



Revision of the New World species of the genus *Dinotrema* (Hymenoptera: Braconidae: Alysiiinae)

FRANCISCO JAVIER PERIS-FELIPO^{1,3} & SERGEY A. BELOKOBYSKI²

¹*Bleichestrasse 15, CH-4058 Basel (Switzerland)*

²*Museum and Institute of Zoology Polish Academy of Sciences, Wilcza 64, Warszawa 00-679, Poland; Zoological Institute Russian Academy of Sciences, St. Petersburg, 199034, Russia*

³*Corresponding author. E-mail: peris.felipo@gmail.com*

Table of contents

Abstract	2
Introduction	2
Material and methods	3
Taxonomic part	3
Class Hexapoda Blainville, 1816	3
Order Hymenoptera Linnaeus, 1758	3
Suborder Apocrita Latreille, 1810	3
Superfamily Ichneumonoidea Latreille, 1802	3
Family Braconidae Nees, 1811	3
Subfamily Alysiiinae Leach, 1815	3
Tribe Alysiiini Leach, 1815	3
Genus <i>Dinotrema</i> Foerster, 1863	4
<i>Dinotrema angusticorne</i> (Fischer, 1969)	4
<i>Dinotrema armillariae</i> (Fischer, 1969)	6
<i>Dinotrema caudatum</i> (Fischer, 1969)	8
<i>Dinotrema clayensis</i> (Fischer, 1969)	11
<i>Dinotrema communis</i> (Fischer, 1969)	11
<i>Dinotrema disstriae</i> (Fischer, 1969)	15
<i>Dinotrema ephemera</i> (Viereck, 1917), comb. nov.	17
<i>Dinotrema floridensis</i> (Shenefelt, 1974), comb. nov.	19
<i>Dinotrema foliformis</i> (Fischer, 1969), comb. nov.	21
<i>Dinotrema latitergum</i> (Fischer, 1969), comb. nov.	24
<i>Dinotrema lobidens</i> (Fischer, 1971), comb. nov.	25
<i>Dinotrema longibasis</i> (Fischer, 1969), comb. nov.	28
<i>Dinotrema multiaerolatum</i> Peris-Felipo, 2016	31
<i>Dinotrema pauperum</i> (Fischer, 1969)	33
<i>Dinotrema plaumanni</i> Peris-Felipo, 2016	35
<i>Dinotrema saileri</i> (Fischer, 1969)	36
<i>Dinotrema shannoni</i> (Fischer, 1969)	38
<i>Dinotrema signifrons</i> Viereck, 1906, comb. resurr.	41
<i>Dinotrema stenostigma</i> (Provancher, 1886)	43
<i>Dinotrema subbidentatum</i> Peris-Felipo, 2016	46
<i>Dinotrema sylvaticae</i> (Fischer, 1969)	46
<i>Dinotrema teutoniaense</i> Peris-Felipo, 2016	48
Key to Nearctic and Neotropical species of <i>Dinotrema</i>	50
Acknowledgments	52
References	52

Abstract

The first comprehensive revision of the Nearctic and Neotropical species of the genus *Dinotrema* Foerster, 1863 is provided. Twenty-two species of this genus are redescribed and illustrated. The following new combinations are suggested: *D. floridensis* (Shenefelt, 1974), **comb. nov.**; *D. ephemera* (Viereck, 1917), **comb. nov.**; *D. foliformis* (Fischer, 1969), **comb. nov.**; *D. latitergum* (Fischer, 1969), **comb. nov.**; *D. lobidens* (Fischer 1969), **comb. nov.** and *D. longibasis* (Fischer 1969), **comb. nov.** *Dinotrema bucculatricis* (Fischer 1969) is synonymized with *D. angusticorne* (Fischer 1969), **syn. nov.** *Dinotrema sublatitergum* (**nom. nov.**) is new name for junior homonym *Dinotrema latitergum* (Fischer, 1975), not *D. latitergum* (Fischer, 1969). The key to all New World species of *Dinotrema* is compiled for the first time.

Key words. Parasitoid, Diptera, redescription, new combination, *Dinotrema*, Nearctic, Neotropical

Introduction

The subfamily Alysini is a monophyletic group characterised by apomorphic external morphological features such as exodont mandibles, the total loss of the occipital and prepectal carinae, and koinobiont specialisation on Diptera hosts (Wharton 2002). The monophyly has also been confirmed by molecular phylogenetic studies (Gimeno *et al.* 1997, Zaldivar *et al.* 2006). About 2000 species and 104 genera have been recorded worldwide within Alysini (Yu *et al.* 2012), which is now divided into two large and polymorphic tribes Alysini and Dacnini (Shenefelt 1974, Yu *et al.* 2012). Griffiths (1964, 1966a, 1966b, 1968a, 1968b, 1984) considered the tribe Dacnini as monophyletic. On the other hand, the tribe Alysini is perhaps paraphyletic and even polyphyletic group (Wharton 2002). Morphologically, these two tribes are mainly distinguished by the presence (Alysini) or absence (Dacnini) of the vein r-m (second radiomedial) on fore wings (Alysini has three submarginal (radiomedial) cells while Dacnini only two), and by the different numbers of the mandibular teeth, usually not more than three in Alysini and often four–seven in Dacnini.

With regard to host-parasitoid relationships, members of the tribe Alysini have a very wide range of hosts from 29 families of cyclorrhaphous Diptera, predominantly from the phytophagous, sarcophagous, necrophagous, and parasitoid fly families Agromyzidae, Anthomyiidae, Calliphoridae, Drosophilidae, Muscidae, Phoridae, Sarcophagidae, and Tephritidae. On the other hand, Dacnini have been only reared from 13 families of Diptera and mainly from leaf and stem miners of the families Agromyzidae, Chloropidae and Ephydriidae (Yu *et al.* 2012, Kostromina *et al.* 2016).

