Order Hymenoptera, family Mutillidae

Subfamilies Ticoplinae and Dasylabrinae

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INTRODUCTION

Mutillidae are ectoparasitoid wasps commonly referred to as 'velvet ants' because of the appearance of the dense hair that covers their bodies. Females are entirely wingless, while males are normally fully winged. The females are known for their extremely painful sting. They invade the nests of wasps and bees and lay eggs near the larvae and pupae. Mutillidae, with about 4200 described species, occur worldwide but mainly in the tropics. They are especially common in desert and sandy areas.

The United Arab Emirates are located in the eastern part of the Arabian Peninsula south and north of the Tropic of Cancer between Persian Gulf and the Gulf of Oman. Most part of this country is occupied by the great desert Rub-al-Khali. Up to now, the mutillid fauna of the UAE was unknown; solely the family Mutillidae (without identified taxa) was recorded from this country by Tigar & Osborne (1999). The mutillid fauna of neighboring Iran numbers 78 species in 22 genera (Lelej, 2002; Lelej & Osten, 2004; Lelej et al., 2008). Forty species in 19 genera occur in Yemen (Lelej & van Harten, 2006) and only four species are known from Oman and seven species from Saudi Arabia. During 2005–2009, A. van Harten collected several thousands of specimens of Mutillidae in different sites of the UAE using different kinds of traps (van Harten, 2008). The light traps were most successful for the collecting of mutillids, because the velvet ants are mainly nocturnal and crepuscular in the arid areas. We expect that the number of mutillid species in the UAE will be no less than that in Yemen, another country of Arabian Peninsula. The study of the material is continuing and here the first part of our research, covering the subfamilies Ticoplinae and Dasylabrinae, is presented. Two new species are described, three known species are listed as well as five species that are probably new and will be described elsewhere in the near future.

MATERIALS AND METHODS

This paper is based mainly on material collected in United Arab Emirates by A. van Harten with traps (mostly light traps, Malaise traps, water traps) during recent years (2005–2009). This material comprises several thousand mutillid specimens. Never before has such rich material of Arabian Mutillidae been available for study. We also studied 48 specimens collected by T. Osten in 2003 in the neighbouring Oman [deposited in SMNS]. For the identification of material we used the collections of Palaearctic Mutillidae housed in the Institute of Biology and Soil Science, Vladivostok, Russia (IBSS) and the Zoological Institute, St. Petersburg, Russia (ZIN). Valuable exchange material of Afrotropical Mutillidae has been received by the senior author from Denis Brothers (University of KwaZulu–Natal, Pietermaritzburg, South Africa), and the late Guido Nonveiller.

Specimens were borrowed from or will be deposited in the following collections: IBSS, ZIN, Museo Civico di Storia Naturale di Milano, Italy, National Museum of Natural History, Leiden, the Netherlands (RMNH), Staatliches Museum für Naturkunde in Stuttgart, Germany (SMNS), and the United Arab Emirates Invertebrate Collection. During a trip to South Africa (University of KwaZulu-Natal, Pietermaritzburg) in 2008, the senior author was able to study

the vast material (including many types) used by D.J. Brothers and P.S. Bayliss for their revision of the genus *Tricholabiodes*.
The following abbreviations have been used in the text: T1, T2, T3, etc., to denote the first, second, third, etc., metasomal terga, and S1, S2, S3, etc., to denote the first, second, third, etc., metasomal sterna; POD, to denote the postocellar (interocellar) distance between posterior ocelli which is measured from above, and OOD, to denote the ocellocular distance between posterior ocellus and compound eye which is measured from above; LT – light trap; MT – Malaise trap; PT – pitfall trap; WT – water trap; AvH – A. van Harten; NARC – National Avian Research Centre.

