



The Pipunculidae (Diptera) fauna of the Canary Islands and Madeira

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Abstract

This study updates the present knowledge of the Pipunculidae (Diptera) of the Atlantic islands of the Canaries and Madeira. In total, 14 species are reported with 13 for the Canary Islands and three for Madeira. *Chalarus perplexus*, *Eudorylas clavatus*, *Tomosvaryella brachybasis*, *T. freidbergi*, *T. glabrum*, *T. kuthyi* and *T. parakuthyi* are reported for the first time from the islands. *Tomosvaryella glabrum*, formerly considered a synonym of *T. subvirescens*, is re-instated as a separate species with *T. tecta* as a junior synonym. *Tomosvaryella ornatipes*, formerly considered a synonym of *T. frontata* is re-instated as a separate species. Aspects on endemism, inter-island variation, zoogeographical affinities, and seasonality of the pipunculid fauna of these Atlantic islands are briefly discussed.

Keywords : taxonomy, Afrotropics, Mediterranean Region

Introduction

Pipunculidae are small, black flies, closely related to hoverflies (Syrphidae). They can be readily differentiated from the latter by the large compound eyes which occupy most of the sub-hemispherical head and by the wing venation (KOZÁNEK *et al.*, 1998). The European fauna is fairly well known as far as the western and central regions are concerned. The Mediterranean fauna however is poorly known with only a few recent studies on the diversity of particular countries (Israel and Spain by DE MEYER, 1995 and 1997 respectively; Italy by KOZÁNEK & BELCARI, 1995).

The Canary Archipelago consists of a group of seven large islands and some smaller islets, situated north of the Equator (27-29°N; 13-18°W). They are all of volcanic origin, with a total land area of 7452km², and the highest peak (on Tenerife) reaching 3718m. The archipelago can be divided ecologically in two subgroups (WHITE, 1983). The eastern islands of Lanzarote

and Fuerteventura lie much closer to the African mainland (appr. 100km from the African coast) and do not exceed an elevation of 650m. They have an arid climate, partly due to the hot Sahara winds, which blow from the mainland. The western islands are situated between 200 and 360km from the mainland and have a more oceanic climate. Because of the moisture, carried by the north-east trade winds and causing a cloud zone between 800 and 1500m, the higher altitudes are characterised by a more humid habitat. Faunistically the western islands are sometimes subdivided in two subgroups with Gran Canaria separate from the others (BÁEZ, 1982).

The Madeira archipelago (32-33°N; 16-17°W) is also of volcanic origin and is composed of the main island Madeira (728km²), Porto Santo (69km²) and some smaller uninhabited islands. They are situated approximately 560km from the African mainland, and 450km north of the Canary islands (WHITE, 1983). The highest peak, on Madeira, reaches 2000m.

During recent years the third author (MB) has studied the origin and affinities of the fauna of these Atlantic islands (BÁEZ, 1982, 1993). The knowledge of the pipunculid fauna is however very limited. The first records were published by BECKER who listed seven species from the Canary Islands (BECKER, 1908a), including two new species which were considered endemic (*Eudorylas setosus* (BECKER) and *Tomosvaryella ornatipes* (BECKER)), and a single species (*T. geniculata* (MEIGEN)) for Madeira (BECKER, 1908b). FREY listed the same species for the fauna of the Canaries (FREY, 1936) and added *Chalarus spurius* (FALLÉN) to the fauna of Madeira (FREY, 1949). No other records were found after these publications. Because of recent collecting efforts, which turned out to indicate the presence of some additional species, it was considered worthwhile to verify the older records and to publish an annotated list for the pipunculid fauna of the islands. This investigation also resulted in some taxonomic and nomenclatorial problems that needed to be resolved.

Material and Methods

The present study is largely based on material collected by the third author between 1973 and 1999 and deposited in the author's collection. Further material was put at our disposal by B. MERZ, Genève Switzerland (MPC) from his collecting trips to the Canary Islands in 1988 and 1990. In addition, material was studied from BECKER's collection at Museum für Naturkunde der Humboldt Universität zu Berlin, Germany (MNHU) and FREY's collection at the Zoological Museum Helsinki, Finland (ZMH), in order to verify the historical records. The ZMH collection also held a number of specimens, collected by LINDBERG on the Canary Islands. For study of the taxonomic status of *T. glabrum* (ADAMS), *T. ornatipes* and *E. setosus*, type material of the collections of MNHU and Snow Entomological Museum, Lawrence USA (SEM) were studied. All material listed refers only to the material examined from the study site. It is collected by the third author and deposited in his collection, except noted otherwise.

