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TRICHOPTERA (INSECTA) COLLECTED IN MEDITERRANEAN RIVER BASINS OF THE IBERIAN PENINSULA: TAXONOMIC REMARKS AND NOTES ON ECOLOGY

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ABSTRACT

As a result of the GUADALMED project, undertaken in Iberian Mediterranean basins, to which were added samples taken by the junior author in the area, we collected numerous caddisfly larvae, pupae and adults. Some larvae were also reared in the lab to obtain adults and allow proper identification. A total of 90 species were identified, which accounts for more than a fourth of the species known in the Iberian Peninsula and Balearic Islands. Here we confirm the presence of doubtful species in the Iberian Peninsula (*Glyphotaelius pellucidus*) and we expand the distribution range of others (*Lype reducta*, *Micrasema minimum, Limnephilus guadarramicus, Sericostoma pyrenaicum*). Moreover, because of the unconformity of morphological larval characteristics with present taxonomical keys (*Mesophylax aspersus*) or lack of larvae descriptions (*Allogamus mortoni, Stenophylax espanioli*), here we include some relevant taxonomical aspects that are useful to identify larvae. A brief description of the larva of a possible new species of *Hydropsyche* (from now on *H.* gr. *instabilis*) is also given.

Key words: Trichoptera, Mediterranean rivers, Iberian Peninsula, Faunistics, Taxonomy, Ecology.

RESUMEN

Los tricópteros (Insecta) recolectados en las cuencas mediterráneas de la Península Ibérica: notas taxonómicas y requerimientos ecológicos

Como resultado de los estudios realizados en el proyecto GUADALMED en las cuencas de los ríos mediterráneos peninsulares y otros muestreos realizados por la primera autora del trabajo se han recolectado numerosas larvas, pupas y adultos de tricópteros. Algunas larvas fueron criadas en el laboratorio para la obtención de adultos y con ello asegurar su identificación. Se han identificado un total de 90 especies que suponen más de una cuarta parte de las especies actualmente conocidas en la Península Ibérica y Baleares. En este trabajo se confirma la presencia, hasta ahora dudosa en la Península Ibérica, de algunas especies (*Glyphotaelius pellucidus*) y se amplia el área de distribución de otras (*Lype reducta*, *Micrasema minimum, Limnephilus guadarramicus, Sericostoma pyrenaicum*). Además, se incluyen algunos aspectos taxonómicos relevantes para la identificación de algunas larvas en futuros estudios, debido a que las claves ya existentes no describen correctamente la larva (*Mesophylax aspersus*) o porque se trata de larvas sin describir (*Allogamus mortoni, Stenophylax espanioli*). Se añade también una somera descripción de la larva de una posible nueva especie de *Hydropsyche* (citada aquí como *H.* gr. *instabilis*) y que requiere un estudio más detallado.

Palabras clave: Trichoptera, ríos Mediterráneos, Península Ibérica, Faunística, Taxonomía, Ecología.

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Introduction

Studies on caddisflies in the Iberian Peninsula date from the mid-nineteenth century; although most have been performed recently (González *et al.*, 1992). Most taxonomic research has been done in northern and central areas of Spain (García de Jalón, 1982; González *et al.*, 1987), although contributions from southern regions are increasing (e.g. Ruiz *et al.*, 2001) and new species have recently been described (González & Ruiz, 2001; Zamora-Muñoz *et al.*, 2002). Along the Mediterranean coast of the Iberian Peninsula, taxonomic and faunistic (see examples in González *et al.*, 1992; Malicky, 2002) but also ecological studies have been performed on many caddisfly species (Puig *et al.*, 1981; Herranz & García de Jalón, 1984; Gallardo-Mayenco, 1993; Gallardo-Mayenco *et al.*, 1998), but no extensive studies have been performed until now.

In the Iberian Peninsula, the Order Trichoptera comprises numerous species with 390 records although only 325 species can be identified with confidence (see updated checklist of Trichoptera from the Iberian Peninsula by González, 2003). The Iberian Peninsula hosts more caddisfly species than other parts of Europe (e.g. England, with 207 species; Edington & Hildrew, 1995; Wallace *et al.*, 1990), but has similar numbers to other Mediterranean Basin countries (e.g. Italy, with 381 species —Cianficconi, 2002).

Here we present a list of 90 caddisfly species after identification of 12,499 larvae, 177 pupae and 261 adults collected during a survey of 15 river basins located along the Mediterranean coast of the Iberian Peninsula.

Materials and methods

Trichoptera were collected mainly from 10 basins situated along the Mediterranean coast of the Iberian Peninsula and selected from the GUADALMED Project (Fig. 1): Besòs, Llobregat, Mijares, Turia, Júcar, Segura, Almanzora, Aguas, Adra and Guadalfeo (a description of the basins sampled can be found in Robles *et al.*, 2002). Moreover, we also include data obtained from several ecological studies of the Foix, Tordera, Ter, Noguera Ribagorçana and Guadalquivir basins (Prat *et al.*, 1999, 2000 and 2001; Rieradevall & Prat, 2000; Solà, 2001) (Fig. 1). Overall, the study area lies whitin the mediterranean climate zone (Köppen, 1923), with annual precipitation ranging from less than 300 mm in the more arid basins of the southeast to over 800 mm in northern basins and in some mountain areas. The basins are formed by limestone and sedimentary materials, although some siliceous areas are also present, such as in the Sierra Nevada, Pyrenees and Montseny ranges. The vegetation in the basins mainly consists of sclerophyllous and evergreen trees and shrubs, although in the more mountainous areas deciduous and coniferous forests are present. As in other mediterranean climate regions, the basins have been greatly affected by human activity (Trabaud, 1981), such as agriculture, cattle farming, urbanization, salinization, water utilization and regulation (Conacher & Sala, 1998). All these factors have negatively affected the rivers, either directly or indirectly (Prat & Ward, 1994).

Caddisfly larvae and pupae were obtained by sampling all available habitats with a kick net of 250 mm mesh size. They were then preserved in formalin (4%) or alcohol (70%) before identification to maximum taxonomic level in the lab. Larvae and pupae were also collected in the field, transported to the lab and reared to obtain pupae and adults, using a similar method as in Vieira-Lanero (1996). This system consists of a tank with a constant water temperature of 19ºC. A water pump recirculated and cleaned the water in a closed circuit, exposed it to natural light, and simultaneously provided oxygen. Pupae and larvae from last instars were located in small circular plastic cages and were separated by sampling sites or rivers. Each cage had a substrate composed of clean gravel. For shredders, leaf-litter was taken from riverbeds. For grazers, stones with periphyton were collected at the same site where larvae were obtained. We did not rear larvae of predators or filter-feeders.

In addition, adults were also obtained in the field by sweeping riparian vegetation with an entomological net or using a light trap with a UV-light connected to a car battery. To identify adults and pupae, genitalia were digested in a 10% KOH solution, at a constant temperature of 90ºC. Once digested, they were placed in a glycerin solution and were observed and identified under a stereoscope or microscope.

Results

A total of 12,499 larvae, 177 pupae and 261 adults from 169 sites were identified. We present Trichoptera species following the taxonomical

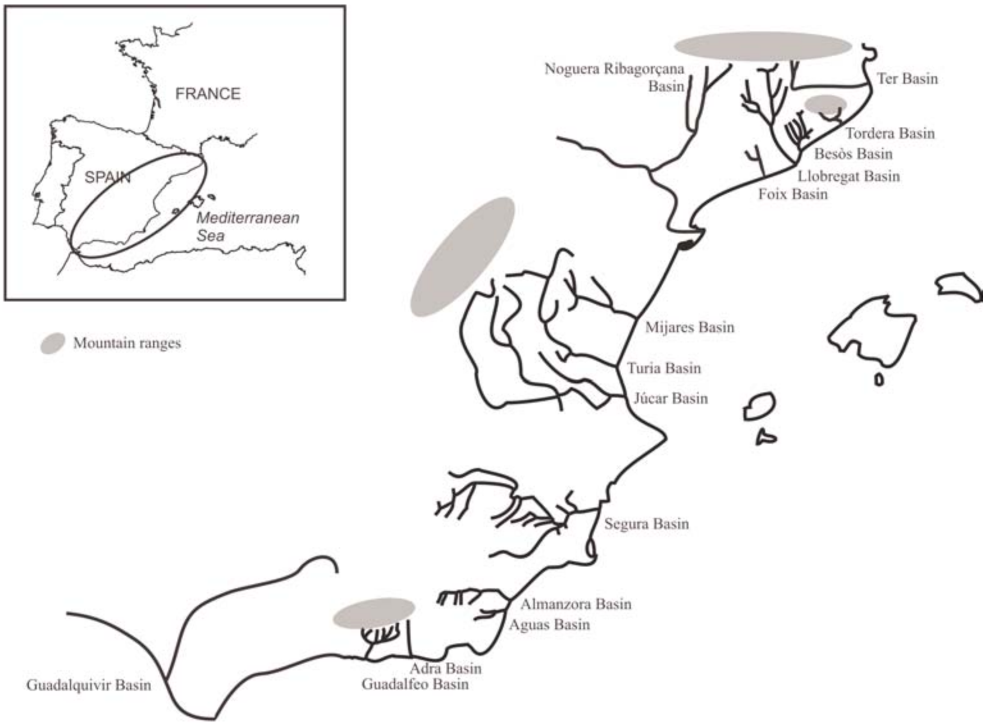

Fig. 1.— Basins sampled along Mediterranean coast of Iberian Peninsula.

Fig. 1.— Cuencas muestreadas en la costa Mediterránea de la Peninsula Ibérica.

classification described by Wiggins (1996). We omitted subgenera because they are not widely used in the literature (Vieira-Lanero, 2000). For each species, the number of larvae (L), pupae (P) and adults (♂ and ♀) are given. In general, only the identification of male specimens is included. Females were identified only when they appeared with several males (e.g. in *Agapetus*), or when they belonged to families where females are quite well known (e.g. Limnephilidae). For pupae and adults, the sampling months are shown in brackets. Capture sites were classified by basin, and coded by a letter and a number. Their exact location is presented in the Appendix. In some cases, a question mark (?) is added before some sampling localities when the identity of the larvae found was not clear.

When thought necessary, some taxonomic remarks are presented, including information about subspecies or morphological characteristics. Table 1 includes information about ecology and the general and local distribution of each species collected, based on our study and the literature.

Suborder SPICIPALPIA
Family RHYACOPHILIDAE Stephens, 1836
Subfamily Rhyacophilinae Stephens, 1836

Rhyacophila Pictet, 1834

Rhyacophila dorsalis (Curtis, 1834)

MATERIAL STUDIED: 324L, 10P♂♂3P♀♀ (IV, V, VII, VIII), 3♂♂ (IV, V). Ter Basin: T3, T4, T8, T10; Tordera Basin: ToM8, ToM12; Besòs Basin: B25, B32; Llobregat Basin: L38, L42, L54, L56, L57, L60a, L60c, L61, L68, L77; Mijares Basin: MI4; Turia Basin: TU1, TU2, TU4, TU6, TU9; Júcar Basin: JU8

The males collected in the Llobregat River corresponded to the "Pyrenee form" (Malicky, pers. com., 2001); however, because the taxonomic situation of *R. dorsalis* in these mountains is still unclear, the subspecies of this form is not given (Malicky, 2002).

Rhyacophila evoluta McLachlan, 1879

MATERIAL STUDIED: 43L, 1P♂ (V), 3♂♂ (VII). Ter basin: T1, T2, T8, T9, T10, T11

Table 1.— Global and local distribution, ecological characteristics and water quality preferences of the caddisfly species collected in the area sampled. Only species are presented. Genera were omitted and their ecological information can be found in the text.

Tabla 1.— Distribución global y local, características ecológicas y tolerancia a la calidad del agua de las especies de tricópteros recolectadas en la zona muestreada. Solamente se presentan las especies. Los géneros han sido omitidos y su información ecológica se halla en el texto.

	WORLD-WIDE DISTRIBUTION[1]	DISTRIBUTION IBERIAN PENINSULA[1]	DISTRIBUTION IN SAMPLED MEDITERRANEAN AREA[2]	LONGITUDINAL ZONATION [3]	GEOLOGICAL PREFERENCES[3]	WATER QUALITY PREFERENCES[4]
Rhyacophila dorsalis (Curtis, 1834)	Central and southern Europe	Northern and central basins except northwest	Northern and central basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to moderate
Rhyacophila evoluta McLachlan, 1879	Central and southwestern Europe	Northeastern basins	Northern basins	Headwaters	Siliceous	Very good
Rhyacophila fasciata Hagen, 1859	Europe and SW Asia (Anatolia, Lebanon)	Northern basins except northwestern	Northern basins	Headwaters to midstream reaches	Calcareous	Very good to good
Rhyacophila intermedia McLachlan, 1868	Central and southwestern Europe	Northern and central basins	Northern basins	Headwaters	Siliceous	Very good
Rhyacophila laevis Pictet, 1834	Central and southwestern Europe	Northeastern basins	Northern basins	Headwaters	Siliceous	Very good
Rhyacophila meridionalis E. Pictet, 1865	Southwestern Europe	Widespread	Northern and southern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to good
Rhyacophila mocsaryi Klapálek, 1898	Pyrenees and Iberian Peninsula	Northern and central basins	Northern basins	Headwaters	Siliceous	Very good
Rhyacophila munda McLachlan, 1862	Southwestern Europe and north Africa	Widespread	Central and southern basins	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good to bad
Rhyacophila nevada Schmid, 1952	Endemic to the Iberian Peninsula	Southern basins	Southern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to good
Rhyacophila* cf. *occidentalis McLachlan, 1879	Southwestern Europe	Widespread	Southern basins	Headwaters	Siliceous	Very good to good
Rhyacophila pascoei McLachlan, 1879	Central and southern Europe	Central and southern basins	Southern basins	Midstream reaches	Siliceous	Moderate
Rhyacophila relicta McLachlan, 1879	Pyrenees and Iberian Peninsula	Northern basins	Northern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to good
Rhyacophila* gr. *tristis Pictet, 1834	Central and southern Europe and Anatolia	Northern and central basins	Northern and central basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to good
Agapetus fuscipes Curtis, 1834	Central and western Europe	Widespread	Northern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to moderate
Agapetus incertulus McLachlan, 1884	Iberian Peninsula and north Africa	Central and southern basins	Southern basins	Headwaters to lowland reaches	Calcareous Siliceous Sedimentary	Very good to poor
Glossosoma* cf. *boltoni Curtis, 1834	Europe	Northeastern basins	Northern basins	Headwaters	Siliceous	Very good