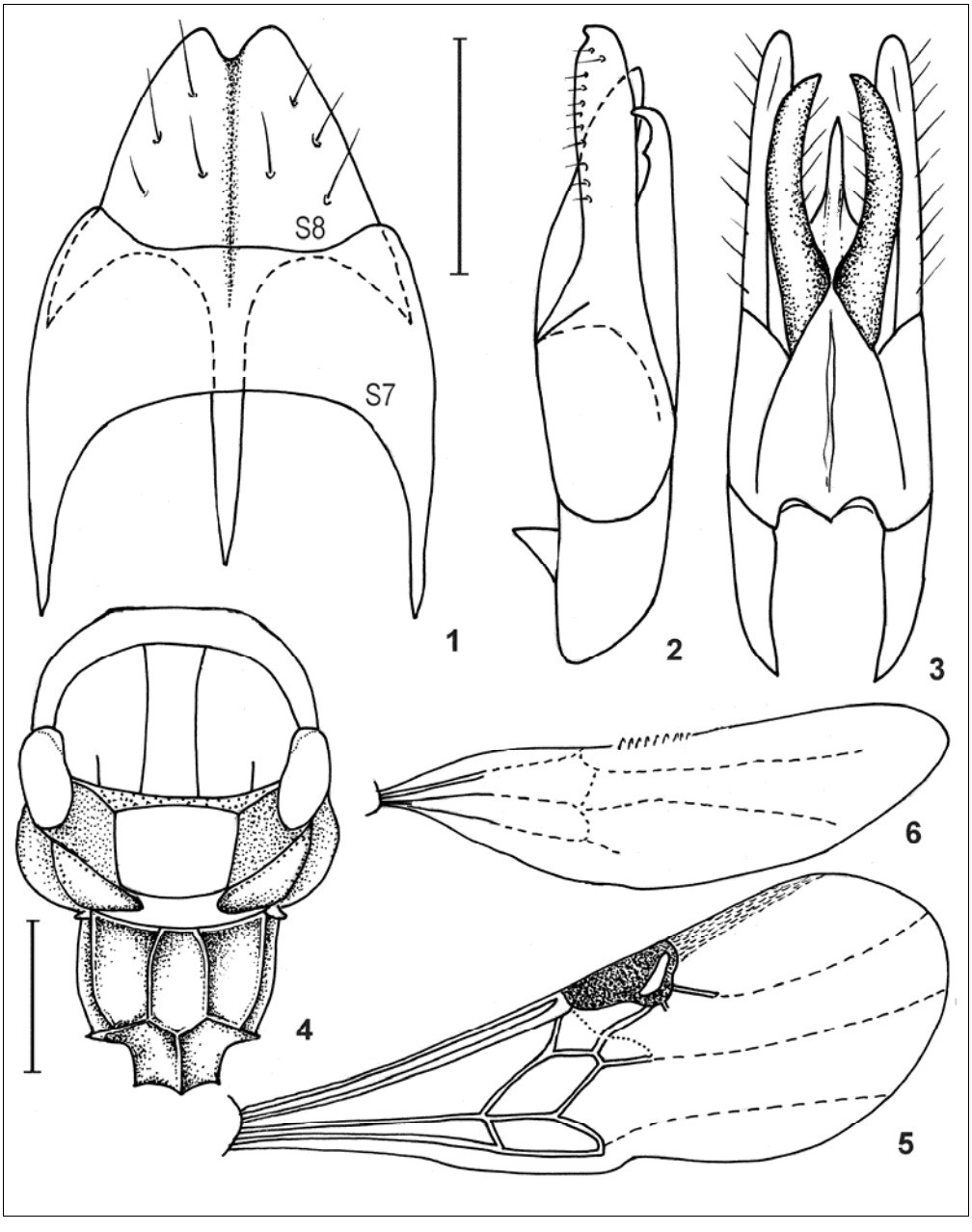
SYSTEMATIC ACCOUNT

Subfamily **Ticoplinae** Nagy, 1970

Tribe **Ticoplini** Nagy, 1970

Genus ***Nanomutilla*** André, 1900
The taxonomic history of *Nanomutilla* is discussed by Mitchell & Brothers (2002). Currently, this genus includes many species from southern Palaearctic and Afrotropical Regions, most of them being as yet undescribed. We accept here Mitchell & Brothers' concept of *Nanomutilla*. The senior author discussed with D. Brothers the systematic position of *Nanomutilla wurayahensis* nov. spec. described below.

