A new species of *Rophites* from Armenia with comments on allied species

*(Hymenoptera, Apoidea, Halictidae)*

Andreas DUBITZKY

Abstract

*Rophites schoenitzeri* sp. n. from Armenia is described as new and compared to its sibling species *R. nigripes* FRIESE 1902. Together with *R. caucasicus* MORAWITZ 1875 these species constitute the *R. nigripes*-group, which is defined in the text. Relevant diagnostic features of the new species and *R. nigripes* are documented by SEM, and a key to the species of the *R. nigripes*-group is provided.

Introduction

The palearctic halictid bee genus *Rophites* SPINOLA ranges from Spain and northwest Africa (Morocco) to Asia minor eastward to Manchuria (EBMER & SCHWAMMBERGER, 1986). It contains about 15 described species and is most diverse in the eastern Mediterranean region and western parts of Asia (eastern Turkey and neighboring states).

*Rophites* is clearly characterized and differentiated from allied genera (esp. *Rhophitoides*) according to SCHWAMMBERGER (1975) and EBMER & SCHWAMMBERGER (1986) by the elongate and clearly flattened first three segments of the labial palp, by the galea which is considerably longer than maxillary palp and by the frons of females which bear thorn-like bristles, a feature probably unique for bees. EBMER (1984), EBMER & SCHWAMMBERGER (1986) and SCHWAMMBERGER (1975) thus maintain *Rophites* and *Rhophitoides* as separate genera, a concept which is followed in this paper. MICHENER (2000) however subgenerically divides *Rophites* into *Rhophitoides*, *Rophites* s.str. and the monotypic *Flavodufourea*, which was previously placed in *Rhophitoides* by SCHWAMMBERGER (1975). WARNCKE (1979, 1982) considered the genus *Rophites* in a much wider sense to include *Dufourea*, *Rhophitoides*, *Trilia*, *Morawitzella* and others as subgenera.

Presumably *Rophites* is oligolectic on Lamiaceae since several species (*R. quinquespinosus* SPINOLA 1808, *R. algirus* PÉREZ 1895, *R. hartmanni* FRIESE 1902, *R. caucasicus* MORAWITZ 1775) apparently prefer flowers of *Stachys* and *Betonica* (EBMER & SCHWAMMBERGER, 1986).

I was fortunate to discover the new species of *Rophites* from Armenia among the numerous undetermined bee specimens in the collection of the late Dr. R. W. GRUNWALDT, which is now housed in the Zoologische Staatssammlung München (ZSM).

Methods and material

The specimens were photographed by scanning electron microscopy (SEM) using a Philips XL 20 SEM. Pinned and air-dried specimens were fixed with Leit-C-Plast on a object table and analyzed by 1.6 kV using a special low voltage anode (spot 4, integrate 1 or 4, slow scan 3). The hidden sternum and genitalia of the males were dissected from the metasoma and cleared in 10% KOH for about 3 h. After washing with distilled water they were put in ethanol (75 %) and transferred to solutions of acetone (75 %, 85 %, 90 %, 95 % and 99 % for 10 min each). The samples were stored in 100 % acetone for 24 h, critical point dried using a BAL-TEC CPD 030 critical point dryer and sputtered for 120 sec with a Polarion SEM coating system. Structures prepared this way were analyzed by SEM using a conventional high voltage anode at 10 kV (spot 4.5, integrate 1, slow scan 3).
Material examined. Specimens of nearly all known species of Rophites (except R. thracicus EBMER 1993 and R. transitorius EBMER 1993) in the Biologizentrum des Oberösterreichischen Landesmuseums, Linz (OLL), the ZSM and the collection of the author (CAD) were examined and compared to the new species.

Following abbreviations are used throughout the text: APAS 7: apical part of paired appendages of sternum 7 of male; AS: antennal segment; BL: body length; BPAS 7: basal part of paired appendages of sternum 7 of male; FWL: length of forewing; GS: gonostylus; S: metasomal sternum; T: metasomal tergum. Morphological terminology follows Michener (2000).

