

THYREOPHORA CYNOPHILA (PANZER), CENTROPHLEBOMYIA FURCATA (FABRICIUS) AND OTHER DIPTERANS ASSOCIATED TO WINTER CARCASSES (INSECTA: DIPTERA)

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Abstract: New populations of the piophilids *Thyreophora cynophila* (Panzer) and *Centrophlebomyia furcata* (Fabricius) have been found in Spain, thus extending their known distribution to the east of the Iberian Peninsula. Furthermore, *Prochyliza nigricornis* (Meigen) has been collected in the Iberian Peninsula for the second time. Finally, other dipterous species collected on winter carcasses are mentioned.

Key words: Diptera, *Thyreophora cynophila*, *Centrophlebomyia furcata*, carcasses, Spain.

Thyreophora cynophila (Panzer), *Centrophlebomyia furcata* (Fabricius) y otros dípteros asociados a cadáveres invernales (Insecta: Diptera)

Resumen: Se han hallado nuevas poblaciones de los piofílidos *Thyreophora cynophila* (Panzer) y *Centrophlebomyia furcata* (Fabricius) en España, ampliando su distribución conocida hacia el este peninsular. Además, *Prochyliza nigricornis* (Meigen) se captura por segunda vez de la Península Ibérica. Finalmente, se presentan otras especies de dípteros recogidas sobre cadáveres invernales.

Palabras clave: Diptera, *Thyreophora cynophila*, *Centrophlebomyia furcata*, cadáveres, España.

Introduction

The story repeats. On the Tuesday morning of 8 March 2011, just before going to bed, the first author (MC-T) opened a message sent by the third autor (JB). It had two attached files and said: “A friend (Félix Compaired) has sent me the photos of the fly attached, these were taken in Luesia (Zaragoza). He tells me that three specimens went in and out of the nostrils of a dead cow“. When I read “dead cow“, I immediately thought “What if they are of *Thyreophora cynophila* again?“ And when I opened the first photo (Fig. 1), effectively, not one but two specimens of it appeared. And, when I opened the second one (Fig. 2) a first plane of it was shown. ¡Hallucinating, incredible, they had photographed *Thyreophora cynophila* again, but the most interesting was that they were from a new zone! ¡Another region where this enigmatic and beautiful fly lives! Again, the sensation I felt when I saw them was undescrivable. The next day I spoke with the photos’ author (FC) with the intention of going there and trying to collect at least one specimen, even though the photos had been taken almost one month before (12 February 2011). Taking advantage that I was on vacation, I went there two days later. As said, the story repeats as in Carles-Tolrá *et al.*, 2010.

Studied area

The Sierra de Santo Domingo is situated in the North of Zaragoza province (Aragón, Spain), half way between the Pyrenees and Ebro Valley. It has a surface of 12.000 ha and belongs to the municipalities of Luesia, Biel-Fuencalderas and Longás.

It presents various rivers, among which we emphasize Arba de Luesia, Arba de Biel and Onsella. Its altitude varies from 800 to 1.525 m a.s.l. The climate is mediterranean, softened by the atlantic influence. The greater precipitations

are in Autumn and Spring, with 800 mm in lower zones and up to 1.200 mm in higher altitudes, above 1.000 m a.s.l. In Winter, the temperatures may reach -16 °C and snow above of 900 m a.s.l.

These characteristics, together with a complicated relief, allow the presence of a great variety of vegetals, being abundant oak (*Quercus faginea*), pine (*Pinus sylvestris*) and beech (*Fagus sylvatica*) forests. A long time ago, a large quantity of oak forests were cut to convert them into cereal fields. Nevertheless, some years later such fields were abandoned, some of them are now natural meadows, whereas many others were reforested, more than 40 years ago, with pines of *Pinus sylvestris* and *P. nigra* ssp. *nigra*. The undergrowth is mainly formed by shrubs of box (*Buxus sempervirens*), holly (*Ilex aquifolium*), juniper (*Juniperus communis*) and greenweed (*Genista scorpius*), whereas the most abundant grass is *Helictothricum cantabricum*.

Among the fauna we emphasize the great abundance of wild boars (*Sus scrofa*) and increasing deer (*Cervus elaphus*) and roe deer (*Capreolus capreolus*). Fox (*Vulpes vulpes*), badgers (*Meles meles*), stone martens (*Martes foina*) and wild cats (*Felis silvestris*), can also be found. It is also very important to emphasize the abundance, since former times, of livestock, composed of cows, sheep, horses and goats. Undoubtedly, all this vertebrate fauna of mammals has allowed *T. cynophila* to not become extinct in this region.

