

A new species of the genus *Dinotrema* Foerster (Hymenoptera, Braconidae, Alysiniinae) from Turkey

Maximilian FISCHER¹, Gregory Thomas SULLIVAN^{2,3,*}, İsmail KARACA², Sebahat K. OZMAN-SULLIVAN⁴

¹Natural History Museum, Zoology Department, International Institute of Entomology, Vienna, Austria

²Department of Plant Protection, Faculty of Agriculture, Süleyman Demirel University, Isparta, Turkey

³School of Geography, Planning, and Environmental Management, The University of Queensland, Brisbane, Australia

⁴Department of Plant Protection, Faculty of Agriculture, Ondokuz Mayıs University, Samsun, Turkey

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Abstract: A new species of the genus *Dinotrema* Foerster is reported from the Samsun region on the central Black Sea coast of Turkey. The genus generally parasitizes flies and ranks among the most species-rich taxa of the Braconidae. Morphological details of the new species *Dinotrema samsunense* Fischer & Sullivan are described, figured, and compared taxonomically with the most closely related species.

Key words: Braconidae, Alysiniinae, *Dinotrema*, new species, Turkey

1. Introduction

According to Whitfield et al. (<http://tolweb.org/tree?group=Braconidae&contgroup=Ichneumonoidea>), there are 45 subfamilies of Braconidae and a highly conservative estimate of 40,000–50,000 species worldwide. About 2000 species and more than 100 genera have been recorded in the subfamily Alysiniinae (www.taxapad.com). The genus *Dinotrema* Foerster includes more than 300 species (Foerster, 1862; <http://www.faunaeur.org>; www.taxapad.com) and is a member of the subfamily Alysiniinae of the Braconidae (Fischer, 1971, 1972, 1976, 1993; Achterberg, 1988; Fischer and Samiuddin, 2008; <http://www.faunaeur.org>). It is comparatively easy to recognize the genus, but the identification of species is considered extremely difficult. The genus has a very wide distribution, including Western and Central Europe (Fischer, 1971, 1993; Achterberg, 1988; Munk et al., 2013a, 2013b; Peris-Felipo and Belokobylskij, 2013; Peris-Felipo et al., 2013a, 2013b, 2013c, 2013d; <http://www.faunaeur.org>; www.taxapad.com), Turkey (Yıldırım et al., 2010), Russia (Tobias, 2006; Belokobylskij and Tobias, 2007), Korea (Papp, 2003), and Australia (Wharton, 2002), but few rearing records are available. The hosts are mainly Phoridae, but include Anthomyiidae, Platypezidae, and Drosophilidae (Diptera) (Achterberg, 1988; Yakovlev and Tobias, 1992; Fischer, 1993; Belokobylskij and Tobias, 2002; Fischer et al., 2008). Disney and Munk (2005) reported *D. necrophilum* (Hedqvist) from the scuttle fly

Megaselia giraudii (Egger) (Phoridae), Wharton (2002) reported *D. monstrosus* Wharton from an unknown species of platypezid fly, and Munk et al. (2013a) reported *Dinotrema alysiiae* Munk & Peris-Felipo from *Callomyia amoena* Meigen (Platypezidae).

