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Chrysis schmideggeri n. sp., a new cuckoo-wasp of the *Chrysis rubricata*-group (Hymenoptera, Chrysididae)

Abstract - *Chrysis schmideggeri* n. sp. is described from North Africa; it is related to *C. rubricata* Mocsáry, from which it differs for its longer first flagellomere, the narrower scapal basin, the non-divergent propodeal teeth, the third tergite with a medial longitudinal carina before the pit row, the entirely red metasoma, and the male genitalia. A comparison with *C. rubricata* Mocsáry is also given, while *C. patruela* Linsenmaier, previously considered as belonging to the *C. rubricata* group, is proved to belong to the *C. curta* group after the examination of the type series.

Key words: Chrysididae, *Chrysis schmideggeri* n. sp., North Africa, taxonomy, *C. rubricata*.

Riassunto - *Chrysis schmideggeri* sp.n., un nuovo Criside del gruppo *Chrysis rubricata* (Hymenoptera, Chrysididae).

Viene descritta *Chrysis schmideggeri* n.sp. del Nord Africa, simile a *C. rubricata* Mocsáry, dalla quale si distingue per la maggior lunghezza del primo flagellomero, per la faccia più stretta, per la forma degli angoli propodeali non divergenti, per il terzo tergite con una evidente carena mediana longitudinale avanti alla fila di fossette, per il colore interamente rosso del metasoma e per la forma dei genitali. Viene fornita una tabella comparativa con *C. rubricata*, mentre la specie *C. patruela* Linsenmaier, precedentemente considerata appartenente al gruppo *rubricata* Mocsáry, in seguito all'esame della serie tipica è risultata appartenere al gruppo *curta* Buysson.

Parole chiave: Chrysididae, *Chrysis schmideggeri* sp.n., Nord Africa, tassonomia, *C. rubricata*.

Introduction

In December 2001 I received from my colleague Christian Schmid-Egger (Herrsching, Germany) some interesting cuckoo-wasps collected during an entomological trip in Tunisia in March 2001. Among them I found a beautiful female specimen similar to *Chrysis rubricata* Mocsáry, but differing from original description in colour and morphology. Thus, in March 2002, my colleague Michele Zilioli and I spent two weeks in Southern Tunisia where we collected 25 specimens of this amazing cuckoo-wasp at different sites. All these specimens belong to an undescribed taxon, *C. schmideggeri* n. sp., herein described. A fur-

ther female specimen of *Chrysis schmideggeri* n. sp., from Libya was found in Linsenmaier's collection.

C. schmideggeri n. sp. belongs to the *Chrysis rubricata* group (Kimsey & Bohart, 1991), a small species-group with two North African species: *C. rubricata* Mocsáry and *C. patruela* Linsenmaier.

After the examination of the type material, it comes out that *C. patruela* Linsenmaier apparently belongs to a different species-group, namely the *C. curta* group.

Methods and abbreviations

The external and internal morphological features were examined by a stereomicroscope Leica MZ-5. The metasoma was photographed with a Scanning Electron Microscope (SEM) Jeol 5610 LV.

The following abbreviations are used (after Kimsey & Bohart, 1991): l/w = length/width ratio; F = flagellomere; MOD = midocellus diameter; OD = ocular distance (the shortest one between eyes in full face view); P = pedicel; PD = puncture diameter; PPW = posterior propodeal width; S = metasomal sternum; T = metasomal tergum; TFC = transverse frontal carina; I, II, III etc. are Roman numerals associated to either antennal or metasomal segments.

Chrysis schmideggeri n. sp.

Type series

Holotype: ♀, **Tunisia**, El Almaïem (35 km WSW Gafsa), 34°16' N – 09°03'E, 1/IV/2002, leg. P. Rosa.

Paratypes: 1 ♀, **Tunisia**, 10 km SE of Foum Tataouine, 32°51'N – 10°30' E, 25/III/2001, leg. C. Schmid-Egger; 2 ♂♂, 6 ♀♀ **Tunisia**, Maztouria, 32°52'N – 10° 27'E, 26/III/2002, leg. P. Rosa; 3 ♀♀, **Tunisia**, Tataouine, 32°51'N – 10° 32'E, 6/IV/2002, leg. P. Rosa; 3 ♀♀, **Tunisia**, El Almaïem (35 km WSW Gafsa), 34°16' N – 09°03'E, 1/IV/2002, leg. P. Rosa; 1 ♂, 7 ♀♀, **Tunisia**, Maztouria, 10 km SW Tataouine 27/III – 6/IV/2002, M. Zilioli legit; 1 ♂, **Tunisia**, Al Almaïem, 30 km SW Gafsa, 30/III-5/IV/2002, M. Zilioli legit. 1 ♂, **Libya**, Tripolitania, Mendib, 85 km SE of El Fogaha, 24/II/1952, legit K. M. Guichard.