Likewise, we emphasize that the rocky tops, house colonies of griffon vultures (*Gyps fulvus*), as well as pairs of eagle owls (*Bubo bubo*), lammergeiers (*Gypaetus barbatus*) and golden eagles (*Aquila chrysaetos*). Finally, there are also a lot of other birds of smaller size.

Material and methods

They were not completely sure that the dead cow had still stayed there after almost one month, as a lot of depreducers live in such zone (see above). Therefore, in case, I brought remains of sheep (heads cut in half, skin.....) and calf (femora, spinal columns, ribs.....). I left all of these remains in the open air two days so that they would begin to decay as much as possible before I went there. When we arrived to the place of the dead cow, we fortunately saw that it was still there, and furthermore entire. The dead cow was in a reforested zone, concretely in the forestal path that goes from Barranco de Luzientes to Barranco de Tresecho (UTM 30TXM666920/4702470), at an altitude of 970 m a.s.l., in the Tablado de Fayanás hill, belonging to the municipality of Luesia. So, we also put the remains in the middle of the same forestal path, near the cow, and spread out in four washing bowls. To collect the flies the first author (MC-T) used an aspirator. The collecting time was only of two days (10 and 11 March 2011). Nevertheless, even though the time period was short, we have obtained excellent results.

Results

Although the main aim of the travel was to collect at least one specimen of *T. cynophila*, I took advantage, obviously, to collect other dipterans attracted by the dead cow and remains, that were put as bait. So, a total of 405 specimens of dipterans belonging to 15 species of 6 families were also caught, as it is shown below. We highlight, very specially, the captures of *Thyreophora cynophila* (Panzer), *Centrophlebomyia furcata* (Fabricius) and *Prochyliza nigricornis* (Meigen), all belonging to the family Piophilidae. All the material has been collected and identified by the first author and it is preserved in alcohol (70°) in his private collection. The proportion of sexes has been separated by a slash / (males/females).

DRYOMYZIDAE

Dryomyza flaveola (Fabricius, 1794)

Material studied: 10.3.2011 0/1, 11.3.2011 2/0.

A common saprophagous and necrophagous species.

HELEOMYZIDAE

As in a previous study on dipterans associated to winter cadavers (Carles-Tolrá, 2011), this family has been, by far, the most abundant one. Concretely, due again to the genus *Oldenbergiella* Czerny, 1924, confirming again that this genus can be extremely abundant and common in the appropriate habitats (see Carles-Tolrá, 2011). We highlight that the 269 specimens collected of this genus really represents the tip of the iceberg that were observed, as only a very small sample was collected.

Heleomyza captiosa (Gorodkov, 1962)

Material studied: 10.3.2011 1/0.

A very common psychrophilous, saprophagous and coprophagous species.

Neolelia flavicornis (Loew, 1862)

Material studied: 10.3.2011 1/0.

A rare saprophagous species.

Neolelia ruficauda (Zetterstedt, 1847)

Material studied: 10.3.2011 27/6, 11.3.2011 3/2 (two pairs mating).

A common necrophagous species.

Oldenbergiella calcarifera Papp, 1980

Material studied: 10.3.2011 6/0, 11.3.2011 21/10 (ten pairs mating).

A fairly common psychrophilous and necrophagous species. Only those females that were mating (10) have been identified.

Oldenbergiella seticerca Papp, 1980

Material studied: 10.3.2011 118/0, 11.3.2011 72/1 (one pair mating).

A psychrophilous and necrophagous species. Only one female that was mating has been identified.

Oldenbergiella sp.

Material studied: 10.3.2011 0/25, 11.3.2011 0/16.

According to the males collected these females should belong to *O. calcarifera* and *O. seticerca*. This new material will be added to that collected in Carles-Tolrá (2011) for the separation of both species, that will be done in an additional work, as it is indicated in such paper.

PIOPHILIDAE

This family has given, without any doubt, the most unexpected and surprising results. We highlight three of the four species collected.

Centrophlebomyia furcata (Fabricius, 1794)

Material studied: 10.3.2011 4/1, 11.3.2011 3/2.

These specimens of *C. furcata* have been very interesting, and at the same time unexpected. Effectively, *C. furcata* had also been thought to be extinct in mainland Europe for more than one year until one specimen was recently collected in the Sierra de Guadarrama (Madrid, Spain) (Gómez-Gómez *et al.*, 2008). Now, 10 specimens of both sexes have been collected, and in only two sampling days, which means that its population is abundant. I want to highlight that when I was aspirating these exemplars I thought they were Heleomyzidae (*Heleomyza*, *Neolelia*), because at simple sight they are very similar and, furthermore, it is what was found in Sierra de Cebollera one year ago (Carles-Tolrá *et al.*, 2010). What was my surprise when I arrived home and saw with the binocular microscope that they were not heleomyzids, but *C. furcata*! If I had known I would have captured many more! These specimens represent, therefore, the second capture of this species, after more than one century, for mainland Europe. Its geographical distribution is now expanded to the east of the Iberian Peninsula in Aragón.

