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REMARKS ON *HELCOMYZA MEDITERRANEA* (LOEW, 1854)  
(DIPTERA, HELCOMYZIDAE)

**Riassunto.** *Osservazioni su Helcomyza mediterranea (Loew, 1854) (Diptera, Helcomyzidae).*

Conseguente al ritrovamento di nuovo materiale di *Helcomyza mediterranea* (Loew) proveniente da vecchie raccolte effettuate nei litorali italiani dell'Adriatico settentrionale, vengono qui proposte alcune osservazioni ecologiche, fenologiche e morfologiche su questa specie, con particolare riguardo alla morfologia dei genitali maschili e del postaddome della femmina.

**Summary.** On discovering specimens of *Helcomyza mediterranea* (Loew) from some old collections made on the shores of the Italian North Adriatic Sea, some ecological, phenological, and morphological remarks are given for this species, with special reference to male and female postabdominal morphology.

INTRODUCTION

LOEW (1854) described *Helcomyza mediterranea*, as *Actora mediterranea*, based on specimens of both sexes from “die griechischen und kleinasiatischen Küsten”. GRIDELLI (1942) pointed out that Loew's types of this species, preserved in the Museum für Naturkunde der Humboldt-Universität (Berlin, Germany), are represented by only a single specimen, labelled “Turkey [sic] – v. Friv. – Coll. H. Loew”, and that no additional specimens were found in the Diptera collection of that museum.

After exhaustively discussing the taxonomic status of this species, GRIDELLI (1942) concluded that *Helcomyza mediterranea* is the Mediterranean subspecies of *H. ustulata* Curtis, 1825. Accordingly, he subdivided the latter species into two subspecies, *H. ustulata ustulata* inhabiting the sandy beaches of central and northern Europe, and *H. ustulata mediterranea* occurring on the seashores of the northern Mediterranean, with isolated records from Venice (Italy), Greece, and Turkey. While the latter two citations are from LOEW's (1854) original description, the citations from Lido of Venice were based on specimens that GRIDELLI (1942) himself collected and thoroughly studied. Unfortunately, his examinations of these specimens exclusively concerned the colour pattern of the mesonotum and some biometric indexes, neglecting the morphology of the male terminalia.

If, on the one hand, the colour pattern of the mesonotum is generally somewhat distinctive for separating the northern and southern populations in Europe, that is to say between *H. ustulata ustulata* and *H. ustulata mediterranea* (sensu Gridelli, 1942), on the other hand, the morphology of the male terminalia (see further) unequivocally proves that the two populations are indeed not conspecific, but represent two distinct, closely related species, as defined by both former and recent authors. Confirmation of this is corroborated here by the examinations and illustrations of the male terminalia of these two species as well as by the female postabdomen and spermathecae of *H. mediterranea*.

## TAXONOMIC ACCOUNT

*Helcomyza mediterranea* (Loew, 1854)*Actora mediterranea* Loew, 1854: 22.Material examined

Laguna Veneta, ricerche lagunari 1944-48 [Lagoon of Venice, lagoon researches 1944-48], A. Giordani Soika collector.

Locality: Veneto, Lido di Venezia, Alberoni (a relatively large marine sandy beach). St.: 311 – wet beach, x.1946, 7 ♂♂ 3 ♀♀; 769 – on sand, wet beach, 19.ix.1947, 6 ♂♂ 2 ♀♀; 787 – *Ammophila* on foredunes, 10.ii.1948, 1 ♂; 806 – beach, 10.ii.1948, 1 ♂ 1 ♀; 821 – [without place (biotope) of collection], 4.iii.1948, 2 ♂♂; 850 – beach, 17.iii.1948, 1 ♂; 918 – wet sand, 20.x.1947, 1 ♀; 919 – ibidem, 5.xi.1947, 7 ♂♂ 4 ♀♀; 959 – wet beach, 2.x.1947, 2 ♂♂ 2 ♀♀; 982 – (without locality, in all probability Alberoni), x.1942, 4 ♀♀; 1013 – on sand, 15.ii.1950, 1 ♂; 1028 – beach, 17.ii.1950, 1 ♂ 1 ♀; 1323 – (collection data lost), 4 ♂♂ 1 ♀; (no station number) – 2.iii.1957, 1 ♀; 4.iv.1959, 2 ♂♂; wet beach, *Talitrus* zone, 15.x.1959, 4 ♂♂ 2 ♀♀.