Table 1.— *(Continued).*

	WORLD-WIDE DISTRIBUTION[1]	DISTRIBUTION IBERIAN PENINSULA[1]	DISTRIBUTION IN SAMPLED MEDITERRANEAN AREA[2]	LONGITUDINAL ZONATION [3]	GEOLOGICAL PREFERENCES[3]	WATER QUALITY PREFERENCES[4]
Allotrichia pallicornis (Eaton, 1873)	Central and southern Europe, north Africa and southwestern Asia	Widespread	Northern and central basins	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good to moderate
Hydroptila* gr. *sparsa Curtis, 1834	See text	See text	Northern basins	Midstream to lowland reaches	Calcareous Sedimentary	Very good to good
Hydroptila vectis Curtis, 1834	Europe, north Africa and southwestern Asia	Widespread	Northern and southern basins	Midstream to lowland reaches	Calcareous Siliceous Sedimentary	Very good to bad
Orthotrichia angustella (McLachlan, 1865)	Europe and north Africa	Widespread	Central and southern basins	Midstream to lowland reaches	Calcareous Sedimentary	Very good to moderate
Philopotamus montanus (Donovan, 1813)	Europe	Widespread	Northern and southern basins	Headwaters	Calcareous Siliceous Sedimentary	Very good
Philopotamus variegatus (Scopoli, 1763)	Central, southern Europe and Anatolia	Northern and central basins	Northern basins	Headwaters	Siliceous	Very good
Wormaldia triangulifera McLachlan, 1878	Southern Europe and Anatolia	Eastern basins	Northern basins	Headwaters	Calcareous	Very good
Wormaldia saldetica Botosaneanu & González, 1984	Endemic to the Pyrenees	Northeastern basins	Northern basins	Headwaters	Calcareous	Very good
Chimarra marginata (Linnaeus, 1767)	Western Europe and north Africa	Widespread	Widespread	Midstream to lowland reaches	Calcareous Siliceous Sedimentary	Very good to moderate
Hydropsyche* cf. *acinoxas Malicky, 1981	Endemic to the Iberian Peninsula	Northeastern basins	Northern basins	Headwaters	Siliceous	Very good
Hydropsyche brevis Mosely, 1930	Pyrenees and Iberian Peninsula	Central and southern basins	Central and southern basins	Headwaters to lowland reaches	Calcareous Sedimentary	Very good to good
Hydropsyche bulbifera McLachlan, 1878	Central and southern Europe and Anatolia	Widespread	From northern to Segura basins	Headwaters to lowland reaches	Calcareous Sedimentary	Very good to moderate
Hydropsyche dinarica Marinkovic-Gospodnetic, 1979	Western Europe	Widespread	Northern basins	Headwaters	Calcareous Siliceous	Very good
Hydropsyche exocellata Dufőur, 1841	Western Europe	Widespread	Widespread	Headwaters to lowland reaches	Calcareous Siliceous Sedimentary	Very good to very bad
Hydropsyche fontinalis Zamora-Muñoz & González, 2002	Endemic to the Iberian Peninsula	Southern basins	Southern basins	Headwaters to midstream reaches	Calcareous	Very good
Hydropsyche iberomaroccana González & Malicky, 1999	Iberian Peninsula and north Africa	Southern basins	Southern basins	Midstream reaches	Calcareous Sedimentary	Good to moderate Siliceous

Table 1.— *(Continued)*.

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Hydropsyche incognita Pitsch, 1993	Central and southwestern Europe	Widespread	Widespread	Headwaters to lowland reaches	Calcareous Siliceous Sedimentary	Very good to bad
Hydropsyche infernalis Schmid, 1952	Endemic to the Iberian Peninsula	Central and southern basins	Central and southern basins	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Good to moderate
Hydropsyche instabilis (Curtis, 1834)	Europe and Anatolia	Widespread	Widespread	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good to good
Hydropsyche* gr. *instabilis (Curtis, 1834)	Unknown	Unknown	From northern to Segura basins	Headwaters to midstream reaches	Calcareous Sedimentary	Very good to good
Hydropsyche siltalai Döhler, 1963	Europe and Anatolia	Widespread (but see text)	From northern to Segura basins	Headwaters	Calcareous Siliceous Sedimentary	Very good to good
Hydropsyche tibialis McLachlan, 1884	Endemic to the Iberian Peninsula	Western and southern basins	Southern basins	Headwaters	Siliceous	Very good
Cheumatopsyche lepida (Pictet, 1834)	Europe and southwestern Asia	Widespread	Widespread	Midstream to lowland reaches	Calcareous Sedimentary	Very good to good
Ecnomus deceptor McLachlan, 1884	Western Mediterranean	Widespread	Northern and southern basins	Midstream reaches	Calcareous	Very good to moderate
Psychomyia pusilla (Fabricius, 1781)	Europe, north Africa and southwestern Asia	Widespread	Northern and central basins	Midstream to lowland reaches	Calcareous Sedimentary	Very good to good
Lype reducta (Hagen, 1868)	Europe, north Africa and southwestern Asia	Widespread	Northern and southern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to good
Metalype fragilis (Pictet, 1834)	Western Europe	Northern, central and southern basins except northwest	Southern basins	Midstream reaches	Calcareous Sedimentary	Very good
Tinodes assimilis McLachlan, 1865	Western Europe	Widespread	Northern and southern basins	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good to good
Tinodes dives (Pictet, 1834)	Central and southern Europe	Northern and central basins except northwest	Northern and central basins	Headwaters	Calcareous Sedimentary	Very good
Tinodes maclachlani Kimmins, 1966	Western Europe	Northeastern basins	Northern basins	Headwaters	Calcareous	Very good
Tinodes maculicornis (Pictet, 1834)	Western Europe	Widespread except in the northwest	Northern and southern basins	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Good
Tinodes waeneri (Linnaeus, 1758)	Europe and north Africa	Widespread	Northern and southern basins	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good to moderate

Table 1.— *(Continued)*.

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Plectrocnemia geniculata McLachlan, 1871	Central and southern Europe and north Africa	Widespread except in the northwest	Northern basins	Headwaters	Calcareous	Very good
Plectrocnemia laetabilis McLachlan, 1880	Iberian Peninsula, Pyrenees and north Africa	Northern basins	Northern basins	Headwaters	Calcareous Siliceous	Very good
Polycentropus flavomaculatus (Pictet, 1834)	Europe and north Africa	Widespread	Northern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to good
Polycentropus kingi McLachlan, 1881	Western Europe and north Africa	Widespread	Widespread	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good to good
Cyrnus* cf. *montserrati González & Otero, 1983	Iberian Peninsula and north Africa	Central and southern basins	Southern basins	Headwaters	Calcareous	Very good
Brachycentrus (O.) maculatum (Fourcroy, 1785)	Central, southern Europe and southwestern Asia	Widespread	Northern and southern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to moderate
Micrasema longulum McLachlan, 1876	Central and western Europe	Widespread	Southern basins	Headwaters	Siliceous	Very good
Micrasema minimum McLachlan, 1876	Southern Europe	Widespread	Northern and southern basins	Headwaters	Calcareous Siliceous	Very good
Micrasema moestum (Hagen, 1868)	Southwestern Europe and north Africa	Widespread	Southern basins	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good
Lepidostoma hirtum (Fabricius, 1775)	Europe and Anatolia	Widespread	Northern basins	Headwaters	Siliceous	Very good
Lasiocephala basalis (Kolenati, 1848)	Europe except Scandinavia	Widespread	Widespread	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good
Crunoecia irroata (Curtis, 1834)	Central and southern Europe	Northern basins	Northern basins	Headwaters	Siliceous	Very good
Drusus bolivari (McLachlan, 1880)	Iberian Peninsula, Pyrenees and France	Widespread	Southern basins	Headwaters	Calcareous Siliceous Sedimentary	Very good
Drusus discolor (Rambur, 1842)	Central and southern Europe	Northern basins	Northern basins	Headwaters	Siliceous	Very good
Drusus rectus (McLachlan, 1868)	Southwestern Europe	Northern basins except northwest	Northern basins	Headwaters	Siliceous	Very good
Anomalopterygella chauviniana (Stein, 1874)	Southwestern Europe	Northern and southern basins	Northern and southern basins	Headwaters to midstream reaches	Siliceous Sedimentary	Very good to moderate

Table 1.— *(Continued)*.

	WORLD-WIDE DISTRIBUTION[1]	DISTRIBUTION IBERIAN PENINSULA[1]	DISTRIBUTION IN SAMPLED MEDITERRANEAN AREA[2]	LONGITUDINAL ZONATION [3]	GEOLOGICAL PREFERENCES[3]	WATER QUALITY PREFERENCES[4]
Limnephilus guadarramicus Schmid, 1955	Endemic to the Iberian Peninsula	Widespread	Widespread	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good to good
Limnephilus lunatus Curtis, 1834	Europe, north Africa and southwest Asia	Northern basins	Northern basins	Midstream reaches	Calcareous	Good
Glyphotaelius pellucidus (Retzius, 1783)	Europe and Siberia	Northeastern basins	Northern basins	Headwaters	Calcareous Siliceous	Very good
Chaetopteryx villosa (Fabricius, 1798)	Europe	Northern and central basins except northwest	Northern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good
Potamophylax cingulatus (Stephens, 1837)	Europe	Northern and central basins	Northern and central basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good
Potamophylax latipennis (Curtis, 1834)	Europe, Siberia and Anatolia	Widespread	Northern and southern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good
Halesus digitatus (Schrank, 1781)	Europe reaching Iran	Northeastern basins	Northern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to good
Halesus radiatus (Curtis, 1834)	Europe	Northern and central basins	Northern and central basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to good
Halesus tessellatus (Curtis, 1834)	Europe and Siberia	Southern basins [5]	Widespread	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good
Stenophylax espanioli Schmid, 1957	Iberian Peninsula, north Africa and Pyrenees	Northern and central basins	Northern basins	Headwaters	Siliceous	Very good
Mesophylax aspersus (Rambur, 1842)	Western Europe, Mediterranean region, Madeira, Canary Islands and southwest Asia (until Kashmir)	Widespread	Widespread	Headwaters to lowland reaches	Calcareous Siliceous Sedimentary	Very good to moderate
Allogamus auricollis (Pictet, 1834)	Central and western Europe	Northeastern basins	Northern basins	Headwaters	Calcareous Siliceous	Very good
Allogamus mortoni (Navás, 1907)	Endemic to the Iberian Peninsula	Southern and central basins	Southern basins	Headwaters to midstream reaches	Calcareous Siliceous Sedimentary	Very good
Thremma gallicum McLachlan, 1880	Southwest Europe	Northern basins	Northern basins	Headwaters	Siliceous	Very good
Silo graellsii E. Pictet, 1865	Southern Europe	Northern basins	Northern basins	Headwaters	Siliceous	Very good
Athripsodes albifrons (Linnaeus, 1758)	Europe	Widespread	Southern basins	Headwater to midstream reaches	Siliceous	Very good
Ceraclea sobradieli (Navás, 1917)	Pyrenees and Iberian Peninsula	Widespread	Central basins	Midstream to lowland reaches	Calcareous Sedimentary	Good

Table 1.— *(Continued)*.

	WORLD-WIDE DISTRIBUTION[1]	DISTRIBUTION IBERIAN PENINSULA[1]	DISTRIBUTION IN SAMPLED MEDITERRANEAN AREA[2]	LONGITUDINAL ZONATION [3]	GEOLOGICAL PREFERENCES[3]	WATER QUALITY PREFERENCES[4]
Mystacides azurea (Linnaeus, 1761)	Europe	Widespread	From northern to Segura basins	Headwaters to lowland reaches	Calcareous Siliceous Sedimentary	Very good to moderate
Setodes argentipunctellus McLachlan, 1877	Western Europe and north Africa	Widespread	Central and southern basins	Headwaters to lowland reaches	Calcareous Siliceous Sedimentary	Very good to good
Adicella reducta (McLachlan, 1865)	Europe	Widespread	Northern and southern basins	Headwaters	Siliceous	Very good
Calamoceras marsupus Brauer, 1865	Southwestern Europe	Widespread	Southern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good
Odontocerum albicorne (Scopoli, 1763)	Europe	Northern basins	Northern basins	Headwaters to midstream reaches	Calcareous Siliceous	Very good to good
Sericostoma pyrenaicum E. Pictet, 1865	Southwest Europe	Northern and southeast basins	Northern and southern basins	Headwater reaches	Calcareous Siliceous	Very good
Sericostoma vittatum Rambur, 1842	Endemic to the Iberian Peninsula	Widespread	Southern basins	Headwater reaches	Siliceous	Very good
Schizopelex furcifera McLachlan, 1880	Pyrenees and Iberian Peninsula	Northeastern basins	Northern basins	Headwaters	Siliceous	Very good
Beraea maurus (Curtis, 1834)	Europe	Northeastern basins	Northern basins	Headwaters	Siliceous Calcareous	Very good

[1] Information was obtained from our records and the following references: González *et al*., 1992; Terra, 1994; Vieira-Lanero, 2000; Ruiz *et al*., 2001.

[2] Information in this column was obtained from our records. Northern basins go from Ter to Noguera Ribagorçana basins; Central basins go from Mijares to Júcar basins; Southern basins go from Segura to Guadalquivir basins.

[3] Ecological information was obtained from our records. Longitudinal zonation was obtained using the stream order at an scale of 250.000 (Headwaters correspond to order to 1-2; Midstream reaches to 2-3; Lowland reaches to 3-4. Geological preferences were obtained using the percentage of geological substrate of the basin covered by each site, only in cases where this percentage was higher than 25 on more than 25% of occasions.

[4] Water quality preferences were obtained from our records using the values of the biological index IBMWP (Iberian Biological Monitoring Working Party, formerly BMWP' — Alba-Tercedor & Sánchez-Ortega, 1988; Alba-Tercedor *et al*., 2002) recorded in the site where the species were present and compared. Very good corresponds to a IBMWP higher than 101; Good to a IBMWP between 61 and 100; Moderate to a IBMWP between 36 and 60; Bad to a IBMWP between 16 and 35; and Very Bad to a IBMWP lower than 15.

[5] Except for an incomplete record of a female from the Sierra de Albarracín (Botosaneanu, in letter, 1998).

Although *R. evoluta* was formerly cited in the midstream reaches of the Llobregat River (Puig *et al.*, 1981), the revision of the original material (from the Barcelona University collection) and the new samples from the same sites do not show the presence of this species in this area. Therefore, all previous records of *R. evoluta* from the Llobregat River belong to *R. dorsalis* and the data from Puig *et al.* (1981) must be referred to this species.