Identifications were based on recent revisions published for the European fauna (see KOZÁNEK *et al.*, 1998 for an overview), and in conjunction with the reference collections of the Koninklijk Belgisch Instituut voor Natuurwetenschappen,

Brussel Belgium (KBIN) and the Hungarian Natural History Museum, Budapest Hungary (HN HM). Cross reference for the Afrotropical fauna was done through DE MEYER (1992,1993) and the collection at the Koninklijk Museum voor Midden Afrika, Tervuren Belgium (KMMA).

Results

Chalarinae

Chalarus perplexus JERVIS, 1990

Material examined : LA GOMERA : 1♂, El Cedro, 10.VIII.1974; 1♂, Los Tilos, 25.VII.1973; 2♂♂, Meriga, 10.VIII.1974; 1♀, Raso de la Bruma, 1.VIII.1977. GRAN CANARIA : 2♂♂, Cueva Grande, 1.IX.1990. EL HIERRO : 1♀, Mancafete, 31.V.1997. LA PALMA : 1♀, La Caldereta, 15.VII.1979; 1♀, La Galga, 17.V.1983. TENERIFE : 2♀♀, El Batán, 13.III.1981; 1♂, El Socorro, 1.XII.1973; 4♀♀, Ijuana, 7.VI.1985, 2♀♀, 4.X.1984; 1♂, 28.V.1986; 12♀♀, Monte de Pedro Alvarez, 14.VI.1981; 2♀♀, Bco. de Ruiz, 6.IV.1975; 1♂, Los Rodeos, 30.III.1980, G. ORTEGA; 1♀, El Sauzal, 3.VI.1979; 1♀, Agua Garcia, 5.XI.1998; 1♂, Agua Mansa, 28.VI.1998; 1♂, Punta del Hidalgo, 27.III.1984; 1♀, Monte Aguirre, 16.VIII.1979; 1♀, El Moquinal, 17.V.1981; 1♀, Altos de la Victoria, 24.VI.1989; 1♀, El Bailadero, 6.III.1981; 1♂, Agua Mansa, 17.VII.1931, FREY (ZMH). MADEIRA : 4♂♂, Camacha-Santo da Serra, 21.VIII.1989; 1♂ 1♀, Campanario, 15.VIII.1989; 6♂♂, Encumeada, 20.VIII.1989; 1♂, Portela, 27.VIII.1989; Monte, 1♂, 3.XI.1996, M. KOPONEN; 1♀, 10.IV-1.V.1938, STORÅ (ZMH); 1♀, Queimadas, 24-26.VI.1957, LINDBERG (ZMH).

The genus *Chalarus* is poorly known. Until 1966, most European *Chalarus* specimens were identified as *C. spurius* (FALLÉN) and only three species were known for the region (SACK, 1935). COE (1966) pointed out that these were in fact species complexes and he described an additional five new species. JERVIS (1992) published a taxonomic revision of the genus with particular reference to the European fauna, raising the number of species found in Europe to 21. It is however clear from his revision that the systematics of this group is not completely resolved at the moment and that species identification remains problematic. The female material examined keys out here. The species is differentiated by the strongly convergent frons, the very large frontal ommatidia and the shape of the piercer. The male is not described by JERVIS (1992) as is the case in

many other species, but we assume that the male specimens found here belong to the same species as the females. Caution should however be taken in any identification of *Chalarus* material. Further study of the group is needed to clarify the status of this and other species.

Probably the records of *Chalarus spurius* by BECKER (1908a) from Laguna and by FREY (1936) from Gran Canaria (Moya), Tenerife (Agua Mansa) and Gomera (Cumbre) refer actually to *C. perplexus*. The same also applies to the record from Madeira (FREY, 1949). Most of these historical records could however not be confirmed: the only specimen from the Canary Islands in Becker's collection at MNHU, consists of a single wing and is identified as *Chalarus holosericeus*; the material from Moya and Agua Mansa at ZMH is completely or largely destroyed, and the specimen from Cumbre could not be found. Of the specimen of Monte, Madeira only the head is remaining which corresponds with that of *perplexus*.

True *Chalarus spurius* specimens were not seen from the islands, among the material studied. Given the abundance of *C. perplexus* and the absence of *C. spurius* in the recent collections, we decide to eliminate the latter from the species list of the Canary islands and Madeira for the time being.

Chalarus perplexus is recorded from several European countries (mainly western and northern Europe, but also Switzerland and Italy). It seems to be one of the most abundant species found in both archipelagos, mostly in laurel bushes, but it is often captured also in pine forest and in secondary habitats (humid cultivs) in the Canaries.

Pipunculinae

Cephalopsini

Cephalops (Semicephalops) sp.

Material examined: MADEIRA 1♂, Chão dos Louros, 13.VII.1990.

