Notes on endemic Alpine chrysidids, with key to Alpine *Philoctetes* Abeille de Perrin, 1879, and remarks on two rarely collected species (Hymenoptera, Chrysididae)

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Abstract - A detailed study of two endemic Alpine species of the genus *Philoctetes* Abeille de Perrin, 1879 is given, as well as a key to the Alpine *Philoctetes* species and a brief discussion on Alpine Chrysididae. New distributional data, notes on type specimens and pictures are provided. A new synonym *Philoctetes putoni* (du Buysson, 1892) = *Philoctetes delvarei* Tussac & Tussac, 1993 **syn. n.** is proposed.

Key words: Chrysididae, Elampini, *Philoctetes*, taxonomy, Alps.

Riassunto - Note sui crisidi endemici delle Alpi, con chiave dicotomica per i *Philoctetes* Abeille de Perrin, 1879 alpini e considerazioni su due specie raramente raccolte (Hymenoptera, Chrysididae).

Viene presentato uno studio dettagliato di due specie endemiche delle Alpi nel genere *Philoctetes* Abeille de Perrin, 1879, assieme ad una chiave dicotomica per i *Philoctetes* alpini ed una breve discussione sui crisidi alpini. Vengono forniti nuovi dati distribuzionali, osservazioni sugli esemplari tipici e immagini di esemplari e ambienti. Viene proposta la nuova sinonimia *Philoctetes putoni* (du Buysson, 1892) = *Philoctetes delvarei* Tussac & Tussac, 1993 **syn. n.**

Parole chiave: Chrysididae, Elampini, *Philoctetes*, tassonomia, Alpi.

INTRODUCTION

Few notes have been published on Alpine Chrysididae so far (Invrea, 1941; Linsenmaier, 1968, 1997; Rosa, 2006), and some scattered data and descriptions were provided by Giraud (1863), Trautmann & Trautmann (1919), Berland & Bernard (1938), Trautmann (1927), Zimmermann (1944), Linsenmaier (1959), Tussac & Tussac (1993), Niehuis (2000) and Schmid-Egger (2011).

Endemic species are seemingly rare among Chrysididae, and they mostly concern insular faunas (Kimsey & Bohart, 1991); nevertheless, a small number of endemic species can be found in the Alps (Linsenmaier, 1968; Rosa, 2006) as well. Four of them belong to Elampini [*Hedychridium aereolum* sensu Linsenmaier, 1959, *H. cupratum* (Dahlbom, 1854), *Philoctetes helveticus* (Linsenmaier, 1959), *Ph. putoni* (du Buysson, 1892)], and two belong to Chrysidini (*Chrysis lucida* Linsenmaier, 1959; *C. angustula* ssp. *alpina* Niehuis, 2000). Alpine endemic species are usually found between 1400 m and 2400 m and share some morphological features: flattened body, shallow punctuation, and long, blackish erect setae. Linsenmaier (1968) also mentioned the lengthening of the mesosoma.

A complete biogeographical study of the Alpine species has never been published. As some parts of the Alps have never been permanently covered by glaciers (Vaccari, 1941), Rosa (2006) suggested that species apparently endemic to the Alps survived in intra-Alpine ice-free refugia even during the maximum expansion of the Würm glaciation, rather than following the glaciers front to the plains. This hypothesis is supported by their limited areale in the Alps, with total exclusion of the pre-Alpine areas; yet, their absence in lowland regions could be also caused by adaptations to colder climates and competition with species better adapted to higher temperatures; lastly, hosts of these chrysidids are unknown and therefore a biogeographical analysis is unreliable at this time.

MATERIALS AND METHODS

Photographs were taken by means of a Canon PowerShot S50 digital camera mounted on a Leica MS5 stereomicroscope and processed through the Combine ZP software. Backscattered images were taken with a scanning electron microscope JEOL JSM 5610 LV. Images of type specimens were taken by P. Rosa by a Nikon D-80 connected to a stereomicroscope Togal SCZ and stacked through the Combine ZP software. White balance was calibrated using photo-camera settings to reduce blue effects of fluorescent light of Togal microscope. Pictures in the field were taken by M. Jacobs with Canon 7D Mark II and Canon EF 100mm F2.8L Macro IS USM.

Morphological terminology follows that of Kimsey & Bohart (1991).

Abbreviations used in the descriptions are: F1, F2, F3, etc. = flagellomere I, flagellomere II, flagellomere III and

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Received: 17 November 2016
Accepted for publication: 21 December 2016

so on; l/w = length/ width; MOD = midocellus diameter; MS = malar space, the shortest distance between the base of the mandible and the lower margin of the compound eye; OOL = the shortest distance between the posterior ocellus and the compound eye; P = pedicel; PD = puncture diameter; POL = the shortest distance between posterior ocelli; T1, T2, T3 = metasomal terga 1, 2, and 3.

Depositories

MNHU	Museum für Naturkunde der Humboldt-Universität, Berlin, Germany.
CHUR	Museum of the Chur National Park, Zernez, Switzerland.
CSEC	Christian Schmid-Egger personal Collection, Berlin, Germany.
MJC	Maarten Jacobs personal Collection, Herentals, Belgium.
MNHN	National Museum of Natural History, Paris, France.
MZC	Michele Zilioli personal Collection, Albizzate, Italy.
NMLS	Natur-Museum Luzern, Switzerland.
PRC	Paolo Rosa personal Collection, Bernareggio, Italy.
ZIN	Zoological Institute, St. Petersburg, Russia.
ZFMK	Zoological Research Museum Alexander Koenig, Bonn, Germany.

THE ALPINE CHRYSIDIDAE

Only five species are seemingly endemic to Alps (*Hedychridium aereolum* sensu Linsenmaier, 1959, *H. cupratum*, *Philoctetes helveticus*, *Ph. putoni* and *Chrysis lucida*).

Chrysis lucida is collected in France, Switzerland, Italy and Austria. It was firstly described as *C. succincta* var. *hirsuta* Trautmann & Trautmann, 1919 [*nec* Gerstäcker, 1869], whose type was probably destroyed during World War II bombings (Frank Koch, pers. comm.). *Hedychridium cupratum* is collected in France, Italy, Switzerland and Austria; Linsenmaier (1987) reported it from Morocco (Anti-Atlas mountains) too. Later, Linsenmaier (1999) wrote that the specimen collected by Naef in Morocco was possibly mislabeled and actually came from Wallis (Switzerland), where Naef usually collected Chrysididae (Rosa *et al*. 2015a). Also, we consider the species identified as *Hedychridium aereolum sensu* Linsenmaier (1959) as endemic. It is known from the Alps in France, Italy, Switzerland and southern Germany (Baden-Württemberg), but it is actually an undescribed species. In fact, the study of the type material of *H. minutum* var. *aereolum* du Buysson, 1893 (by P.R. and O. Niehuis *in litteris*) confirms *H. minutum* var. *aereolum* as a junior synonym of *H. ardens* (Coquebert, 1801), and the species mentioned by Linsenmaier is still unnamed. Linsenmaier (1987) also reported *H. aereolum* from the Pyrenees, and Invrea (1941) from the Apennines, at Camigliatello Silano, but at least the latter citation is related to another undescribed species. The other two Elampini, namely *Philoctetes helveticus* and *Ph. putoni* are dealt with in the present article.

