

***Machimus margaretae* Weinberg & Tsacas, 1975, a new synonym for *Machiremisca decipiens* (Wiedemann in Meigen, 1820) (Diptera: Asilidae)**

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Abstract: While studying a series of Spanish Asilidae, problems arose with the identification of *Machiremisca* Lehr, 1996 specimens. The examination of the type material of *Machimus margaretae* Weinberg & Tsacas, 1975, as well as the study of the literature referring to this species, suggest that this taxon should be considered as a junior synonym of *Machiremisca decipiens* (Wiedemann in Meigen, 1820). High-resolution pictures of *Machimus margaretae* **syn. n.** are published for the first time.

Key words: Diptera, Asilidae, *Machiremisca*, *Machimus*, new synonymy, Spain.

***Machimus margaretae* Weinberg & Tsacas, 1975, nuevo sinónimo de *Machiremisca decipiens* (Wiedemann in Meigen, 1820) (Diptera: Asilidae)**

Resumen: Al estudiar una serie de Asilidae españoles, surgieron problemas al identificar ejemplares de *Machiremisca* Lehr, 1996. El examen del material tipo y el estudio de la literatura llevan a proponer un nuevo sinónimo, *Machimus margaretae* Weinberg & Tsacas, 1975 **syn. n.**, que se presenta como sinónimo menor de *Machiremisca decipiens* (Wiedemann in Meigen, 1820). Se publican por primera vez imágenes en alta resolución de *Machimus margaretae* Weinberg & Tsacas, 1975 **syn. n.**

Palabras clave: Diptera, Asilidae, *Machiremisca*, *Machimus*, nueva sinonimia, España.

Taxonomy/Taxonomía: *Machimus margaretae* **syn. n.**

Introduction

Robber flies (Diptera: Asilidae) are one of the largest and most abundant families of flies, with more than 7,000 species worldwide (Hull, 1962). Despite robber flies being considered attractive and relatively well-studied worldwide, much remains to be discovered and documented, particularly on the Iberian Peninsula (e.g., van den Broek *et al.*, 2018; Álvarez Fidalgo *et al.*, 2019). Especially *Machimus* Loew, 1849 remains problematic, with 26 valid species in Spain (Álvarez Fidalgo & van den Broek, 2019) and more than 188 species in the world (Dennis & Barnes, 2012). In order to identify this speciose genus, it is often necessary to study series of both male and female specimens and to compare these specimens to reference material, including type specimens. Many problems arise from inadequate descriptions, damaged type material, inaccessible or lost type material, short type series, and single-sex-based species descriptions. One of the better described species is *Machimus margaretae* Weinberg & Tsacas, 1975, which was described from southern Spain (“La Mora entre Granada et Cadix”) on the basis of one male and one female. In contrast to the situation with many other *Machimus* species, accurate drawings and textual descriptions of *M. margaretae* are available, allowing for fast, confident species identification. However, since its description, no additional records of *M. margaretae* have been published.

Materials and methods

The author collected *Machiremisca decipiens* (Wiedemann in Meigen, 1820) in March 2020 in the province of Huelva (Andalucía) by using an entomological sweep net, catching Asilidae on sight. All specimens were pinned and deposited in the collection of the Museo Nacional de Ciencias Naturales (MNCN, Madrid).

***Machiremisca decipiens*:** SPAIN: Huelva, Andalucía: El Rompido, Río Piedras (37.2198, -7.1511): 1♂, 13.5.2020, leg. and det. Mortelmans, col. MNCN. Huelva, Andalucía: Mazagón (37.144, -6.8394): 2♂ 1♀, 13.3.2020, leg. and det. Mortelmans, col. MNCN.

From the Staatliches Museum für Naturkunde Stuttgart (SMNS, Stuttgart), the author borrowed the male holotype and the female allotype of *M. margaretae*. Both type specimens are in good condition. The terminalia of both male and female that were removed and dissected by Weinberg & Tsacas (1975) are stored in glass microvials with cork stoppers, attached to the pin with the remainder of the specimen. The glycerine inside the original micro-

vials had evaporated, so the author replaced microvials with high-quality plastic microvials, refilled with glycerine.

***Machimus margaretae*:** SPAIN: ANDALUCÍA: La Mora entre Granada et Cadix: 1♂ holotype, 1♀ allotype, 1.6.1971, leg. M. Ertels, det. Weinberg & Tsacas, col. SMNS.

To compare congeners, the author studied the lectotype of *Machiremisca periscelis* (Macquart, 1849) in the Royal Belgian Institute of Natural Sciences (RBINS, Brussels).

***Machiremisca periscelis*:** ALGERIA: EL TAREF: La Calle [= El Kala]: 1♂ lectotype, col. RBINS.

Morphological analyses and diagnoses of the specimens were performed with a Novex AR-Zoom Stereomicroscope with 40x magnification. Diagnoses of the male genitalia, general measurements, and photographs of the specimens were made by use of a Leica M205 stereomicroscope with up to 160x magnification at the LifeWatch Marine Observatory (Flanders Marine Institute, Ostend, Belgium). To prepare the male terminalia for examination, the author employed the following technique: (1) completely removing the abdomen, (2) soaking the abdomen for 10 minutes in warm KOH, (3) soaking the abdomen for 20 minutes in tap water, (4) soaking the abdomen for 10 minutes more in EtOH-HCl, and (5) soaking the abdomen for 20 minutes more in tap water. After examination, the macerated abdomen is placed in a plastic microvial containing a few drops of glycerine, and the microvial is pinned, through the stopper, on the same pin that holds the rest of the specimen.