2. Materials and methods

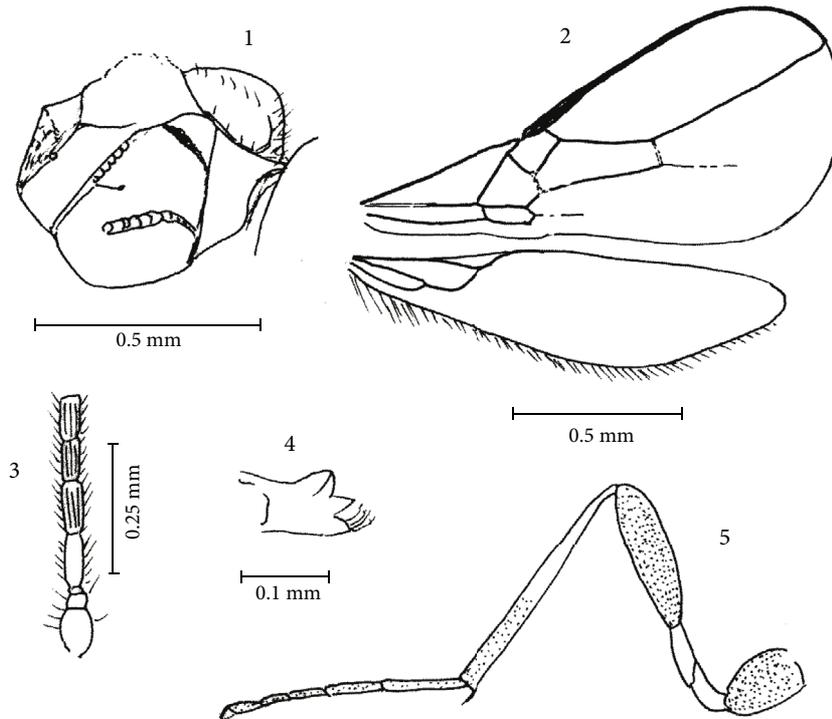
The specimen was found during a study of the parasitoids of *Hyphantria cunea* Drury (Lepidoptera: Arctiidae) in Samsun Province, Turkey, in 2009. A total of 110 *H. cunea* pupae were collected on 29.03.2009 from Erenköy village (41°06'18"N, 36°59'52"E) of Terme township, Samsun Province. Groups of 5 pupae were placed in separate plastic vials and sealed with a fine mesh cover. The parasitoid emerged on 15.04.2009 and was stored in 80% alcohol. Identification, description, and illustration were done by the first author, Maximilian Fischer, according to the keys and methodologies of Fischer (1971, 1976).

3. Results

Dinotrema samsunense Fischer & Sullivan, sp. nov.
(Figures 1–5)

Diagnosis: The species belongs to the *Dinotrema cratocera*-group. The nearest species taxonomically is *Dinotrema fungicolum* (Tobias) and it can be distinguished as dealt with below. The *signifrons*-group, the *petiolata*-group, and the *inops*-group in Fischer (1976) are now in the *cratocera*-

* Correspondence: gsullivan107@gmail.com



Figures 1–5. *Dinotrema samsunense* Fischer & Sullivan, sp. nov. – 1. Mesosoma (lateral), 2. Hind and fore wings, 3. Basal segments of antenna, 4. Mandible, 5. Hind leg.

group. Most *Dinotrema* species are listed at www.taxapad.com. Fischer and Samiuddin (2008) presented a recent key for the species-groups of *Dinotrema*.

- 1 T1 dark; legs entirely yellow; posterior mesopleural furrow entirely smooth; mandibles and palpi yellow; 1.7 mm; Russia (Karelia):.....*D. fungicolum* (Tobias)
 - T1 red; legs brown, coxae darkened; trochanters and basal half of the tibiae yellow; posterior mesopleural furrow crenulated above; mandibles and palpi brown; 1.5 mm; Turkey:.....*D. samsunense* Fischer & Sullivan, sp. nov.

Material examined: Holotype: 1♂, Turkey, Samsun, Terme, Erenköy, reared by Gregory T Sullivan and Sebahat K Ozman-Sullivan from an overwintered *H. cunea* pupa (see “Remarks”) collected on 29.03.2009; the parasitoid emerged on 15.04.2009. The holotype has been deposited in the International Institute of Entomology of the Natural History Museum in Vienna, Austria (NHMW).

Etymology: The new species is named after the type locality of Samsun, Turkey.

Description: Male. Length of body 1.5 mm.

Head: Twice as wide as long, 1.6 times as wide as the face, 1.4 times as wide as the mesoscutum, 3.5 times as wide as the T1. Eyes twice as long as the temple (seen from above), slightly protruding, eye and temple rounded in a

