

Notas / Notes

New distribution data on Spanish autochthonous species of freshwater fish

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The Iberian freshwater fish fauna is characterized by a relatively high number of endemic species in relation to other European fish faunas, some of which are restricted to a small hydrogeographical region (Doadrio, 2002; Kottelat & Freyhof, 2007). Some of these species are highly threatened and have sharply declining populations in the Iberian Peninsula (Doadrio, 2002; IUCN, 2010), requiring extensive monitoring to detect further changes in population trends and distribution ranges. A monitoring project on Spanish rivers between 2008 and 2010 using 785 sampling localities has produced new records and confirmed others for several species as well as supplying new data on the distribution range of these species. These new records, along with the current Iberian distribution of the species, are presented in Figure 1. Common names follow Leunda *et al.* (2009).

***Lampetra planeri* Bloch, 1784 (Cephalaspidomorphi, Petromyzontidae)**

The genus *Lampetra* Bonnaterra, 1788, is characterized by a slender body and an oral disc in

which the middle endolateral teeth are usually tricuspid, and the posterior teeth are frequently absent (Kottelat & Freyhof, 2007). European fresh waters are inhabited by two species, the European river lamprey (*L. fluviatilis* Linnaeus, 1758) and the European brook lamprey (*L. planeri* Bloch, 1784). In Spain only one population of *L. planeri*, from the Ugarana River basin (Nivelle in France), has been reported (Álvarez & Doadrio, 1986; Doadrio 2002). However, the Ugarana is not located in the Iberian Peninsula, having its source in the north Pyrenean slope in Spain and flowing into the Atlantic slope between Saint-Jean de Luz and Ciboure in France. In Portugal, *L. planeri* is reported from several rivers including the Sado, São, Pedro, Nabão, and Inha (Pereira *et al.*, 2010). *Lampetra fluviatilis* has become extinct in Spain because of the construction of several dams in the Tagus River. The last reported record in Spain was in 1974 in the Guadarrama River, Tagus basin, Chozas de Canales, Toledo (Doadrio, 2002).

During monitoring of the majority of Spanish rivers, we found *Lampetra planeri* (Fig. 2) within the Iberian Peninsula in Spain for the first time. This population was identified in five sites within the Deva

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River basin (Table 1). The Deva is a short river in the Cantabrian area, with its source in Fuente De (Cantabria), flowing into the Cantabrian Sea at the border between the autonomous communities of Asturias and Cantabria. In August of 2009 and 2010, all captured specimens were ammocoetes of life stages prior to the “transformer” stage [that marking the beginning of transition to adult form, and is characterized by the development of functional eyes and the modified mouth into a fully formed sucker (Gardiner, 2003)]. In March 2009, we collected a transformer and in December 2010, all captured specimens were transformers. None of the specimens were sexually mature. Some transformers were kept in an aquarium to wait for sexual maturation. Transformers of *Lampetra planeri* are distinguished from those of *L. fluviatilis* by either coloration pattern or relative body proportions, such as disc length, eye length, or preorbital length relative to total length, with these parts being proportionally larger in *L. fluviatilis* than in *L. planeri* (Hardisty *et al.*, 1970). Although body depth has been reported as a morphometric measurement to distinguish between the transformers of the two *Lampetra* species potentially inhabiting the Iberian Peninsula, its validity for this purpose has been questioned (see Gardiner, 2003). Total length range of the transformers also differs, being usually less than 120 mm in *Lampetra fluviatilis* (typically 90-115 mm) and often exceeding 130 mm in *L. planeri* (although populations frequently range from 90 to 120 mm). Almost all of the Deva-Cares specimens showed total length greater than 130 mm. The position of teeth in the oral disc (Fig. 3) differs, but during winter the oral disc of *L. planeri* and *L. fluviatilis* are similar. For this reason, oral disc morphology and its proportion relative to total length have limitations for species identification during winter (Gardiner, 2003). The morphometric character most useful for distinguishing between *L. planeri* and *L. fluviatilis* transformers is eye length relative to body length, which is 2.2-2.4% of total length in *L. planeri* and 2.5-2.7% in *L. fluviatilis* (Gardiner, 2003). The eye length proportion in the Deva-Cares specimens that we collected ranged from 1.8 to 2.2% (Table 2). The taxonomy of these two *Lampetra* species has been a matter of controversy for a long time. They are considered to be morphologically similar but different in their timing of metamorphosis and sexual maturation (e. g. Loman, 1912). From a molecular point of view, it is difficult to distinguish the species genetically (Schreiber & Engelhorn,

