



The genus *Aspilota* Foerster (Hymenoptera: Braconidae: Alysiinae) in western Asia

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ABSTRACT. New data for the genus *Aspilota* Foerster, 1863 (Braconidae: Alysiinae) of the Western Asia are provided. Four species, *A. flagimilis* Fischer, 1966, *A. insolita* (Tobias, 1962), *A. latitemporata* Fischer, 1976 and *A. nidicola* Hedqvist, 1972, are recorded for the first time from Iran. Illustrated re-descriptions of *Aspilota alfalfae* Fischer, Lashkari Bod, Rakhshani & Talebi, 2011, *A. delicata* Fischer, 1973, *A. flagimilis*, *A. insolita*, *A. latitemporata*, and *A. nidicola* are presented. A key to the Western Asian species of *Aspilota* is provided.

Key words: Parasitoids of Diptera, Alysiinae, *Aspilota*, western Asia, Iran, re-descriptions, key.

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Introduction

Aspilota genera-complex is the most taxonomically complicate group within the tribe Alysiinae (Hym., Braconidae), mainly because of very small body size and their reduced number of reliable diagnostic characters (Belokobylskij 2005). With about 750 species described worldwide (Yu *et al.* 2012), this group includes the following genera: *Adelphenaldis* Fischer, 2003, *Alithia* Cameron, 1906, *Aspilota* Foerster, 1863, *Carinthilota* Fischer, 1975, *Cubitalostigma* Fischer, 1998, *Dinostigma* Fischer, 1966,

Dinotrema Foerster, 1863 (including *Pterusa* Fischer, 1958), *Eudinostigma* Tobias, 1986, *Grandilota* Fischer, 2002, *Leptotrema* van Achterberg, 1988, *Lysodinotrema* Fischer, 1995, *Neorthostigma* Belokobylskij, 1998, *Orthostigma* Ratzeburg, 1844, *Panerema* Foerster, 1863, *Regetus* Papp, 1999, and *Synaldis* Foerster, 1863 (Peris-Felipo *et al.* 2014a, b, c).

The genus *Aspilota* is well defined in this group by the presence of the paraclypeal fovea reaching the inner margin of eye and the presence of the vein cuqu1 (2-SR) of the

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fore wing (van Achterberg 1988; Peris-Felipo and Belokobylskij 2016).

About 250 species were described in the genus *Aspilota* from nearly all zoogeographic regions. However, only three species have been previously recorded in the western Asia (Yu *et al.* 2012; Gadallah *et al.* 2015; Peris-Felipo *et al.* 2016a). Farahani *et al.* (2016) also recorded *Aspilota intermissa* Fischer, 1974, from Iran, however, according to the revision by Peris-Felipo *et al.* (2014a) this species actually belongs to the genus *Dinotrema*. In this work, additional species of the genus *Aspilota* are recorded for Iran with re-descriptions of all the previously known species. Finally, an identification key to the western Asian species of *Aspilota* is provided.

Material and methods

For the terminology of the morphological features, sculpture and measurements, see Peris-Felipo *et al.* (2014a); for wing venation nomenclature, see Peris-Felipo *et al.* (2014a) and in parenthesis van Achterberg (1993). The keys by Fischer (1976, 1978), Belokobylskij and Tobias (2007) and Papp (2008) were used for the identification of the *Aspilota* species. The material was imaged using Digital Microscope Keyence® VHX-2000 and then processed in Adobe Photoshop® imaging system. The following abbreviations are used for morphological terminology: POL: postocellar line; OOL: ocular-ocellar line; OD: maximum diameter of lateral ocellus. Abbreviations used for the collections where material is deposited are: Department of Entomology, Tarbiat Modares University (Tehran, Iran; TMUC), Entomological Collection at the University of Valencia (Valencia, Spain; ENV), Natural History Museum London (London, UK; BMNH), Naturhistorisches Museum Wien (Vienna, Austria; NHMW), Swedish Museum of Natural History (Stockholm,

Sweden; NHRS), and Zoological Institute of the Russian Academy of Sciences (St Petersburg, Russia; ZISP).

Results

Seven species of *Aspilota* are recorded from the Western Asia. All these taxa are re-described, illustrated and keyed. The species are listed alphabetically below.

Order Hymenoptera

Family Braconidae

Subfamily Alysiinae

Genus *Aspilota* Foerster, 1863

Aspilota alfalfae Fischer, Lashkari Bod, Rakhshani & Talebi, 2011 (Figs. 1, 2)

Aspilota alfalfae Fischer, Lashkari Bod, Rakhshani & Talebi, 2011: 128; Khajeh *et al.*, 2014: 415; Gadallah *et al.*, 2015: 4; Peris-Felipo *et al.*, 2016a: 126; Farahani *et al.*, 2016: 5.

Material examined. IRAN: 1 ♀ (holotype), [Fars province], Zarghan, swept on *Medicago sativa* L., 20.v.2008 (Lashkari leg.) (NHMW); 1 ♀, Khuzistan [province], Desful [Dezful], iii-iv.1978, yellow tray (V.F. Eastop leg.) [B.M. 1975-46] (BMNH).

Re-description. Female (holotype). Body length 2.0 mm; fore wing length 1.9 mm; hind wing length 1.5 mm.

Head. In dorsal view 1.8 times as wide as its median length, 1.4 times as wide as mesoscutum, smooth, with temple rounded behind eyes. Eye in lateral view 1.7 times as high as its width and 0.7 times as wide as temple, medially. POL 1.2 times OD; OOL 3.9 times OD. Face 1.6 times as wide as high; inner margins of eyes subparallel. Clypeus 2.1 times as wide as high, slightly concave ventrally. Mandible 3-dentate, not widened towards apex, parallel sides, 1.2 times as long as its maximum width.



Figure 1. *Aspilota alfalfae* Fischer, Lashkari Bod, Rakhshani & Talebi (female, holotype): **A.** Habitus, lateral view; **B.** Head, front view; **C.** Mandible; **D.** Antenna; **E.** Head and mesosoma, lateral view; **F.** Head and mesonotum, dorsal view.

Upper tooth distinctly shorter than lower tooth, small and rounded; middle tooth rather long and narrow, longer than lower tooth, pointed apically; lower tooth widest, rounded, distinctly turned downwards. Antennae 15-segmented, shorter than body. Scape 2.2 times longer than pedicel. First flagellar segment 3.3 times as long as

its apical width, 1.3 times as long as second segment. Second and third flagellar segments 2.0 times as long as its maximum width; fourth and fifth segments 1.6 times, sixth to tenth segments 1.4 times, 11th to 13th segments 1.7 times, and 15th (apical) segment 2.5 times as long as their width accordingly.



Figure 2. *Aspilota alfalfae* Fischer, Lashkari Bod, Rakhshani & Talebi (female, holotype): **A.** Propodeum; **B.** First metasomal tergite; **C.** Hind leg, metasoma and ovipositor, lateral view; **D.** Fore and hind wings.

Mesosoma. In lateral view 1.2 times as long as high. Mesoscutum (dorsal view) 0.8 times as long as its maximum width, smooth. Notauli mainly absent on horizontal surface of mesoscutum. Mesoscutal pit absent. Prescutellar depression smooth, without lateral carinae. Precoxal sulcus present, crenulate, not reaching anterior and posterior margins of mesopleuron. Posterior mesopleural furrow crenulate in upper half, smooth in lower half. Propodeum widely sculptured without distinct longitudinal median carinae. Propodeal spiracles relatively small.

Wings. Length of fore wing 2.6 times as long as its maximum width. Radial (marginal) cell ending at apex of wing, 4.1 times as long as its maximum width. Vein r_2 (3-SR) 2.0 times as long as vein cu_{1+2} (2-SR); vein r_3 (SR1) 2.5 times as long as vein

r_2 (3-SR). Brachial (first subdiscal) cell closed distally, 2.2 times as long as its maximum width. Hind wing 4.2 times as long as its maximum width.

Legs. Hind femur 4.5 times as long as its maximum width. Hind tibia weakly widened towards apex, 9.7 times as long as its maximum subapical width, 0.9 times as long as hind tarsus. First segment of hind tarsus 1.8 times as long as second segment.

Metasoma. First tergite long, slightly widened towards apex, 1.4 times as long as its apical width, finely rugose-striate in apical half. Ovipositor 1.5 times as long as first tergite, 0.4 times as long as metasoma, 0.8 times as long as hind femur, 0.07 times as long as fore wing.

Colour. Body light brown. Antenna mainly and pterostigma brown. Scape, pedicel,

mandibles and legs yellowish brown. Wings hyaline.

Variation. Body length 2.0–2.1 mm; fore wing length 1.9–2.0 mm. Antennae 15–17-segmented. Eye in lateral view 0.6–0.7 times as wide as temple medially. Hind femur 4.3–4.5 times as long as its maximum width. First metasomal tergite 1.4–1.5 times as long as its apical width.

Male. Unknown.

Comparative diagnosis. This species is similar to *Aspilota latitemporata* Fischer, 1969, but differs from it in having the precoxal sulcus not reaching anterior and posterior margins of the mesopleuron (reaching anterior and posterior margins in *A. latitemporata*), first flagellar segment 3.3 times as long as its maximum width (3.8 times in *A. latitemporata*), hind femur 4.5 times as long as its maximum width (3.5 times in *A. latitemporata*), first metasomal tergite 1.4 times as long as its apical width (1.8 times in *A. latitemporata*), and clypeus 2.1 times as wide as high (2.6 times in *A. latitemporata*).

Distribution. Iran (Yu *et al.* 2012).

***Aspilota delicata* Fischer, 1973 (Figs. 3, 4)**

Aspilota delicata Fischer, 1973: 248; 1976: 357, Papp, 2007: 100; Ghahari *et al.*, 2011: 1271; Yu *et al.*, 2012; Peris-Felipo, 2013: 96; Peris-Felipo *et al.*, 2014b: 7; Khajeh *et al.*, 2014: 415; Gadallah *et al.*, 2015: 4; Broad *et al.*, 2016: 22; Peris-Felipo *et al.*, 2016a: 126; Farahani *et al.*, 2016: 5.

