Notes on *Hydraena (Phothydraena) atrata*
Desbrochers des Loges, 1891, with comments
on the Iberian species of the subgenus
(Coleoptera: Hydraenidae)

P. Aguilera, I. Ribera & G.N. Foster

ABSTRACT

The distribution of *Hydraena (Phothydraena) atrata* Desbrochers des Loges, 1891 is extended to several localities in North-east and Central Spain, being recorded for the first time in Portugal. In coexisting populations, the species can be externally separated from *H. (P.) testacea* Curtis, 1830 by its broader and less chitinized elytral epipleura. It was found mainly in habitats with stagnant or slowly flowing turbid water, steep edges, and silt substratum. It also occurred in temporary fens, the edges of streams, and in artificial habitats, sometimes in high densities. Phenology and relative abundance through the year indicates a univoltine life cycle, with over-wintering adults and late spring or early summer breeding. The same life cycle was observed in *H. testacea*, with which it coexisted in most of the sites. Peak population densities were found in early autumn. The third Iberian species of the subgenus, *H. (P.) hernandoi* Fresneda & Lagar, 1990 is recorded for the first time after its description from several localities south of the Guadalquivir river.

Key words: Hydraenidae, Phothydraena, distribution, ecology, phenology, external morphology, Iberian Peninsula.

RESUMEN

Notas sobre *Hydraena (Phothydraena) atrata* Desbrochers des Loges, 1891, con referencia al resto de especies ibéricas del subgénero (Coleoptera: Hydraenidae).

La distribución de *Hydraena (Phothydraena) atrata* Desbrochers des Loges, 1891 se amplía a distintas localidades del noreste y el centro de España, citándose además por primera vez de Portugal. En poblaciones en las que coexisten se puede distinguir externamente de *H. (P.) testacea* Curtis, 1830 por las epipleuras elípticas, más anchas y menos quitinizadas. Se ha encontrado principalmente en aguas estancadas o débilmente corrientes, turbias, con márgenes verticales y fondo arcilloso. También se encuentra en lagunas temporales, orillas de ríos y hábitats artificiales, en ocasiones en gran abundancia. La fenología y la abundancia relativa de los adultos a lo largo del año sugieren un ciclo de vida univoltino, con adultos hibernantes que se reproducen...
a finales de primavera o a principios de otoño, al igual que en *H. testacea*, con la que convive habitualmente. Las mayores densidades de adultos se encontraron a primeros de otoño. La tercera especie ibérica del subgénero, *H. (P.) hernandoi* Fresneda & Lagar, 1990, se cita, por primera vez desde su descripción, en distintas localidades al sur del río Guadalquivir.

**Palabras clave:** Hydrænidae, *Phothydraena*, distribución, ecología, fenología, morfología externa, Península Ibérica.

**INTRODUCTION**

Three species of *Phothydraena* are known to occur in the Iberian Peninsula, *Hydraena (P.) testacea* Curtis, 1830; *H. (P.) atrata* Desbrochers des Loges, 1891; and *H. (P.) hernandoi* Fresneda & Lagar, 1990. *H. testacea* is a Western Palaearctic species widely distributed in the Iberian Peninsula, although some old records may refer to other species of the subgenus (VALLADARES & MONTES, 1991; AGUILERA & GEREND, 1995).

The known distribution of *H. atrata* ranges from Central and Southern France to North Africa (BERTHÉLEMY, 1986; BERTHÉLEMY et al., 1991; VALLADARES & MONTES, 1991). Although the distribution was supposed to be continuous (BERTHÉLEMY, 1986), previous records from the Iberian Peninsula were rather scarce and dispersed: four localities close together in the south of the province of León (VALLADARES, 1985; VALLADARES, 1988), Madrid (specimens from the Museo Nacional de Ciencias Naturales, Madrid, BERTHÉLEMY, 1965), and Tafalla, in Navarra (GARRIDO et al., 1994). The species has been found in several new localities in NE and Central Spain, and in Portugal (figure 1), confirming its wide distribution in the Iberian Peninsula.

The only published records of *H. hernandoi* were those provided in its description, several localities in Sierra de Cazorla (Jaén) and Málaga (FRESNEDA & LAGAR, 1990). Its distribution is extended to Granada, Cádiz and other localities in Málaga and Jaén (figure 1), all of them south of the Guadalquivir river, an area with a large number of endemic species of *Hydrænidae* (VALLADARES & MONTES, 1991).

**STUDIED MATERIAL**

*Hydraena (Phothydraena) testacea* Curtis, 1830

Only material from the Canadal fens is listed, as comments on the pheno-logy and life cycle of this species were based on it (see below). For its detailed distribution in the Iberian Peninsula see VALLADARES & MONTES (1991) and AGUILERA & GEREND (1995).

Hydraena atraía in the Iberian Peninsula


Hydraena (Phothydraena) arrata Desbrochers des Loges, 1891

RESULTS AND DISCUSSION

Distribution

\(H. \text{ testacea}\) and \(H. \text{ atraia}\) seem to be present in the whole Iberian Peninsula. However, the occurrence of \(H. \text{ atraia}\) SE of the Guadalquivir valley has to be confirmed. On the other hand, the limits of the distribution of \(H. \text{ hernandoi}\) remain uncertain, both in the Iberian Peninsula (whether if it occurs NW of the river Guadalquivir) and in nearby areas, namely North Africa and the Balearic islands. BERTHÉLEMY (1986) noticed that southern Spanish and northern African specimens of \(H. \text{ testacea}\) were morphologically different from French or northern Spanish ones. If, as suggested by FRESNEDA & LAGAR (1990), these differences correspond to what it is described as \(H. \text{ hernandoi}\), its presence in North Africa seems most likely. Moreover, the close biogeographical relationships between the Bético-Rifeño system, the African Riff mountains and some Mediterranean islands have to be considered in evaluating its potential distribution (BENNAS et al., 1992).

