

THYREOPHORA CYNOPHILA (PANZER, 1798) (DIPTERA: PIOPHILIDAE: THYREOPHORINI): DISTRIBUTION AREA IN LA RIOJA (SPAIN)

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Abstract: The piophilid *Thyreophora cynophila* (Panzer) has a distribution range of nearly 77,000 hectares in the mountains of La Rioja (Spain). Unpublished data on its ecology are given.

Key words: Diptera, Piophilidae, *Thyreophora cynophila*, geographical distribution, Spain, La Rioja.

Thyreophora cynophila (Panzer, 1798) (Diptera: Piophilidae: Thyreophorini): área de distribución en La Rioja (España)

Resumen: El piofílido *Thyreophora cynophila* (Panzer) ocupa un área de distribución de casi 77.000 ha en las montañas de La Rioja (España). Se dan datos inéditos sobre su ecología.

Palabras clave: Diptera, Piophilidae, *Thyreophora cynophila*, distribución geográfica, España, La Rioja.

1. Introduction

Thyreophora cynophila (Panzer, 1798) is a diptera of family Piophilidae easily identified by its body and legs shiny black with iridescent blue-green, transparent wings with black dots and red-orange head and orange-yellow eyes, ocellus, third antennal segments and a spot in its occiput all in matt black (Fig. 1).

Adults come to carcasses of large mammals (deer, roe deer, boars, dogs, sheep, cows, horses, etc.) in different stages of decomposition and the females lay their eggs on them. Larvae seem to eat the marrow of long bones and spine (Carles-Tolrá *et al.*, 2010).

Its distribution range was restricted for years to France, Germany and Austria, and it was given as extinct, also for many years, because five decades after its discovery it hadn't been recaptured (Carles-Tolrá *et al.*, 2010).

More than 150 years after its theoretical disappearance, it has been recently rediscovered in the Natural Park of Sierra de Cebollera (Villoslada de Cameros, La Rioja, Spain) by Carles-Tolrá *et al.* (2010) and in the Guadarrama National Park (Lozoya, Madrid, Spain) by Martín-Vega *et al.* (2010), far away from their current well-known territories. This has driven us to find out its range in the Autonomous Community of La Rioja (Fig. 2).

2. Sampling method

During the potentially favourable season (winter months), areas with similar biogeographical conditions to the Natural Park of Sierra de Cebollera were visited, as well as others with more Mediterranean characteristics in order to establish the approximate limits of the geographical distribution area in the region of this striking piophilid.

The variables used for the election of biotopes were:

- **Climate:** because *T. cynophila* was discovered, and is distributed exclusively, in some Central European regions (around Paris and parts of Austria and Germany).

- **Land cover:** paying attention to Central European vegetation (deciduous forestland (*Fagus* and *Quercus*) and its related shrublands and grasslands, riparian forest areas, and *Pinus sylvestris* forestlands).

- **Elevation range:** from 800 to 1.400 meters above sea level (m.a.s.l.), considering that searched conditions don't take place at lower elevations in La Rioja.

Following these criteria, several sampling sites were chosen as suitable locations for the species at high basins of the rivers Tirón, Oja, Najerilla, Iregua and Leza (mountain areas of San Lorenzo, Demanda, Urbión, Cebollera, Cameros and Hayedo de Santiago). In order to ascertain the degree of penetration of *T. cynophila* in the Ebro depression (located at lower mean altitude and with warmer and drier climate conditions) sampling sites were also planned in areas of more Mediterranean conditions as those belonging to the municipalities of Santo Domingo de la Calzada and San Vicente de la Sonsierra.

Once sampling sites were selected, animal carcasses were visited and air and ground traps were placed with bones of sheep, calf and horse as bait. The carcasses were inspected until they showed positive results or until the degree of decomposition was so advanced as to prevent the imago visits; traps were removed after two weeks of being placed. Surveys were conducted from February 28 until March 29, 2010, during the morning and afternoon depending on weather conditions. Higher mountain areas were rejected because of snow.

3. Results

Findings

In order to confirm the presence of *T. cynophila* positive contacts were obtained at 11 of 18 sampling sites located, whereas 7 were negative (Table I).



Fig. 1. *Thyreophora cynophila*.

