

***Chalinus albitibialis*, a new species of Orussidae (Insecta, Hymenoptera) from Morocco**

LARS VILHELMSSEN

Zoological Museum, University of Copenhagen, Universitetsparken 15, DK-2100, Denmark
e-mail: lbvilhelmsen@zmuc.ku.dk

Abstract

Chalinus albitibialis n. sp. is described and illustrated. It differs from all other members of the genus by possessing an extensive white area on the hind tibia. It is the first record of the genus from North Africa. The phylogenetic position of the new species relative to other members of *Chalinus* and the implications for the biogeography of the genus are discussed.

Key words: New species, Western Palaearctic, Afrotropical, zoogeography

Introduction

Chalinus is a small genus of strikingly blue-green metallic coloured wasps primarily distributed in sub-Saharan Africa. They superficially resemble Chrysididae, but the absence of a wasp-waist and the presence of a cirlet of cuticular pegs around the median ocellus clearly identify them as members of the Orussidae. Vilhelmsen (2001) recently revised *Chalinus*, synonymising a number of previously recognised species. The phylogeny and biogeography of the genus were explored in the comprehensive treatments of the entire family by Vilhelmsen (2003, 2004). With the species described here, the number of valid species of *Chalinus* totals nine.

Materials & Methods

The specimens were examined with a Leica MZ APO dissection microscope. Images were taken with a Leica DC 300 digital camera and integrated with Automontage.

The specimens were scored for as many characters as possible from the dataset assembled by Vilhelmsen (2003) for analysing the phylogeny of the entire Orussidae. The char-

acter states for *Chalinus albitibialis* are displayed in Table 1; the full character matrix of Vilhelmsen (2003) with the new species included is available from the author on request. Analyses were run in PAUP*4.10b (Swofford 2002) implementing implied weights with the settings k=7, amb0/amb-; 20/100 replications in turn; these are the settings used for deriving the preferred tree in Vilhelmsen (2003). For further discussion of the choice of settings the reader is referred to that paper. The cladistic analysis with amb- yielded two trees of fit -125,67172; they did not differ in the topology they displayed within *Chalinus* spp. (Fig. 6). The amb0 analysis produced 180 trees; they differed from the amb- trees in having the topology of *Chalinus* spp. more fully resolved, with *C. albitibialis* n. sp. being the sistergroup to *C. timnaensis* Kraus.

TABLE 1. States for characters from Vilhelmsen (2003) scored for *Chalinus albitibialis* n. sp.

Characters	States
1-20	1110000011 00-200?030
21-40	10p2010000 2102001011
41-60	0101120000 000?101?10
61-80	1110010?00 0100110120
81-100	10?0012000 1000?10002
101-120	?020010010 200?110022
121-140	00011?0100 0?????1?000
141-160	010001?10? 0211?????1?0
161-163	?00

- = inapplicable, p = 0/1 polytomy.