Genus *Philoctetes* Abeille de Perrin, 1879

Philoctetes Abeille de Perrin, 1879: 26. Type species: *Holopyga cicatrix* Abeille de Perrin, 1879 (= *Philoctetes micans* (Klug, 1835)). Designated by Ashmead, 1902.

Generic diagnosis

1) short malar space (≤1 MOD), not distinctly bisected by the curved genal carina;
2) genal carina usually faint or not sharply elevated;
3) pronotum weakly to strongly concave laterally and punctate medially;
4) mesoscutum with punctures clumped along notauli, or more evenly distributed, but anyway gathering together toward notauli;
5) mesopleuron extending ventrally as an oblique angle, ecarinate and not strongly projecting between omaulus and scrobal carina;
6) metascutellum conical to spine-like;
7) forewing with medial cell glabrous, medial vein strongly arched, stigma short;
8) fore femur often carinate ventrally;
9) tarsal claws with 1-3 subsidiary teeth (Rosa *et al*. 2015b).

DISCUSSION

The interpretation of the genus *Philoctetes* has changed notably, according to different authors. Linsenmaier (1959, 1997, 1999) considered it as a subgenus of *Omalus* Panzer, 1801 and followed the original meaning given by Abeille de Perrin (1879), as well as du Buysson (1891-1896), Bischoff (1913), Trautmann (1927). These authors considered *Philoctetes* as a homogeneous genus including only few species characterized by small size (2-4 mm); conical to mucronate, rarely convex, metascutellum; enlarged hind tibiae (especially in males), with a pointed transverse apical swelling; tarsal claws with three subsidiary teeth (Rosa *et al.,* 2015b). On the other side, Kimsey & Bohart (1991) provided a different interpretation of the genus, including additional diagnostic features such as malar space not bisected by genal carina and mesoscutal punctures usually clumped along notauli. Kimsey & Bohart (1991) were followed by most recent authors, including Rosa (2006). Nevertheless, the list of the species assigned to *Philoctetes* by Kimsey & Bohart (1991) was recently deeply modified (Tussac & Tussac, 1993; Mingo, 1994; Niehuis, 2001; Rosa, 2003, 2005, 2006; Rosa *et al*., 2014, 2015a, 2015b), and now includes species that Kimsey & Bohart (1991) considered as belonging to *Elampus* Spinola, 1806, *Holophris* Mocsáry, 1890, *Omalus* Panzer, 1801, and *Pseudomalus* Ashmead, 1902. The *Philoctetes* species dealt with below were included by Kimsey & Bohart (1991) in the genera *Elampus* (*Ph. putoni*) and *Pseudomalus* (*Ph. helveticus*).

KEY TO THE ALPINE SPECIES OF *PHILOCTETES*

1- Body entirely blue, green to dark green in both sexes (Figs. 1-6) 2
- Body distinctly bicoloured: head and mesosoma green, green-blue or blue contrasting with red or golden-red T1, T2, and often T3 as well. Male sometimes dorsally darkened, but bicoloured in lateral view 4

2- Metascutellum with large, elongated parallel sided projection (Figs. 4B, 5B, 6B, 7B,D,F) .... ***Ph. putoni* (du Buysson, 1892)**
- Metascutellum without projection, sharply angled or slightly protruding (Figs.1B, 2B, 7A,C, 7 E) 3

3- Body covered with short (up to 1.5 MOD) standing white setae. In lateral view, metascutellum sharply convex; apical median notch on T3 with thick border; posterolateral margins of T3 sinuous ….....…… ……...……..... ***Ph. truncatus* (Dahlbom, 1831)**
- Body covered with long (up to 2 MOD) standing black setae (Figs. 1D, 2D); in lateral view metascutellum slightly protruding (Figs. 1B, 2B,C, 7C), and in dorsal view triangularly shaped (Fig. 7A); apical median notch on T3 with thin border, posterolateral margins of T3 uniformly arched (Figs. 1D, 2D) .....…..…. ***Ph. helveticus* (Linsenmaier, 1959)**

4- T1 and T2 red or golden red, distinctly contrasting with green or light blue T3. T3 margin with a shallow median notch, and uniformly arched laterally. T3 without transverse swelling or thickened rim …..... ..... ***Ph. bogdanovii* (Radoszkowski, 1877)**
- T1, T2, and T3 uniformly red or golden red. T3 margin with a deep median notch, and sinuous laterally, or apical margin of T3 with transverse swelling and shallow notch 5

5- Margin of T3 with a shallow median notch, transverse swelling, and uniformly arched sides …..... ..... ***Ph. punctulatus* (Dahlbom, 1854)**
- Margin of T3 with deep median notch, no transverse swelling, and sinuous sides (in male sometimes less evidently so) ..... ***Ph. bidentulus* (Lepeletier, 1806)**

***Philoctetes helveticus* (Linsenmaier, 1959)** (Figs. 1A-D, 2A-D, 3A, 7A,C,E)

Omalus (*Omalus*) *helveticus* Linsenmaier, 1959: 16. Holotype ♀; Switzerland: Engadin (Chur); Linsenmaier, 1968: 72; Linsenmaier, 1997: 134.

Pseudomalus helveticus: Kimsey & Bohart, 1991: 267.

Philoctetes helveticus: Tussac & Tussac, 1993: 475.

Pseudomalus helveticus (Linsenmaier, 1959) synonym of *Pseudomalus putoni* (du Buysson, 1892): Strumia, 2001: 89.

Philoctetes helveticus Rosa, 2005: 13. Revalidated. Rosa, 2006: 122.

Material examined. *Switzerland:* 1 ♀: [Fourn, 1900 m, de Beaumont] [♀ Type *Omalus* Pz. *helveticus* Linsenmaier det.] <handwritten in red> (Chur); 1♂: [Chandolin CH 4.VII.1982 Alpage 2200 m W. Perraudin] [♂ Allotype *Omalus* Pz. *helveticus* Linsenmaier det. 1991] <handwritten in red> [25] (NMLS); 1♀: [Zermatt 10/7] [♀ Omalus Pz. *helveticus* Lins. Linsenmaier det. 1984] (NMLS); *Italy:* 1♀: [Italy, Aosta Valley, Chamolé Lake, 2350 m, 4.VIII.2016, leg. M. Jacobs] (PRC) (Figs. 3A-B).