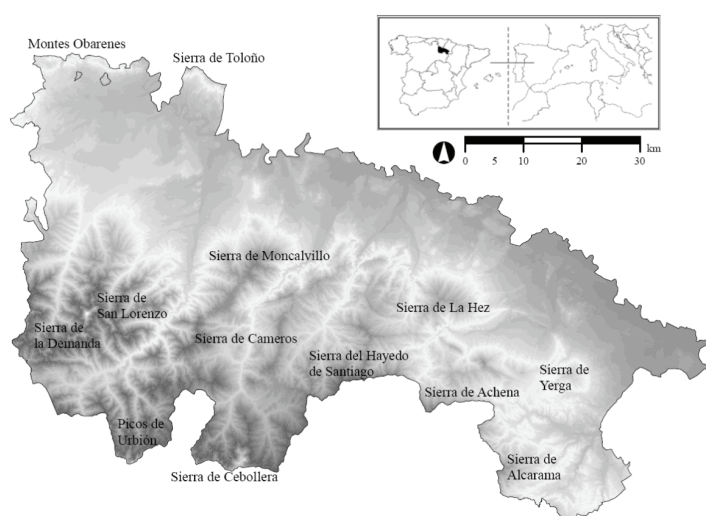


Fig. 2. Study area: La Rioja.

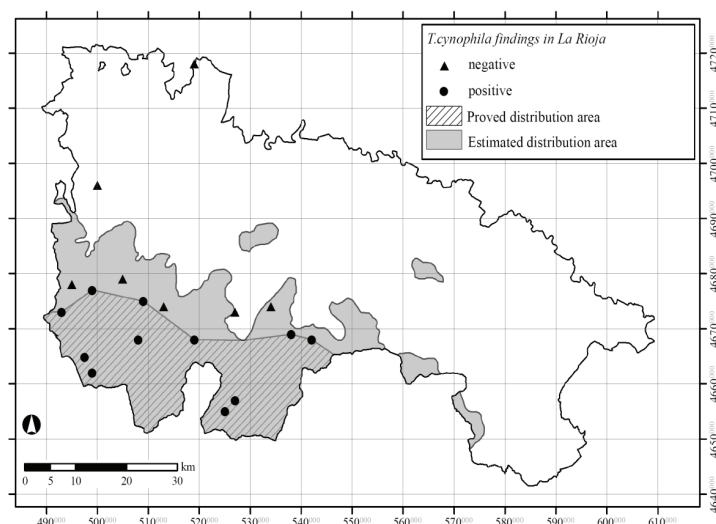


Fig. 3. Distribution area proposed for *Thyreophora cynophila* in La Rioja.

Average temperature at positive contacts was 9.2 °C, while at negative contacts was 10.3°C. In terms of elevation, average values of both categories were similar, 1,135 m.a.s.l. in the case of positive contacts and 1,100 where

T.cynophila was absent. However, differences observed between positive and negative contacts regarding the average temperature and elevation were not statistically significant in either cases (Mann Whitney test for temperature, $Z = -0.860$, $p = 0.3834$, and for elevation, $Z = -0.136$, $p = 0.8913$).

Distribution area

The obtained data implies a proved distribution range of *T.cynophila* in La Rioja that would cover, at least, a total area of approximately 76,500 hectares (Fig. 3). This area is comprised between the most external sampling sites where *T.cynophila* was found and the southern administrative boundary of the Autonomous Region, the latter coinciding largely with the higher elevations of Iberian Mountains in La Rioja, and therefore the most eurosiberian conditions. Considering that the area theoretically suitable for the life of this fly in the region can be broader, we have ventured to estimate its potential distribution range.

This calculation was carried out based on the variables considered in the selection of biotopes and field sampling results (Table I and Table II) linking multiple layers of geographic information. Land cover data are taken from the La Rioja Forest Map (Government of La Rioja, 2006). Temperature and rainfall data belong to average annual isotherms and to February and March average isotherms, as well as annual average isohyets and average isohyets of those months (from Abaigar Núñez Olivera & Martínez, 1991; Government of La Rioja, 1994a and 1994b).

Thus the potential range (Fig. 3) is estimated at approximately 138,000 hectares within the Iberian Mountains of La Rioja: La Demanda, Urbión, Cebollera and Cameros Mountains (ca. 128,900 ha), Acheña (ca. 2,900 ha) and Alcarama Mountains (ca. 2,300 ha), and two northern sites located in the scope of Moncalvillo and La Hez Mountains (ca. 2,400 ha and 1,500 ha, respectively).