1998; Espanhol *et al.*, 2007; Blank *et al.*, 2008) despite the presence of unique haplotypes of each, since they do not possess a definitive phylogenetic structure (Pereira *et al.*, 2010). Communal spawning and behavioral mating between *Lampetra fluviatilis* and *L. planeri* has been identified, although without successful reproduction confirmed (Lasne *et al.*, 2010). This statement questions whether reproductive isolation between both species really exists or not and whether *L. fluviatilis* and *L. planeri* belong to the same species or constitute different ecotypes within the same species (Docker, 2009), if we consider the classical biological species concept of non-interbreeding populations (e. g. Mayr, 1942; Dobzhansky, 1950). The main differences between these species are found in their life cycle. *Lampetra planeri* is a strictly freshwater non-predatory species, whereas *L. fluviatilis* is a predatory migratory species. Waiting for more specific studies regarding hybridization between both species, adaptations to life conditions and studies finding more specific genetic markers able to separate *Lampetra* species, we use morphological diagnostic characters reported in literature for transformers (e.g. Gardiner, 2003) to distinguish both species. Morphometric characters measured (Table 2) along with the size of oocytes of a female sexually mature specimen (Fig. 4), which were always greater than 0.5 mm, as is indicated in Kottelat & Freyhoff (2007) for individuals of *Lampetra planeri*, allowed us to ascribe the specimens captured in the Deva-Cares basin as belonging to *L. planeri*.

Sea lamprey, *Petromyzon marinus* Linnaeus, 1758 (Cephalaspidomorphi, Petromizontidae)

The sea lamprey (*Petromyzon marinus* Linnaeus, 1758) (Fig. 2) is an anadromous parasitic species characterized by an oral disc wider than the body and an infra-oral lamina with 7-8 large, sharp teeth (Kottelat & Freyhof, 2007). In addition, unlike *Lampetra* larvae, the caudal region of the sea lamprey ammocoete contains black pigment, with the entire oral hood being pigmented, while in *Lampetra* the pigmentation area does not reach the edge of the upper lip (Gardiner, 2003).

The sea lamprey is widely distributed on both sides of the North Atlantic Ocean, although, recently, molecular analysis has suggested that the European and North American specimens may represent different species (Rodríguez-Muñoz *et al.*, 2004). In Spain,

