Copestylum melleum (Jaennicke, 1867) (Diptera, Syrphidae) is an established neozoon on the Canary Islands

Thomas Romig and Martin Hauser

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The occurrence of the Mexican species *Copestylum melleum* (Jaennicke) on the Canary Islands was first reported by Baez (2000). We provide further records from Tenerife, La Palma and Gomera, together with a diagnosis of the species. The number and geographical spread of records since 1994 suggest that *C. melleum* is a firmly established neozoon in the archipelago. This is apparently the first member of this large genus to become established in the Palaearctic region.

Key words: *Copestylum melleum*, neozoon, Canary Islands, Syrphidae.

Zusammenfassung

In Ergänzung des Erstnachweises der mexikanischen Art *Copestylum melleum* (Jaennicke) auf den Kanarischen Inseln, der in sehr knapper und eher versteckter Form publiziert wurde (Baez 2000), melden wir neue Funde von Teneriffa, La Palma und Gomera und liefern eine Diagnose der Art. Die Zahl der Nachweise und deren Verbreitung legen nahe, dass *C. melleum* ein fest etabliertes Neozoon im Archipel ist. Dies ist offenbar die erste Art dieser großen Gattung, die sich in der palaearktischen Region etablieren konnte.

Introduction

Copestylum Macquart includes more than 315 described and about 100 undescribed species (Thompson 1999). Most are neotropical, a few occur north of Mexico, and only one species reaches southern Canada. The genus has not recently been revised (Curran 1939, 1953, Fluke 1951), and no reliable diagnostic keys exist except for the West Indies, whose syrphid fauna has been reviewed by Thompson (1981).

A few years ago the species *C. melleum* (Jaennicke) was reported from the Canary Islands by Baez (2000). In total, 12 specimens were collected between 1994 and 1998, 10 at various locations on the island of Tenerife and one each on La Palma and La Gomera. Baez (2000) concluded that the invasion of the archipelago by this species had occurred recently, because intense collecting over the preceding 20 years did not yield any specimens.

This is, to the authors knowledge, the first report of the establishment of a *Copestylum* species outside the Americas, with the exception of Hawaii. In contrast, the related *Ornidia obesa* (Fabricius, 1775) is by now widely distributed in the moist tropics, an expansion which was certainly facilitated by the wide range of decaying organic material which can be exploited as larval habitat by that species.

Baez (2000) did not provide information on how the species was determined. Identification was apparently carried out by F.C. Thompson, based on comparison with specimens of *C.melleum* identified by Curran and Coquillet (Thompson, pers. comm.). Efforts by the present authors to trace type material of *C.melleum* in the museums in Darmstadt (HMLD) (which should be the type depository, according to the description) and Frankfurt (Senckenberg Museum), where additional Jaennicke material is deposited, proved fruitless, so it is probably lost. However, the specimens we have seen from the

