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Original article (Orijinal araştırma)

A study of Ichneumonidae (Hymenoptera) from Northeastern Anatolia III, with new records and description male of *Temelucha pseudocaudata* Kolarov, 1982

Kuzeydoğu Anadolu'dan Ichneumonidlerle ilgili bir çalışma, yeni kayıtlar ve *Temelucha pseudocaudata* Kolarov, 1982'nın erkeğinin tanımı

Janko KOLAROV[1] **Saliha ÇORUH[2*]** **İrfan ÇORUH[2]**

Summary

Forty-four ichneumon species belonging to Anomaloninae, Banchinae, Cremastinae, Ctenopelmatinae, Diplazontinae, Metopiinae, Ophioninae, Pimplinae, Tryphoninae and Xoridinae subfamilies were collected from Northeastern Anatolia, of Turkey in 2015. The newly discovered male of *Temelucha pseudocaudata* Kolarov, 1982 is described. Eight species are recorded for the first time from Turkey: *Ctenochira meridionator* Aubert, 1969, *Diplazon deletus* (Thomson, 1890), *Exochus flavifacies* Kusigemati, 1984, *Homotropus pallipes* (Gravenhorst, 1829), *Odontocolon rufiventris* (Holmgren, 1860), *Sussaba cognata* (Holmgren, 1858), *Triclistus congener* (Holmgren, 1858) and *Tromatobia lineatoria* (Villers, 1789). New data on the distribution of 36 known species is also reported. Additionally, a short zoogeographical characterization is given for each of the species.

Keywords: Fauna, Ichneumonidae, Northeastern Anatolia, zoogeographical notes

Özet

Anomaloninae, Banchinae, Cremastinae, Ctenopelmatinae, Diplazontinae, Metopiinae, Ophioninae, Pimplinae, Tryphoninae ve Xoridinae altfamilyalarına ait 44 ichneumonid türü, 2015 yılında Kuzeydoğu Anadolu'dan toplanmıştır. *Temelucha pseudocaudata* Kolarov, 1982 türünün erkeğinin tanımı ilk defa yapılmıştır. Sekiz tür Türkiye'den yeni kayıt olarak verilmiştir. Bunlar: *Ctenochira meridionator* Aubert, 1969, *Diplazon deletus* (Thomson, 1890), *Exochus flavifacies* Kusigemati, 1984, *Homotropus pallipes* (Gravenhorst, 1829), *Odontocolon rufiventris* (Holmgren, 1860), *Sussaba cognata* (Holmgren, 1858), *Triclistus congener* (Holmgren, 1858) ve *Tromatobia lineatoria* (Villers, 1789)'dır. Bilinen 36 tür için yeni lokasyonlar eklenirken, her bir tür için de zoocoğrafik notlar da verilmiştir.

Anahtar sözcükler: Fauna, Ichneumonidae, Kuzeydoğu Anadolu, zoocoğrafik notlar

[1] Faculty of Pedagogy, University of Plovdiv, Plovdiv, Bulgaria
[2] Atatürk University, Faculty of Agriculture, Department of Plant Protection, 25240 Erzurum, Turkey
* Corresponding author (Sorumlu yazar) e-mail: spekel@atauni.edu.tr
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Introduction

Hymenoptera is one of the few mega diverse insect orders. Some 300 thousand to 2.5 million hymenopteran species are estimated to exist worldwide and nearly 115 thousand species have been described (Stork, 1988; La Salle & Gauld, 1992; Gauld & Gaston, 1995; Grissell, 1999).

The order Hymenoptera is an important group in class Insecta as it contains agriculturally, ecologically and economically significant species. They are also ecological indicators. Hymenopteran parasitoids are potential biocontrol agents of agricultural pests (Anbalagan et al., 2015).

Ichneumonidae is a family within the order Hymenoptera and are commonly called ichneumon wasps. As larvae, they parasitize a wide range of hosts, most frequently the larvae and pupae of the larger holometabolous insect orders (Coleoptera, Diptera, other Hymenoptera and Lepidoptera), although a small number also attack the immatures of other holometabolous insects such as Trichoptera (Agriotypinae), Mecoptera (a few Campopleginae), Raphidioptera (a few Campopleginae), and Neuroptera (Brachycyrtinae, some Cryptinae) (Eberhard, 2000).

Despite the abundance, diversity and ecological importance of Ichneumonidae, faunistic studies are not yet adequate in Turkey. The number of species of Ichneumonidae recorded in the Ichneumonidae World catalog Turkey is 1056. An intense series of studies over the last 3 years (Çoruh & Kolarov, 2013, 2016; Çoruh & Özbek, 2013; Çoruh et al., 2013, 2014a, b, c; Kolarov et al., 2014a, b, c, 2015, 2016; Özdan, 2014; Riedel et al., 2014; Yaman, 2014; Yurtcan & Kolarov, 2015; Çoruh & Çalmaşur, 2016) has raised this number to 1220. With eight new records in this paper, the number is now 1228.

The work describe here is recent progress in an ongoing project (Kolarov et al., 2014a, b, 2015, 2016; Çoruh et al., 2014a, b). The objective of this study was to determine the faunal richness in the study area, provide habitat and associated plant data for collected insects, and contribute to the knowledge of Ichneumonidae distribution in Turkey, and also describe the male of *Temelucha pseudocaudata* Kolarov, 1982.

Material and Methods

Sampling and collection method

Adult specimens, 182 in total, were collected from various habitats in Erzincan, Erzurum, Giresun, Gümüşhane, Ordu, Rize and Trabzon Provinces in Northeastern Anatolia, Turkey (Figure 1, Table 1). The ichneumonid specimens were collected on flowering plants by insect net in July 2015. All samples were collected by the first two authors. The identified samples were deposited in the collection of the University of Plovdiv (Bulgaria). Classification, nomenclature, distributional data and associated plants of some species follow Yu et al. (2012). Plant samples were also collected and determined according to Davis (1965-1988) by the third author, and deposited in the herbarium of the Department of Plant Protection of Atatürk University (Erzurum).