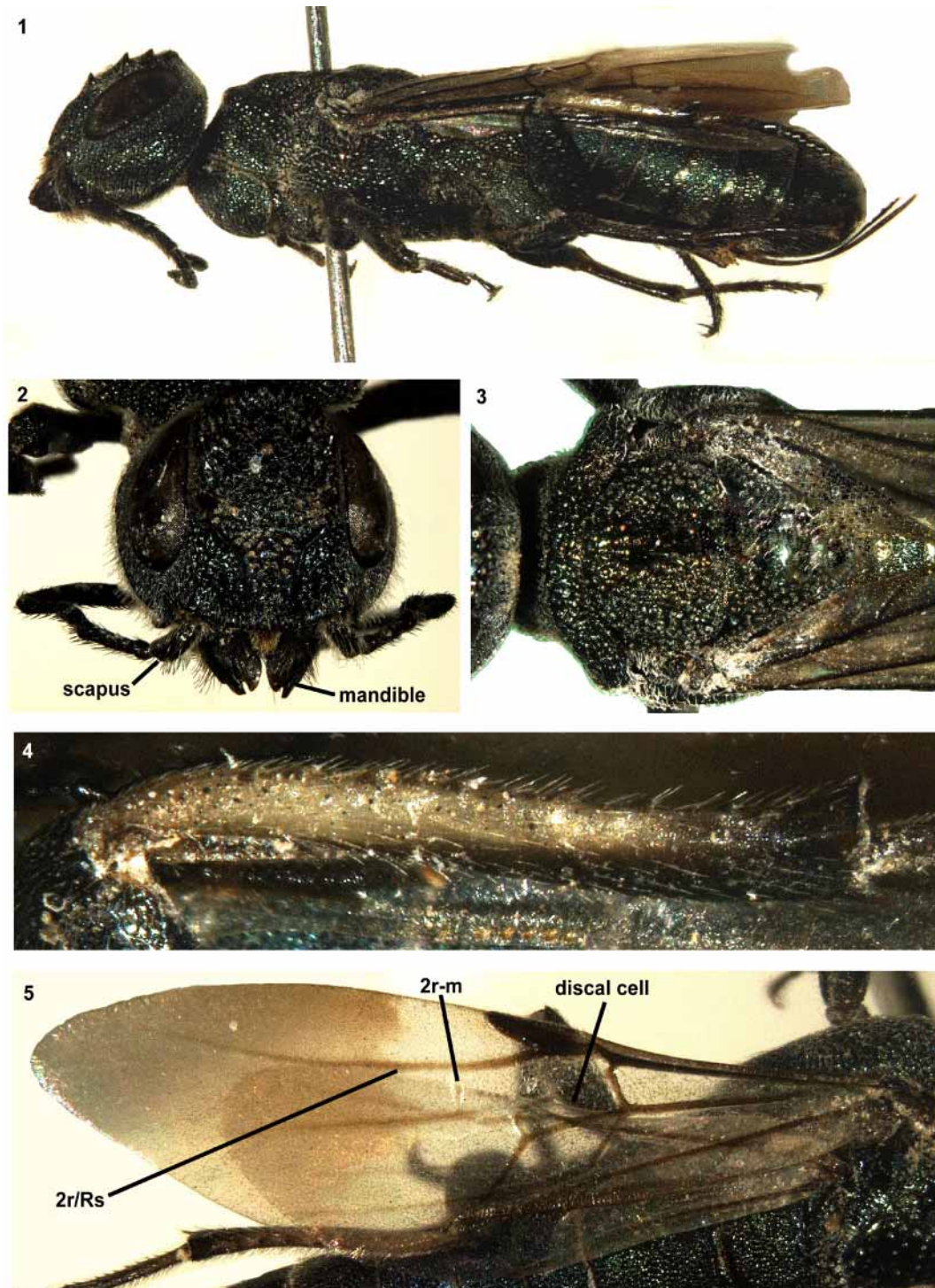
***Chalinus albitibialis* Vilhelmsen, new species**

(Figs 1–5)

Type. Holotype female. MOROCCO. Zagora, Oulad Driss, 29.821° N, 5.669° W, Mt. 800m, iv.2001, ex. *Tamarix*, M. + D. + R. Gigli leg. Paratype female, same data as holotype. Depository: Zoological Museum, University of Copenhagen.

Etymology. The species name refers to the extensive white marking on the hind tibia.

Description. Based on holotype, unless otherwise noted. **Body length:** 13.2 mm [paratype 9.8 mm]. **Colour:** Body metallic blue-green (Fig. 1), except posteroventrally on abdomen, where at least T9 dark brown to black. Antenna and mouthparts dark brown to black. Femora metallic blue-green [paratype with mid and hind femur more brownish]. Fore tibia metallic blue-green basally, dark brown distally. Mid tibia and all tarsi light to



FIGURES 1–5. *Chalinus albitibialis* Vilhelmsen, new species. 1 Holotype, lateral view. 2 Holotype, head anterior view. 3. Holotype, thorax dorsal view. 4. Holotype, hind tibia lateral view. 5. Paratype, fore wing dorsal view.

dark brown. Hind tibia posteriorly with creamy white band extending from base almost to apex (Fig. 4), otherwise dark brown. Fore wing predominantly hyaline, with slightly infuscate area extending from just distally of pterostigma to apex (Fig. 5). Venation dark brown [partly more weakly coloured in paratype] **Head (Fig. 2)**: median longitudinal frontal carina well developed and converging, not reaching ventral transverse frontal carina. Ventral transverse frontal carina with slight incurvation medially. Pilosity posteriorly of eye well developed [less developed in paratype]. Postocular carina well developed. Head capsule in ventral view with posteroventral margins converging in a distinct angle. Antenna with scapus flattened, curved, without distinct anteromedian projection opposite base of A2. Remaining antennomeres not flattened or constricted basally. Stout elongate hairs densely placed on A3–7 and ventrally on A8–9. Maxillary and labial palps very reduced. **Thorax (Fig. 3, 4)**: Pronotum with anterodorsal rim raised, sculptured posteriorly of transverse groove and throughout anterolaterally. Mesoscutum with axillar flange not projecting distinctly, being parallel with lateral margin of mesoscutellum. Mesoscutellar sulcus well developed and continuous anteriorly of mesoscutellum. Hind coxa with only scattered hairs laterally. Hind femur smooth ventrally. Hind tibia without lateral carina proximally, 8–9 pegs present dorsally in single row; two short, well developed apical spurs present, being subequal in length. **Fore wing (Fig. 5)**: Vein 2r arising from middle of pterostigma and curving gently into vein Rs. Discal cell slightly longer proximally than distally, almost reaching vein R dorsally, vein 1r-Rs very short. Vein 2r-m situated distally of distal end of pterostigma. **Abdomen**: Posterior margin of T8 almost straight. T9 with a pair of raised areas with sparse sculpture posterolaterally.