Rhyacophila fasciata Hagen, 1859

MATERIAL STUDIED: ?3L, 2P♂♂ (IV, VII). Ter Basin: T10; Llobregat Basin: L43, L60a

There is some controversy regarding *R. fasciata* and *R. denticulata.* Malicky & Sipahiler (1993) consider *R. denticulata* as a subspecies of *R. fasciata*, in spite of its distinct larva (Vieira-Lanero, 2000), whose sword process differs in length (but see Basaguren, 1990; Zamora-Muñoz & Alba-Tercedor, 1992). On the other hand, while González *et al.* (1992) and González (2003) consider *R. denticulata* as a different species, they state that the presence of *R. fasciata* in the Iberian Peninsula should be confirmed.

We identified the pupae found in the Llobregat River (L60a) as *R. fasciata denticulata*, and the sclerites in the pupal cocoon presented a long sword process, which does not correspond to the larval description of *R. denticulata* (Despax, 1928). Moreover, some larvae collected in the Ter and Llobregat rivers presented the typical morphology of *R. fasciata*, with a long sword process and an apotome with a black posterior patch with black muscle insertions (according to Buholzer, 1978; Waringer & Graf, 1997). A specific study analyzing adults of *R. fasciata denticulata* and the variability of their larvae should be performed to determine whether *R. denticulata* is a subspecies of *R. fasciata,* and thus to confirm the presence of *R. fasciata* in the Iberian Peninsula.

Rhyacophila intermedia McLachlan, 1868

MATERIAL STUDIED: 2L, 1♂ (VII). Noguera Ribagorçana Basin: OUT0m, INLET

Rhyacophila laevis Pictet, 1834

MATERIAL STUDIED: 2L. Noguera Ribagorçana Basin: OUT200m, INLET

Rhyacophila meridionalis E. Pictet, 1865

MATERIAL STUDIED: 150L, 2P♂♂ (VIII), 1♂ (X). Ter Basin: T9, T10, T12, TM2, TM5; Tordera Basin: ToM5, ToM6, ToM8, ToM10, ToM12, ToM13, ToM15; Besòs Basin: B32; Llobregat Basin: L54, L56; Segura Basin: SE01; Almanzora Basin: AL6; Adra Basin: AD5; Guadalfeo Basin: GU1, GU5, GU11, GU15

The colour pattern of the head of *R. meridionalis* larva is very variable (Décamps, 1965; Vieira-Lanero, 2000). In our study area, we have found the two forms described by Zamora-Muñoz *et al.* (1997). Most of the specimens collected in northern basins (i.e., Ter, Tordera, Besòs and Llobregat) were similar to those in northwestern Spain (Vieira-Lanero, 2000), which is consistent with the original description made by Décamps (1965). In contrast, the larvae found in southern basins (Segura, Almanzora, Adra and Guadalfeo) were similar to the colour pattern described in Zamora-Muñoz *et al.* (1997).

Rhyacophila mocsaryi Klapálek, 1898

MATERIAL STUDIED: 37L. Ter basin: T3, T4, T7, T8, T10, TM4, TM5

In the Iberian Peninsula and Pyrenees this species is associated with the subspecies *tredosensis* (González *et al.*, 1992).

Rhyacophila munda McLachlan, 1862

MATERIAL STUDIED: 141L, 4P♂♂3P♀♀ (I, IV, VII), 1♀ (V). Mijares Basin: MI7; Turia Basin: TU12; Júcar Basin: JU5, JU9, JU12, JU13, JU19; Segura Basin: SE1, SE3, SE4, SE5, SE7, SE16; Almanzora Basin: AL2, AL6, AL10, AL11; Aguas Basin: AG1; Adra Basin: AD2, AD3, AD4; Guadalfeo Basin: GU4, GU5, GU6, GU7, GU8, GU9, GU10, GU11, GU12, GU13, GU14, GU15, GU16

The length of the sword process can be used to distinguish the larva of *R. munda* from other species of the *Pararhyacophila*-group; this process being shorter in *R. munda* (Viedma & García de Jalón, 1980). However, Malicky & Lounaci (1987) pointed out that an error in the original description of *R. munda* by Edington & Hildrew (1981) may have occurred, implying that *R. munda* may also present a long sword process. In this regard, we found that the specimens of *R. munda* from the south and southeast of the Iberian Peninsula always showed a longer process than that expected. All the specimens collected in Adra, Guadalfeo, Mijares, Turia, Júcar, Segura, Almanzora and Aguas basins presented a long sword process and a spherical protuberance on the posteroventral area of the protrochanter, characters that differ from the description of this species from Iberian material (Viedma & García de Jalón, 1980) and which are also discussed in Vieira-Lanero *et al.* (2001). We encountered some difficulties when applying published keys to identify larval specimens, although we classified them as *R. munda*.

This species is widely distributed and very abundant in southern Spain and although more pupae and adults are needed to confirm larval identifications, in some of the basins studied, the rearing of larvae in the lab confirmed their identity in the Adra and Guadalfeo basins, as in other nearby basins (e.g. Genil and Guadiana Menor basins; Zamora-Muñoz, 1992; Picazo-Muñoz, 1995).

The larva of *R. munda* shows a strong similarity to the undescribed *R. fonticola*, which is also present in southern Spain and coexists at some sites (Ruiz *et al.*, 2001). Because *R. fonticola* is still undescribed we classified all the specimens collected as *R. munda*.

Rhyacophila nevada Schmid, 1952

MATERIAL STUDIED: 160L, 6P♂♂ (II, IV, VII, X), 1♂ (VII). Almanzora Basin: AL6, AL7; Segura Basin: SE1, SE3, SE4, SE8; Adra Basin: AD4; Guadalfeo Basin: GU1, GU2, GU3, GU4, GU5, GU6, GU7, GU9, GU10, GU11, GU12, GU13, GU14, GU15

Recently, after analyzing a few imagines, Malicky (2002) considered *R. nevada* a sub-species of *R. dorsalis*. However, according to Zamora-Muñoz & Alba-Tercedor (1992), these two species have distinctly different larvae, which are differentiated by size and colour patterns of head and pronotum. *R. dorsalis* cephalic pleurae show an inconspicuous pattern of dark spots, present on *R. nevada*, and a continuous shade pattern of the pronotum on the posterior half (Figs. 2a and 2b). Except in a few larvae, the head patterns of the specimens collected in northern basins, where only *R. dorsalis* was present, fitted well with Zamora-Muñoz's step-key corresponding to *R. dorsalis*. On the other hand, in southern basins, most of the specimens corresponded to *R. nevada*, and a few had typical features of *R. dorsalis*. Therefore, our material confirms that larvae of *R. dorsalis* and *R. nevada* can be distinguished along the Mediterranean coast of the Iberian Peninsula.

Rhyacophila nevada displayed an ecological profile which differed greatly from that of *R. dorsalis*. *R. nevada* shows preferential distribution in pristine headwaters with predominant siliceous basins, and was more sensitive to water pollution than *R. dorsalis*. Consequently, because of the differences observed in larval morphology and ecology of these two species, and because of the few specimens analyzed by Malicky, here we consider them as distinct species.

Rhyacophila* cf. *occidentalis McLachlan, 1879

MATERIAL STUDIED: 24L. Adra Basin: AD5; Guadalfeo Basin: GU1, GU11, GU15

Larvae from the Adra and Guadalfeo basins were similar to those of *R. occidentalis*. However, we did not find any mature pupae or adults to confirm the identity of the species.

Rhyacophila pascoei McLachlan, 1879

MATERIAL STUDIED: 1L. Guadalfeo Basin: GU16

Rhyacophila relicta McLachlan, 1879

MATERIAL STUDIED: 39L. Ter Basin: T10, T12; Tordera Basin: ToM9; Llobregat Basin: L42, L54, L64, L68, L60a, L67

Rhyacophila* gr. *tristis Pictet, 1834

MATERIAL STUDIED: 102L, 6♂♂ (V, VII, VIII). Ter Basin: T2, T3, T5, T8, T10, T11, TM4, TM5; Tordera Basin: ToM13; Besòs Basin: B32; Llobregat Basin: L44, L45, L54, L56, L60a; Noguera Ribagorçana Basin: OUT0m, OUT200m, INLET; Júcar Basin: JU7

We found one imago in the Mongrony River (NE Spain, Pyrenees), which presented several taxonomic features similar to those of *R. aquitanica,* cited by Navás in nearby areas, a species that requires confirmation in the Iberian Peninsula (see González *et al.*, 1992). However, we consider our specimen to be *R.* gr. *tristis* because of the absence of characters to differentiate the males of these two species with certainty and the high variability in *R. tristis* (González, pers. com., 2001). Similarly, it was difficult to distinguish the larvae of *R. tristis* from those of *R. aquitanica*. Buholzer (1978) observed that *R. tristis* does not present ventral transversal stripes in the cephalic capsule, whereas *R. aquitanica* does. In northwestern Spain, where only *R. tristis* has been found, the larva has such transversal stripes (Vieira-Lanero, pers. com., 2001), as is also the case in our specimens. Consequently, we considered both larvae and adult to belong to *R.* gr. *tristis*.

Family GLOSSOSOMATIDAE Wallengren, 1891
Subfamily Agapetinae Martynov, 1913
Agapetus Curtis, 1834

This genus is abundant and widely distributed in the Mediterranean, but the larvae of several species have not been described to date (e.g. *A. theischingeri*, *A. incertulus* — but see Ruiz *et al.*, in press). We found many larvae of this genus, but because of the uncertainties in its identification, we present only the species confirmed by pupae or adults. It is interesting to point out that the *Agapetus* specimens found in southern basins were more tolerant to pollution than expected from literature (González del Tánago & García de Jalón, 1984), especially with regard to suspended solids, conductivity, nitrites and ammonium. This tolerance could indicate the presence of one or several undescribed species.

Agapetus fuscipes Curtis, 1834

MATERIAL STUDIED: 8P♂♂3P♀♀ (II, IV, V, VII), 1♂ (V). Ter Basin: T3, T10; Besòs Basin: B12, B35; Llobregat Basin: L82; Foix Basin: F24

Vieira-Lanero (2000) found that most of the larvae of *A. fuscipes* collected in northwest Spain lacked lateral setae in the third abdominal segment. In our case, larvae collected where *A. fuscipes* pupae were found presented the typical seta pattern of *A. fuscipes* of 2-1-1 (first, second and third lateral setae of abdominal segments).

Agapetus incertulus McLachlan, 1884

MATERIAL STUDIED: 1P♂ (VII), 3♂♂ (V, VII). Segura Basin: SE16; Adra Basin: AD3, AD1

Although this species appears to be widespread in the Iberian Peninsula according to the literature (see González *et al*., 1992; Ruiz *et al*., in press), the records in north Spain (Vizcaya region) seem to be an error. Checking the original source of the Vizcaya record (García de Jalón, 1982), *A. incertulus* was only recorded in Guadalajara and Jaén (central and southern Spain). The species of *Agapetus* recorded in Vizcaya to date are *A. delicatulus*, *A. fuscipes* and *A. ochripes* (Basaguren, 1990).

Synagapetus McLachlan, 1879

This genus was found in the Ter, Tordera and Besòs basins and coexisted with *Agapetus*. However, because many larvae still remain undescribed and we did not collect pupae or adults, we were unable to identify larvae at species level.

Subfamily Glossosomatinae Wallengren, 1891

Glossosoma Curtis, 1834

Glossosoma* cf. *boltoni Curtis, 1834

MATERIAL STUDIED: 22L. Ter Basin: T1, T2, T7, T8, T9, T10, T11

The larvae in our samples resembled *G. boltoni*, but we did not collect mature pupae to ensure larval identifications. From the species of the *Glossosoma* genus, the larva of *G. spoliatum* McLachlan, 1879 remains undescribed. *G. boltoni* has been cited in north and northeast Spain (González *et al*., 1992), where *G. spoliatum* is also present.

Family HYDROPTILIDAE Stephens, 1836

Subfamily Hydroptilinae Stephens, 1836

TRIBUS Hydroptilini Stephens, 1836

Allotrichia McLachlan, 1880

Allotrichia pallicornis (Eaton, 1873)

MATERIAL STUDIED: 36L. Besòs Basin: B35; Mijares: MI8; Júcar Basin: JU11

Although we did not collect pupae or adults, our larvae fit the redescription done by Vieira-Lanero (2000), and showed a dorsal sclerite at the IX abdominal segment.

Hydroptila Dalman, 1819

Given the fact that the larvae of several species distributed along the Mediterranean coast of the Iberian Peninsula remain undescribed (of 31 species recorded in the Peninsula, only the larvae of 6 are known —Vieira-Lanero, 2000), and the difficulties to distinguish those already described, here we present only the results obtained from pupae and adults.

Hydroptila* gr. *sparsa Curtis, 1834

MATERIAL STUDIED: 1P♂ (VIII). Llobregat Basin: L68

The *sparsa*-group is highly variable (Malicky, 1997) and is distributed throughout Europe, north Africa and southwest Asia. Our specimen resembled *H. angustata,* which is recorded only in the southern basins of the Iberian Peninsula.

Hydroptila vectis Curtis, 1834

MATERIAL STUDIED: 8P♂♂2P♀♀ (II, IV, V, VIII, IX), 26♂♂10♀♀ (II, VIII, XI). Tordera Basin: ToM9; Llobregat Basin: L60a, L61, L68; Foix Basin: F25; Almanzora Basin: AL4; Adra Basin: AD1, AD4; Guadalfeo Basin: GU6, GU7, GU9

Oxyethira Eaton, 1873

This genus comprises five species in the Iberian Peninsula, and it is difficult to identify their larvae (see Vieira-Lanero, 2000). Specimens from this genus were collected in reaches of the Segura, Aguas and Almanzora basins at altitudes between

210 and 920 m. Given that we did not find pupae or adults, we could not identify our specimens.

TRIBUS Orthotrichiini Nielsen, 1948
Ithytrichia Eaton, 1873

The larvae of this genus were found in midstream reaches of the Turia, Júcar and Segura basins, but because of the lack of pupae or adults and the little information available on larval stages (with some species undescribed or difficult to differentiate —Vieira-Lanero, 2000), we were unable to identify the material collected.

Orthotrichia Eaton, 1873

Orthotrichia angustella (McLachlan, 1865)

MATERIAL STUDIED: 30L. Júcar Basin: JU2, JU6, JU8, JU9, JU13; Segura Basin: SE18

Suborder ANNULIPALPIA
Superfamily PHILOPOTAMOIDEA Stephens, 1829
Family PHILOPOTAMIDAE Stephens, 1829
Subfamily Philopotaminae Stephens, 1829
Philopotamus Stephens, 1829

Philopotamus montanus (Donovan, 1813)

MATERIAL STUDIED: 344L, 3P♂♂1P♀ (IV, VII, VIII) 25♂♂ (III, IV, V). Ter Basin: T1, T2, T4, T7, T10, T14, T15, T16, TM2, TM5; Tordera Basin: ToM12, ToM13, ToM14, ToM15; Besòs Basin: B35; Llobregat Basin: L56; Noguera Ribagorçana Basin: OUT0m; Segura Basin: SE4; Adra: AD5; Guadalfeo Basin: GU1, GU5, GU11

Philopotamus variegatus (Scopoli, 1763)

MATERIAL STUDIED: 2♂♂ (V, VI). Ter Basin: T3, T17

Wormaldia McLachlan, 1865

The difficulty to distinguish larvae, and even adults, of this genus is notable. Therefore, although larval specimens from the same genus were found in the Tordera, Besòs, Turia and Júcar basins, only adult records are presented.