common curve, diameter of antennal sockets as great as their distance from each other and from eyes, occiput nearly straight. Upper side smooth, almost hairless, only a few hairs near the eyes and in the ocellar area, ocelli slightly protruding, the distance from each other as great as their diameter, the distance of the lateral ocellus from the eye as great as the width of the ocellar area. Face strongly convex, punctate and with evenly distributed hairs, with hairless stripes only near eyes, along the eye margins some more or less long hairs, hair points not discernible, eye margins parallel. Clypeus 3.0 times as wide as high, arched, projecting, rounded below, with a few longer hairs. Epistomal furrow smooth. Tentorial pits oval, their diameter as great as their distance from the eyes. Mandible 1.5 times as long as apical width, lower edge straight, upper margin weakly curved, apically only slightly wider than at base, tooth 2 pointed, surpassing teeth 1 and 3 slightly, these blunt, a right angle between teeth 1 and 2, an incision between teeth 2 and 3, the latter with longer, curved bristles, external side nearly smooth, a short lamella arising from tooth 1; maxillary palpi about as long as the head is high. Antennae longer than the body, in the present specimen a little shortened, 19 segments visible, but probably only few segments missing; F1, 3.0 times as long as wide, the following Fs becoming a little shorter, Fm and F17 twice as long as wide, tube-like, weakly separated

from each other, hairs not longer than the width of the segments, 2 or 3 sensilla visible in lateral view.

Mesosoma: 1.3 times as long as high, upper side curved. Mesoscutum 1.3 times as wide as long, rounded in front, notauli developed only in front, absent behind, passing into marginal furrows, their imaginary course indicated by a few hairs, nearly smooth, mesoscutal pit weakly developed. Prescutellar furrow divided, smooth, lateral areas as broad as long. Postaxillae and metascutum smooth. Propodeum delicately rugose, with only an indication of a basal carina and a pentagonal areola, spiracles small. Anterior furrow of the side of the pronotum weakly crenulated. Sternaulus (precoxal suture) narrow, crenulated, reaching as far as the anterior edge, not reaching the middle coxa, posterior mesopleural furrow crenulated above, smooth below, anterior mesopleural furrow smooth. Metapleuron smooth, upper and lower furrows nearly without sculpture. Hind femora 5.0 times as long as broad.

Wings: st and metacarp forming a uniform anterior marginal vein, r arising from the base of the st by a distance equal to the length of r1, r1 longer than the width of the st, r1 passing in a curve into r2, r2 twice as long as cc1, r3 straight, twice as long as r2, R reaching the tip of the wing, nr much postfurcal, d twice as long as cc1, Cu2 narrowing distally, nv postfurcal by its own width, B closed, np arising from the middle of the outer side of B, m desclerotized towards its base, np developed only as a fold; r' and cu2' at most indicated as folds, SM' more than half the length of M'.

Metasoma: T1 twice as long as apical width, weakly narrowed towards base, dorsal carinae present only in front, weakly longitudinally striated, but smooth behind, spiracles on small tubercles in front of the middle, at sides with 2 long lateral bristles. The following tergites lacking sculpture.

Colors: Black. T1 red. Legs brown, coxae somewhat dark, trochanters and basal half of the tibiae yellow. Mandibles and palpi brown. Wing membrane hyaline.

Female – Unknown.

References

- Achterberg C van (1988). The genera of the *Aspilota*-group and some descriptions of fungicolous Alysini from the Netherlands (Hymenoptera: Braconidae: Alysini). *Zool Verhandl* 247: 1–88.
- Andreotti R, Koller WW, Tadei WJ, Prado AP do, Barros JC, Santos F Dos, Gomes A (2003). Occurrence of the *Megaselia scalaris* (Loew, 1866) (Diptera, Phoridae) as a parasitoid of *Boophilus microplus* in Campo Grande, MS, Brazil. *Rev Bras Parasitol*, 12: 46–47.
- Belokobylskij SA, Tobias VI (2002). New subgenus of the genus *Dinotrema* Foerster (Hymenoptera, Braconidae, Alysini) from east Palaearctic with description of a new species. *Far East Entomol* 120: 1–7.
- Belokobylskij SA, Tobias VI (2007). Fam. Braconidae. Subfam. Alysinae. Group of genera closed to *Aspilota*. In: Lelej AS, editor. *Key to Insects of the Russian Far East. Neuropteroidea, Mecoptera, Hymenoptera*. Vladivostok: Dal'nauka 4: 9–133 (in Russian).

Remarks: The genus *Dinotrema* is known to parasitize dipteran hosts, but in the current case the actual host of *D. samsunense* Fischer & Sullivan, sp. nov. is unknown. *Dinotrema samsunense* may have directly parasitized the *H. cunea* larva or pupa (primary parasitism), which appears unlikely, or it may have parasitized a parasitoid of *H. cunea*.