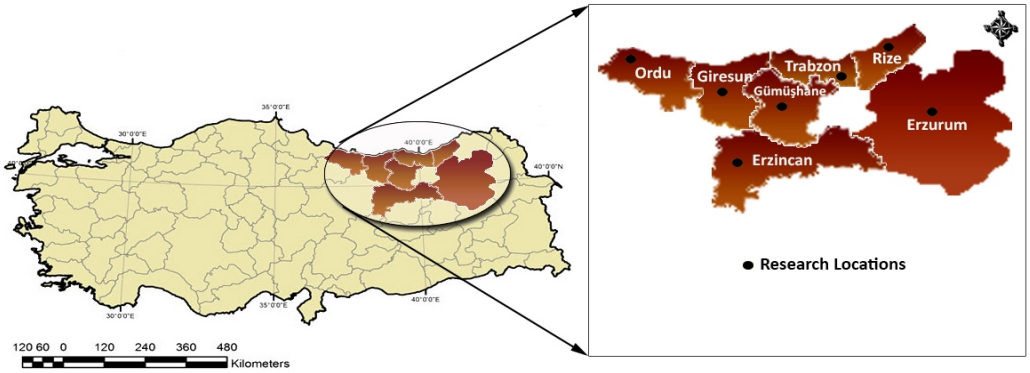

Figure 1. Research locations in Northeastern Anatolia, Turkey.

Study area

Collection areas with geographic coordinates, altitude and habitat details are shown in Table 1 and vegetation data for each location in Table 2.

Table 1. Collection areas in seven provinces in Northeastern Anatolia, Turkey

Collection areas			Coordinates	Altitude (m)	Habitat
Province	District	Locality			
Erzincan	Avcılar		39°36.899′ N, 39°49.328′ E	1221	Hillside, dominant plant *Medicago sativa* L.
	Merkez	Ahmetli	39°53.481′ N, 39°21.197′ E	1988	Roadside, semi-wet mown pasture
	Pöske Mountain		39°51.160′ N, 39°21.515′ E	1838	Roadside, oak area (red soil)
Erzurum	Aşkale	Kandilli	39°57.420′ N, 40°52.550′ E	1904	Roadside, meadow area near water channel, dominant plant *M sativa*
	Aşkale	Tepebaşı Valley	39°51.741′ N, 40°37.454′ E	2009	Roadside, dry land, pasture, dominant plant *Quercus petraea* (Mattuschka) Liebl.
	Merkez	Gelinkaya	40°01.741′ N, 40°54.855′ E	1803	Roadside, dominant plants *Salix triandra* L., *Populus tremula* L. and *M. sativa*
Giresun	Bulancak		40°55.984′ N, 38°13.045′ E	16	*Corylus avellana* L.
	Eynesil	Kekiktepe	41°02.723′ N, 39°05.641′ E	4	Seaside, hazelnut garden on highest peak
	Keşap	Yolağzı	40°55.998′ N, 38°34.578′ E	1	Roadside, half shade, semi-wet, hazelnut garden
Gümüşhane	Kelkit	Köycük	40°08.584′ N, 39°25.354′ E	1393	Roadside, garden areas
Ordu	Turnasuyu	Turnasuyu	40°58.572′ N, 37°58.577′ E	1	Roadside, mown pasture, shade, hazelnut garden
Rize	İkizdere, Çamlık	İkizdere, Çamlık	40°42.979′ N, 40°37.017′ E	1099	Mown and unmown pasture, dominant plant *Ulmus glabra* Huds.
Trabzon	Yomra	Yomra	40°56.365′ N, 39°52.131′ E	20	Roadside, 20 m above the road, shade, hazelnut garden with cut herbs

Table 2. Vegetation at the collection areas in seven provinces in Northeastern Anatolia, Turkey

Plant species	EA	EmA	EP	EAK	EAT	EmG	GB	GEK	GKY	GKK	OT	RIC	TY
Acantholimon caryophyllaceum Boiss.					x								
Achillea biebersteinii Afan.	x												
Achillea millefolium L.		x				x							
Agrimonia eupatoria L.								x			x		x
Alchemilla caucasica Buser		x											
Alchemilla sintenisii Rotmh.												x	
Allium armenum Boiss. et Kotschy			x										
Allium atroviolaceum Boiss.										x			
Allium rotundum L.					x								
Alyssum repens Baumg.											x		
Amaranthus retroflexus L.							x	x					
Anchusa leptophylla Roemer et Schulters			x	x									
Anthemis tinctoria L.					x		x				x		
Arctium minus (Hill) Bernh.												x	
Artemisia austriaca Jacq.			x										
Artemisia vulgaris L.							x		x		x		
Asperula orientalis Boiss. et Hohen.	x			x									
Astragalus lagurus Willd.					x								
Astragalus lineatus Lam.						x							
Astragalus microcephalus Willd.					x								
Astrodaucus orientalis (L.) Drude													
Bromus arvensis L.						x							
Bromus japonicus Thunb.			x	x									
Bupleurum falcatum L.			x										
Bupleurum rotundifolium L.				x	x					x			
Calystegia sepium (L.) R. Br.							x	x					x
Campanula rapunculoides L.												x	
Campanula stevenii Bieb.						x							
Carduus nutans L.		x											
Carex panicea L.		x											
Carum carvi L.				x	x								
Centaurea pseudoscabiosa Boiss. et Buhse				x									
Centaurea solstitialis L.	x									x			
Centaurea virgata Lam.			x										

EA: Erzincan, Avcılar; EmA: Erzincan, Merkez, Ahmetli; EP: Erzincan, Pöske Mountain; EAK: Erzurum, Aşkale, Kandilli; EAT: Erzurum, Aşkale, Tepebaşı Valley; EmG: Erzurum, Merkez, Gelinkaya; GB: Giresun, Bulancak; GEK: Giresun, Eynesil, Kekiktepe; GKY: Giresun, Keşap, Yolağzı; GKK: Gümüşhane, Kelkit, Köycük; OT: Ordu, Turnasuyu; RIÇ: Rize, Ikizdere, Çamlık; TY: Trabzon, Yomra.