Material examined. AUSTRIA: 1 ♀ (holotype), Salzburg, Parsch, an Waldlichtung, 9.x.1961 (P.P. Babiý leg.) (NHMW); 1 ♀ (paratype), same locality but, an Gebuesch, 24.x.1961 (P.P. Babiý leg.) (NHMW). IRAN: 1 ♀, Kerman province, Lalezar, 29°3'52.57"N, 56°47'49.93"E, 2706 m, 27.vi.2013 (A. Ameri leg.) (TMUC); 1 ♀, Hormozgan province, Zakin, 27°51'08.33"N, 56°19'03.68"E, 1335 m, 11.iv.2013 (A. Ameri leg.) (TMUC).

Re-description. Female (holotype). Body length 1.6 mm; fore wing length 2.4 mm; hind wing length 1.7 mm.

Head. In dorsal view twice as wide as its median length, 1.5 times as wide as mesoscutum, smooth, with temple rounded behind eyes. Eye in lateral view 0.9 times as high as its width and 0.7 times as wide as temple, medially. POL 2.0 times OD; OOL 4.0 times OD. Face 1.8 times as wide as high; inner margins of eyes subparallel. Clypeus 2.7 times as wide as high, slightly concave, ventrally. Mandible 3-dentate, not widened towards apex, parallel-sided, 1.4 times as long as its maximum width. Upper tooth distinctly shorter than lower tooth, small and rounded; middle tooth rather long and narrow, longer than lower tooth, pointed apically; lower tooth widest, rounded, weakly turned downwards. Antennae 18-segmented, as long as body. Scape 2.2 times longer than pedicel. First flagellar segment 4.0 times as long as its apical width, 1.1 times as long as second segment. Second flagellar segment 3.0 times as long as its maximum width; third to tenth segments 2.0 times, 11th to 15th segments 1.1–1.2 times, and 16th (apical) segment 1.8 times as long as their width accordingly.

Mesosoma. In lateral view, 1.2 times as long as high. Mesoscutum (dorsal view) as long as its maximum width, smooth. Notauli mainly absent on horizontal surface of mesoscutum. Mesoscutal pit absent. Prescutellar depression smooth, without lateral carinae. Precoxal sulcus present, crenulate, not reaching anterior and posterior margins of mesopleuron. Posterior mesopleural furrow crenulate. Propodeum with pentagonal areola. Propodeal spiracles relatively small.

Wings. Length of fore wing 2.7 times as long as its maximum width. Radial (marginal) cell ending at apex of wing, 4.3 times as long as its maximum width.



Figure 3. *Aspilota delicata* Fischer (female, holotype): **A.** Habitus, lateral view; **B.** Head, front view; **C.** Mandible; **D.** Antenna; **E.** Head and mesosoma, lateral view; **F.** Head and mesonotum, dorsal view.

Vein r2 (3-SR) 2.5 times as long as vein cuqu1 (2-SR); vein r3 (SR1) 2.4 times as long as vein r2 (3-SR). Brachial (first subdiscal) cell closed distally, 2.5 times as long as its maximum width. Hind wing 4.3 times as long as its maximum width.

Legs. Hind femur 4.7 times as long as its maximum width. Hind tibia weakly widened towards apex, 9.5 times as long as its maximum subapical width, 1.1 times as long as hind tarsus. First segment of hind tarsus 1.7 times as long as second segment.



Figure 4. *Aspilota delicata* Fischer (female, holotype): **A.** Propodeum; **B.** First metasomal tergite; **C.** Hind leg, metasoma and ovipositor, lateral view; **D.** Fore and hind wings.

Metasoma. First tergite long, slightly widened towards apex, 2.0 times as long as its apical width, finely rugose-striate in apical half. Ovipositor 0.9 times as long as first tergite, 0.25 times as long as metasoma, 0.5 times as long as hind femur, 0.08 times as long as fore wing.

Colour. Body, antenna, and pterostigma brown. Mandibles and legs yellowish brown. Wings hyaline.

Variation. Body length 1.6–1.8 mm; fore wing length 2.4–2.5 mm; hind wing length 1.7–1.8 mm. Antennae 18–19-segmented. Hind femur 4.7–4.8 times as long as its maximum width.

Male. Unknown.

Comparative diagnosis. This species is similar to *Aspilota nidicola* Hedqvist, 1972,

but differs from it in having the first flagellar segment 4.0 times as long as its maximum width (3.3 times in *A. nidicola*), hind femur 4.7 times as long as its maximum width (4.2 times in *A. nidicola*), face 1.8 times as wide as high (1.5 times in *A. nidicola*) and clypeus 2.7 times as wide as high (2.3 times in *A. nidicola*).

Distribution. Austria, Denmark, England, Finland, Greece, Hungary, Iran, Ireland, Scotland, Spain, Sweden (Yu *et al.* 2012; Peris-Felipo 2013; Broad *et al.* 2016; Peris-Felipo *et al.* 2016b, Koponen *et al.* 2016).

***Aspilota flagimilis* Fischer, 1966** (Figs. 5, 6)

Aspilota flagimilis Fischer, 1996: 661; Fischer *et al.*, 2008: 1454; Yu *et al.*, 2012; Peris-Felipo, 2013: 97; Peris-Felipo *et al.*, 2014b: 7.

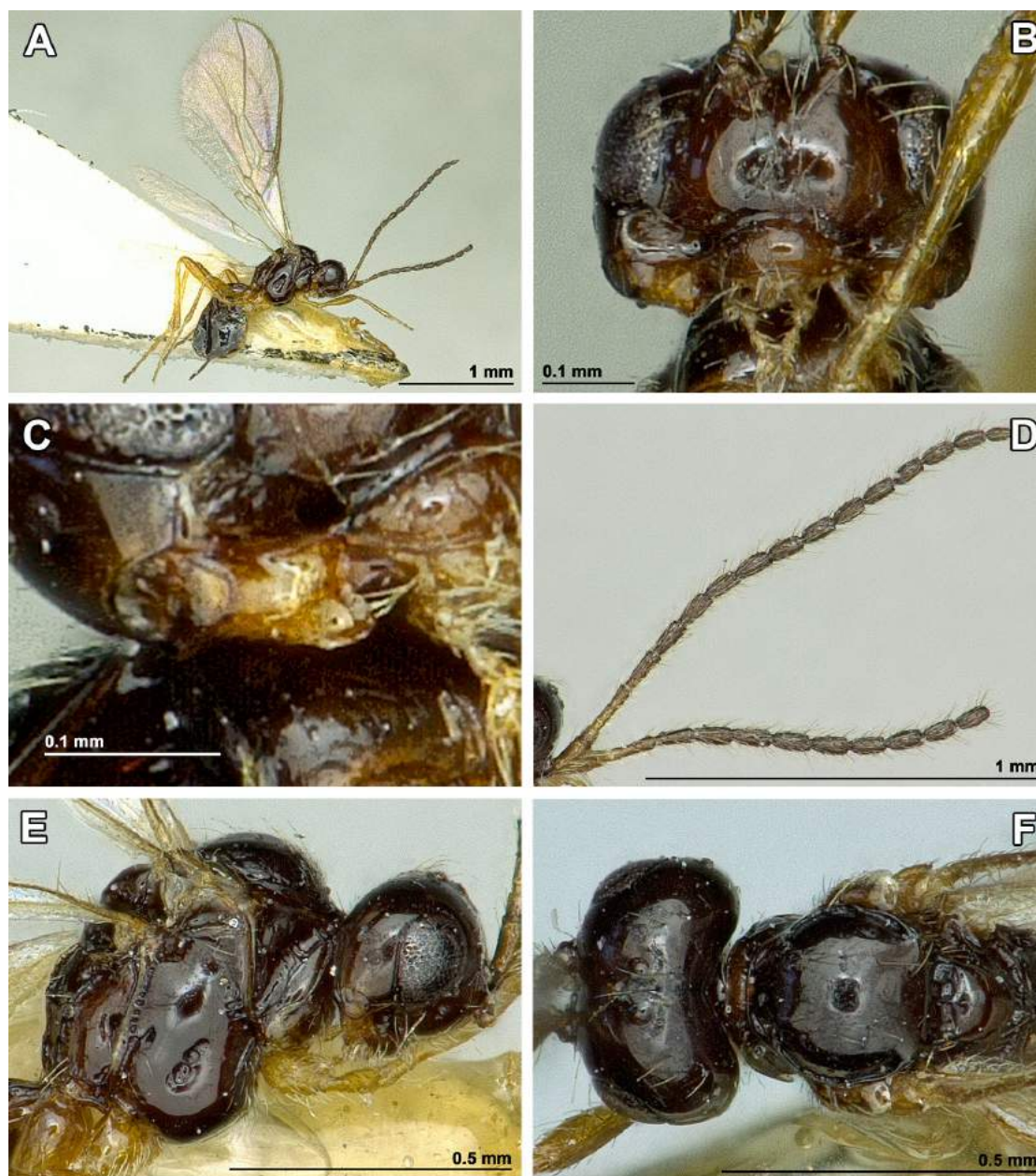


Figure 5. *Aspilota flagimilis* Fischer (female, holotype): **A.** Habitus, lateral view; **B.** Head, front view; **C.** Mandible; **D.** Antenna; **E.** Head and mesosoma, lateral view; **F.** Head and mesonotum, dorsal view.

Material examined. **SPAIN:** 1 ♀ (holotype), Sagunto, 12.iv.1960 (Docavo leg.) (NHMW). **IRAN:** 3 ♀♀, Isfahan province, Najafabad, swept on *Chenopodium* sp., 6.vi.2012 (E. Nader leg.) (ENV, NHMW).

Re-description. Female (holotype). Body length 1.5 mm; fore wing length 2.1 mm; hind wing length 1.5 mm.

