

Research articleSubmitted: January 15th, 2017 - Accepted: March 23rd, 2017 - Published: June 30th, 2017**New records of Campopleginae for Italy
(Hymenoptera: Ichneumonidae)**Filippo DI GIOVANNI ^{1,*}, Matthias RIEDEL ²¹ Department of Biology and Biotechnologies "Charles Darwin", "Sapienza" University of Rome - Piazzale Valerio Massimo 6, I-00162 Rome, Italy - filippo.digiovanni@uniroma1.it² Bärenbadstraße 11, D-82487 Oberammergau, Germany - mamaflo.riedel@t-online.de

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Abstract

The present study is based on material collected through an intensive sampling in north-eastern Italy, with thirteen species of the subfamily Campopleginae (Hymenoptera, Ichneumonidae) newly recorded for Italy: *Campoletis agilis* (Holmgren, 1860), *C. thomsoni* (Roman, 1915), *Campoplex punctulatus* (Szépligeti, 1916), *C. rothi* (Holmgren, 1860), *Diadegma annulicrus* (Thomson, 1887), *Echthronomas ochrostoma* (Holmgren, 1860), *Hyposoter coxator* (Thomson, 1887), *H. discedens* (Schmiedeknecht, 1909), *H. meridionellator* Aubert, 1965, *H. tenuicosta* (Thomson, 1887), *Olesicampe binotata* (Thomson, 1887), *Rhimphoctona melanura* (Holmgren, 1860) and *Sinophorus nitidus* (Brischke, 1880). *Hyposoter meridionellator* Aubert, 1965 (**stat. rev.**) is recognized as a different species to *Hyposoter rufovariatus* (Schmiedeknecht, 1909). The male of *Echthronomas facialis* (Thomson, 1887) and the hitherto unknown male of *Echthronomas ochrostoma* (Holmgren, 1860) are described for the first time. The number of Campopleginae known from Italy is raised to 245 species.

Key words: Italian fauna, parasitoids, checklist, *Echthronomas*, *Hyposoter*.

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Introduction

With more than 24.000 described species (Yu et al. 2012) and more than 60.000 estimated (Gauld et al. 2002), the family Ichneumonidae (Hymenoptera) is one of the largest within insects. Currently, 37 subfamilies are recognized (Quicke 2015), 32 of which are present in Europe (Yu et al. 2012; van Achterberg & Zwakhals 2013).

Within Ichneumonidae, Campopleginae is one of the most species-rich and most frequently encountered subfamilies. It includes more than 2.100 species worldwide (Yu et al. 2012), about 800 of which are present in Europe, currently grouped in 42 genera (Yu et al. 2012; van Achterberg & Zwakhals 2013). The Campopleginae are koinobiont endoparasitoids, most of them ovipositing into relatively exposed or weakly concealed hosts (Gauld et al. 2002).

The parasitoid larva develops within the growing host and eventually kills it after the host constructed a cocoon or sometimes even before it completes the larval feeding (Jerman & Gauld 1988). They attack caterpillars of a wide range of Lepidoptera families, although a few genera have known to attack beetle and sawfly larvae (Townes 1970), or even Raphidioptera (Aspöck 2002). One species has

been reared from a terrestrial Trichoptera larva (Horstmann 2004). So far, the Campopleginae fauna of Italy consists of 28 genera and 232 species (excluding species of uncertain validity; Scaramozzino 1995; Yu et al. 2012; van Achterberg & Zwakhals 2013). Recently three more species of Campopleginae have been added to Italy, one of which belonging to the monospecific genus *Leptocampoplex* Horstmann, 1970 (Di Giovanni et al. 2015b; Di Giovanni & Reshchikov 2016). Albeit some significant improvements to the checklist of the Ichneumonidae in Italy in the last few years (Turrisi et al. 2007; Riedel & Turrisi 2013; Zwakhals & Turrisi 2014; Di Giovanni et al. 2015a, 2015b; Di Giovanni & Reshchikov 2016), the faunistic knowledge of this group in the Country is still largely unsatisfactory (Di Giovanni et al. 2015b).