Wormaldia triangulifera McLachlan, 1878

MATERIAL STUDIED: 1♂ (IV). Llobregat Basin: L45

The specimen found belonged to the *triangulifera* sub-species, which is distributed in south-west Europe (González *et al.*, 1992).

Wormaldia saldetica Botosaneanu & González, 1984

MATERIAL STUDIED: 1P♂ (II). Llobregat Basin: SC1

Subfamily Chimarrinae Rambur, 1842
Chimarra Stephens, 1829

Chimarra marginata (Linnaeus, 1767)

MATERIAL STUDIED: 786L, 1P♂ (X), 2♂♂ (V, VIII). Llobregat Basin: L42, L44, L45, L60a, L61; Mijares Basin: MI5 MI6, MI9; Turia Basin: TU10, TU12; Júcar Basin: JU2, JU3, JU4, JU8, JU13, JU15, JU17, JU19; Segura Basin: SE5; Almanzora Basin: AL14, AL15; Aguas Basin: AG1, AG2, AG7; Adra Basin: AD3; Guadalfeo Basin: GU7, GU9

Superfamily HYDROPSYCHOIDEA Curtis, 1835
Family HYDROPSYCHIDAE Curtis, 1835
Subfamily Hydropsychinae Curtis, 1835
Hydropsyche Pictet, 1834

Hydropsyche* cf. *acinoxas Malicky, 1981

MATERIAL STUDIED: 4P♂♂ (IV, VIII). Tordera Basin: ToM7, ToM8, ToM12; Besòs Basin: B8a

The pupae found fit quite well under *H. acinoxas*, although there were slight differences in the X segment, which were difficult to evaluate (González, pers. com., 2001). The larvae collected and sclerites found from pupae could be confused with larvae and sclerites of *H. dinarica* and *H. ambigua* (Fig. 2c and Zamora-Muñoz *et al.*, 1995, for comparison). However, the apotome was less wide and pentagonal than *H. dinarica* and not as rounded in its lateral edges than in *H. ambigua*. In the dark colouration of the apotome only three light indistinct spots can be distinguished: two on the epistomal sulcus and one on the oral area (Fig. 2c). The apotome of *H.* cf. *acinoxas* lacks any light aboral spots, as in *H. ambigua*.

The holotype of *H. acinoxas* was found in Ter basin at 1000 m of altitude by Malicky (1981), and it has been recorded also in the Montseny ranges (Filbà, 1986). Our pupae were found in small rivers in the Montseny ranges.

Hydropsyche brevis Mosely, 1930

MATERIAL STUDIED: 58L. Mijares Basin: MI5, MI6, MI9; Turia Basin: TU9, TU10; Júcar Basin: JU2, JU4, JU5, JU12, JU13, JU17; Segura Basin: SE5, SE8, SE18

Hydropsyche bulbifera McLachlan, 1878

MATERIAL STUDIED: 47L, 1P♂ (VII). Besòs Basin: B22; Llobregat Basin: L44, L45; Mijares Basin: MI3, MI4, MI10; Segura Basin: SE1, SE2, SE5

Hydropsyche dinarica Marinkovic-Gospodnetic, 1979

MATERIAL STUDIED: 980L, 1P♂ (VII), 2♂♂ (VII). Ter Basin: T2, T7, T8, T10, TM2. TM4, TM5; Tordera Basin: ToM15; Llobregat Basin: L56, L54

Hydropsyche exocellata Dufőur, 1841

MATERIAL STUDIED: 3372L, 3P♂♂ (IV, VIII), 3♂♂ (IV). Besòs Basin: B10, B12, B16, B17a, B22, B25, B30, B35; Llobregat Basin: L38, L39, L42, L56, L60a, L60c, L64a, L68, L90, L91, L94, L95, L100, L101, L102; Mijares Basin: MI1, MI3, MI6, MI8; Turia Basin: TU6, TU7, TU8, TU9, TU10, TU11, TU13; Júcar Basin: JU2, JU3, JU4, JU5, JU9, JU10, JU11, JU12, JU13, JU15, JU16, JU17, JU19; Segura Basin: SE6, SE10; Almanzora Basin: AL7; Adra Basin: AD1; Guadalfeo Basin: GU9, GU10.

Although this species has been found mainly in midstream and lowland reaches (e.g. García de Jalón, 1986; Usseglio-Polatera, 1992) we found a few individuals in some headwater reaches with very good water quality.

Hydropsyche fontinalis Zamora-Muñoz & González, 2002

MATERIAL STUDIED: 2L. Segura Basin: SE4

Hydropsyche iberomaroccana González & Malicky, 1999

MATERIAL STUDIED: 13L, 1♂ (IV). Adra Basin: AD3; Guadalfeo Basin: GU7, GU9

Larvae identified as *H. iberomaroccana* followed the distinctive head pattern reported by Zamora-Muñoz *et al.* (1995) (= *H.* cf. *punica*). We collected *H. iberomaroccana* only in southern areas, although it was difficult to distinguish its larvae from those of *H. incognita*. However, characteristic *H. iberomaroccana* larvae (like those divided in step 17 by Zamora-Muñoz *et al.*, 1995) were not found in northern basins.

Hydropsyche incognita Pitsch, 1993

Because of the difficulty in distinguishing larvae of *H. incognita* from those of *H. iberomaroccana,* both species found in the Iberian Mediterranean area (Zamora-Muñoz *et al.*, 1995), only the records from pupae or adults of the former are presented. We also collected 1,677 larvae that we identified as *H.* gr. *pellucidula*.

MATERIAL STUDIED: 14P♂♂ (II, IV, VII, VIII, X), 9♂♂ (II, IV, V, IX). Llobregat Basin: L44, L60c; Foix Basin: F25; Almanzora Basin: AL14; Aguas Basin: AG2, AG3, AG5; Adra Basin: AD2; Guadalfeo Basin: GU8, GU9

Recently, all the specimens recorded as *H. pellucidula* (Curtis, 1834) in the Iberian Peninsula have been classified as *H. incognita* because there is no evidence of the presence of *H. pellucidula* in the area (Malicky, pers. com., in Vieira-Lanero, 2000).

Hydropsyche infernalis Schmid, 1952

MATERIAL STUDIED: 115L. Turia Basin: ?AF1; Segura Basin: SE3, SE7, SE16; Almanzora Basin: AL1, AL6, AL14; Aguas Basin: AG1, AG2; Adra Basin: AD3, AD4, AD5; Guadalfeo Basin: GU2, GU4, GU5, GU6, GU12, GU13

No pupae or adults were collected, but larvae displayed a V-shape aboral spot in the apotome, as described in Zamora-Muñoz *et al.* (1995) (Fig. 2d). In northwestern Spain (where *H. infernalis* has not been recorded —Vieira-Lanero, 2000), *H. siltalai* (a close species that also lacks gills on the 7th abdominal segment) has an apotome similar to *H. infernalis* with a V-shaped aboral spot (Vieira-Lanero, 2000), instead of the typical U-shaped spot (Edington & Hildrew, 1995; Zamora-Muñoz *et al*., 1995). Therefore, in areas where these two species may coexist, it may be difficult to distinguish larvae. For example, because *H. infernalis* has been collected in southern and in some central areas in the Iberian Peninsula (González *et al.*, 1992 and Zamora-Muñoz *et al.*, 1995), we cannot ensure, without pupae or adult specimens, that our larval samples from the Turia basin are truly *H. infernalis*.

Hydropsyche instabilis (Curtis, 1834)

MATERIAL STUDIED: 697L, 5P♂♂ (VII), 7♂♂ (II, VII, VIII). Ter Basin: T10, T11, T12, TM4; Besòs Basin: B35; Llobregat Basin: L54, L56; Mijares Basin: MI4; Turia Basin: TU4, TU6; Júcar Basin: JU7, JU8; Segura Basin: SE1, SE3; Almanzora Basin: AL2, AL6, AL7; Adra Basin: AD4, AD5; Guadalfeo Basin: GU1, GU2, GU3, GU5, GU6, GU7, GU8, GU9, GU11, GU12, GU13, GU14, GU15, GU16

Hydropsyche* gr. *instabilis

MATERIAL STUDIED: 93L, 4P♂♂ (VII, VIII). Llobregat Basin: L44; Foix Basin: F24, F25; Mijares Basin: MI3, MI7; Júcar Basin: JU1, JU7, JU15, JU17; Segura Basin: SE1

The male genitalia of the pupa of *H.* gr. *instabilis* resemble those of *H. infernalis* and *H. fontinalis* (González, pers. com., 2001). However, more pupae and adults are required to confirm whether *H.* gr. *instabilis* is a new species. Like *H. infernalis* and *H. fontinalis,* the larva of this species lacks gills on the 7th abdominal segment, but its apotome pattern is easily distinguishable from that of *H. infernalis* and *H. fontinalis* (Figs. 2d to 2f). The shape of the apotome of *H.* gr. *instabilis* (Fig. 2f) is wide and not as triangular as in *H. fontinalis* (Fig. 2e), with

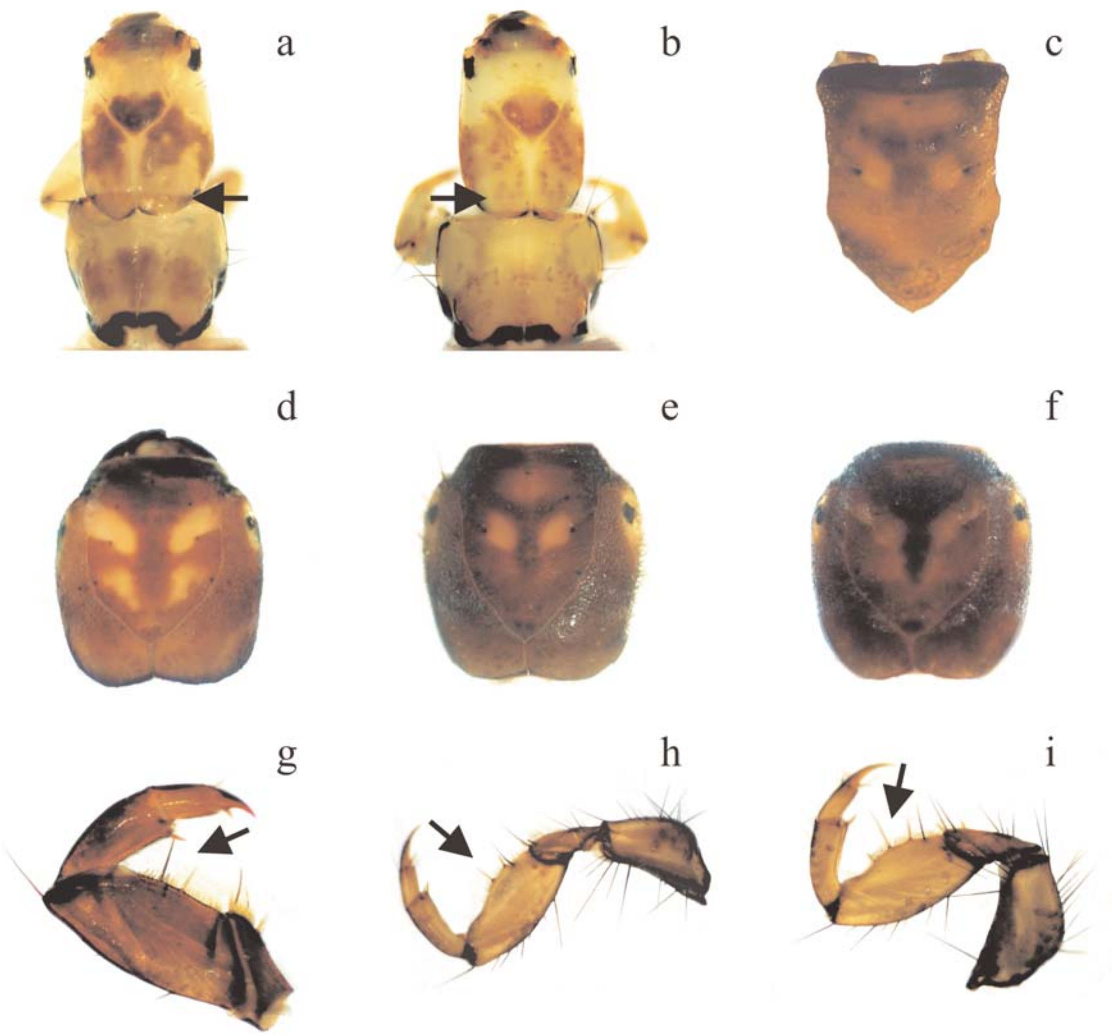

Fig. 2.— Larvae found in sampled Mediterranean basins. a) cephalic capsule and pronotum of *Rhyacophila dorsalis*; b) cephalic capsule and pronotum of *R. nevada*; c) apotome of *Hydrosyche* cf. *acinoxas*; d) cephalic capsule of *H. infernalis*; e) cephalic capsule of *H. fontinalis*; f) cephalic capsule of *H.* gr. *instabilis*; g) first leg of *Glyphotaelius pellucidus*; h) first leg of *Mesophylax aspersus* with two ventral setae; i) first leg of *M. aspersus* with three ventral setae.

Fig. 2.— Larvas de las cuencas Mediterráneas muestreadas. a) cápsula cefálica y pronoto de *Rhyacophila dorsalis*; b) cápsula cefálica y pronoto of *R. nevada*; c) apotoma de *Hydrosyche* cf. *acinoxas*; d) cápsula cefálica de *H. infernalis*; e) cápsula cefálica de *H. fontinalis*; f) cápsula cefálica de *H.* gr. *instabilis*; g) primera pata de *Glyphotaelius pellucidus*; h) primera pata de *Mesophylax aspersus* con dos sedas ventrales; i) primera pata de *M. aspersus* con tres sedas ventrales.

the posterior vertex not very pointed. In both species a dark Y-shaped patch stands out in the central area of the apotome, but is more conspicuous in *H. fontinalis*. *H.* gr. *instabilis* lacks the oral light spot present in *H. fontinalis*, and the two lateral light spots on the epistomal sulcus are indistinct and extending to the posterior vertex following the lower arm of the Y-shaped central patch. Both larvae of *H.* gr. *instabilis* and *H. infernalis* have wide and pentagonal apotomes but the principal difference between both species is in the pattern of the light spots of the apotome (Figs. 2d and 2f). In contrast to the above described pattern of *H.* gr. *instabilis*, *H. infernalis* has two pairs of lateral light spots (on and under the epistomal sulcus), often joined, leaving a dark and elongated wide patch in the central area of the apotome (Fig. 2d), and sometimes a light oral and aboral spots can also be distinguished (Zamora-Muñoz *et al.*, 1995).