This specimen is the only representative of the genus *Cephalops* found among the material studied. It does not key out to any of the known West Palaearctic or Afrotropical *Cephalops* species described so far. It belongs to the subgenus *Semicephalops* based on the wing venation and abdominal shape except that the membraneous

area of the postabdomen does not reach the epandrium (see DE MEYER, 1994 for details on subgeneric recognition). Male genitalia and post-abdominal structure seem to indicate that the species is related to species of the *visendus* subgroup within *Semicephalops*, of which no representative occurs in the Palaearctic region. In the Afrotropical region, the group is represented by *C. visendus* (HARDY). However, since only a single male was represented in the collections studied, it was decided to await more material before a formal description should be given.

Eudorylini

Eudorylas clavatus (BECKER, 1898)

Material examined: TENERIFE: 1♀, La Tejita, 9.IV.1986; 1♀, Güímar, 29.VII.1974.

Eudorylas clavatus was originally described from a female specimen from Mori, Italy. Later BECKER (1900) synonymised it with *E. holosericeus* (BECKER), who was described from male specimens from Mori and Rumania. Later works like SACK (1935) seem to have illustrated the female specimen of *clavatus* as the female sex of *holosericeus*. DEMPEWOLF (1996) however questioned this synonymy, based on a series of German specimens from both sexes of what he identified as *clavatus*. The whereabouts of the type of *clavatus* are unknown. The first author had the opportunity to study one of the male syntypes of *holosericeus*. It clearly differs from the male *clavatus* illustrated by DEMPEWOLF (1996) in genital characters. However, because of the limited knowledge of both sexes and partial unavailability of type material, the true identity of both species is unclear. The female specimens from the Canary islands resemble the description given by DEMPEWOLF in most aspects. The shape of the ovipositor is different in that the ventral side of the ovipositor near the base of the piercer is not smooth but rather with a protuberance (as in *E. melanostolus* (BECKER)), and the tip of the piercer is strongly curved. The specimens are tentatively placed here, although further material of both sexes is required to confirm the identity of this species. *E. clavatus* belongs to a species group within *Eudorylas* characterised by the lack of apical spurs on the anterior four tibiae, and a large ovipositor with extended base, as in *E. melanostolus* and *E. halteratus* (MEIGEN). New to the fauna of the Canary Islands.

***Eudorylas fluviatilis* (BECKER, 1900)**

Material examined : LA PALMA : 1♂, Breña Baja, Los Cancajos, I.IV.1998, M. KOPONEN. TENERIFE : Bco. San Andrés, 2♂♂ 1♀, 5.IV.1982; 2♂♂ 1♀, 22.VI.1985; 1♂, Bco. Hondo, 17.VI.1982; 1♂, Charco del Pino, 3.X.1998, 450m, MERZ & BÁEZ (MPC); 1♂, Puerto de S. Juan, 16-22.I.1949, LINDBERG (ZMH).

Eudorylas fluviatilis is a Mediterranean species, originally described from Egypt and with certainty reported from Spain, and Israel (there is an additional record from Russia that needs to be confirmed). It belongs to a species complex as outlined in DE MEYER (1997) but the material examined here clearly belongs to *E. fluviatilis* s.s., based on the shape of the male genital characters. The species was mentioned from Orotava, Tenerife by BECKER (1908a) but the original specimen (one male) could not be found in the MNHU collection.

***Eudorylas setosus* (BECKER, 1908)**

Material examined : Type material : syntypes, TENERIFE : 2♂♂ Villa Orotava, '47081'; 1♀, Orotava, '46844'; 1♂, Tenerife, '51360'; 1♀, Laguna, '51462' (all MNHU).

Other material : LA GOMERA : 1♀, Agulo, 10.VIII.1974; 1♂, Agulo, La Palmita, 29.IX.1998, B. MERZ (MPC); 1♀, Bco. Majona, 7.IV.1974; 1♂, Meriga, 10.VIII.1974; 1♀, Mora de Gaspar, 2.VIII.1977. EL HIERRO : 1♂, Echedo, 29.I.1978; Frontera, 1♀, 30.V.1976, 1♂, 1.II.1978. LA PALMA : 1♀, Breña Baja Los Cancajos, 26.III.1998, M. KOPONEN; 1♂, Dehesa, 14.XI.1974, 1♂, 13.I.1935, E. SANTOS-RODRIGUEZ; 1♂, 14.IV.1935, E. SANTOS-RODRIGUEZ; 1♂, 25.VII.1937, E. SANTOS-RODRIGUEZ. TENERIFE : 1♀, Bco. Badajoz, 27.III.1975; 1♂ 1♀, El Bailadero, 6.III.1981; 2♂♂ 1♀, 6.III.1981; 2♂♂ 1♀, Bajamar, 19.III.1974; 2♂♂, Las Cañadas, 20.X.1987; 1♀, Las Cañadas, 27.VI.1996, N. ZURITA; 1♂, Fasnía, 20.V.1973; 1♀, Igueste de Candelaria, 18.XI.1979; 1♂, El Moquinal, 17.V.1981; 1♂, La Perdoma, 21.VI.1981; 1♀, Punta de Teno, 14.XII.1997; 1♂ 1♀, Las Rosas, 11.VII.1982; 1♀, Bco. San Andres, 6.II.1987; 1♂, San Diego, 24.VI.1982; 1♀, Sta. Ursula, 21.VI.1981; Valle Tabares, 2♂♂, 23.IV.1973; 1♂ 1♀, 29.IV.1973; 1♂, 31.VIII.1980; 1♂, Bajamar, 3.II.1980; 1♀, Monte Aguirre, 11.VI.1985; 1♂, Tamaimo, 600 m, 22.II.1950, LINDBERG (ZMH); 1♂, Granadilla, 23-24.I.1949, LINDBERG (ZMH); 1♂, La Esperanza, 16.VIII.[no year], FREY (det. FREY) (ZMH); 1♀, Puerto de S. Juan, 16-22.I.1949, LINDBERG (ZMH); 1♀, Puerto de la