Additional North Adriatic localities where the species was collected:

Veneto: Lido di Venezia, S. Nicolò, 21.iii.1947, M. Levrini, 2 ♂♂ 1 ♀; Emilia-Romagna: Lido di Volano, wet beach, *Talitrus* zone, 26.x.1958, A. Giordani Soika, 2 ♀♀; ibidem, 25.x.1959, same collector, 1 ♂; Lido di Volano, road near the beach, “aeroplancton” [i.e. aerial sampling about 250-300 cm above the soil (autocatcher method by car)], 23.xi.1983, 1:30pm, A. Giordani Soika, 1 ♂.

Discussion

My examination of the male terminalia of *H. mediterranea* proved that this species is not conspecific with *H. ustulata*. The surstyli of the former species (figs. 1-2) are distinctly longer and slenderer, with the anterior surstylus bearing long, strong setae on its anterior margin. Otherwise, the surstyli of *H. ustulata* (figs. 3-4) are noticeably shorter and stumpy, particularly the anterior surstylus that is reduced to a subtriangular, obtuse projection in lateral view.

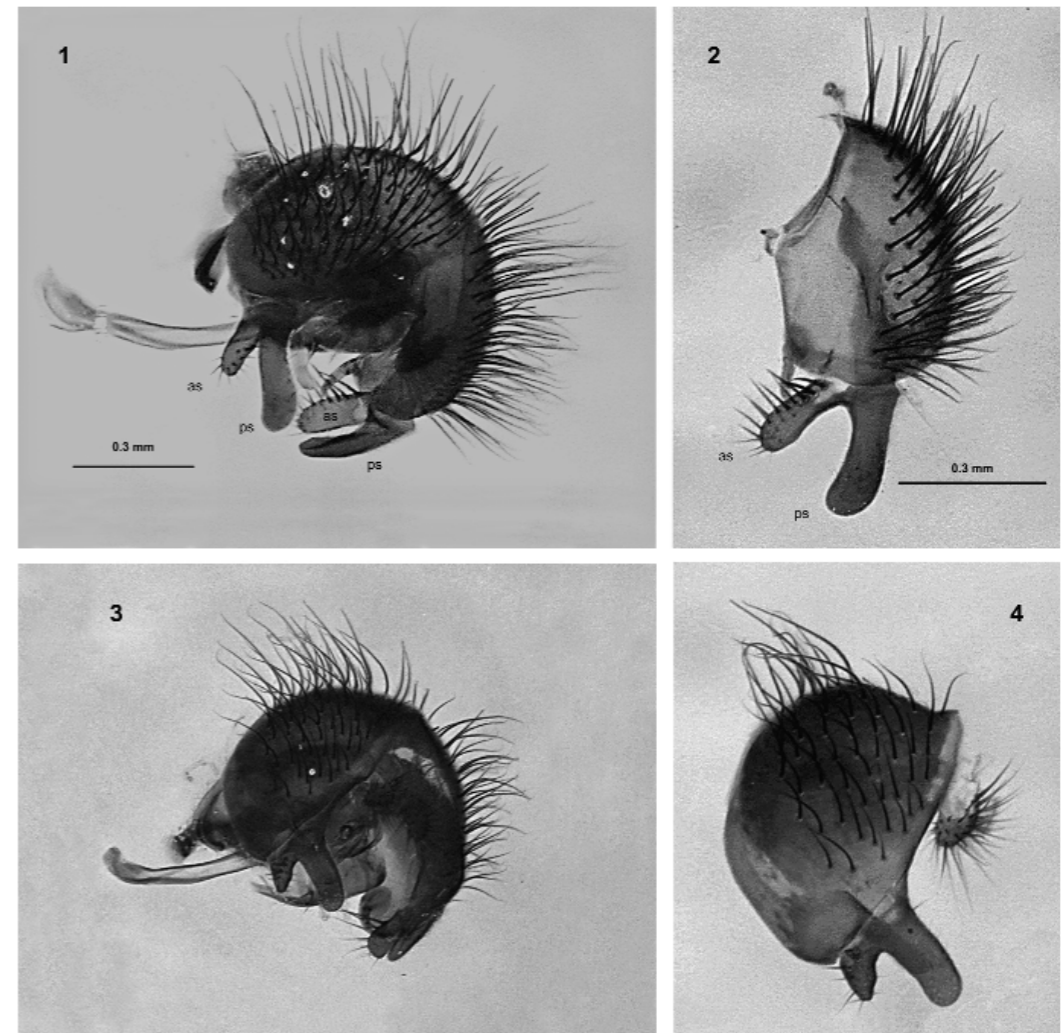
MCALPINE (1998) figured the male terminalia of *H. ustulata*, although his figures look slightly different as to the morphology of the surstyli. On the other hand, the morphology of the female postabdomen (fig. 5) of these two species is quite similar (also see MCALPINE, 1998 for *H. ustulata*). Two perfectly spherical spermathecae have been observed in *H. mediterranea* (fig. 6).