Hydropsyche siltalai Döhler, 1963

MATERIAL STUDIED: 1876L, 2P♂♂ (VII, VIII). Ter Basin: TM3; Tordera Basin: ToM8, ToM9, ToM11; Besòs Basin: B25, B7a, B28, B22, B35, B32, B36; Llobregat Basin: L42, L54, L60a; Júcar Basin: JU6, JU8; Segura Basin: SE5, SE18

In northwestern Spain, *H. siltalai* presents a high variability in head colour pattern, with the light aboral spot being more frequently V- than U-shaped (Vieira-Lanero, 2000; Vieira-Lanero, pers. com., 2001). Our specimens from northern basins always showed a U-shaped spot, similar to other specimens collected in central Spain (see Zamora-Muñoz *et al.*, 1995).

Until the description of the larva of *H. infernalis* (Zamora-Muñoz *et al*., 1995), the only European species lacking gills on the 7th abdominal segment was *H. siltalai*. This fact questions the records in the Ibeiran Peninsula based only on larval identifications previous to the description of *H. infernalis*, especially those from southern Spain, where *H. infernalis* is predominant.

Hydropsyche tibialis McLachlan, 1884

MATERIAL STUDIED: 7L. Guadalfeo Basin: GU1, GU11

Cheumatopsyche Wallengren, 1891

Cheumatopsyche lepida (Pictet, 1834)

MATERIAL STUDIED: 2L, 1P♂ (X). Llobregat Basin: L42; Júcar Basin: JU2, JU3, JU4, JU12, JU13; Segura Basin: SE5

Family ECNOMIDAE Ulmer, 1903

Ecnomus McLachlan, 1864

Ecnomus deceptor McLachlan, 1884

MATERIAL STUDIED: 1L, 1P♂ (VI). Llobregat Basin: L77; Guadalquivir Basin: GE (C. Solà, leg)

Family PSYCHOMYIIDAE Walker, 1852

Subfamily Psychomyiinae Walker, 1852

Psychomyia Latreille, 1829

Psychomyia pusilla (Fabricius, 1781)

MATERIAL STUDIED: 10L, 2♂♂ (VII). Ter Basin: T21; Llobregat Basin: L42, L68; Júcar Basin: JU3, JU9

Lype McLachlan, 1878

Lype reducta (Hagen, 1868)

MATERIAL STUDIED: 5L, 2♂♂ (IV). Besòs Basin: B25, B35; Segura Basin: SE2, SE18

Larvae collected in the Segura Basin expands the distribution area of *Lype reducta* to the southeast of the Iberian Peninsula.

Metalype Klapálek, 1898

Metalype fragilis (Pictet, 1834)

MATERIAL STUDIED: 8L. Segura Basin: SE1

Tinodes Curtis, 1834

Three species whose larvae have not been described have been cited in the south of Spain: *T. algiricus* McLachlan, 1880, *T. maroccanus* Mosely, 1938 and *T. baenai* González & Otero, 1984 (González *et al*., 1992). Consequently, it was difficult to identify our larval samples, especially from southern basins. The identification of the following specimens were obtained from already known larvae and should be interpreted with care.

Tinodes assimilis McLachlan, 1865

MATERIAL STUDIED: 13L, 1♂ (VII). Llobregat Basin: L56; Segura Basin: SE1; Almanzora Basin: AL6, AL7, AL11, AL14; Aguas Basin: AG2; Guadalfeo Basin: GU1

Tinodes dives (Pictet, 1834)

MATERIAL STUDIED: 11L. Llobregat Basin: L44, L45, L56; Júcar Basin: JU6

Tinodes maclachlani Kimmins, 1966

MATERIAL STUDIED: 2L. Llobregat Basin: L44, L45

Tinodes maculicornis (Pictet, 1834)

MATERIAL STUDIED: 7L. Besòs Basin: B36; Almanzora Basin: AL17

Tinodes waeneri (Linnaeus, 1758)

MATERIAL STUDIED: 34L, 1♂ (IV). Besòs Basin: B28, B32, B35; Llobregat Basin: L60c, L102; Segura Basin: SE7

Family POLYCENTROPODIDAE Ulmer, 1903
Subfamily Polycentropodinae Ulmer, 1903
Plectrocnemia Stephens, 1836

We recorded specimens of *Plectrocnemia* in the Besòs, Llobregat, Turia, Júcar, Segura, Adra and Guadalfeo basins. However, because of the difficulty to differentiate larvae, especially when they are not full-grown (Vieira-Lanero, 2000), we present here records from pupae and adults only.

Plectrocnemia geniculata McLachlan, 1871

MATERIAL STUDIED: 1♂ (IV). Foix Basin: F7a

Plectrocnemia laetabilis McLachlan, 1880

MATERIAL STUDIED: 1P♂ (V), 3♂♂ (VII, VIII). Foix Basin: F33; Noguera Ribagorçana Basin: OUT0m, INLET

Polycentropus Curtis, 1835

Polycentropus flavomaculatus (Pictet, 1834)

MATERIAL STUDIED: 170L, 2P♂♂ (VIII), 8♂♂ (IV, V, VIII). Ter Basin: T3, T10; Llobregat Basin: L38, L42, L44, L54, L56, L60a, L60c, L61, L64a, L68; Besòs Basin: B10, B22, B32, B35

Polycentropus kingi McLachlan, 1881

MATERIAL STUDIED: 175L. Besòs Basin: B32; Júcar Basin: JU17; Segura Basin: SE1, SE2, SE3, SE4, SE7; Almanzora Basin: AL6, AL7, AL8, AL10, AL11; Aguas Basin: AG2, AG7; Guadalfeo Basin: GU5

Cyrnus Stephens, 1836

Cyrnus* cf. *montserrati González & Otero, 1983

MATERIAL STUDIED: 7L. Segura Basin: SE2

Although no pupae or adults were collected in the study area, and larvae of *C. montserrati* are not described, the specimens found presented a distinct head colour pattern close to that of *C. cintranus* (Vieira-Lanero, pers. com., 2001). Moreover, in the first abdominal segment, our specimens had 2 setae sa3 and larvae of *C. cintranus* present only 1 setae in this position (Vieira-Lanero, 2000).

Suborder INTEGRIPALPIA
Superfamily LIMNEPHILOIDEA Kolenati, 1848
Family BRACHYCENTRIDAE Ulmer, 1903
Brachycentrus Curtis, 1834

Brachycentrus (O.) maculatum (Fourcroy, 1785)

MATERIAL STUDIED: 8L. Llobregat Basin: L68; Guadalfeo Basin: GU3

Micrasema McLachlan**,** 1876

Micrasema longulum McLachlan, 1876

MATERIAL STUDIED: 27L. Adra Basin: AD5; Guadalfeo Basin: GU1, GU2, GU5, GU15

Micrasema minimum McLachlan, 1876

MATERIAL STUDIED: 28L. Ter Basin: T3, T8, T10; Segura Basin: SE4

Larvae in the Segura basin expands the distribution area of *Micrasema minimum* to the southeast of the Iberian Peninsula.

Micrasema moestum (Hagen, 1868)

MATERIAL STUDIED: 212L. Segura Basin: SE1; Almanzora Basin: AL6, AL7, AL8; Adra Basin: AD5; Guadalfeo Basin: GU1, GU2, GU3, GU5, GU11, GU12, GU15

Some of the larvae collected displayed a similar, although less conspicuous, pattern as *M.* gr. *moestum sensu* Vieira-Lanero (2000).

Family LEPIDOSTOMATIDAE Ulmer, 1903
Subfamily Lepidostomatinae Ulmer, 1903
Lepidostoma Rambur, 1842

Lepidostoma hirtum (Fabricius, 1775)

MATERIAL STUDIED: 14L. Tordera Basin: ToM6, ToM8, ToM10, ToM11

Lasiocephala Costa, 1857

Lasiocephala basalis (Kolenati, 1848)

MATERIAL STUDIED: 417L, 13P♂♂10P♀♀ (VII), 12♂♂ 11♀♀ (V, VII). Tordera Basin: ToM10, ToM11; Turia Basin: TU6; Júcar Basin: JU7, JU8; Segura Basin: SE1; Adra Basin: AD5; Guadalfeo Basin: GU1, GU2, GU3, GU5, GU9, GU11, GU12, GU13, GU14, GU15

Subfamily Theliopsychinae Weaver, 1993
Crunoecia McLachlan, 1876

Crunoecia irroata (Curtis, 1834)

MATERIAL STUDIED: 3L. Besòs Basin: B29

Family LIMNEPHILIDAE Kolenati, 1848
Subfamily Drusinae Banks, 1916
Drusus Stephens, 1837

Drusus bolivari (McLachlan, 1880)

MATERIAL STUDIED: 17L. Segura Basin: SE1, SE4

Drusus discolor (Rambur, 1842)

MATERIAL STUDIED: 5L. Ter Basin: T10, T18; Noguera Ribagorçana Basin: OUT200m

Drusus rectus (McLachlan, 1868)

MATERIAL STUDIED: 167L, 1♂5♀♀ (VII). Ter Basin: T10, T19; Noguera Ribagorçana Basin: OUT0m, OUT200m, INLET

It is difficult to distinguish *D. rectus* from *D. annulatus*. There are records of adults of both species in the Pyrenees (see González *et al.*, 1992) but no larval keys are available to differentiate them. Hiley (1970), Szczesny (1978), Wallace *et al.* (1990) and Waringer & Graf (1997) include only *D. annulatus*, whereas Décamps & Puyol (1975) reported only *D. rectus*. Because it was not possible to distinguish these two species using existing keys, and no pupae or adults of *D. annulatus* were collected, we provisionally considered all specimens as *D. rectus*.

Anomalopterygella Fischer, 1966

Anomalopterygella chauviniana (Stein, 1874)

MATERIAL STUDIED: 27L, 1♂ (X). Ter Basin: T12; Adra Basin: AD5; Guadalfeo Basin: GU1, GU15

Subfamily *Limnephilinae* Kolenati, 1848
TRIBUS Limnephilini Kolenati, 1848

Limnephilus Leach, 1815

Limnephilus guadarramicus Schmid, 1955

MATERIAL STUDIED: 103L, 2♂♂ (IV). Besòs Basin: B7, B24, B28; Llobregat Basin: L42, L44, L45, L60a, L61, L64a, L77; Mijares Basin: MI1, MI3, MI8, MI10; Turia Basin: TU1, TU5; Júcar Basin: JU6, JU8, JU17; Aguas Basin: AG5

This species presents high variability in case morphology, from entirely mineral (see original description in Vera, 1979) to organic (twigs disposed tangentially, see Vieira-Lanero, 2000). We found types of both cases, although the latter was more frequent.

Specimens collected in central and some southern basins expand the distribution area of *Limnephilus guadarramicus* in the Iberian Peninsula.

Limnephilus lunatus Curtis, 1834

MATERIAL STUDIED: 3L, 2P♂♂ (IV). Llobregat Basin: L64a, L77

Glyphotaelius Stephens, 1833

Glyphotaelius pellucidus (Retzius, 1783)

MATERIAL STUDIED: 20L, 2P♂♂1P♀ (II, IV), 4♂♂1♀ (II). Ter Basin: SO; Besòs Basin: B7, B7a

Prat *et al.* (1983) recorded *G. pellucidus* larvae in the Besòs basin. Because no pupae or adults have been collected in Spain, Vieira-Lanero (2000) considered that its presence required confirmation. We obtained several pupae and adults of *G. pellucidus* after rearing larvae from the Besòs basin, which showed the characteristic genitalia and anterior wing morphology (see Schmid, 1952; Malicky, 1983). Our observation confirms the presence of this species in the Iberian Peninsula. Moreover, the larvae fitted the keys by Waringer & Graf (1997) and Vieira-Lanero (2000) very well, showing 2 ventral setae of distinct colour in the first femur (Fig. 2g). Most of the specimens collected had a typical case made of round pieces of litter arranged in the characteristic way, although others used non-rounded pieces disposed longitudinally. On the other hand, some collected *Potamophylax* sp. (see below) built a similar case to the one from *Glyphotaelius*, a characteristic observed by other authors (e.g. Wallace *et al.*, 1990, Vieira-Lanero, 2000). In our study, *G. pellucidus* was found exclusively in the headwaters of temporary rivers, and had an earlier flight period than in more temperate climates (Sommerhäuser *et al.*, 1997).

TRIBUS Chaetopterygini Hagen, 1858

Chaetopteryx Stephens, 1829

We recorded the larvae of *Chaetopteryx* in the Ter, Besòs, Llobregat, Turia, Júcar, Segura and Guadalfeo basins. Because of the difficulty to identify larvae at species level, only records from pupae and adults are presented.

Chaetopteryx villosa (Fabricius, 1798)

MATERIAL STUDIED: 1♀ (X). Ter Basin: T10

TRIBUS Stenophylacini Schmid, 1955

Potamophylax Wallengren, 1891

Potamophylax cingulatus (Stephens, 1837)

MATERIAL STUDIED: 194L, 5P♂♂2P♀♀ (VIII), 1♂2♀♀ (VIII). Ter Basin: TM1, TM2, TM3, TM4, T8, T9, T10, T11; Tordera Basin: ToM13, ToM15; Besòs Basin: B35; Llobregat

Basin: L54, L56; Noguera Ribagorçana Basin: INLET; Júcar Basin: JU1

Potamophylax latipennis (Curtis, 1834)

Material studied: 257L, 8P♂♂ 12P♀♀ (VIII), 10♂♂3♀♀ (II, VII, VIII, X). Ter Basin: T7, T9, T10, T12, TM1, TM3, TM4, TM5; Tordera Basin: ToM7, ToM8; Besòs Basin: B8a, B29, B35, B36; Llobregat Basin: L54, L56, L60a; Adra Basin: AD5; Guadalfeo Basin: GU1, GU11, GU15

Halesus Stephens, 1836

Halesus digitatus (Schrank, 1781)

Material studied: 51L, 2♂♂ (VII, X). Ter Basin: T8, T10, T12; Besòs Basin: B35; Llobregat Basin: L44, L54, L68; Noguera Ribagorçana Basin: OUT200m

Halesus radiatus (Curtis, 1834)

Material studied: 103L. Ter Basin: T7, TM1, TM4, TM5; Tordera Basin: ToM6, ToM7, ToM8, ToM10, ToM11, ToM12, ToM15; Besòs Basin: B7a, B8a, B32, B35, B36; Llobregat Basin: L44, L56, L68; Mijares Basin: MI7; Turia Basin: TU1, TU2, TU4; Júcar Basin: JU1, JU7, JU8

Halesus tessellatus (Curtis, 1834)

Material studied: 142L. Besòs Basin: B35; Turia Basin: TU1, TU2; Júcar Basin: JU7, JU8; Segura Basin: SE1, SE3, SE4; Adra Basin: AD5; Guadalfeo Basin: GU1, GU5, GU11, GU12, GU15

Although we did not find pupae or adults, Zamora-Muñoz & Alba-Tercedor (1995) reported this species in the Iberian Peninsula. According to Panzenböck & Waringer (1997) our larvae were identified as *H. tessellatus*. An analysis of the pupae and adult material is required to confirm the presence of *H. tessellatus* in northern basins.