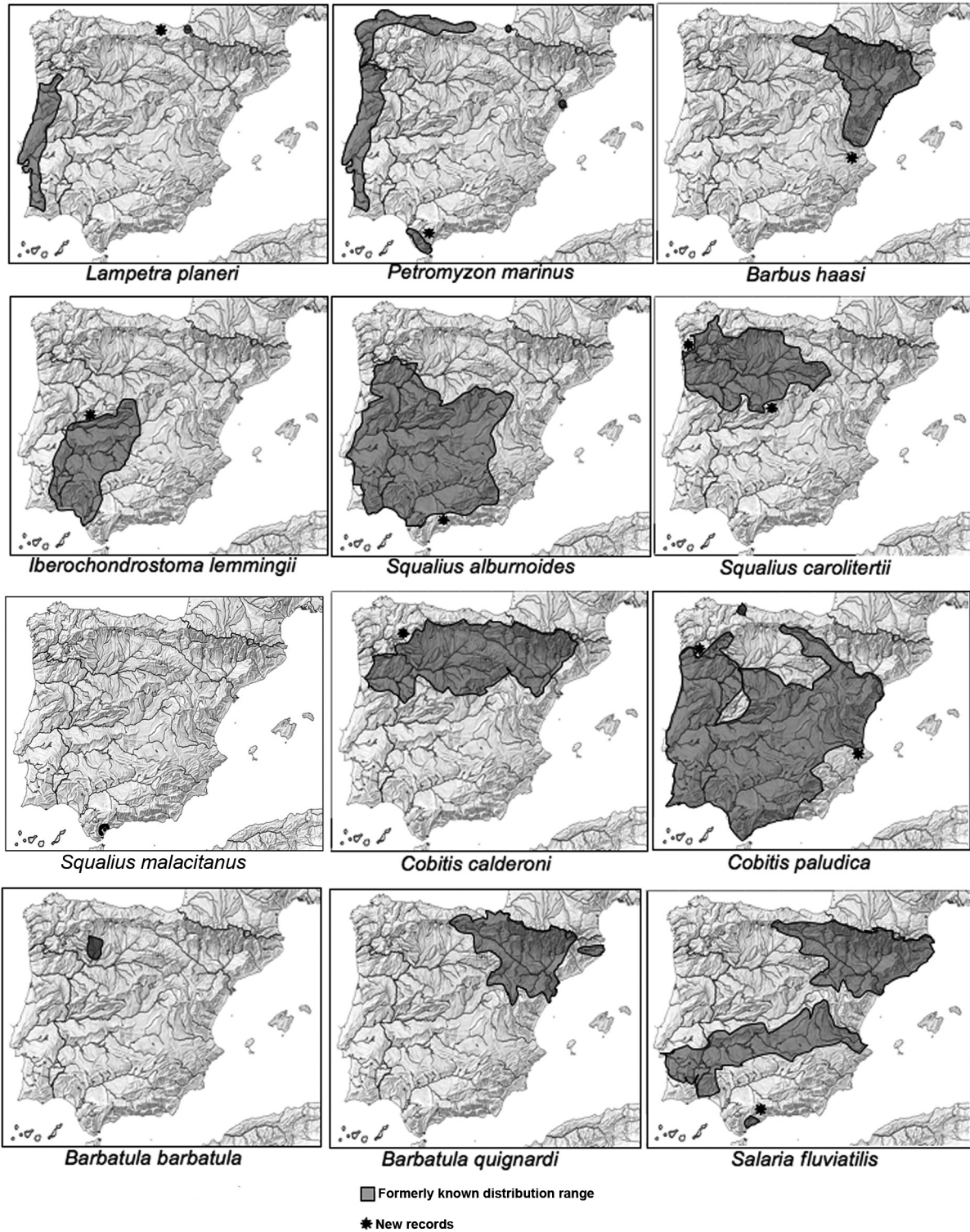


Fig. 1.– Iberian distribution of freshwater fish species included in this study. Black star indicates new records for these species.

Fig. 1.– Distribución ibérica de las especies de peces de agua dulce incluidas en este estudio. Las estrellas negras indican nuevas citas para estas especies.

Table 1.- New records of Spanish freshwater fish species. Voucher numbers refer to tissue samples collected from individuals for DNA analyses. Collectors: AA, A. Arrioli; BL, B. Levin; BP, B. Prieto; CC, C. Cunha; CP, C. Pedraza; CPz, C. Pérez; EF, E. Fernández; FM, F. Melero; GS, G. Solís; ID, I. Doadrio; IM, I. Martínez; JLG, J.L. González; JM, J. Manzano; MJA, M.J. Aramburu; MV, M. Vilá; PG, P. Garzón; PO, P. Ornelas; SP, S. Perea.

Table 1.- Nuevas citas de especies españolas de peces de agua dulce. Los números de catálogo hacen referencia a muestras de tejido de individuos para el análisis del DNA.

TAXA	LOCALITY	UTM	N° SPECIMENS COLLECTED (VOUCHER NUMBERS)	DATE	COLLECTORS
<i>Lampetra planeri</i>	Deva R. Panes. Asturias. Spain	30T 0371192 4798562	49 ammocoetes (MNCN AT19104-19153)	VIII/18/2010	PG, JLG, ID
<i>Lampetra planeri</i>	Deva R. La Hermida. Cantabria. Spain	30T 0367385 4793019	22 ammocoetes (MNCN AT11482-11483)	VIII/6/2009	PG, JLG, ID
<i>Lampetra planeri</i>	Cares R. Mier. Asturias. Spain	30T 0364166 4797591	13 ammocoetes (MNCN AT19072-19084)	VIII/11/2010	PG, JLG, ID
<i>Lampetra planeri</i>	Deva R. Panes. Asturias. Spain	30T 0371168 4798471	1 transformer	III/2/2009	IM, FM
<i>Lampetra planeri</i>	Deva R. Rumes. Cantabria. Spain	30T 0369611 4795043	11 ammocoetes (MNCN AT19098-19103)	VIII/18/2010	PG, JLG, ID
<i>Lampetra planeri</i>	Deva R. Puente Lies. Asturias. Spain	30T 0369759 4797452	36 transformers	IV/12/2010	PG, PO, CP, ID
<i>Petromyzon marinus</i>	Guadiaro R. Jimena de la Frontera. Cádiz. Spain	30S 0284451 4034112	21 (11 transf. + 10 ammoc.)	IV/12/2010	PG, PO, CP, ID
<i>Barbus haasi</i>	Barranco del Agua. Júcar basin. Jaratuel. Valencia. Spain	30S 0664334 4334018	22 transformers	VI/12/2009	PG, JLG, ID
<i>Iberochondrostoma lemmingii</i>	Arroyo Palomero. Alagón basin. Cerezo. Cáceres. Spain	29T 7355508 4457628	1 (MNCN AT9450)	VI/27/2010	PG, JLG, ID
<i>Squalius alburnoides</i>	Guadalhorce R. Álora. Málaga. Spain	30S 0348796 4077634	1 (MNCN M356)	IV/23/2001	ID
<i>Squalius alburnoides</i>	Guadalhorce R. Cártama. Málaga. Spain	30S 0355999 4066246	21 (MNCN AT19625-19646)	IX/10/2010	PG, JLG, ID
<i>Squalius carolitertii</i>	Alberche R. Tagus basin. San Martín de la Vega del Alberche. Ávila. Spain	30T 0315779 4477869	4 (MNCN AT6893-6897)	III/22/2009	PG, JLG, ID
<i>Squalius carolitertii</i>	Oitavén R. Verdugo basin. Fornelos de Montes. Pontevedra. Spain	29T 0545613 4689244	13	V/6/2010	PG, JLG, ID
			44 (MNCN AT9641-9647)	VI/24/2010	PG, JLG, ID
			92	VI/27/2010	PG, SP, JLG, ID
			25	V/31/2009	PG, CC, AA, ID
			25 (MNCN AT18549-18575)	VI/30/2010	MJA, BP, JLG
			45	VIII/14/2010	PG, JLG, JM, MV, ID