Head. In dorsal view 1.9 times as wide as its median length, 1.5 times as wide as mesoscutum, smooth, with temple rounded behind eyes. Eye in lateral view 1.4 times as high as its width and about as wide as temple medially. POL 1.8 times OD; OOL 3.4 times OD. Face 1.8 times as wide as high; inner margins of eyes subparallel.



Figure 6. *Aspilota flagimilis* Fischer (female, holotype): **A.** Propodeum; **B.** First metasomal tergite; **C.** Hind leg, metasoma and ovipositor, lateral view; **D.** Fore and hind wings.

Clypeus 2.5 times as wide as high, slightly concave ventrally. Mandible 3-dentate, weakly widened towards apex, 1.8 times as long as its maximum width. Upper tooth distinctly shorter than lower tooth, small and rounded; middle tooth long and narrow, longer than lower tooth, pointed apically; lower tooth widest, rounded, distinctly turned downwards. Antennae 16-segmented, as long as body. Scape 2.6 times longer than pedicel. First flagellar segment 4.2 times as long as its apical width, 1.1 times as long as second segment. Second flagellar segment 3.6 times as long as its maximum width; 3rd segment 2.5 times, 4th to 6th segments 2.1–2.2 times, seventh to 13th segments 2.0 times, and 14th (apical) segment 2.8 times as long as their width accordingly.

Mesosoma. In lateral view, 1.2 times as long as high. Mesoscutum (dorsal view) as long as its maximum width, smooth. Notauli mainly absent on horizontal surface of mesoscutum. Mesoscutal pit absent. Prescutellar depression smooth, without lateral carinae. Precoxal sulcus present, crenulate, not reaching anterior and posterior margins of mesopleuron. Posterior mesopleural furrow crenulate in upper half, smooth in lower part. Propodeum with pentagonal areola. Propodeal spiracles relatively small.

Wings. Length of fore wing 2.7 times as long as its maximum width. Radial (marginal) cell ending at apex of wing, 4.1 times as long as its maximum width. Vein r2 (3-SR) 2.9 times as long as vein cuqu1 (2-SR); vein r3 (SR1) 2.2 times as long as

vein r2 (3-SR). Brachial (first subdiscal) cell closed distally, 3.2 times as long as its maximum width. Hind wing 6.0 times as long as its maximum width.

Legs. Hind femur 4.9 times as long as its maximum width. Hind tibia weakly widened towards apex, 10.7 times as long as its maximum subapical width, 1.2 times as long as hind tarsus. First segment of hind tarsus 2.3 times as long as second segment.

Metasoma. First tergite long, slightly widened towards apex, 2.4 times as long as its apical width, striate in apical half. Ovipositor 1.1 times as long as first tergite, 0.4 times as long as metasoma, 0.7 times as long as hind femur, 0.1 times as long as fore wing.

Colour. Body, antenna, and pterostigma brown. Mandibles and legs yellowish brown. Wings hyaline.

Variation. Body length 1.5–1.6 mm; fore wing length 2.0–2.1 mm; hind wing length 1.5–1.6 mm. Antennae 16–17-segmented. First flagellar segment 4.2–4.3 times as long as its maximum width. Second flagellar segment 3.0–3.2 times as long as its apical width. Hind femur 4.8–4.9 times as long as its maximum width. First metasomal tergite 2.4–2.5 times as long as its apical width.

Male. Unknown.

Comparative diagnosis. This species is similar to *Aspilota delicata* Fischer, 1973 and *A. nidicola* Hedqvist, 1972. *Aspilota flagimilis* differs from *A. delicata* in having the eye in lateral view about as wide as temple medially (0.7 times in *A. delicata*), mandible 1.8 times as long as its maximum width (1.4 times in *A. delicata*), posterior mesopleural furrow crenulate in upper half, smooth in lower part (completely crenulate in *A. delicata*), vein r2 (3-SR) 2.9 times as long as vein cuq1 (2-SR) (2.5 times in *A. delicata*), and first metasomal tergite 2.4 times as long as its apical width (2.0 times in *A. delicata*). On the other hand, *A. flagimilis* differs from *A. nidicola* in having the eye in lateral view about as wide as temple

medially (0.8 times in *A. nidicola*), mandible 1.8 times as long as its maximum width (1.3 times in *A. nidicola*), first flagellar segment 4.2 times as long as its maximum width (3.3 times in *A. nidicola*), posterior mesopleural furrow crenulate in upper half, smooth in lower part (completely crenulate in *A. nidicola*), vein r2 (3-SR) 2.9 times as long as vein cuq1 (2-SR) (2.3 times in *A. nidicola*), hind femur 4.9 times as long as its maximum width (4.2 times in *A. nidicola*), and first metasomal tergite 2.4 times as long as its apical width (1.8 times in *A. nidicola*).

Distribution. Spain (Yu *et al.* 2012), Iran (**new record**).

***Aspilota insolita* (Tobias, 1962) (Figs. 7, 8)**

Orthostigma insolita Tobias, 1962: 98; *Aspilota insolita*: Fischer, 1976: 353; Fischer *et al.*, 2008: 1454; Yu *et al.*, 2012; Peris-Felipo, 2013: 98; Peris-Felipo *et al.*, 2014b: 8; Broad *et al.*, 2016: 23.

Material examined. RUSSIA: 1 ♂ (holotype), "Tolmachevo, Leningradsk. [aya Province], Tobias [coll.], 18.VIII. [1]960" (ZISP). IRAN: 2 ♀♀, Kerman province, Delfard, 28°57'59.23"N, 57°38'34.73"E, 2068 m, 6 & 30.iv.2013 (A. Ameri leg.) (TMUC).

Re-description. Male (holotype). Body length 1.9 mm; fore wing length 2.1 mm; hind wing length 1.3 mm.

Head. In dorsal view, 1.6 times as wide as its median length, 1.6 times as wide as mesoscutum, smooth, with temple rounded behind eyes. Eye in lateral view 1.6 times as high as its width and about as wide as temple medially. POL 1.4 times OD; OOL 3.6 times OD. Face 1.5 times as wide as high; inner margins of eyes subparallel. Clypeus 2.0 times as wide as high, slightly concave ventrally. Mandible 3-dentate, not widened towards apex, 1.4 times as long as its maximum width. Upper tooth distinctly shorter than lower tooth, small and rounded; middle tooth long and narrow, longer than lower tooth, pointed apically; lower tooth wide, rounded, distinctly turned downwards.

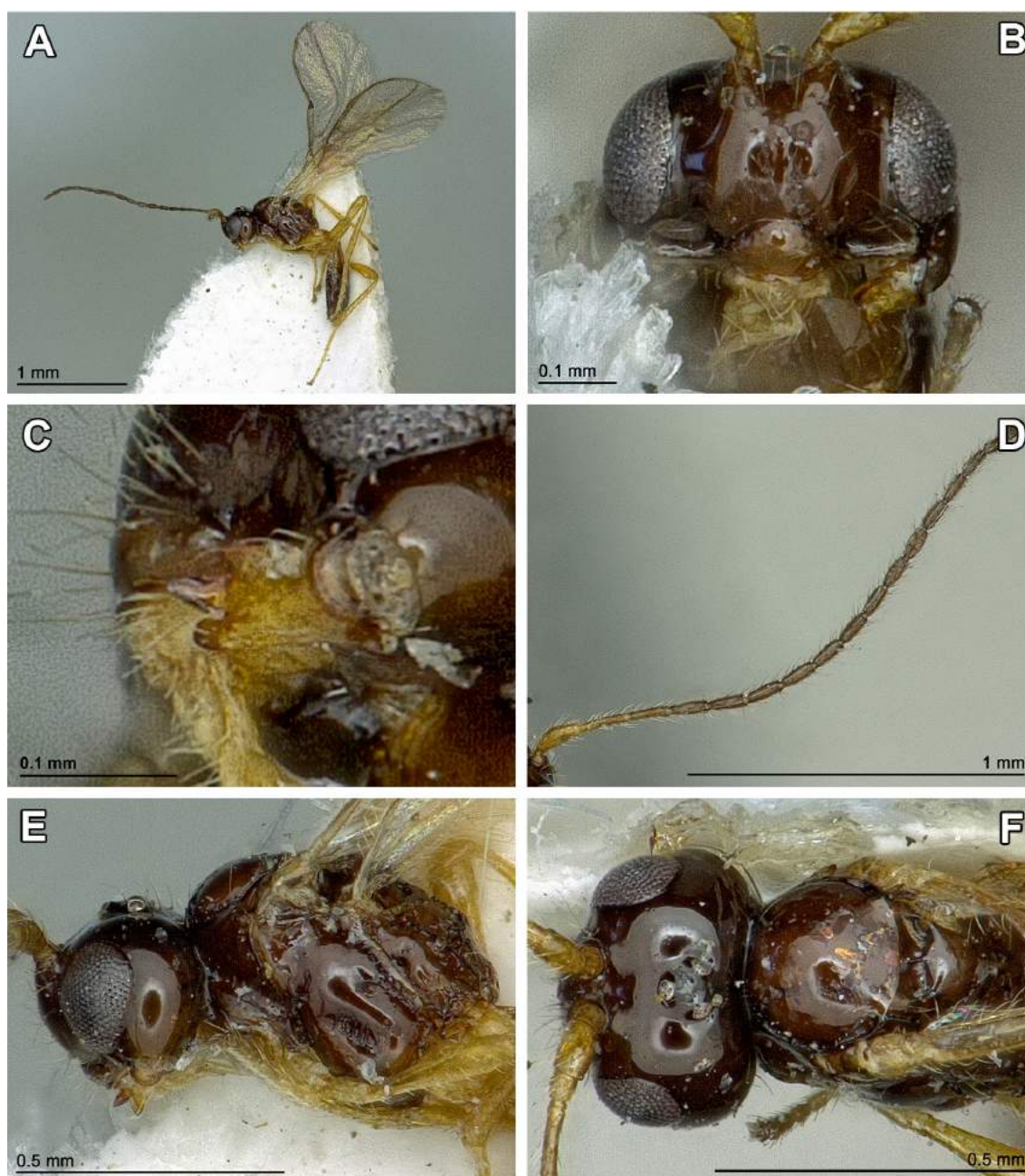


Figure 7. *Aspilota insolita* (Tobias) (male, holotype): **A.** Habitus, lateral view; **B.** Head, front view; **C.** Mandible; **D.** Antenna; **E.** Head and mesosoma, lateral view; **F.** Head and mesonotum, dorsal view.

