyna flavago* (Denis and Schiffermüller), *Hadena perplexa* (Denis and Schiffermüller), *Lacanobia oleracea* L., *Orthosia incerta* (Hufnagel), *Orthosia stabilis* (Denis & Schiffermüller), *Xanthia togata* Esper (Lepidoptera: Noctuidae); *Aglais urticae* (L.), *Argynnis paphia* (L.), *Vanessa atalanta* L., *Vanessa cardui* (L.) (Lepidoptera: Nymphalidae); *Sitochroa verticalis* (L.) (Lepidoptera: Crambidae).

Ctenichneumon nitens (Christ, 1791)

Material examined: Erzurum, Ispir Road, Ovacık-Çatak Dam, 1400 m, 1♂, 27.VIII.2003, leg. H. Özbek.

Distribution: Palaearctic, new for Turkey.

Host: *Trichiura crataegi* (L.) (Lepidoptera: Lasiocampidae); *Caradrina clavipalpis* (Scopoli), *Hecatera dysodea* (Denis & Schiffermüller), *Lacanobia contigua* (Denis & Schiffermüller), *Noctua serena* Denis & Schiffermüller (Lepidoptera: Noctuidae); *Phalera bucephala* (L.) (Lepidoptera, Notodontidae); *Aglossa pinguinalis* (L.) (Lepidoptera: Pyralidae).

Remark: althugh *Ctenichneumon nitens* has large distribution area (Palaearctic) and parasitoid of some important lepidopterous species was recorded first in Turkey.

Diphyus fossorius (Linnaeus, 1758)

Material examined: Erzurum, Ilıca. Atlıkonak, 8.VII.1997, 1♂, leg. Ö. Çalmasur.

Distribution: Palaearctic, new for Turkey.

Host: *Dendrolimus sibiricus* Tschetverikov (Lepidoptera:Lasiocampidae); *Calliteara fascelina* (L.) (Lepidoptera: Lymantriidae); *Agrotis segetum* (Denis & Schiffermüller), *Aletia ferrago* F., *Mniotype adustus* (Esper) (Lepidoptera: Noctuidae); *Aglais urticae* (L.), *Nymphalis antiopa* (L.) (Lepidoptera: Nymphalidae).

Diphyus inopinus Heinrich, 1972

Material examined: Erzurum, 1850 m, 26.VII.1992, 1♀, leg. M. Atamanalp.

Distribution: Austria and Poland, new for Turkey as well as Asia continent.

Host: Unknown.

Melanichneumon glaucatoriops Heinrich, 1972

Material examined: Erzurum, Ilıca, Atlıkonak, 1750m, 29.VI.1999, 1♂, leg. Ö. Çalmaşur.

Description: Body length 13 mm. Flagellum with 45 segments, stout, first flagellomere about 1.3 times and the second 1.2 times as long as wide, together about 0.40 times as long as the compound eyes, tyloids on flagellomeres 5-17, oval, maximally 0.7 times as long as their segment. Temples almost parallel behind the eyes and slightly narrowed apically, ocelli small, distance to compound eyes 1.4 times as long as the lateral ocellus; frons, face and clypeus with coarse punctures. Genae seen from lateral widened, about 1.3 times as wide as the compund eye, densely punctures in the lower part. Genal carinae meeting hypostomal carina near mandibular base. Head and mesosoma covered with brownish hairs, notauli indistinct. Mesoscutum, mesopleura and metapleura densely punctured, smooth and shining between the punctures, epicnemia not elevated, coxal carina distinct. Scutellum moderately raised, somewhat wider than long, without lateral carinae. Area basalis with central tubercle, area superomedia horseshoe-like, slightly wider than long, almost smooth, costulae distinct. Femora strongly thickened, hind femur about 2.9 times as long as high. All tibiae with strong spines. Claws without teeth. Postpetiole without dorsal carinae, middle field not differentiated, densely punctured. Tergite 2 about 0.9 times as long as wide, gastrocoeli slightly impressed, thyridiae indistinct. Tergites 2-3 with very dense punctures, following tergites with superficial punctures. Colour: black. Mandibles centrally reddish, basal flagellomeres partly reddish beneath. Ivory are facial orbits, small spot on vertex, hind edge of pronotum, spot on tegulae, whole scutellum, widely interrupted hind margins of tergites 2-4. Coxae, trochanters and trochantelli black, legs otherwise red, tarsi III slightly darkened. Pterostigma brown.

Distribution: Azerbaijan, Austria, Italy, female known from Turkey (Çoruh *et al*., 2011).

Host: Unknown.

Platylabops humilis (Wesmael, 1857)

Material examined: Erzurum: Atatürk University field, 1850 m, 13.VII.1996, 1♂, leg. S. Tosun.

Distribution: Western Palaearctic, new for Turkey.

Host: Unknown.

