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A survey on Tersilochinae (Hymenoptera: Ichneumonidae) species of Turkey, with a key to European genera

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Abstract: Thirty-five species from 7 genera of Tersilochinae (Hymenoptera: Ichneumonidae) occur in Turkey. Of these, 20 species are new records for Turkish fauna. The general distribution and data on the biology of Turkish species are provided. Keys to all European genera and subgenera are given, with a short annotation on the taxonomy, distribution and biology of each genus.

Key words: Hymenoptera, Ichneumonidae, Tersilochinae, Turkey, new records, fauna, key to genera

Tersilochinae (Hymenoptera: Ichneumonidae) altfamilyası Avrupa cins anahtarı ve Türkiye türleri

Özet: Tersilochinae (Hymenoptera: Ichneumonidae) altfamilyasının Türkiye'den 7 cinse ait 35 türü bulunduğu saptanmıştır. Bunların 20'si Türkiye için yeni kayıttır. Türkiye türlerinin genel dağılımı ve biyolojileri hakkında bilgi verilmiştir. Tüm Avrupa cinsleri ve altcinsleri için anahtarlar hazırlanmış, her cinsin taksonomisi, yayılışı ve biyolojisi konusunda kısa bilgi sunulmuştur.

Anahtar sözcükler: Hymenoptera, Ichneumonidae, Tersilochinae, Türkiye, yeni kayıt, fauna, cins anahtarı

Introduction

Tersilochinae is a medium-sized cosmopolitan ichneumonid subfamily that includes over 300 species in the Palaearctic region (Khalaim, personal data) and about 160 described species from 13 genera in Europe. Tersilochines occur in all terrestrial biotopes of Europe from steppes and wet forests to alpine meadows and tundra, but as a rule are most numerous and diverse in forests. Their flight period is from early spring to late autumn, but most of the species can be collected from May to July. The subfamily consists of koinobiont endoparasitoids which oviposit predominantly into beetle larvae. Some species also were reared from Xyelidae (Hymenoptera) (Blank, 2002) and Eriocraniidae (Lepidoptera) (Jordan, 1998). Tersilochines are predominantly small-sized

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ichneumonids with a body length of 3.0-7.0 mm and can most easily be recognized by their forewing without an areola but with a large pterostigma, a thickened 2*rs-m* vein and an angle of 90° or less between the first and second sections of the radius (Figures 1-4), and with maxillary and labial palpi 4- and 3-segmented, respectively (these palpi are in turn usually 5- and 4-segmented in other ichneumonid subfamilies) (Figure 5).

The Tersilochinae fauna of Turkey has been poorly investigated, and was represented by only 14 species until now (Yu et al., 2005). Two species described in Turkey are *Probles anatolicus* by Horstmann (1981a), and *Heterocola longipalpis* by Kolarov and Beyarslan (1994). Faunistic records of Tersilochinae from Turkey were also published by Sedivý (1959), Horstmann (1971, 1981a), Kolarov and Beyarslan (1994), and Çoruh et al. (2002). Kolarov (1995) in his Catalogue of Turkish Ichneumonidae recorded 6 species of Tersilochinae: *Aneuclis incidens*, *A. melanaria*, *Diaparsis aperta*, *Phradis morionellus*, *Probles exilis*, and *P. rufipes*.

Twenty species, and the subgenus *Rugodiaparsis* with a undetermined number of species, are reported as new for Turkey in this paper. The general distribution and data on the biology of Turkish species are provided. All species found in Turkey were previously known to occur in Europe. Nevertheless we expect that the real Turkish fauna of Tersilochinae is much richer and requires further investigation. We think that many other European species and probably all European genera may be found in this country. This is our reason for including a key to all European genera and subgenera, and short annotations on the taxonomy, distribution, and biology of each genus.

Materials and methods

Forty-six specimens of Tersilochinae have been collected in different regions of Turkey by M. Aydoğdu, H.H. Başıbüyük, A. Beyarslan, Ö. Çetin, F. İnanç, and M. Yurtcan, and are housed at the Zoological Museum of the Biology Department of Trakya University, Edirne, Turkey (EDTU). For specimens housed at EDTU, we have omitted the institutional abbreviation from the key. Moreover about 80 tersilochine specimens were examined from the collections of the Natural History Museum, London (BMNH), Zoologische Staatssammlung, München (ZSM), and the Zoological Institute of the Russian Academy of Sciences, St. Petersburg (ZISP).

Geographical distribution is generally based on the works of Horstmann (1971, 1981a), Khalaim (2002a, 2002b, 2003, 2004a, 2004b, 2005, 2007), and Yu et al. (2005). Geographical names mainly follow the Atlas MS Encarta Premium 2006. In the distribution section, "Caucasus" means the countries of Georgia, Armenia, and Azerbaijan, and the term "Middle Asia" refers to Turkmenistan, Uzbekistan, Tajikistan, and Kyrgyzstan. Species recorded for Turkey for the first time are marked by an asterisk (*). Terminology for morphological structures mainly follows Townes (1969). Taxonomy is according to the catalogue TaxaPad (Yu et al., 2005).