Thanks to an intensive samplings in north-eastern Italy, in the present study we add thirteen new Italian records of Campopleginae. In addition, *Hyposoter meridionellator* Aubert, 1965 (**stat. rev.**) is raised to species level, and accepted as a different taxon from the similar *Hyposoter rufovariatus* (Schmiedeknecht, 1909). The descriptions of the hitherto unknown male of *Echthronomas ochrostoma* (Holmgren, 1860) and of the male of *E. facialis* (Thomson, 1887) are provided.

Materials and methods

Most part of the records in the present paper originates from field samplings in north-eastern Italy, carried out in 2013 using Malaise traps in the understory of semi-natural and artificial oak-hornbeam forests of the eastern Po Plain (see Di Giovanni et al. 2015b). The material has been collected by the first author (F. Di Giovanni leg.) and identified by the second author (M. Riedel det.).

All taxa are listed in alphabetical order. Distributional notes, with minor changes, follow the Catalogue of World Ichneumonidae (Yu et al. 2012) and the Fauna Europaea website (van Achterberg & Zwakhals 2013).

The material is deposited in the following collections:

MZUR: Museo di Zoologia, “Sapienza” University of Rome, Italy.

MR: private collection of Matthias Riedel in Oberammergau, Germany.

Results

Campoletis agilis (Holmgren, 1860)

Italy: Veneto, Treviso, Meolo, 45.36.25N 12.27.25E, 23 Jul-5 Aug 2013, 2♂♂ (MZUR); Friuli-Venezia Giulia, Udine, Carlino, tenuta Villabruna, 45.46.35N 13.11.16E, 21 Jul-3 Aug 2013, 1♂ (MZUR); Friuli-Venezia Giulia, Udine, Carlino, tenuta Villabruna, 45.46.53N 13.12.09E, 21 Jul-3 Aug 2013, 1♂ (MZUR); Latium, Roma, Tenuta della Cervelletta, 7 Oct 2007, M. Mei leg., 1♂ (MZUR); Apulia, Foggia, loc. Emmaus, SP (Provincial road) 117, 16 Apr 2015, 1♂ (MZUR).

Diagnosis. Tegula yellow. Hind femur red. Hind tibia almost entirely yellowish-red, slightly infuscate basally and apically. Metasoma black, metasomal sternites brown-black (Schmiedeknecht 1909; Szépligeti 1916).

Distribution. Europe, new for Italy.

Campoletis thomsoni (Roman, 1915)

Italy: Veneto, Treviso, Gaiarine, Francenigo, bosco Otello, 45.51.41N 12.29.38E, 23 Jul-5 Aug 2013, 2♂♂, 1♀ (MZUR); Veneto, Treviso, Meolo, 45.36.25N 12.27.25E, 23 Jul-5 Aug 2013, 3♂♂ (MZUR); Veneto, Treviso, Cessalto, Santa Maria di Campagna, bosco San Marco, 45.42.21N 12.34.42E, 23 Jul-5 Aug 2013, 1♀ (MZUR); Veneto, Venezia, San Stino di Livenza, bosco di Bandiziol e Pressacon, 45.44.58N 12.42.09E, 23 Jul-5 Aug 2013, 1♂ (MZUR); Veneto, Venezia, Portogruaro, loc. Lison, bosco del Merlo, 45.44.48N 12.44.30E, 23 Jul-5 Aug 2013, 2♂♂ (MZUR); Veneto, Venezia, Concordia Sagittaria, loc. Sindacale, bosco delle Lame, 45.41.48N 12.52.06E, 21 Jul-