Triptognathus atripes (Gravenhorst, 1820)

Material examined: Bayburt, Maden, 1650 m, 16.VI.2000, 1♀, leg. C. Güçlü. Erzurum, Atatürk University field, 17.VI.1970, 1♂, leg. H. Özbek, 6.VI.1971, 1♀, 5.VII.1973, 1♂, leg. M. Doğanlar, 15.VI.1976, 1♀, leg. H. Özbek, 10.VIII.1992, 1♀, leg. I. Aslan, 25.VII.1993, 1♂, leg. E. Kılıç, 5.VII.1997, 1♂, leg. S. Çoruh, 10.VI.2000, 1♂, leg. M. Kesdek; Palandöken Mt., 2300 m, 23.VII.1996, 2♂♂, 23.VII.1997, 1♂,

leg. S. Çoruh; Dutcu, Kamyolu, 18.VII.1999, 1♀, leg. S. Çoruh; Güngörmez, 2500 m, 28.VII.1996, 1♂, 28.VII.1998, 2♂♂, leg. E. Yıldırım; Askale, Kop Mt, 2200 m, 16.VI.2000, 1♀, leg. Ö. Çalmasur; Hınıs, Söylemez, 1650 m, 28.VI.2005, 1♀, leg. E. Yıldırım; Olur, 22.VII.1992, 2 ♀♀, leg. E. Yıldırım, Süngübayır, 1850 m, 23.VII.1992, 1♀, 24.VII.1996, 1♀, leg. E. Yıldırım; Oltu, Camlıbel, 1750 m, 2.VII.1997, 1♀, leg. E. Yıldırım, Sütkans, 1500 m, 18.VI.1996, 2♀♀, 25.VI.1996, 2♀♀, leg. E. Yıldırım; Pasinler, Pelitli, 2200 m, 14.VII.1998, 1♀, leg. E. Yıldırım; Senkaya, Turnalı, 1750 m, 12.VI.1992, 1♀, 28.VII.1993, 2♀♀, leg. E. Yıldırım; Tortum, Meydanlar, 21.V.1995, 1♀, leg. I. Aslan, Aktas, 1700 m, 29.V.1994, 2♀♀, leg. H. Özbek.

Distribution: Palaearctic, known from only Kayseri (Turkey) (Kohl, 1905).

Host: Unknown.

Remark: Kohl (1905) was recorded *T. atripes* from Kayseri, after one century we recorded it in Bayburt and Erzurum provinces and it is a quite abundant species.

Triptognathus cf. fumigator (Gravenhorst, 1820)

Material examined: Erzurum, Atatürk University field, 14.VI.1970, 1♂; leg. H. Özbek, 1.VII.1992, 1♀, leg. M. Atamanalp; Palandöken Mt., 2400 m, 1.VII.1996, 1♀, leg. E. Yıldırım.

Distribution: Palaearctic, new for Turkey.

Host: Unknown.

Triptognathus unifasciatus (Spinola, 1843)

Material examined: Bayburt, Demirözü, 14.VIII.1992, 1♀, leg. H. Bostan. Erzurum, Atatürk University field, 14.VI.1970, 1♂, 17.VI.1970, 1♂, leg. H. Özbek; Şenkaya, Turnalı, 12.VI.1992, 1♀, leg. H. Özbek.

Distribution: Palaearctic, known from Turkey (locality could not be determined) (Heinrich, 1978)

Host: Unknown.

Zoogeographic Characterizations

The geographic distribution of above mentioned species can be divided into the following groups:

Palaearctic range: *Ctenichneumon castigator*, *C. nitens*, *Diphyus fossorius*, *Triptognathus atripes*, *T. cf. fumigator*, and *T. unifasciatus*

West Palaearctic range: *Platylabus vibratorius* and *Platylabops humilis.*

Turano-European chorotype: *Diphyus inopinus* and *Melanichneumon glaucatoriops*.

DISCUSSION

Kolarov (1995) listed in his catalogue 66 species of Ichneumoninae occurring in Turkey. With the studies in last several years (Özbek *et al*., 2003; Çoruh *et al*., 2005; Riedel, 2008; Riedel *et al*., 2010; Çoruh and Özbek, 2011 and Çoruh *et al*., 2011) many species and genera were added to the Turkish fauna and result became 172 species in 53 genera. With the present contribution, the Ichneumoninae species occurring in Turkey raised to 178 species in 53 genera.

It is remarkable to note that although *Platylabus vibratorius* and *Platylabops humilis* have West-Palaearctic distribution, those of *Ctenichneumon nitens, Diphyus fossorius*

and *Triptognathus cf. fumigator* have Palaearctic distributions they are recorded from Turkey for the first time. Furthermore, *Diphyus inopinus* has been known only from Austria was recorded from Turkey too. The male of *Melanichneumon glaucatoriops* has been unknown it was described.

The family Ichneumonidae is one of the most important group of parasitoids on various pests in different orders of insects, such as Lepidoptera, Coleoptera and Diptera to a less extend spiders and the egg sacs of spiders and pseudoscorpions. Some of the ichneumonids have been used successfully as bio control agents and given the largely undocumented fauna there is a huge potential for their use in managed bio control programmes (Gupta, 1991). Although the biology of ichneumonids is very variable in general, and all forms of parasitism are represented, but common to all ichneumonids is that they kill their host (Laurenne, 2008). Because of being valuable parasitoid group known hosts each species were included. All these situations increase the importance of such studies in the country.

The zoogeographical characterizations reveal that except Turano-European chorotyp the rest of the species have very large distribution area. Probably, almost all of them were European originated species were distributed eastward to Turkey.

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