

New Chloropidae from the Basque Country (northern Spain). Additions to the Chloropidae (Diptera) fauna from northern Spain, with new records

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ABSTRACT

For the first time, the finding of three genera and four species of the family Chloropidae associated to cadaveric environment has been reported. Two out of the four species listed, *Siphunculina aenea* (Macquart, 1835) and *Siphunculina quinquangula* (Loew, 1873), are also reported for the first time from the Iberian Peninsula.

Key words: Forensic Entomology, Diptera, Chloropidae, sarcosaprophagous fauna, Iberian Peninsula, Basque Country, Spain.

RESUMEN

Nuevos Chloropidae del País Vasco (Norte de España). Incorporaciones a la fauna de Chloropidae (Diptera) del norte de España, con nuevas citas.

Se recoge el hallazgo de tres géneros y cuatro especies de la familia Chloropidae asociados por vez primera a entornos cadavéricos. Dos de las cuatro especies recolectadas, *Siphunculina aenea* (Macquart, 1835) y *Siphunculina quinquangula* (Loew, 1873), se citan también por primera vez para la península ibérica.

Palabras clave: Entomología Forense, Diptera, Chloropidae, fauna sarcosaprófaga, península ibérica, País Vasco, España.

INTRODUCTION

Chloropidae are small, bristle-less flies that can be found in all vegetation areas, from tundra to rainforest, savanna, and desert (WATSON & DALLWITZ, 2003; NARTSHUK, 2011). The larvae of this family have an exceptional broad dietary spectrum, being most species phytophagous or saprophytophagous (NARTSHUK, 2011). Nevertheless, they have been rarely reported from cadaveric environments (CASTILLO MIRALBÉS, 2002; PRADO E CASTRO *et al.*, 2012).

This family is poorly known in our country. Only recent works have just begun to publish a relatively short list of species for Spain (CARLES-TOLRÁ, 2002, 2004; NARTSHUK, 1984, 2004), still remaining the northern region unexplored (cf. CARLES-TOLRÁ *et al.*, 2012; EBEJER, 2006). The aim of this article is to contribute to the knowledge of the diversity and geographic distribution of Chloropidae species, including some information of their biology and ecology.

MATERIAL AND METHODS

The new findings here reported are part of a major research focused on the study of carrion-related arthropods, which has taken place in the “Aiako Harria” Natural Park (Errenteria, Guipúzcoa, Spain; UTM coordinates 30TWN91458860) during the summer months of 2009 and 2010.

The scenario of the Park is predominantly forest, with intermittent open areas for grazing and crops (LIZAUR SUKIA *et al.*, 1996). One of the most remarkable enclaves is the “Urdaburu-Añarbe” forest, within which sampling was performed. Specifically, the research was carried out in an area previously used for the recuperation of wild boar populations, which remains nowadays unused (DÍAZ MARTÍN & SALOÑA BORDAS, 2012; VENTURA *et al.*, 2012).

The experiment was carried out using carcasses of domestic piglets (*Sus scrofa* Linnaeus, 1758) of about 8-12 kilograms. Pigs are considered the best animal model for forensic studies due to the similarities between this species and human beings (CATTS & GOFF, 1992; GOFF, 1993; SCHOENLY *et al.*, 2006). The sampling procedure has been explained in detail in previous works (CARLES-TOLRÁ *et al.*, 2012; DÍAZ MARTÍN & SALOÑA BORDAS, 2012; VENTURA *et al.*, 2012).

Diptera adults were daily collected with handheld insect net upon decomposing carcasses, immediately preserved in ethanol 70% v/v and properly labeled (CARLES-TOLRÁ *et al.*, 2012).

Specimens were identified by one of the authors (E.P. Nartshuk) using the following taxonomic keys: DELY-DRASKOVITS, 1983; NARTSHUK *et al.*, 1988; ISMAY & NARTSHUK, 2000.

Information about the geographic distribution and feeding habits is also included. The stage of decomposition under which they were captured has been classified attending to the five stages described by PAYNE (1965) and ANDERSON & VANLAERHOVEN (1996): Fresh, Bloated, Active Decay, Advanced Decay, and Dry – Remains.

Samples are kept in the reference collection of the Forensic Entomology Laboratory, University of the Basque Country (UPV/EHU, Biscay, Spain).

RESULTS

Nine specimens of the family Chloropidae were collected during the research, being represented by 4 species of the subfamily Oscinellinae. All the specimens were captured at the same locality. Therefore, the species list reflects only the date and sex ratio (male/female).