Antennae 18-segmented, 0.9 times as long as body. Scape 2.0 times longer than pedicel. First flagellar segment 5.3 times as long as its apical width, 1.1 times as long as second segment. Second flagellar segment 4.6 times as long as its maximum width; third segment 3.2 times, fourth to sixth segments

2.6 times, seventh to 12th segments 2.4 times, 13th to 15th 2.2 times, and 16th (apical) segment 2.0 times as long as their width accordingly.

Mesosoma. In lateral view, 1.3 times as long as high. Mesoscutum (dorsal view) as long as its maximum width, smooth.

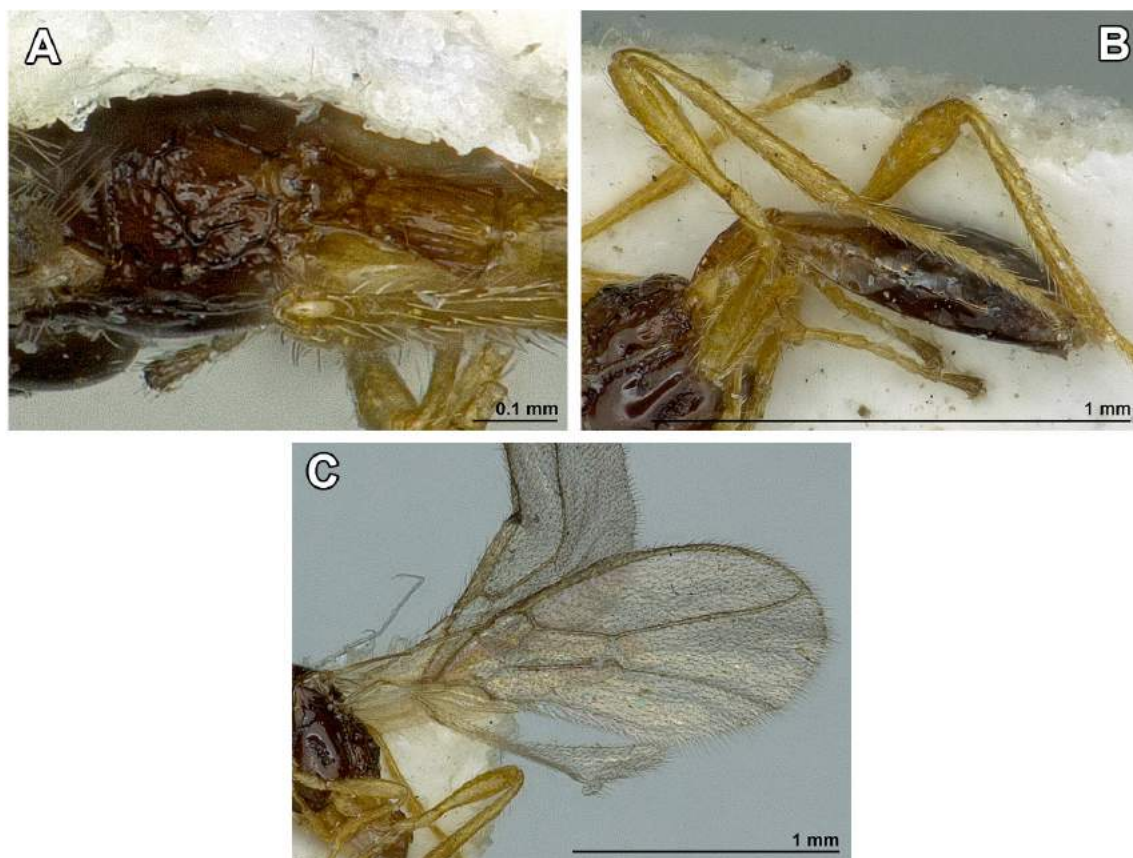


Figure 8. *Aspilota insolita* (Tobias) (male, holotype): **A.** Propodeum and first metasomal tergite; **B.** Hind leg and metasoma, lateral view; **C.** Fore wing.

Notauli mainly absent on horizontal surface of mesoscutum. Mesoscutal pit absent. Prescutellar depression smooth, without lateral carinae. Precoxal sulcus present, crenulate, not reaching anterior and posterior margins of mesopleuron. Posterior mesopleural furrow crenulate in upper half, smooth in lower part. Propodeum with pentagonal areola. Propodeal spiracles relatively small.

Wings. Length of fore wing 2.7 times as long as its maximum width. Radial (marginal) cell ending at apex of wing, 4.0 times as long as its maximum width. Vein r2 (3-SR) 1.9 times as long as vein cuqu1 (2-SR); vein r3 (SR1) 2.5 times as long as vein r2 (3-SR). Brachial (subdiscal) cell closed distally, 3.0 times as long as its maximum width. Hind wing 5.5 times as long as its maximum width.

Legs. Hind femur 4.1 times as long as its maximum width. Hind tibia weakly widened towards apex, 10.0 times as long as its maximum subapical width, 1.1 times as long as hind tarsus. First segment of hind tarsus 1.8 times as long as second segment.

Metasoma. First tergite long, slightly widened towards apex, 2.5 times as long as its apical width, striate in apical half.

Colour. Body, antenna, and pterostigma brown. Mandibles and legs yellowish brown. Wings hyaline.

Female (main characters). Body length 2.1 mm; fore wing length 2.4 mm; hind wing length 1.5 mm.

Head. Eye in lateral view 1.7 times as high as its width and as wide as temple medially. Face 1.7 times as wide as high.

Clypeus 2.1 times as wide as high. Mandible 1.4–1.5 times as long as its maximum width. Antennae 17–19-segmented. First flagellar segment 4.7–4.8 times as long as its apical width. Second flagellar segment 4.3 times as long as its maximum width; third segment 3.0 times, fourth to penultimate segments 2.3–2.5 times, and apical segment 2.2 times as long as their width accordingly.

Mesosoma. In lateral view, 1.2 times as long as high. Mesoscutum (dorsal view) as long as its maximum width, smooth. Notauli mainly absent on horizontal surface of mesoscutum. Mesoscutal pit absent. Prescutellar depression smooth, without lateral carinae. Precoxal sulcus present, crenulate, not reaching anterior and posterior margins of mesopleuron. Posterior mesopleural furrow crenulate in upper half, smooth in lower part. Propodeum with pentagonal areola. Propodeal spiracles relatively small.

Wings. Length of fore wing 2.5 times as long as its maximum width. Radial (marginal) cell ending at apex of wing, 4.0 times as long as its maximum width. Vein r2 (3-SR) 1.9–2.0 times as long as vein cuq1 (2-SR); vein r3 (SR1) 2.4–2.5 times as long as vein r2 (3-SR). Brachial (subdiscal) cell closed distally, 3.0 times as long as its maximum width. Hind wing 5.7 times as long as its maximum width.

Legs. Hind femur 4.0 times as long as its maximum width.

Metasoma. First tergite long, slightly widened towards apex, 2.5 times as long as its apical width, striate in apical half.

Colour. Body, antenna, and pterostigma brown. Mandibles and legs yellowish brown. Wings hyaline.

Comparative diagnosis. This species is similar to *Aspilota isfahanensis* Peris-Felipo, 2016, but differs in having the eye in lateral view about as wide as temple medially (1.7 times in *A. isfahanensis*), the first flagellar segment 5.3 times as long as its maximum

width (3.3 times in *A. isfahanensis*), middle flagellar segments 2.2–2.6 times as long as their maximum width (1.8–2.0 in *A. isfahanensis*), vein r2 (3-SR) 1.9 times as long as vein cuq1 (2-SR) (2.3 times in *A. isfahanensis*), face 1.5 times as wide as high (1.9 times in *A. isfahanensis*) and clypeus 2.0 times as wide as high (2.5 times in *A. isfahanensis*).

Distribution. Former Czechoslovakia, Denmark, England, Hungary, Ireland, Russia, Spain (Yu *et al.* 2012; Broad *et al.* 2016; Peris-Felipo *et al.* 2016b), Iran (**new record**).

***Aspilota isfahanensis* Peris-Felipo, 2016** (Figs. 9, 10)

Aspilota isfahanensis Peris-Felipo in Peris-Felipo *et al.*, 2016a: 122.

Material examined. IRAN: 1 ♀ (holotype), Isfahan [province], Najafabad, 6.x.2012, swept on *Chenopodium* sp. (E. Nader leg.) (NHMW); 1 ♀ (paratype), same data as for holotype (ZISP).

Main characters of species. Female. Body length 1.8 mm; fore wing length 2.0 mm; hind wing length 1.6 mm.

Head. In dorsal view 1.9 times as wide as its median length, 1.4 times as wide as mesoscutum. Eye in lateral view 1.4 times as high as its width and 1.7 times as wide as temple medially. Face 1.9 times as wide as high. Clypeus 2.5 times as wide as high. Mandible 1.3 times as long as its maximum width. Upper tooth distinctly shorter than lower tooth, very small and rounded; middle tooth rather long and narrow, longer than lower tooth, pointed apically; lower tooth widest, rounded, distinctly turned downwards. Antennae 16–17-segmented. First flagellar segment 3.3 times as long as its apical width, 1.3 times as long as second segment.

Mesosoma. In lateral view 1.2 times as long as high. Mesoscutum (dorsal view) 0.8 times as long as its maximum width, smooth. Mesoscutal pit absent. Prescutellar depression smooth, without lateral carinae.