4. Conclusions

- *T.cynophila* has been found in 11 different sites of the Iberian Mountains in La Rioja located between 900 and 1,400 m.a.s.l. It hasn't been found in any more Mediterranean biotopes prospected (i.e. Ebro river depression).
- *T.cynophila* in La Rioja is found in mountain areas with a wider European climate tendency located in the southwest part of the region: La Demanda, Urbión, Cebollera and Cameros Mountains.
- The proved distribution range of *T.cynophila* in La Rioja covers at least 76,500 hectares and its potential distribution range is estimated at approximately 138,000 ha.

T.cynophila is a common species in its current location and easy to locate by their striking appearance in decomposition carcasses of wild mammals (deers, roes) and domestic animals of extensive livestock (sheep, cows, horses), very common in La Rioja mountains.

Table I. *Thyreophora cynophila* findings in La Rioja

Site / Municipality	UTM grid	Elevation (m.a.s.l.)	Land cover	T (°C) (average)	Host	Result (#sex)
Barranco del Chozón, Villoslada de Cameros	WM2757	1,200	Beech /Deciduous oak	9	Horse	(1♀)
Arroyo de Puente Ra, Villoslada de Cameros	WM2555	1,260	Beech	4	Deer	(2♀, 1♂)
Llano La casa, Ezcaray	VM9373	1,300	Beech	5	Deer	(6♀, 2♂)
Arroyo Vargas, Ajamil	WM4268	1,000	Deciduous oak	12	Horse	(6♀, 1♂)
Alto de Peña Hincada, Brieua de Cameros	WM1968	1,400	Pasture	9	Sheep	(3♀)
Casa Forestal Valvanera, Anguiano	WM0975	1,100	Shrub /Holm oak	10	Deer	(1♂)
Pastos afueras pueblo, Laguna de Cameros	WM3869	1,040	Pasture	11	Cow	(8♀)
Barranco Fuente Escoba, Villavelayo	VM9962	1,080	Beech /Shrub	10	Deer	(6♀)
Arroyo Calamantio, Mansilla de la Sierra	WM0868	900	Deciduous oak / Holm oak / Ash	11	Deer	(1♂)
Barranco Usaya, Ezcaray	VM9977	1,100	Beech	11	Roe deer	(6♀, 1♂)
Las Antenas, Canales de la Sierra	VM9764	1,100	Shrub	9	Cow	(1♂)
Muladar, Sto. Domingo de la Calzada	WM0096	800	Shrub /Pine (resettlement)	15	Pig, cow, sheep	–
Ladera de Collado Hondo, Ventrosa	WM1374	1,250	Shrub	7	Deer	–
Arzobias, Ezcaray	VM9578	1,150	Heath	9	Deer	–
Tres aguas, San Millán de la Cogolla	WM0579	1,200	Beech	6	Deer	–
Rivas de Tereso, San Vicente de la Sonsierra	WN1918	985	Pine (resettlement) / Kermes oak	12	Horse spine	–
La Rasa, Almarza de Cameros	WM3474	1,230	Deciduous oak / Beech	11	Cow femur	–
Montemediano, Montemediano	WM2773	1,100	Beech	12	Cow femur	–

Table II: Variables considered in the estimation of the potential distribution area

Variable	Inclusion range
Elevation	> 900 m.a.s.l.
Land Cover	Forest lands: beech, deciduous oak, gall oak, deciduous mixed forest, scotch pine, other pines, exotic conifers (<i>Pseudotsuga menziesii</i> and others), holm oak. Heathlands and shrublands. Pastures and rangelands.
February and March average temperature	< 6°C
Annual average temperature	< 9°C
February and March average rainfall	> 70 mm/month
Annual average rainfall	> 700 mm/year

- Significant predilections haven't been detected in terms of type of carcasses (sheep, calf, horse, roe deer or venison) or land cover (dominated by *Fagus*, *Pinus*, *Quercus*, *Erica*, *Genista*, *Cytisus* or other species), which provides new data on the question raised by Carles-Tolrá *et al.* (2010).
- The activity of adults of *T.cynophila* in La Rioja extends from February to April in the spring generation. Duration of its Autumn generation hasn't been studied.
- At the moment we do not consider that *T.cynophila* may be subject to risks of conservation in the study area due to the relative abundance of carcasses during the reproduction season and due to the number of findings during the study.
- In the light of recent findings of Carles-Tolrá *et al.* (2010) and Martín-Vega *et al.* (2010) as well as the ecological requirements of the species, it is likely that the distribution range of *T.cynophila* is even wider, and its supposed absence in other mountainous areas of the Iberian Peninsula is only due to lack of sampling.

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