Stenophylax Kolenati, 1848

It is difficult to identify *Stenophylax* species in the Iberian Peninsula because of numerous undescribed larvae. Therefore, we include only the pupae or adults collected. The larvae of this genus were found in several temporary streams in the Besòs, Júcar, Segura, Almanzora and Guadalfeo basins.

Stenophylax espanioli Schmid, 1957.

Material studied: 2P♂♂ (X), 1♂ (X). Ter Basin: T10

The larvae of this species remain undescribed. In larval sclerites we found setae insertions at the anterior sides of meso- and meta-femora, which indicates that *S. espanioli* larvae are similar to that of *S. permistus,* according to Vieira-Lanero (2000).

Mesophylax McLachlan, 1882

Mesophylax aspersus (Rambur, 1842)

Material studied: 316L, 11P♂♂1P♀ (II, III, IV, V, VII), 48♂♂14♀♀ (II, IV, V, XI). Besòs Basin: B7a, B12, B22, B24, B28, B32; Llobregat Basin: L42, L45, L60c; Foix Basin: F4, F7, F7a, F16, F28; Mijares Basin: MI1, MI3, MI7; Turia Basin: TU3, TU7; Júcar Basin: JU5; Segura Basin: SE3, SE8, SE10, SE13, SE15, SE16; Almanzora Basin: AL1, AL2, AL3, AL4, AL5, AL10, AL11, AL14; Adra Basin: AD4; Guadalfeo Basin: GU5, GU6, GU7

Although Malicky (1998) considers all *Mesophylax* species from the Iberian Peninsula as being *M. aspersus*, *M. impunctatus* has been recorded by other authors (see González *et al.*, 1992). According to Wallace *et al.* (1990) and Waringer & Graf (1997), these two species can be clearly differentiated by the number of ventral setae in the first femur: 2 in *M. impunctatus* and 3 in *M. aspersus*. In the laboratory, we reared several larvae with 2 ventral setae in the first leg, and only adults of *M. aspersus* were obtained (n= 62). All larvae collected in the field presented 2 setae in both legs, except in three specimens, which had 2 setae in one femur (Fig. 2h) and 3 in the other (Fig. 2i). Therefore, we consider that this character is not useful to distinguish *M. aspersus* and *M. impunctatus* in the Iberian Peninsula because of its variability, which also can be related with the geographic variability shown by adults of *M. aspersus* (Botosaneanu, in letter, 2000). The unclear taxonomy of adults of these two species may explain why the differences between their larvae are also uncertain (González, pers. com., 2001). This species survives drought by adapting its lifecycle (e.g. Bouvet, 1974; Bournaud, 1971). In this regard, we observed (during laboratory rearing) that even when drought is imposed suddenly, mature pupae emerge very quickly.

Allogamus Schmid, 1955

Allogamus auricollis (Pictet, 1834)

Material studied: 13L. Ter Basin: T1, T2, T12; Llobregat Basin: L44

Some specimens found in the Ter basin presented very long mineral cases, approximately double the larval size.

Allogamus mortoni (Navás, 1907)

MATERIAL STUDIED: 1P♂ (XI). Almanzora Basin: AL6

Although *A. mortoni* is abundant in some mountain ranges of southern Spain in the Mediterranean area (Aceituno-Castro *et al.*, 1999), its larva is still undescribed. At sites where only *A. mortoni* was present, larvae showed a light band in the anterior part of the pronotum, as in *A. ligonifer*. In southern basins we collected 45 *Allogamus* larvae, most of which presented this pattern at the pronotum; however, pupae or adults are required to confirm their identity.

Family UENOIDAE Iwata, 1927
Subfamily Thremmatinae Martynov, 1935
Thremma McLachlan, 1876

Thremma gallicum McLachlan, 1880

MATERIAL STUDIED: 9L. Noguera Ribagorçana Basin: OUT0m, OUT200m

Family GOERIDAE Ulmer, 1903
Subfamily Goerinae Ulmer, 1903
Silo Curtis, 1830

Silo graellsii E. Pictet, 1865

MATERIAL STUDIED: 25L. Ter Basin: T1, T8, T11, T12, TM2, TM4, TM5; Tordera Basin: ToM7

Superfamily LEPTOCEROIDEA Leach, 1815
Family LEPTOCERIDAE Leach, 1815
Subfamily Leptocerinae Leach, 1815
TRIBUS Athripsodini Morse & Wallace, 1976
Athripsodes Billberg, 1820

Genus *Athripsodes* includes several species whose distribution within the Mediterranean area remains undescribed (e.g. *A. taounate*). Therefore, although larvae from this genus were found in the Almanzora, Aguas, Adra and Guadalfeo basins, we include only pupae or adults.

Athripsodes albifrons (Linnaeus, 1758)

MATERIAL STUDIED: 1P♀ (VII). Guadalfeo Basin: GU1

Ceraclea Stephens, 1829

Ceraclea sobradieli (Navás, 1917)

MATERIAL STUDIED: 2L. Júcar Basin: JU10

TRIBUS Mysacidini Burmeister, 1839
Mystacides Berthold, 1827

Mystacides azurea (Linnaeus, 1761)

MATERIAL STUDIED: 62L. Tordera Basin: ToM8, ToM9, ToM11, ToM12; Besòs Basin: B24, B32, B35; Llobregat Basin: L44, L45, L61, L68; Mijares Basin: MI5; Turia Basin: TU10; Júcar Basin: JU2, JU10; Segura Basin: SE2, SE18

TRIBUS Oecetini Silfvenius, 1905
Oecetis McLachlan, 1877

We found larvae of *Oecetis* in the Segura basin, although it was not possible to identify the species because the larva of some species recorded near the Mediterranean area have not been described to date (e.g. *O. grazalemae*).

TRIBUS Setodini Morse, 1981
Setodes Rambur, 1842

Setodes argentipunctellus McLachlan, 1877

MATERIAL STUDIED: 112L, 1P♀ (X). Turia Basin: TU12; Júcar Basin: JU2, JU6; Segura Basin: SE2, SE4, SE16; Almanzora Basin: AL2, AL6; Aguas Basin: AG1, AG2; Adra Basin: AD1, AD3; Guadalfeo Basin: GU16

TRIBUS Triaenodini Morse, 1981
Adicella McLachlan, 1877

Adicella reducta (McLachlan, 1865)

MATERIAL STUDIED: 5L, 1♀ (VII). Tordera Basin: ToM10, ToM12; Besòs Basin: B29; Guadalfeo Basin: GU1, GU11

Family CALAMOCERATIDAE Ulmer, 1905
Subfamily Calamoceratinae Ulmer, 1905
Calamoceras Brauer, 1865

Calamoceras marsupus Brauer, 1865

MATERIAL STUDIED: 2L. Segura Basin: SE1, SE2

Family ODONTOCERIDAE Wallengren, 1891
Subfamily Odontocerinae Wallengren, 1891
Odontocerum Leach, 1815

Odontocerum albicorne (Scopoli, 1763)

MATERIAL STUDIED: 201L, 3P♂♂ (IV, VI), 11♂♂ (VII, VIII). Ter Basin: T4, T7, T8, T10, T11, TM2, TM3, TM4, TM5;

Tordera Basin: ToM6, ToM7, ToM8, ToM11, ToM12, ToM13, ToM14, ToM15; Besòs Basin: B8a, B12, B32, B35; Llobregat Basin: L54, L56, L60a

Superfamily SERICOSTOMATOIDEA Stephens, 1836
Family SERICOSTOMATIDAE Stephens, 1836
Sericostoma Latreille, 1825

It is difficult to distinguish larvae of *Sericostoma*. Therefore, we present only species confirmed by pupae or adults. A revision of the adults found in the Iberian Peninsula is needed because of their morphological variability (González, pers. com., 2001).

Sericostoma pyrenaicum E. Pictet, 1865

MATERIAL STUDIED: 3P♂♂ (VII), 2♂♂ (IV). Besòs Basin: B32; Llobregat Basin: L54; Foix Basin: F11; Segura Basin: SE1

Our records from the Segura basin extend the distribution range of this species to southeast Spain.

Sericostoma vittatum Rambur, 1842

MATERIAL STUDIED: 1♂ (VII). Adra Basin: AD5.

Schizopelex McLachlan, 1876

The Iberian Peninsula hosts two species of this genus (*S. festiva* and *S. furcifera*). Because *S. furcifera* remains undescribed, we present only species confirmed by pupae and adult specimens of this genus. Vieira-Lanero (2000) described some taxonomical features to distinguish *Schizopelex* from *Sericostoma*, but all the Sericostomatidae larvae that we collected were identified as *Sericostoma*.

Schizopelex furcifera McLachlan, 1880

MATERIAL STUDIED: 1P♂ (VIII), 1♂ (VII). Ter Basin: T20; Tordera Basin: ToM7

Family BERAEIDAE Wallengren, 1891
Beraea Stephens, 1833

Beraea maurus (Curtis, 1834)

MATERIAL STUDIED: 2L. Besòs Basin: B29; Llobregat Basin: L44

Discussion

Compared with other temperate areas, Mediterranean Basin fauna are highly diverse, with a considerable level of endemicity and complexity as the result of the interaction of complex historical and ecological factors (Balletto & Casale, 1991). However, in spite of the high caddisfly richness of the Iberian Peninsula (Gonzalez, 2003), the Mediterranean area is poorer in species than other less mediterranean zones in the north and especially northwest of Spain (González *et al.*, 1987). This phenomenon has been related to ecological and historical factors though it also should be born in mind that the majority of studies were performed in the northern regions of the Iberian Peninsula, far from the Mediterranean area (González *et al.*, 1987). A total of 90 species were identified in our study, which accounts for 27.7% of the species recorded and identified with confidence in the Iberian Peninsula. Although this percentage might seem poor, it must be stated that not all mediterranean basins have been sampled and not all collected larvae were identified to species level. The maximum diversity of caddisflies in the area sampled was found in regions with high-mountain influences (e.g. rivers from Pyrenees, Montseny and Sierra Nevada ranges) or those where northern and southern species mix (e.g. in the Segura basin). In addition, Mediterranean rivers in central and some southeastern areas (e.g. rivers from the Almería province) present a depleted caddisfly fauna (Bonada, 2003). This depletion may be related to the lack of extensive studies (González *et al.*, 1987), but it is especially attributable to the harshness of the climate and to the high human impact on the southern arid regions.

The groups of species according to their distribution areas are shown in Figure 3, where sampling sites have been grouped into three sets (northern, central and southern basins) to facilitate interpretation. According to the literature, the species have been grouped into three categories depending on their distribution: widespread, Iberian-north African and endemic species of the Iberian Peninsula and/or Pyreness. Overall, most of the caddisflies collected in the area were widely distributed, which is in accordance with González *et al.* (1987). In comparison with northern and central basins, southern basins showed the highest proportion of endemic species, with a mix of species that are widely distributed around the Iberian Peninsula and those exclusive to the Baetic-Rift area. Our results emphasize the importance of southern basins as a speciation area for several groups of invertebrates (Ruiz *et al.*, 2001).

On the basis of our results, the distribution areas of some caddisfly species could be expanded (*Lype*

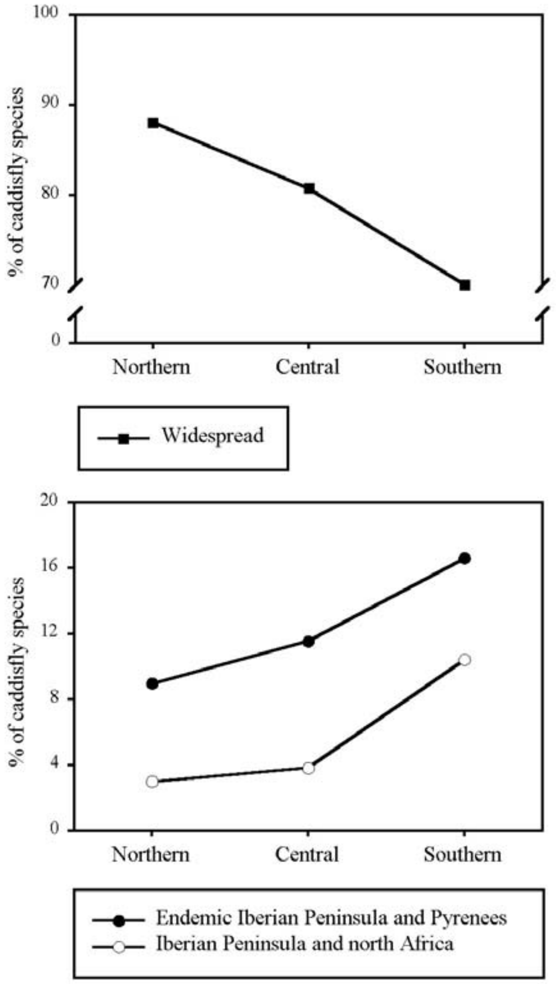

Fig. 3.— Percentage of caddisfly species with a widespread distribution, Iberian-north African and endemic species of the Iberian Peninsula and Pyrenees classified into three groups of basins sampled. Northern basins include the Ter, Tordera, Besòs, Llobregat, Foix and Noguera Ribagorçana. Central basins include the Mijares, Turia and Júcar. Southern basins include the Segura, Almanzora, Aguas, Adra, Guadalfeo and Guadalquivir. The graph is based on 89 species. *Hydropsyche* gr. *instabilis* has been omitted because the limits of its distribution are unknown.