Nanomutilla wurayahensis Lelej **nov. spec.** Plate 1, Figures 1–5
Specimens examined: Holotype: ♂, United Arab Emirates: Wadi Wurayah, 25°24'N 56°17'E, 12–14.iv.2005, in Malaise trap and water traps, leg. A. van Harten [RMNH]. Paratypes: 1♂ with the same label as holotype [IBSS]. 1♂, Wadi Maidaq, 26.xi.2005–2.i.2006, WT, leg. AvH.
Diagnosis: Superficially *Nanomutilla wurayahensis* nov. spec. even resembles the male of *Heterogyna nocticola* Ohl, 2006 (family Heterogynaidae) recently described from Oman (Ohl & Bleidorn, 2006) and recorded from the UAE (Ohl, 2008) by fore wing venation and by the colouration of antennae and legs, but differs by having quite another shape of pronotum, hypopygium (S8), and genitalia. in the male the new species differs greatly from both species of *Nanomutilla* described from Jordan [*N. yoca* (Nagy, 1970) and *N. parila* (Nagy, 1970)] by having more developed fore and hind wing venation (strongly reduced in both mentioned species), by having elongate tegula (small rounded in both mentioned species), and by having notauli and basal part of parapsids (lacking in both mentioned species). *Nanomutilla wurayahensis* nov. spec. is most similar to undescribed species from Kenya and Jordan (D. Brothers, pers. comm.).
Description: Male. Body length 3.6–4.8 mm. Head. 1.16× as wide as long, 0.91× as wide as mesosoma, sparsely pubescent. Antennal tubercles separate, not joined by a straight transverse ridge. Scape ventrally with strong lateral and weak mesal carina. Frons and vertex finely and sparsely punctate, interspaces of about several puncture diameters; vertex along eye posterior border weakly striate. Eye inner margin shallowly emarginate at mid height. Eye entirely pubescent, pubescence visible at small magnification. Ocellar triangle weakly protuberant, ratio POD:OOD 1.0. Malar space 0.13× eye height. Clypeus with median area delimited by weak ridges. Mandible with larger apical and smaller middle and basal inner tooth, with weak subbasal tubercle beneath. First flagellomere 0.61× as long as second flagellomere; flagellomere 2 twice as long as wide.



Figures 1–5. *Nanomutilla wurayahensis* Lelej nov. spec., male. 1: S7 and S8, ventral view; 2: Genitalia, lateral view; 3: Genitalia, ventral view; 4: Mesosoma, dorsal view; 5: Fore wing; 6: Hind wing. Scale–line for Figs 1–3 – 0.25 mm, for Fig. 4 – 0.5 mm.

Plate 1. *Nanomutilla wurayahensis* Lelej nov. spec., male, habitus.

Mesosoma as in Figure 2, 1.54× as long as wide, excluding anterior collar. Dorsal and anterior faces of pronotum smoothly merging, without transverse carina. Pronotum sparsely punctate dorsally, interspaces of about several puncture diameters; humeral angle abruptly obtuse; antero-dorsal margin straightish. Mesoscutum as densely punctate as pronotum, scutellum more finely punctate than pronotum; long setae on posterior and lateral margins of scutellum. Notaulus well developed and deep, reaching posterior margin of mesoscutum; weakly developed, anteriorly convergent parapsidal line reaching level of anterior margin of tegula. Scutellum weakly convex, flattened posteriorly, sides convergent posteriorly, posterior margin not lamellate, abutting metanotum.