Distribution. Switzerland and Italy. Specimens have been collected in alpine grassland, shrublands or rocky places between 1600 m and 2350 m (Fig. 2B). M. Jacobs, after the recent finding of *Ph. helveticus* in August 2016, spent extra five days around the collecting place at Chamolé Lake (Pila, Aosta) and its vicinity looking without success for other specimens by visual search, Moerike traps and sweeping grasses, herbs and branches (mainly pine trees and willows). Therefore, it stays unclear if there is a population of *P. helveticus* present, whereas the species is very rare or is rarely found due to its ecology (flight period, habitat preferences, etc.) or the specimen got there by accident from higher or lower elevation.

Diagnosis. *Philoctetes helveticus* is closely related to *Ph. putoni*, but can be easily separated by its distinctly convex metascutellum ending in a short triangular and raised prominence (*vs*. metascutellum with a subrectangular and elongate plate in *Ph. putoni*); T1 densely punctate (*vs*. T1 antero-medially polished, postero-laterally with tiny dots); metasoma with long, thick, black and erect setae (*vs*. metasoma with short, appressed and whitish setae).

Description. Body length: 4.4-4.6 mm; fore wing length: 3.0 mm; OOL = 2.7 MOD; POL = 1.9 MOD; MS = 1.0 MOD; relative length of P:F1:F2:F3 = 1:1.2:0.7:0.6.

Head. Frons, vertex and face laterally to scapal basin with small (up to 0.5 MOD) and shallow punctures (Fig. 1C). Punctures along posterior margin of vertex smaller, with two impunctate areas posterior to ocelli. Scapal basin glabrous, transversally and irregularly rugulose. Gena with large punctures only; genal carina not bisecting MS (Fig. 1B). Ocellar triangle isosceles, postocellar line indistinct, with only short line (< 0.5 MOD) starting from ocelli. Mandible tridentate.

Mesosoma. Pronotum antero-laterally with shallow punctures as large as those on vertex; anteromedially with shallower and smaller punctures, intervals and posteromedian surface with tiny dots. Mesoscutum with small (0.5 MOD) and shallow punctures mostly clumped along notauli (Figs. 1A, 2A); notaular pit deep and short (about 1 MOD); parapsidal furrows as narrow lines. Mesoscutellum with large punctures (1 MOD) medially with large polished area (0.5 PD). Metascutellum convex, triangular in dorsal view ending in a short triangular and raised median prominence (Figs. 1B, 2B,C, 7A,B). Mesopleuron with confluent large punctures. Tarsal claw four-toothed.

Metasoma. T1 and T2 dorsally finely and uniformly punctuate (Figs. 1A, 7E), laterally with double punctuation with tiny and larger dots irregularly distributed; T3 with irregular larger punctures; T3 transversely depressed before the apical margin, depression well visible in lateral view (Fig. 1B); T3 margin mostly laterally gently curved; towards the middle an undulation abruptly starts and it is followed by a brownish rim to apical notch. Apical notch triangular bordered by a thickened margin (Fig. 1D).

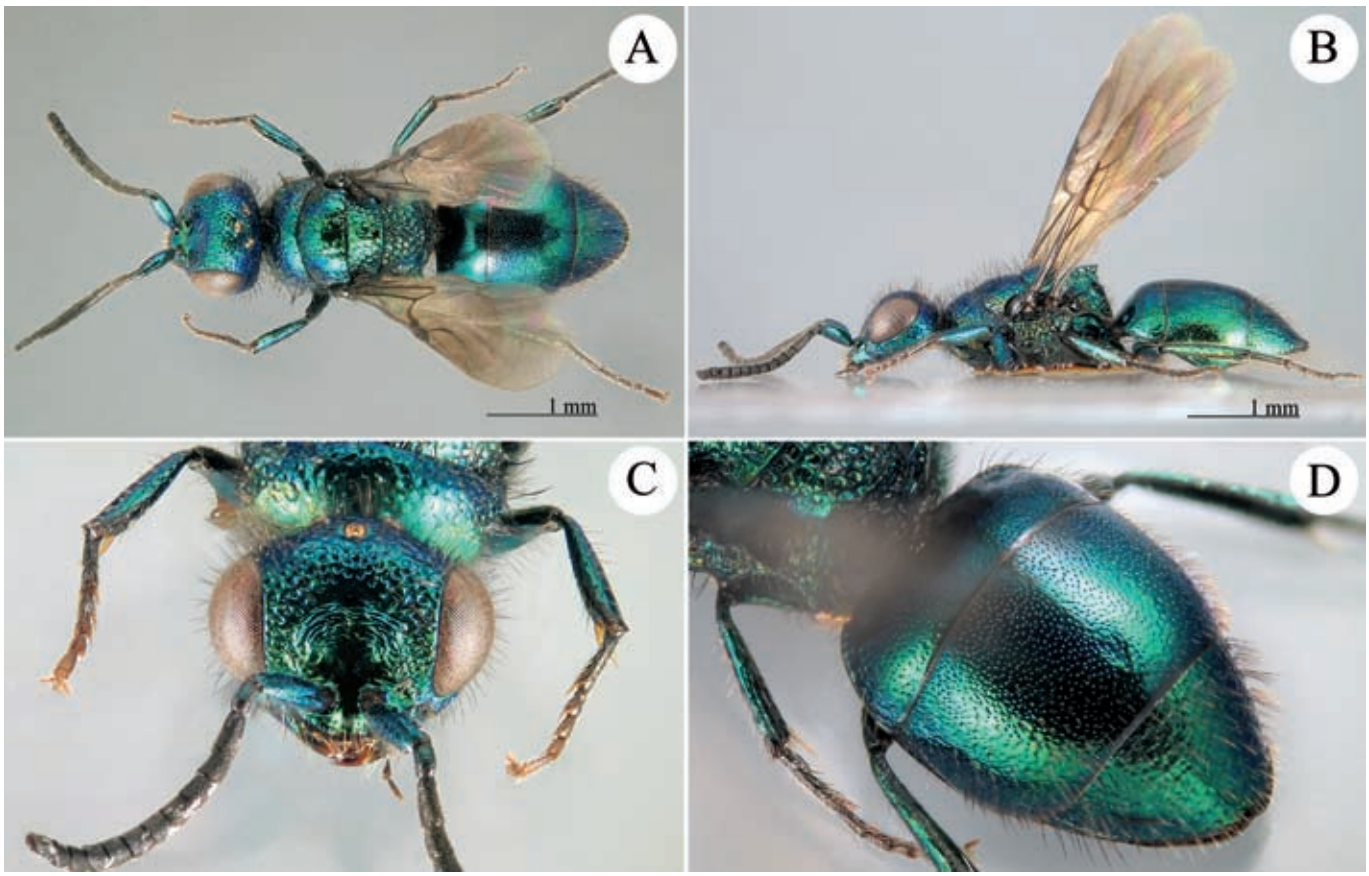

Fig. 1 - *Philoctetes helveticus* (Linsenmaier), female: A) habitus, dorsal view; B) habitus, lateral view; C) head, frontal view; D) T3, dorso-lateral view.