Despite the sufficient knowledge on this subfamily, its generic classification is imperfect and complicated with numerous established genera-groups. The *Aspilota* group of genera is rather well differentiated association inside of the tribe Alysini (van Achterberg 1988) and currently includes 17 genera (Peris-Felipo *et al.* 2014).

The genus *Dinotrema* Foerster, 1863 is the second largest genus of Alysini with approximately 430 described species from all zoogeographic regions excluding Antarctica (Peris-Felipo and Belokobylskij 2016a). Species of *Dinotrema* parasitise the larvae of Diptera predominantly belonging to the family Phoridae (van Achterberg 1988; Peris-Felipo and Belokobylskij 2016b).

The current status of the genus *Dinotrema* was established and justified by van Achterberg (1988), and the members of this genus differ from the most related *Aspilota* by the short paraclypeal fovea that are far distant from the inner margin of eyes. Fischer (1972) and Tobias (2003, 2004a, 2004b, 2006) suggested dividing *Dinotrema* species into some morphological groups characterized by extent and type of sculpture of the propodeum and presence/absence of the mesoscutal pit. These features were also used in the recent revisions of the Western Palaearctic (Peris-Felipo *et al.* 2014) and Afrotropical species (Peris-Felipo and Belokobylskij 2016a). Recently, *Dinotrema* with four new species was recorded in the Neotropical region for the first time and a key to the Nearctic and Neotropical *Dinotrema* species of this genus was published (Peris-Felipo and Belokobylskij, 2016b). However, since this publication other known species of *Aspilota*-group from the Nearctic region are revised and new combinations revealed.

The purpose of this study is to review all known New World (Nearctic and Neotropical regions) *Dinotrema* species. This review includes redescrptions of type material, photos of their characters, and the preparation of a new updated key to species.

Material and methods

For the terminology of the morphological features, sculpture and measurements, see Peris-Felipo *et al.* (2014); for wing venation nomenclature, see Peris-Felipo *et al.* (2014) and in parenthesis van Achterberg (1993). The morphological groups based on the propodeal sculpture of Peris-Felipo *et al.* (2014) were used for the preparation of the new key to the Nearctic and Neotropical *Dinotrema* species. Specimens were imaged using a Digital Keyence® VHX-2000 and Adobe Photoshop® imaging system. Types of the studied species are deposited in the collections of the Natural History Museum (London, U.K.; BMNH), Naturhistorisches Museum (Vienna, Austria; NHMW), Smithsonian Institution (Washington, U.S.A.; NMNH), and Zoological Institute of the Russian Academy of Sciences (St Petersburg, Russia; ZISP).

Taxonomic part

A total of 22 species of the genus *Dinotrema* from Nearctic and Neotropical regions are re-described and illustrated. After the revision of the type material of the *Aspilota*-group species deposited in the NMNH (Washington) the following taxa are transferred to *Dinotrema* from *Aspilota*: *D. floridensis* (Shenefelt, 1974), **comb. nov.**; *D. ephemera* (Viereck, 1917), **comb. nov.**; *D. foliformis* (Fischer, 1969), **comb. nov.**; *D. latitergum* (Fischer, 1969), **comb. nov.**; *D. lobidens* (Fischer 1969), **comb. nov.** and *D. longibasis* (Fischer 1969), **comb. nov.** *Dinotrema bucculatricis* (Fischer 1969) is synonymized with *D. angusticorne* (Fischer 1969) (**syn. nov.**). Original and new species combinations and publications of original species descriptions are listed in Table 1.

TABLE 1. List of new combinations presented in this paper, with their original combinations and publications.

New World species in original generic combination	New World species as nom.nov./comb. nov./ syn. nov.	Original publication
<i>Aspilota cubiceps</i> Fischer 1969	<i>Dinotrema floridensis</i> Shenefelt, 1974	Fischer, 1969a; Shenefelt, 1974
<i>Aspilota ephemera</i> Viereck, 1917	<i>Dinotrema ephemera</i> (Viereck, 1917)	Viereck, 1917
<i>Aspilota foliformis</i> Fischer, 1969	<i>Dinotrema foliformis</i> (Fischer, 1969)	Fischer, 1969a
<i>Aspilota latitergum</i> Fischer, 1969	<i>Dinotrema latitergum</i> (Fischer, 1969)	Fischer, 1969b
<i>Aspilota lobidens</i> Fischer, 1971	<i>Dinotrema lobidens</i> (Fischer, 1971)	Fischer, 1971
<i>Aspilota longibasis</i> Fischer, 1969	<i>Dinotrema longibasis</i> (Fischer, 1969)	Fischer 1969d
<i>Dinotrema bucculatricis</i> (Fischer 1969)	<i>Dinotrema angusticorne</i> (Fischer 1969)	Fischer, 1969c

The Palaearctic *Dinotrema latitergum* (Fischer, 1975) (described originally in *Aspilota*) is a junior homonym of the Nearctic *Dinotrema latitergum* (Fischer, 1969) and we propose the new name for junior homonym, *Dinotrema sublatitergum*, **nom. nov.**