Results and discussion

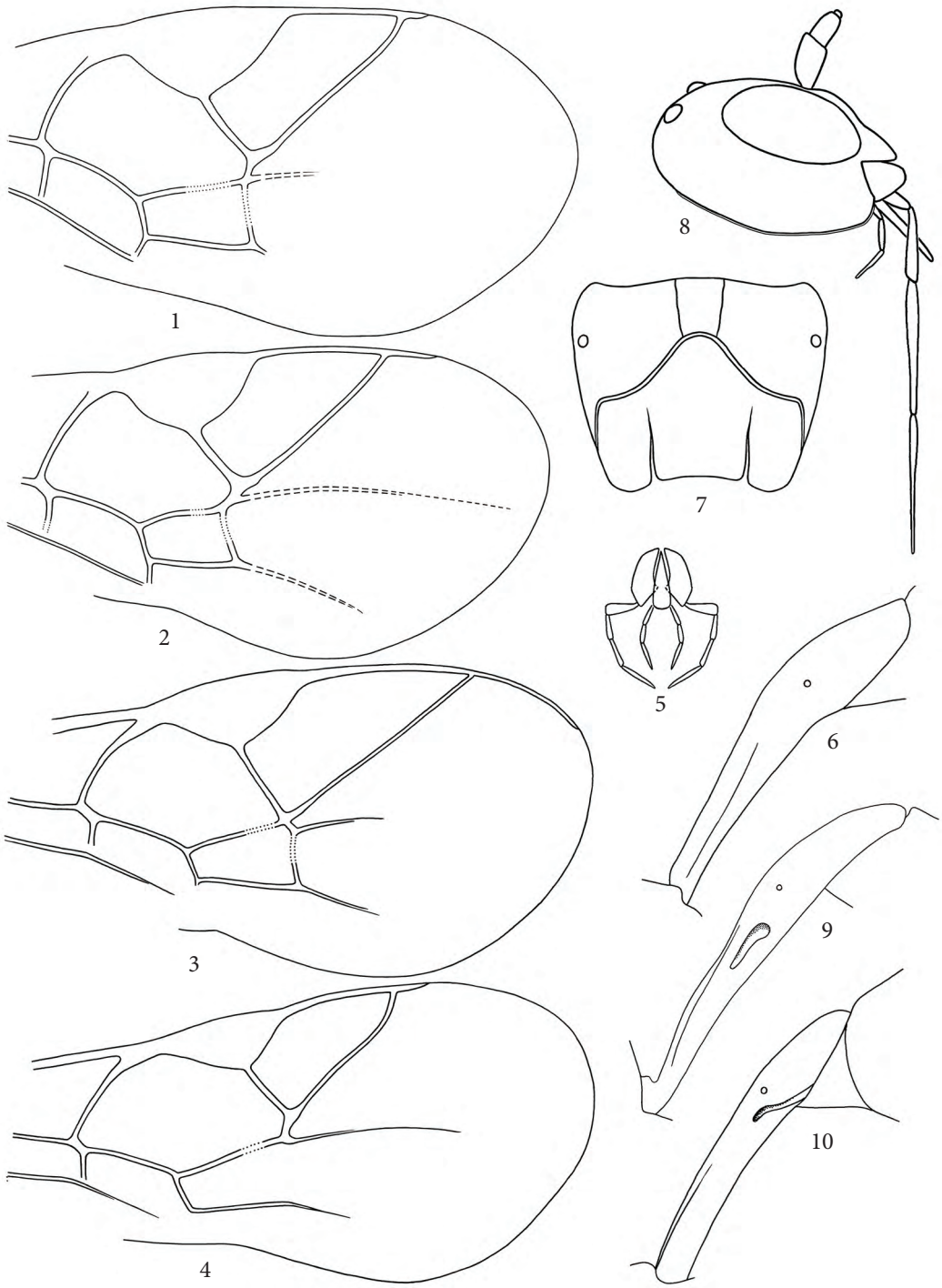
Taxonomy

Key to European genera of Tersilochinae

1. First metasomal segment without glymma (as in Figure 6). Propodeum with basal area (Figure 7), basal furrow, or sometimes with longitudinal wrinkles dorsally. Forewing usually with vein 2*m-cu* antefurcal (Figure 2) or interstitial (Figure 1) (*Palpator* with vein 2*m-cu* postfurcal, but has an extremely long maxillary palpi – Figure 8). Distance between propodeal spiracle and pleural carina 2-5 diameters of spiracle. Genera group *Phradis*.....2

– First metasomal segment usually with glymma (Figures 9, 10). Propodeum with basal area, furrow or keel. Forewing with vein 2*m-cu* postfurcal or rarely interstitial. Distance between propodeal spiracle and pleural carina often shorter.....4

2. Maxillary palpi short, at the most half as long as height of head. Vein 2*m-cu* interstitial (Figure 1), or rarely very slightly antefurcal or postfurcal. Ovipositor sometimes with dorsal and ventral subapical teeth, its shape rather diverse.....***Phradis*** Förster



Figures 1-10. Tersilochinae. 1 – *Phradis* sp.; 2 – *Heterocola* sp.; 3 – *Aneuclis* sp.; 4 – *Sathropterus pumilus* Holmgren. 5 – *Tersilochus caudatus* Holmgren; 6, 9 – *Diaparsis* spp.; 7 – *Phradis* sp.; 8 – *Palpator sicilicus* Khalaim; 10 – *Tersilochus* sp.; 1-4 – forewing; 5 – labial and maxillary palpi; 6, 9, 10 – first tergite (lateral view); 7 – propodeum (dorsal view); 8 – head (lateral view) (Redrawn after Khalaim 2006, 2007).

– Maxillary palpi much longer than height of head (Figure 8). Vein 2*m-cu* antefurcal (Figure 2) or distinctly postfurcal (as in Figure 3). Ovipositor evenly upcurved, without teeth, usually with shallow dorsal subapical depression only.....3

3. Vein 2*m-cu* postfurcal (as in Figure 3). Mandible triangular, its lower tooth reduced .....***Palpator*** Khalaim

– Vein 2*m-cu* antefurcal (Figure 2). Mandible not triangular, lower tooth well-developed.... .....***Heterocola*** Förster

4. First metasomal segment without glymma (Figure 6), or with isolated glymma (Figure 9). Propodeum with basal keel (Figure 11). Genera group *Diaparsis*.....5

– First metasomal segment with glymma joined by a furrow to ventral part of postpetiole (Figure 10). Propodeum with basal area (as in Figure 7), basal furrow, or rarely with basal keel. Genera group *Tersilochus*.....7