Cruz, 2-4.II.1949, LINDBERG, (ZMH); 1♀, Orotava, 4.VII.1931 STORÁ (ZMH).

This species was described as being endemic for the Canary islands, and described from specimens of Gran Canaria, Tenerife and La Palma. It can be easily distinguished from all other European species by the large spines on the posterior margin of the scutellum. The species is so far only reported from the type locality and from Granada, Spain. After detailed study of the male genitalia of type and other material, it turned out that the earlier record from Israel (DE MEYER, 1995) belongs to another, apparently hitherto undescribed species. The specimens from the Canaries differ in general size but all seem to belong to the same species. Males of the extreme sizes were dissected and the genital structures proved to be identical. Remarkable also is the fact that, despite the numerous specimens collected, none was recorded from Gran Canaria although type material is mentioned from this island.

Tomosvaryellini

***Tomosvaryella brachybasis* DE MEYER, 1993**

Material examined : LA PALMA : 1♀, Breña Baja, Los Cancajos, 3.IV.1998, M. KOPONEN. TENERIFE : Bco. San Andrés, 1♂, 8.VII.1998; 1♀, 11.V.1998.

Tomosvaryella brachybasis was originally described from southern Africa (Botswana, Namibia, South Africa) by DE MEYER (1993). The material of the Canaries correspond in all respects with the African material, and is therefore placed here. A species with similar male genital structure (*T. urdaensis*) has been reported from Kazakhstan (KUZNETZOV, 1994b), but the surstyli shape is less irregular. This is a considerable extension of the known distribution of this species. Perhaps it could concern here a xerophilous species with a disjunct distribution in the desert areas of the Afrotropical region (albeit so far not recorded from the Saharan or Sahel belts), and adjacent island groups. This pattern has been earlier noticed in two, closely related species (*T. oligoseta* DE MEYER and *T. inopinata* DE MEYER) found respectively in southern Africa (Botswana, Namibia) and Israel and Egypt (Sinai Desert). It could also concern here a sibling species of *T. brachybasis*. However, because of the limited amount of material at hand, we prefer to

place it here for the time being. New to the fauna of the Canary Archipelago.

***Tomosvaryella freidbergi* DE MEYER, 1995**

Material examined : FUERTEVENTURA : 1♂, Gran Tarajal, 12-15.III.1949, LINDBERG (ZMH). GOMERA : 1♂, Agulo/La Palmita, 300–600 m, 29.IX.1998, B. MERZ (MPC). GRAN CANARIA : 1♂, '47725' (MNHU). TENERIFE : 3♂♂ 1♀, Las Lagunetas, 12.V.1973; 1♂, Las Mercedes, 2.V.1973; 1♀, El Moquinal, 17.V.1981; 1♀, Valle Tabares, 3.V.1973; 1♂, Los Cristianos, 20 m, 28.IV.-5.V.1988, B. MERZ (MPC); 1♂, Laguna, 4.VI.1947, LINDBERG (ZMH); 1♂, Las Arenas, 10.II.1947, LINDBERG (ZMH); 1♀, Orotava, 25.VII.1931, STORÁ (ZMH).

This species was originally described from Israel, as part of a species complex related to *T. kuthyi*. See FÖLDVÁRI & DE MEYER (2000) for a detailed discussion on species recognition in this and related species. It has furthermore been reported from Spain, Hungary, and Egypt. The first author also saw material from Kazakhstan and Kirghizstan. Its distribution seems to be restricted to the Mediterranean region, Central Europe and Central Asia. New to the fauna of the Canary Archipelago.