The holotype is deposited in the Museo Civico di Storia Naturale di Milano (Italy). Two female paratypes, from Tunisia and Libya, are deposited in Linsenmaier's collection at the Natur Museum, Luzern (Switzerland). Other paratypes are deposited in the C. Schmid-Egger's (Herrsching, Germany), in M. Zilioli's (Buguggiate (VA), Italy) and in the author's private collections.

Holotype (female)

Size: full length 8.2 mm.

Colour: body red metallic, except for the dark blue metallic following parts: area around ocelli, pronotal collar, tegulae and middle area of the scutum.

Head: in full face view, length 2.2 mm, width 2.3 mm; in dorsal view, thickness 0.9 mm.

Clypeus deeply incised apically. TFC almost wanting, reduced to three separate slight ridges of about the same length. Scapal basin narrow and smooth, with some punctures along the mid-line, connected to the outer ones by thin ridges in the upper part. Malar space very long (2.3 MOD), a little longer than F-I. Mandibles brown with one internal tooth, metallic red proximally and lighter apically. Antennae long and thin (Fig. 1a); scapus and pedicel coppery; flagellomeres black. Relative lengths of P / F-I / F-II / F-III / F-IV: 1 / 2.8 / 2 / 1.6 / 1; F-V and followings slightly longer than broad (Fig. 1a). Head with long (1.5 MOD) and erect white hairs. PD on vertex ~ 0.25 MOD; punctuation on face and on malar space similar in diameter.

Mesosoma: length 3.0 mm; width (PPW) 2.3 mm.

Pronotum with scarcely marked anterior depression; punctuation of pronotum and scutum double, with large and small punctures, the larger ones prevail (PD ~ 0.35 MOD); a similar punctuation is visible on scutellum, but with widely separated larger punctures (PD ~ 0.5 MOD); episternal sulcus well marked, consisting of a row of large punctures; scrobal sulcus very broad. Wing venation with radial cell open, the radial sector ending 1.5 MOD before the wing margin; wings with a brown spot along the radial vein. Legs coppery-red with the inner part of femora and tibiae brown; tarsi dark brown.

Metasoma: length 3.6 mm (T-I 1 mm, T-II 1.9 mm, T-III 0.7 mm).

Punctuation on T-I double with predominant large punctures; T-II with dense large punctures becoming more scattered towards the hind margin (Fig. 10); a broad medial longitudinal carina is also present. T-III edentate with a hyaline margin, weakly notched medially, and a sharp median longitudinal carina before the apical pit row; pit row formed by deep, large and longitudinally very elongate pits resulting in a scrobiculate punctuation (*sensu* Harris, 1979), the anal rim, posterior to pit row, well developed in length and unpunctured (Fig. 8), as in the species of the *Chrysis hydropica* group (in particular *C. tumens* Buysson). S-I coppery, S-II coppery with two triangular black spots fused medially; S-III black. Internal segments as in Fig. 2.

Paratypes

Males. Smaller than females; all the studied specimens are 5.6 mm to 5.7 mm long; same colour pattern as females, except for tarsi lighter brown. T-I very short; scape basin more ridged in the middle; punctuation of mesosoma irregular, T-III apically truncate, such as in males of the *Chrysis hydropica* group, sometimes with a more or less developed median concavity; S-II with two smaller, rounded and fused black spots (Fig. 5b). Aedeagus as in Fig. 3a.

Females. 6.0 - 9.0 mm. Colour always as in the holotype, but in some dried specimens the red metallic fades into coppery. TFC more or less distinct; wing venation very variable, with radial cell closed to widely open (for this reason it can not be considered a diagnostic character). Apex of T-III more or less distinctly notched in the middle. S-III either entirely black or dark with some metallic red reflections. The Libyan paratype has the apical rim of T-III dark-green, contrasting with the red metasoma, and the punctuation on T-II and T-III less coarse.

