

An update on the distribution of *Cobitis paludica* (de Buen, 1930) in the NW Iberian Peninsula

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ABSTRACT

An update on the distribution of *Cobitis paludica* in the NW Iberian Peninsula

It has long been believed that the southern Iberian spined-loach (*Cobitis paludica*) was introduced to the northwest of the Iberian Peninsula. This paper updates the distribution of the southern Iberian spined-loach in the NW Iberian Peninsula with six new localities in the rivers Furnia, Hospital, Pego, Pontiñas, Tripes and Ulla, some of which with substantial populations (Pego and Tripes). This study supports the view that the southern Iberian spined-loach is native in the NW Iberian Peninsula, where its populations are mostly small and appear to be very fragmented. It is therefore critical that sampling effort is increased, to improve our knowledge of the species' abundance, distribution and population dynamics.

Key words: Cobitidae, Cypriniformes, distribution, endemic species

RESUMEN

Actualización de la distribución de *Cobitis paludica* en el noroeste de la Península Ibérica

Durante mucho tiempo se ha creído que la presencia de la colmilleja (*Cobitis paludica*) en el noroeste de la Península Ibérica se debe a introducciones. Este artículo actualiza la distribución de la colmilleja en el noroeste de la Península Ibérica con seis nuevas localidades en los ríos Furnia, Hospital, Pego, Pontiñas, Tripes y Ulla, algunas de las cuales con sustanciales poblaciones (Pego y Tripes). Este estudio respalda la opinión de que la colmilleja es nativa en el noreste de la Península Ibérica, donde sus poblaciones son en su mayoría pequeñas y parecen estar muy fragmentadas. Por lo tanto, es fundamental aumentar el esfuerzo de muestreo para mejorar nuestro conocimiento sobre la abundancia, la distribución y la dinámica poblacional de la especie.

Palabras clave: Cobitidae, Cypriniformes, distribución, especie endémica

INTRODUCTION

The southern Iberian spined-loach, *Cobitis paludica* (de Buen, 1930), is a fish species endemic to the Iberian Peninsula that tends to inhabit the middle-lower parts of rivers with low current and feeds predominantly on insect larvae, algae and detritus (Perdices & Doadrio, 1997). This species is listed as vulnerable (VU) in the Spanish Red Data Book due to abundance declines and contractions in distribution (Doadrio, 2001; Doadrio *et al.*, 2011).

The southern Iberian spined-loach is widely distributed in Iberian river basins (the Albufera de Valencia, Aljibre, Alvor, Arade, Barbate, Bullent, Cavado, Ebro, Guadalete, Guadalhorce, Guadalmedina, Guadalquivir, Guadiana, Jara, Jucar, Limia, Lis, Mijares, Miño, Mondego, Nalón, Odiel, Peñíscola, Piedras, Racons, Sado, Samarra, Segura, Serpis, Sizandro, Tagus, Turia, Vega, and some tributaries on the western margin of Douro basin) (Hervella & Caballero, 1999; Doadrio, 2001; Doadrio & Perdices, 2005; Doadrio *et al.*, 2011; Perea *et al.*, 2011). It has long been believed that anglers introduced the species to some tributaries of the Duero basin and the NW Iberian Peninsula (Elvira, 1995; Doadrio, 2001; Doadrio *et al.*, 2011). The species was also introduced in the Segura basin, but these populations may be a consequence of a water-transfer scheme between the Tajo and Segura basins (Verdiell-Cubero *et al.*, 2012). The aims of this note are to (i) update the information on the distribution of the southern Iberian spined-loach in the NW Iberian Peninsula, and (ii) discuss whether the species should be considered as introduced or native in the NW Iberian Peninsula.

MATERIAL AND METHODS

Sampling campaigns were conducted from June to September in 2008 and 2010 in 23 siliceous rivers in Galicia (NW Spain) (Fig. 1). Ten systems (Anllóns, Eo, Lerez, Mandeo, Masma, Mera, Ouro, Sar, Ulla and Umia) were surveyed in 2008, and the international stretch of the River Miño and 12 tributaries (Barxas, Caselas, Deva, Furnia, Hospital, Louro, Pego, Ribadil, Tamuxe, Tea, Termes and Tripes) were surveyed in 2010.