***Tomosvaryella geniculata* (MEIGEN, 1824)**

Material examined : GOMERA : 1♂, Antoncojo, 26.III.1999; 1♂, El Cedro, ca. 1000 m, 23.III.1950, LINDBERG (ZMH); 1♀, Playa del Inglés, 27.III.1999. LA PALMA : 1♂ 2♀♀, supra El Paso, 600m, 4.IV.1950, LINDBERG (ZMH). GRAN CANARIA : 2♂♂, Arucas, 2.III.1949, LINDBERG; 1♀, Bandama, 500 m, 5.III.1950, LINDBERG; 1♀, Santa Brigida, 21.II.1949, LINDBERG; 1♂, Tirajana, S. Bartolomé 14.III.1950, LINDBERG (all ZMH). TENERIFE : 1♀, Puerto de la Cruz, 7-8.V.1947, LINDBERG (ZMH).

A widespread species found in several European countries. The males can be easily differentiated from any other *Tomosvaryella* spp. by the velvet like pilosity of the abdominal sternites. See FÖLDVÁRI & DE MEYER (2000) for a further discussion on species recognition in this and related species. It is reported from the three main Canarian islands by BECKER (1908a) as well as from Madeira (BECKER, 1908b). In the historical collection of BECKER, only one specimen was found from Gran Canaria (Nr 47725). This specimen belongs however to *T. freidbergi* (cf. above).

Remarkable is the fact that this species is well represented in the historical collection of LINDBERG but has not been recorded since then except for a few specimens on Gomera (cf. material examined above). The third author regularly visited these localities but to no avail. Perhaps the sites have changed over the years and the species is not to be found there anymore. But it was not encountered in other, similar localities on the island either. No straightforward explanation to this phenomenon could be found.

***Tomosvaryella glabrum* (ADAMS, 1905) stat. rev.**

***Tomosvaryella tecta* DE MEYER, 1993 syn. nov.**

Material examined : GRAN CANARIA : 1♂, Arguineguin, 22.IX.1973. TENERIFE : 3♂♂, Los Cristianos, 26.VIII.1973.

This species was originally described from Zimbabwe by ADAMS (1905). HARDY (1949) considered it as a synonym of *T. subvirescens* (LOEW). The latter is considered to be a cosmopolitan species. When revising the Afrotropical *Tomosvaryella* fauna, DE MEYER (1993) found a related species to *T. subvirescens* and described it as *T. tecta*. When, at a later stage the first author had the opportunity to study the holotype of *T. glabrum* (deposited in SEM), it was shown that it was a different species from *T. subvirescens* but synonymous with *T. tecta*. *Tomosvaryella glabrum* therefore has to be re-instated and *T. tecta* should be placed as a junior synonym of the former. *T. glabrum* has so far only been found with certainty in Israel, Egypt and some Afrotropical countries (Kenya, South Africa, Zimbabwe). It seems to be an Afrotropical species mainly distributed in southern and eastern Africa but reaching the East Mediterranean region. The occurrence on the Canary Islands is a considerable extension of the distribution hitherto known. The exact distribution is however not fully known because of further possible confusion with *subvirescens*, which is also found a.o. in the Afrotropical and European regions. New to the fauna of the Canary Archipelago.

***Tomosvaryella kuthyi* ACZÉL, 1944**

Material examined : TENERIFE : 1♂, Bajamar, 3.II.1980; 1♀, Las Cañadas, 13.VIII.1996, A. CAMACHO.

Although the single male specimen found is

damaged (surstyli largely broken off), it clearly belongs to this species, because of the presence of a distinct posteroventral row of hairs on the hind femur. *Tomosvaryella kuthyi* is a fairly widespread species, found all over Europe except the northern part. It belongs, together with a.o. *T. freidbergi*, to a species complex where species recognition is difficult (see FÖLDEVÁRI & DE MEYER, 2000 for details). New to the fauna of the Canary Archipelago.

Tomosvaryella littoralis (BECKER, 1898)

This species was reported by BECKER (1908a) from Tenerife ('Ein Weibchen aus S. Cruz, Teneriffe'), but the specimen could not be found in the MNHU collection. Nor could this record be confirmed by new material. *Tomosvaryella littoralis* is considered a strictly littoral species, reported from several countries throughout Europe, but mainly Atlantic Ocean; North Sea and Baltic Sea shores. It seems to be absent in the Mediterranean Region. Therefore the occurrence of this species on the Canary Islands can be considered somewhat doubtful. It is indicated on the check list (Table 1) with a question mark.

Tomosvaryella ornatipes (BECKER, 1908) stat. rev.

Material examined : Type material : 1♂ (lectotype) 1♀ (paralectotype), GRAN CANARIA, '47723' (MNHU) [third type specimen is only represented by one wing in MNHU collection].