5. Brachial cell of forewing closed at apex, posterior part of postnervulus present except for a narrow bulla (as in Figure 1). First metasomal segment usually with distinct glymma (Figure 9).....***Diaparsis*** Förster

– Brachial cell of forewing widely open at apex, posterior part of postnervulus absent (Figures 3, 4). First metasomal segment without glymma (as in Figure 6), or rarely with very small round glymma.....6

6. Vein 2*m-cu* present (Figure 3). Ovipositor upcurved, its tip not sinuate..***Aneuclis*** Förster

– Vein 2*m-cu* completely absent (Figure 4). Ovipositor tip sinuate....***Sathropterus*** Förster

7. Sternaulus distinct, at least half as long as mesopleuron. Thyridia usually elongate.....8

– Sternaulus absent or shorter, or thyridia transverse.....10

8. Spurs of hind leg long and straight, about half as long as hind basitarsus. Basal part of propodeum about half as long as apical area. Posterior tergites with straight and relatively long setae. Ovipositor depressed.....***Spinolochus*** Horstmann

– Spurs of hind leg shorter and more or less curved apically. Basal part of propodeum sometimes much longer. Posterior tergites with rare and short setae (except for *Barycnemis agilis* Holmgren). Ovipositor compressed (except for *Barycnemis agilis* with depressed ovipositor).....9

9. Spurs of hind leg moderately long, weakly curved apically to almost straight. Sternaulus more or less distinctly upcurved anteriorly. Basal part of propodeum at the most as long as apical area, usually much shorter. Legs slender. Ovipositor slender, weakly upcurved, short to very long. Body moderately stout.....***Probles*** Förster

– Spurs of hind leg distinctly curved apically (Figure 12). Sternaulus linear to slightly upcurved anteriorly. Basal part of propodeum usually longer than apical area. Legs slender to very thick (Figure 12). Ovipositor sometimes very robust and strongly upcurved (Figure 13), its sheath at most twice as long as first tergite. Body sometimes strongly elongat .....***Barycnemis*** Förster

10. Clypeus, in profile, flat and distinctly separate from face, almost entirely granulate, impunctate. Sternaulus long and coarse. Ovipositor very short, its sheath distinctly shorter than first tergite. Antenna of female thickened, middle flagellar segments almost as long as broad.....***Epistathmus*** Förster

– Clypeus, in profile, more or less convex, weakly separate from face, almost always punctate in upper part and smooth in lower part.....11

11. Glymma situated behind middle of first tergite.....***Tersilochus*** Holmgren

– Glymma situated near or before middle of first tergite……..…….12

12. Head and mesosoma entirely granulate. Tarsal claws pectinate. Pterostigma of forewing usually strongly enlarged, much wider than length of first section of radial vein. Eyes in male enlarged (as in Figure 14) and antenna shortened.....***Allophroides*** Horstmann

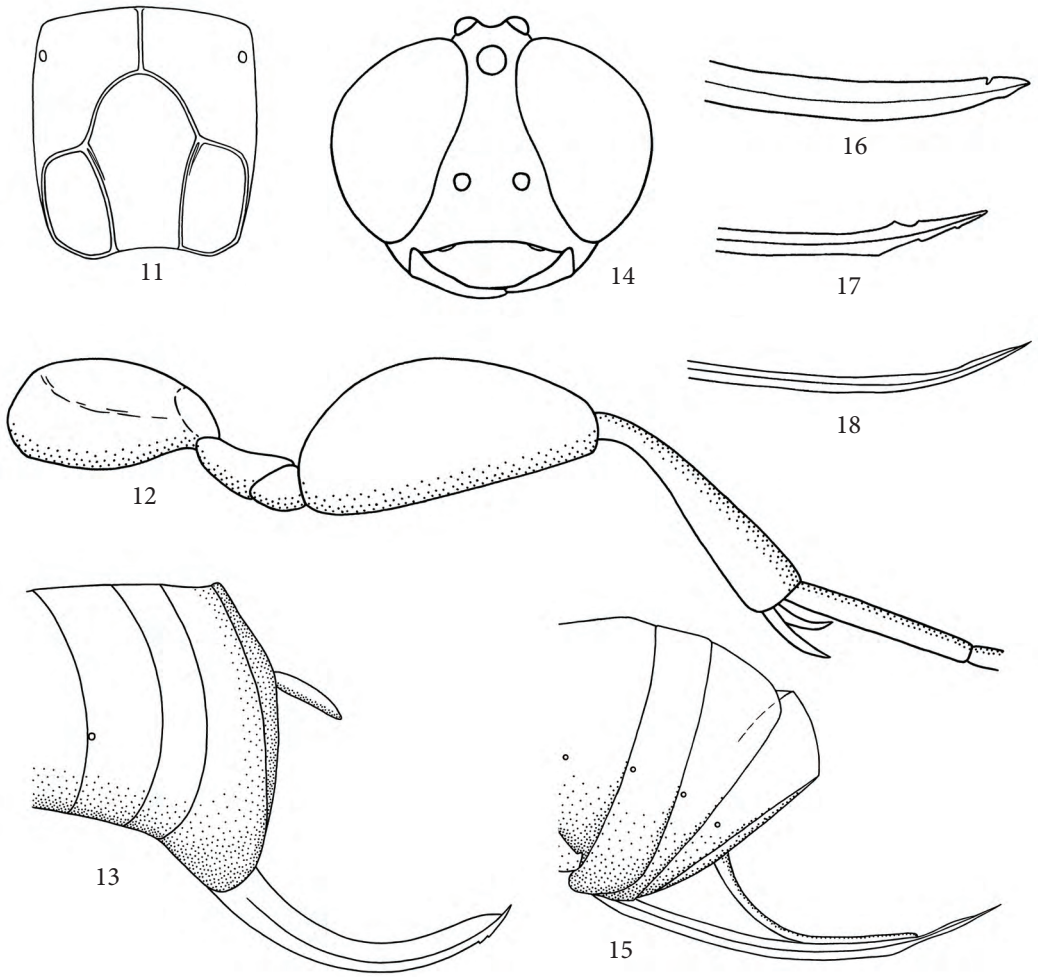
– Head and mesosoma mostly smooth. Tarsal claws not pectinate. Pterostigma of forewing not enlarged, usually shorter than first section of radial vein. Eyes in male not enlarged. Antenna not shortened..... ***Gelanes*** Horstmann

Allophroides Horstmann

Small Holarctic genus (Nearctic species not described); 4 species in Europe. Not recorded in Turkey. Flight period in spring and early summer. Probably parasitoids of Xyelidae larvae in male cones on conifers (Carlson, 1979; Ohmart and Dahlsten, 1979). Key to European species is given by Horstmann (1971).