Table 2. (Continued)

Plant species	EA	EmA	EP	EAK	EAT	EmG	GB	GEK	GKY	GKK	OT	RIC	TY
Cephalaria procera Fisch. et Lall.		x			x	x							
Cerastium glomeratum Thuill.											x		
Cerinthe minor L.	x	x											
Chenopodium album L.							x	x					
Chenopodium vulvaria L.										x			
Chondrilla juncea L.			x										
Cichorium intybus L.	x	x	x			x		x			x		
Cirsium arvense (L.) Scop.		x		x	x	x				x			
Cirsium echinus (Bieb.) Hand.-Mazz.				x						x			
Commelina communis L.								x					
Conium maculatum L.							x						
Convolvulus arvensis L.		x		x						x			
Convolvulus galaticus Rostan ex Choisy										x			
Conyza canadensis (L.) Cronquist							x	x	x		x		
Coronilla varia L.					x	x				x			
Corylus avellana L.							x	x	x		x		x
Crataegus orientalis Pallas ex Bieb.					x								
Crepis armena DC.		x	x		x								
Crepis vesicaria L.											x		
Cynanchum acutum L.			x										
Cynodon dactylon (L.) Pers.				x									
Dactylis glomerata L.		x		x	x	x				x			
Daucus carota L.	x				x			x		x			
Delphinium cyphoplectrum Boiss.					x								
Descurainia sophia (L.) Webb ex Prantl										x			
Digitalis ferruginea L.												x	
Digitaria sanguinalis (L.) Scop.	x												
Echinops galaticus Freyn			x										
Echinops pungens Trautv.										x			
Echium italicum L.	x												
Echium vulgare L.										x			

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Table 2. (Continued)

Plant species	EA	EmA	EP	EAK	EAT	EmG	GB	GEK	GKY	GKK	OT	RIC	TY
Epilobium angustifolium L.								x	x	x	x		
Equisetum ramosissimum Desf.		x											
Erigeron acer L.									x				x
Eryngium billardieri Delar.	x			x	x					x			
Eryngium campestre L.	x												
Eryngium giganteum Bieb.						x							
Euphorbia palustris L.							x						
Euphorbia peplus L.									x				
Euphorbia petrophila C. A. Meyer		x	x										
Euphorbia stricta L.	x				x					x	x		
Euphorbia virgata Waldst. et Kit.			x			x							
Falcaria vulgaris Bernh.							x			x			
Festuca callieri (Hackel ex St.Yves) F. Markgraf apud Hayek			x										
Festuca ovina L.		x	x	x	x								
Filipendula vulgaris Moench						x							
Galium verum L.		x	x	x	x	x							
Geranium asphodeloides Burm. Fil.											x		
Geranium pyrenaicum Burm. Fil.												x	
Geranium sanguineum L.												x	
Geranium tuberosum L.						x							
Gladiolus atroviolaceus Boiss.			x										
Globularia trichosantha Fisch. et Mey.					x								
Grammosciadium daucoides DC.		x											
Helichrysum arenarium (L.) Moench			x										
Heracleum pastinacifolium C. Koch						x							
Holcus lanatus L.							x		x		x		x
Hypericum elongatum Ledeb.		x	x	x	x					x			
Hypericum perforatum L.								x	x		x		
Inula oculus-christi L.				x									
Isatis sp.			x	x						x			
Juncus acutus L.											x		

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Table 2. (Continued)

Plant species	EA	EmA	EP	EAK	EAT	EmG	GB	GEK	GKY	GKK	OT	RIC	TY
Koeleria cristata (L.) Pers.			x										
Lactuca serriola L.	x			x		x	x		x	x			
Lapsana communis L.						x	x		x	x		x	
Lathyrus pratensis L.						x							
Leontodon crispus Vill.				x									
Leontodon hispidus L.								x				x	
Leopoldia comosa (L.) Parl.					x								
Lepidium draba L.		x								x			
Linaria kurdica Boiss. et Hohen.				x									
Lolium perenne L.						x	x				x		
Lotus corniculatus L.						x							
Marrubium parviflorum Fisch. et Mey.		x											
Medicago lupulina L.													x
Medicago sativa L.	x					x							
Melampyrum arvense L.				x	x								
Melilotus alba Desr.	x												
Melilotus officinalis (L.) Desr.				x	x								
Mentha longifolia (L.) Hudson		x		x								x	
Nasturtium officinale R. BR.									x				
Onobrychis altissima Grossh					x								
Ononis spinosa L.		x											
Onopordum acanthium L.										x			
Origanum vulgare L.												x	
Papaver dubium L.		x											
Papaver tauricola Boiss.										x			
Paspalum dilatatum Poiret							x	x					x
Phleum pratense L.		x				x							
Phlomis pungens Willd.				x	x								
Phragmites australis Cav.) Trin. ex Steudel						x							
Pilosella hoppeana (Schult.) F.W. Schultz & Sch.Bip.												x	
Plantago atrata Hoppe		x											
Plantago lanceolata L.								x		x		x	

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Table 2. (Continued)

Plant species	EA	EmA	EP	EAK	EAT	EmG	GB	GEK	GKY	GKK	OT	RIC	TY
Plantago major L.							x	x	x		x	x	
Poa bulbosa L.	x	x		x									
Poa longifolia Trin.								x					
Poa nemoralis L.		x											
Poa pratensis L.							x				x	x	x
Polygonum persicaria L.							x		x		x		
Populus tremula L.						x							
Potentilla argentea			x		x								
Prunella vulgaris								x			x	x	
Pteridium aquilinum								x	x			x	x
Quercus petraea (Mattuschka) Liebl.					x								
Ranunculus kotschyi Boiss.												x	
Rhinanthus angustifolius C. C. Gmelin		x		x		x						x	
Rorippa sylvestris (L.) Besser								x			x		
Rubus discolor Weihe et Nees.								x					x
Rubus hirtus Waldst. et Kit.							x		x				
Rumex acetosella L.		x							x				
Rumex crispus L.				x		x	x						
Salix pentandra L.			x										
Salix triandra L.						x							
Salvia candidissima Vahl			x		x								
Salvia sclarea L.			x										
Salvia verticillata L.										x		x	
Sambucus ebulus L.							x				x		
Sanguisorba minor Scop.	x	x	x		x								
Scabiosa argentea L.	x				x								
Scabiosa caucasica Bieb.			x										
Senecio nemorensis L.									x				
Senecio paucilobus DC.		x											
Senecio vernalis Waldst. et Kit.		x											
Senecio vulgaris L.						x	x				x		
Seseli libanotis (L.) W. Koch					x	x							