Other material : FUERTEVENTURA : 1♀, Chilegua, 4-14.III.1949, LINDBERG (ZMH). TENERIFE : 1♂, Bajamar, 5.VIII.1973; 1♂, La Tejita, 9.IV.1986.

BECKER described this apparently endemic species from Gran Canaria. KUZNETZOV (1994a) placed *ornatipes* in synonymy with *frontata* (BECKER) based on study of type material of *ornatipes* and the holotype of *frontata*. However other information seems to indicate that the holotype of the latter is lost. According to KOTRBA (pers. comm.) only one specimen of *frontata* is present in the collection of BECKER, which is on loan to KUZNETZOV. The first author had the opportunity to study this specimen while on a visit to ZISP. It is a male with the following labels 'Tunis V / 52828' 'Sammlung / Dr TH BECKER' 'frontatus / m BECK' and a red holotype label added by KUZNETZOV. However this is not the type since not from the type locality (which is

Sinaja, Rumania). The specimen from Tunis was already by earlier curators of MNHU (i.c. PEUS) indicated as the type, but this error was pointed out by COLLIN as can be seen from his correspondence with Dr PEUS (ex archives COLLIN at University Museum, Oxford, courtesy of M. ACKLAND). Dr KUZNETZOV recently confirmed (pers. comm.) that he compared the types of *ornatipes* with this specimen of *T. frontata*. The whereabouts of the true type of *frontata* are therefore unknown. This is of some importance since the diagnostic character usually given for male *frontata* is the separation of the eyes, which is unusual in Pipunculinae except for *Dorylomorpha*. This was indicated in the original description of *frontata*, and observed again by HARDY (1967) in his redescription of the species, based on non-type material from France. The male in *ornatipes* however has the eyes touching as noticed in the original description, and as observed in the type material by the first author, and in the material in front of us. Also the male genitalia structure is different between material identified as *frontata* from Israel and in *ornatipes*. Unfortunately, the first author did not have the opportunity to study the male genitalia in detail in the type of *ornatipes* while on his visit to ZISP. Given these diagnostic differences, we prefer to consider *ornatipes* as a separate and true species, different from *frontata*. It is however suggested that a detailed study of these and related species (like *T. helwanensis* (COLLIN) from Egypt which has similar male genital structure as *ornatipes*) is required in order to clarify the true identity of these species.

Tomosvaryella parakuthyi DE MEYER, 1995

Material examined : GRAN CANARIA : 1♂, Maspalomas, 24-26.II.1949, LINDBERG (ZMH).

As with *T. freidbergi*, *T. parakuthyi* belongs to the *kuthyi* complex of species, and was originally described from Israel and the Sinai desert in Egypt. This is the first record outside the region of the type localities. New to the fauna of the Canary islands.

Tomosvaryella sylvatica (MEIGEN, 1824)

This species was reported by BECKER (1908a) from Tenerife ('Zwei Weibchen. Teneriffe.') as well as by FREY (1936) (Orotava, 1♂ 1♀ (St); Güímar 2♀♀ (St.,Fr.)). It is the most widespread species of the genus in Europe, and is also

reported from the Nearctic and Oriental regions. However, among the material studied no specimens were identified as belonging to *T. sylvatica*. The BECKER material could not be found in the collections of MNHU. In the ZMH collection historical material from Orotava and Güímar is present but none of the specimens belong to *T. sylvatica*. Given its wide distribution, the occurrence on the Canary Islands is not impossible. However we prefer to mention it here from the islands with a question mark in the check list (Table 1)

Discussion

Table 1 summarises the number of species found per island. The largest diversity is found on Tenerife, and to a lesser extent on Gran Canaria. The differences in diversity are partly a reflection of bias regarding collecting efforts, but also partly of the differences in ecosystem heterogeneity between the islands. The island of Tenerife is the largest and highest of all within the archipelago. It shows also the highest diversity in habitats, which results in it being the most diverse in insects. As mentioned in the introduction, the islands of Lanzarote and Fuerteventura form a distinct subgroup within the archipelago. They are characterised by more arid conditions, a geographical position closer to the African mainland, and low altitudes. Although the third author frequently visited the islands, no Pipunculidae were collected (there are only a few specimens in the historical collection of ZMH). On the other

hand, Pipunculidae do occur in similar xeric conditions on the other islands.