Class Hexapoda Blainville, 1816

Order Hymenoptera Linnaeus, 1758

Suborder Apocrita Latreille, 1810

Superfamily Ichneumonoidea Latreille, 1802

Family Braconidae Nees, 1811

Subfamily Alysiinae Leach, 1815

Tribe Alysiini Leach, 1815

Genus *Dinotrema* Foerster, 1863

Diagnosis of the genus. Mandibles small, simple, tridentate. Paraclypeal fovea short, far not reaching edge of eyes. Mesoscutum with or without mesoscutal pit; notauli present only in anterior part of mesoscutum; precoxal sulcus always present; propodeum smooth or more common with different types of sculpture and sometimes with longitudinal or transverse carinae. In fore wing, radial (marginal) cell never shortened; vein cu₁ (2-SR) always present and usually distinctly sclerotized; veins recurrent (m-cu) and nervulus (cu-a) always postfurcal; brachial (first subdiscal) cell always closed postero-apically by brachial (CU1a) vein. Metasoma more or less distinctly compressed laterally. Ovipositor sheath usually not longer than metasoma.

Hosts. Dipteran larvae mainly from families Anthomyiidae, Phoridae and Platypezidae.

Dinotrema angusticorne (Fischer, 1969)

(Figs 1, 2)

Aspilota angusticornis Fischer 1969a: 102; Yu *et al.* 2012.

Dinotrema angusticorne: Peris-Felipo and Belokobylskij 2016b: 3.

Aspilota bucculatricis Fischer 1969c: 62; Shenefelt 1974: 968; Marsh 1979: 220; Yu *et al.* 2012 (**syn. nov.**).

Dinotrema bucculatricis: Peris-Felipo and Belokobylskij 2016b: 3.

Material examined. 1 male (paratype of *D. angusticorne*), "U.S.A., Cabin John, May. 1919, R.M. Fouts Collector" (NHMW); 1 female (paratype of *D. bucculatricis*), "U.S.A., Newfoundland, Squires, Mem., PK, 24.vii.1961, C.P. Alexander leg." (NHMW).

Redescription. Female. Body 1.6 mm; fore wing 1.8 mm; hind wing 1.1 mm.

Head. In dorsal view, 1.7 × as wide as median length, 1.5 × as wide as mesoscutum, smooth. Eye in lateral view 1.4 × as wide as temple medially. POL 1.4 × OD; OOL 3.2 × OD. Face 1.8 × as wide as high. Clypeus 3.0 × as wide as high. Paraclypeal fovea reaching halfway distance between clypeus and eye. Mandible 1.4 × as long as its maximum width, widened towards apex. Upper tooth rather wide, shorter than lower tooth; middle tooth longer than upper tooth, thin, pointed apically; lower tooth short, subrounded. Antenna more than 16-segmented (apical segments missing). First flagellar segment 3.3 × as long as its apical width. Second to third flagellar segments 2.5 × as long as their maximum width; fourth and fifth segments 2.1 times; sixth to 14th segments 1.7–1.9 × as long as their maximum width respectively.

Mesosoma. In lateral view 1.2 × as long as high. Mesoscutum (in dorsal view) 0.9 × as long as its maximum width. Notauli mainly absent on horizontal surface of mesoscutum. Mesoscutal pit present, oval-elongate. Prescutellar depression (scutellar sulcus) with distinct median and without lateral carinae. Precoxal sulcus present, crenulated, not reaching anterior and posterior margins of mesopleuron. Posterior mesopleural furrow smooth. Propodeum mainly smooth with complete median longitudinal carinae and with short subtransverse carinae emerging from median carina, but far distant from propodeal edges. Propodeal spiracles very small, its diameter 0.2 × as wide as distance from spiracle to anterior margin of propodeum.

Leg. Hind femur 4.1 × as long as its maximum width.

Wings. Radial (marginal) cell 4.3 × as long as its maximum width. Vein r₂ (3-SR) 2.0 × as long as vein cu₁ (2-SR); vein r₃ (SR1) 2.7 × as long as vein r₂ (3-SR).

Metasoma. First tergite weakly widened towards apex, 2.0 × as long as its apical width, weakly striate in apical half. Ovipositor 1.1 × as long as first tergite, clearly shorter than metasoma, 0.7 × as long as hind femur.

Colour. Body, antenna, mandible, legs and pterostigma brown to dark brown. Wings hyaline.

Male. Body 1.3 mm; fore wing 1.6 mm; hind wing 1.1 mm. Antenna 20-segmented. First flagellar segment 3.8 × as long as its apical width. Radial (marginal) cell 3.9 × as long as its maximum width. Vein r₂ (3-SR) 2.5 × as long as vein cu₁ (2-SR); vein r₃ (SR1) 2.3 × as long as vein r₂ (3-SR). Hind femur 4.1 × as long as its maximum width. Otherwise similar to female.

Comparative diagnosis. This species is similar to *D. clayensis* (Fischer, 1969) and *D. latitergum* (Fischer, 1969). *Dinotrema angusticorne* differs from *D. clayensis* in having the eye in lateral view 1.4 × as wide as temple medially (1.1 × in *D. clayensis*), first metasomal tergite 2.0 × as long as its apical width (2.5 × in *D. clayensis*), radial (marginal) cell 4.3 × as long as its maximum width (3.8 × in *D. clayensis*), vein r₂ (3-SR) 2.0 × as long as