3 Aug 2013, 1♂ (MZUR); Friuli-Venezia Giulia, Udine, Muzzana del Turgnano, 45.47.57N 13.06.36E, 21 Jul-3 Aug 2013, 3♂♂ (MZUR); Friuli-Venezia Giulia, Udine, Marano Lagunare, tenuta Villabruna, 45.46.36N 13.09.32E, 9-21 Jun 2013, 1♂ (MZUR); Friuli-Venezia Giulia, Udine, Carlino, tenuta Villabruna, 45.46.35N 13.11.16E, 21 Jul-3 Aug 2013, 1♂ (MZUR); Friuli-Venezia Giulia, Udine, Marano Lagunare, tenuta Villabruna, 45.46.36N 13.09.32E, 21 Jul-3 Aug 2013, 3♂♂ (MZUR); Friuli-Venezia Giulia, Udine, Carlino, tenuta Villabruna, 45.47.33N 13.12.24E, 21 Jul-3 Aug 2013, 2♀♀ (MZUR); Friuli-Venezia Giulia, Udine, Carlino, bosco Prà Quain e Venchiaratis, 45.47.09N 13.12.53E, 21 Jul-3 Aug 2013, 1♂ (MZUR).

Diagnosis. Tegula yellow. Hind femur red. Hind tibia medially whitish, basally and apically strongly infuscate. Metasoma with tergite I almost entirely black, tergite II and III black with wide red band apically, other tergites black medially and largely red laterally, metasomal sternites pale (Schmiedeknecht 1909; Szépligeti 1916).

Distribution: Palaearctic, new for Italy.

Campoplex punctulatus (Szépligeti, 1916)

Italy: Veneto, Padova, Arzzergrande, scolo Schilla, 45.15.23N 12.03.18E, 22 Jul-4 Aug 2013, 1♀ (MZUR); Veneto, Treviso, Meolo, 45.36.25N 12.27.25E, 23 Jul-5 Aug 2013, 2♀♀ (MZUR); Veneto, Treviso, Meolo, 45.38.09N 12.26.17E, 10-22 Jun 2013, 1♀ (MZUR); Veneto, Treviso, Gaiarine, Francenigo, bosco Otello, 45.51.41N 12.29.38E, 23 Jul-5 Aug 2013, 2♀♀ (MZUR); Veneto, Treviso, Cessalto, Santa Maria di Campagna, bosco San Marco, 45.42.21N 12.34.42E, 10-22 Jun 2013, 1♀ (MZUR); Veneto, Venezia, Mestre, bosco di Carpenedo, 45.30.41N 12.14.47E, 9-21 Jun 2013, 1♀ (MZUR); Veneto, Venezia, Mestre, bosco di Carpenedo, 45.30.41N 12.14.47E, 22 Jul-4 Aug 2013, 1♀ (MZUR); Veneto, Venezia, Mestre, bosco di Zaher, 45.31.14N 12.17.21E, 22 Jul-4 Aug 2013, 2♀♀ (MZUR); Veneto, Venezia, San Stino di Livenza, bosco di Bandiziol e Pressacon, 45.44.58N 12.42.09E, 23 Jul-5 Aug 2013, 1♀ (MZUR); Veneto, Venezia, Concordia Sagittaria, loc. Sindacale, bosco delle Lame, 45.41.48N 12.52.06E, 9-21 Jun 2013, 1♀ (MZUR); Veneto, Venezia, Concordia Sagittaria, loc. Sindacale, bosco delle Lame, 45.41.48N 12.52.06E, 21 Jul-3 Aug 2013, 6♀♀ (MZUR); Friuli-Venezia Giulia, Udine, Palazzolo dello Stella, Nogali Braide, bosco Brussa, 45.45.54N 13.04.52E, 21 Jul-3 Aug 2013, 2♀♀ (MZUR); Friuli-Venezia Giulia, Udine, Muzzana del Turgnano, 45.47.57N 13.06.36E, 21 Jul-3 Aug 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, San Giorgio di Nogaro, loc. Zellina, bosco Boscato, 45.49.60N 13.10.03E, 9-21 Jun 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, San Giorgio di Nogaro, bosco Ronchi di Sass, 45.48.21N 13.14.27E, 21 Jul-3 Aug 2013, 1♀ (MZUR).