**Rophites schoenitzeri** sp. n.


**Description**

**Male.** BL: 7.0-9.3 mm (8.3 mm). FWL: 5.7-6.1 mm (6.0 mm).

Structure: Head round, nearly as long as broad (0.93 times). Galea tesselate, dull. Clypeus twice as wide as long with strong honeycomb punctuation. Supraclypeal area dull, with fine honeycomb punctuation. Frons dull, median honeycomb punctuation is considerably larger than that on supraclypeal area. Lateral parts of frons (area along inner margin of compound eye), paracocular area, as well as main parts of vertex and genal area shiny with dense punctuation. Distance from hind margin of lateral ocellus to hind margin of vertex 2.3 times as wide as diameter of lateral ocellus. Ventral margin of genal area 1.7 times as wide as compound eye in lateral view. Scape twice as long as broad with irregular wrinkle-like punctuation. AS 3-12 about 1.7 times as long as broad, AS 13 at least 3 times as long as broad, apically clearly pointed. Scutum and scutellum shiny with distinct, dense punctuation. Metanotum dull, with irregular small punctuation. Mesepisterna shiny with irregular punctuation which is most scattered dorsally. Propodeal triangular with strong longitudinal, parallel-sided wrinkles. Lateral parts as well as declivous part of propodeum weakly shiny with strong dense punctuation. Middle tibia swollen with front margin strongly convex. Basitarsus of middle legs recognizable concave. Trochanter of hind legs with well-developed lobe-like projection, therefore strongly angulate in profile (Fig. 18). T smooth and shiny with prominent dense punctuation except nearly impunctate marginal zone. Pygidial plate as wide as antennal flagellum, apically broadly rounded. S 1-5 shiny, with irregular dense punctuation. Lateroapical part of S 6 with a pair of large, tooth-like projections nearly reaching lateral margin of basal part (Fig. 14). Median carina of ventral side of apical part of S 6 forming a strong tooth-like projection when viewed in profile. Apicolateral margin of BPAS 7 distinctly rectangular (Figs 10, 12). BPAS 7 tooth-like, considerably longer than half the length of basal part. Dorsal tooth-like projections of BPAS 7 elongate at least three times as long as wide (Figs 10-11). Shape of S 8 and genitalia as in Fig 4-6. GS strongly truncate, only tooth-like apical part protruding gonocoxite in lateral view.

Integumental color: Mandibles black basally dark reddish brown apically. Antenna blackish dorsally, blackish brown to black colored ventrally. Other parts of head as well as thorax black. Legs black (coxa to tibia) to blackish brown (tarsi). Spurs of all legs bright yellowish gray colored. Claws grayish brown basally, reddish brown apically. Tegulae dark brownish transparent, veins of wings brownish, stigma dark brown. Metasoma black except brownish transparent marginal zone of T.

Pubescence: Hairs of whole body yellowish brown and of varying length.

**Female.** Unknown.

**Diagnosis:** The new species is very similar to R. nigripes from which it is clearly differentiated by the following characters (character states of R. nigripes in parentheses):

AS 4-13 black to blackish brown beneath (yellowish); trochanter of hind legs with lobe-like projection, Fig. 18 (trochanter angular in profile but without lobe-like projection, Fig. 17); apical part of S 6 with large tooth-like projections laterally, about 0.7 times as wide as basal part, Fig. 14 (lateral tooth-like projections smaller, apical part only half as wide as basal part, Fig. 13); apical part of S 6 with large ventroapical tooth medially (median ventroapical tooth strongly reduced to absent); BPAS 7 distinctly rectangular apicolaterally, without protruding lateroapical wings, Figs 10, 12 (acute, protruding lateroapical wings strongly
developed, Figs 7, 9); dorsal tooth-like projections of BPAS 7 long, Figs 10, 11 (short, Figs 7, 8); APAS 7 basally with long tooth-like projection on ventral side, Fig. 11 (tooth-like projection short, strongly reduced, Fig. 8); gonocoxite long, at least 2.5 times as long as broad in lateral view, Fig. 5 (truncate, only 2 times as long as broad, Fig. 2); apical part of gonocoxite hardly diverging, longer (1.3 times) than broad in lateral view, with dense punctuation, Figs 4-6 (considerably diverging, as long as broad, with dispersed punctuation, Figs 1-3); GS strongly truncate, only tooth-like apical part protruding gonocoxite in lateral view, Fig. 5 (GS distinctly protruding gonocoxite in lateral view, Fig. 2).