Tegula elongate, ratio of tegula length to mesoscutum length 0.66, posteriorly even protruding over level of posterior margin of scutum; anteriorly with oblique line of dense punctures delimiting small shiny impunctate area; densely punctate along inner border; with sparse setae, disc shiny impunctate without setae. Metanotal dorsellum flattened, finely and densely punctate laterally. Propodeum widest anteriorly. Disc and declivity of propodeum distinct. Propodeal disc at least 1.5× as long as declivity height, with three very large central and two lateral fields defined by well developed carinae. Propodeal declivity with two large fields defined by well developed carinae except posterior border. Lateral surface of pronotum with sparse fine punctures. Mesopleuron coarsely and densely punctate, interspaces less than puncture diameter, disc sparsely punctate, interspaces of about three puncture diameter or more, weakly convex and sparsely punctate ventrally. Metapleuron and lateral surface of propodeum densely punctate. Fore wing with venation distally of radial (marginal) cell

nebulous to spectral, weak and almost indistinguishable. Hind tibia with longer spur, 0.54× as long as first tarsomere.
Metasoma. Felt line on S2 and T2 absent. S2 with short median longitudinal basal carina. Hypopygium apical margin notched mesally. Sparse, shallow punctation dorsally, interspaces 2–4× puncture diameter. T1 0.71× as long as T2, T2 0.84× as long as wide. T7 dorsally flattened, sparsely punctate. S1 coarsely punctate with straight median longitudinal carina. Genitalia as in Figures 2 and 3. Penis valve more than 0.75× as long as gonostyle; gonostyle almost straight; volsella with setae ventrally, not brush-like, ventrally slightly curved; penis valve with two teeth apicoventrally.
Colour. Black, but tegula pale translucent over posterior third, mandible yellowish-brown with brown apex; antenna dark brown with yellow scape and pedicel; legs yellow with brown apical portion of femora; tibial spurs yellowish, wings hyaline, pterostigma and marginal cell dark brown, other venation brown to pale-brown. Semi-erect pubescence of body predominantly whitish, sparse apical fringe of white setae on T1–T6 and S2–S6.
Female. Unknown.
Distribution: UAE.
Etymology: The specific name originates from Wadi Wurayah, the type locality, a large canyon system in the mountainous area on the east side of the UAE. Since April 2009 Wadi Wurayah has been a fully protected area.

Subfamily **Dasylabrinae** Invrea, 1964

Genus ***Tricholabiodes*** Radoszkowski, 1885
The species of this genus are nocturnal and widespread in arid areas of the Palaearctic and Afrotropical regions, a few penetrate to the Oriental region. Most of the species are known from males, a few from females and five (*Tricolabiodes asiaticus* Radoszkowski, 1885, *T. nursei* Lelej, 1995, *T. thisbe* (Péringuey, 1898), *T. lividus* André, 1909 and *T. tharensis* Lelej, 1995) are known from both sexes.
We recognized in the UAE six species represented by males and three species represented by females. The descriptions of four new species represented by males are to appear in a monograph on *Tricholabiodes* (Brothers & Bayliss, in prep.) and we enumerate them as species 1–4. Furthermore, the senior author informed D. Brothers about how our species numbers correspond to their new species, so that they can be included in the paratype series. Of three species represented by females (from the *semistriatus* species-group) one probably is the opposite sex of a new species being described by Brothers & Bayliss (in prep.). We enumerate this female species as *Tricholabiodes* spec. 5.

Tricholabiodes aegyptiacus (Radoszkowski, 1876) Plates 2–3
Specimens examined: Sharjah Desert Park, 1♀, 30.iv–25.v.2008, LT, leg. AvH. Um al-Quwain, 4♀, 1–30.xi.2008, PT, leg. AvH.
Distribution: Egypt. New to the UAE.