Colour. Body metallic green with brassy reflections in living specimens (Fig. 3A). Dry collection specimens are darker, green to blue with greenish reflections on scutellum and metanotum (Fig. 2). T1 and T2 medially with large dark to black areas. Legs metallic green to blue, tarsi dark brown. Antenna with metallic green scapus and pedicel, flagellum entirely black.

Vestiture. Head and mesosoma coated with long, standing black setae (1.6-2.2 MOD). Metasoma laterally with long (2-2.2 MOD), standing black setae (Figs. 1D, 2D). Legs with short (1 MOD) whitish setae.

Remarks. In the original description, Linsenmaier (1959) placed *Omalus helveticus* in the subgenus *Omalus* s.str. rather than in *Philoctetes* because only the female was known. He considered as belonging to *Philoctetes* only those species with males having dilated and flattened posterior tibia. Kimsey & Bohart (1991) placed *O. helveticus* in the genus *Pseudomalus* without having examined the type. Tussac & Tussac (1993) placed *O. helveticus* in the genus *Philoctetes*, based on the description and the drawings provided by Linsenmaier (1959); whereas Strumia (1995) included *O. helveticus* again in the genus *Pseudomalus*, and later (2001) synonymized *O. helveticus* with *Ps. putoni* after examining the type of the latter, but not the type of *O. helveticus*. Rosa (2006) revalidated *O. helveticus* in the genus *Philoctetes*.

A 1991 labelled "allotype" male of *Ph. helveticus* in Linsenmaier's collection is not part of the type series, which is based only on the holotype, by monotypy, housed at CHUR.

Since the only cited specimen for Italy [Valle d'Aosta, Val d'Ayas (Strumia, 2001)] was not available for this study, and Strumia (2001) considered *Ph. helveticus* as a synonym of *Ph. putoni*, we were not sure about the presence of *Ph. helveticus* in Aosta Valley (Rosa, 2006). Recently, a female specimen has been collected by one of us (M.J.) around the Chamolé lake, Pila (Aosta), 2350 m, and it can be considered as the first reliable Italian record. This species is one of the most rarely collected and only four specimens are preserved in the examined European collections so far.

Linsenmaier (1997) placed *O. helveticus* in the newly established *hirtus* species-group [based on *Ellampus* (*Philoctetes*) *hirtus* (Semenov, 1932)]. Nevertheless, after type examination at ZIN, we confirm Kimsey & Bohart's (1991) classification, which includes *E. hirtus* into the genus *Pseudomalus*; whereas *Ph. hirsutus* (Semenov, 1932) from Uzbekistan is undoubtedly the most similar species. The latter is very similar to *Ph. helveticus*, but has a non protruding metascutellum and deeper body punctuation.

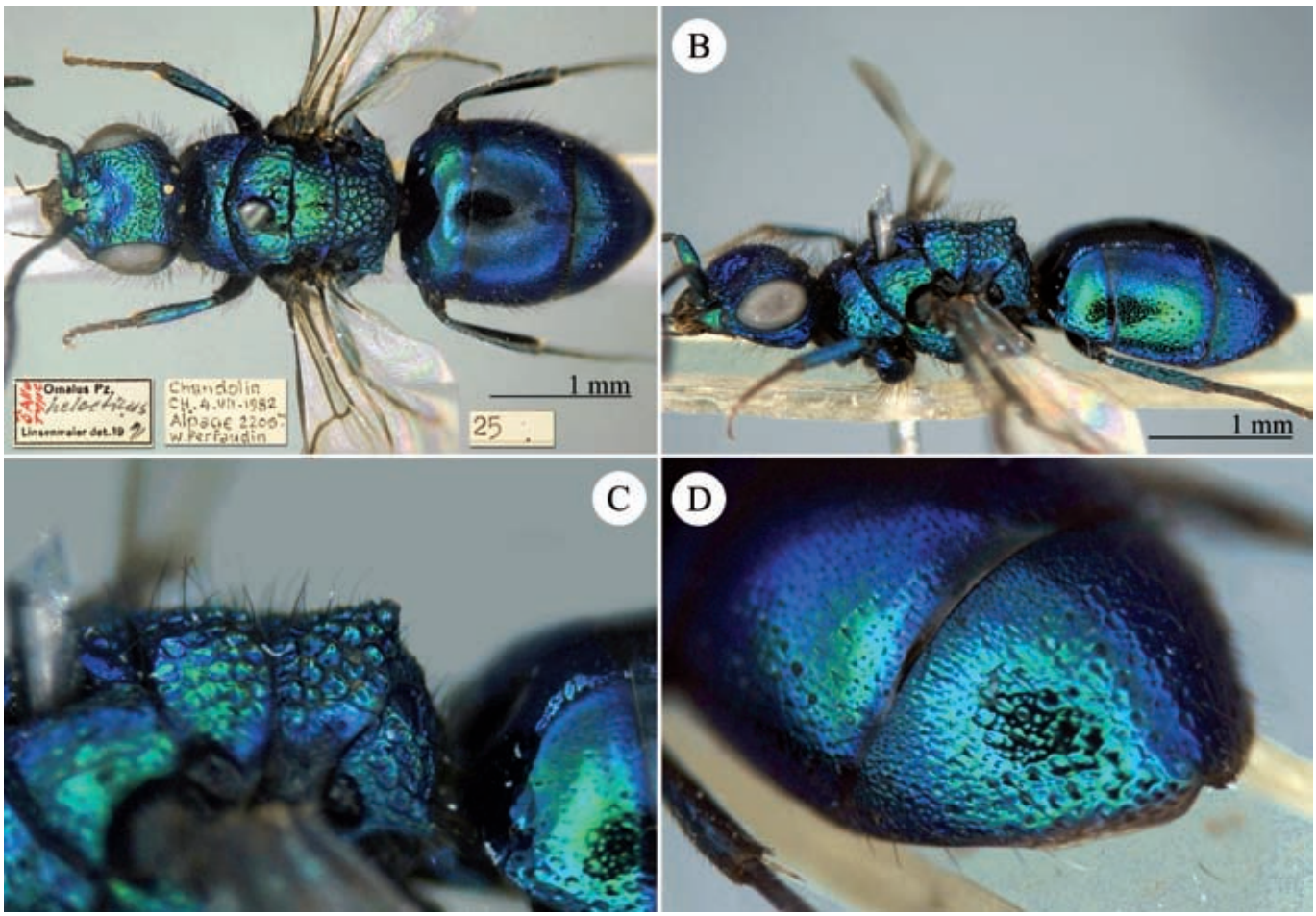

Fig. 2 - *Philoctetes helveticus* (Linsenmaier), male: A) habitus, dorsal view; B) habitus, lateral view; C) scutellum and metascutellum, lateral view; D) T3, dorso-lateral view.