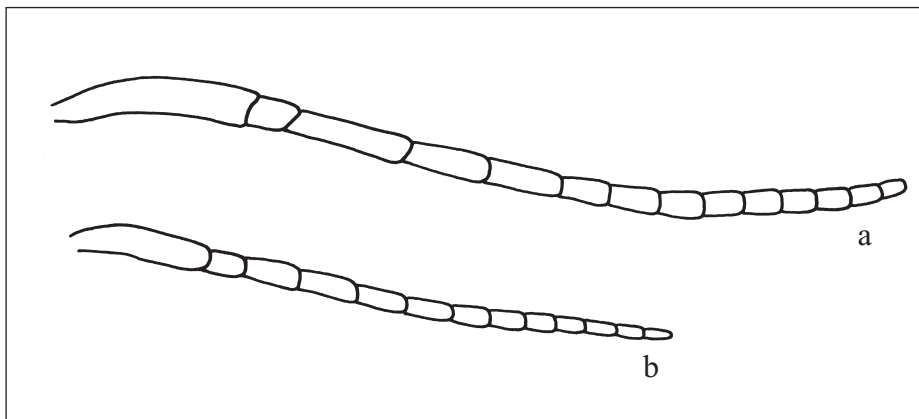


Fig. 1 - *C. schmideggeri* n.sp., antenna: a) holotype (olotipo) ♀; b) paratype (paratipo) ♂.

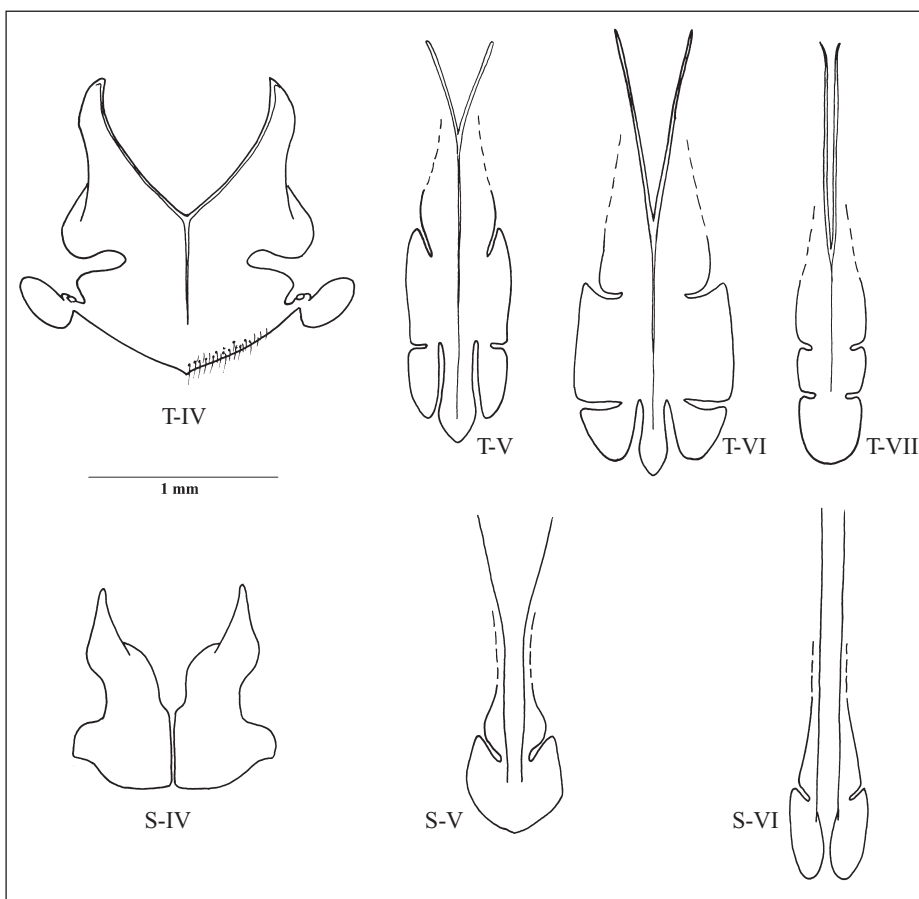


Fig. 2 - *C. schmideggeri* n.sp.; holotype (olotipo) ♀, internal tergites and sternites (tergiti e sterniti introflessi).

Distribution

C. schmideggeri n. sp. is known from Tunisia and Libya: all of the Tunisian specimens have been collected in the southern desertic regions around Gafsa (Al Almaïem) and Tataouine (Foum Tataouine and Maztouria); one specimen has been collected at Mendib, Tripolitania, Libya, 85 km SE of El Fogaha by K. M. Guichard.

Phenology

In Tunisia *C. schmideggeri* n. sp. is recorded from the end of March until mid-April; Guichard's Libyan specimen was collected at the end of February.