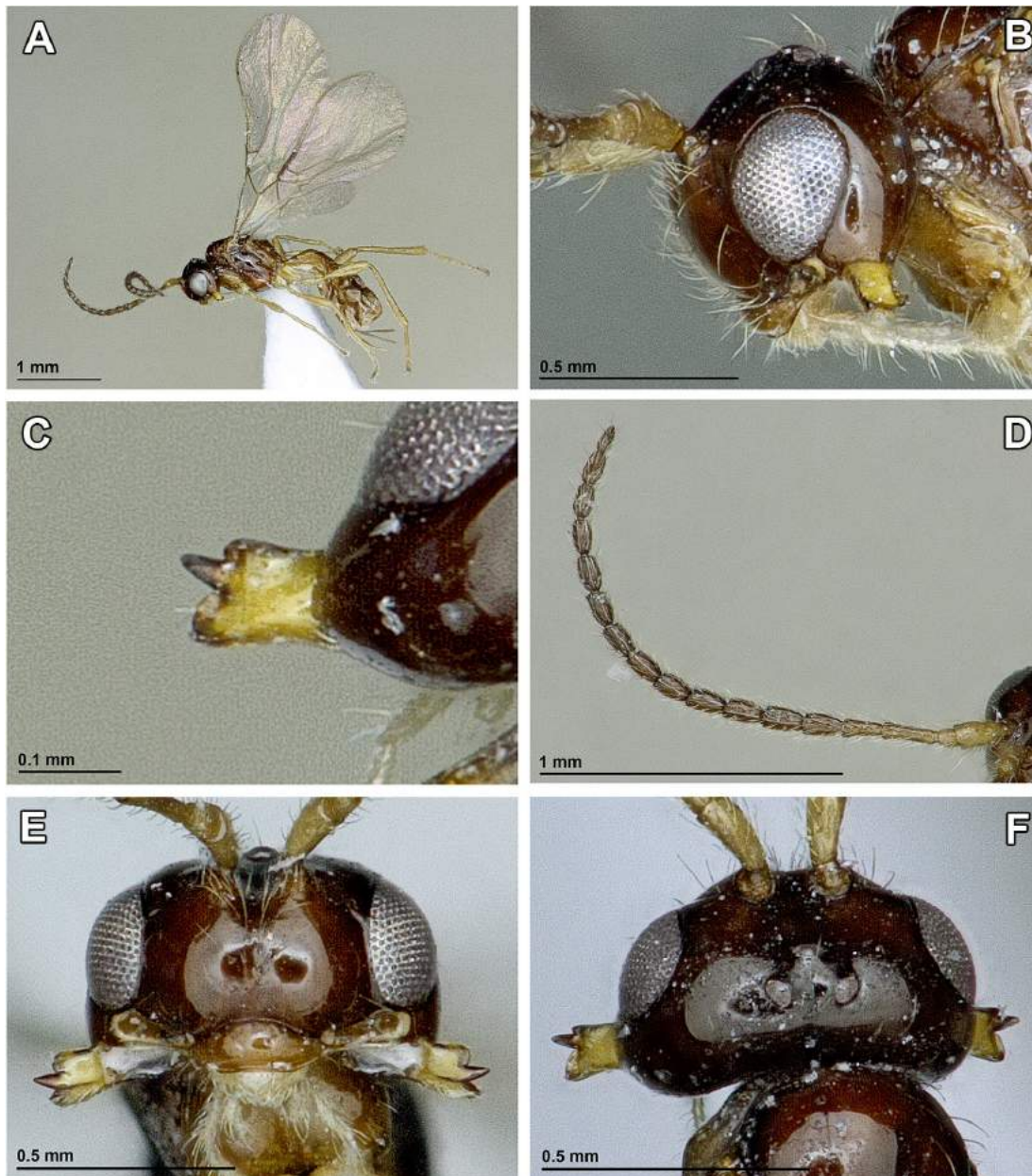


Figure 9. *Aspilota isfaherensis* Peris-Felipo (female, holotype): **A.** Habitus, lateral view; **B.** Head, lateral view; **C.** Mandible; **D.** Antenna; **E.** Head, front view; **F.** Head, dorsal view.

Precoxal sulcus crenulate, not reaching anterior and posterior margins of mesopleuron. Posterior mesopleural furrow crenulate in upper half, smooth in lower half. Propodeum with pentagonal areola delineated by distinct carinae. Propodeal spiracles relatively small.

Wings. Length of fore wing 2.7 times as long as its maximum width. Radial (marginal) cell 4.0 times as long as its maximum

width. Vein r2 (3-SR) 2.3 times as long as vein cuqu1 (2-SR); vein r3 (SR1) 2.5 times as long as vein r2 (3-SR). Brachial (subdiscal) cell 3.0 times as long as its maximum width.

Legs. Hind femur claviform, 4.0 times as long as its maximum width. Hind tibia 1.5 times as long as hind tarsus. First segment of hind tarsus twice as long as second segment.

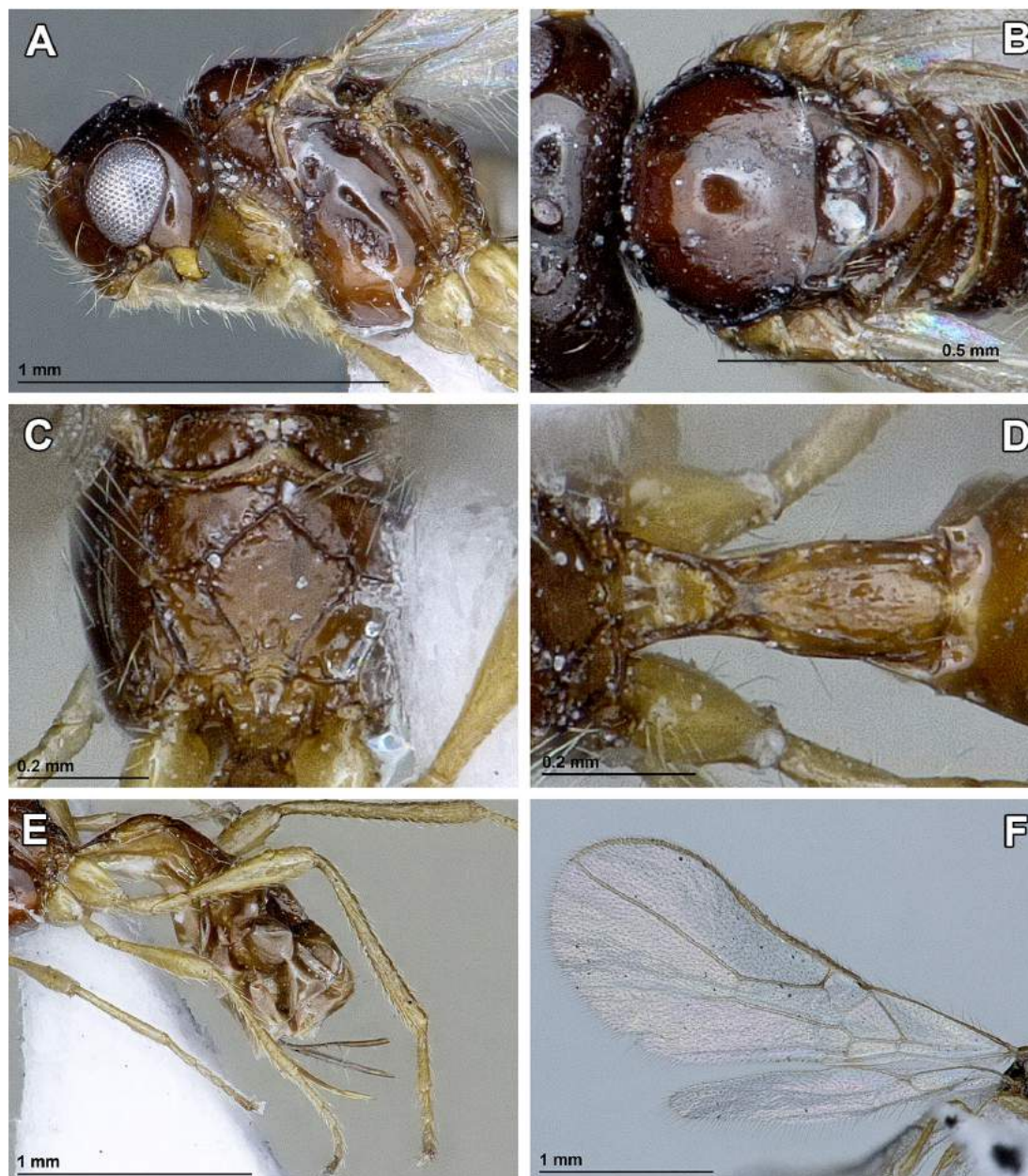


Figure 10. *Aspilota isfaherensis* Peris-Felipo (female, holotype): **A.** Head and mesosoma, lateral view; **B.** Mesonotum; **C.** Propodeum; **D.** First metasomal tergite; **E.** Hind leg, metasoma and ovipositor, lateral view; **F.** Fore and hind wings.

Metasoma. First tergite 2.6 times as long as its apical width, finely rugose-striate in apical half. Ovipositor 1.2 times as long as first tergite, 0.4 times as long as metasoma, 0.2 times as long as fore wing.

Colour. Body, antenna, and pterostigma dark brown. Mandibles and legs yellowish brown. Wings hyaline. Length.

Comparative diagnosis. This species is similar to *Aspilota insolita* (Tobias, 1962); differences between both species are shown after the re-description of the last species.

Distribution. Iran (Peris-Felipo *et al.* 2016a).

