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Aquatic Invasions Records

First record of the Asian leech *Barbronia weberi* (Blanchard, 1897) (Hirudinea: Arhynchobdellida: Erpobdelliformes: Salifidae) in the Iberian Peninsula

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Abstract

Barbronia weberi, an Asian leech, was found in September-October 2010 in a river from Central Spain. This is the first record of the species for the Iberian Peninsula and the Jarama River in particular, where in September-October 2010 the leech was collected during sampling for a bioassessment program. On the program's completion we expect to observe the seasonal dynamic of *B. weberi* population in the Jarama River.

Key words: *Barbronia weberi,* Salifidae, non-native species, Jarama River, Spain

Introduction

The high population density of Central Spain in the vicinity of Madrid has, in addition to shortage of fresh water resources and intensive water use in the area, led to the implementation of discharge regulations on watercourses. Anthropogenic impacts have changed the morphology, hydrology as well as the physical and chemical properties of surface waters in this area. As we noticed from our study, the temperature of river water downstream from a series of wastewater treatment plants (WWTPs) has increased by 3-5°C in the rivers Manzanares, Henares and Jarama (tributaries of the Tajo River).

In particular, this higher water temperature has enabled tropical aquatic invasive species, such as the Asian leech *Barbronia weberi* (Blanchard, 1897) (Hirudinea: Arhynchobdellida: Erpobdelliformes: Salifidae), to establish themselves in these rivers. The leech belongs to the family Salifidae and is a typical freshwater predator that feeds on invertebrates (e.g. oligochaeta, insect larvae and small molluscs), swallowing the entire prey organism (Reed 2001). Members of Salifidae originate from Asia with records of introductions to North and South America, Australia, New Zealand and Europe (Govedich et al. 2003).

The distribution of *B. weberi* in the Iberian Peninsula has not yet been reported in the literature, making the material presented here the first description of the leech in this geographical area.

Materials and methods

During a 2010 macroinvertebrate sampling campaign on rivers in the area of Madrid *Barbronia weberi* was collected at one location on the Jarama River near transport bridge over the river next to the village of Paracuellos (N 40°29′54″, W 03°32′55″; altitude – 584,2 m) (Figure 1). The leech was discovered during sampling in September and October. In total we collected 6 specimens using a hand net sampling (25×25 cm frame, mesh size 500 µm) with the "kick-method" in shallow areas (0.3-0.5 m), by washing stones with a brush and by using Dutch artificial substrates (Pashkevich et al. 1996; De Pauw et al. 1994) – stainless steel baskets filled with glass marbles. All macroinvertebrates were preserved in 96% alcohol and stored in the

Figure 1. Map of the study area indicating the sampling location on the Jarama River (indicated by cycle). Map background : GoogleMaps.

Table 1. Minimum and maximum values of chemical parameters (n=2) at the sampling locations on the Jarama River measured in 2010-11.

Parameters	Paracuellos	Uceda
Temperature (°C)	14.9 – 20.3	12.3 – 14.0
pH	7.55 – 7.77	7.08 – 7.27
Conductivity (µS/cm)	700 – 847	252 – 259
Oxygen (mg/l)	5.91 – 7.44	9.14 – 9.83
Oxygen saturation (%)	65 – 74	89 – 92
BOD5 (mgO_2/l)	2.0	1.0
NH4+ (mg/l)	6.03 – 6.78	0.71 – 2.95
Total phosphorus (mg/l)	0.27 – 1.15	0.05 – 0.22

refrigerator (4°C) prior to identification. The samples were examined with an OLYMPUS SZX7 binocular microscope (magnification: 20× to 200×), and with a SZ51 (magnification: 5× to 20×). Individuals were identified, counted and weighed prior to glycerol treatment for 24 hours to increase their transparency, slides were prepared and pictures taken (with a DP-21 OLYMPUS digital camera).