Biology

C. schmideggeri n. sp. was found flying on low sand walls or rock walls used as boundary lines separating cultivated fields around oases (Figg. 12 and 13). No specimens were observed on flowers; no data exist about its host.

Derivatio nominis

This species is dedicated to Christian Schmid-Egger, who entrusted me with the study of his specimens.

Remarks

Two species were previously placed in the *Chrysis rubricata* group: *C. rubricata* Mocsáry and *C. patruela* Linsenmaier. I could study the types and here I am going to expound my observations.

***Chrysis rubricata* group diagnosis and discussion:**

According to Kimsey & Bohart (1991) the species of the *C. rubricata* group can be recognized by the following characters:

- in male, F-I with l/w ratio equal to 1.5, and 0.8 times shorter than F-II; in females, F-I with l/w ratio = 4, but less than twice as long as pedicel;
- face medially transversally microridged;
- TFC weakly M-shaped to absent;
- malar space 3-4 MOD;
- subantennal space 1.5-2.0 MOD;
- clypeus rather deeply incised apically;
- pit row of T-III well developed; margin of T-III edentate, slightly incised medially in male, almost evenly convex in female; lateral edge simple;
- spots of S-II semicircular and fused;
- S-VIII of the male subtriangular.

This species-group is strictly related to the *Chrysis hydropica* group, from which it differs by the short F-I of the male, the weak or absent TFC, the black spots of S-II (reduced and not reaching to the lateral margins), and the female internal urites (Rosa, in press). The species of both groups are very rare and their biology is unknown.

***Chrysis rubricata* Mocsáry**

Chrysis rubricata Mocsáry, 1902. *Termesz. Fuzetek*, XXV: 340. [Lectotype male, Egypt (HNHM), examined].

Small species, 4-6 mm, with clypeus incised apically; TFC weakly M-shaped or absent; malar space 2- 3 MOD; in female, F-I = 3 MOD; in male, F-I = 1,5 MOD; T-III pit row with scrobiculate punctuation (Fig. 9); apex of T-III edentate; tarsi long and thin; S-II black spots semicircular and fused. Punctuation dense, thin on head and mesosoma, with larger and weaker impressed punctures on metasoma (Fig. 11). Colour variable red to metallic green; pronotal collar, tegulae, central part of the scutum and apex of tergites metallic green (Fig. 7).

Distribution

According to the known specimens, *C. rubricata* range seems to be restricted to Egypt, from the Cairo Dept. to El Tih. Linsenmaier (1999) listed Egypt and Libya, but the single specimen collected in Libya proved to belong to *C. schmideggeri* n.sp..

Phenology

C. rubricata is recorded from February until the end of March.

Biology

Unknown.

Morphological comparison between *C. rubricata* and *C. schmideggeri*

C. schmideggeri sp.n. is closely related to *Chrysis rubricata*, from which it differs through differences reported in Table 1.

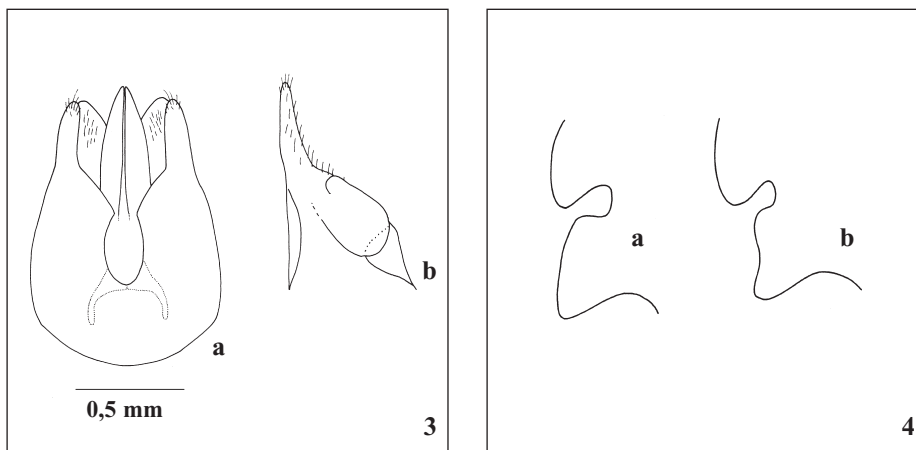


Fig. 3 - a) *C. schmideggeri* n.sp.; paratype (paratipo) ♂, genital capsule (capsula genitale); b) *C. rubricata* Mocsáry ♂, apex of gonocoxa (apice della gonocoxa) (from Kimsey and Bohart, 1991).