Fig. 3.— Porcentaje de especies de distribución amplia, ibérico-norteafricana y endémicas de la Península Ibérica y Pirineos para cada uno de los tres grupos de cuencas vertientes al Mediterráneo. Las cuencas del norte incluyen: Ter, Tordera, Besòs, Llobregat, Foix y Noguera Ribagorçana. Las cuencas del centro incluyen: Mijares, Turia y Júcar. Las cuencas del sur incluyen: Segura, Almanzora, Aguas, Adra, Guadalfeo and Guadalquivir. El gráfico se ha obtenido con 89 especies. *Hydropsyche* gr. *instabilis* no ha sido incluido debido a que se desconocen sus límites de distribución.

reducta, *Micrasema minimum, Limnephilus guadarramicus, Sericostoma pyrenaicum*). We also confirm the presence of others (e.g. *Glyphotaelius pellucidus*) and provide relevant taxonomic and ecological data for further studies.

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References

ACEITUNO-CASTRO, E., LUZÓN-ORTEGA, J. M., TIERNO DE FIGUEROA, J. M., GONZÁLEZ-CHAMORRO, B., JÁIMEZ-CUÉLLAR, P. & ZAMORA-MUÑOZ, C., 1999. Contribución al conocimiento de los insectos acuáticos de la Sierra de Huétor (Granada, España). *XVII Jornadas de la Asociación española de Entomología,* Bilbao: 58.

ALBA-TERCEDOR, J. & SÁNCHEZ-ORTEGA, A., 1988. Un método rápido y simple para evaluar la calidad biológica de las aguas corrientes basado en el de Hellawell (1978). *Limnetica*, 4: 51-56.

ALBA-TERCEDOR, J., JÁIMEZ-CUÉLLAR, P., ÁLVAREZ, M., AVILÉS, J., BONADA, N., CASAS, J., MELLADO, A., ORTEGA, M., PARDO, I., PRAT, N., RIERADEVALL, M., ROBLES, S., SÁINZ-CANTERO, C. E., SÁNCHEZ-ORTEGA, A., SUÁREZ, M. L., TORO, M., VIDAL-ABARCA, M. R., VIVAS & ZAMORA-MUÑOZ, C., 2002. Caracterización del estado ecológico de ríos mediterráneos ibéricos mediante el índice IBMWP (antes BMWP'). *Limnetica*, 21: 175-185.

BALLETTO, E. & CASALE, A., 1991. Mediterranean insect conservation. In: N.M. Collins & J.A. Thomas (eds.). *The conservation of insects and their habitats.* Academic Press. London: 122-142.

BASAGUREN, A., 1990. *Los tricópteros de la red hidrográfica de Bizkaia*. PhD. Universidad del País Vasco. 603 pp.

BONADA, N., 2003. *Ecology of the macroinvertebrate communities in mediterranean rivers at different scales and organization levels. Ph.D.* University of Barcelona. Barcelona. 355 pp. Available in PDF in http://www.tdx.cbuc.es/

BOURNAUD, M., 1971. Observations biologiques sur les trichoptères cavernicoles. *Bulletin Mensuel de la Société Linnéenne de Lyon*, 7: 197-211.

BOUVET, Y., 1974. Ecologie et reproduction chez les Trichoptères cavernicoles du groupe de Stenophylax (Limnephilidae, Stenophylacini). *Proceedings of the 1st International Symposium on Trichoptera*: 105-109.

BUHOLZER, H., 1978. *Larvenmorphologie und Verbreitung der schweizerischen RHYACOPHILA-Arten (Trichoptera, Rhyacophilidae)*. Dissertation ETH Nr. 6177. Zürich. 151 pp.

CIANFICCONI, F., 2002. The third list of Italian Trichoptera (1990-2000). *Proceedings of the 10th International Symposium on Trichoptera*, 15: 349-358.

CONACHER, A. J. & SALA, M., 1998. *Land degradation in Mediterranean environments of the world: Nature and extent cause and solutions*. John Wiley & Sons Ltd. Chichester. 491 pp.

DÉCAMPS, H., 1965. Larves Pyrénéennes du genre Rhyacophila (Trichoptères). *Annales de Limnologie*, 181): 51-72.

DÉCAMPS, H. & PUYOL, J. Y., 1975. Les larves de Drusinae des Pyrénées (Trichoptères, Limnephilidae). *Annales de Limnologie*, 11(2): 157-167.

DESPAX, R., 1928. La larve et la nymphe de *Rhyacophila denticulata* McLachlan (Trichoptera). *Bulletin de la société d`Históire Naturelle de Toulousse*, 62: 149-155.

EDINGTON, J. M. & HILDREW, A. G., 1981. A key to the caseless caddis larvae of the British Isles with notes on their ecology. *Scientific publications of the Freshwater Biological Association*, 43: 1-92.

EDINGTON, J. M. & HILDREW, A. G., 1995. *A Revised Key to the Caseless Caddis Larvae of the British Isles, with Notes on their Ecology*. Freshwater Biological Association Publications. Ambleside. 134 pp.

FILBÀ, L., 1986. Tricòpters recol·lectats al Montseny. *I Jornada de Recerca Naturalista al Montseny*: 61-63.

GALLARDO-MAYENCO, A., 1993. Macroinvertebrate associations in two basins of SW Spain. *Archive für Hydrobiologie*, 127(4): 473-483.

GALLARDO-MAYENCO, A., PRENDA, J. & TOJA, J., 1998. Spatio-Temporal distribution and ecological preferences of coexisting hydropsychid species (Trichoptera) in two Mediterranean river Basins (S Spain). *International Review of Hydrobiology*, 83(2): 123-134.

GARCÍA DE JALÓN, D., 1982. Contribución a la zoogeografía de los tricópteros españoles. *SHILAP Revista de lepidopterología*, 10(37, 38, 39): 75-78, 157-155, 237-244.

GARCÍA DE JALÓN, D., 1986. Los Hydropsychidae (Trichoptera) de la cuenca del Duero. *Boletín de la Asociación Española de Entomología*, 10: 127-138.

GONZÁLEZ, M. A., GARCÍA DE JALÓN, D. & TERRA, L., 1987. Faunistic studies on Iberian Trichoptera: A historical survey and present state of knowledge. *Proceedings of the 5th International Symposium on Trichoptera*: 85-90.

GONZÁLEZ, M. A., TERRA, L. S. W., GARCÍA DE JALÓN, D. & COBO, F., 1992. *Lista faunística y bibliográfica de los Tricópteros (Trichoptera) de la Península Ibérica e Islas Baleares*. Asociación Española de Limnología, 11. 200 pp.

GONZÁLEZ, M. A. & RUIZ, A., 2001. Une nouvelle espèce de Trichoptère du Sud de l'Espagne: *Allogamus gibraltaricus* n. sp. (Trichoptera: Limnephilidae). *Annales de Limnologie*, 37(3): 219-221.

GONZÁLEZ, M. A., 2003. El Reino Animal en la Península Ibérica y las Islas Baleares. Orden Trichoptera. http://www.fauna-iberica.mncn.csic.es/htmlfauna/faunibe/zoolist/insecta/trichoptera/trichoptera.html

GONZÁLEZ DEL TÁNAGO, M. & GARCÍA DE JALÓN, D., 1984. Desarrollo de un índice biológico para estimar la calidad del las aguas de la cuenca del Duero. *Limnetica*, 1: 263-272.

HERRANZ, J. M. & GARCÍA DE JALÓN, D., 1984. Distribución de las especies del género *Hydropsyche* (Trichoptera, Hydropsychidae) en la cuenca del alto Tajo (Guadalajara). *Limnetica*, 1: 203-206.

HILEY, P. D., 1970. A key to the larvae of four distinct limnephilids*: Drusus annulatus* Stephens*, Ecclisopteryx guttulata* (Pictet)*, Apatania muliebris* McLachlan and *Ironoquia dubia* (Stephens) (Trichoptera: Limnephilidae). *Entomologist's Gazette*, 21: 289-294.

KÖPPEN, W., 1923. *Die Klimate der Erde*. Bornträger. Berlin. 369 pp.

MALICKY, H., 1981. Weiters Neues über Köcherfliegen aus dem Mittelmeergebiet (Trichoptera). *Entomofauna (Zeitschrift für Entomologie)*, 2(27): 335-356.

MALICKY, H., 1983. *Atlas of European Trichoptera*. Dr. W. Junk Publishers. The Hague. 298pp.

MALICKY, H. & LOUNACI, A., 1987. Beitrag zur Taxonomie und Faunistik der Köcherfliegen von Tunesien, Algerien und Marokko (Trichoptera). *Opuscula Zoologica Fluminensia*, 14: 1-20.

MALICKY, H. & SIPAHILER, F., 1993. Köcherfliegen (Tricoptera) ans der Türkei mit Bemerkungen zu weiteren mediterranen Köcherfliegen. *Bulletin de la Société Entomologique Suisse,* 66: 457-478.

MALICKY, H., 1997. Die mediterranean, vorderasiatischen und europäischen Arten des *Hydroptila sparsa* – Gruppe (Trichoptera, Hydroptilidae). *Entomologische Berichte Luzern*, 38: 137-53.

MALICKY, H., 1998. Revision der Gattung *Mesophylax* McLachlan. *Beiträge zur Entomologie*, 48(1): 115-144.

MALICKY, H., 2002. The sub-specific division of *Rhyacophila dorsalis* Curtis, 1834 and its transitions to *R. nubila* Zetterstedt, 184 (Trichoptera: Rhyacophilidae). *Proceedings of the 10th International Symposium on Trichoptera*, 15: 149-166.

PANZENBÖCK, M. & WARINGER, J., 1997. A key to fifth instar larvae of *Halesus radiatus* Curtis 1834, *Halesus digitatus* Schrank 1781 and *Halesus tessella-*

tus Rambur 1842 (Trichoptera: Limnephilidae), based on Austrian material. *Aquatic Insects*, 19(2): 65-73.

PICAZO-MUÑOZ, J., 1995. *Caracterización y calidad de las aguas de los cauces de la cuenca del río Guadiana Menor. Aspectos fisico-químicos y macroinvertebrados acuáticos. PhD.* Universidad de Granada. Granada. 256 pp.

PRAT, N., PUIG, M. A. & GONZÁLEZ, G., 1983. *Predicció i control de la qualitat de les aigües dels rius Besòs i Llobregat II*. Diputació de Barcelona. Barcelona. 164 pp.

PRAT, N., RIERADEVALL, M., MUNNÉ, A., SOLÀ, C. & BONADA, N., 1999. *La qualitat ecològica del Llobregat, el Besòs i el Foix. Informe 1997*. Diputació de Barcelona. Barcelona. 154 pp.

PRAT, N., RIERADEVALL, M., MUNNÉ, A., SOLÀ, C. & BONADA, N., 2001. *La qualitat ecològica del Llobregat, el Besòs, el Foix i la Tordera. Informe 1991.* Diputació de Barcelona. Barcelona. 171 pp.

PRAT, N., VILA-ESCALÉ, M. & JUBANY, J., 2000. *Estat ecològic dels rius i rieres de la conca del riu Ter*. Projecte de recerca per a ALBATER. Grup ECO-BILL. 49 pp.

PRAT, N. & WARD, J. V., 1994. The tamed river. In: R. Margalef (ed.). *Limnology Now: A Paradigm of Planetary Problems*. Elsevier Science. London: 219-236.

PUIG, M. A., BAUTISTA, I., TORT, M. J. & PRAT, N., 1981. Les larves de trichoptères de la riviere Llobregat (Catalogne, Espagne). Distribution longitudinale et relation avec la qualite de l'eau. *Series Entomologica*, 20: 305-311.

RIERADEVALL, M. & PRAT, N., 2000. El zoobentos en los lagos y lagunas de alta montaña de la península Ibérica y su interés como indicadores de cambios ambientales. In: I. Granados & M. Toro (eds.). *Conservación de los lagos y humedales de alta montaña de la península Ibérica*. Ediciones de la Universidad Autónoma de Madrid. Madrid: 187-200.

ROBLES, S., TORO, M., NUÑO, C., AVILÉS, J., ALBA-TERCEDOR, J., ÁLVAREZ, M., BONADA, N., CASAS, J., JÁIMEZ-CUÉLLAR, P., MELLADO, A., MUNNÉ, A., PARDO, I., PRAT, N., SUÁREZ, M. L., VIDAL-ABARCA, M. R., VIVAS, S., MOYÀ, G. & RAMON, G., 2002. Descripción de las cuencas mediterráneas seleccionadas en el proyecto GUADALMED. *Limnetica,* 21(3-4): 35-61.

RUIZ, A., SALAMANCA-OCAÑA, J. C. & FERRERAS-ROMERO, M., 2001. Fauna de tricópteros (Insecta: TRICHOPTERA) de cursos de agua que drenan canutos del Parque Natural de Los Alcornocales (sur de España). *Boletín de la Asociación Española de Entomología*, 25(3-4): 105-120.

RUIZ, A., SALAMANCA-OCAÑA, J. C. & FERRERAS-ROMERO, M., in press. The larva of *Agapetus incertulus* McLachlan, 1884 (Trichoptera, Glossosomatidae). *Aquatic Insects*.

SCHMID, F., 1952. Les genres *Glyphotaelius* Steph. et *Nemotaulius* Bks (Trichopt. Limnophil.). *Bulletin de la Société Vaudoise des Sciences Naturelle*, 65(280): 213-244.

SOLÀ, C., 2001. *Efecte de la contaminació minera sobre la comunitat de macroinvertebrats a la conca del riu Guadiamar. Memòria DEA*. Universitat de Barcelona. Barcelona. 96 pp.

SOMMERHÄUSER, M., ROBERT, B. & SCHUHMACHER, H., 1997. Fligth periods and life history strategies of caddisflies in temporary and permanent woodland brooks in the Lower Rhine area (Germany). *Proceedings of the 8th International Symposium on Trichoptera*: 425-433.

SZCZESNY, B., 1978. Larvae of the subfamily Drusinae (Insecta: Trichoptera) from the Polish part of the Carpathian Mts. *Acta Hydrobiologica*, 20(1): 35-53.

TERRA, L. S. W., 1994. *Atlas provisório dos Tricópteros (Insecta, Trichoptera) de Portugal Continental*. Estudos e Informaçao, 360. Instituto Florestal, Vila do Conde. 100 pp.

TRABAUD, L., 1981. Man and Fire: Impacts on mediterranean vegetation. In: F. di Castri, D.W. Goodall & R.W. Specht (eds.). *Mediterranean-Type Shrublands*. Elsevier. New York: 523-537.

USSEGLIO-POLATERA, P., 1992. Graphical expression of the ecological significance of a faunistic assemblage and its application to the study of the Rhône river Trichoptera at Lyons (France). *Proceedings of the 7th International Symposium on Trichoptera:* 305-311.

VERA, R., 1979. La larva de *Limnephilus guadarramicus* Schmid, 1955 (Trich., Limnephilidae). *Boletín de la Asociación Española de Entomología*, 3: 65-71.