Ejlali et al. (2008) reported *Megaselia scalaris* Loew as a parasitoid of *H. cunea* in Iran. *Dinotrema samsunense* may therefore have parasitized a phorid parasitoid of *H. cunea*, possibly *M. scalaris*. In documented cases, *M. scalaris* parasitized the praying mantis *Parastagmatoptera tessellata* Saussure (Mongiardino Koch et al., 2013), *Triatoma brasiliensis* Neiva (Hemiptera: Reduviidae) (Costa et al., 2007), and the tick *Boophilus microplus* Canestrini (Ixodida: Ixodidae) (Andreotti et al., 2003). Another possibility is that *D. samsunense* parasitized a tachinid primary parasitoid; many parasitic tachinid flies, namely *Nemoraea pellucida* (Meigen) and *Compsilura concinnata* (Meigen), emerged from other *H. cunea* pupae collected at the same time (Sullivan et al., 2012). Ichneumonid and chalcidoid parasitoids were also collected (Sullivan et al., 2010, 2011).

The circumstances of the emergence of the *D. samsunense* specimen from a batch of 5 pupae were as follows. A single specimen of *Virgichneumon dumeticola* Gravenhorst (Hymenoptera: Ichneumonidae) emerged on the same day as the *D. samsunense* specimen. The other 4 pupae were checked to find an emergence hole for *D. samsunense* but no evidence of an emergence hole was found. At a later date (05.05.2009), 2 *H. cunea* emerged. On 15.05.2009, a tachinid, *N. pellucida*, emerged. Nothing emerged from the fifth pupa.