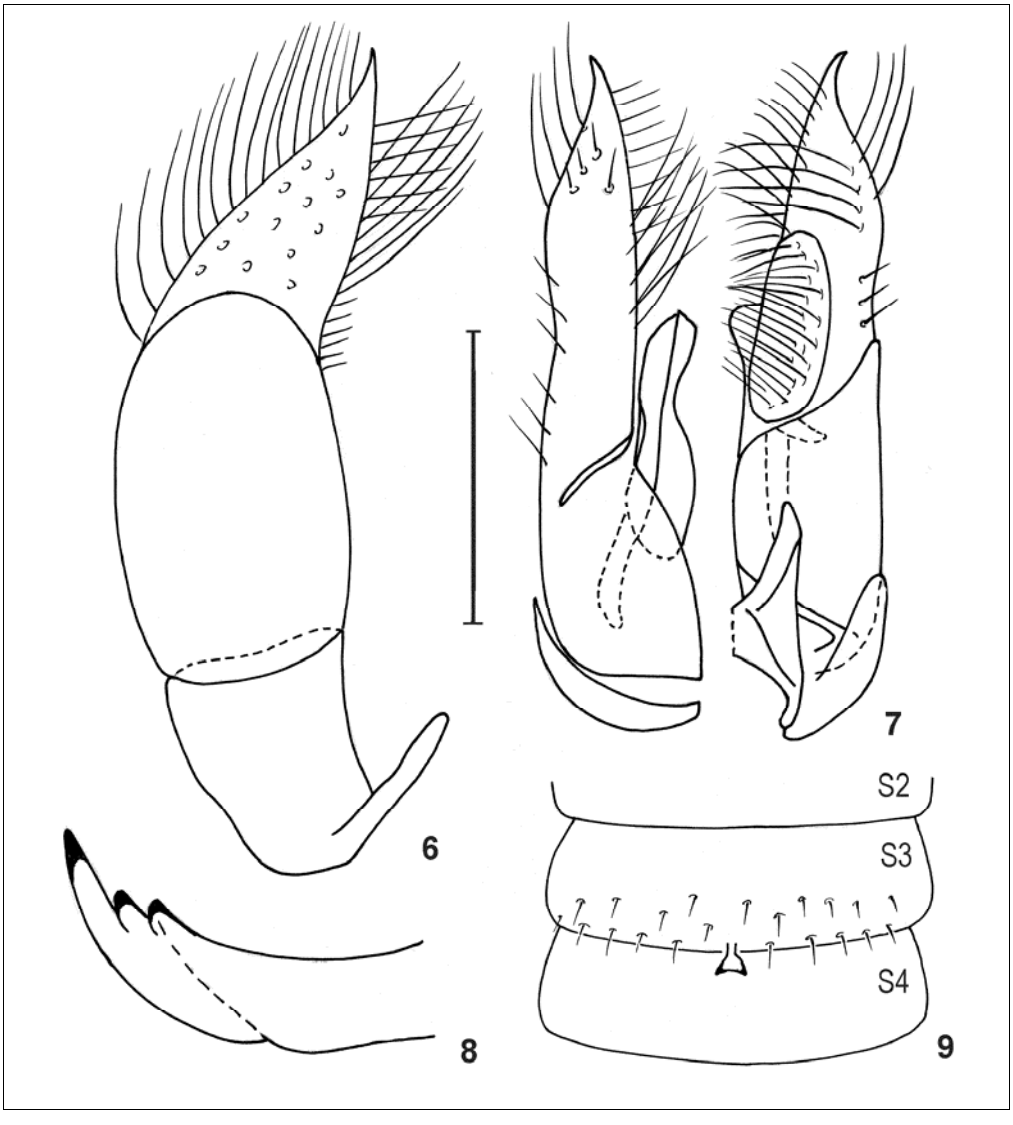
Tricholabiodes arabicus Suárez, 1967 Plate 4
Specimens examined: N of Ajman, 1♂, 25.v–12.vi.2008, WT, leg. AvH; 12♂, 26.v–5.vii.2008, WT, leg. AvH; 20♂, 5–16.vii.2008, WT, leg. AvH; 15♂, 16–19.vii.2008, WT, leg. AvH; 10♂, 10–14.viii.2008, leg. AvH. SSW of ad-Dhaid, 5♂, 23.iv.2005, at light, leg. AvH & K. Szpila. Um al-Quwain, 1♂, 27–29.x.2008, PT, leg. AvH. Wadi Bih dam, 10♂, 13–21.iv.2008, LT, leg. AvH; 20♂, 21–30.iv.2008, LT, leg. AvH; 18♂, 30.iv–4.vi.2008, LT, leg. AvH; 9♂, 4–9.vi.2008, LT, leg. AvH; 4♂, 9–18.vi.2008, LT, leg. AvH; 15♂, 18–24.vi.2008, LT, leg. AvH; 9♂, 24–29.vi.2008, LT, leg. AvH; 5♂, 29.vi–8.vii.2008,

Plates 2–3. *Tricholabiodes aegyptiacus* (Radoszkowski), female, habitus. 2: Dorsal view; 3: Lateral view.