Diagnosis. Tegula yellow. Prepectal carina ventrolaterally angled towards the lower corner of pronotum. Vein *2m-cu* in the front wing arising from the hind corner of the areola. Hind coxa black. Hind femur red, sometimes slightly infuscate basally. Hind tibia red, sometimes slightly infuscate subbasally and apically. Metasoma black, tergite II about 1.3 times as long as wide. Ovipositor about 1.3 times as long as hind tibia (Schmiedeknecht 1909; Szépligeti 1916; Horstmann 1985).

Distribution. Europe, new for Italy.

***Campoplex rothi* (Holmgren, 1860)**

Italy: Veneto, Treviso, Cessalto, bosco Olmè, 45.41.56N 12.37.09E, 23 Jul-5 Aug 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, Muzzana del Turgnano, Selva di Avronchi, 45.47.29N 13.07.04E, 8-18 May 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, Carlino, tenuta Villabruna, 45.46.35N 13.11.16E, 9-21 Jun 2013, 1♀ (MZUR).

Diagnosis. Tegula yellow. Hind femur red. Hind tibia yellowish-white medially, yellowish-red basally, apically infuscate. Metasomal tergites I and II black, other tergites more or less black medially and largely red laterally (Schmiedeknecht 1909; Szépligeti 1916).

Distribution. Europe, new for Italy.

***Diadegma annulicrus* (Thomson, 1887)**

Italy: Veneto, Padova, Arzergrande, scolo Schilla, 45.15.23N 12.03.18E, 11-21 May 2013, 1♀ (MZUR); Veneto, Venezia, Mestre, bosco di Carpenedo, 45.30.41N 12.14.47E, 9-19 May 2013, 1♀ (MZUR).

Diagnosis. Metasoma apically shining, without transverse grooves. Female metasomal tergite VII with deep notch apically, the notch with parallel sides. Metasomal tergite II less than twice as long as wide. Hind tibia basally and medially whitish, subbasally and apically infuscate. Ovipositor longer than metasomal tergite I but shorter than hind tibia (Horstmann 1969, 1973).

Distribution. Europe, new for Italy.

***Echthronomas facialis* (Thomson, 1887)**

(Fig. 1a: male habitus)

Italy: Veneto, Treviso, Gaiarine, Francenigo, bosco Crasere, 45.54.02N 12.29.59E, 10-22 Jun 2013 (MZUR).

Notes: The species is already known for Italy, having been collected by Smits van Burgst (1914, 1918) in North It-

aly (Bolzano, Trentino-Alto Adige). Although Smits van Burgst (1914: 326) collected a male, Horstmann (1987), in his revision of the European species of the genus, reports the male of *E. facialis* as unknown.

Description. Flagellum with 39 segments. Hind femur 4.6 times as long as wide. Propodeum without carination, basal transverse carina and lateromedial longitudinal carinae absent.

Color. Labial and maxillary palps, mandible except teeth, clypeus, face, frontal orbit up to lateral ocelli, scape ventrally, hind corner of pronotum and tegula yellow. Antenna ventrally dark brown to yellowish-brown distally. Pterostigma dark brown. Front and middle legs with coxa, trochanter and trochantellus, tibia and tarsus yellow, femur yellowish-red; hind leg with coxa, femur, trochanter and tarsus black, trochantellus and tibial spurs yellow; hind tibia yellow medially, black basally and on the apical 0.4. Metasoma black, tergites II and III with apical yellowish band, sternites pale.

Distribution. Europe (including Italy). Recently recorded in Ukraine (Varga 2014).

***Echthronomas ochrostoma* (Holmgren, 1860)**

(Fig. 1b: male habitus; male of this species was previously unknown)

Italy: Veneto, Treviso, Meolo, 45.36.22N 12.27.23E, 10-22 Jun 2013 (MZUR).

Description. Flagellum with 41 segments. Hind femur 4.8 times as long as wide. Propodeum with reduced carination, only basal transverse carina present (Fig. 1c).