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Table 2. (Continued)

Plant species	EA	EmA	EP	EAK	EAT	EmG	GB	GEK	GKY	GKK	OT	RIC	TY
Setaria viridis (L.) P. Beauv.							x						
Silene vulgaris (Moench) Garcke	x	x			x								
Solanum nigrum L.								x					
Sonchus arvensis L.				x									
Sonchus oleraceus L.							x	x				x	
Sorghum halepense (L.) Pers.							x		x				
Stachys sylvatica L.									x				
Stipa pulcherrima C. Koch					x								
Tanacetum balsamita L.		x											
Tanacetum macrophyllum (Waldst. et Kit.) Schultz-Bip.													x
Taraxacum crepidiforme DC.		x										x	
Telekia speciosa (Schreber) Baumg.									x				
Teucrium orientale L.				x									
Tragopogon dubius Scop.						x							
Trifolium montanum L.					x								
Trifolium pratense L.						x		x			x	x	x
Trifolium repens L.												x	x
Turgenia latifolia (L.) Hoffm.				x									
Ulmus glabra Huds.												x	
Urtica dioica L.							x	x			x	x	
Verbascum cheiranthifolium Boiss.			x		x					x			
Verbascum oreophilum C. Koch		x	x										
Verbascum speciosum Schrader				x									
Vicia cracca L.				x		x		x	x				x
Xanthium strumarium L.							x			x	x		
Xeranthemum annuum L.	x		x	x	x					x			

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Results

In the present study, a total of 44 species were identified. These species belong to Anomaloninae, Banchinae, Cremastinae, Ctenopelmatinae, Diplazontinae, Metopiinae, Ophioninae, Pimplinae, Tryphoninae and Xoridinae subfamilies. Eight species, marked in the text by an asterisk, are new records for Turkish fauna. The newly discovered male of *T. pseudocaudata* is described.

Subfamily Anomaloninae Viereck,1918

Agrypon gracilipes (Curtis, 1839)

Material examined: Giresun: Keşap, Yolağzı, 25.VII.2015, 2 ♀♀; Ordu: Turnasuyu, 24.VII.2015, ♀.

Distribution in Turkey: Ankara and Bayburt (Özdemir & Kılınçer, 1990; Çoruh et al., 2004, 2014c).

Distribution in World: Palearctic region.

Associated plants: *Foeniculum vulgare* Miller

Anomalon cruentatum (Geoffroy, 1785)

Material examined: Erzincan: Pöske Mt. 23.VII.2015, ♂; Erzurum: Aşkale, Tepebaşı Valley, 23.VII.2015, ♀; Gümüşhane: Kelkit, Köycük, 23.VII.2015, ♀.

Distribution in Turkey: Adana, Adıyaman, Afyon, Antalya, Batman, Bayburt, Bingöl, Diyarbakır, Edirne, Elazığ, Erzincan, Erzurum, Gaziantep, Hatay, Iğdır, Istanbul, Isparta, Kahramanmaraş, Kars, Kırklareli, Malatya, Mardin, Muğla, Tekirdağ and Tunceli (Kolarov et al., 1994, 2002, 2014a; Çoruh et al., 2004; Gürbüz, 2005; Boncukçu, 2008; Kırtay, 2008; Birol, 2010; Gürbüz et al., 2011; Çoruh & Kolarov, 2016; Özdan & Gürbüz, 2016).

Distribution in World: Azerbaijan, Turkey, Kazakhstan and Tajikistan.

Associated plants: *Anthriscus sylvestris* (L.) Hoffm. and *Peucedanum oreoselinum* (L.) Moench.

Subfamily Banchinae Wesmael, 1845

Lissonota (*Loxonota*) *flavovariegata* (Lucas, 1849)

Material examined: Erzincan: Ahmetli, 23.VII.2015, 6 ♂♂, ♀, Avcılar (Figure 2), 23.VII.2015, ♀; Erzurum: Gelinkaya, 26.VII. 2015, 53 ♂♂, 9 ♀♀, Kandilli, 6 km from Aşkale, 22.VII.2015, 6 ♂♂, ♀; Giresun: Eynesil, Kekiktepe, 25.VII. 2015, ♂, ♀, Keşap, Yolağzı, 25.VII.2015, ♀; Gümüşhane: Kelkit, Köycük, 23.VII.2015, 6 ♂♂, 4 ♀♀; Ordu: Turnasuyu, 24.VII.2015, ♀.

Distribution in Turkey: Ankara, Bayburt, Bolu, Çankırı, Erzincan, Erzurum, Kars, Kırşehir, Konya, Nevşehir, Trabzon and Yozgat (Özdemir, 1996; Pekel, 1999; Çoruh et al., 2004, 2014c).

Distribution in World: Algeria, Europe, Turkey, Armenia and Iran.

Remark: this species was collected on *M. sativa* while feeding in Kandilli and Avcılar.

Figure 2. Study areas in Avcılar, Erzincan Province, Turkey.

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

Material examined: Erzurum: Kandilli, 6 km from Aşkale, 22.VII.2015, 2 ♀♀.

Distribution in Turkey: Diyarbakır, Elazığ, Erzurum, Mardin and Ordu (Pekel & Özbek, 2000; Akkaya, 2005, Kolarov et al., 2016; Özdan & Gürbüz, 2016).

Distribution in World: Holarctic region.

Remark: This species was collected on *M. sativa* while feeding.

Lissonota (*Loxonota*) *lineata* Gravenhorst, 1829

Material examined: Erzincan: Ahmetli, 23.VII.2015, ♂.

Distribution in Turkey: Diyarbakır, Hatay and Osmaniye (Akkaya, 2005; Gürbüz et al., 2011).

Distribution in World: Europe, Turkey, Iran and Mongolia.

Lissonota (*Lissonota*) *apleuralis* Brischke, 1880

Material examined: Erzincan: Avcılar, 23.VII.2015, ♂, ♀; Erzurum: Kandilli, 6 km from Aşkale, 22.VII.2015, ♀; Giresun: Keşap, Yolağzı, 25.VII.2015, ♀.