Plates 4: *Tricholabiodes arabicus* Suárez, male, habitus.

LT, leg. AvH; 12♂, 9–23.vii.2008, LT, leg. AvH. OMAN: 10 km S of al-Qabil, sandy desert, 5♂, 8.xii.2003, LT, leg. T. Osten [SMNS].
Distribution: Oman, Yemen (Suárez & Nonveiller, 1990). New to the UAE.

Tricholabiodes brothersi Lelej **nov. spec.** Plates 5–6, Figures 6–9
Specimens examined: Holotype: ♂, United Arab Emirates, al-Ajban, 24°36'N, 55°01'E, 19–26.v.2006, in Malaise trap, leg. A. van Harten [RMNH]. Paratypes: 1♂ with the same data as holotype [IBSS]. 9♂, SSW of ad-Dhaid, 23.iv.2005, at light, leg. AvH & K. Szpila. 1♂, Sharjah, 6–30.vi.2005, LT, leg. AvH. 1♂, NARC, near Sweihan, 2–30.iv.2005, LT, leg. AvH.
Diagnosis: The male of the new species differs from other *Tricholabiodes* species, including the new ones being described by Brothers & Bayliss (in prep.), by having a posteromesal bifurcal process on S3 (Fig. 9) and by having a very small quadrangular *2r-m* cell (larger and quinqueangular in other species).
Description: Male. Body length 5.6–8.4 mm. Free border of clypeus entirely convex, without a protuberance on either side of midline, without vestiture clumped. Mandible compressed tridentate, mesal margin smooth; dorsal rim of mandible carinate, without an enlarged vertical flange (Fig. 8); subbasal ventral tooth not dilated. Anterior surface of scape with one longitudinal carina. Anteromesal surface of mesosternum simple, without mesosternal process on either side of midline. Posterior mesal margin of metacoxa without a tuft of setae. Metacoxa without any trace of longitudinal carina along mesal margin, ventral surface of coxa strongly convex. Mesotibia oval in cross-section. Ventral surface of metafemur without clumping of macrosetae, macrosetae shorter than shorter tibial spur. Anterior one-third of T2 moderately and mediumly punctate. Mesobasitarsus almost imperceptibly curved in lateral view. Ratio POD:OOD 1.3. Diameter of anterior ocellus 1.35× distance between it and



Figures 6–9. *Tricholabiodes brothersi* Lelej nov. spec., male. 6: Genitalia, lateral view; 7: Genitalia (left – dorsal view, right – ventral view); 8: Mandible; 9: S3 and S4, ventral view. Scale-line for Figs 6, 7 – 0.5 mm.

posterior ocellus. Head with sides behind eyes strongly convergent with straight posterior margin (dorsal view). Antennal scrobe with well-developed dorsal tubercle. Frons and vertex matt, microgranulate. Pronotum and mesopleuron reticulate. Mesoscutum with complete notauli and traced parapsids. Mesoscutum with dense medium punctation. Mesoscutellum with smaller puncture. Propodeum gently sloping, laterally and dorsally reticulate. Parascutal carina well developed, ending by tooth. Metasomal segment 1 petiolate, T1 1.65× its maximal width. T2 with long lateral felt line, S2 without any traces of felt line. Disc of S2 not

Plates 5–6: *Tricholabiodes brothersi* Lelej nov. spec., male, habitus.

flattened. S3 with posteromesal bifurcal process (Fig. 9). T7 except basal part microgranulate, basal part elevated with rough foveae. Genitalia as in Figures 6 and 7. Colour. Antennal palps and legs even whitish-yellow, other body parts straw-coloured. Mandibular teeth reddish-brown. Wings hyaline, fore wings distally of cells slightly infuscated. Body and legs clothed with subappressed short and scattered long erect whitish setae. Felt line on T2 whitish.
Female. Unknown.
Distribution: UAE.
Etymology: This species is dedicated to Denis J. Brothers, world authority on Mutillidae and Aculeate classification and evolution.