Aneuclis Förster

Moderate-sized genus with 16 Palaearctic species; about 8 species in Europe. Mainly associated with herbaceous landscapes. Common parasitoids of various beetles (Chrysomelidae, Curculionidae, and Nitidulidae) on cruciferous plants. Key to Palaearctic species of this genus was given by Khalaim (2004b).



Figures 11-18. Tersilochinae. 11 – *Diaparsis* sp.; 12 – *Barycnemis punctifrons* Horstm.; 13 – *Barycnemis claviventris* Grav.; 14 – *Allophrys* sp.; 15 – *Probles kunashiricus* Khalaim; 16 – *Tersilochus lapponicus* Hellén; 17 – *T. rubrigaster* Khalaim. 18 – *Diaparsis rara* Horstm.; 11 – propodeum (dorsal view); 12 – hind leg (lateral view); 13, 15 – apex of metasoma with ovipositor (lateral view); 14 – head (frontal view) 16-18 – apex of ovipositor (lateral view) (Redrawn after Khalaim 2003, 2004, 2005, 2007).

A. anterior Horstmann, 1971

Material examined. İzmir: Urla, 23.06.1998, 1 ♀.

Distribution. Western Europe, Bulgaria, Moldova, Turkey (Adana, Antalya, İzmir; Kolarov and Beyarslan, 1994), Russia (Voronezh reg.), Kazakhstan.

Biology. Flight period from May to September. Host unknown.

A. incidens (Thomson, 1889)

Material examined. Afyon: Sincan-Akören, 26.07.1997, 1 ♀. Kütahya: Gediz-Nurdağı Sobaalanı, 28.07.2001, 1 ♀. Kastamonu: Taşköprü, Alamaşişli, 06.09.2001, 1 ♀.

Distribution. Common Transpalaearctic species: the Madeira Islands, almost all of Europe, Caucasus, Turkey (Adana, Adıyaman, Afyon, Antalya, Burdur, Edirne, Gaziantep, İçel, Kastamonu, Kütahya, Van; Sedivý, 1959; Horstmann, 1971; Kolarov and Beyarslan, 1994; Kolarov, 1995), Kazakhstan, Middle Asia, Russian southern Siberia and south of Far East, Mongolia.

Biology. Flight period from April to September. Parasitoid of sap beetles *Meligethes aeneus* F. and *M. viridescens* F. (Nitidulidae) (Aubert and Jourdheuil, 1959; Miczulski, 1966; Sedivý, 1983).

A. melanaria (Holmgren, 1860)

Material examined. Ankara: 20 km N Şereflikoçhisar, 24.06.1962, 2 ♀♀ (BMNH). Çanakkale: Lapseki, 06.05.1993, 1 ♀. Çanakkale: Gökçeada-Merkez, 05.06.1996, 1 ♀. Çankırı: Çerkeş, 04.07.2001, 1 ♀.

Distribution. Tunisia, almost all of Europe (except northern regions), Caucasus, Turkey (Ankara, Çanakkale, Çankırı; Horstmann, 1971: Anatolia; Kolarov, 1995), Kazakhstan, Middle Asia, Afganistan (Band-Amir, 3000 m, 23-31.07.1977, 2 ♀♀, 3 ♂♂, BMNH; **first record**), Mongolia. Common species.

Biology. Flight period from May to September. Parasitoid of *Ceutorhynchus pleurostigma* Marsch. (= *assimilis* Payk.) (Curculionidae) and *Psylliodes chrysocephala* L. (Chrysomelidae) (Aubert and Jourdheuil, 1959; Sedivý, 1983).

Barycnemis Förster

Medium-sized Holarctic genus with 24 Palaearctic species; 19 species in Europe and Caucasus. *B. angustipennis* Holmgren is known as a parasitoid of *Byrrhus* sp. (Byrrhidae) (Horstmann, 1981a), *B. blediator* Aubert is a common parasitoid of *Bledius spectabilis* Kratz in saltmarshes in England (Staphylinidae) (Wyatt and Foster, 1989), and Nearctic species *B. linearis* Ashmead develop in *Pissodes* sp. on conifers (Curculionidae) (Viereck, 1912). Males are rather more difficult to recognize than the females, or sometimes impossible. Key to Palaearctic species of *Barycnemis* was given by Khalaim (2004a).

B. alpina (Strobl, 1901)

Distribution. Alps, Scandinavia, Bulgaria, Turkey (Bayburt; Çoruh et al., 2002). European, predominantly montane species, occurs above treeline in Alps (Horstmann, 1981a).

Biology. Flight period from July to August. Host unknown.

B. harpura (Schrank, 1802)

Distribution. Holarctic species, pancontinental and rather common in the Palaearctic region. Recorded in Turkey by Horstmann (1981a), Kolarov and Beyarslan (1994).

Biology. Flight period from June to October. Host unknown.