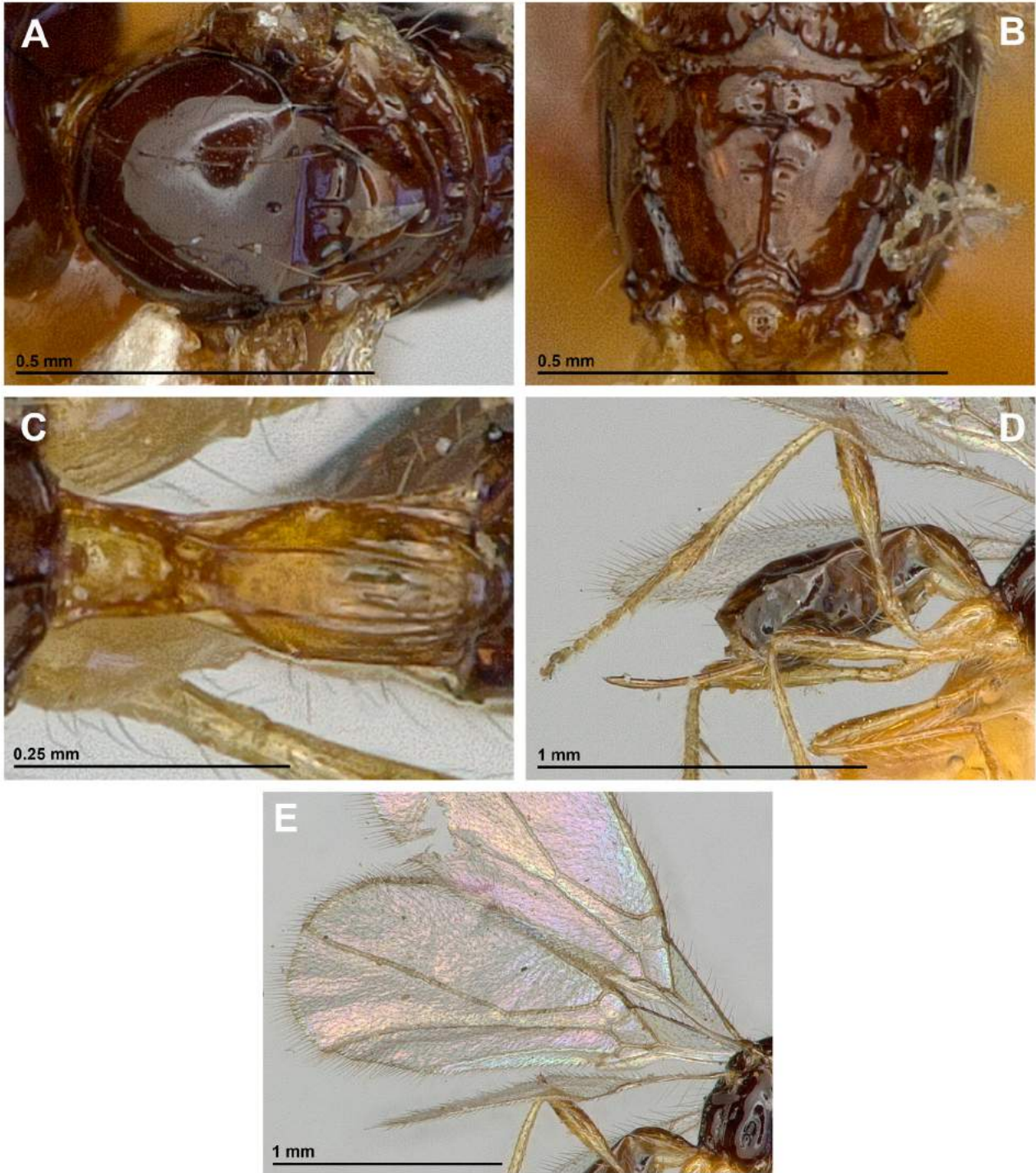


FIGURE 45. *Dinotrema teutoniaense* Peris Felipo 2016 (female, holotype). **A.** Mesonotum, dorsal view. **B.** Propodeum, dorsal view. **C.** First metasomal tergite. **D.** Metasoma, hind leg and ovipositor, lateral view. **E.** Fore and hind wings.

Key to Nearctic and Neotropical species of *Dinotrema*

- 1. Propodeum entirely or mainly smooth (Figs 4B, 16A, 22A) 2
- Propodeum width complete or short median carinae or widely and entirely sculptured; sometimes additionally with complete longitudinal median carina or large and distinctly delineated areola 4
- 2(1). Head in dorsal view $1.2 \times$ as wide as median length (Fig. 15F). Mesosoma in lateral view $1.6 \times$ as long as high (Fig. 15B). Eye in lateral view $0.8 \times$ as wide as temple medially (Fig. 15B). Hind femur $2.5 \times$ as long as its maximum width (Fig. 16B). First metasomal tergite $2.8 \times$ as long as its apical width (Fig. 16A). Propodeal spiracles large, its diameter $0.6 \times$ as wide as distance