Distribution in Turkey: Bursa and Çanakkale (Kolarov et al., 1997a, b).

Distribution in World: Europe, Turkey and North China.

Associated plants: *Anethum graveolens* L., *Chaerophyllum bulbosum* L., *Cirsium vulgare* (Savi) Ten., *Daucus carota* subsp. s*ativus* L., *Epilobium angustifolium* L., *Fraxinus excelsior* L., *Heracleum sphondylium* L., *Pastinaca graveolens* M. Bieb., *Peucedanum oreoselinum* and *Quercus sessiliflora* (Herb Smith).

Remark: this species was collected on *M. sativa* while feeding near Avcılar.

Lissonota (*Lissonota*) *variabilis* Holmgren, 1860

Material examined: Erzurum: Kandilli, 6 km from Aşkale, 22.VII.2015, 2 ♂♂.

Distribution in Turkey: Erzurum and Kars (Pekel, 1999).

Distribution in World: Europe, Georgia and Turkey.

Associated plants: *Angelica sylvestris* L., *Heracleum sphondylium*, *Peucedanum oreoselinum* and *Picea* sp.

Remark: This species was collected on *M. sativa* while feeding.

Subfamily: Cremastinae Forster, 1869

Pristomerus armatus (Lucas, 1849)

Material examined: Erzurum: Aşkale, Tepebaşı Valley, 23.VII.2015, ♀.

Distribution in Turkey: Elazığ, Erzurum, Malatya and Sivas (Pekel & Özbek, 2000; Kolarov &Yurtcan, 2009).

Distribution in World: Algeria, Morocco, Europe, Georgia, Turkey, Armenia, Iran, Kazakhstan, Turkmenistan, Uzbekistan, Kyrgyzstan and Siberia.

Pristomerus vulnerator (Panzer, 1799)

Material examined: Erzincan: Avcılar, 23.VII.2015, 2 ♂♂, 2 ♀♀.

Distribution in Turkey: Ankara, Black Sea Region, Bursa, Erzurum, Samsun and Tekirdağ (Kolarov, 1995b; Kolarov, 1997; Pekel & Özbek, 2000).

Distribution in World: Holarctic and Oriental regions.

Associated plants: *Alnus glutinosa* (L.), *Angelica sylvestris* and *Peucedanum oreoselinum.*

Temelucha pseudocaudata Kolarov, 1982

This species was described only by female (Kolarov, 1982). In materials investigated we found male specimen and it is described below:

Male. Front wing 4.5 mm long (2.5 as long as hind tibia). Head moderately narrowed behind eyes. Frons concave behind each antennal socket, raised laterally. Ocellus large, its diameter 1.4 times as long as distance between lateral ocellus and eye. Flagellum with 31 (in female with 27-30) segments, first segment 1.5 times as long as fifth, all segments elongated (in female apical segments square to transversal). Inner eye orbita divergent downwards. Clypeus moderately convex with arched apical ridge.

Lower lateral ridge of pronotum produced as distinct sharp tooth. Sternaulus distinct in front half. Nervulus almost interstitial, nervellus not intercepted, discoidella as unclear depigmented trace. Areolation of propodeum complete. Areola shorter than in female, closed behind. Legs slender, hind femur 4.4 as long as wide. Correlation between hind tarsal segments as 44:18:14:9:12. Tarsal claws simple.

Black. Frontal and upper half of face orbits. Predominant part of outer orbits yellow; front and middle legs without black except coxae; apical 0.25 of second tergum, third and fourth terga red colored.

In other as in female.

Material examined: Erzurum, Kandilli, 6 km from Aşkale, 22.VII.2015, ♂, ♀.

Distribution: Bulgaria, Ukraine (Narolsky, in litt.) and Turkey.

Temelucha turcata Kolarov & Beyarslan, 1999

Material examined: Erzurum: Kandilli, 6 km from Aşkale, 22.VII.2015, 6 ♀♀.

Distribution in Turkey: Ankara, Elazığ, Eskişehir, Kayseri, Malatya and Sivas (Kolarov & Yurtcan, 2009).

Distribution in World: Turkey.

Subfamily: Ctenopelmatinae Forster, 1869

Absyrtus vicinator (Thunberg, 1822)

Material examined: Rize: İkizdere, Çamlık, 26.VII.2015, ♀.

Distribution in Turkey: Konya (Özbek et al., 2000).

Distribution in World: Palearctic region.

Associated plants: *Rubus* spp.

Subfamily: Diplazontinae Viereck, 1918

**Diplazon deletus* (Thomson, 1890)

Material examined: Erzincan: Ahmetli (39°53.481′ N, 39°21.197 E), 1988 m, 23.VII.2015, ♂.

Distribution in World: Holarctic region.

Associated plants: *Phragmites communis* (Cav.).

Diplazon laetatorius (Fabricius, 1781)

Material examined: Giresun: Eynesil, Kekiktepe, 25.VII.2015, ♀.

Distribution in Turkey: Adana, Adıyaman, Afyon, Ankara, Antalya, Artvin, Aydın, Bolu, Burdur, Denizli, Erzincan, Erzurum, Eskişehir, Hatay, Isparta, Izmir, Kahramanmaraş, Nevşehir, Kırklareli, Konya, Osmaniye, Sinop, Trabzon, Şanlıurfa and Zonguldak (Özdemir, 2001; Çoruh, 2011; Gürbüz et al., 2011; Kolarov, 2015).

Distribution in World: Cosmopolitan species.

Associated plants: *Baccharis pilularis* DC., *Citrullus lanatus* (Thunb.) Matsum. & Nakai, *Citrus sinensis* (L.) Osbeck, *Cynara cardunculus* subsp. *flavescens* L. *Heracleum sphondylium*, *Malus domestica* Borkh., *Neottia ovata* (L.), *Oryza sativa* L., *Peucedanum oreoselinum*, *Picea excelsa* Lam., *Poa pratensis* L. and *Vicia faba* L.

Diplazon scutatorius Teunissen, 1943

Material examined: Rize: İkizdere, Çamlık, 26.VII.2015, 2 ♂♂, ♀.

Distribution in Turkey: Rize (Çoruh, 2009; Çoruh et al., 2014c).