<i>Squalius maeacitanus</i>	Vaquero stream. Estepona. Málaga	30S 0303138 4007225	1	IV/14/2011	CPz, EF
<i>Cobitis calderoni</i>	Caboalles R. Sil basin. Villablino. León. Spain	29T 0717124 4757683	2 (MNCN AT17956-57)	VI/30/2010	PG, JLG, PO, ID
<i>Cobitis paludica</i>	Macaco R. Limia basin. Lobios. Ourense. Spain	29T 0592552 4652952	6 (MNCN AT18058-18063)	VII/1/2010	PG, JLG, PO, ID
<i>Cobitis paludica</i>	Serpis R. Serpis basin. Beniarrés. Alicante. Spain	30S 0279262 4035725	1 (MNCN AT112727)	IX/25/2009	PG, JLG, BL, ID
<i>Barbatula barbatula</i>	Cea R. Douro basin. Villamol. León. Spain	30T 0332250 4699010	3	IX/8/2010	PG, GS, JLG, ID
<i>Barbatula barbatula</i>	Esla R. Douro basin. Villaroaño. León. Spain	30T 0293776 4706287	15	VII/15/2009	PG, JLG, ID
<i>Barbatula barbatula</i>	Orbigo R. Douro basin. Veguellina. León. Spain	30T0263752 4701473	14 (MNCN AT16841)	VI/4/2010	PG, JLG, GS, ID
<i>Salaria fluviatilis</i>	Hozgarganta R. Guadiaro basin. Jimena de la Frontera. Cádiz. Spain	30S 0279262 4035725	60	VII/16/2009	PG, JLG, ID
<i>Salaria fluviatilis</i>	Bullent R. Pego. Alicante. Spain	30S 0752960 4307746	13 (MNCN AT16833-16835)	VI/4/2010	PG, GS, JLG, ID
			50 (MNCN AT10987-10991)	VII/16/2009	PG, JLG, ID
			1 (MNCN AT9445)	VII/12/2009	PG, BP, JLG, ID
			4 (MNCN AT17689-17691)	VI/26/2010	PG, SP, JLG, ID
			11 (MNCN AT19410-19411)	IX/9/2010	PG, GS, JLG, ID

it occupies several basins along the Cantabrian, Atlantic, and Mediterranean (only in the Ebro River) slopes. Therefore, the sea lamprey inhabits most Cantabrian rivers, although it is missing from some areas of País Vasco and Cantabria community, as well as from Galician rivers. This species has been reported from several basins including the Guadiana River, Guadalquivir's estuary and some southern rivers such as the Guadiaro estuary, the Guadalete and Barbate Rivers, and some Ebro tributaries. These records are old and scarce (Doadrio, 2002). We have recently collected juvenile specimens from the Guadiaro River (Table 1). This confirms that reproduction of the sea lamprey occurs in southern Spain. The Guadiaro River runs southward from the Serranía de Ronda (Málaga province) through the Sierra de Grazalema and flows into the Mediterranean Sea at Sotogrande in Cádiz. Populations of sea lamprey have declined mainly because of pollution, water abstraction for irrigation and golf courses, and presence of barriers in rivers that prevent them from reaching breeding sites (Doadrio, 2002). Thus, although the sea lamprey is widely distributed along the majority of Spanish coastal areas, it is rare.