Fig. 4 - Left propodeal angle (angolo propodeale sx) of: a) *C. schmideggeri* n.sp., paratype (paratipo) ♂; b) *C. rubricata* Mocsáry, lectotype (lectotipo) ♂.

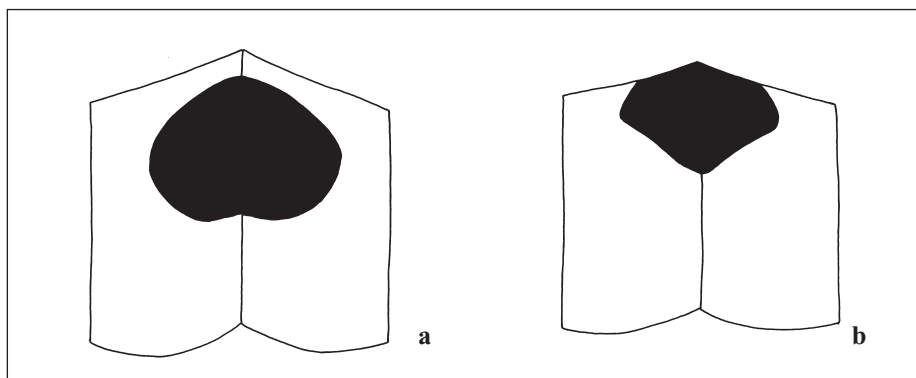


Fig. 5 - S-II black spots (macchie nere del S-II) of: a) *C. schmideggeri* n.sp., paratype (paratipo) ♂; b) *C. rubricata* Mocsáry, lectotype (lectotipo) ♂.

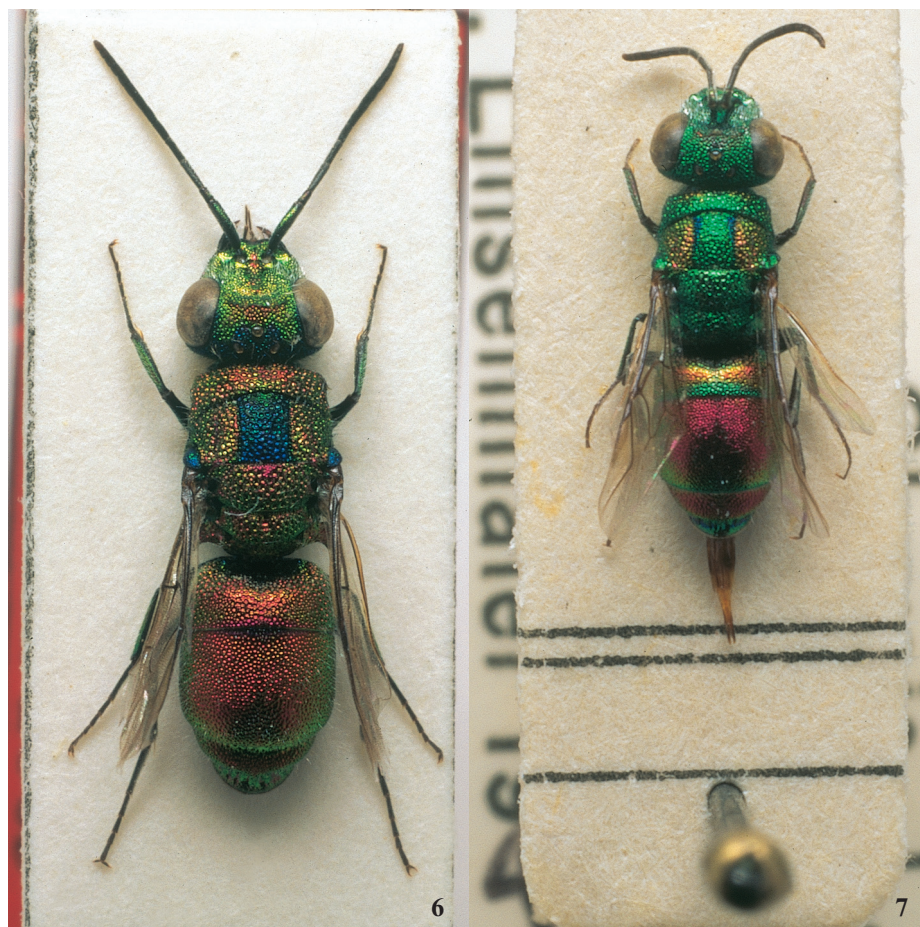


Fig. 6 - *C. schmideggeri* n.sp., holotype (olotipo) ♀ (Photo: R. Appiani).