Results

Taxonomic history of *Machiremisca*

The basis of this genus were given by Theodor (1980), who described the ‘*Dysmachus verticillatus*-group’ for *Dysmachus verticillatus* Becker, 1907, *Dysmachus costalis* Theodor, 1980, *Dysmachus periscelis* (Macquart in Lucas, 1849) and *Dysmachus decipiens* (Wiedemann in Meigen, 1820). Theodor (1980) differentiated this species group from other *Dysmachus* Loew, 1860 by the following characters [copied here exactly]: “Face tubercle large, reaching almost to the antennae. A tuft of long white hairs in the middle of the occiput and two such tufts on the disc of the scutellum. Hairs on antennae, frons and ocellar tubercle white. Four to six marginal setae on the scutellum. Cerci of female free, triangular, pointed, diverging.” Furthermore, Theodor (1980) suggested that these four species could rightfully be placed in their own subgenus if genitalia of both

D. periscelis and *D. decipiens* were proven to be similar to *M. verticillatus* and *M. costalis* [two species to which Theodor (1980) had no access].

Sixteen years later, Lehr (1996) erected the genus *Machiremisca* for *D. verticillatus* and *D. costalis*. While doing so, Lehr (1996) relied on the description given by Theodor (1980) for the *Dysmachus verticillatus*-group which is characterized by the female terminalia having free, triangular and diverging cerci [similar to species of *Eremisca* Hull, 1962 and *Phileris* Tsacas & Weinberg, 1976] and the male genitalia closely related to Machimini [epandrium straight, aedeagus narrow at base with the aedeagal prolongations wide]. Later, Tomasovic *et al.* (2003) studied *D. periscelis* and *Eremisca decipiens* (Wiedemann in Meigen, 1820) [as suggested by Theodor (1980)] and moved both of these species to *Machiremisca*.

As of today, the genus includes four species: *M. costalis*, *M. decipiens*, *M. periscelis* and *M. verticillatus*.

Synonymy of *Machimus margaretae*

Machiremisca decipiens was originally described as *Asilus decipiens* Wiedemann in Meigen, 1820, was later moved to *Dysmachus* by Lehr (1988), then to *Eremisca* by Lehr (1996), and finally to *Machiremisca* by Tomasovic *et al.* (2003). It is a morphologically variable species, known to have at least three synonyms: *Asilus variegatus* Meigen, 1820, *Eutolmus multicolor* Schiner, 1854, and *Dysmachus varispinus* Strobl, 1909. All of these synonyms were described because of variations in leg color. However, identification of *M. decipiens* is straightforward by use of the figures of the male genitalia in Engel (1930, p. 113) and Tomasovic *et al.* (2003, p. 92) and of the female genitalia in Engel (1930, p. 113). In order to compare this species with its congeners one also can refer to Theodor (1980), who provides illustrations of the terminalia of both males and females of *M. verticillatus* and *M. costalis*. Álvarez Fidalgo *et al.* (2019) provide habitus images of *M. periscelis*, and Tomasovic *et al.* (2003) provide drawings of the male genitalia of *M. periscelis*. *Machiremisca decipiens* is known from France, Spain, Portugal, Italy and Iran (Hayat, 2008), especially from sandy coastal dunes (Engel, 1930; Bosák & Hradský, 2008). The newly collected material from Andalucía was collected in sandy dune areas too, while the asilids were sitting on the ground looking for prey (especially Apidae).

Machimus margaretae was described from two type specimens by Weinberg & Tsacas (1975). Their description explicitly states that the new species was compared only to species of *Machimus* [and so, neglecting several similar species in *Dysmachus*]. The assignment to *Machimus* makes sense because the new species they described has male terminalia similar to that of other species in the Machimini [similar to species now assigned to *Machiremisca*]. Male and female terminalia are illustrated in Weinberg & Tsacas (1975). No other publications, records, illustrations, or pictures of *M. margaretae* are known, so habitus pictures of this species are provided herein for the first time (Fig. 1-3).

While identifying a series of Asilidae from Andalucía, problems arose in their identification, as it was not possible to identify the series as either *M. decipiens* or *M. margaretae*. Therefore, type material of *M. margaretae* was borrowed to enable the author to better understand the illustrations and textual descriptions in Weinberg & Tsacas (1975). The external morphology and the male and female terminalia of *M. margaretae* were found to be identical to those of *M. decipiens*. Tomasovic *et al.* (2003) suggested this potential synonymy but declined to formally publish it because he had not seen the types of *M. margaretae*.

Weinberg & Tsacas (1975) did not describe the female cerci as being divergent ('bifid'), although careful examination of the provided illustration depicts divergent cerci (Weinberg & Tsacas, 1975, Fig. 1e). More important, the female cerci are wedged into the previous tergite, a diagnostic character for e.g., *Dysmachus* or

Machiremisca. *Machimus* always has the cerci free. These characters are a genotypic character for *Machiremisca*. Review of type material proved that the drawings of Weinberg & Tsacas were, in fact, very accurate, as the cerci are indeed bifid (Fig. 3).

Conclusion

Machimus is a problematic and speciose genus. Although a small step, *M. margaretae* is here synonymized with *M. decipiens*, further improving our knowledge of the Iberian Asilidae and diminishing potential points of struggle in identifying Iberian Asilids.

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* References available at www.sea-entomologia.org

Fig. 1. Dorsolateral view of female allotype of *Machimus margaretae*.



Fig. 2. Dorsolateral view of male holotype of *Machimus margaretae*.



Fig. 3. Dorsal view of female allotype *Machimus margaretae* showing diverging triangular cerci.