External morphology

BERTHÉLEMY (1965) noted the external similarity between \(H. \text{ atraia}\) and \(H. \text{ testacea}\), using the male genitalia as the only character for their identification. Subsequently, BERTHÉLEMY (1986) described differences in the 10th...
abdominal tergite, and in the shape of the apex of the elytra (rounded in *H. testacea*, oval in *H. atrata*). According to Valladares (1988) specimens of *H. atrata* were usually darker than those of *H. testacea*, and with more excavated posterior pronotal expansions. We have found some variability in these characters, in particular the colour of both species, which is virtually the same in samples in which they coexist. There is no clear size differences between the two species (Berthélémy et al., 1991).

The studied specimens of *H. hernandoi* had the head black and a very dark pronotum, in agreement with Fresneda & Lagar (1990). However, the same authors noted that some southern specimens of *H. testacea* could be similarly dark (the species was not compared with *H. atrata*). As seen above, the colour of the head and pronotum of *H. atrata* and *H. testacea* is variable, being completely black in some cases.

In studying coexisting populations of *H. atrata* and *H. testacea* we observed that the expansions of the elytral epipleura (particularly in the apex of the elytra) were broader in *H. atrata*, with the maximum width at the point of maximum curvature (figure 2). They also were less chitinized, with a paler aspect. In *H. testacea* these expansions were narrower, more uniform, and

![Figure 2: Elytral epipleura of: a, *H. testacea* and b, *H. atrata*, ventral view (La Junquera, 10-IX-1994, both males). Traced from photographs.](image)

more chitinized. Although in some specimens differences were difficult to perceive, it is easy to detect in large samples the presence of both species without having to dissect all the specimens.

*H. hernandoi* seems to have a broad, regularly curved epipleura, similar to that of *H. atrata*. However, until more specimens and populations can be studied it is not possible to assess the constancy of this character. We have not observed any constant difference in the size or the shape of the enlarged punctures of the apex of the elytra between the three species, this being also a variable character.

**Ecology and Phenology**

**Valladares** (1988) provided the first description of the habitat of *H. atrata*. This author found the species in the edges of streams with silt or sandy substratum, with turbid water and a slow current.

The specimens from Zaragoza, Teruel, Corbera d’Ebre and some sites in La Junquera shared a well defined habitat, resembling those described by **Valladares** (1988): artificial excavated ponds, with silt substratum, turbid water, step edges, and with no or little vegetation. The species also occurred in residual ponds in temporary streams (Querol), the edges of permanent rivers (Gaià), artificial watering places with dead leaves and other plant debris (La Junquera), and natural freshwater temporary fens with aquatic vegetation dominated by several species of *Phragmites*, *Typha* and *Scirpus* (La Junquera) (see **Ribera et al.**, 1994 for a detailed description of the habitats from La Junquera). It coexisted with *H. testacea* in most of the habitats in La Junquera and Tarragona, but not in the sites in Zaragoza and Teruel (although *H. testacea* was found in a nearby watering place in Tornos).

The species occurred in water with a conductivity ranging from 200 to more than 1000 μS, and pH between 6 and 9. It also had a rather wide altitudinal range (from 170 to more than 1000 m). The key characteristics of its habitat thus seem to be related more to its physical structure, and probably to the availability of a suitable kind of detritus. *H. hernandoi* has so far being found in small streams and springs with clear water.

Most of the previous records of *H. atrata* refer to isolated specimens, so there is no published information concerning its phenology and life cycle. Regular sampling of the temporary fens and associated habitats in La Junquera during two complete cycles, in which the species was found regularly and abundantly, allow us to give a first account of its biology. Adult specimens were found all the year around, but there were two population peaks: one in spring, and other, much more pronounced, in autumn. Immature specimens were collected from July to September both in 1990 and in 1994. *H. testacea* showed a similar pattern in its phenology, but in both years immature specimens appeared a month before those of *H. atrata*. In the two sites in Zaragoza, sampled in July, there were also immature adults of *H. atrata*.

According to **Landin** (1976) for Hydrophiloidea, **Nilsson** (1986) for Agabini, and **Cuppen** (1993) for *Hydraena*, this pattern conforms to a univoltine life cycle, in which the beetles breed during late spring or early summer and
hibernate as adults. Immature adults of *H. testacea* were found in the Netherlands from July to November (CUPPEN, 1993). Both LANDIN (1976) and CUPPEN (1993) found that adults were more abundant in the spring peak, while in Capmany the autumn peak was more pronounced (as measured with semi-quantitative samples, RIBERA et al., 1994). However, if adults reproduce in early summer, and the new generation overwinter as adults, the maximum density is expected to occur in autumn and not in spring (the spring population would be those adults that had survived the winter, while the autumn population would be the whole new generation).

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REFERENCES


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Pedro Aguilera. Carrer del Pou 21-23, átic 2. 08016 Barcelona (España)  
Ignacio Ribera. Avda. Dr. Massana 14, 2. 08760 Barcelona (España)  
Garth N. Foster. 3 Eglinton Terrace. Ayr KA7 1JJ (Scotland, U.K.)