Distribution in World: Palearctic region.

Homotropus nigritarsus (Gravenhorst, 1829)

Material examined: Erzurum: Gelinkaya, 26.VII.2015, ♂.

Distribution in Turkey: Afyon, Antalya, Ardahan, Denizli, Erzurum, Gümüşhane, Isparta and Izmir (Kolarov, 2015).

Distribution in World: Holarctic region and Mexico.

Associated plants: *Betula nana.*

Remark: This species was collected on *M. sativa* while feeding.

**Homotropus pallipes* (Gravenhorst, 1829)

Material examined: Rize: İkizdere, Çamlık, 26.VII.2015, 4 ♀♀.

Distribution in World: Holarctic region and Mexico.

Associated plants: *Poa pratensis* and *Tsuga heterophylla* (Raf.) Sarg.

**Sussaba cognata* (Holmgren, 1858)

Material examined: Rize: İkizdere, Çamlık, 26.VII.2015, 3 ♀♀.

Distribution in World: Holarctic and Oriental regions.

Associated plants: *Angelica sylvestris* and *Oryza sativa*.

Sussaba pulchella (Holmgren, 1858)

Material examined: Rize: İkizdere, Çamlık, 26.VII.2015, ♂.

Distribution in Turkey: Ankara and Çankırı (Özdemir, 2001).

Distribution in World: Holarctic and Oriental regions.

Associated plants: *Angelica* sp., *Oryza sativa*, *Peucedanum oreoselinum, Picea abies* (L.) H. Karst., *P. excelsa*, *Polygonum* sp. and *Prunus padus* L.

Syrphophilus bizonarius (Gravenhorst, 1829)

Material examined: Giresun: Dereli, Çamağzı, 23.VII.2015, ♀; Rize: İkizdere, Çamlık, 26.VII.2015, ♂.

Distribution in Turkey: Adana, Ankara, Burdur, Çankırı, Eskişehir, Hatay, Isparta, Konya, Niğde and Sinop (Özdemir, 2001; Gürbüz et al., 2011; Kolarov, 2015).

Distribution in World: Holarctic and Oriental regions.

Associated plants: *Angelica* sp., *Betula nana* L., *Epilobium angustifolium*, *Oryza sativa*, *Poa pratensis* L. and *Veronica anagallis-aquatica* L.

Subfamily: Metopiinae Förster, 1869

**Exochus flavifacies* Kusigemati, 1984

Material examined: Ordu: Turnasuyu, 24.VII.2015, 2 ♀♀; Rize: İkizdere, Çamlık, 26.VII.2015, 2 ♂♂.

Distribution in World: Mongolia.

Exochus mitratus Gravenhorst, 1829

Material examined: Erzincan: Avcılar, 23.VII.2015, ♀.

Distribution in Turkey: Antalya, Denizli, Erzurum, Giresun, Isparta, Kars, Kırklareli and Rize (Kolarov et al., 2009; Çoruh et al., 2014a)

Distribution in World: Holarctic region.

Associated plants: *Peucedanum oreoselinum* and *Quercus lusitanica* Lam.

Remark: this species was collected on *M. sativa* while feeding.

Exochus prosopius Gravenhorst, 1829

Material examined: Giresun: Eynesil, Kekiktepe, 25.VII 2015, 2 ♂♂; Trabzon: Yomra, 25.VII.2015, ♂.

Distribution in Turkey: Giresun, Izmir and Rize (Kolarov et al., 2009; Çoruh et al., 2014a)

Distribution in World: Palearctic region.

Exochus suborbitalis Schmiedeknecht, 1924

Material examined: Erzurum: Gelinkaya, 26.VII.2015, ♀.

Distribution in Turkey: Antalya, Erzurum, Giresun, Isparta, Kahramanmaraş, Ordu and Osmaniye (Kolarov et al., 2009, 2016).

Distribution in World: Palearctic region.

Associated plants: *Peucedanum oreoselinum*.

Exochus thomsoni Schmiedeknecht, 1924

Material examined: Erzurum: Gelinkaya, 26.VII.2015, ♂; Rize: İkizdere, Çamlık, 26.VII. 2015, 2 ♂♂.

Distribution in Turkey: Erzurum and Isparta (Çoruh & Kolarov, 2012; Özdan, 2014).

Distribution in World: Palearctic region.

Exochus vafer Holmgren, 1873

Material examined: Erzurum: Gelinkaya, 26.VII. 2015, ♀.

Distribution in Turkey: Isparta, Erzincan and İzmir (Kolarov et al., 2009; Çoruh & Kolarov, 2012; Özdan, 2014).

Distribution in World: Europe, Turkey and Siberia.

**Triclistus congener* (Holmgren, 1858)

Material examined: Erzurum: Aşkale, Tepebaşı Valley (Figure 3), 23.VII.2015, ♀.

Distribution in World: Europe and USA.

Subfamily: Ophioninae Scuckard, 1840

Enicospilus ramidulus (Linnaeus, 1758)

Material examined: Erzurum: Aşkale, Tepebaşı Valley, 23.VII.2015, 2 ♀♀; Rize: İkizdere, Çamlık, 26.VII.2015, ♀; Trabzon: Yomra, 25.VII.2015, ♀.

Figure 3. Study areas in Tepebaşı Valley, Aşkale, Erzurum Province (left) and Avcılar, Erzincan Province (right), Turkey.

Distribution in Turkey: Ankara, Erzincan, Erzurum, Isparta, Karabük, Kastamonu, Malatya, Nevşehir, Konya, Rize, Sinop and Tekirdağ (Kolarov, 1995a; Kolarov et al., 2000; Akkaya, 2005; Kolarov & Gürbüz, 2006; Okyar & Yurtcan, 2007; Çoruh & Çalmaşur, 2016).

Distribution in World: Palearctic, Oriental and Afrotropical regions.

Associated plants: *Alnus glutinosa*, *Carum carvi* L., *Oryza sativa*, *Salvia glutinosa* L. and *Seseli libanotis* (L.) W. Koch.

Remark: this species was collected on *S. libanotis* (L.) W. Koch while feeding in Tepebaşı Valley.

Enicospilus tournieri (Vollenhoven, 1879)

Material examined: Erzurum: Gelinkaya, 26.VII.2015, ♂, 8 ♀♀.