Iberian redfin barbel, *Barbus haasi* Mertens, 1925 (Actinopterygii, Cyprinidae)

The Iberian redfin barbel (*Barbus haasi* Mertens, 1925) is an endemic Spanish fish identified by its large head and a longer and wider snout relative to other Iberian *Barbus* species. In the adult, pharyngeal teeth are present in three rows (5/3/2) and are straight, the upper lip is thick, and the lower one has a well-developed median lobe. The most posterior unbranched dorsal fin ray has small denticles (Doadrio, 1990, 2002).

This species is distributed along the upper reaches of several Spanish rivers, the Ebro basin, and several Mediterranean rivers including the Llobregat, Francolí, Foix, Besós, Gaia, La Cenia, Riudecanyes, Mijares, Palancia, and Turia (Doadrio & Garzón 1987; Doadrio, 2002). Recently, we found a previously unreported population of *B. haasi* in the Jucar basin (Table 1), a river which runs southward from its source in the Montes Universales in Cuenca province, later turning east to flow into the Gulf of Valencia in the Mediterranean Sea. This extends the range of this species. The morphological identification was confirmed by mitochondrial DNA analysis.

Table 2.— Morphometric measurements of *Lampetra planeri* specimens captured in the Deva-Cares basin. Measurements are expressed in mm.

Tabla 2.— Medidas morfométricas de especímenes de *Lampetra planeri* capturados en la cuenca del Deva-Cares. Las medidas están expresadas en mm.

SPECIMEN	PREORBITAL LENGTH (% RELATIVE TO TL)	EYE LENGTH (% RELATIVE TO TL)	ORAL DISC LENGTH (% RELATIVE TO TL)	BODY DEPTH (% RELATIVE TO TL)	TOTAL LENGTH (TL)
1	8.1 (6.3)	2.9 (2.2)	5.6 (4.3)	9.0 (7)	128
2	7.8 (6.2)	2.8 (2.2)	5.6 (4.4)	9.8 (7.8)	125
3	8.9 (5.7)	2.8 (1.8)	5.9 (3.8)	10.2 (6.5)	155
4	8.8 (6.2)	3.1 (2.2)	6.3 (4.4)	9.6 (6.8)	141
5	8.4 (6.0)	3.0 (2.1)	6.7 (4.8)	9.4 (6.7)	139
6	8.2 (5.7)	3.2 (2.2)	6.5 (4.5)	9.6 (6.7)	143
7	7.9 (5.4)	2.7 (1.8)	5.7 (3.9)	9.4 (6.4)	146
8	7.6 (5.7)	2.6 (1.9)	4.8 (3.6)	8.9 (6.6)	133
9	7.8 (5.4)	2.7 (1.9)	5.7 (3.9)	9.0 (6.2)	145
10	9.6 (6.1)	3.0 (1.9)	6.4 (4.0)	10.1 (6.4)	157
11	9.4 (5.9)	3.1 (1.9)	6.0 (3.8)	9.8 (6.2)	158
12	10.7 (6.0)	3.6 (2.0)	6.6 (3.7)	10.8 (6.1)	176
13	8.4 (5.9)	3.1 (2.2)	5.1 (3.6)	8.8 (6.2)	142
14	8.2 (6.1)	3.1 (2.3)	5.9 (4.4)	8.2 (6.1)	134
15	9.8 (6.4)	3.4 (2.2)	6.1 (4.0)	9.8 (6.5)	151
16	8.7 (5.5)	3.4 (2.1)	6.5 (4.1)	9.9 (6.2)	158
17	9.9 (5.9)	3.4 (2.1)	7.0 (4.2)	11.2 (6.7)	167
18	7.6 (5.5)	2.6 (1.8)	4.9 (3.5)	9.4 (6.8)	138
19	7.9 (6.3)	2.7 (2.1)	4.9 (3.9)	7.4 (5.9)	124
20	6.3 (5.6)	2.1 (1.8)	4.5 (4.0)	7.1 (6.3)	112
21	8.6 (5.9)	3.4 (2.3)	6.6 (4.5)	8.7 (6.0)	145
22	8.2 (5.6)	3.2 (2.2)	5.0 (3.4)	8.5 (5.8)	145

Barbus haasi (Fig. 2) shows genetic introgression with the Western Mediterranean barbel (*B. meridionalis*) in the Besós and Llobregat basins, which represents the northern extremes of the distribution area of the Iberian redfin barbel (Machordom *et al.*, 1990). The Jucar basin constitutes the southern border of its distribution, thus hybridization may occur between the Iberian redfin barbel and the Eastern Iberian barbel (*Luciobarbus guiraonis*), the other barbel species inhabiting the Jucar basin. Further efforts are necessary to determine the occurrence of hybridization or possibly an ancient mitochondrial introgression from *B. haasi* to *L. guiraonis*, a phenomenon described for other cyprinids (see e.g. Dowling & Demarais, 1993; Aboim *et al.*, 2010). In general, Iberian redfin barbel populations have suf-