**Etymology:** The new species is named in honor of my supervisor and apidological mentor Prof. Dr. Klaus SchöNITZER.

**Discussion**

In the genus *Rophites*, the species *R. nigripes*, *R. caucasicus* and *R. schoenitzeri* sp. n. form a distinct species group referred to as the “*R. nigripes*-group”. It is characterized by the following male features:

S 6 with two strong, tooth-like projections lateroapically (Figs 13, 14); appendages of S 7 more or less quadrangular basally, tooth-like apically (Figs 7, 9, 10, 12); volsella of male genitalia with long and dense
Figs 7-16. Male S6 (13,14), S7 (7-12) and S8 (15-16). 9,12,13-16, ventral view; 8,11, lateral view; 7,10, dorsal view. 7-9,13,15, R. nigripes Friese; 10-12,14, 16, R. schoenitzeri sp. n. Arrows: Apicolateral part of BPAS 7 (7,10), dorsal tooth-like projections of BPAS 7 (8,11) and lateral tooth-like projections of S6 (13-14). Arrowheads: Ventral tooth-like projections basally of APAS 7 (8,11). Scale bar: 250 μm.
pubescence, therefore hardly visible (Figs 3, 6); gonostylus truncate, spine-like apically, hardly protrudes gonocoxite laterally (Figs 1-6); trochanter of hind legs more or less carinate (except R. caucasicus). The hairy volsella as well as the shape of S 6 and 7 are unique features within Rophites and therefore represent solid autapomorphies for the species group.

**Distribution**

All species of the R. nigripes-group show a distinct distribution in the western part of Asia (Turkey to Caucasus). R. nigripes is the most western representative and R. caucasicus is restricted to the Caucasian mountain range in the north (Ebmer, 1993). R. schoenitzeri sp. n. is apparently the most eastern species of the group. Aside from R. algirus Pérez 1895, R. foveolatus Friese 1900 and R. mandibularis Morawitz 1891, R. schoenitzeri sp. n. is the fourth species of Rophites recorded from Armenia (see also Ebmer & Schwammberger, 1986; Ebmer, 1993).

**Recognition**

Using the species determination key in Ebmer & Schwammberger (1986) the new species would run out at R. caucasicus, however it is not consistent with the characters given there for the shape of AS 13 and the trochanter of hind legs. Determination of the new species is made possible in the following revised key to the species of the R. nigripes-group:

**Key to the males of the R. nigripes-group:**

1. AS 13 truncate, only twice as long as broad, apically broadly rounded; trochanter of hind legs rounded
   - AS 13 elongate, at least 3 times as long as broad, apically pointed; trochanter of hind legs angled ....
   
2. AS 4-13 yellowish beneath; trochanter of hind legs without lobe-like projection; S 6 as in Fig. 13, without strong ventroapical tooth medially; S 7 and 8 as shown in Figs 7-9 and 15; male genitalia as in Figs 1-3
   - AS 4-13 black to blackish brown beneath; trochanter of hind legs with strong lobe-like projection; S 6 as in Fig. 14, with strong ventroapical tooth medially; S 7 and 8 as shown in Figs 10-12 and 16; male genitalia as in Figs 4-6

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Zusammenfassung


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References


Author’s address:

Andreas Dubitzky
Zoologische Staatssammlung München
Münchhausenstr. 21
D-81247 München, Germany
E-mail: andreas_dubitzky@yahoo.de