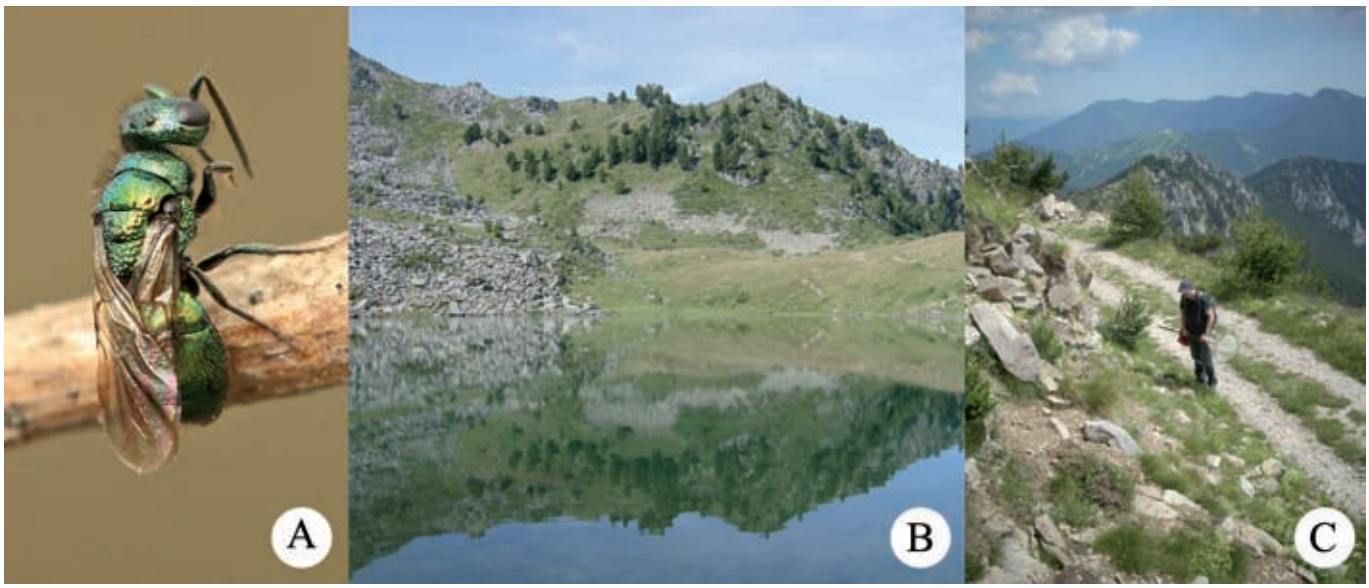

Fig. 3 - A) *Philoctetes helveticus*, female (Photo by M. Jacobs); B) Aosta Valley, Chamolé lake, 2350 m (Photo by C. Monte); C) O. Niehuis looking for *P. putoni* at Milefonts, 2030 m, Mercantour National Park (Photo by P. Rosa).

***Philoctetes putoni* (du Buysson, 1892)** (Figs. 4A-D, 5A-D, 6A-D, 7B,D,F)

Notozus putoni du Buysson, 1892: 108. Holotype ♂; France: Basses-Alpes, Larche (Paris) (examined).

Elampus putoni: Kimsey & Bohart, 1991: 169.

Philoctetes delvarei Tussac & Tussac, 1993: 473. Holotype ♂; France: Hautes-Alpes, Arvieux, 1750 m, 16.vii.1990, leg. G. Delvare (Paris) (examined). **Syn. nov.**

Pseudomalus putoni: Strumia, 2001: 89.

Philoctetes putoni: Rosa, 2005: 13; Rosa, 2006: 120; Schmid-Egger, 2011: 36.

Material examined. *France:* 1♀: [Larche *24/7*] [Museum Paris *Larche Basses-Alpes* Coll. R. du Buysson 1900] [*Notozus putoni Buyss*. R. du Buysson det.] [Holotypus *Notozus putoni Buyss. des. Móczár 1998*] (NMHN); 1♂: [France Hautes Alpes Arvieux 1750 m] [Brunissard 7.VII.1990 G. Delvare leg.] [457] [Muséum Paris *1994 Don 806*] [Holotype ♂ Philoctetes delvarei dét. H. Tussac 1993] (NMHN); 1♀: [France: Hautes Alpes Arvieux L'Eychaillon] [2150 m 16.VII.1990 G. Delvare leg.] [459] [Muséum Paris *1994 Don 806*] [Paratype ♀ Philoctetes delvarei dét. H. Tussac 1993] (NMHN); 1♂, 1♀: Mercantour National Park, Col de la Cayolle 2300 m, 14.VII.2010, leg. C. Schmid-Egger (CSEC); 2♀♀, Mercantour National Park, Le Pra, 1700 m, 44.3238 N 6.8836 E, 1700 m, 17.VII.2009, leg. Schmid-Egger (CSEC); 5♀♀: Mercantour National Park, Millefonts, 2030 m, 44.1025 N 7.1721 E, 15.VII.2009 and 13.VII.2010, leg. C. Schmid-Egger (CSEC); 1♂: Mercantour National Park: La Foux d'Allos, 1900 m, 44.294 N 6.564 E, 15.VII.2010, leg. C. Schmid-Egger (CSEC). 18♂♂ and 4♀♀: Mercantour National Park, Millefonts, 2050 m, 44°05'51.27"N 7°11'01.41"E, 13-14.VII.2011, leg. O. Niehuis (ZFMK); 9♂♂ and 7♀♀: same collecting data, leg. P. Rosa (MNHN, MJC, MZC, PRC) (Fig. 3C). Italy: 1♀: [Aosta, Pondel, 880 m, 5.VIII.2002, leg. M. Zilioli] (PRC).

Distribution. France and Italy. *Philoctetes putoni* has been frequently collected in the Provence-Alpes-Côte d'Azur (Mercantour National Park (Schmid-Egger, 2011 and pers. obs.)), Parc National des Écrins (Berland & Bernard, 1938), and Parc Naturel Régional du Queyras (Tussac & Tussac, 1993), but it seems widespread and common in the western Alps and it is expected also from Piedmont (Parco Naturale delle Alpi Marittime). French specimens have been collected in alpine grassland between 1700 m and 2300 m. The Valle d'Aosta specimen was collected in the xerothermic area of Pondel, Val di Cogne, at 880 m. This specimen seemingly reached this dry and warm site following a wind stream from the surrounding high mountains included in the Parco Nazionale del Gran Paradiso. The specimen cited for "Val d'Ayas" (without any more precise locality indication) indicates that the species is widespread on both sides of Aosta Valley. Also, other Alpine endemic species, as *Chrysis lucida*, *Hedychridium aereolum* sensu Linsenmaier and *H. cupreum*, were collected in Val d'Ayas