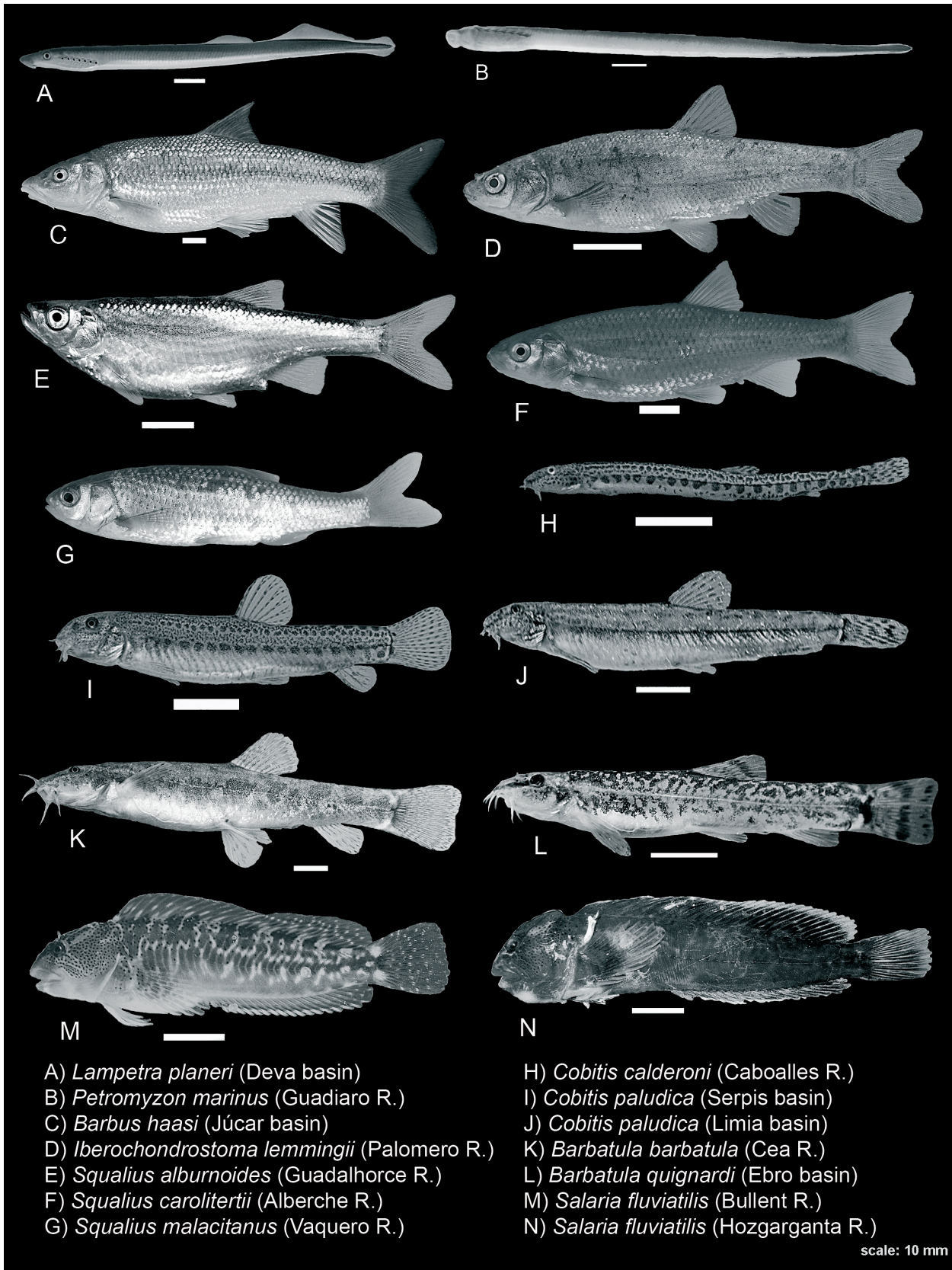
fered a strong decline mainly due to pollution and the presence of exotic species (Doadrio, 2002), which still continues.

Iberian arched-mouth nase, *Iberochondrostoma lemmingii* (Steindachner, 1866) (Actinopterygii, Cyprinidae)

The Iberian arched-mouth nase (*Iberochondrostoma lemmingii* Steindachner, 1866) is a small cyprinid characterized by an arched mouth without a horny layer on the lower lip. The body is covered with small scales, 52-66 on the lateral line, and the entire body may be black spotted (Doadrio, 2002; Robalo *et al.*, 2007).