Diaparsis Förster

Worldwide distributed genus with about 35 Palaearctic species; 15 species in Europe. The genus is divided into 5 subgenera, 4 of them occur in Europe (see the key below). The host range of *Diaparsis* includes beetle families Buprestidae, Chrysomelidae, Cerambycidae, Curculionidae, and Scolytidae. Moreover, *D.* (*Ischnobatis*) *stramineipes* Brischke develop in *Pontania* (Hymenoptera, Tenthredinidae) galls on *Salix*, and are recorded to parasitize inquiline weevils *Curculio salicivorus* Payk. (Curculionidae) (Horstmann, 1981a) and *Pontania* species (Al-Zaffar and Aldrich, 1997, 1998; Kopelke, 1994). Palaearctic species were reviewed in 2 papers by the senior author (Khalaim, 2002a, 2005).

Key to subgenera of the genus *Diaparsis*

1. Prepectal carina reaching anterior margin of mesopleuron at very acute angle. Width of eye, in dorsal view, almost as long as the temple. Sternaulus absent or weak. Basal part of propodeum 0.5-1.2 times as long as

apical area. Mesopleuron impunctate or finely punctate….....……2

– Prepectal carina reaching anterior margin of mesopleuron at angle of 30° or more. Width of eye, in dorsal view, significantly exceeding length of temple. Sternaulus often strong, crenulate. Basal part of propodeum usually half as long as apical area, or shorter. Mesopleuron sometimes coarsely punctate.....3

2. Propodeum irregularly and coarsely wrinkled and densely pubescent. Antenna short, clavate, ultimate flagellomere enlarged. Ovipositor very fine, almost as long as body. – One steppe species, *D.* (*L.*) *clavata* Khalaim, recorded in Europe from Volgograd region of Russia only (Khalaim, 2002a).....***Lanugoparsis*** Khalaim

– Propodeum not wrinkled, without dense pubescence. Antenna not shortened, filiform, its ultimate flagellomere not enlarged. Ovipositor moderately thick, much shorter than body. – Three species in Europe. Key to Palaearctic species was given by Khalaim (2002a)..... .....***Nanodiaparsis*** Horstmann

3. Lower part of occipital carina elevated in the form of wide lobe, and separated from temple by crenulate groove, forming ventrally elongate tooth in place of connection with hypostomal carina. Ovipositor with 2 dorsal subapical teeth, its sheath about 1.5 times as long as first tergite. – Only one species, *D.* (*I.*) *stramineipes* Brischke, is known (Khalaim, 2002a)...***Ischnobatis*** Förster

– Lower part of occipital carina only slightly lobiform elevated, not separated from temple by crenulate groove, without tooth in place of connection with hypostomal carina. Ovipositor varying in shape and length. – Ten species in Europe. Key to Palaearctic species was given by Khalaim (2005).....***Diaparsis*** s. str.

****D.* (*D.*) *carinifer*** (Thomson, 1889)

Material examined. Samsun: Engiz-Ballıca, 17.05.1959, 1 ♂ (BMNH).

Distribution. Transpalaearctic species: Europe (except northern regions), Russian Caucasus, Turkey (Samsun), Middle Asia, south of Russian Far East. Introduced into U.S.A. for control of *Oulema melanopus* L. (Stehr and Haynes, 1972; Dysart et al., 1973).

Biology. Flight period from May to August. Parasitoid of *Oulema* spp. (Chrysomelidae) (Horstmann, 1971; Miczulski, 1988).

* ***D.* (*D.*) *nitida*** Horstmann, 1981

Material examined. Samsun: Engiz-Ballıca, 17.05.1959, 1 ♂ (BMNH).

Distribution. Transpalaearctic species: Hungary, Ukraine, Caucasus (Azerbaijan), Turkey (Samsun), Kazakhstan, south of Russian Far East.

Biology. Flight period in the western Palaearctic region from April to May, and in October. Host unknown.

* ***D.* (*D.*) *nutritor*** (Fabricius, 1804)

Material examined. Tekirdağ: Şarköy-Güzelköy, 26.06.1993, 1 ♀.

Distribution. Europe, Caucasus, Turkey (Tekirdağ).

Biology. Flight period from May to July. Host unknown.

* ***D.* (*D.*) *rara*** (Horstmann, 1971)

Material examined. Kastamonu: Daday, Ballıdağ-Kelebek yaylası, 01.07.2001, 1 ♀.

Distribution. Austria, Hungary, Germany, Lithuania, Belarus, Ukraine, Russia (European part, Caucasus, southern Siberia, and south of Far East), Turkey (Kastamonu), Kazakhstan.

Biology. Flight period from May to July. Host unknown.

D.* (*D.*) ?*temporalis Horstmann, 1979

Material examined. Edirne: Enez-Sütçüler, 15.04.1994, 1 ♂.

Distribution. Europe (except in north), Caucasus, ?Turkey (Edirne), Kazakhstan. Introduced into U.S.A. for control of *Oulema melanopus* L. (Stehr and Haynes, 1972; Dysart et al., 1973).

Biology. Flight period from April to July. Parasitoid of *Oulema* spp. (Chrysomelidae) (Horstmann, 1979, 1981a; Kolarov, 1988). *D. temporalis* was described in 1979, therefore comments about hosts and introduction into U.S.A. of *D. carinifer* before 1979

probably refer to both species, *D. carinifer* and *D. temporalis*.

Notes. Originally *D. temporalis* was divided into 2 subspecies, both occurring in Europe. We do not consider these subspecies separately here.

D.* (*N.*) *aperta (Thomson, 1889)

Distribution. Europe, Caucasus, West Turkey (Horstmann, 1971; Kolarov, 1995), Middle Asia.

Biology. Flight period from May to August. Parasitoid of *Anthaxia tuerki* Ganglb. (Buprestidae) (Sedivý, 1986) and *Molorchus umbellatarum* Schreb. (Cerambycidae) (Strojnowski, 1977).

******D.* (*N.*) *frontella*** (Holmgren, 1860)

Material examined. Kastamonu: Azdavay-Kiraz dağı, 05.09.2001, 1 ♀.