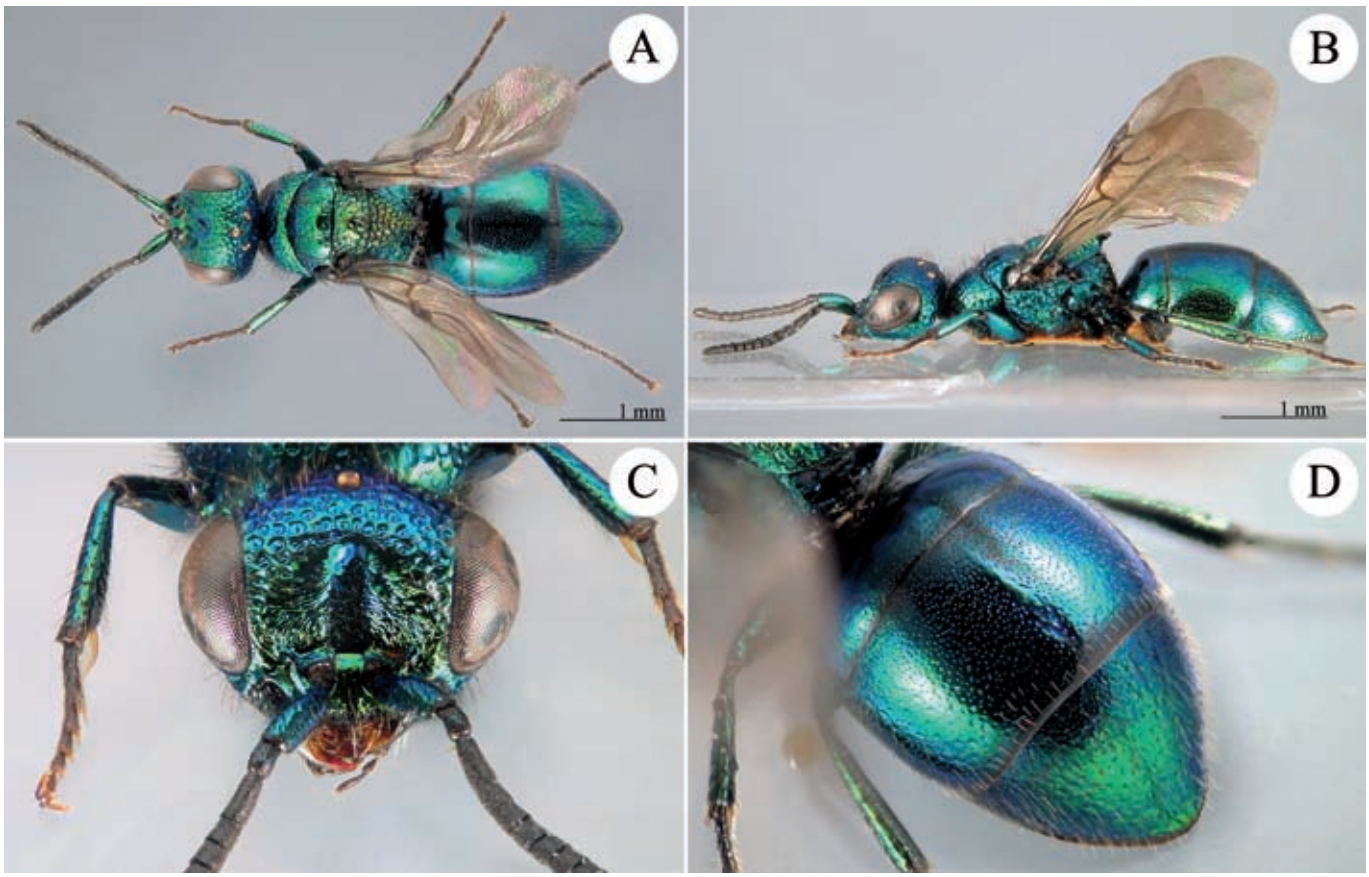

Fig. 4 - *Philoctetes putoni* (du Buysson), female: A) habitus, dorsal view; B) habitus, lateral view; C) head, frontal view; D) T3, dorsolateral view.

alpine grassland from Crest, 1900 m, Ostafa, 2400 m, and Fiéry, 1800 m (Rosa, 2006), and therefore *P. putoni* is expected in the mountains above Champoluc.

Description. Body length: 3.7-7.7 mm; fore wing length: 2.5-3.5 mm; OOL = 2.5 MOD; POL = 2.1 MOD; MS = 1.0 MOD; relative length of P:F1:F2:F3 = 1:1.35:0.8:0.7.

Head. Frons, vertex, face between compound eyes and scapal basin with small (up to 0.75 MOD), deeper and well defined punctures. Posterior margin of vertex with smaller punctures, and two impunctate areas behind ocelli. Scapal basin medially polished, laterally transversally and irregularly rugulose (Fig. 4C). Gena with large punctures only. Genal carina not bisecting MS (Fig. 4B). Ocellar triangle isosceles, postocellar line indistinct, with a short line (<0.5 MOD) barely visible starting from ocelli. Mandible tridentate.

Mesosoma. Pronotum with deep punctures similar to those on vertex, medially with smooth intervals (1-2 PD), and with row of small punctures along the posterior margin. Mesoscutum with large (0.5-0.75 MOD) and well distinct punctures mostly clumped along notauli; punctures basally between notauli larger, generally about 1 MOD; notaular pit deep and short (about 1 MOD); parapsidal furrows complete as narrow lines (Fig. 4A). Mesoscutellum with large punctures (1 MOD) antero-medially with larger polished area (0.5 PD). Metascutellum with elongate subrectangular lamella, apically subtruncate; lamella long as or longer than scutellum width (Figs. 4A, 5A, 7B). Mesopleuron with large punctures without intervals. Tarsal claw four-toothed.

Metasoma. T1 antero-medially polished, T1 laterally and T2 dorsally with fine, uniformly scattered tiny dots (Fig. 7F); laterally with double punctuation foveolate-puncticulate irregularly distributed. T3 with irregular, larger punctures; T3 posterior margin gently convex; an undulation starts abruptly in the middle with a brownish rim reaching the apical notch. T3 transversely depressed before the apical margin, depression well visible in lateral view; T3 apical notch triangular and bordered by a thickened margin (Figs. 5D, 6D).

Colour. Body metallic green to green-blue in living specimens. Dried collection specimens darker, green to blue with greenish reflections on scutellum and metanotum; T1 and T2 medially with large dark to blackish areas. Legs metallic green to blue, tarsi light brown. Antenna with scapus metallic green, pedicel and flagellum entirely black.

Vestiture. Head and mesosoma with long, black erect setae (1.0-1.8 MOD). Metasoma laterally with short (1-1.5 MOD) and appressed whitish setae (Figs. 4D, 6D). Legs with short (1 MOD) and whitish setae.