	from spiracle to anterior margin of propodeum (Fig. 16A). [Antenna 13-segmented. Body length 2.1 mm]. U.S.A	
-	Head in dorsal view 1.7–1.8 × as wide as median length (Figs. 3F, 21F). Mesosoma in lateral view 1.0–1.1 × as long as high (Figs. 3B, 21B). Eye in lateral view 2.0–3.8 × as wide as temple medially (Figs. 3B, 21B). Hind femur 4.0–4.5 × as long as its maximum width (Figs. 4C, 22C). First metasomal tergite 0.8–2.0 × as long as its apical width (Figs. 4B, 22B). Propodeal spiracles small, its diameter 0.2–0.3 × as wide as distance from spiracle to anterior margin of propodeum (Figs. 4B, 22A).	D. floridensis (Shenefelt)
3(2).	First metasomal tergite 2.0 × as long as its apical width (Fig. 22B). Eye in lateral view 2.0 × as wide as temple medially (Fig. 21B). Mandible as long as its maximum width (Fig. 21C). First flagellar segment 2.5 × as long as its maximum width (Fig. 21D). Apical flagellar segments same colour as middle segments (Fig. 21D). Hind femur 4.0 × as long as its maximum width (Fig. 22C). Antenna 20-segmented. Body length 1.7 mm. U.S.A.	D. lobidens (Fischer)
-	First metasomal tergite 0.8 × as long as its apical width (Fig. 4B). Eye in lateral view 3.8 × as wide as temple medially (Fig. 3B). Mandible 1.3 × as long as its maximum width (Fig. 3C). First flagellar segment 4.0 × as long as its maximum width (Fig. 3D). Apical flagellar segments paler than middle segments (Fig. 3D). Hind femur 4.5 × as long as its maximum width (Fig. 4C). Antenna 21-segmented. Body length 1.6 mm. U.S.A.	D. armillariae (Fischer)
4(1).	Propodeum with distinctly delineated areola (Figs. 30A, 40F).	5
-	Propodeum without delineated areola	6
5(1).	Two teeth of mandible visible in lateral view (Fig. 40A). Mandible 1.7 × as long as its maximum width (Fig. 40A). Apical flagellar segments same colour as middle segments (Fig. 40C). First flagellar segment 2.5–3.0 × as long as its maximum width (Fig. 40C). Eye in lateral view 1.3 × as wide as temple medially (Fig. 40E). First metasomal tergite 1.4 × as long as its apical width (Fig. 41A). Antenna 17-segmented. Body length 1.6–2.0 mm. Brazil	D. subbidentatum Peris-Felipo
-	Three teeth of mandible visible in lateral view (Fig. 29C). Mandible 1.3 × as long as its maximum width (Fig. 29C). Apical flagellar segments paler than middle segments (Fig. 29D). First flagellar segment 3.5 × as long as its maximum width (Fig. 29D). Eye in lateral view 1.8 × as wide as temple medially (Fig. 29F). First metasomal tergite 3.0 × as long as its apical width (Fig. 30B). Antenna 23-segmented. Body length 2.0–2.2 mm. Brazil	D. plaumanni Peris-Felipo
6(4).	Mesoscutal pit absent (Figs. 13F, 23F, 31F).	7
-	Mesoscutal pit present.	9
7(6).	Precoxal sulcus long, reaching anterior margin of mesopleuron (Fig. 31B). Posterior mesopleural furrow completely crenulated (Fig. 31B). First metasomal tergite 1.5 × as long as its apical width (Fig. 32A). Propodeal spiracles large, its diameter 0.6 × as wide as distance from spiracle to anterior margin of propodeum (Fig. 32A). Antenna 18-segmented. Body length 2.2 mm. U.S.A	D. saileri (Fischer)
-	Precoxal sulcus short, not reaching anterior margin of mesopleuron (Figs. 21B, 23B). Posterior mesopleural furrow mainly smooth or weakly crenulated below (Figs. 21B, 23B). First metasomal tergite 2.1–2.5 × as long as its apical width (Figs. 22B, 24B). Propodeal spiracles small, its diameter 0.2–0.3 × as wide as distance from spiracle to anterior margin of propodeum (Figs. 22A, 24A).	8
8(7).	First metasomal tergite 2.1 × as long as its apical width (Fig. 14A). Eye in lateral view as wide as temple medially (Fig. 13B). First flagellar segment 3.3 × as long as its maximum width (Fig. 13D). Apical flagellar segment 3.6 × as long as its maximum width (Fig. 13D). Face 2.3 × as wide as high (Fig. 13E). Propodeum mainly or widely smooth and with complete median longitudinal carina (Fig. 14A). Antenna 19-segmented. Body length 1.2 mm. U.S.A	D. ephemera (Viereck)
-	First metasomal tergite 2.5 × as long as its apical width (Fig. 24B). Eye in lateral view 1.3 × as wide as temple medially (Fig. 23B). First flagellar segment 3.0 × as long as its maximum width (Fig. 23D). Apical flagellar segment 2.7 × as long as its maximum width (Fig. 23D). Face 2.6 × as wide as high (Fig. 23D). Propodeum widely or entirely sculptured (Fig. 24A). Antenna 23-segmented. Body length 2.2 mm.] U.S.A	D. longibasis (Fischer)
9(6).	Propodeal spiracles large, its diameter 0.6–0.7 × as wide as distance from spiracle to anterior margin of propodeum (Figs. 34A, 36A).	10
-	Propodeal spiracles small, its diameter 0.2–0.3 × as wide as distance from spiracle to anterior margin of propodeum.	11
10(9).	Mandible 0.9 × as long as its maximum width (Fig. 35C). Hind femur 4.0 × as long as its maximum width (Fig. 36B). First metasomal tergite 2.0 × as long as its apical width (Fig. 36A). Eye in lateral view as wide as temple medially (Fig. 35B). Face 2.4 × as wide as high (Fig. 35E). Antenna 19-segmented. Body length 1.8 mm. U.S.A	D. signifrons Viereck
-	Mandible 1.2 × as long as its maximum width (Fig. 33C). Hind femur 3.4 × as long as its maximum width (Fig. 34B). First metasomal tergite 1.6 × as long as its apical width (Fig. 34A). Eye in lateral view 1.3 × as wide as temple medially (Fig. 33B). Face 2.7 × as wide as high (Fig. 33E). Antenna with more than 15 segments (apical segments missing). Body length 2.3 mm. U.S.A.	D. shannoni (Fischer)
11(9).	Posterior mesopleural furrow completely crenulated (Fig. 42B). Antenna 26-segmented. Body length 2.9 mm. U.S.A.	D. sylvaticae (Fischer)
-	Posterior mesopleural furrow smooth.	12
12(11).	First metasomal tergite 1.5–2.0 × as long as its apical width.	13
-	First metasomal tergite 2.3–3.9 × as long as its apical width.	18
13(12).	Mandible 1.7 × as long as its maximum width (Fig. 11C). First flagellar segment 2.2 × as long as its maximum width (Fig. 11D). Antenna with more than 14 segments (apical segments missing). Body length 1.6 mm.] U.S.A.	D. disstriae (Fischer)
-	Mandible 1.0–1.3 × as long as its maximum width. First flagellar segment 3.0–4.0 × as long as its maximum width.	14
14(13).	First flagellar segment 3.0–3.2 × as long as its maximum width (Figs. 5D, 9D).	15
-	First flagellar segment 3.8–4.0 × as long as its maximum width (Fig. 1D).	17
15(14).	Mandible as long as its maximum width (Fig. 5C). First metasomal tergite 1.5 × as long as its apical width (Fig. 5D). Hind femur 3.5–3.6 × as long as its maximum width (Fig. 6D). [Antenna 17–20-segmented. Body length 1.6 mm.] U.S.A.	