Distribution. Europe, Caucasus, Turkey (Kastamonu), Kazakhstan, Russian southern Siberia .

Biology. Flight period from July to October. Parasitoid of *Scolytus rugulosus* Müller (Scolytidae) (Horstmann, 1981a).

Epistathmus Förster

Only one species, Transpalaearctic *E. crassicornis* Horstmann, is described. Not recorded in Turkey. This species is common in Europe. Flight period from June to September (mostly in July and August). Host unknown.

Gelanes Horstmann

Probably Holarctic genus (Nearctic species not described) with 10 Palaearctic species; Six species in Europe. Not recorded in Turkey. Flight period in Europe mostly from April to June. Parasitoids of Xyelidae larvae in male cones on conifers (Achterberg and Altenhofer, 1997; Schedl, 1997; Blank, 2002). Key to Palaearctic species was given by Khalaim (2002b).

Heterocola Förster

Small predominantly South-European genus; 7 species in Europe. Horstmann (1971) divided this genus into 2 subgenera, *Heterocola* s. str. and *Heterocoloides* Horstmann. We do not use the subgeneric level here, because of difficulties with interpretation of the species described after 1971. Flight period in Europe mostly in spring and early summer. Host unknown. Key to European species was given by Horstmann (1971). Moreover, 3 South-European species were described after 1971 (Horstmann and Kolarov, 1988; Kolarov, 1989; Kolarov and Beyarslan, 1994).

H. longipalpis Kolarov and Beyarslan, 1994

Distribution. Turkey (Erzurum).

Biology. Flight period in July. Host unknown.

******H. nigrotibialis*** Horstmann and Kolarov, 1988

Material examined. Sivas: Yıldızeli, 01.06.2001, 1 ♂. Çankırı: Çerkeş, 04.07.2001, 5 ♀♀.

Distribution. Spain, Bulgaria, Turkey (Çankırı, Sivas).

Biology. Flight period from June to July. Host unknown.

Palpator Khalaim

Two species from Tunisia and Southern Italy (Sicily) were described recently (Khalaim, 2006). Not recorded in Turkey. Flight period in April. Host unknown.

Phradis Förster

Moderately large genus with 38 Palaearctic species; 24 species in Europe and Caucasus. In Europe *Phradis* is known to parasitize species of *Meligethes* Stephens (Nitidulidae) on rape (*Brassica* spp.). Key to European species was given by Khalaim et al. (2009).

******P. brevis* (**Brischke, 1880)

Material examined. Sivas: Yıldızeli, Çalı, 01.06.2001, 1 ♀.

Distribution. Common Transpalaearctic species: Europe, Russia (Caucasus, southern Siberia, and south of Far East), Turkey (Sivas), Kazakhstan, Mongolia.

Biology. Flight period from April to July. Parasitoid of *Meligethes difficilis* Heer (Horstmann, 1981a; Williams et al., 1984).

******P. decrescens*** (Thomson, 1889)

Material examined. 70 km SE of Van, Güzeldere mountain pass, 2730 m, 07.06.2001, 1 ♀, 1 ♂ (ZISP).

Distribution. Europe, Caucasus, Turkey (Van), Kazakhstan.

Biology. Flight period from May to July. Host unknown.

P. minutus (Bridgman, 1889)

Distribution. Europe, Caucasus, Turkey (Isparta; Kolarov and Beyarslan, 1994).

Biology. Flight period from April to July. Host unknown.

P. morionellus (Holmgren, 1860)

Distribution. Common Transpalaearctic species: Tunisia, Europe, Russia (Caucasus, southern Siberia, and south of Far East), Turkey (Anatolia; Horstmann, 1981a; Kolarov, 1995), Kazakhstan, Middle Asia.

Biology. Flight period in Europe from early May to August. Parasitoid of *Meligethes aeneus* F., *Meligethes difficilis* Heer, *M. viridescens* F., *M. symphyti* Heer, *M. coracinus* Sturm, and *M. nigrescens* (= *picipes*) Steph. (Osborne, 1960; Sedivý, 1983; Williams et al., 1984; Nilsson and Anderson, 1987).

P. nigritulus (Gravenhorst, 1829)

Distribution. Transpalaearctic species: Europe, Turkey (İçel; Kolarov and Beyarslan, 1994), Kazakhstan, Russian Siberia and south of Far East, Mongolia.

Biology. Flight period in Europe from May to August. Host unknown.

****P. rufiventris*** Horstmann, 1981

Material examined. 70 km SE of Van, Güzeldere mountain pass, 2730 m, 07.06.2001, 2 ♀♀ (ZISP).

Distribution. Europe, Turkey (Van), Kazakhstan.

Biology. Flight period from May to June. Host unknown.

Probles Förster

Predominantly Holarctic genus with 36 species in Europe and Caucasus. Non-European species mostly undescribed. The genus is divided into 5 subgenera (see the key below). In Europe, species of *Probles* develop in coleopteran hosts of the families Cisidae, Endomycidae, Curculionidae, and Melandryidae. Palaearctic species of the subgenera *Rugodiaparsis* and *Microdiaparsis* were reviewed by Khalaim (2003, 2007). Key to European species of *Euporizon* was given by Horstmann (1981a); moreover, 2 European species were described after 1981 by Horstmann and Kolarov (1988).