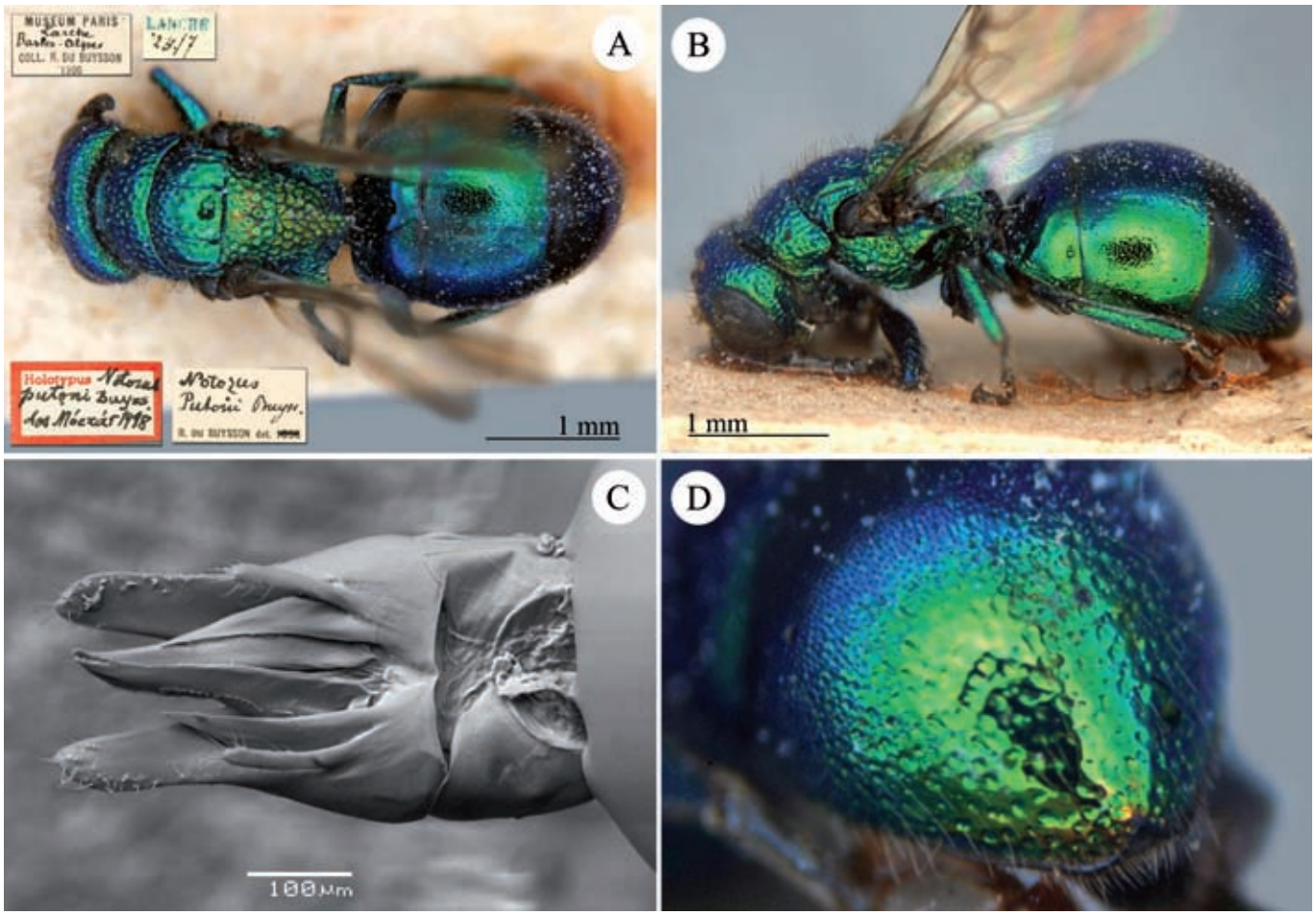

Fig. 5 - *Philoctetes putoni* (du Buysson), female, holotype: A) habitus, dorsal view; B) habitus, lateral view; D) T3, dorso-lateral view; C) *Philoctetes putoni* (du Buysson), male: genital capsula.

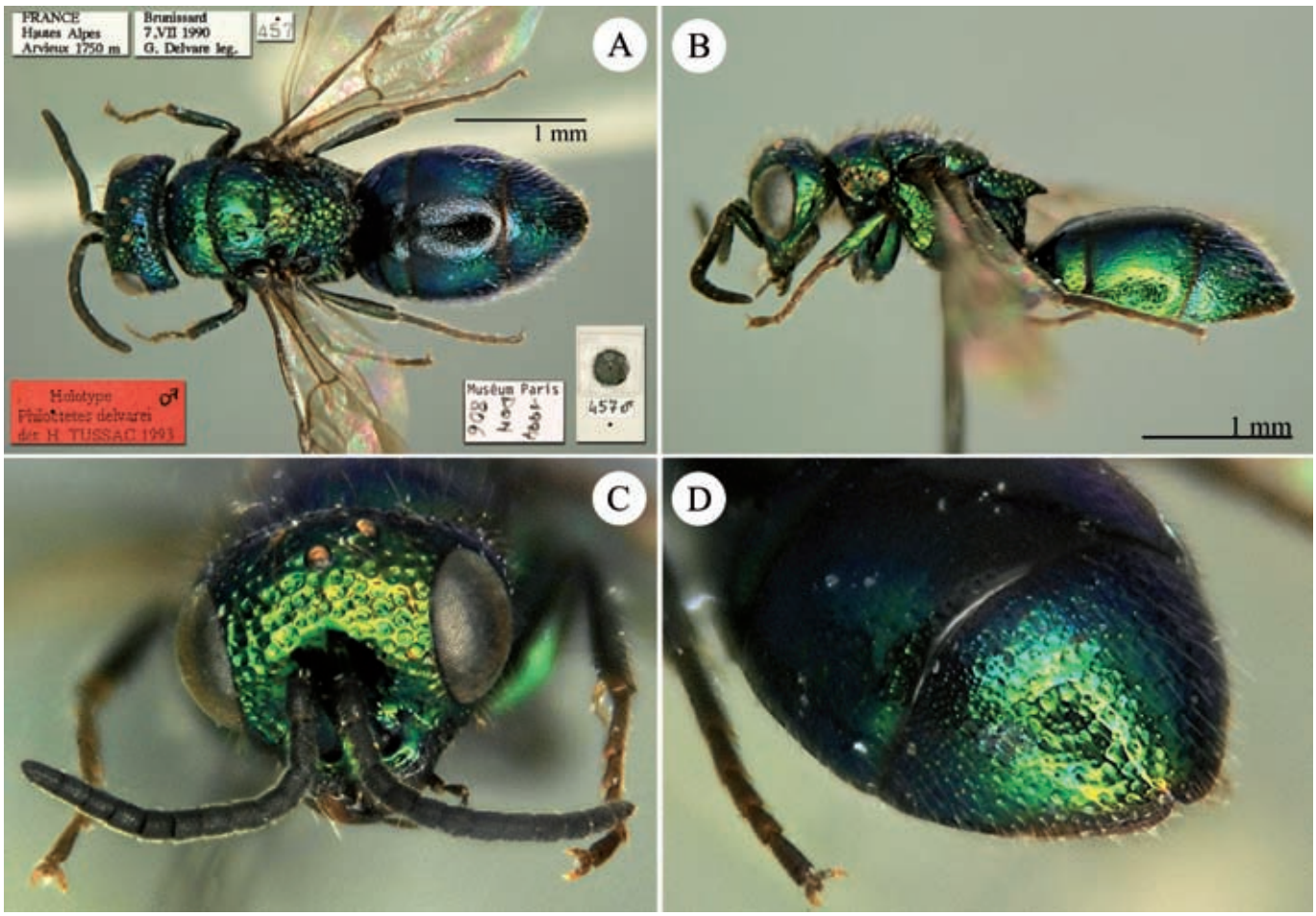

Fig. 6 - *Philoctetes delvarei* Tussac & Tussac, male, holotype: A) habitus, dorsal view; B) habitus, lateral view; C) head, frontal view; D) T3, dorso-lateral view.