Tricholabiodes craspedopygius Suárez, 1967 Plates 7–8
Specimens examined: Sharjah, 1♀, 10.xi.2004, LT, leg. AvH. Sharjah Desert Park, 3♀, 6–28.xii.2006, PT, leg. AvH; 10♀, 20–26.x.2008, PT, leg. AvH; 12♀, 1–30.xi.2008, PT, leg. AvH. Um al-Quwain, 4♀, 1–30.xi.2008, PT, leg. AvH.
Distribution: Eritrea. New to the UAE.

Tricholabiodes spec. 1
Specimens examined: Al-Ajban, 5♂, 19–26.v.2006, MT, leg. AvH; 4♂, 27.v–26.vi.2006, MT, leg. AvH. SSW of ad-Dhaid, 13♂, 23.iv.2005, at light, leg. AvH & K. Szpila. Sharjah, 1♂, 31.v–12.vi.2005, LT, leg. AvH. NARC near Sweihan, 6♂, 14.iii–2.iv.2005, LT, leg. AvH; 25♂, 2–30.iv.2005, LT, leg. AvH; 13♂, 30.iv–11.v.2005, LT, leg. AvH.

Tricholabiodes spec. 2
Specimens examined: Al-Ajban, 13♂, 19–26.v.2006, MT, leg. AvH; 4♂, 27.v–26.vi.2006, MT, leg. AvH; 2♂, 17.x–19.xi.2005, LT, leg. AvH. N of Ajman, 1♂, 5–16.vii.2008, WT, leg. AvH. SSW of ad-Dhaid, 13♂ 23.iv.2005, at light, leg. AvH & K. Szpila. Sharjah, 2♂, 10.xi.2004, LT, leg. AvH; 1♂, 6–30.vi.2005, LT, leg. AvH. Sharjah Desert Park, 4♂, 30.iv–31.v.2005, LT; 3♂, 7–16.v.2006, LT; 1♂, 5–12.v.2007, LT; 1♂, 21–28.v.2007, LT; 1♂, 6–30.iv.2008, LT; 7♂, 30.iv–25.v.2008, LT; 3♂, 16.vi–17.vii.2008, LT; 1♂, 17–24.vii.2008, LT; 1♂, 24.vii–14.viii.2008, LT; 3♂, 1–30.xi.2008, LT; all leg. AvH. NARC near Sweihan, 1♂, 14.iii–2.iv.2005, LT, leg. AvH; 6♂, 2–30.iv.2005, LT, leg. AvH; 1♂, 30.iv–11.v.2005, LT, leg. AvH.

Tricholabiodes spec. 3
Specimens examined: Al-Ajban, 5♂, 17.x–19.xi.2005, LT, leg. AvH; 13♂, 19–26.v.2006, MT, leg. AvH; 9♂, 27.v–26.vi.2006, MT, leg. AvH. N of Ajman, 2♂, 10–14.viii.2008, WT, leg. AvH. SSW of ad-Dhaid, 16♂, 23.iv.2005, at light, leg. AvH & K. Szpila. Near Mahafiz, 6♂, 2–14.ix.2006, LT, leg. AvH. Sharjah, 2♂, 6–30.vi.2005, LT, leg. AvH. Sharjah Desert Park, 1♂, 30.iv–31.v.2005, LT; 3♂, 7–16.v.2005, LT; 3♂, 30.vi–9.vii.2005, LT; 1♂, 5–12.v.2007, LT; 2♂, 21–28.v.2007, LT; 2♂, 4–9.vi.2007, LT; 1♂, 6–30.iv.2008, LT; 10♂, 30.iv–25.v.2008, LT; 2♂, 25.v–16.vi.2008, LT; 21♂, 16.vi–17.vii.2008, LT; 3♂, 17–24.vii.2008, LT; 3♂, 24.vii–14.viii.2008, LT; 1♂, 9.viii–4.ix.2008, LT; all leg. AvH.