Key to subgenera of the genus *Probles*

1. Propodeum rugulose, with basal keel (sometimes indistinct) which is at least half as long as apical area. Temple long, about as long as eye width in dorsal view. Thyridia as long as wide, or slightly elongate. Ovipositor short, with thin needle-like tip (Figure 15)…….....……***Rugodiaparsis*** Horstmann
– Propodeum not rugulose, or partly rugulose, usually with short basal area. Temple usually shorter. Thyridia distinctly elongate. Ovipositor without needle-like tip, sometimes very long…….....……2
2. Temple about as long as eye width in dorsal view. Ovipositor tip sinuate…***Microdiaparsis*** Horstmann
– Temple as a rule shorter than eye width. Ovipositor tip not sinuate…….....……3
3. Malar space almost twice as long as basal width of mandible; face elongate. Ovipositor sheath 3.5 times as long as first tergite.....***Rhynchoprobles*** Horstmann
– Malar space at the most as long as basal width of mandible. Ovipositor sheath often shorter than first tergite…….....……4
4. Clypeus with more or less developed transverse ridge in its upper half; in profile, stronger convex in its upper half. Body length about 5.0-6.0 mm…….....……***Probles*** s. str.
– Clypeus without transverse ridge; in profile, flat or weakly convex. Body usually shorter…….....…***Euporizon*** Horstmann

P.* (*Euporizon*) *exilis (Holmgren, 1860)

Distribution. Europe, Turkey (Adana; Sedivý, 1959; Kolarov, 1995).

Biology. Flight period from July to September. Parasitoid of *Cis boleti* Scopoli, *Cis jaquemarti* Mell. (Cisidae), and *Endomychus coccineus* L. (Endomycidae) (Horstmann, 1971, 1981a).

P.* (*E.*) *rufipes (Holmgren, 1860)

Material examined. Trabzon: Zigana mountain pass, 1-6.08.1972, 1 ♀, 1 ♂ (ZSM).

Distribution. Europe, Turkey (Trabzon; Horstmann, 1981a: "North Anatolia"; Kolarov, 1995).

Biology. Flight period from July to September. Host unknown.

P.* (*Microdiaparsis*) *anatolicus Horstmann, 1981

Material examined. Trabzon: Zigana mountain pass, E 39°31′, N 40°41′, 1-8.08.1972 and 23-27.07.1973, 11 ♀♀ and 52 ♂♂ (including holotype and 26 paratypes) (ZSM). Tekirdağ: Şarköy-Güzelköy, 08.09.1999, 1 ♀.

Distribution. Russia (Krasnodar reg., Krasnaya Polyana), Abkhazia (Myussera nature reserve; Lidzava, near Pitsunda [Bichvint'a]), Georgia (Ajaria, E Bat'umi, 9 km E of Goderdzi pass), Armenia (Parakar, near Yerevan), Turkey (Tekirdağ, Trabzon).

Biology. Flight period from June to September. Host unknown.

****P.* (*M.*) *neoversutus*** (Horstmann, 1967)

Material examined. Kastamonu: Azdavay-Kiraz dağı, 05.09.2001, 1 ♀.

Distribution. Transpalaearctic species: Europe, Turkey (Kastamonu), south of Russian Far East.

Biology. Flight period in Europe from July to October. Host unknown.

****P.* (*P.*) *erythrostomus*** (Gravenhorst, 1829)

Material examined. Antalya: Finike, 75 m, 16.06.1938, 1 ♂ (BMNH). Afyon: Sandıklı, Kusura, 10.04.1996, 1 ♀ (BMNH).

Distribution. Europe, Turkey (Afyon, Antalya).

Biology. Flight period in Europe from April to October (probably 2 generations). Host unknown.

****P.* (*P.*) *flavipes*** (Szépligeti, 1899)

Material examined. Trabzon: Zigana mountain pass, 24.07.1973, 1 ♀, 1 ♂ (ZSM).

Distribution. Europe, Turkey (Trabzon).

Biology. Flight period in Europe from July to August. Host unknown.

****Probles* (*Rugodiaparsis*) sp.**

Material examined. Kayseri: Erciyes, 21.06.2003, 2 ♂♂. First record of the subgenus *Rugodiaparsis* in Turkey.

Sathropterus Förster

Only one species, *S. pumilus* Holmgren, is known. This species occurs in the Palaearctic region from the Atlantic to the Pacific Ocean (Khalaim, 2004b), and is also found in North and South America, South Africa, and Australia. Not recorded in Turkey. Host unknown.

Spinolochus Horstmann

Small Holarctic genus with 2 species. One species, *S. laevifrons* Holmgren, occurs from the Atlantic to the Pacific Ocean (Khalaim, 2004a, 2007). Not recorded in Turkey. Host unknown.

Tersilochus Holmgren

Moderately large genus with the majority of its species in the Holarctic region (Nearctic species mostly undescribed); about 40 species in Europe. The genus is divided into 3 subgenera (see the key below). Keys to the European species of the subgenera *Gonolochus*, *Tersilochus* and *Pectinolochus* were given by Horstmann (1971, 1981a). Two European species were described after 1981 by Horstmann and Kolarov (1988). Key to Palaearctic species of *Pectinolochus* with data on distribution was given by Khalaim (2007).

Key to subgenera of the genus *Tersilochus*

1. Tarsal claws pectinate. Head and mesosoma entirely or mostly granulate, usually without distinct punctures. Metasoma as a rule dark brown to black. Ovipositor without distinct dorsal teeth (European species), sometimes high, strongly compressed, with small and narrow dorsal notch near apex (as in Figure 16).....***Pectinolochus*** Aubert

– Tarsal claws not pectinate. Head and mesosoma sometimes distinctly punctate. Metasoma reddish brown to black. Ovipositor often with strong dorsal teeth (Figure 17), never high and narrowly notched (as in Figure 18).....2

2. Mesopleuron usually impunctate or finely punctate. Thyridia usually distinctly transverse. Sternaulus sometimes well-developed.....***Tersilochus*** Holmgren

– Mesopleuron distinctly punctate, or first tergite 1.5-2.0 times as long as wide anteriorly and thyridia slightly elongate. Sternaulus weak or absent.....***Gonolochus*** Förster

T.** (G.***) ***caudatus*** (Holmgren, 1860)

Material examined. Edirne: Tavuk Ormanı, 07.05.2002, 2 ♀♀.