Fig. 2.— Specimens collected in each newly reported population.

Fig. 2.— Ejemplares capturados en cada nueva población citada.



A) *Lampetra planeri* (Deva basin)
 B) *Petromyzon marinus* (Guadiaro R.)
 C) *Barbus haasi* (Júcar basin)
 D) *Iberochoondrostoma lemmingii* (Palomero R.)
 E) *Squalius alburnoides* (Guadalhorce R.)
 F) *Squalius carolitertii* (Alberche R.)
 G) *Squalius malacitanus* (Vaquero R.)

H) *Cobitis calderoni* (Caboalles R.)
 I) *Cobitis paludica* (Serpis basin)
 J) *Cobitis paludica* (Limia basin)
 K) *Barbatula barbatula* (Cea R.)
 L) *Barbatula quignardi* (Ebro basin)
 M) *Salaria fluviatilis* (Bullent R.)
 N) *Salaria fluviatilis* (Hozgarganta R.)

scale: 10 mm

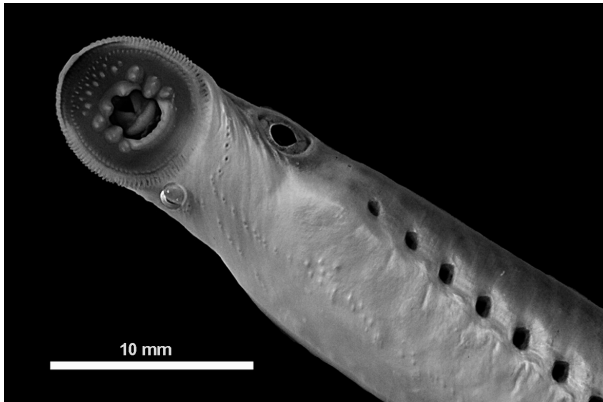


Fig. 3.— Oral disc of *Lampetra planeri* during the winter season.

Fig. 3.— Disco oral de *Lampetra planeri* durante el invierno.

This species is an Iberian endemism distributed in several Spanish river basins: the Tagus, Guadiana, Guadalquivir, and Odiel. Within the past two years, we discovered a population of this species (Fig. 2) in the Palomero stream, a small tributary of the Alagón River in the Tagus basin, from which it had not been previously reported (Table 1). This record constitutes its most north-westerly distribution in the Iberian Peninsula. The Palomero stream is a small river with its source in the Sierra del Castillejo and Sierra del Canchal flowing into the Valdeobispo reservoir in the Alagón basin. Water pollution and water abstraction for irrigation are the main threats to this species in this region (Doadrio, 2002).

**Calandino, *Squalius alburnoides* (Steindachner, 1866)
(Actinopterygii, Cyprinidae)**

The calandino (*Squalius alburnoides* Steindachner, 1866) is a small species of hybrid origin, which has variable ploidy levels. The calandino has a slender body and a thinner caudal peduncle in comparison to other Iberian *Squalius* species. It possesses small fins, usually with 7 branched dorsal fin rays and 8-9 branched anal fin rays (Doadrio, 2002). This species is distributed along the southwestern part of the Iberian Peninsula and inhabits the following river basins: Douro, Tagus, Sado, Guadiana, Guadalquivir, and Odiel (Doadrio, 2002). Within these basins it is generally associated with other *Squalius* species due

to its reproductive biology, which generally involves meiotic hybridogenesis (see e.g. Carmona *et al.*, 1997). We have found a previously unreported Spanish population for this species (Fig. 2) in the River Guadalhorce in southern Spain (Table 1). This river drains the plain of Antequera and flows into the Mediterranean Sea in Málaga province. The newly discovered population comprised diploid and triploid individuals. The possibility that this species has been artificially introduced into the River Guadalhorce cannot be discounted, due to the absence of previous records in this basin.

**Northern Iberian chub, *Squalius carolitertii*
(Doadrio, 1987) (Actinopterygii, Cyprinidae)**

The Northern Iberian chub (*Squalius carolitertii* Doadrio, 1987) is a medium-sized species characterized by narrow infraorbital bones relative to other Iberian *Squalius* species, such as the Southern Iberian chub (*S. pyrenaicus*) and the Gallo chub (*S. castelanus*); a rounded snout; and a subterminal mouth. Head length is approximately equal to body depth (Doadrio, 1987, 2002; Doadrio *et al.*, 2007). The distribution range of *S. carolitertii* covers the northwestern region of the Iberian Peninsula (Doadrio, 2002), in the Douro and Galician river basins. Within Galician drainage, *S. carolitertii* is present in the Limia, Miño, and Lerez basins. We report for the first time this species (Fig. 2) in the upper reaches of the Alberche River, a tributary of the Tagus basin (Table 1). The Alberche River constitutes one of the main tributaries of the Tagus basin. Its source is in Fuente Alberche and it forms the natural division between the Sierra de Gredos and Sierra de Guadarrama ranges in the Sistema Central Mountains. We also found for the first time a second population of *S. carolitertii* in northwestern Spain in the Oitavén River (Table 1), a tributary to the Verdugo River which flows into the Atlantic at the Ría de Vigo in Galicia.