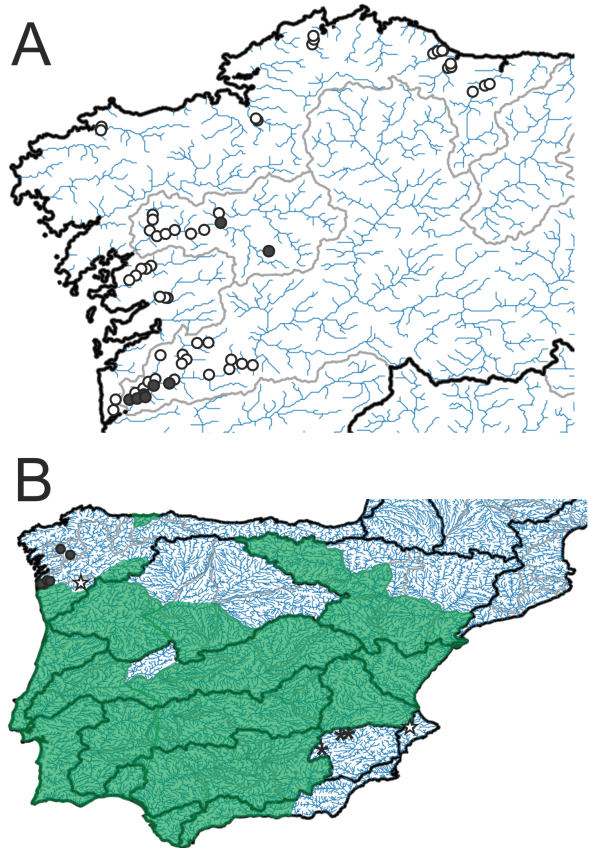


Figure 1. Maps of the NW Iberian Peninsula (A) and Iberian Peninsula (B) showing the distribution of the southern Iberian spined-loach (*Cobitis paludica*). A = Map of the sampling sites in 23 rivers of Galicia (NW Spain). Presence of the species in dark circles (●) and absence in white circles (○). B = The distribution of the southern Iberian spined-loach. The potential distribution of the southern Iberian spined-loach, based on the work of Perea *et al.* (2011), is coloured green. Stars (☆) represent records in the rivers Serpis and Macaco (Perea *et al.*, 2011). Asterisks (*) represent records in the rivers Mundo, Segura and Zumeta (Verdiell-Cubero *et al.*, 2012). Dark circles (●) represent the new records described in this study. River networks (blue lines), river basins (grey lines) and drainage basins (black lines) are shown for both maps (A and B). *Mapas del noroeste de la Península Ibérica (A) y de la Península Ibérica (B) mostrando la distribución de la colmilleja (Cobitis paludica). A = Mapa de los puntos de muestreo localizados en 23 ríos de Galicia (NO España). Presencia de la especie en círculos oscuros (●) y ausencia en círculos claros (○). B = Actualización de la distribución de la colmilleja. La distribución potencial de la colmilleja, basada en el trabajo de Perea *et al.* (2011), se muestra en color verde. Las estrellas (☆) representan las citas en los ríos Serpis y Macaco (Perea *et al.*, 2011). Los asteriscos (*) representan las citas en los ríos Mundo, Segura y Zumeta (Verdiell-Cubero *et al.*, 2012). Los círculos oscuros (●) representan las nuevas citas descritas en este estudio. La red hidrográfica (líneas azules), las cuencas fluviales (líneas grises) y las cuencas de drenaje (líneas negras) se muestran para ambos mapas (A y B).*

Fish sampling was conducted using electrofishing (2200-W generator with a single anode of 30 cm diameter). Densities (ind/m²) of the southern Iberian spined-loach were calculated for the 2010 sampling campaign using the Zippin multiple-pass depletion method (Zippin, 1956). Additionally, opinion surveys were carried out on local (i.e. from Galicia, $n = 20$) and non-local (i.e. from central Spain, $n = 20$) anglers in an attempt to establish whether the species has been introduced in NW Spain as a consequence of its use as live bait in recreational fishing (see supplementary information, Appendix 1, available at <http://www.limnetica.net/en/limnetica>).

RESULTS

Southern Iberian spined-loach were found in a single locality within the River Ulla basin (Fig. 1), after the capture of two individuals (75 and 77 mm total length) from Ponte Ledesma (UTM 29T 554286E 4738186N). Additionally, the species has been recently reported in the Pontiñas River basin (Lalin, UTM 29T 572493E 4723818N), a tributary of the Deza River in the Ulla basin (see supplementary information, Appendix 2, available at <http://www.limnetica.net/en/limnetica>). The species was also found in five rivers (Furnia, Hospital, Miño, Pego and Tripes) in the international stretch of the River Miño in 2010, with densities between 0.009 ind/m² and 0.372 ind/m² (Furnia and Tripes, respectively). Except three sites in the international stretch of the River Miño (Miño, Pego and Tripes) densities were below 0.10 ind/m².