Distribution. Pancontinental common palaearctic species. Turkey (Edirne).

Biology. Flight period in Europe from April to July. Parasitoid of *Ceutorhynchus pleurostigma* Marsch. and *Dorytomus taeniatus* F. (Curculionidae) (Fulmek, 1968).

T.** (G.***) ***nitens*** Horstmann et Kolarov, 1988

Material examined. Kastamonu: Küre-Ersizlerdere, İpsinler, 12.06.2002, 1 ♀.

Distribution. Austria (Semmering, env. Reichenau), Bulgaria, Ukraine (Crimea, Alushta), Russia (Krasnodar reg., Gelendzhik), Turkey (Kastamonu).

Biology. Flight period from May to June. Host unknown.

T.** (G.***) ***rugulosus*** Horstmann, 1981

Material examined. Afyon: İscehisar, 28.04.2002, 1 ♀.

Distribution. England (Hants, Romsey, Awbridge), Italy, Slovenia (Istria, Markovščina), Turkey (Afyon).

Biology. Flight period from March to April and from June to July (probably 2 generations). Parasitoid of *Ceuthorhynchidius horridus* (Panzer) (Curculionidae) on *Carduus macrocephalus* Desf. and *Galactites tomentosa* Moench (Asteraceae) (Horstmann, 1981b).

T.** (T.***) ***cognatus*** Holmgren, 1860

(correct name for *T. jocator* Holmgren, 1859 according to Horstman, 2005).

Material examined. Edirne: Suakacağı, 15.04.1994, 1 ♀.

Distribution. Europe (including East Kazakhstan), Turkey (Edirne).

Biology. Flight period from April to June. Host unknown.

T.** (T.***) ***heterocerus*** (Thomson, 1889)

Material examined. Bursa: Karacabey, 80 m, 30.06.1962, 1 ♀ (BMNH).

Distribution. Europe, Caucasus (Georgia), Turkey (Bursa).

Biology. Flight period from May to July. Parasitoid of *Meligethes aeneus* F. and *M. viridescens* F. (Nitidulidae) (Osborne, 1960; Sedivý, 1983; Nilsson and Anderson, 1987).

T.** (T.***) ***obscurator*** (Aubert, 1959)

Material examined. Ankara: Polatlı, 800 m, 2.05.1962, 1 ♀ (BMNH). Edirne: Havsa-Çukurköy, 16.04.1994, 1 ♀. Konya: Beyşehir, 22.04.2001, 1 ♀. Edirne: Tavuk Ormanı, 07.05.2002, 2 ♀♀.

Distribution. Europe, Turkey (Edirne, Ankara, Konya).

Biology. Flight period from March to June and in October. Parasitoid of *Ceutorhynchus pallidactylus* (Marsh.) (Klingenberg and Ulber, 1994), *C. quadridens* Panzer (Curculionidae) (Aubert and Jourdheuil, 1959; Sedivý, 1983), *Psylliodes chrysocephala* L. (Chrysomelidae) (Sedivý, 1983).

T.** (T.***) ***triangularis*** (Gravenhorst, 1807)

Material examined. Afyon: İscehisar, 28.04.2002, 1 ♀. Edirne: Tavuk Ormanı, 07.05.2002, 1 ♀.

Distribution. Europe, Turkey (Edirne, Afyon).

Biology. Flight period from April to June. Parasitoid of *Ceutorhynchus pleurostigma* Marsch. (Fulmek, 1968).

T.** (T.***) ***tripartitus*** (Brischke, 1880)

Material examined. Edirne: Havsa-Çukurköy, 16.04.1994, 1 ♀. Edirne: Tavuk Ormanı, 07.05.2002, 1 ♀.

Distribution. Europe, Turkey (Edirne).

Biology. Flight period from April to May. Parasitoid of *Psylliodes chrysocephala* L. (Chrysomelidae) (Aubert and Jourdheuil, 1959; Horstmann, 1971; Sedivý, 1983).

Thirty-five species from seven tersilochine genera are known to occur in Turkey: *Aneuclis anterior* Horstm., *A. incidens* (Thomson), *A. melanaria* (Holmgren), *Barycnemis alpina* (Strobl), *B. harpura* (Schrank), **Diaparsis carinifer* (Thomson), **D. nitida* Horstm., **D. nutritor* (F.), **D. rara* (Horstm.), *D.* ?*temporalis* Horstm., *D. aperta* (Thomson), **D. frontella* (Holmgren), *Heterocola longipalpis* Kolarov and Beyarslan, **H. nigrotibialis* Horstm. and Kolarov, **Phradis brevis* (Brischke), **P. decrescens* (Thomson), *P. minutus* (Bridgman), *P. morionellus* (Holmgren),

P. nigritulus (Grav.), **P. rufiventris* Horstm., *Probles exilis* (Holmgren), *P. rufipes* (Holmgren, 1860), *P. anatolicus* Horstm., **P. neoversutus* (Horstm.), **P. erythrostomus* (Grav.), **P. flavipes* (Szépl.), **Tersilochus caudatus* (Holmgren), **T. nitens* Horstm. and Kolarov, **T. rugulosus* Horstm., **T. cognatus* Holmgren, **T. heterocerus* (Thomson), **T. obscurator* (Aubert), **T. triangularis* (Grav.), **T. tripartitus* (Brischke). Of these, 20 species are new listings for Turkish fauna (marked by asterisk). The subgenus *Rugodiaparsis* of the genus *Probles* with unidentified species is recorded in Turkey for the first time. The most abundant genera are *Tersilochus* (8 species), *Diaparsis* (7 species), *Probles* (7 species), and *Phradis* (6 species). Generally the Turkish fauna resembles the European one, and predominantly contains common European species. This study summarizes the known data on Tersilochinae in Turkey and reflects the general composition of Turkish tersilochine fauna, but we conclude that additional rare species and genera will be identified in the future.

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