Results and discussion

The Paracuellos location on the Jarama River where the leech specimens were collected was characterized by a poor to moderate chemical water quality (Table 1). The difference in water quality between Paracuellos and an upstream reference location (Uceda) was due to discharges from domestic and industrial wastewater treatment plants between Uceda and Paracuellos. At the Paracuellos site, the conductivity and the NH^{4+} concentration were three times higher than at Uceda, and the total phosphorus was five times higher. The oxygen saturation was lower downstream of the sewage effluent outlets as well. Moreover, water temperature and pH values were also higher at the Paracuellos sampling point.

Barbronia weberi (Blanchard, 1897) is a species of Salifidae previously belonging to the Erpobdellidae family (Soos 1966). It is the most common leech found in the Indian subcontinent (Nesemann and Neubert 1999). This species has been probably introduced on a global scale as occasional specimens through the aquarium trade. Nowadays this leech may be considered as a cosmopolite, because it has been recorded all over the world during the last 30 years: in New Zealand (Mason 1976), England (Sawyer 1986),

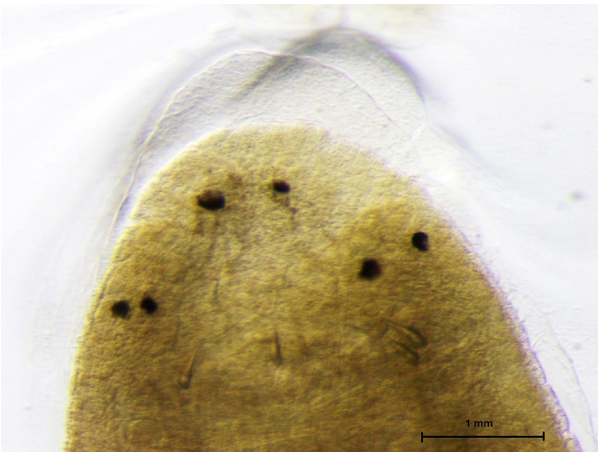

Figure 2. Dorsal view of the apical end of *Barbronia weber*i, three pairs of eyes and pharyngeal stylets are visible. Photo by T. Pavluk.

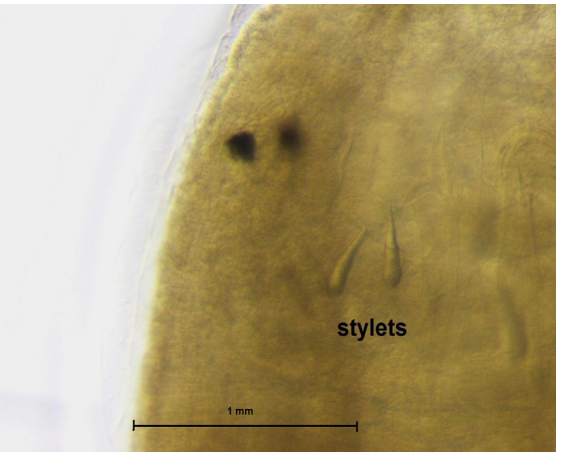

Figure 3. Dorsal view of the left apical part of *Barbronia weberi*, the pair of pharyngeal stylets is noticeable in details. Photo by T. Pavluk.

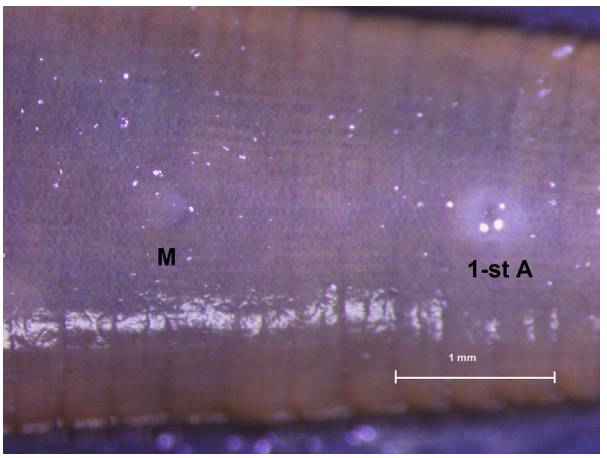

Figure 4. Ventral view of the male gonopore (M) and the first accessory pore (A). Photo by T. Pavluk.