However, the most obvious character that at first sight distinguishes the two species is the markedly darker, coffee-brown colour of both the frons and mesonotum in *H. mediterranea* in comparison to the distinctly paler *H. ustulata*. In this connection, GRIDELLI (1942) carried out meticulous comparisons between the two species. For additional information, the reader is referred to that 1942 paper.

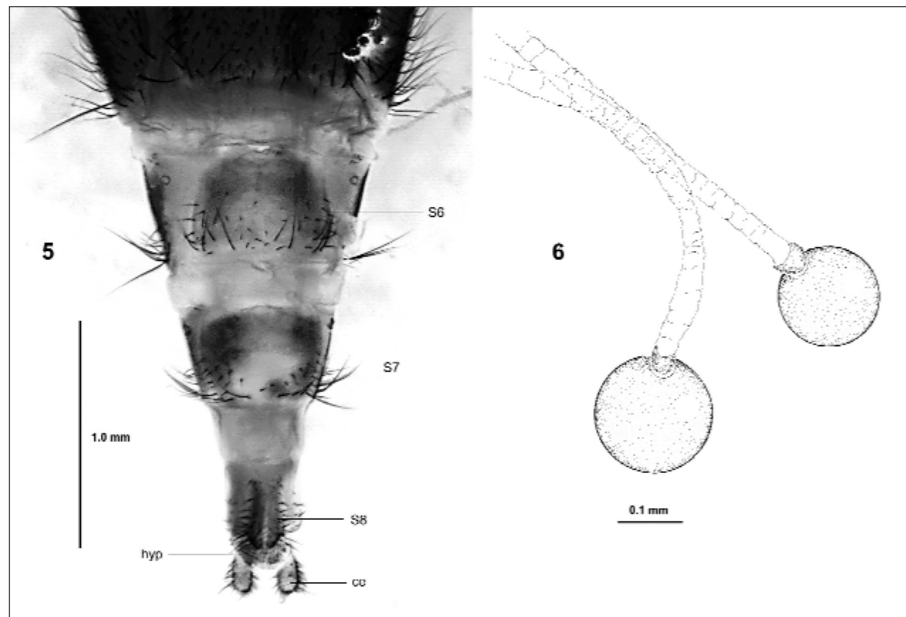
Additionally, the Mediterranean species seems to be larger than the species from the Atlantic coast of Europe (CZERNY, 1930), even though the accurate study by GRIDELLI (1942) proves these differences in size to be rather inconsistent. The range in size of the North Adri-

atic specimens of *H. mediterranea* that I examined (measurements obtained by detailed linear digitalized tracks directly taken on the image of the fly captured by a specific software and displayed on the pc monitor) is as follows: body 6.61-11.20 mm, wing 6.18-10.12 mm.