Male. Unknown.

Biology. Both specimens were reared from *Tamarix* sp. (Tamaricaceae) branches of approximately 5 cm diameter. Larvae of *Buprestis bilyi* Novak & Kuban (Buprestidae) were found in the same branches. This is the second putative host association reported for *Chalinus* spp., the other being a specimen of *C. somalicus* Guiglia from wood infested with cerambycids (Vilhelmsen 2001).

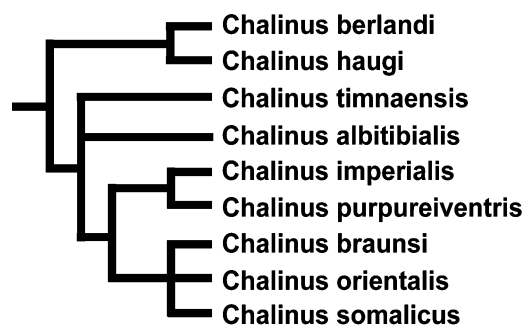


FIGURE 6. Cladogram of *Chalinus* spp.

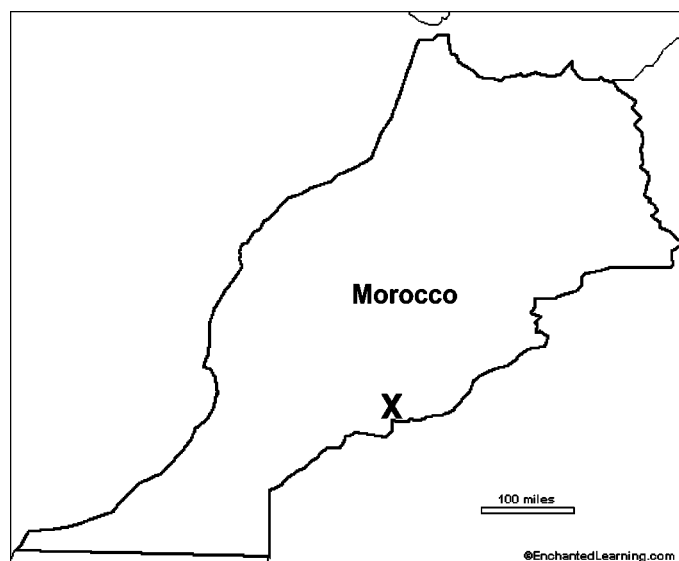


FIGURE 7. Type locality of *Chalinus albitibialis* n. sp.

Discussion

Chalinus albitibialis is unambiguously placed in *Chalinus* because of the presence of a suboccipital trough (Vilhelmsen 2003, character 32:1) and the absence of any of the autapomorphies of *Mocsarya* (median longitudinal carinae not converging (10:1), presence of lateral longitudinal frontal carina (12:2), postocular carina developed only ventrally (24:1)), the sistergroup of *Chalinus* and the only other genus in Orussidae displaying a number of unique features (metallic body coloration, characteristic wing venation etc., see Vilhelmsen 2003). Within *Chalinus*, the new species can be included in the clade comprised by *C. braunsi* (Enslin), *C. imperialis* (Westwood), *C. orientalis* Guiglia, *C. purpleiventris* Cameron, *C. somalicus*, and *C. timnaensis* because it possesses a flattened and curved scapus (character 34:2), the female antenna having a distinct carina distally on A9 and distinct hairs ventrally (39:1 & 42:1), the female T8 being without a posterior projection (149:0) and the female T9 having a raised, smooth area posterolaterally (153:1). In a cladistic analysis, *C. albitibialis* is placed in an unresolved trichotomy with *C. timnaensis* and the other species listed above (Fig. 6). The two former species do not have a median triangular projection on the ventral transverse frontal carina (20:1) and a projection/carina on the ventral margin of the scapus (35:1/2), traits shared by the remaining species in this clade. In the key in Vilhelmsen (2001), *C. albitibialis* keys to *C. timnaensis*, based on the traits listed above and, in the amb0 analysis, the two species come out as sister groups, albeit with no unambiguous support. A putative synapomorphy of these two taxa is the presence of a notch medially on the ventral transverse frontal carina (21:1). The possession

of this feature is unique within *Chalinus*; however, not all *C. timnaensis* specimens have this trait, even if it is present in the holotype (Vilhelmsen 2001). It is possible that *C. timnaensis* is paraphyletic with respect to *C. albitibialis*.