Prochyliza nigricornis (Meigen, 1826)

Material studied: 10.3.2011 14/2 (one pair mating), 11.3.2011 8/4.

Also interesting capture, as it represents the second record for the Iberian Peninsula, after Martín-Vega & Baz, 2010. With them, its geographical distribution is increased to the east in the Iberian Peninsula in Aragón. I want to highlight that, apart from these specimens collected, numerous more specimens were observed on the dead cow and remains, although evidently it is not possible to know if they belong to this species or to the next one.

Prochyliza nigrimana (Meigen, 1826)

Material studied: 10.3.2011 0/4, 11.3.2011 0/1.

A common saprophagous and necrophagous species.

Thyreophora cynophila (Panzer, 1798)*

Material studied: 10.3.2011 3/11, 11.3.2011 1/1. (Two specimens on the dead cow and fourteen on the remains)

These captures have also been very interesting, as they increase notably its geographical distribution. Curiously, *T. cynophila* has passed from being a species that had been "extinct"



Fig. 1. Habitus of two males of *Thyreophora cynophila*, one *Calliphora* and two *Oldenbergiella* specimens on the nose of the dead cow.



Fig. 2. Habitus of a male of *Thyreophora cynophila* on a horn of the dead cow.

Table I. *Thyreophora cynophila*: geographical distribution, number of specimens, and sampling time by zone and its reference.

Zone	Specimens	Sampling time	Reference
Sierra de Cebollera (La Rioja)	89	1 month	Carles-Tolrá <i>et al.</i> , 2010
Sierra de Guadarrama	6	5 weeks	Martín-Vega <i>et al.</i> , 2010
Southwest of La Rioja	46	1 month	Zaldívar <i>et al.</i> , 2011
Sierra de Santo Domingo	16	2 days	this paper

for more than a century and a half to having a well represented population in the Iberian Peninsula (Spain). Effectively, its very recent discovery in the Iberian Peninsula (Carles-Tolrá *et al.*, 2010 and Martín-Vega *et al.*, 2010) was really unexpected. More recently, Zaldívar *et al.*, 2011 have checked that this species is widespread in the southwest of La Rioja (Spain). Now, these new captures extend its distribution to the east peninsular, in the pre-Pyrenees, and record it, therefore, for the first time for Aragón.

In Table I we summarize its current geographical distribution, the number of specimens collected up to now and the sampling time (we have not counted the observed, but not collected, specimens). In it, it can be observed that *T. cynophila* is very abundant in La Rioja (89 + 46 = 135 specimens) and, taking into account that 16 specimens were collected in a concrete point of the Sierra de Santo Domingo in only two days, it is to expect that it is also abundant in this zone. Contrarily, in Sierra de Guadarrama there seems to be few, at least in the collecting point sampled for 5 weeks, but without doubt it will be abundant in further or nearer zones. All these captures reconfirm the supposition that *T. cynophila* is currently far from being a species in danger of becoming extinct. As long as a more or less abundant and stable population of vertebrates is kept so that they can subsist.

SEPSIDAE

Sepsis fulgens Meigen, 1826

Material studied: 10.3.2011 8/7, 11.3.2011 6/6.

A very common coprophagous species, found also on cadavers.

SPHAEROCERIDAE

Coproica vagans (Haliday, 1833)

Material studied: 11.3.2011 1/1.

A very common coprophagous species, found also on cadavers.

Spelobia baezi (Papp, 1977)

Material studied: 10.3.2011 1/0.

A common saprophagous species, found also on cadavers.

Sphaerocera curvipes Latreille, 1805

Material studied: 10.3.2011 1/1.

A very common coprophagous species, found also on cadavers.

MUSCIDAE

Eudasyphora cyanella (Meigen, 1826)

Material studied: 11.3.2011 0/2.

A common coprophagous species, found also on cadavers.

Notes: * In the paper by Carles-Tolrá *et al.*, 2010 we put 1794 as the year of description of *T. cynophila*. When we had to put it in that paper, the doubt among 1794 and 1798 appeared, as both years are in the consulting papers (McAlpine, 1977; Papp, 1978, 1984 and Sack, 1939). Finally, we decided to put 1794 following Gómez-Gómez *et al.*'s (2008) paper, as this was the most recent one. Nevertheless, two years later, in Martín-Vega *et al.*, 2010, they put 1798 as the year of description, and we have followed this in this paper.

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