Variability. Males are variable in size and colour, as in other *Philoctetes* species and related genera. The body colour, especially on metasoma, can be darker blue to blackish (Fig. 6A). Also, the shape of metanotal projection is variable being narrower, subtruncate or with sharp apical margin.

Remarks. *Philoctetes delvarei* Tussac & Tussac, 1993 has been described on some specimens collected close to the type locality of *Ph. putoni*. Tussac & Tussac (1993) did not mention *Ph. putoni* in their detailed description of *Ph. delvarei* because it was then considered as a member of the genus *Elampus* Spinola by Kimsey and Bohart (1991). The examination of type material of *Ph. delvarei* confirms that this species is a synonym of *Ph. putoni*.

Lastly, *Ph. putoni* was even erroneously considered as a synonym of *Omalus* (*Notozus*) *ambiguus* Dahlbom, 1854 by Linsenmaier (1951), thus increasing uncertainty in the identification of several European species.

Acknowledgments

We wish to thank Fabrizio Rigato (MSNM, Italy) for critical review of the manuscript; Christian Schmid-Egger (Berlin, Germany) for the loan of the specimens collected at the Mercantour Park; Marie-France Leccia (Mercantour National Park) for providing permits and support during our researches in the Park. Oliver Niehuis (Bonn, Germany) for logistic and support during our research visit at the Mercantur National Park. Agnièle Touret-Alby and Claire Villemant (MNHN, France), Marco Bernasconi (NMLS, Switzerland) Frank Koch (MNHU, Germany), and Sergey A. Belokobylskij (ZIN, Russia) for allowing the examination of type material. We also thank Werner Arens (Bad Hersfeld, Germany) and Villu Soon (Tartu, Estonia) for reviewing the manuscript and their useful comments to improve the text. The study was partly supported by SYNTHESYS Project http://www.synthesys.info/ which is financed by European Community Research Infrastructure Action under the FP7 "Capacities" Program" (FR-TAF-5995) and the GBIF Swiss Node (http://www.gbif.ch).

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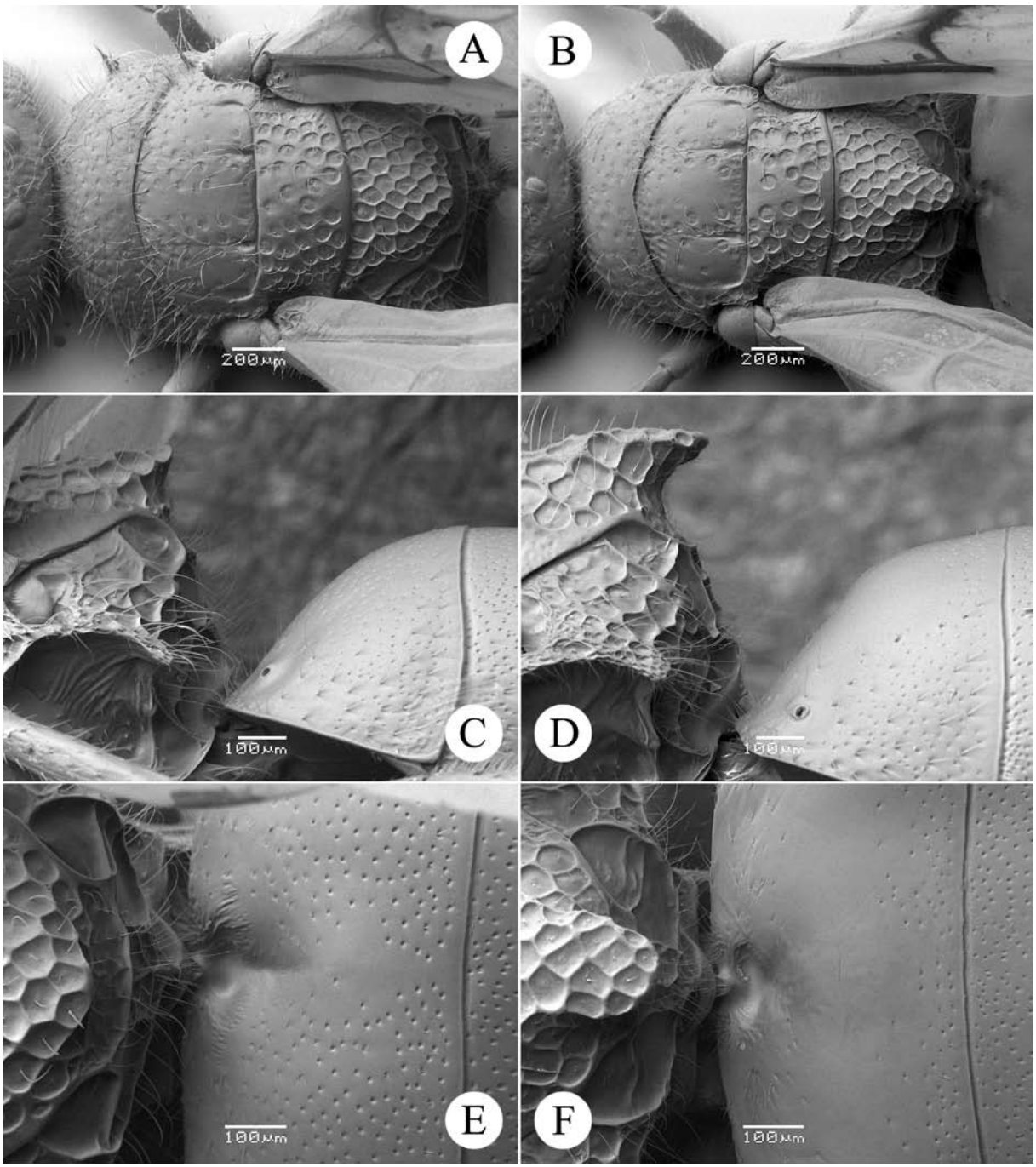

Fig. 7 - A,C,E) *Philoctetes helveticus* (Linsenmaier), female: A) mesosoma, dorsal view; C) mesoscutum, propodeum and T1, lateral view; E) T1, dorsal view. B,D,F) *Philoctetes putoni* (du Buysson), female: B) mesosoma, dorsal view; D) mesoscutum, propodeum and T1, lateral view; F) T1, dorsal view.

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