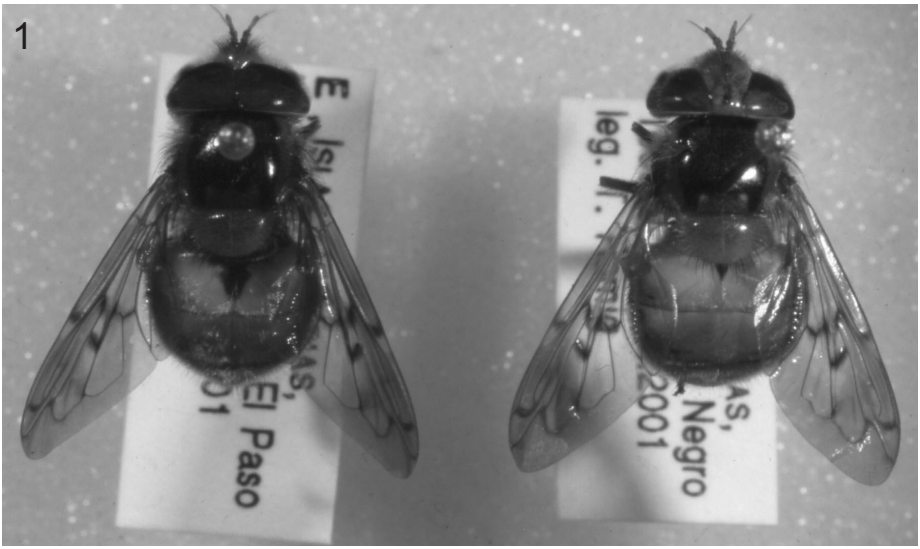

Fig. 1: ***Copestylum melleum*** (Jaennicke), male and female from the Canary Islands.

Fig. 2: ***Copestylum melleum*** (Jaennicke), male from the Canary Islands.

Canary Islands (and from Mexico) agree well with the rather detailed original description by Jaennicke (1867), so the identity of the species is not in doubt.

The type locality of *C. melleum* is given as "Mexico" with no further data. Only a few specimens from Mexico could be found in museum collections and no published records other than of the type specimens are known to the authors.

In the following paragraphs we present diagnostic characters of the species, 20 new records from the Canary Islands, and a synopsis of location data from Mexico, which were retrieved from the United States National Collection, Washington (USNM), the Canadian National Collection, Ottawa (CNC), and the Insect Research Collection of Wisconsin, Madison (IRCW).

Description

The following description is based on 7 specimens from the Canary Islands in the collections of the authors (4 male, 3 female).

Head: face protruding, yellow with broad black lateral stripe extending from the eye to the mouth edge. Facial tubercle very shallow. Face with short yellow hairs except for a black-haired area above the tubercle, and rather long black hairs on the frons and the ocellar triangle (male; frontal hairs shorter in the female). Male holoptic. Eyes with long brown hairs, much shorter in the female. Antennae reddish yellow, 3rd segment elongate, with concave upper and lower edges, small sensory pit near the base (female; rudimentary in the male), arista long plumose.

Thorax: mesonotum shining, with broad, translucent, dull yellow lateral stripes. In front of the scutellum a similarly coloured ± rectangular area with a small, opaque, whitish spot on each anterolateral corner. Mesonotum covered in short, reddish-yellow hairs mixed with longer black hairs, arrangement of hairs giving the impression of two lateral and one very narrow, median, longitudinal stripes. Scutellum yellowish, similarly haired, but black hairs longer, increasing in length towards the fringe of long black bristles on the posterior edge. Pleura dark, hairs brownish to yellow mixed with black. – Legs: femora black with yellow apices, tibiae more extensively yellow (appearing darker due to cover with long black hairs), tarsi bright yellow with short yellow pubescence except for the apical 2-3 segments which are blackish. – Wing: with greyish tinge due to dense, but incomplete, cover with microtrichiae, transverse veins bordered with brown, giving a spotted appearance.

Abdomen: T1 predominantly dark (male) or dull reddish-yellow (female). T2 to T5 bright reddish-yellow, with the exception of a basal black triangle of varying size on T2, and a complicated pattern of small black marks on T2-4, consisting of narrow stripes parallel to the lateral and posterior edges, completely dissolved into rows of irregular, partly confluent dots (conspicuous under magnification only) in some specimens. Abdominal pubescence short and reddish-yellow, with narrow lines of black hairs at the posterior edges of the tergite, lateral pubescence long, with alternating patches of black

and yellow. Genital segments black. Venter black, except for a broad, yellow, translucent band extending from S2 to S3.

Body length 7.4 - 10.4 mm.

The species cannot be confused with any other Palaearctic or Afrotropical fly (figs 1, 2).

New records from the Canary Islands

Tenerife: Erjos, 26.-29.VII.1999, 1♂, 1♀ (leg. Niehuis, coll. Hauser); Bosque de la Esperanza (2 km n Arafo), 1000 m, 21.IX.2001, 1♀ (leg. & coll. Romig).