Fig. 7 - *C. rubricata*, ♀ (Photo: R. Appiani).

Tab. 1 - Morphological comparison between *C. rubricata* and *C. schmideggeri* (Comparazione morfologica tra *C. rubricata* e *C. schmideggeri*).

	<i>Chrysis schmideggeri</i> n. sp.	<i>Chrysis rubricata</i> Mocsáry
Head	♀ ♀: F-I / F-II = 1.4 / 1. OD = 5.5 MOD.	♀ ♀: F-I / F-II = 1.2 / 1. OD = 6 MOD.
Mesosoma	♀ ♀ and ♂ ♂: postero-lateral propodeal teeth backward directed, not divergent (Fig. 4a); episternal and scrobal sulci well marked; tarsi dark brown.	♀ ♀ and ♂ ♂: postero-lateral propodeal teeth divergent (Fig. 4b); episternal and scrobal sulci barely visible; tarsi yellowish.
Metasoma	T-II with dense and large punctures (PD ~ 0.3 MOD) becoming scattered towards the tergal apex, but always well impressed (Fig. 10).	T-II with small punctures (PD ~ 0.2 MOD), becoming scattered and weaker towards the tergal apex (Fig. 11).
	Entirely metallic red metasoma, without any green reflection; pit row of T-III usually concolour.	T-I and T-II posteriorly with green reflections; pit row of T-III and apical rim green or greenish.
	♀ ♀: strong medial longitudinal ridge before the pit row (Fig. 8).	♀ ♀: without, or only with an indistinct medial longitudinal ridge before the pit row (Fig. 9).
	♂ ♂: S-II black spots fused, large, rounded, not connected to anterior visible margin of the sternite (Fig. 5a).	♂ ♂: S-II black spots fused and connected to anterior visible margin of the sternite (Fig. 5b).
	♀ ♀: S-III black or dark with at most slight red-greenish reflection.	♀ ♀: S-III red metallic.
	♂ ♂: <i>Genital capsule</i> : apex of gonocoxae broader (Fig. 3a).	♂ ♂: <i>Genital capsule</i> : apex of gonocoxae narrower (Fig. 3b).

***Chrysis patruela* Linsenmaier**

Chrysis patruela Linsenmaier, 1999: *Entomofauna*, Supplement n° 10: 128. [Holotype ♀ and allotype ♂, Maroc, HNHM, examined].

Small species, 4.5 - 5.0 mm, with clypeus scarcely incised apically; TFC weakly M-shaped; malar space short, in female less than 2 MOD, in male 1.4 MOD; F-I

in female 3 MOD, in male very long ~ 3 MOD; T-III pit row simple, well marked, without scrobiculate punctuation; apex of T-III, especially in male, truncate; punctuation on T-II double, with small and large punctures and shining intervals between punctures. Colour in female on head and mesosoma similar to *C. rubricata* Mocsáry, on T-II and T-III darker, almost metallic violet; in male metallic green on head, mesosoma, apex of tergites and central part of T-II; metallic red on the rest of metasoma.

After types examination, I consider *C. patruela* as not belonging to the *C. rubricata* group owing to the following features:

- in male, l/w of F-I = 2.2 and twice longer than F-II;
- in female, l/w of F-I = 2.3 but less than 1.5 times the pedicel length; the female holotype lacks her left antenna and flagellomeres from F-II of the right one; F-I = 3.5 MOD long;
- TFC present, weakly M-shaped;
- malar space very short: 1.8 MOD (female); 1.4 MOD (male);
- subantennal space short: 1.3 MOD;
- in male T-III edentate, very short and wide, truncate and slightly incised medially; in female T-III ending just behind the pit row, without an unusually developed anal rim;
- T-III pit row well marked, yet not scrobiculate;
- S-II spots fused and connected to the lateral margins.

The characters of *C. patruela* mentioned above well fit the diagnosis of the *C. curta*-group (Rosa, in press), whose species were previously considered belonging to the *C. millenaris*-group (Linsenmaier, 1959, 1968, 1999). Linsenmaier probably placed this species in the *C. rubricata*-group rather than in *C. millenaris*-group, because of the chromatic similarities with *C. rubricata*. Linsenmaier's drawings are quite accurate, although the black spots on S-II are actually not fused. Therefore, I propose to place *C. patruela* under the *C. curta* group (*sensu* Rosa, in press).