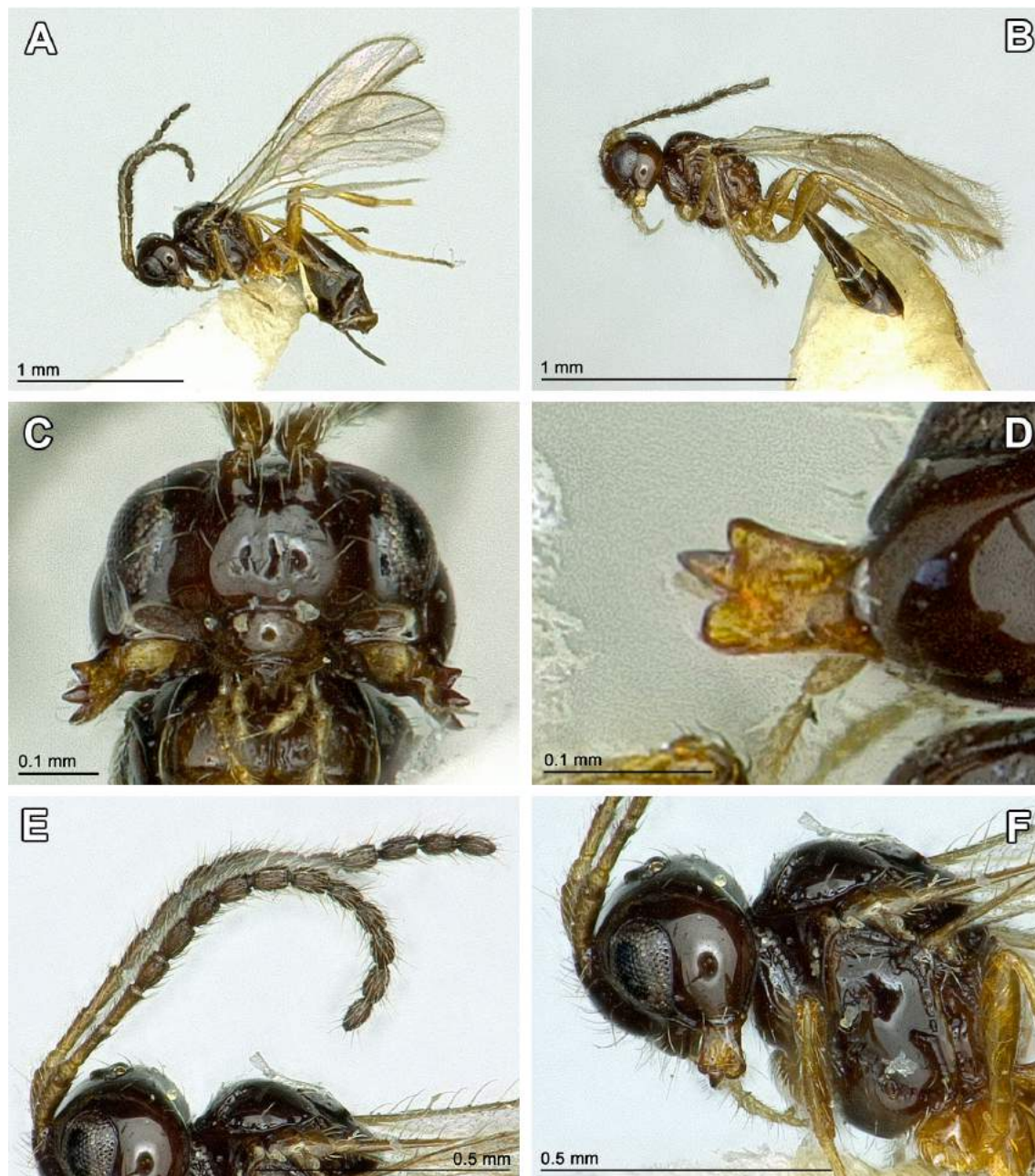


Figure 11. *Aspilota latitemporata* Fischer (A., C. and D. female, holotype; B. male, paratype): A, B. Habitus, lateral view; C. Head, front view; D. Mandible; E. Antenna; F. Head and mesosoma, lateral view.

Aspilota latitemporata Fischer, 1976 (Figs. 11, 12)

Aspilota latitemporata Fischer, 1976: 379; Papp, 2008: 251; Yu *et al.*, 2012; Papp, 2012: 168; Peris-Felipo, 2016: 94.

Material examined. AUSTRIA: 1 ♀ (holotype), Burgenland, Jabing, 28.vii.1960 (Fischer leg.) (NHMW); 1 ♂ (paratype), same data as holotype (NHMW). IRAN: 1 ♀, Khuzistan [province], Desful [Dezful], iii-iv.1978, yellow trays (V.F. Eastop leg.)

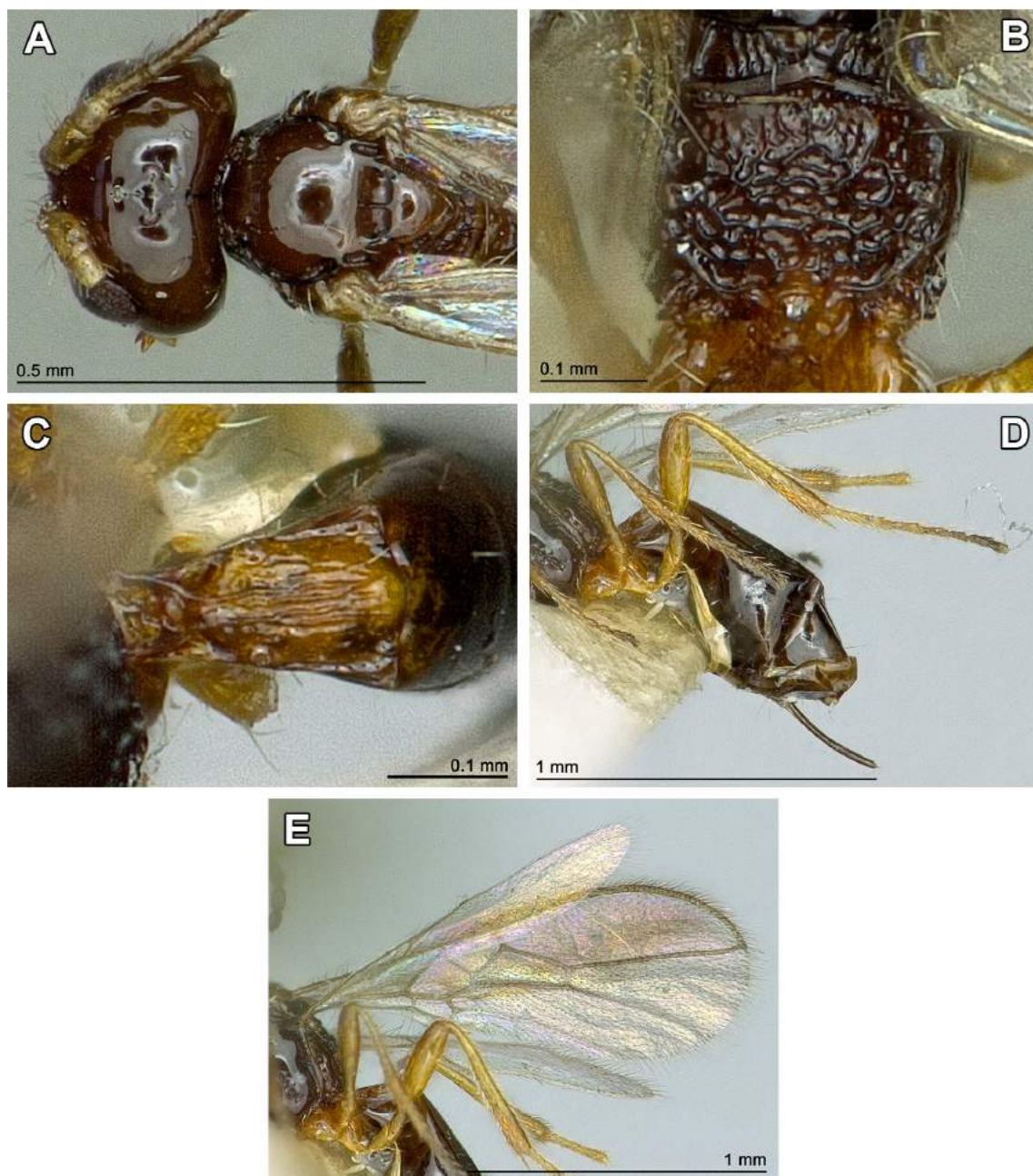


Figure 12. *Aspilota latitemporata* Fischer (female, holotype): **A.** Head and mesonotum, dorsal view; **B.** Propodeum; **C.** First metasomal tergite; **D.** Hind leg, metasoma and ovipositor, lateral view; **E.** Fore and hind wings.

[B.M. 1978–46] (BMNH); 1 ♀, Fars province, Jahrom, 28°34'01.62"N, 53°27'29.53"E, 1540 m, 22.iv.2012 (A. Ameri leg.) (TMUC).

Re-description. Female (holotype). Body length 1.5 mm; fore wing length 1.6 mm; hind wing length 1.3 mm.

Head. In dorsal view 1.7 times as wide as its median length, 1.6 times as wide as mesoscutum, smooth, with temple rounded behind eyes. Eye in lateral view 1.5 times as high as wide and 0.7 times as wide as temple medially. POL 1.8 times OD; OOL 3.0 times OD. Face 1.7 times as wide as high; inner

margins of eyes subparallel. Clypeus 2.6 times as wide as high, slightly concave ventrally. Mandible 3-dentate, weakly widened towards apex, 1.3 times as long as its maximum width. Upper tooth distinctly shorter than lower tooth, and rounded; middle tooth long and narrow, longer than lower tooth, pointed apically; lower tooth widest, rounded, distinctly turned downwards (Fig. 11D). Antennae 15-segmented, 0.8 times as long as body. Scape 3.0 times longer than pedicel. First flagellar segment 3.8 times as long as its apical width, as long as second segment. Second flagellar segment 3.8 times as long as its maximum width; third to ninth segments 1.7 times, tenth to 12th segments 1.4 times, and 13th (apical) segment 2.0 times as long as their width accordingly.

Mesosoma. In lateral view, 1.1 times as long as high. Mesoscutum (dorsal view) about as long as its maximum width, smooth. Notauli mainly absent on horizontal surface of mesoscutum. Mesoscutal pit absent. Prescutellar depression smooth, without lateral carinae. Precoxal sulcus present, crenulate, reaching anterior and posterior margins of mesopleuron. Posterior mesopleural furrow crenulate in upper half, smooth in lower part. Propodeum entirely sculptured without median longitudinal carina. Propodeal spiracles relatively small.