Distribution in Turkey: Ankara, Erzurum and Hatay (Kolarov et al., 2000; Çoruh et al., 2014a)

Distribution in World: Palearctic region.

Remark: this species was collected on *M. sativa* while feeding in Gelinkaya.

Subfamily: Pimplinae Wesmael, 1845

Endromopoda detrita (Holmgren, 1860)

Material examined: Erzincan: Ahmetli, 23.VII.2015, ♂.

Distribution in Turkey: Afyon, Bayburt, Burdur, Bursa, Çanakkale, Denizli, Edirne, Erzincan, Erzurum, Gümüşhane, Iğdır, Isparta, İstanbul, İzmir, Kars, Kırklareli, Rize, Tekirdağ and Tunceli (Kolarov, 1987, 1995a; Özdemir & Kılınçer, 1990; Öncüer, 1991; Kolarov & Beyarslan, 1994; Kolarov et al., 1997a, b, 1999, 2002, 2014c; Kolarov & Gürbüz, 2004; Çoruh, 2005; Yurtcan, 2007; Çoruh & Kolarov, 2010).

Distribution in World: Holarctic and Oriental regions.

Associated plants: *Adonis vernalis* L., *Angelica sylvestris*, *Chaerophyllum aromaticum* L., *Cirsium palustre* (L.) Scop., *Daucus carota* L., *Daucus carota* subsp. s*ativus*, *Foeniculum vulgare*, *Heracleum* sp., *Juniperus communis* L. and *Peucedanum oreoselinum.*

Exeristes roborator (Fabricius, 1793)

Material examined: Erzincan: Pöske Mt., 23.VII.2015, ♂.

Distribution in Turkey: Ankara, Ardahan, Artvin, Balıkesir, Bayburt, Bilecik, Bingöl, Bitlis, Burdur; Bursa, Çanakkale, Denizli, Edirne, Erzurum, Erzincan, Gümüşhane, Hakkari, Isparta, İstanbul, İçel, Kars, Kırklareli, Muğla, Muş, Rize, Tekirdağ and Tunceli (Özdemir & Kılınçer, 1990; Öncüer, 1991; Kolarov & Beyarslan, 1994; Kolarov, 1995a; Kolarov et al., 1997a, b, 1999, 2002, 2014c; Kasparyan & Gültekin,

2002; Gürbüz, 2004, 2005; Kolarov & Gürbüz, 2004; Çoruh, 2005; Yurtcan, 2007; Çoruh & Kolarov, 2010; Tozlu & Çoruh 2011; Özbek & Çoruh, 2012).

Distribution in World: Palearctic, Oriental and Afrotropical regions, introduced into North America (including Mexico).

Associated plants: *Anethum graveolens*, *Chaerophyllum bulbosum*, *Daucus carota*, *Euphorbia virgata* L., *Fraxinus excelsior*, *Heracleum sphondylium*, *Pastinaca graveolens, Peucedanum oreoselinum, Quercus sessiliflora*, *Salvia sylvestris* Linne, *Seseli tortuosum* Sibth. & Sm., *Tamarix* spp.

Itoplectis maculator (Fabricius, 1775)

Material examined: Erzurum: Aşkale, Tepebaşı Valley, 23.VII.2015, 4 ♀♀.

Distribution in Turkey: Adana, Ankara, Afyon, Artvin, Balıkesir, Bitlis, Bolu, Çanakkale, Çorum, Denizli, Edirne, Eskişehir, Erzurum, Gümüşhane, Isparta, İçel, İzmir, Kars, Kastamonu, Kırklareli, Kırşehir, Konya, Nevşehir, Niğde, Muğla, Rize, Sinop, Tekirdağ, Van, Yozgat and Zonguldak (Kolarov, 1987, 1995a; Özdemir & Kılınçer, 1990; Öncüer, 1991; Kolarov & Beyarslan, 1994; Erol & Yaşar, 1996; Kolarov et al., 1997a, 1999, 2002; Özdemir & Özdemir, 2002, Gürbüz, 2004; Kolarov & Gürbüz, 2004; Çoruh, 2005; Gürbüz, 2005; Yurtcan & Beyarslan, 2005; Çoruh et al., 2007, 2014a; Okyar & Yurtcan, 2007; Gürbüz et al., 2009; Çoruh & Kolarov, 2010; Birol, 2010; Eroğlu et al., 2011).

Distribution in World: Palearcticregion, introduced into USA.

Associated plants: *Adonis vernalis*, *Alnus glutinosa, Chaerophyllum bulbosum*, *Cirsium palustre Daucus carota*, *Epilobium angustifolium*, *Euphorbia nicaeensis* All., *Fraxinus excelsior*, *Heracleum sphondylium*, *Peucedanum oreoselinum, Picea abies*, *P. excelsa*, *Pinus sylvestris* L., *Quercus ilex* L., *Quercus sessiliflora*, *Rubus* spp. and *Taxus baccata* L.

Liotryphon caudatus (Ratzeburg, 1848)

Material examined: Erzincan: Avcılar, 23.VII.2015, ♀.

Distribution in Turkey: Anatolia and Isparta (Öncüer, 1991; Kolarov, 1995a; Kolarov & Gürbüz, 2004; Gürbüz, 2005; Çoruh, 2016).

Distribution in World: Palearctic region and New Zealand.

Associated plants: *Acer pseudoplatanus* L.

Scambus nigricans (Thomson, 1877)

Material examined: Erzurum: Gelinkaya, 26.VII. 2015, ♀; Rize: İkizdere, Çamlık, 26.VII.2015, ♀.

Distribution in Turkey: Afyon, Artvin, Balıkesir, Bayburt, Burdur, Bursa, Çanakkale, Denizli, Edirne, Erzincan, Erzurum, Isparta, İstanbul, İzmir, Kahramanmaraş, Kars, Kırklareli and Tekirdağ (Kolarov & Beyarslan, 1994; Kolarov et al., 1997a, 1999, 2002; Kolarov & Gürbüz, 2004; Çoruh, 2005; Yurtcan, 2007; Çoruh et al., 2007; Çoruh & Kolarov, 2010; Kolarov & Çalmaşur, 2011).