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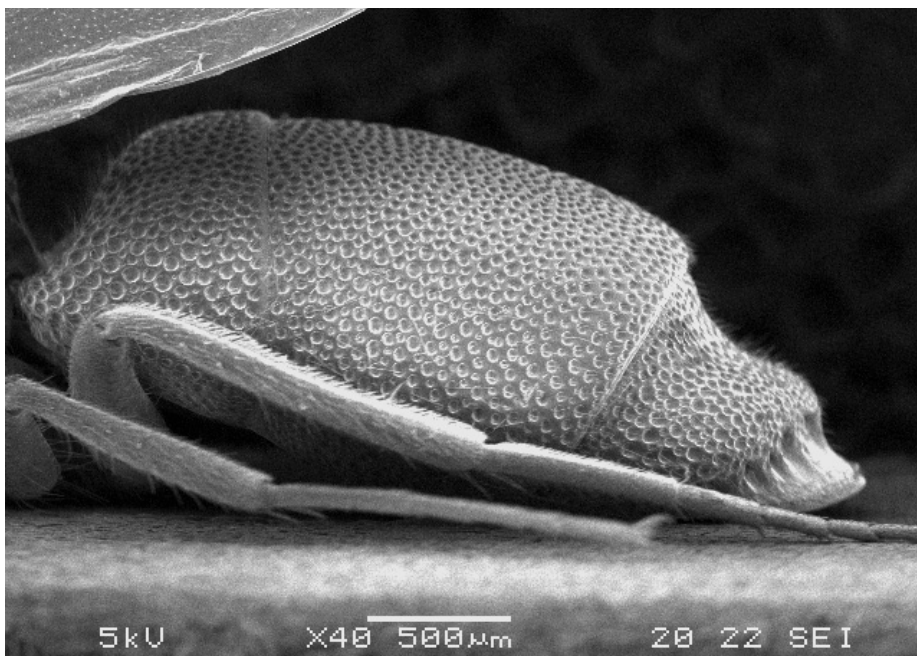


Fig. 8 - *C. schmideggeri* n.sp., paratype (paratipo) ♀, metasoma, lateral view (metasoma, visione laterale) (SEM microphoto, 40x).

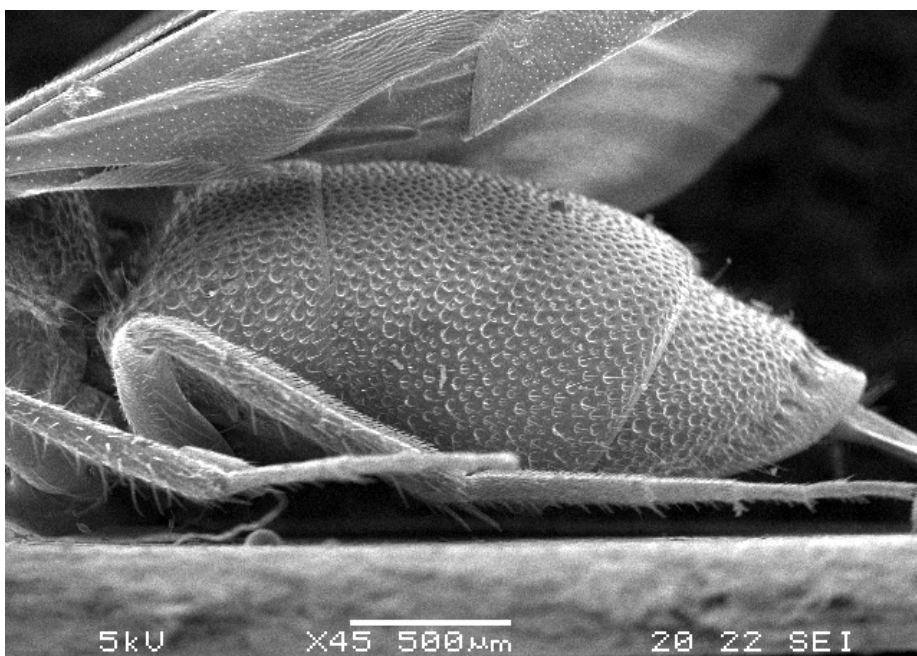


Fig. 9 - *C. rubricata* Mocsáry, ♀, metasoma, lateral view (metasoma, visione laterale) (SEM microphoto, 45x).