VIEDMA, M. G. & GARCÍA DE JALÓN, D., 1980. Description of four larvae of *Rhyacophila* (*Pararhyacophila*) from the Lozoya River, Central Spain, and key to the species of the Iberian Peninsula (Trichoptera: Rhyacophilidae). *Aquatic Insects*, 2(1): 1-12.

VIEIRA-LANERO, R., 1996. *Contribución al conocimiento de las larvas de algunos Tricópteros (Insecta: Trichoptera) de Galicia*. *MSc*. Universidade de Santiago de Compostela. Santiago de Compostela. 111 pp.

VIEIRA-LANERO, R., 2000. *Las larvas de los tricópteros de Galicia (Insecta: Trichoptera)*. *PhD*. Universidade de Santiago de Compostela. Santiago de Compostela. 611pp.

VIEIRA-LANERO, R., GONZÁLEZ, M. A. & COBO, F., 2001. Descripción de las larvas de dos endemismos ibéricos del género *Rhyacophila: R. melpomene* Malicky, 1976 y *R. laufferi* Navás, 1918 (Trichoptera, Rhyacophilidae). *Graellsia*, 57(1): 29-37.

WALLACE, I. D., WALLACE, B. & PHILIPSON, G. N., 1990. *A key to the case-bearing caddis larvae of Britain and Ireland.* Freshwater Biological Association Publications. Ambleside. 237 pp.

WARINGER, J. & GRAF, W., 1997. *Atlas der Östrreichischen Köcherfliegenlarven: unter Einschluss der angrenzenden Gebiete*. Facultas-Universitätsverlag. Wien. 286 pp.

WIGGINS, G. B., 1996. *Larvae of the North American Caddisfly Genera (Trichoptera). 2nd edition*. University of Toronto Press. Toronto. 457 pp.

ZAMORA-MUÑOZ, C., 1992. *Macroinvertebrados acuáticos, caracterización y calidad de las aguas de los cauces de la cuenca alta del río Genil. PhD*. Universidad de Granada. Granada. 255 pp.

ZAMORA-MUÑOZ, C. & ALBA-TERCEDOR, J., 1992. Description of the larva of *Rhyacophila (Rhyacophila) nevada* Schmid, 1952 and key to the species of *Rhyacophila* of the Iberian Peninsula (Trichoptera: Rhyacophilidae). *Aquatic Insects*, 14(2): 65-71.

ZAMORA-MUÑOZ, C. & ALBA-TERCEDOR, J., 1995. Primera cita de *Halesus tessellatus* Rambur 1842 (Trichoptera: Limnephilidae) en la Península Ibérica. *Boletín de la Asociación Española de Entomología*, 19(3-4): 200-201.

ZAMORA-MUÑOZ, C., ALBA-TERCEDOR, J. & GARCÍA DE JALÓN, D., 1995. The larvae of the genus *Hydropsyche* (Hydropsychidae; Trichoptera) and key for the identification of species of the Iberian Peninsula. *Bulletin de la Société Entomologique Suisse*, 68: 189-210.

ZAMORA-MUÑOZ, C., PICAZO, J. & ALBA-TERCEDOR, J., 1997. New findings of the larval pattern variability in *Rhyacophila meridionalis* Pictet, 1865 (Trichoptera: Rhyacophilidae). *Aquatic Insects*, 19(1): 1-8.

ZAMORA-MUÑOZ, C., GONZÁLEZ, M. A., PICAZO-MUÑOZ, J. & ALBA-TERCEDOR, J., 2002. *Hydropsyche fontinalis*, a new species of the *instabilis*-group from the Iberian Peninsula (Trichoptera, Hydropsychidae). *Aquatic Insects*, 24(3): 189-197.

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Appendix.— Location of sampling sites. For each site the code used in the text, UTM coordinates, river name, province and altitude above the sea level are shown.

Apéndice.— Localización de las estaciones muestreadas. Para cada estación se presenta el código utilizado en el texto, las coordenadas UTM, el nombre del río, la provincia y la altitud.

Site code	X_UTM	Y_UTM	Altitude (m.)	Stream/River	Province
TER BASIN					
T1	4416	46940	1440	Ter	Girona
T2	4425	46934	1380	Ter/Carboners	Girona
T3	4428	46874	1080	Ter	Girona
T4	4448	46862	1000	Ter	Girona
T5	4234	46790	1020	Garfull	Girona
T7	4499	46926	1220	Ritort	Girona
T8	4506	46919	1200	Ritort	Girona
T9	4508	46910	1160	Ritort	Girona
T10	4513	46908	1180	Fabert	Girona
T11	4517	46888	1080	Torrent de la Ginestosa	Girona
T12	4484	46853	960	Ritort	Girona
T14	4476	46927	1420	Torrent de la Casassa	Girona
T15	4463	46869	920	Feitús	Girona
T16	4388	46703	920	La Tolosa	Girona
T17	4266	46851	1060	Rigart	Girona
T18	4295	46918	2060	Fontalba	Girona
T19	4303	46945	1980	Torrent de Finestrelles	Girona
T20	4419	46900	1180	Ter	Girona
T21	4515	46887	1060	Ritort	Girona
SO	4355	46648	640	Riera de la Solana	Barcelona
TM1	4428	46300	740	Torrent de Valldoriola	Barcelona
TM2	4466	46333	680	Riera de la Sala	Girona
TM3	4477	46336	700	Riera Major	Girona
TM4	4493	46320	800	Torrent de Collpregon	Girona
TM5	4522	46341	760	Riera d'Espinelves	Girona
TORDERA BASIN					
ToM6	4552	46306	480	Riera d'Arbúcies	Girona
ToM7	4575	46293	460	Sot del Clot	Girona
ToM8	4582	46299	360	Riera d'Arbúcies	Girona
ToM9	4631	46270	200	Riera d'Arbúcies	Girona
ToM10	4481	46249	480	Riera de la Castanya	Barcelona
ToM11	4484	46248	460	Riera de Sant Marçal	Barcelona
ToM12	4512	46265	780	Riera de Sant Marçal	Barcelona
ToM13	4529	46229	720	Sot de l'Infern	Barcelona
ToM14	4545	46258	1220	Riera de Santa Fe	Barcelona
ToM15	4555	46251	1140	Riera de Santa Fe	Barcelona
RIBERA RIBAGORÇANA BASIN					
INLET	3183	47234	2240	Inlet to Lac Redon	Lleida
OUT0m	3179	47232	2220	Barranc de Lac Redon	Lleida
OUT200m	3170	47231	2200	Barranc de Lac Redon	Lleida
BESÒS BASIN					
B8a	4458	46178	320	Riera de Cànoves	Barcelona
B10	4400	46145	220	Congost	Barcelona
B12	4296	46109	240	Riera de Caldes	Barcelona
B16	4373	46044	100	Tenes	Barcelona
B17a	4315	46063	240	Caldes	Barcelona
B22	4211	46132	340	Ripoll	Barcelona
B24	4253	46165	560	Gallifa	Barcelona
B25	4327	46174	250	Tenes	Barcelona
B28	4308	46196	570	Tenes	Barcelona
B36	4381	46269	500	Martinet	Barcelona

Appendix.— *(Continued).*

Site code	X_UTM	Y_UTM	Altitude (m.)	Stream/River	Province
B29	4422	46293	1000	Avencó	Barcelona
B30	4362	46293	530	Congost	Barcelona
B32	4397	46248	340	Avencó	Barcelona
B35	4403	46199	380	Vallcàrquera	Barcelona
B7a	4490	46161	320	Vilamajor	Barcelona
B7	4540	46102	320	Riera de les Arenes	Barcelona
LLOBREGAT BASIN					
SC1	3999	46458	760	Riera de Sant Cugat	Barcelona
L100	4039	46151	165	Cardener	Barcelona
L101	4049	46135	150	Llobregat	Barcelona
L102	4061	46179	180	Llobregat	Barcelona
L38	4007	46232	220	Cardener	Barcelona
L39	3974	46300	250	Cardener	Barcelona
L42	3931	46373	386	Cardener	Barcelona
L43	3852	46448	425	Cardener	Barcelona
L44	3942	46322	630	Negre	Barcelona
L45	4158	46166	540	Riera de les Nespres	Barcelona
L54	4009	46769	720	Llobregat	Barcelona
L56	4164	46796	1360	Llobregat	Barcelona
L57	4138	46770	840	Llobregat	Barcelona
L60a	4074	46601	487	Llobregat	Barcelona
L60c	4073	46550	460	Llobregat	Barcelona
L61	4167	46531	550	Merlès	Barcelona
L64a	4117	46283	320	Gavarresa	Barcelona
L67	4078	46395	320	Llobregat	Barcelona
L68	4071	46350	285	Llobregat	Barcelona
L77	3813	46049	310	Anoia	Barcelona
L82	3760	46121	465	Veciana	Barcelona
L90	4175	45848	20	Llobregat	Barcelona
L91	4137	45917	45	Llobregat	Barcelona
L94	4104	45953	60	Llobregat	Barcelona
L95	4068	46026	80	Llobregat	Barcelona
FOIX BASIN					
F11	3825	45864	400	Albareda	Barcelona
F24	3753	45865	660	Pontons	Barcelona
F25	3765	45861	580	Pontons	Barcelona
MIJARES BASIN					
MI1	6840	44770	1370	Mijares	Teruel
MI10	6861	44561	950	Valbona	Teruel
MI3	6839	44550	920	Mijares	Teruel
MI4	6987	44445	690	Mijares	Teruel
MI5	7212	44373	310	Mijares	Castellón
MI6	7375	44302	90	Mijares	Castellón
MI7	6900	44415	890	Albentosa	Castellón
MI8	7173	44561	760	Villahermosa	Castellón
MI9	7263	44380	300	Villahermosa	Castellón
TURIA BASIN					
TU10	6849	43860	200	Turia	Valencia
TU11	7046	43840	95	Turia	Valencia
TU12	6720	43797	550	Sot	Valencia
TU13	6535	44212	605	Turia	Valencia
TU1	6943	44766	1470	Alfambra	Teruel
TU2	6703	44958	1070	Alfambra	Teruel
TU3	6635	44753	930	Alfambra	Teruel
TU5	6085	44719	1530	Turia	Teruel

Appendix.— *(Continued).*

Site code	X_UTM	Y_UTM	Altitude (m.)	Stream/River	Province
TU4	6627	44268	900	Arcos	Teruel
TU6	6317	44737	1140	Turia	Teruel
TU7	6545	44550	820	Turia	Teruel
TU8	6489	44259	650	Turia	Cuenca
TU9	6717	43965	340	Turia	Valencia
JÚCAR BASIN					
JU10	5805	43504	670	Júcar	Albacete
JU11	6080	43332	620	Júcar	Albacete
JU12	6338	43395	515	Júcar	Albacete
JU13	6907	43489	160	Júcar	Valencia
JU15	6679	43633	540	Magro	Valencia
JU16	7081	43562	125	Magro	Valencia
JU17	6093	44015	830	Guadazaón	Cuenca
JU19	6876	43573	290	Magro	Valencia
JU1	6244	44543	1300	Cabriel	Teruel
JU2	6141	44112	850	Cabriel	Cuenca
JU3	6434	43557	390	Cabriel	Valencia
JU4	6644	43465	340	Cabriel	Valencia
JU5	6684	43361	400	Cantaban	Valencia
JU6	6048	44403	1120	Guadazaón	Cuenca
JU7	5987	44684	1300	Júcar	Cuenca
JU8	5985	44537	1200	Júcar	Cuenca
JU9	5651	44199	840	Júcar	Cuenca
SEGURA BASIN					
SE10	5972	41761	650	Corneros	Murcia
SE13	6460	41635	60	Majada	Murcia
SE15	6701	41023	100	Garruchal	Murcia
SE16	5901	42151	780	Argos	Murcia
SE18	5488	42302	720	Zumeta	Albacete
SE1	5346	42246	1020	Segura	Jaén
SE2	5345	42258	1020	Madera	Jaén
SE3	5557	42219	950	Taibilla	Albacete
SE4	5492	42565	1040	Mundo	Albacete
SE5	5815	42675	650	Mundo	Albacete
SE6	6175	42439	330	Mundo	Albacete
SE7	5975	42104	710	Quipar	Murcia
SE8	6314	42166	410	Perea	Murcia
ALMANZORA BASIN					
AL1	5357	41323	1000	Sauco	Almería
AL10	5539	41327	600	Sierro	Almería
AL11	5533	41306	760	Sierro	Almería
AL14	5690	41280	560	Chercos	Almería
AL15	5666	41277	760	Chercos	Almería
AL17	5919	41342	180	Almanzora	Almería
AL2	5357	41323	960	Sauco	Almería
AL3	5403	41335	820	Herrerías	Almería
AL4	5427	41341	760	Almanzora	Almería
AL5	5493	41334	690	Bacares	Almería
AL6	5500	41310	800	Bacares	Almería
AL7	5493	41290	920	Bacares	Almería
AGUAS BASIN					
AG1	5826	41052	260	Aguas	Almería
AG2	5844	41055	210	Aguas	Almería
AG3	5862	41073	180	Aguas	Almería
AG5	5950	41115	60	Aguas	Almería
AG7	5883	41135	210	Jauto	Almería

Appendix.— *(Continued).*

Site code	X_UTM	Y_UTM	Altitude (m.)	Stream/River	Province
ADRA BASIN					
AD1	5001	40701	80	Adra	Almería
AD2	4974	40862	370	Adra	Almería
AD3	4984	40762	200	Adra	Almería
AD4	4990	40935	680	Adra	Almería
AD5	4982	41038	1820	Adra	Almería
GUADALFEO BASIN					
GU10	4549	40786	160	Guadalfeo	Granada
GU11	4690	40943	1540	Poqueira	Granada
GU12	4677	40887	1000	Poqueira	Granada
GU13	4674	40851	500	Poqueira	Granada
GU14	4540	40938	1100	Torrente	Granada
GU15	4774	40967	1540	Trevélez	Granada
GU16	4674	40841	500	Guadalfeo	Granada
GU1	4636	40916	1860	Chico	Granada
GU2	4541	40989	1300	Dúrcal	Granada
GU3	4489	40949	760	Dúrcal	Granada
GU4	4487	40878	500	Dúrcal	Granada
GU5	4832	40931	1350	Guadalfeo	Granada
GU6	4814	40856	860	Guadalfeo	Granada
GU7	4733	40834	540	Guadalfeo	Granada
GU8	4657	40828	340	Guadalfeo	Granada
GU9	4596	40815	220	Guadalfeo	Granada
GUADALQUIVIR BASIN					
GE	2181	41586	60	Guadiamar	Sevilla