Color: Labial and maxillary palps, mandible except teeth, clypeus, face, frontal orbit beneath ocelli, scape ventrally (Fig. 1d) and tegula yellowish. Pterostigma dark brown. All coxae, trochanters and trochantelli black, trochanters and trochantelli of front and middle legs with reddish spots; legs otherwise reddish, hind femur at the base and at the apex narrowly infuscate; hind tibia and tarsus black, hind tibia with a large subbasal ivory spot on outer side, its spurs ivory. Metasomal tergite II in the apical 0.2, tergite III completely and sides of tergite IV at base reddish, sternites dark.

Distribution. Northern and Central Europe, new for Italy.

***Hyposoter coxator* (Thomson, 1887)**

Italy: Veneto, Treviso, Meolo, 45.36.25N 12.27.25E, 23 Jul-5 Aug 2013, 1♀ (MZUR); Veneto, Treviso, Cessalto, Santa Maria di Campagna, bosco San Marco, 45.42.21N 12.34.42E, 23 Jul-5 Aug 2013, 1♀ (MZUR); Veneto, Ven-

ezia, Mestre, bosco di Carpenedo, 45.30.47N 12.14.45E, 9-21 Jun 2013, 1♀ (MZUR); Veneto, Venezia, Concordia Sagittaria, loc. Sindacale, bosco delle Lame, 45.41.48N 12.52.06E, 21 Jul-3 Aug 2013, 4♀♀ (MZUR).

Diagnosis. Scapus yellowish-white ventrally. Tegula white. Front and middle coxae yellowish-white, hind coxa red. Hind tibia yellowish-red medially, basally and apically infuscate. Metasoma black (Schmiedeknecht 1909; Szépligeti 1916).

Distribution. Europe, **new for Italy.**

***Hyposoter discedens* (Schmiedeknecht, 1909)**

Italy: Veneto, Treviso, Meolo, 45.36.25N 12.27.25E, 9-19 May 2013, 1♀ (MZUR); Veneto, Treviso, Cessalto, Santa Maria di Campagna, bosco San Marco, 45.42.21N 12.34.42E, 9-19 May 2013, 2♀♀ (MZUR); Veneto, Venezia, San Stino di Livenza, bosco di Bandiziol e Pressaccon, 45.44.58N 12.42.09E, 9-19 May 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, Palazzolo dello Stella, Nogali Braide, bosco Brussa, 45.45.54N 13.04.52E, 21 Jul-3 Aug 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, Marano Lagunare, tenuta Villabruna, 45.46.36N 13.09.32E, 9-21 Jun 2013, 2♀♀ (MZUR); Friuli-Venezia Giulia, Udine, Marano Lagunare, tenuta Villabruna, 45.46.36N 13.09.32E, 21 Jul-3 Aug 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, Carlino, tenuta Villabruna, 45.46.53N 13.12.09E, 9-21 Jun 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, Carlino, tenuta Villabruna, 45.47.33N 13.12.24E, 9-21 Jun 2013, 1♀ (MZUR).

Diagnosis. Scapus black but usually with yellow spot ventrally. Tegula whitish. Hind tibia red medially, with white spot at the base, subbasally and apically infuscate. Metasoma red, tergite I almost entirely and tergite II basally and medially black (Schmiedeknecht 1909; Szépligeti 1916).

Distribution. Europe, **new for Italy.**

***Hyposoter meridionellator* Aubert, 1965 (stat. rev.)**

Italy: Friuli-Venezia Giulia, Udine, San Giorgio di Nogaro, loc. Zellina, bosco Boscato, 45.49.60N 13.10.03E, 21 Jul-3 Aug 2013, 1♀ (MR).

Diagnosis. Metasomal tergite I without glymma. Tegula yellow. Front and middle coxae partly yellow, hind coxa black. Front trochanter and trochantellus yellow. Metasomal tergites I-III black, apically red, tergites IV and V completely reddish. Ovipositor slightly shorter than postpetiole.