Chalinus albitibialis is unique within the genus in having extensive white markings on at least one of the legs. This feature occurs also in other members of the Orussidae. Notably, it is an autapomorphy of the large genus *Orussus*, but it has also evolved independently in the species *Guiglia bombycinus* Benson, *Ophrynon levigatus* Middlekauff, and *Pedicrista hyalina* Benson (see Vilhelmsen 2003, characters 63 & 111). Only in about ten species of *Orussus* are the white markings on the hind tibia developed to the degree also displayed by *C. albitibialis*. In the former, they apparently serve in courtship and threat displays in conjunction with additional markings on the face, antenna, and abdominal tip (Ahnlund & Ronquist 2001; Vilhelmsen 2003). There are no observations to support a similar function in *C. albitibialis*.

Chalinus spp. have not previously been recorded from Morocco (Fig. 7) (Vilhelmsen 2001). The only other records outside sub-Saharan Africa is of *C. timnaensis* from Israel (Kraus 1998) and Tunisia (Blank et al. in press). This species is also known from the Central African Republic, Côte d'Ivoire, Liberia, and Nigeria, i.e., close to the southern boundary of the Sahara. The present distribution of these two species and their possible close relationship might be taken as an indication that their common ancestor was more widely distributed in North Africa, including the area now covered by the Sahara. The populations represented by the records of *C. albitibialis* n. sp. in Morocco and *C. timnaensis* in Israel and Tunisia might have become isolated only comparatively recently, as the desert expanded in the late Pleistocene, perhaps as late as 5–6.000 years BP (deMenocal et al. 2000). However, this hypothesis needs to be further corroborated by discovering additional specimens confirming this pattern and giving a more complete picture of the distribution ranges of the species.

Acknowledgements

I want to thank Maurizio Gigli, Rome, Italy, for providing information about the circumstances the specimens were collected in and Øistein Berg, Haslum, Norway, for drawing my attention to them. Stephan Blank, Müncheberg, Germany, provided information about an additional record for *C. timnaensis*.

Literature cited

Ahnlund, H. & Ronquist F. (2001) The biology and occurrence of the red parasitic sawfly (*Orussus abietinus*) in the Nordic countries. *Entomologisk Tidsskrift*, 122, 1–11 [in Swedish, with an English summary].

- Blank, S.M., Kraus, M. & Taeger, A. (in press) *Orussus smithi*, spec. nov., and notes on additional West Palaearctic Orussidae (Hymenoptera). In: Blank, S.M., Schmidt, S. & Taeger, A. (eds), *Recent sawfly research — synthesis and prospects*. Goecke & Evers, Keltern.
- Kraus, M. (1998) Die Orussidae Europas und des Nahen Ostens (Hymenoptera: Symphyta). In: Taeger, A. & Blank, S. M. (Eds), *Pflanzenwespen Deutschlands*. Goecke & Evers, Keltern, pp. 283–300.
- deMenocal, P., Ortiz, J., Guilderson, T. Adkins, J., Sarnthein, M., Baker, L. & Yarusinsky, M. (2000) Abrupt onset and termination of the African humid period: rapid climate responses to gradual insolation forcing. *Quaternary Science Reviews*, 19, 347–361.
- Swofford, D.L. (2002) *PAUP*. Phylogenetic Analysis Using Parsimony* and Other Methods, ver. 4.0b10*. Sinauer Associates, Inc. Publishers. Sunderland, Massachusetts.
- Vilhelmsen, L. (2001) Systematic revision of the genera *Chalinus* Konow, 1897 and *Mocsarya* Konow, 1897 (Hymenoptera, Orussidae). *Insect Systematics & Evolution*, 32, 361–380.
- Vilhelmsen, L. (2003) Phylogeny and classification of the Orussidae (Insecta: Hymenoptera), a basal parasitic wasp taxon. *Zoological Journal of the Linnean Society*, 139, 337–418.
- Vilhelmsen, L. (2004) The old Wasp and the Tree: Fossils, phylogeny and biogeography in the Orussidae (Insecta, Hymenoptera). *Biological Journal of the Linnean Society*, 82, 139–160.