One of the examined specimens (Lido di Volano, 23.xi.1983, leg. A. Giordani Soika, 1 ♂) shows a curious teratologic character of the left wing veins  $R_{2+3}$  and  $R_{4+5}$ , which are interconnected at a few points by short, spurious cross-veins (fig. 7). Otherwise, these spurious cross-veins are vestigial on the right wing, which bears only strikingly short rudiments of them.



**Figs. 1-4.** *Helcomyza mediterranea* (Loew), male terminalia, 1: latero-caudal view; 2: lateral view. *Helcomyza ustulata* Curtis, male terminalia, 3: latero-caudal view; 4: lateral view. The omitted scale bars in figures 3 and 4 should be construed as being the same as in figures 1 and 2, respectively.



**Figs. 5-6.** *Helcomyza mediterranea* (Loew). **5:** female postabdomen in ventral view; **6:** spermathecae. Abbreviations – ce: cercus, hyp: hypoproct, S(#): Sternite.



**Fig. 7.** *Helcomyza mediterranea* (Loew), teratology of the left wing veins  $R_{2+3}$  and  $R_{4+5}$ . Abbreviations – Sc: Subcosta, R(#): Radial vein, M(#): Medial vein.

#### DISTRIBUTIONAL REMARKS

*Helcomyza mediterranea* is recorded from the coastal areas of Bulgaria, Greece, Italy (North Adriatic Sea), and Turkey.

In the catalogue of the Diptera species preserved in Venturi's collection, LOI & RASPI (1983) recorded two specimens of *H. ustulata* and one specimen of *H. mediterranea*. Prof. Raspi kindly informed me (pers. com. of May 4 and 5, 2011) that those specimens in Venturi's collection bear the following collection labels: [Marche, Italy], Fano, 12.xi.1952, leg. F. Venturi, [1 ♂]; [Emilia-Romagna, Italy], Rimini, beach, on putrescent crab, 25.ix.1968, leg. F. Venturi, [1 ♀ 1 undet. sex]. Venturi identified the former specimen as *H. mediterranea*, whereas the latter two specimens were identified as *H. ustulata*. A careful examination, carried out by Prof. Raspi on my behalf, of the terminalia of the specimen from Fano corroborated its specific status as *H. mediterranea*, whereas for the two specimens from Rimini he was unable to study the terminalia, since one of them is a female, whereas the other specimen has the postabdominal segments lacking. In any case, Raspi noticed no consistent external differences, including coloration, with respect to the specimen of *H. mediterranea* from Fano. In this connection, ZANGHERI (1969) also reported *H. ustulata* Curtis (Ringdahl det.) from Porto Corsini [Emilia-Romagna, Italy], October (day and year not given), on beach vegetation. In my opinion, this is yet another citation that refers to specimen/s belonging to *H. mediterranea*. Additionally, MUNARI & RIVOSECCHI, 1995 recorded this species from the Italian North Adriatic Sea, mainly based on the former records by GRIDELLI (1942), ZANGHERI (1969) and LOI & RASPI (1983).

#### ECOLOGICAL AND PHENOLOGICAL REMARKS

*Helcomyza mediterranea* is a thalassobiontic species inhabiting the shoreline of Mediterranean sandy beaches, often occurring on wrack heaps and in a few cases also reaching the vegetation of the foredunes. It was reported as a halobiontic fly (thalassobiontic, according to GRIDELLI, 1942) on moist sand with piles of stranded seaweeds, as well as on psammophilous vegetation of the foredunes. It was also recorded from dry debris on beaches inundated by waves. As above-mentioned, two specimens of *H. mediterranea*, probably erroneously determined by Venturi as *H. ustulata*, were collected on a putrescent crab on the beach of Rimini.