H. rufovariatus (Schmiedeknecht) differs by: metasomal

tergite I with distinct glymma. Tegula black with ivory spot. Metasomal tergite III laterally red, tergites IV and V red with baso-median black spots. Ovipositor as long as the postpetiole.

Distribution. Previously known from France and Corsica (Aubert 1965, 1966, 1969), **new for Italy.**

***Hyposoter tenuicosta* (Thomson, 1887)**

Italy: Veneto, Treviso, Meolo, 45.36.25N 12.27.25E, 23 Jul-5 Aug 2013, 1♀ (MR); Veneto, Venezia, Portogruaro, loc. Lison, bosco del Merlo, 45.44.48N 12.44.30E, 23 Jul-5 Aug 2013, 1♀ (MZUR).

Diagnosis. Tegula brown-black. Propodeum with costulae faint. Hind tibia yellowish-red, apically infuscate. Metasoma almost entirely black, tergite II apically and tergites III and IV laterally red-brown marked (Schmiedeknecht 1909; Szépligeti 1916).

Distribution. Europe, **new for Italy.**

***Olesicampe binotata* (Thomson, 1887)**

Italy: Veneto, Treviso, Meolo, 45.36.25N 12.27.25E, 10-22 Jun 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, Carlino, proprietà Villabruna, 45.46.37N 13.11.15E, 9-21 Jun 2013, 1♂, F. Di Giovanni det. (MZUR).

Diagnosis. Clypeus black. Tegula yellow. Hind femur brown-black, reddish on the inner side. Hind tibia red, whitish at the base and infuscate apically. Metasoma basally and apically black, tergite II apically, tergites III and IV, and sometimes tergite V laterally and medially red. Metasomal tergite I laterally without wrinkles. (Schmiedeknecht 1909; Szépligeti 1916).

Distribution. Europe, **new for Italy.**

***Rhimphoctona melanura* (Holmgren, 1860)**

Italy: Friuli-Venezia Giulia, Udine, San Giorgio di Nogaro, bosco Ronchi di Sass, 45.48.21N 13.14.27E, 9-21 Jun 2013, 1♀ (MZUR).

Diagnosis. Head and mesosoma with coriaceous background. Temples almost parallel behind eyes. Hind coxa black, hind femur red. Costulae of propodeum present, area superomedia wider and longer than area basalis. Ovipositor longer than hind tibia (Horstmann 1980).