With 13 species for the Canaries and 3 species for Madeira, the pipunculid fauna of the islands can be considered as relatively poor. Especially compared with the European mainland, where 80 till well over 100 species can be found in some countries. This is a general tendency among the Diptera found on the islands. So far, about 1000 species are reported from the Canary islands and 400 from Madeira. A review of this is given in BÁEZ (1982, 1993 respectively). Some groups are very rich in endemic species, with on average about 40% of endemism among the Diptera of the Canary islands and 14% among those of Madeira. However the degree of endemism varies greatly according the individual groups studied. In Pipunculidae, endemism or near-endemism is limited to a few species, usually represented by related species either in the Palaearctic or Afrotropical region. The only species that could be endemic is *T. ornatipes* and perhaps the undescribed *Cephalops*. All other species have been reported from either Europe and/or the African mainland.

The zoogeographical affinities follow the general tendencies outlined for other insect groups (BÁEZ, 1982, 1993). The species composition seems to be largely Palaearctic with species represented either all over Europe (like *T. geniculata*, *C. perplexus*) or limited to the Mediterranean region with possible extensions into Central Europe and/or Central Asia (like *T. freidbergi*,

Table 1. Check list of Pipunculidae of the Canary Islands and Madeira. Records between '()' refer to historical records that could not be confirmed; '?' refer to doubtful records.

Genus	species	Fuertev.	Gomera	Hierro	Gr. Can.	Palma	Tenerife	Madeira
<i>Chalarus</i>	<i>perplexus</i>		X	X	X	X	X	X
<i>Cephalops</i>	sp.							X
<i>Eudorylas</i>	<i>clavatus</i>						X	
<i>Eudorylas</i>	<i>fluviatilis</i>					X	X	
<i>Eudorylas</i>	<i>setosus</i>		X	X	(X)	X	X	
<i>Tomosvaryella</i>	<i>brachybasis</i>					X	X	
<i>Tomosvaryella</i>	<i>freidbergi</i>	X	X		X		X	
<i>Tomosvaryella</i>	<i>geniculata</i>		X		X	X	X	(X)
<i>Tomosvaryella</i>	<i>glabrum</i>				X		X	
<i>Tomosvaryella</i>	<i>kuthyi</i>						X	
<i>Tomosvaryella</i>	<i>littoralis</i>						(?)	
<i>Tomosvaryella</i>	<i>ornatipes</i>	X			X		X	
<i>Tomosvaryella</i>	<i>parakuthyi</i>				X			
<i>Tomosvaryella</i>	<i>sylvatica</i>						(?)	
TOTAL		2	4	2	7	5	10 (+2)	3

T. parakuthyi, *E. fluviatilis*, *E. setosus*). Some Afrotropical elements are also present like *T. brachybasis* and *T. glabrum*. Some of these seem to represent disjunct distributions with occurrence in southern Africa and on the Canaries. Similar examples for other groups exist : the genus *Nemapalpus* (Diptera, Psychodidae) has one species in the Palaearctic Region (*N. flavus* in the Canary Islands) and 3 species in South Africa. Closely related species of the genus *Lampromyia* (Diptera, Vermileonidae) are found in southern Africa and the Canary Islands (STUCKENBERG, 1998). The genus *Cyalyrius* (Lepidoptera, Lycaenidae) has one species in the Canary Islands (*Cyalyrius webbianus*) and another one in the island of Mauritius (*Cyalyrius mandersi*). It is however remarkable that all of the pipunculid genera which have their main distribution in the Holarctic region (like *Pipunculus*, *Verrallia*, *Dorylomorpha*) and which are well represented on the European mainland, are absent from the islands.

Seasonal patterns are unclear. The most abundant species (*Chalarus perplexus*, *Eudorylas setosus*) seem to occur throughout the year. If one plots out the collecting dates for the material studied however, there seems to be a tendency to have a larger diversity and higher numbers around April-May and again around August-September. In general, observations on seasonality for Diptera differ. Some high altitude habitats present species with a clear seasonality, while medium and low altitude habitats show a continuous occurrence of species throughout the year (albeit with higher densities in spring and summer). In order to have reliable data on seasonality, a full year cycle with trapping is however required.

In general, the records are too few to draw any definite conclusions on habitat preferences. Only a few preliminary observations can be made : Some species are clearly ubiquitous, found in several different habitats on the islands, like *Eudorylas setosus* and several *Tomosvaryella* species (*freidbergi*, *geniculata*, *kuthyi*). Other species seem to prefer more xeric habitats, like *Eudorylas clavatus* and *Tomosvaryella glabrum*. *Chalarus perplexus* is a species that is encountered more frequently in the laurel forests of both the Canary Islands and Madeira. The typhlocybina leafhopper host for this species should be searched in this habitat (type material from Italy has been reared from *Empoasca vitis*; see JERVIS, 1990).