BESCHOVSKI (1966, 1973a, 1973b, 1975, 1976) recorded this species from the Bulgarian Black Sea sandy beaches (in particular he recorded *H. mediterranea* from the coast near the villages of Durankulak and Shabla, and near Varna), and gave some ecological notes about the specific biotopes where these flies were observed. According to the same author (BESCHOVSKI 1973a, 1973b) this fly is a stenocious species collected with very low frequency (0.3-0.6 per cent from the total number of flies captured in autumn along the Black Sea coasts) in close proximity to the marine shoreline. In all probability, the putative scarcity of this species also is due to the considerable difficulty in capturing individuals that usually move by a very rapid and extremely low flight.

The flight period of *H. mediterranea* is restricted mainly to the coldest months of the year, with a few occasional early vernal and late autumnal occurrences. Conversely, all of the seasonal occurrence information reported by GRIDELLI (1942) and ARDÖ (1957) for *H. ustulata* in central and northern Europe relate to the occurrence of this species during late spring and, to a large extent, during summer.

Dr. V. Beschovski (Sofia) wrote to me (e-mail of April 21, 2011) that “*Helcomyza mediterranea* is known only in autumn from the Bulgarian Black Sea coast, when a small number of dipterous species are flying over the sand, and then this helcomyzid fly is well visible on the wet sand, like sunflower seed, with its dark brown mesonotum bearing two distinctly paler, lateral, longitudinal stripes”.

An interesting record reported here (Lido di Volano, road near the beach, “aeroplancton”, 23.xi.1983, 1:30pm) suggests that this species also makes occasional, solitary micromigrations inland, during the warmest hours of the day. In this connection, GIORDANI SOIKA (1980), in particular by treating the thalassobiontic ephydrid flies and few other flying insects inhabiting the North Adriatic coast, stated that “Si tratta di vere e proprie regolari micromigrazioni, per cui alcuni esemplari di ambo i sessi di alcune specie abbandonano il loro consueto biotopo per volare nella bassa atmosfera. La micromigrazione dura breve tempo e poi gli individui ritornano nel loro biotopo o in un biotopo affine” (translated, These are true regular micromigrations, where a few specimens of both sexes of some species leave their usual habitat to fly in the lower atmosphere [about 250-300 cm above the soil]. The micromigration lasts a short time and then the individuals return to their habitat or to a similar biotope) (also see GIORDANI SOIKA, 1961).

Interesting ecological and behavioural remarks, particularly concerning flight habits, are given by ARDÖ (1957) for the closely related Euro-Atlantic *H. ustulata*, including an observation about necrophagous habits of this species, i.e., feeding on a dead jellyfish stranded on the shoreline.

## CONCLUSIONS

If, on the one hand, I am unable to exclude a priori the occurrence of *H. ustulata* in the Mediterranean basin, on the other hand, I strongly suspect some former records of this species from the Italian seashores, or even specimens, preserved in old collections, bearing the det./label with such determination, could indeed be referred to paler phenotypes of *H. mediterranea* that usually occur inside a given population that is characterized mainly by individuals with a dark, coffee-brown mesonotum (see in particular GRIDELLI, 1942).

Probably *H. mediterranea* is the southern vicariant species of the Atlantic *H. ustulata*. During the last glacial periods (1,800,000 to 15,000 years ago), the latter species very likely expanded to the Mediterranean Sea. Subsequently, during the last warmer post-glacial period, the vast original population split into two separate populations, the southern one confined to the Mediterranean beaches whereas the northern population remained on Euro-Atlantic seashores. During this stage, the Mediterranean population probably began to diverge, due to geographic isolation, giving rise to a new vicariant species.

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