La Palma: Llano Negro, ca. 1000 m, 1.X.2001, 1♀; 2 km e El Paso, ca. 1000 m, 3.X.2001, 2♂ (all leg. & coll. Romig); Laguna de Barlovento, 29.X.2002, 1♂ (leg. det. & coll. Kehlmaier); 4 km NE San Nicolas, 9 km SE Los Llanos, 11.IV.03, 7♂ (leg. Haeseler, coll. Barkemeyer); bei Tijarafe, NW-Kueste, 12.IV.03, 2♂, 1♀ (leg. Haeseler, coll. Barkemeyer); Las Nieves, 3 km nw Santa Cruz de la Palma, 18.IV.03, 2♂, (leg. Haeseler, coll. Barkemeyer); Barranco de la Lava, ca. 13 km s Santa Cruz de La Palma, 18.III.2004, 1♂ (leg. & coll. Barkemeyer).

Gomera: La Palmita, 800 m, 4.V.2000, 1♀ (leg. & coll. J.T. Smit); Agulo, 100 m, 29.IV.2000, 1♀ (leg. & coll. J.T. Smit).

The locations of the new records, together with those reported by Baez (2000), are shown on the map (fig. 3).

On the Canary Islands, the species seems to be on the wing throughout the year. Hitherto published records are from February (5), March (1), April (13), May (2), June (1), July (4), September (2) and October (4).

In the field, the flies are conspicuous, flying rather slowly close to the ground or between vegetation, giving the general impression of oversized *Rhingia*. Two of the specimens were caught while feeding on the yellow flowers of undetermined Asteraceae, one feeding on fennel.

Records from Mexico

Mexico City, XI.1917, 1♀ (leg. Juan Muller, USNM); Guanajuato, 1♂ (leg. A. Duges, USNM); Morelos, Huitzilac, 25.VII.1978, 1♂ (leg. J. Butze, USNM); Durango, 3 mi. W. El Salto, 19.VI.1964, 1♂ (leg. J. E. H. Martin, CNC); Durango, 14 mi. SW. El Salto, 9.VI.1964, 2♀ (leg. J. F. McAlpine, CNC); Sinaloa, 4.5 mi. W. El Palmito, 25.VII.1964, 1♀ (leg. J. F. McAlpine, CNC); Pachuca, Hidalgo, 24.VI.1953, 1 ♀ (coll. IRCW, det. C.L. Fluke 1955).

The distribution records in Mexico are shown on the map (fig. 4).

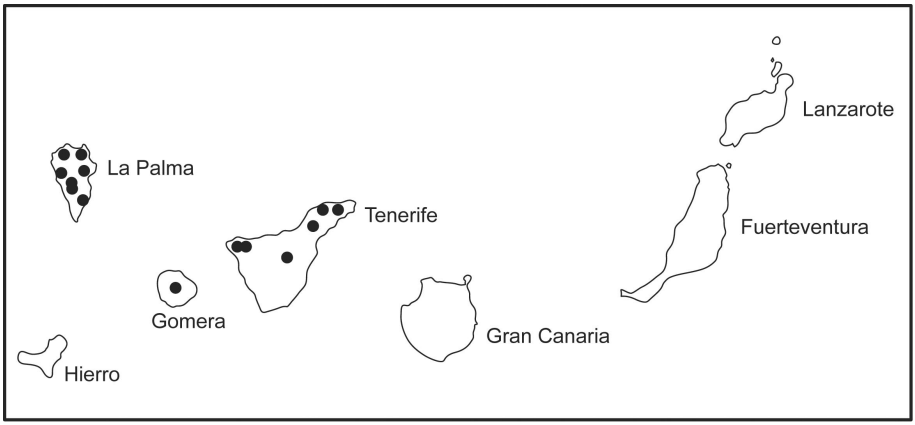

Fig. 3: Distribution records of *C. melleum* in the Canary Islands (including those by Baez 2000).