- *D. caudatulum* (Fischer)
- Mandible 1.2–1.3 × as long as its maximum width (Figs. 9C, 27C). First metasomal tergite 1.8–2.0 × as long as its apical width (Figs. 10B, 27D). Hind femur 3.8–3.9 × as long as its maximum width (Figs. 10C, 28B). **16**
 - 16(15). Propodeum mainly or widely smooth, with complete median longitudinal carina (Fig. 28A). Face 2.2 × as wide as high (Fig. 27E). Clypeus 3.1 × as wide as high (Fig. 27E). Prescutellar depression (scutellar sulcus) without lateral carinae (Fig. 27F). Radial (marginal) cell 4.0 × as long as its maximum width. Vein r2 (3-SR) 3.3 × as long as vein cuq1 (2-SR) (Fig. 28C). Antenna 24-segmented. Body length 1.8 mm. U.S.A. *D. pauperum* (Fischer)
 - Propodeum mainly sculptured, with complete median longitudinal carina (Fig. 10A). Face 1.5 × as wide as high (Fig. 9E). Clypeus 2.1 × as wide as high (Fig. 9E). Prescutellar depression (scutellar sulcus) with lateral carinae (Fig. 9F). Radial (marginal) cell 3.6 × as long as its maximum width. Vein r2 (3-SR) 2.1 × as long as vein cuq1 (2-SR) (Fig. 10D). Antenna 22-segmented. Body length 2.0 mm. U.S.A. *D. communis* (Fischer)
 - 17(14). Propodeum sculptured, without median longitudinal carinae and with carinae reaching propodeal edges (Fig. 19F). First flagellar segment 4.0 × as long as its maximum width. Radial (marginal) cell 3.6 × as long as its maximum width. Vein r3 (SR1) 2.2 × as long as vein r2 (3-SR) (Fig. 20B). [Antenna completely missing.] Body length 1.9–2.1 mm. Canada, U.S.A. *D. latitergum* (Fischer)
 - Propodeum mainly smooth with complete median longitudinal carinae and with short subtransverse carinae emerging from median carina, but far distant from propodeal edges (Fig. 2B). First flagellar segment 3.3 × as long as its maximum width (Fig. 1D). Radial (marginal) cell 4.3 × as long as its maximum width. Vein r3 (SR1) 2.7 × as long as vein r2 (3-SR) (Fig. 2E). Antenna 20-segmented. Body length 1.8 mm. Canada, U.S.A. *D. angusticorne* (Fischer)
 - 18(12). First flagellar segment 5.5 × as long as its maximum width (Fig. 44D). Face 1.2 × as wide as high (Fig. 44C). [Antenna 18-segmented. Body length 1.3–1.4 mm]. Brazil. *D. teutoniaense* Peris-Felipo
 - First flagellar segment 3.0–3.8 × as long as its maximum width. Face 1.7–1.9 × as wide as high. **19**
 - 19(18). First metasomal tergite 2.3–2.5 × as long as its apical width. First flagellar segment 3.0–3.2 × as long as its maximum width. Eye in lateral view 1.1–1.2 × as wide as temple medially. **20**
 - First metasomal tergite 3.1–3.9 × as long as its apical width. First flagellar segment 3.5–3.8 × as long as its maximum width. Eye in lateral view 1.5–1.9 × as wide as temple medially. **21**
 - 20(19). Propodeum completely sculptured, without longitudinal and subtransverse carinae (Fig. 38B). Prescutellar depression (scutellar sulcus) with lateral carinae (Fig. 38A). Vein r2 (3-SR) 2.4 × as long as vein cuq1 (2-SR); vein r3 (SR1) 2.6 × as long as vein r2 (3-SR) (Fig. 38D). Antenna with more than 13 segments (apical segments missing). Body length 1.4 mm. Canada, U.S.A. *D. stenostigma* (Provancher)
 - Propodeum mainly smooth with complete median longitudinal carinae and with short subtransverse carinae emerging from median carina, but far distant from propodeal edges (Fig. 8B). Prescutellar depression (scutellar sulcus) without lateral carinae (Fig. 8A). Vein r2 (3-SR) 2.7 × as long as vein cuq1 (2-SR); vein r3 (SR1) 2.1 × as long as vein r2 (3-SR) (Fig. 8E). Antenna more than 12-segmented (apical segments missing). Body length 2.0 mm. U.S.A. *D. clayensis* (Fischer)
 - 21(19). First metasomal tergite 3.1 × as long as its apical width (Fig. 26E). First flagellar segment 3.8 × as long as its maximum width (Fig. 25E). Head in dorsal view 1.6 × as wide as median length (Fig. 26A). Clypeus 2.3 × as wide as high (Fig. 25F). Propodeum completely sculptured, without median longitudinal carina (Fig. 26D). Antenna 23-segmented. Body length 1.5–2.0 mm. Argentina, Brazil. *D. multiareolatum* Peris Felipo
 - First metasomal tergite 3.9 × as long as its apical width (Fig. 18B). First flagellar segment 3.5 × as long as its maximum width (Fig. 17D). Head in dorsal view 2.0 × as wide as median length (Fig. 17D). Clypeus 3.5 × as wide as high (Fig. 17E). Propodeum mainly smooth and with complete median longitudinal carina (Fig. 18A). Antenna 17-segmented. Body length 2.6 mm. U.S.A. *D. foliformis* (Fischer)