Oscinella frit (Linnaeus, 1758)

MATERIAL EXAMINED: 11.08.2009 (1/0)

Widespread distributed in the Holarctic Region and parts of India and Pakistan (EBEJER, 2006).

Larvae are considered phytophagous, as develop in shoots and seeds of cereals and of many wild grasses. Hence, it is probably to be an accidental case, as up to now no records have been reported for this species in cadaveric environments. It was collected on day 6 (D6) after decease, with the carcass on active decomposition stage.

Siphunculina aenea (Macquart, 1835)

MATERIAL EXAMINED: 16.08.2010 (0/1)

New species reported for the Iberian Peninsula.

Eurasian species, known from Europe to Japan.

It has been previously reared from faeces of wild brown bear and cow dung in Japan (KANMIYA, 1982, 1989), and together with other species of

the genus, it was often reared from bird nests. However, their food habits still remain unknown (KRIVOKHATSKII AND NARTSHUK, 2001; NARTSHUK, 2001; NARTSHUK & MATYUKHIN, 2012). It was collected on day 21 (D21) after decease, with the carcass on dry stage of decomposition.

Siphunculina quinquangula (Loew, 1873)

MATERIAL EXAMINED: 12.08.2009 (0/1), 29.08.2010 (1/3)

New species reported for the Iberian Peninsula.

Eurasian species.

Food habits of larvae are still unknown. It was collected on day 7 (D7) after decease in 2009, and day 34 (D34) in 2010, with the carcass on active decomposition and dry stage respectively.

Tricimba cincta (Meigen, 1830)

MATERIAL EXAMINED: 17.08.2009 (0/1), 16.08.2010 (1/0)

Holarctic species.

Exceptional broad dietary spectrum of larvae.

It has been reared by many authors from stem of cereals infested by other insects, including seedlings of wheat in Norway (RYGG, 1966), rotting spathes of skunk cabbage *Symplocarpus foetidus* L. (Nutt), Boletaceae, Agaricaceae and Russulaceae mushrooms, rotting bark of *Alnus*, berries of *Sambucus racemosa*, dead molluscs, meat baits (BROWN, 1956; MYHÁLYI, 1965; KRIVOSHEINA *et al.*, 1986; DELY-DRASKOVITS, 1972; KRIVOSHEINA, 1974; SCHATZMAN, 1977; GRIMALDI & JENNIKE, 1983; TSCHIRNHAUS, 1992; YAKOVLEV, 1994). Therefore, its presence in cadaveric environments needs a more profound monitoring in future research. It was collected on days 12 (D12) after decease in 2009 and day 21 (D21) in 2010, being the carcass on advance and dry stage of decomposition respectively.

DISCUSSION

The family Chloropidae represents a rather common but usually overlooked group (DE BRUYN, 1999). It has a diverse biology, and many spe-

cies often occupy specific habitat niches, being useful as bioindicators and ecological monitoring (EBEJER, 2006; NARTSHUK, 2011).

Larvae of Chloropidae of some species from genera *Anatrichus* Loew, *Cadrema* Walker, *Conioscinella* Duda, *Gaurax* Loew, *Polyodaspis* Duda and *Pachylophus* Loew develop in dead invertebrates (FERRAR, 1987; NARTSHUK, 1984, 1987). Up to now, only the species *Eutropha lindneri* Sabrosky from the subfamily Chloropinae was reared from vertebrate carcasses, as the Cape Fur Seal *Arctocephalus pusilla* (Schreber) in southwestern Africa (KIRK-SPRIGGS *et al.*, 2001). Moreover, there are some specimens of *Siphunculina* Rondani and *Tricimba* Lioy reared from cat and snake carcasses, and a dead fish (Nartshuk, unpublished data), in the collections of the Zoological Institute of Russian Academy of Sciences in S. Petersburg (Russia).

All the collected species belong to the subfamily Oscinellinae, and report only the 0,14% of the dipterans collected in this research. Nevertheless, this paper increases in two new species the list of Chloropidae known from the Iberian Peninsula (CARLES-TOLRÁ, 2002, 2004; EBEJER, 2006; NARTSHUK, 1984, 2004). This fact highlights the poor knowledge of our fauna, especially referred to sarcosaprophagous species of forensic interest. It is worth noting that the listed species were reared for the first time from corpses of vertebrate animals.

Therefore, we report for the first time the association of these flies to carcass and the stage of decomposition when each species has been collected. Moreover, the potential use of the family Chloropidae as forensic indicator needs to be investigated in detail.

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