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- Costa J, Almeida CE, Esperança GM, Morales NM, Santos-Mallet JR, Goncalves TCM, Prado AP (2007). First record of *Megaselia scalaris* (Loew) (Diptera: Phoridae) infesting laboratory colonies of *Triatoma brasiliensis* Neiva (Hemiptera: Reduviidae). *Neotrop Entomol* 6: 987–989.
- Disney RHL, Munk T (2005). The scuttle fly host *Megaselia giraudii* (Egger) (Diptera: Phoridae) and the first British records of its parasitoid *Dinotrema necrophilum* (Hedqvist, 1972) (Hymenoptera: Braconidae). *Entomol Gaz* 56: 105–106.
- Ejlali N, Salehi L, Khaljiri YJ (2008). Introduction parasitoids of fall webworm *Hyphantria cunea* Drury (Lepidoptera: Arctiidae) pupae in the northeastern Guilan province. Abstracts CD, XXIII International Congress of Entomology; 6–12 July 2008; Durban, South Africa, p. 310.
- Foerster A (1862). Synopsis der Familien und Gattungen der Braconen. *Verh Naturh Ver Rheinl* 19: 225–288 (in German).
- Fischer M (1971). Untersuchungen über die europäischen Alysini mit besonderer Berücksichtigung der Faune Niederösterreichs. *Pol Pismo Entomol* 41: 19–160 (in German).
- Fisher M (1972). Erste Gliederung der paläarktischen *Aspilota*-Arten (Hymenoptera, Braconidae, Alysini). *Pol Pismo Entomol* 42: 323–459 (in German).
- Fischer M (1976). Erste Nachweise von *Aspilota*-Wespen im Burgenland. *Annal Naturhist Mus Wien* 80: 343–410 (in German).
- Fischer M (1993). Eine neue Studie über Buckelfliegen-Kieferwespen: *Synaldis* Foerster und *Dinotrema* Foerster (Hymenoptera, Braconidae, Alysini). *Linzer Biol Beitr* 25: 565–592 (in German).
- Fischer M, Samiuddin A (2008). Tiny Indian Alysini (Insecta: Hymenoptera: Braconidae), collected by Ahmad Samiuddin. *Annal Naturhist Mus Wien* 109: 131–146.
- Fischer M, Tormos J, Pardo X, Asis JD (2008). New citations of Alysini from Spain, with description of *Dinotrema mediocornis hispanicum* n. ssp. and of the females of *Aspilota inflatinervis* and *Synaldis azorica* (Hymenoptera, Braconidae, Alysini). *Linzer Biol Beitr* 40: 1449–1466.
- Mongiardino Koch N, Fontanarrosa P, Padró J, Soto IM (2013). First record of *Megaselia scalaris* (Loew) (Diptera: Phoridae) infesting laboratory stocks of mantids (*Parastagmatoptera tessellata*, Saussure). *Arthropods* 2: 1–6.
- Munk T, Peris-Felipo FJ, Jiménez-Peydró R (2013a). New western Palearctic *Dinotrema* species with mesoscutal pit and only medially sculptured propodeum (Hymenoptera, Braconidae, Alysini). *ZooKeys* 260: 61–76.
- Munk T, Peris-Felipo FJ, Jiménez-Peydró R (2013b). New western Palearctic species of the genus *Dinotrema* Foerster, 1862 with widely sculptured propodeum (Hymenoptera: Braconidae: Alysini). *Ann Zool* 63: 123–141.
- Papp J (2003). Braconidae (Hymenoptera) from Korea, XXI. Species of fifteen subfamilies. *Acta Zool Acad Sci Hung* 49: 115–152.
- Peris-Felipo FJ, Belokobylskij SA (2013). *Dinotrema jimenezi* sp. n., a new species of the genus *Dinotrema* (Hymenoptera: Braconidae: Alysini) with only basomedially sculptured propodeum from Spain. *Biologia* 68: 979–982.
- Peris-Felipo FJ, Belokobylskij SA, Jiménez-Peydró R (2013a). Six new *Dinotrema* species (Hymenoptera, Braconidae) from Spain, with prescutellar pit and medially sculptured propodeum. *Zootaxa* 3694: 545–564.
- Peris-Felipo FJ, Belokobylskij SA, Jiménez-Peydró R (2013b). *Dinotrema vitobiasi* sp. nov., a new Spanish species of the genus *Dinotrema* Foerster with only basomedially sculptured propodeum (Hymenoptera, Braconidae, Alysini). *Zoosyst Rossica* 22: 87–92.
- Peris-Felipo FJ, Belokobylskij SA, Jiménez-Peydró R (2013c). New Spanish *Dinotrema* species with propodeal areola or mainly sculptured propodeum (Hymenoptera, Braconidae, Alysini). *Zookeys*, 297: 43–70.
- Peris-Felipo FJ, Fischer M, Jiménez-Peydró R (2013d). Five new *Dinotrema* species from Spain, with mesoscutal pit and medially sculptured propodeum. *B Insectol* 66: 59–71.
- Sullivan GT, Karaca I, Ozman-Sullivan SK, Kara K (2012). Tachinid (Diptera: Tachinidae) parasitoids of overwintered *Hyphantria cunea* (Drury) (Lepidoptera: Arctiidae) pupae in hazelnut plantations in Samsun province, Turkey. *J Ent Res Soc* 14: 21–30.
- Sullivan GT, Karaca I, Ozman-Sullivan SK, Kolarov J (2010). Ichneumonid (Hymenoptera) parasitoids of overwintering *Hyphantria cunea* (Drury) (Lepidoptera: Arctiidae) pupae in hazelnut plantations of the central Black Sea region of Turkey. *Zootaxa* 2608: 63–68.
- Sullivan GT, Karaca I, Ozman-Sullivan SK, Yang ZQ (2011). Chalcidoid parasitoids of overwintered pupae of *Hyphantria cunea* (Lepidoptera: Arctiidae) in hazelnut plantations of Turkey's central Black Sea region. *Can Entomol* 143: 411–414.
- Tobias VI (2006). Palearctic species of the genus *Dinotrema* Foerster (Hymenoptera, Braconidae, Alysini) with a prescutal pit and long ovipositor. *Entomol Rev* 86: 324–336.
- Wharton RA (2002). Revision of the Australian Alysini (Hymenoptera: Braconidae). *Invertebr Syst* 16: 7–105.
- Yakovlev EB, Tobias VI (1992). Braconidae (Hymenoptera) parasites of fungivorous Diptera in Karelia. *Entomol Fennica* 3: 139–148.
- Yıldırım EM, Civelek HS, Çıkman E, Dursun O, Eskin A (2010). Contributions to the Turkish Braconidae (Hymenoptera) fauna with seven new records. *Turk Entomol Derg* 34: 29–35.