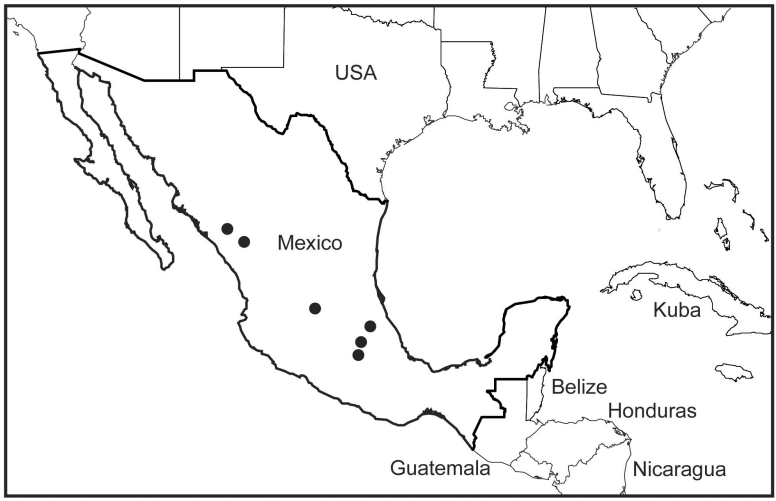

Fig. 4: Distribution of *C. melleum* in Mexico.

Discussion

No information exists on the larval habitat of *C. melleum*, which could provide insights into the potential route of introduction of the species to the Canary Isles. Many *Copestylum* species develop in decaying stems of Cactaceae (Ryckman & Ames 1953, Maier 1982, Marcos-Garcia & Perez-Banon 2002), a habitat not in short supply on the

archipelago due to the ubiquitous naturalized *Opuntia* species, that originated from Central America. However, the specimens collected by one of the authors (TR) were taken rather far away from *Opuntia* habitats, namely meadows, orchards and clearings in *Pinus* forest at higher altitudes. It is possible that the specimens fly over longer distances, but they also may develop in other decaying plant material than cactus. The islands – and the habitats – where *C. melleum* was so far recorded receive rainfall above average for the archipelago, which may be an indication of the ecological requirements of the species. Most of the few Mexican records are from the central highlands and the Sierra Madre Occidental, where the annual rainfall is typically >600 mm (which corresponds well with e.g. the north of Tenerife) and no records are known from the more arid coastal regions.

Although circumstances and time of introduction are unknown, the occurrence of American species on the Canary Islands is not surprising. The islands have for centuries suffered the introduction (on purpose or by accident) of exotic plant species e.g. from the Spanish colonies – the botanical garden in Puerto de la Cruz on Tenerife was founded in the 18th century with the explicit purpose of 'acclimatizing' tropical plants for conditions in Spain. Large numbers of invertebrates were certainly introduced with these plants. The fact that *C. melleum* has only recently been detected is not necessarily indicative of a recent introduction date. The establishment of neozootic species is a complex process, and long 'quiescent' periods (with small, struggling founding populations) may be followed by sudden increases in population densities – possibly caused by the exploitation of a new habitat or food source. Likewise, apparently established, healthy populations of neozoa may even after decades be subject to decline or extinction, caused e.g. by adapted behavior of predators or pathogens. *C. melleum* is rarely collected in its native range in Mexico and the locations are more inland at higher elevations. The discovery of its larval habitat might indicate what predisposed this species, rather than any of its more frequent and wide ranging relatives, to become a successful invader.

It will certainly be interesting to monitor the long-term fate of this conspicuous addition to the Palaearctic syrphid fauna. Also, since this species was able to invade several islands in the archipelago, the (short) distance to the African mainland should in itself not be a barrier to its dispersal – unless this is prevented by the more arid conditions on the eastern Canary Islands and in the coastal region of the continent.

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Adresses of authors:

Dr. Thomas Romig, Universität Hohenheim, Fachgebiet Parasitologie, 70599 Stuttgart, Germany. E-mail: romig@uni-hohenheim.de
Martin Hauser, University of Illinois, 1101 W Peabody Dr., Urbana IL 61801, USA.