Opinion surveys suggested that the southern Iberian spined-loach is unlikely to be used as live bait by local (Galicia, NW Spain) anglers, whereas one angler (5 %) from Central Spain had used the species as live bait (to capture largemouth black bass, *Micropterus salmoides* (Lacépède, 1802)).

DISCUSSION

Confirmation of the presence of the southern Iberian spined-loach in the Ulla basin represents a northwestern expansion of its distribution and increases the number of known Galician popula-

tions to nine (Furnia, Hospital, Macaco, Miño, Pego, Pontiñas, Tea, Tripes and Ulla). Although the species has previously been recorded in the River Tea (Hervella & Caballero, 1999), we did not corroborate its presence in our sampling campaigns. Our findings and those of other authors (e.g. Perea *et al.*, 2011), indicate that the species has a wider distribution in the NW Iberian Peninsula, than was previously recognised. The recent records of the species in the Serpis River (Perea *et al.*, 2011) and many sub-basins of the Guadalquivir basin (Fernández-Delgado *et al.*, 2014; Márquez-Rodríguez, 2014) seem to corroborate the idea that populations of the southern Iberian spined-loach may not have been detected in many areas. We suggest that the distribution of this, and maybe other fish species, could be underestimated because of an absence of specific monitoring programmes and inadequate sampling effort (Fernández-Delgado *et al.*, 2014; Nunn *et al.*, 2014; Sánchez-Hernández *et al.*, 2015).

In recent decades, there has been an on-going debate over the status (i.e., native or introduced) of the southern Iberian spined-loach in the Miño basin. The genetic distinctiveness and morphological singularity of the fish in the Miño basin have led some authors to suggest that the populations might constitute a separate species, *Cobitis victoriae* (De la Cigöña & Oujó, 1999; but see Doadrio & Perdices, 2005). However, the lack of a formal description following the International Code of Zoological Nomenclature prohibits the recognition of the species, and *C. cf. victoriae* should thus remain as *nomen dubium* (Doadrio & Perdices, 2005; Silva *et al.*, 2010; Doadrio *et al.*, 2011). Several studies have supported the hypothesis that the southern Iberian spined-loach was introduced, presumably by anglers, to the northwest of the Iberian Peninsula (Doadrio, 2001; Doadrio *et al.*, 2011). While anglers are key agents responsible for the introduction and translocation of fish species (Elvira 1995; Doadrio *et al.*, 2011; Kalous *et al.*, 2013; Moreno-Valcárcel *et al.*, 2013), colonization of Europe by *Cobitis* spp. (more precisely, *Cobitis taenia* Linnaeus, 1758) is unlikely to have been driven by anglers because of their apparent lack of economic and recreational importance and low popularity as a live bait in recreational fishing

(Culling *et al.*, 2006; Kalous *et al.*, 2013). Although the number opinion surveys used in this study may be insufficient to draw strong conclusions, they suggest that the southern Iberian spined-loach has rarely been used as live bait by local (Galicia, NW Spain) anglers. However, this suggestion should be treated with caution, because one angler from Central Spain had used the species as live bait to capture largemouth black bass, a species that is present in the Miño River, but not in the Ulla basin where the southern Iberian spined-loach was unexpectedly found. We posit that it is very likely that local anglers do not target the southern Iberian spined-loach for fishing, and consequently the species is unlikely to have been introduced by anglers in contrast to other species with socio-economic and recreational importance such as, for example, the European catfish *Silurus glanis* Linnaeus 1758 (e.g. Benejam *et al.*, 2007; Moreno-Valcárcel *et al.*, 2013). However, pathways of introduction other than anglers, such as aquarium trade and intentional release might be responsible of its introduction in NW Iberian Peninsula. Still, we accept the view that the southern Iberian spined-loach should be considered native to the NW Iberian Peninsula, unless future analyses of genetics or pathways of colonization prove a non-native origin.

This study suggests that there is no evidence to support the hypothesis that the southern Iberian spined-loach populations of the NW Iberian Peninsula have been introduced, but most likely highly fragmented and in many cases small. It is therefore critical that sampling effort is increased, to improve our knowledge of the species' abundance, distribution and population dynamics. Monitoring programmes should include endemic species of low socio-economic importance, such as the southern Iberian spined-loach, as their conservation status is of global importance (Nunn *et al.*, 2014; Sánchez-Hernández *et al.*, 2015).

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Con el apoyo de:



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