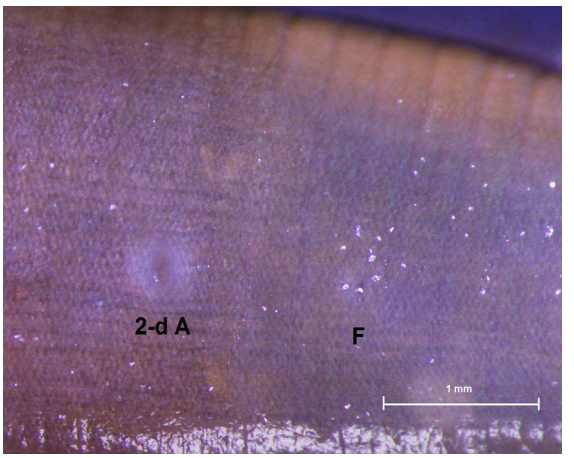

Figure 5. Ventral view of the female gonopore (F) and the second accessory pore (A). Photo by T. Pavluk.

Austria and Germany (Nesemann and Neubert 1999), Brazil (Pamplin and Rocha 2000), United States (Rutter and Klemm 2001), Australia (Govedich et al. 2002), Netherlands (Haaren et al. 2004) and Italy (Genoni and Fazzone 2008). However, according to the Fauna Europea Web Page (2010) and the Fauna Iberica Web Site (2011) neither *B. weberi* nor the family Salifidae in general have been reported previously in the Iberian Peninsula, so that this is the first record of this species and family in this geographical area.

In its native area this species lives in all types of waters, giving preference to waters with a high trophic level. Typical biotopes for the leech are macrophytes and hard submerged substrates like stones and woody debris (Govedich et al. 2003). Mature leeches are highly reproductive and may form, on a weekly basis, one cocoon of 1-5 eggs, during three months of its life cycle. Because this species can grow rapidly and produce a large number of eggs over a short period of time, and it can piggyback with plant species and travel through the aquarium trade, there is potential for *B. weberi* to rapidly invade new localities (Govedich et al. 2003).

B. weberi is clearly distinguished from other autochthonous erpobdellids of similar general

habitus by several characteristics. The general body shape is very typical for leeches of the Erpobdellidae. In the field, the body is covered by minute papillae on the dorsal surface, so that it takes a rough appearance. When specimens are fixed, papillae are not visible. In a preserved condition it has grey-reddish color. Three pairs of eyes are very visible: one labial pair and two buccal pairs (Figure 2). Moreover, this species has three pairs of pharyngeal needle-shaped stylets (Figure 2, 3). Male and female gonopores are distinguished by 4.5 annuli. Two accessory gonopores, one anterior and one posterior to the male and female gonopores, are allocated in the X/XI and XIII/XIV somites (Figure 4, 5).

Apart the finding, reported here, the further distribution of *B. weberi* in the Iberian Peninsula is currently still unknown. Taking into account its tolerance to a wide range of environmental conditions and high reproductive rate, the species could be considered as a successful colonizer. Although *B. weberi* has been characterized as invasive, the invasiveness of most non-native leech species does not appear to have the aggressive nature of some invasive crayfish and fish species (Sket and Trontelj 2008). Other leech captured along with *B. weberi* at the place was *Helobdella stagnalis*. Successful co-existence of both leech species could be partly explained by their different trophic spectrum specialization. *B. weberi* seems to feed predominantly on aquatic oligochaetes and chironomid larvae, swallowing them completely in (Nesemann 1995; Seaby et al. 1995), whereas *Helobdella stagnalis* preys on chironomid larvae and mollusks by sucking the body contents of their prey (Siddall and Budinoff 2005).

As the species was found at one location of the Jarama River in 2010, we can probably expect the further distribution of this leech downstream to Portugal via the Tajo River waterway. In terms of further studies, the seasonal dynamics of the *B. weberi* population in the Jarama River, their potential expansion and the possible effects on the native biota should be researched in follow-up studies.

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