Tricholabiodes spec. 4
Specimens examined: Fujairah, 1♂, 6.iv–2.v.2005, LT, leg. AvH. Hatta, 6♂, 8–26.iv.2006, LT, leg. AvH. Sharjah-Khor Kalba, near tunnel, 1♂, 26.iv–3.v.2006, LT, leg. AvH; 9♂, 23–30.vi.2006, LT, leg. AvH; 5♂, 31.v–7.vi.2006, LT, leg. AvH. Wadi Bih dam, 8♂, 13–21.iv.2008, LT; 11♂, 21–30.iv.2008, LT; 32♂, 30.iv–4.vi.2008, LT; 7♂, 4–9.vi.2008, LT; 39♂, 18–24.vi.2008, LT; 15♂, 24–29.vi.2008, LT; 12♂, 29.vi–8.vii.2008, LT; 75♂, 9–23.vii.2008, LT; all leg. AvH. Wadi Maidaq, 460 m, 1♂, 12.iv.2006, at light, leg. C. Gielis; 15♂, 27.iv–4.v.2006, at light, leg. C. Gielis; 10♂, 1–8.vii.2006, LT, leg. AvH. Wadi Safad, 6♂, 14–21.v.2006, LT, leg. AvH. OMAN: 10 km S of Nizwar, Wadi al-Ghul, 500 m, 14♂, 10–11.xii.2003, LT, leg. T. Osten [SMNS].

Plates 7–8. *Tricholabiodes craspedopygius* Suárez, female, habitus. 6: Dorsal view; 7: Lateral view.

Tricholabiodes spec. 5

Specimens examined: Sharjah Desert Park, 1♀, 30.iv–25.v.2008, LT, leg. AvH. Wadi Bih dam, 1♀, 4–9.vi.2008, LT; 1♀, 18–24.vi.2008, LT; 1♀, 29.vi–8.vii.2008, LT; 1♀, 9–23.vii.2008, LT; all leg. AvH.

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REFERENCES

Brothers, D.J. & P.S. Bayliss (in prep.): Systematic revision of *Tricholabiodes* Radoszkowski (Hymenoptera: Mutillidae).

Harten, A. van (2008): Collecting methods and localities. *Arthropod fauna of the UAE*, 1: 14–32.

Lelej, A.S. (2002): *Catalogue of the Mutillidae* (*Hymenoptera*) *of the Palaearctic region*. Dalnauka, Vladivostok, 171 pp.

Lelej A.S., B. Gharali & H. Lotfalizadeh (2008): New records of velvet ants (Hymenoptera: Mutillidae) from the west of Iran. *Far Eastern Entomologist*, 191: 1–7.

Lelej, A.S. & T. Osten (2004): To the knowledge of the mutillid and bradynobaenid wasps of Iran (Hymenoptera: Mutillidae, Bradynobaenidae). *Proceedings of the Russian Entomological Society St. Petersburg*, 75 (1): 253–262.

Lelej, A.S. & A. van Harten (2006): A review of the Mutillidae (Hymenoptera) of Yemen. *Zootaxa*, 1226: 1–50.

Mitchell, A. & D.J. Brothers (2002): Phylogeny of the genera of Ticoplinae (Hymenoptera: Mutillidae). *Journal of Hymenoptera Research*, 11 (2): 312–325.

Ohl, M. (2008): Order Hymenoptera, family Heterogynaidae. *Arthropod fauna of the UAE*, 1: 403–407.

Ohl, M. & C. Bleidorn (2006): The phylogenetic position of the enigmatic wasp family Heterohynaidae based on molecular data, with description of a new, nocturnal species (Hymenoptera: Apoidea). *Systematic Entomology*, 31: 321–337.

Suárez, F.J. & G. Nonveiller [(1989)1990]: Notas sobre algunos *Tricholabiodes* (Hymenoptera, Mutillidae). *Eos, Revista Española de Entomología*, *Madrid*, 65 (1): 125–188.

Tigar, B.J. & P.E. Osborne (1999): Patterns of biomass and diversity of aerial insects in Abu Dhabi's sandy deserts. *Journal of Arid Environments*, 43: 159–170.

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