Acknowledgments

We are very thankful to Robert Kula from Smithsonian National Museum of Natural History (Washington, USA); Gavin Broad from Natural History Museum (London, UK); and Dominique Zimmermann and Manuela Vizek from Naturhistorisches Museum (Vienna, Austria) for providing us with type material for study. Also, we want to thank Isabelle Zuecker, Eva Sprecher and Matthias Borer, Naturhistorisches Museum Basel, Switzerland, for their kindness and help during our work with the photosystem. The present study was partly supported for second author by the grant of the Russian Foundation for Basic Research (project No 16–04–00197) and the Russian State Research Project No. AAAA-A17-117030310210-3.

References

- Achterberg, C. van. (1988) The genera of the *Aspilota*-group and some descriptions of fungicolous Alysiini from the Netherlands (Hymenoptera: Braconidae: Alysiinae). *Zoologische Verhandelingen*, 247, 1–88.
- Achterberg, C. van (1993) Illustrated key to the subfamilies of the Braconidae (Hymenoptera: Ichneumonoidea). *Zoologische Verhandelingen*, 283, 1–189.

- Dalla Torre, C.D. (1898) *Catalogus Hymenopterorum*. Vol. IV. Braconidae. Guilelmi Engelmann, Lipsiae, 323 pp.
- Fischer, M. (1971) Über nordamerikanische Arten der Gattungen *Orthostigma* Ratzeburg und *Aspilota* Foerster (Hymenoptera, Braconidae, Alysiniinae). *Acta Entomologica Musei Nationalis Pragae*, 38 (1969a), 81–114.
- Fischer, M. (1969b) Revision der nearktischen *Aspilota* Arten der *signifrons*-Gruppe (Hymenoptera, Braconidae, Alysiniinae). *Sitzungsberichte der Osterreichischen Akademie der Wissenschaften Mathematisch*, 1 (178), 243–259.
- Fischer, M. (1969c) Die nearktischen *Aspilota*-Arten der *petiolata*-Gruppe (Hymenoptera, Braconidae, Alysiniinae). *Bollettino del Laboratorio di Entomologia Agraria 'Filippo Silvestri' Portici*, 27, 55–78.
- Fischer, M. (1969d) Die nearktischen Arten der *Aspilota columbiana*-Gruppe und der *Aspilota smithi*-Gruppe. *Redia*, 51, 187–209.
- Fischer, M. (1971) Revision der nearktischen *Aspilota*-Arten der Sektion D und Ergänzungen zu anderen Arten-gruppen. *Annalen des Naturhistorischen Museums in Wien*, 74, 91–127.
- Fischer, M. (1972) Erste Gliederung der palaearktischen *Aspilota*-Arten (Hymenoptera, Braconidae, Alysiniinae). *Polskie Pismo Entomologiczne*, 42 (2), 323–459.
- Gahan, A.B. (1913) Identify of *Scotionerus stenostigma* Prov. *Proceedings of the Entomological Society of Washington*, 15, 38–40.
- Gimeno, C., Belshaw, R. & Quicke, D.L.J. (1997) Phylogenetic relationships of the Alysiniinae/Opiinae (Hymenoptera: Braconidae) and the utility of cytochrome b, 16S and 28S D2 rRNA. *Insect Molecular Biology*, 6 (3), 273–284.
<https://doi.org/10.1046/j.1365-2583.1997.00181.x>
- Griffiths, G.C.D. (1964) The Alysiniinae (Hym., Braconidae) parasites of the Agromyzidae (Diptera). I. General questions of taxonomy, biology and evolution. *Beiträge zur Entomologie*, 14 (7–8), 823–914.
- Griffiths, G.C.D. (1966a) The Alysiniinae (Hym., Braconidae) parasites of the Agromyzidae (Diptera). II. The parasites of *Agromyza* Fallén. *Beiträge zur Entomologie*, 16 (5–6), 551–605.
- Griffiths, G.C.D. (1966b) The Alysiniinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera). III. The parasites of *Paraphytomyza* Enderlein, *Phytagromyza* Hendel and *Phytomyza* Fallén. *Beiträge zur Entomologie*, 16 (7–8), 775–951.
- Griffiths, G.C.D. (1968a) The Alysiniinae (Hym. Braconidae) parasites of the Agromyzidae (Diptera). V. The parasites of *Liriomyza* Mik and certain small genera of Phytomyzinae. *Beiträge zur Entomologie*, 18 (1–2), 5–62.
- Griffiths, G.C.D. (1968b) The Alysiniinae (Hym., Braconidae) parasites of the Agromyzidae (Diptera). VII. The parasites of *Cerodontha* Rondani s.l. *Beiträge zur Entomologie*, 18, 63–152.
- Griffiths, G.C.D. (1984) The Alysiniinae (Hym., Braconidae) parasites of the Agromyzidae (Diptera). VII. Supplement. *Beiträge zur Entomologie*, 34 (2), 343–362.