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References

- ADAMS C.F., 1905. - Diptera Africana, I. *Kansas University Science Bulletin*, 3 : 149-208.
- BÁEZ M., 1982. Consideraciones sobre las características zoogeográficas de la fauna de Canarias. *Instituto de Estudios Canarios, 50 Aniversario, Santa Cruz de Tenerife*, 1 : 21-70.
- BÁEZ M., 1993. - Origins and affinities of the fauna of Madeira. *Boletim do Museu Municipal do Funchal*, suppl. 2 : 9-40.
- BECKER T., 1900. - Dipterologische Studien V. Pipunculidae, Erste Fortsetzung. *Berliner Entomologische Zeitschrift*, 45 : 215-252.
- BECKER T., 1908a. - Dipteren der Kanarische Inseln. *Mitteilungen aus dem Zoologischen Museum in Berlin*, 4 : 1-180.
- BECKER T., 1908b. - Dipteren der Insel Madeira. *Mitteilungen aus dem Zoologischen Museum in Berlin*, 4 : 181-206.
- COE R.L., 1966. - Some British species of *Chalarus* and *Verrallia* (Diptera : Pipunculidae). *Proceedings of the Royal Entomological Society of London*, 35 : 149-160.
- DE MEYER M., 1992. - Revision of the Afrotropical species of *Cephalops* Fallén (Diptera, Pipunculidae). *Journal of African Zoology*, 106 : 81-111.
- DE MEYER M., 1993. - A revision of the Afrotropical species of *Tomosvaryella* Aczél, 1939 (Diptera : Pipunculidae). *Annals of the Natal Museum*, 34 : 43-101.
- DE MEYER M., 1994. - Phylogenetic relationships within the Cephalopsini (Diptera, Pipunculidae). *Bulletin et Annales de la Société Royale belge d'Entomologie*, 130 : 7-18.
- DE MEYER M., 1995. - The pipunculid flies of Israel and the Sinai (Insecta, Diptera, Pipunculidae). *Spixiana*, 18 : 283-319.
- DE MEYER M., 1997. - Contribution to the Pipunculidae fauna of Spain. *Beiträge zur Entomologie*, 47 : 421-450.
- DEMPEWOLF M., 1996. - Taxonomical notes on west palaeartic Pipunculidae including the description of two new *Eudorylas* species (Diptera). *Studia*

- Dipterologica*, 3 : 87-92.
- FÖLDVÁRI M. & DE MEYER M. (2000) - Revision of Central and West European *Tomosvaryella* Aczél species (Diptera, Pipunculidae). *Acta Zoologica Academiae Scientiarum Hungaricae*, 45 (1999) : 299-334.
- FREY R., 1936. - Die Dipterenfauna der Kanarischen Inseln und ihre Probleme. *Commentationes Biologicae*, 6 (1) : 1-234.
- FREY R., 1949. - Die Dipterenfauna der Insel Madeira. *Commentationes Biologicae*, 8(16) : 1-47.
- HARDY D.E., 1949. - The African Dorilaidae (Pipunculidae-Diptera). *Mémoires de l'Institut Royal des Sciences Naturelles de Belgique*, 36 : 1-80.
- HARDY D.E., 1967. - Redescription of *Tomosvaryella frontata* (Diptera : Pipunculidae). *Annals of the Entomological Society of America*, 60 : 116-118
- JERVIS M.A., 1992. - A taxonomic revision of the pipunculid fly genus *Chalarus* Walker, with particular reference to the European fauna. *Zoological Journal of the Linnean Society*, 105 : 243-352.
- KOZÁNEK M. & BELCARI A., 1995. - Contribution to the knowledge of the pipunculid fauna of Italy. *Bollettino della Società Entomologica Italiana*, 127 : 159-178.
- KOZÁNEK M.; DE MEYER M. & ALBRECHT A., 1998. - 3.6 Family Pipunculidae. In : (PAPP L. & DARVAS B. eds) *Contributions to a Manual of Palaearctic Diptera with special reference to flies of economic importance*, 3 : 141-150.
- KUZNETZOV S.Y., 1994a. - Short notes on synonymy and nomenclature of Pipunculidae (Diptera). *Dipterological Research*, 5 : 105.
- KUZNETZOV S.Y., 1994b. - New Palaearctic species of *Tomosvaryella* Aczél (Diptera, Pipunculidae) with redescription of *T. rondanii* (Collin). *Dipterological Research*, 5 : 107-207.
- SACK P., 1935. - 32 Dorylaidae (Pipunculidae). *Fliegen der Palaearktischen Region*, 4(4) : 1-57.
- STUCKENBERG B.R., 1998. - A revision of the Palaearctic species of *Lampromyia* Macquart (Diptera, Vermileonidae), with the description of a new Iberian species and a cladogram for the genus. *Bonner Zoologische Beiträge*, 48 : 67-96.
- WHITE F., 1983. - *The vegetation of Africa. A descriptive memoir to accompany the Unesco/AETFAT/NSO vegetation map of Africa*. Unesco Paris.
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