Distribution in World: Palearctic region.

Associated plants: *Anethum graveolens*, *Chaerophyllum bulbosum*, *Daucus carota*, *Euphorbia nicaeensis*, *Heracleum sphondylium*, *Peucedanum oreoselinum.*

**Tromatobia lineatoria* (Villers, 1789)

Material examined: Erzincan, Pöske Mt., 23.VII.2015, ♀.

Distribution in World: Palearctic region.

Zatypota bohemani (Holmgren, 1860)

Material examined: Gümüşhane: Kelkit, Köycük, 23.VII.2015, ♂.

Distribution in Turkey: Adana, Edirne, Elazığ, Erzurum, Hatay, İçel, Isparta, İstanbul, Kars and Osmaniye (Kolarov, 1987; Kolarov & Beyarslan, 1994; Kolarov & Gürbüz, 2004; Çoruh, 2005; Yurtcan & Beyarslan, 2005; Çoruh & Kolarov, 2010; Gürbüz et al., 2011).

Distribution in World: Holarctic region.

Associated plants: *Anethum graveolens*, *Peucedanum oreoselinum*, *Rubus* spp.

Subfamily: Tryphoninae Shuckard, 1840

Acrotomus lucidulus (Gravenhorst, 1829)

Material examined: Ordu: Turnasuyu, 24.VII.2015, ♂.

Distribution in Turkey: Afyon, Denizli, Edirne, Isparta, Malatya, Muğla and Rize (Yurtcan & Beyarslan, 2002; Çoruh et al., 2005, 2014b; Gürbüz & Kolarov, 2006; Yurtcan et al., 2006; Yaman 2014).

Distribution in World: Palearctic region.

Associated plants: *Heracleum sphondylium* and *Peucedanum oreoselinum.*

**Ctenochira meridionator* Aubert, 1969

Material examined: Ordu: Turnasuyu, 24.VII.2015, ♀.

Distribution in World: Palearctic region.

Netelia (*Netelia*) *silantjewi* (Kokujev, 1899)

Material examined: Erzurum: Gelinkaya, 26.VII.2015, ♂.

Distribution in Turkey: Afyon, Balıkesir, Bursa, Kırklareli, Muğla and Uşak (Kolarov et al., 1997b; Yurtcan & Beyarslan, 2002; Yurtcan et al., 2006; Yaman, 2014).

Distribution in World: Palearctic and Oriental regions.

Associated plants: *Quercus robur.*

Remark: this species was collected on *M. sativa* while feeding in Gelinkaya.

Oedemopsis scabricula (Gravenhorst, 1829)

Material examined: Giresun: Bulancak, 24.VII.2015, ♀.

Distribution in Turkey: Erzurum, Giresun, Malatya, Ordu, Rize and Tekirdağ (Çoruh et al., 2005; Beyarslan et al., 2006; Çoruh et al., 2014a, b; Yaman, 2014).

Distribution: Holarctic and Oriental region.

Thymaris tener (Gravenhorst, 1829)

Material examined: Giresun: Keşap, Yolağzı, 25.VII.2015, ♀.

Distribution in Turkey: Çanakkale (Yaman, 2014).

Distribution in World: Palearctic region.

Associated plants: *Picea* spp.

Subfamily: Xoridinae Shuckard,1840

**Odontocolon rufiventris* (Holmgren, 1860)

Material examined: Rize: İkizdere, Çamlık, 26.VII.2015, ♀.

Distribution in World: Europe.

Xorides gracilicornis (Gravenhorst, 1829)

Material examined: Ordu: Turnasuyu, 24.VII.2015, ♂.

Distribution in Turkey: Isparta and Osmaniye (Kolarov & Gürbüz, 2006; Gürbüz et al., 2011).

Distribution in World: Palearctic region.

Zoogeographical characterization

The zoogeographical characterization follows mainly the chorotype classification of the Near East fauna, proposed by Taglianti et al. (1999). After investigation of the recent geographic distribution of the species, listed above, they can be divided into the following groups:

1. Cosmopolitan distribution; *Diplazon laetatorius*.
2. Multiregional ranges; *Enicospilus ramidulus* and *Exeristes roborator*, distributed in three zoogeographical regions; Palearctic, Oriental and Afrotropical.
3. Species with ranges in two zoogeographical regions; *Anomalon cruentatum*, *Pristomerus vulnerator*, *Sussaba cognata*, *S. pulchella*, *Syrphophilus bizonarius*, *Endromopoda detrita*, *Netelia* (*Netelia*) *silantjewi*, *Oedemopsis scabricula*, distributed in Palearctic/Holarctic and Oriental regions; *Homotropus nigritarsus* and *H. pallipes*, distributed into Holarctic and Neotropic (Mexico) regions; *Liotryphon caudatus*, distributed in Palearctic and Oceanic (New Zealand) regions.
4. Holarctic ranges; *Lissonota* (*Loxonota*) *histrio*, *Diplazon deletus*, *Exochus mitratus*, *Triclistus congener* and *Zatypota bohemani*.
5. Most numerous species with Palearctic ranges; *Agrypon gracilipes*, *Absyrtus vicinator*, *Diplazon scutatorius*, *Exochus prosopius*, *Exochus suborbitalis*, *Exochus thomsoni*, *Enicospilus tournieri*, *Itoplectis maculator*, *Scambus nigricans*, *Tromatobia lineatoria*, *Acrotomus lucidulus*, *Ctenochira meridionator*, *Thymaris tener* and *Xorides gracilicornis*.
6. Sibero-European distributions; *Pristomerus armatus* and *Exochus vafer*.
7. Centralasiatic range; *Exochus flavifacies*.
8. Turano-Europeo-Mediterranean distribution; *Lissonota* (*Loxonota*) *flavovariegata*.
9. Turanian distribution; *Barylypa torquata*.
10. European ranges; *Lissonota* (*Loxonota*) *lineata*, *Lissonota* (*Lissonota*) *pleuralis*, *Lissonota* (*Lissonota*) *variabilis* and *Odontocolon rufiventris*.
11. Ponto-Caucasian sub endemic; *Temelucha pseudocaudata.*
12. Anatolian endemic; *Temelucha turcata.*

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