Distribution. Europe, **new for Italy.**

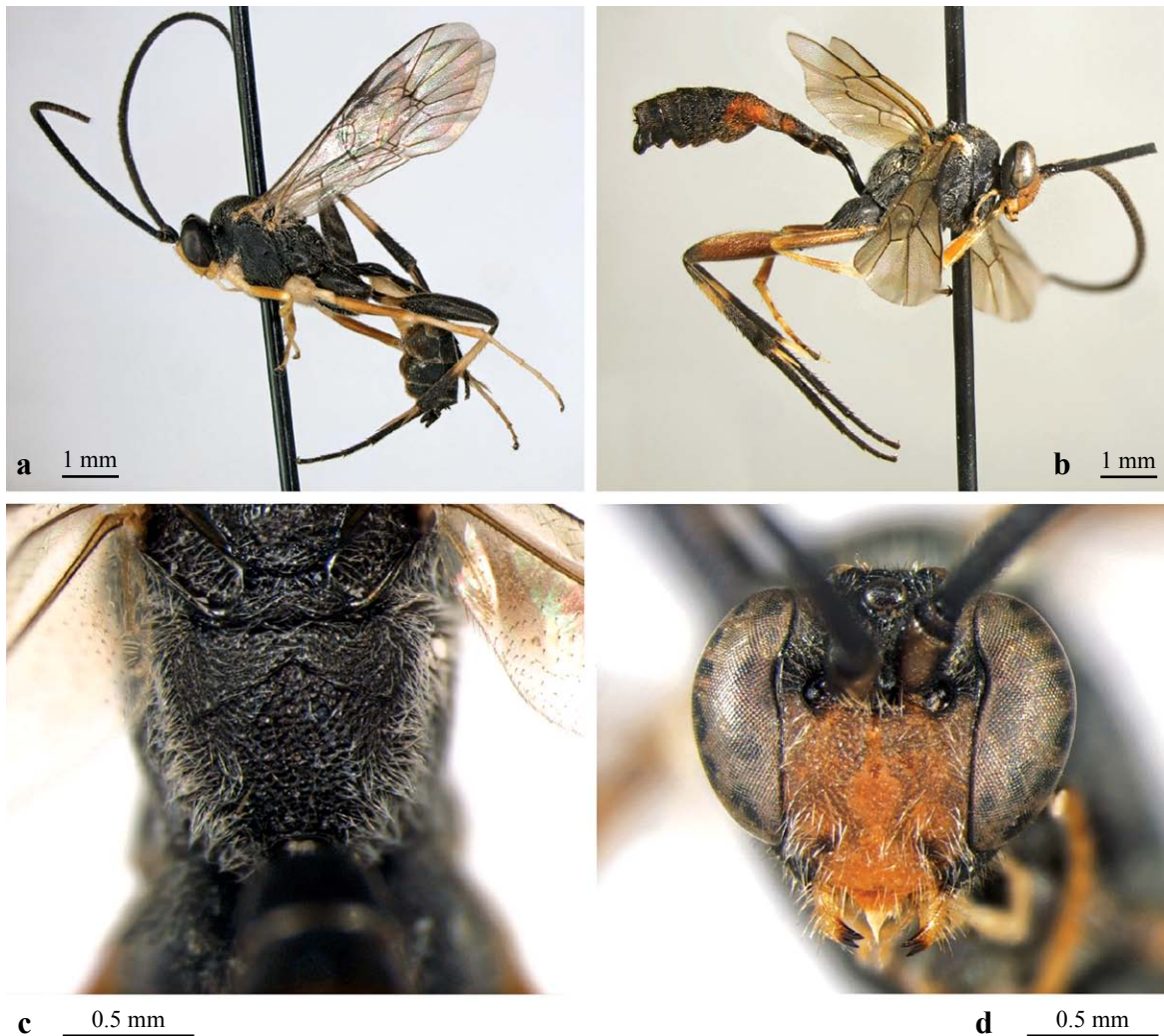


Fig. 1 – *Echthronomas facialis* (Thomson, 1887): habitus of the ♂ (a); *Echthronomas ochrostoma* (Holmgren, 1860), habitus of the ♂ (b); *Echthronomas ochrostoma* (Holmgren, 1860), propodeum of the ♂ (c); *Echthronomas ochrostoma* (Holmgren, 1860), face of the ♂ (d).

Sinophorus nitidus (Brischke, 1880)

Italy: Veneto, Treviso, Meolo, 45.36.25N 12.27.25E, 9-19 May 2013, 2♀♀ (MZUR); Veneto, Treviso, Meolo, 45.36.25N 12.27.25E, 10-22 Jun 2013, 5♀♀ (MZUR); Veneto, Venezia, Mestre, bosco di Carpenedo, 45.30.41N 12.14.47E, 9-21 Jun 2013, 1♀ (MZUR); Veneto, Venezia, Mestre, bosco di Carpenedo, 45.30.47N 12.14.45E, 9-21 Jun 2013, 1♀ (MZUR); Friuli-Venezia Giulia, Udine, Marano Lagunare, tenuta Villabruna, 45.46.36N 13.09.32E, 21 Jul-3 Aug 2013, 1♀ (MZUR).

Diagnosis. Tegula partly yellow or blackish. All femora and tibiae, and hind basitarsus reddish. Metasoma black; metasomal tergite I without lateral groove. Ovipositor 2.5-2.7 times as long as hind femur (Sanborne, 1984).

Distribution. Holarctic and Oriental regions, **new for Italy.**

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