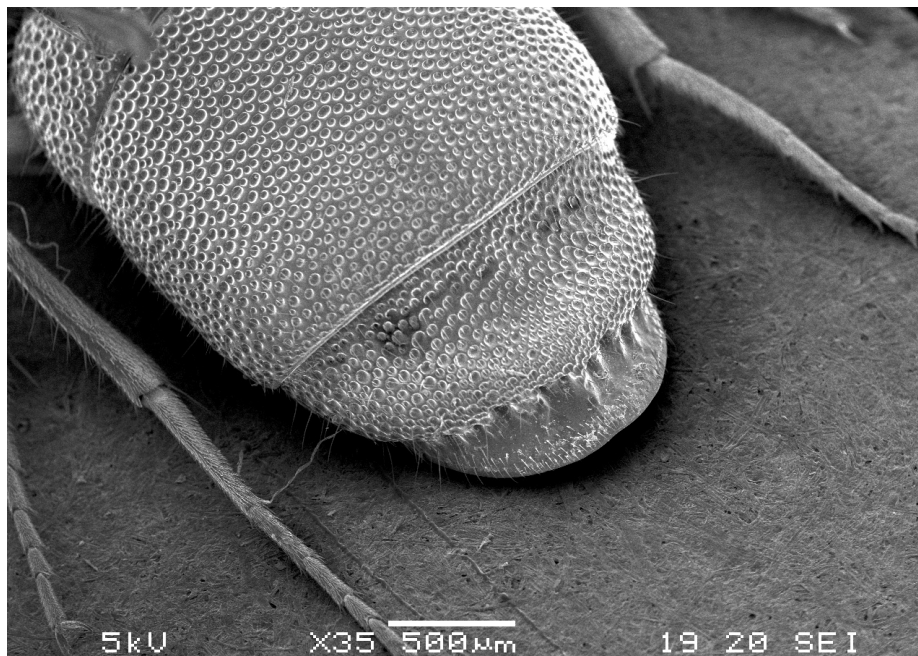


Fig. 10 - *C. schmideggeri* n.sp., paratype (paratipo) ♀, T-III (SEM microphoto, 35x).

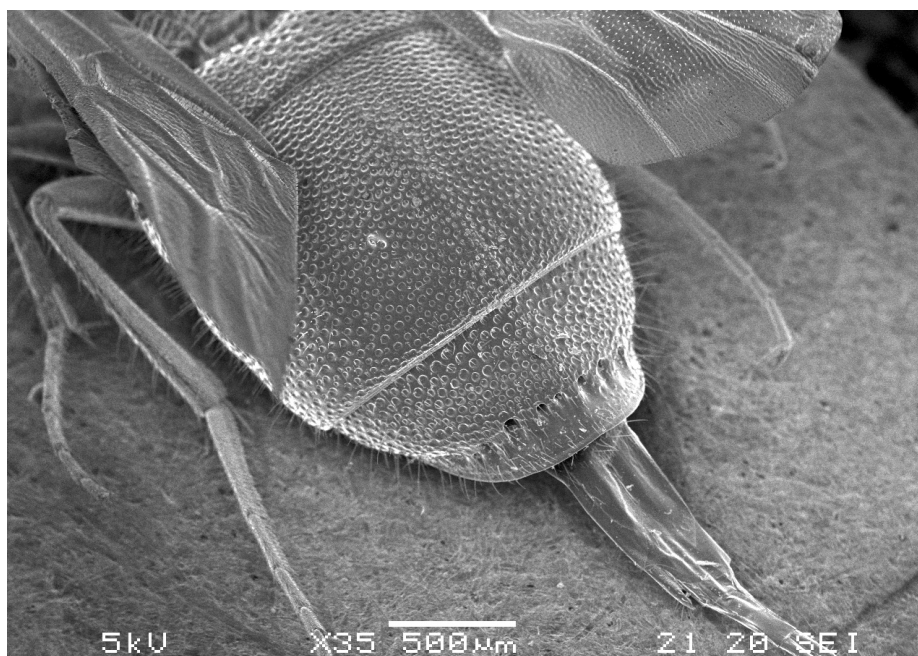


Fig. 11 - *C. rubricata* Mocsáry, ♀, T-III (SEM microphoto, 35x).



Fig. 12 - Tunisia, El Almaïem (35 km WSW Gafsa), M. Zilioli looking for *C. schmideggeri* n.sp. (M. Zilioli alla ricerca di *C. schmideggeri* n.sp.) (Photo: P. Rosa).



Fig. 13 - Tunisia, Maztouria, 10 km SW Tataouine (Photo: P. Rosa).

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