- Marsh, P.M. (1979) Braconidae. Aphidiinae. Hybrizontidae. In: Krombein, K.V., Hurd Jr. P.D., Smith, D.R. & Burks, B.D. (Eds.), *Catalog of Hymenoptera in America north of Mexico*. Smithsonian Institution Press, Washington, pp. 144–313.
- Muesebeck, C.F.W. & Walkey, L.M. (1951) Family Braconidae. In: Muesebeck, C.F.W., Krombein, K.V. & Townes, H.K. (Eds.), *Hymenoptera of America North of Mexico—Synoptic catalog*. Vol. 2. U.S. Dept. Agriculture, U.S.A., pp. 90–184.
- Peris-Felipo, F.J., Belokobylskij, S.A. & Jiménez-Peydró, R. (2014) Revision of the Western Palearctic species of the genus *Dinotrema* Foerster, 1862 (Hymenoptera, Braconidae, Alysiniinae). *Zootaxa*, 3885 (1), 1–483.
<https://doi.org/10.11646/zootaxa.3885.1.1>
- Peris-Felipo, F.J. & Belokobylskij, S.A. (2016a) Afrotropical species of the genus *Dinotrema* Foerster, 1862 (Hymenoptera, Braconidae, Alysiniinae) with description of three new taxa and a key for determination. *Bulletin of Insectology*, 69 (1), 93–106.
- Peris-Felipo, F.J. & Belokobylskij, S.A. (2016b) First record of the genus *Dinotrema* Foerster, 1862 (Hymenoptera, Braconidae, Alysiniinae) from the Neotropical region with description of four new species and a key to the New World taxa. *European Journal of Taxonomy*, 179, 1–23.
<https://doi.org/10.5852/ejt.2016.179>
- Provancher, L. (1883) Faune Canadienne. Hyménoptères. Additions et corrections *Naturaliste Canadien*, 14, 3–20.
- Provancher, L. (1886) *Additions et corrections au Volum II de la Faune Entomologique du Canada*. Traitant des Hyménoptères, Québec, 475 pp.
- Provancher, L. (1889) Additions a la faune hymenopterologique. *Naturaliste Canadien*, 17, 273–440.
- Shenefelt, R.D. (1974) Pars II. Braconidae 7. Alysiniinae. In: Vecht, J. van der & Shenefelt, R.D. (Eds.), *Hymenopterorum Catalogus. Nova Editio*. Dr. W. Junk BV, The Hague, pp. 937–1113
- Tobias, V.I. (2003) Species of the genus *Dinotrema* Foerster, 1862 (Hymenoptera, Braconidae, Alysiniinae) without prescutellar pit and with smooth or only medially sculptured propodeum from Russia and adjacent territories. *Entomological Review*, 83 (3), 279–294.
- Tobias, V.I. (2004a) Species of the genus *Dinotrema* Foerster (Hymenoptera, Braconidae, Alysiniinae) without prescutellar pit and with a widely sculptured propodeum and short mandibles from Russia and neighboring territories. *Entomological Review*, 84 (2), 216–232.
- Tobias, V.I. (2004b) Two new species of the braconid genus *Dinotrema* Foerster (Hymenoptera, Braconidae, Alysiniinae) without prescutellar pit. *Entomological Review*, 84 (6), 673–676.
- Tobias, V.I. (2006) Palearctic species of the genus *Dinotrema* Foerster (Hymenoptera, Braconidae, Alysiniinae) with prescutellar pit and long ovipositor. *Entomological Review*, 86 (3), 324–336.
<https://doi.org/10.1134/S0013873806030092>

- Viereck, H.L. (1906) Notes and descriptions of Hymenoptera from western United States. *Transactions of the American Entomological Society*, 32, 173–247.
- Viereck, H.L. (1917) Guide to the insects of Connecticut. Part III. The Hymenoptera, or wasp-like insects of Connecticut. Ichneumonoidea. State of Connecticut. *State Geological and Natural History Survey*, No. 22, 1–824.
- Wharton, R.A. (1980) Review of New World Alysiini (Hymenoptera: Braconidae) with discussion of generic relationships within the Tribe. *University of California Publications in Entomology*, 88, 1–104.
- Wharton, R.A. (2002) Revision of the Australian Alysiini (Hymenoptera: Braconidae). *Invertebrate Systematics*, 16 (1), 7–105. <https://doi.org/10.1071/IT01012>
- Yu, D.S., van Achterberg, C. & Horstman, K. (2012) *Taxapad 2012, Ichneumonoidea 2011. Database on flash-drive*. Ottawa, Ontario, Canada.
- Zaldivar-Riverón, A., Mori, M. & Quicke, D.L.J. (2006) Systematics of the cyclostome subfamilies of braconid parasitic wasps (Hymenoptera: Ichneumonoidea): A simultaneous molecular and morphological Bayesian approach. *Molecular Phylogenetics and Evolution*, 38 (1), 130–145. <https://doi.org/10.1016/j.ympev.2005.08.006>