Wings. Length of fore wing 2.5 times as long as its maximum width. Radial (marginal) cell ending at apex of wing, 3.4 times as long as its maximum width. Vein r₂ (3-SR) 1.9 times as long as vein cuq₁ (2-SR); vein r₃ (SR₁) 2.5 times as long as vein r₂ (3-SR). Brachial (subdiscal) cell closed distally, 2.1 times as long as its maximum width. Hind wing 6.3 times as long as its maximum width.

Legs. Hind femur 3.5 times as long as its maximum width. Hind tibia weakly widened towards apex, 7.5 times as long as its maximum subapical width, 0.9 times as long as hind tarsus. First segment of hind tarsus 1.7 times as long as second segment.

Metasoma. First tergite long, slightly widened towards apex, 1.8 times as long as its apical width, mainly striate. Ovipositor sheath 1.3 times as long as first tergite, 0.4 times as long as metasoma, as long as hind femur, 0.3 times as long as fore wing.

Colour. Body, antenna, and pterostigma brown. Mandibles and legs yellowish brown. Wings hyaline.

Variation. Body length 1.5–1.8 mm; fore wing length 1.6–2.0 mm; hind wing length 1.3–1.6 mm. Antennae 15–17-segmented. First flagellar segment 3.7–3.8 times as long as its maximum width. Second flagellar segment 3.7–3.8 times as long as its apical width. First tergite 1.8–1.9 times as long as its apical width.

Male. Body length 1.4 mm; fore wing length 1.4 mm; hind wing length 1.2 mm. Hind femur 3.4 times as long as its maximum width. Otherwise similar to female.

Comparative diagnosis. This species is similar to *Aspilota alfalfae* Fischer, Lashkari Bod, Rakhshani & Talebi 2011; differences between these species are shown after the description of the last species.

Distribution. Austria, Hungary, Israel, Romania, Slovakia, Switzerland (Yu *et al.* 2012; Papp 2011–2012; Peris-Felipo 2016), Iran (**new record**).

Aspilota nidicola Hedqvist, 1972 (Figs. 13, 14)

Aspilota nidicola Hedqvist, 1972: 216; Fischer, 1976: 356; Broad *et al.*, 2016: 24

Material examined. SWEDEN: 1 ♀ (holotype), Östergötland, Ändebol, x.1964, ex nest of *Vespula vulgaris* (L., 1758) (K.J. Hedqvist leg.) (NHRS). IRAN: 1 ♀, Fars province, Jahrom, 28°34'01.62"N, 53°27'29.53"E, 1540 m, 22.iv.2012 (A. Ameri leg.) (TMUC).

Re-description. Female (holotype). Body length 2.5 mm; fore wing length 3.1 mm; hind wing length 2.2 mm.

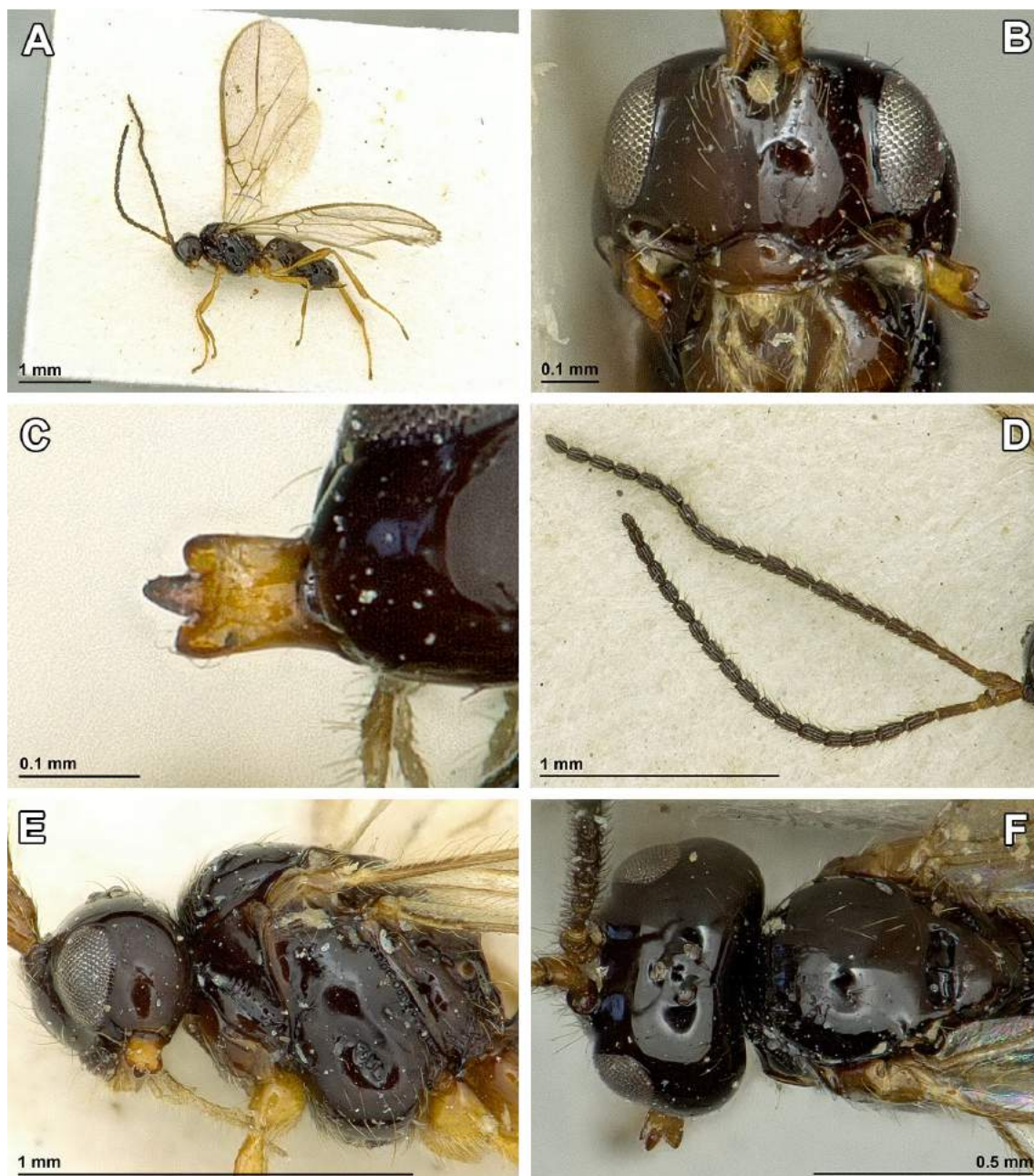


Figure 13. *Aspilota nidicola* Hedqvist (female, holotype): **A.** Habitus, lateral view; **B.** Head, front view; **C.** Mandible; **D.** Antenna; **E.** Head and mesosoma, lateral view; **F.** Head and mesonotum, dorsal view.

Head. In dorsal view 2.0 times as wide as its median length, 1.5 times as wide as mesoscutum, smooth, with temple rounded behind eyes. Eye in lateral view 1.8 times as high as wide and 0.8 times as wide as temple medially. POL 1.4 times OD; OOL 3.6 times OD. Face 1.5 times as wide as high; inner margins of eyes subparallel. Clypeus 2.3

times as wide as high, slightly concave ventrally. Mandible 3-dentate, not widened towards apex, 1.3 times as long as its maximum width. Upper tooth distinctly as long as lower tooth, small and rounded; middle tooth long and narrow, longer than lower tooth, pointed apically; lower tooth rounded, distinctly turned downwards.

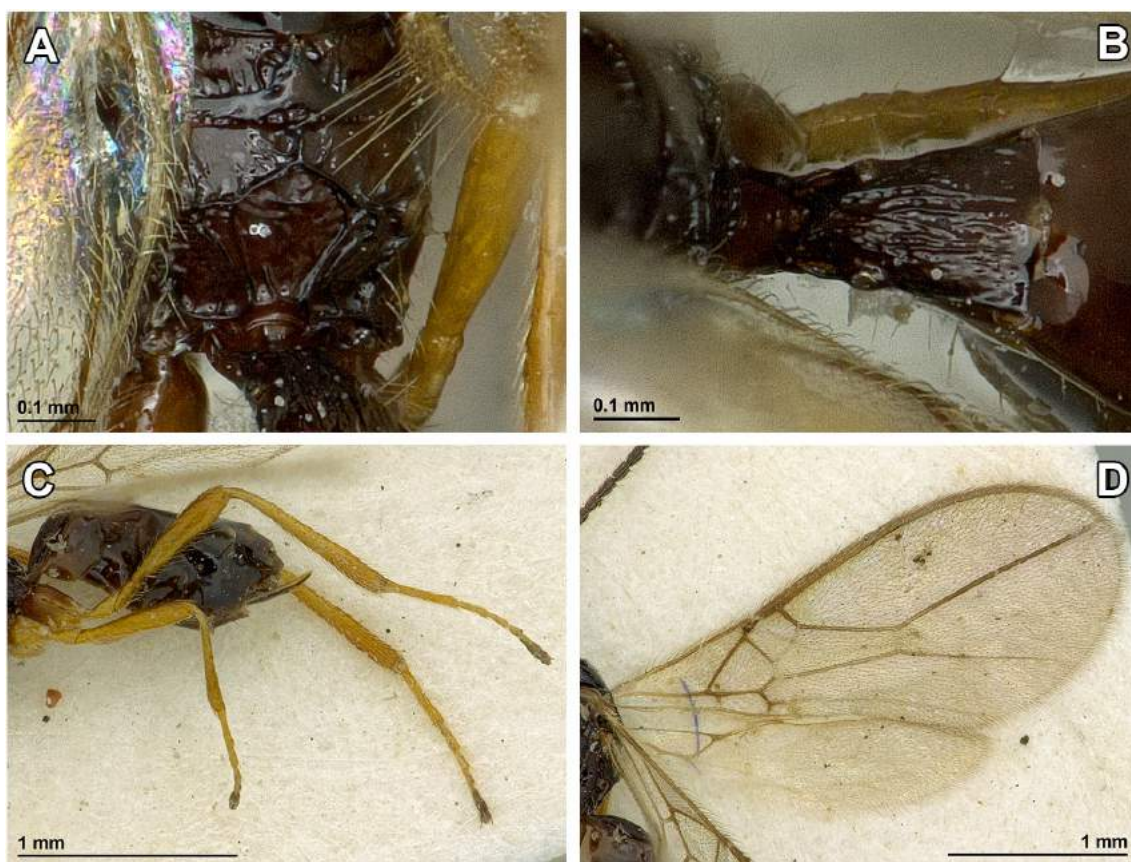


Figure 14. *Aspilota nidicola* Hedqvist (female, holotype): **A.** Propodeum; **B.** First metasomal tergite; **C.** Hind leg, metasoma and ovipositor, lateral view; **D.** Fore and hind wings.

Antennae 20-segmented, 0.9 times as long as body. Scape twice as long as pedicel. First flagellar segment 3.3 times as long as its apical width, 1.2 times as long as second segment. Second flagellar segment 2.2 times as long as its maximum width; third segment 2.0 times, fourth to sixth segments 1.8 times, seventh to 15th segments 1.6 times, 16th and 17th segments 2.0 times, and 14th (apical) segment 2.3 times as long as their width accordingly.

Mesosoma. In lateral view, 1.2 times as long as high. Mesoscutum (dorsal view) as long as its maximum width, smooth. Notauli mainly absent on horizontal surface of mesoscutum. Mesoscutal pit absent. Prescutellar depression smooth, without lateral carinae. Precoxal sulcus present, crenulate, not reaching anterior and posterior margins of mesopleuron.

Posterior mesopleural furrow crenulate. Propodeum with pentagonal areola. Propodeal spiracles relatively small.

Wings. Length of fore wing 2.5 times as long as its maximum width. Radial (marginal) cell ending at apex of wing, 4.0 times as long as its maximum width. Vein r2 (3-SR) 2.3 times as long as vein cuqu1 (2-SR); vein r3 (SR1) 2.4 times as long as vein r2 (3-SR). Brachial (first subdiscal) cell closed distally, 2.2 times as long as its maximum width. Hind wing 4.4 times as long as its maximum width.

Legs. Hind femur 4.2 times as long as its maximum width. Hind tibia weakly widened towards apex, 9.6 times as long as its maximum subapical width, as long as hind tarsus. First segment of hind tarsus 2.3 times as long as second segment.

Metasoma. First tergite long, slightly widened towards apex, 1.8 times as long as its apical width, striate (Fig. 14B). Ovipositor sheath 0.8 times as long as first tergite, 0.3 times as long as metasoma, 0.6 times as long as hind femur, 0.1 times as long as fore wing (Fig. 14C).

Colour. Body, antenna, and pterostigma brown. Mandibles and legs yellowish brown. Wings hyaline.

Variation. Fore wing length 3.0–3.1 mm; hind wing length 2.2–2.4 mm. First flagellar segment 3.2–3.3 times as long as its maximum width. Hind femur 4.2–4.3 times as long as its maximum width.

Male. Unknown.

Comparative diagnosis. This species is similar to *A. delicata* Fischer, 1973; differences between both species are shown after the description of the last species.

Distribution. Denmark, England, Finland, Sweden (Yu *et al.* 2012; Broad *et al.* 2016; Peris-Felipo *et al.* 2016b, Koponen *et al.* 2016), Iran (**new record**).

Key to the Western Asian species of *Aspilota*

1. Propodeum with pentagonal areola (Figs. 4A, 6A, 8A, 10A, 14A).2
- Propodeum without pentagonal areola (Figs. 2A, 12A).6
- 2 (1). Eye in lateral view 0.7–1.0 times as wide as temple medially.3
- Eye in lateral view 1.7 times as wide as temple medially (Fig. 9B). - First flagellar segment 3.3 times as long as its maximum width (Fig. 9D). Hind femur 4.0 times as long as its maximum width (Fig. 10E). First metasomal tergite 2.6 times as long as its apical width (Fig. 10D). Body length 1.8 mm.*A. isfahanensis* Peris-Felipo
- 3 (2). First flagellar segment 3.3–4.2 times as long as its maximum length (Figs. 3D, 5D, 13D). Vein r2 (3-SR) 2.3–2.5 times as

long as vein cuqu1 (2-SR) (Figs. 4D, 6D, 14D).4

- First flagellar segment 4.7–5.3 times as long as its maximum length (Fig. 7D). Vein r2 (3-SR) 1.9–2.0 times as long as vein cuqu1 (2-SR) (Fig. 8C). - Eye in lateral view as wide as temple medially (Fig. 7E). Hind femur 4.0–4.1 times as long as its maximum width (Fig. 8B). First metasomal tergite 2.5 times as long as its apical width (Fig. 8A). Body length 1.9 mm.*A. insolita* (Tobias)

4 (3). Eye in lateral view 0.7–0.8 times as wide as temple medially (Figs. 3E, 13E). Posterior mesopleural furrow entirely crenulate (Figs. 3E, 13E). Mandible 1.3–1.4 times as long as its maximum width (Figs. 3C, 13C). First metasomal tergite 1.8–2.0 times as long as its apical width (Figs. 4B, 14B). Vein r2 (3-SR) 2.3–2.5 times as long as vein cuqu1 (2-SR) (Figs. 4D, 14D).5

- Eye in lateral view as wide as temple medially (Fig. 5E). Posterior mesopleural furrow crenulate in upper half, smooth in lower part (Fig. 5E). Mandible 1.8 times as long as its maximum width (Fig. 5C). First metasomal tergite 2.4–2.5 times as long as its apical width (Fig. 6B). Vein r2 (3-SR) 2.9 times as long as vein cuqu1 (2-SR) (Fig. 6D). Body length 1.5–1.6 mm.*A. flagimilis* Fischer

5 (4). First flagellar segment 3.2–3.3 times as long as its maximum width (Fig. 13D). Hind femur 4.2–4.3 times as long as its maximum width (Fig. 14C). Face 1.5 times as wide as high (Fig. 13B). Clypeus 2.3 times as wide as high (Fig. 13B). Body length 2.5 mm.*A. nidicola* Hedqvist

- First flagellar segment 4.0 times as long as its maximum width (Fig. 3D). Hind femur 4.7–4.8 times as long as its maximum width (Fig. 4B). Face 1.8 times as wide as high (Fig. 3B). Clypeus 2.7 times as wide as high (Fig. 3B). Body length 1.6–1.8 mm.*A. delicata* Fischer

6 (1). Precoxal sulcus not reaching anterior and posterior margins of mesopleuron (Fig. 1E). First flagellar segment 3.3 times as long as its maximum width (Fig. 1D). Hind femur 4.3–4.5 times as long as its maximum width (Fig. 2C). First metasomal tergite 1.4–1.5 times as long as its apical width (Fig. 2B). Clypeus 2.1 times as wide as high (Fig. 1B). Body length 2.0–2.1 mm. *A. alfalfae* Fischer, Lashkari Bod, Rakhshani & Talebi

- Precoxal sulcus reaching anterior and posterior margins of mesopleuron (Fig. 11F). First flagellar segment 3.7–3.8 times as long as its maximum width (Fig. 11E). Hind femur 3.5 times as long as its maximum width (Fig. 12D). First metasomal tergite 1.8–1.9 times as long as its apical width (Fig. 12C). Clypeus 2.6 times as wide as high (Fig. 11C). Body length 1.5–1.8 mm. *A. latitemporata* Fischer

Discussion

Western Asian area includes the territories of Turkey, Syria, Lebanon, Jordan, Israel, Iraq, countries of South Caucasus (Georgia, Armenia, Azerbaijan), Arabian Peninsula and Iran. Only three *Aspilota* species have been already recorded from this area (Fischer *et al.* 2011; Khajeh *et al.* 2014; Peris-Felipo *et al.* 2016a). Four other species are newly recorded in our studies from Iran, which has been considered as cross-road between East and West Palaearctic regions. Two species, *Aspilota alfalfae* and *Aspilota isfahanensis*, were recently described from Iran and not recovered from other countries, while the majority of species are mainly distributed in the Europe (Yu *et al.*, 2012). Lacking the special collections of the Alysiinae material in the western Asian countries can be the main reason for the lower number of known *Aspilota* species.

On the other hand, according to the biology of Alysiini (Wharton, 1984), the

Aspilota species are associated with humid habitats and ephemeral substrates, which are not common in the studied area. The similar regions (mountains and valleys of rivers) of northern Iran and eastern Mediterranean Basin have not appropriately investigated in this respect. Further taxonomic studies in these territories will reveal the occurrence of other *Aspilota* species.

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جنس *Aspilota* Foerster (Hymenoptera: Braconidae: Alysiinae) در غرب آسیا

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چکیده: نتایج یافته‌های جدید در خصوص جنس *Aspilota* Foerster, 1863

(Braconidae: Alysiinae) در منطقه غرب آسیا ارائه شد. چهار گونه شامل *A.*

latitemporata، *A. insolita* (Tobias, 1962)، *A. flagimilis* Fischer, 1966

و *A. nidicola* Hedqvist, 1972 برای اولین بار از ایران گزارش

می‌شوند. توصیف مجدد گونه‌های *Aspilota alfalfae* Fischer, Lashkari Bod،

A. flagimilis، *A. delicata* Fischer, 1973. Rakhshani & Talebi, 2011

و *A. latitemporata* *insolita* *A. nidicola* به صورت مصور ارائه شد. کلید شناسایی

برای گونه‌های متعلق به جنس *Aspilota* در غرب آسیا ارائه شد.

واژگان کلیدی: پارازیتوئیدهای دوبالان، *Aspilota*، Alysiinae، غرب آسیا، ایران،

توصیف مجدد، کلید شناسایی.