Málaga chub, *Squalius malacitanus* Doadrio & Carmona, 2006 (Actinopterygii, Cyprinidae)

The Málaga chub (*Squalius malacitanus* Doadrio & Carmona, 2006) is a medium-sized cyprinid species characterized by broad infraorbital bones, especially the fourth and fifth ones; a terminal mouth; a snout shorter or equal to eye diameter and a depth

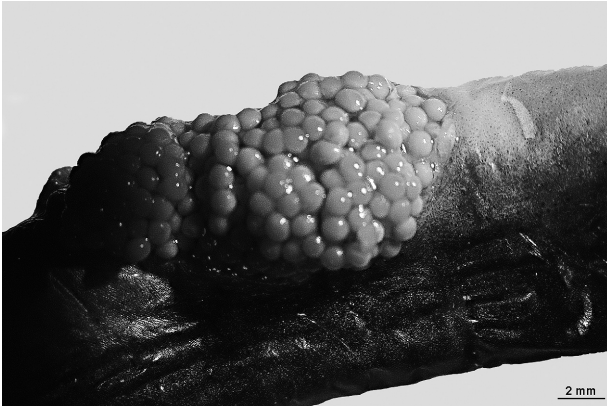


Fig. 4.— Oocytes size of a sexually mature female collected in the Deva-Cares basin.

Fig. 4.— Tamaño de los oocitos de una hembra madura sexualmente capturada en la cuenca del Deva-Cares.

caudal peduncle. These features distinguish *S. malacitanus* from other Iberian *Squalius* species such as the Southern Iberian chub (*S. pyrenaicus*) or the Eastern Iberian chub (*S. valentinus*) as well as some osteological characters (Doadrio & Carmona, 2006). The Málaga chub is a southern Spanish endemism that inhabits several rivers of Málaga province, such as the Guadalmina and Guadaiza basins and the Genal River, a tributary of the Guadiaro basin. Recently, one specimen (Fig. 2, Table 1) of *S. malacitanus* has been found in the Vaquero stream (Estepona, Málaga) which constitutes a new record for this species in Spain. The Vaquero stream is a short river located in Málaga province within the autonomous community of Andalucía that flows into the Mediterranean Sea. The species has a restricted area and should be considered critically endangered according to the IUCN red list.

Northern Iberian spined-loach, *Cobitis calderoni* Bacescu, 1962 (Actinopterygii, Cobitidae)

The Northern Iberian spined-loach (*Cobitis calderoni* Bacescu, 1962) is chiefly distinguished from other Iberian *Cobitis* species, such as the Southern Iberian spined-loach (*C. paludica*), by the absence of the lamina circularis and the distribution of dark blotches along the body. It also possesses a longer and narrower caudal peduncle than *C. paludica* (Doadrio, 2002).

The distribution of *C. calderoni* is mainly the northern part of the Iberian Peninsula and comprises three well-separated populations in Spain: two in the northern Ebro and Douro basins and a third, isolated, population in the Tagus basin. In this latter drainage, *C. calderoni* occurs in sympatry with *C. paludica* (Doadrio & Perdices, 2005). Molecular studies have demonstrated that populations of *C. calderoni* from the Douro and Tagus basins are phylogenetically more closely related to each other than to the Ebro population (Perdices & Doadrio, 2000). In the Ebro basin the species is scarce and generally non-abundant, except for some populations in the Rioja region which are abundant. Conversely, some Douro populations are highly abundant (Doadrio, 2002). The species is also present in some rivers in the Douro basin in Portugal, but is restricted to small regions (Bogado *et al.*, 2005). Within the Tagus basin, *C. calderoni* inhabits the upper stretches of the Jarama and Lozoya Rivers. Other populations from the upper reaches of the Tajuña and Manzanares rivers (Doadrio, 2002) need further confirmation. Monitoring sampling strategies in the Tajuña River were unsuccessful into finding *Cobitis calderoni*.

Within the past two years, we found a previously unreported Spanish population of this species (Fig. 2) in the Caboalles River of the Sil basin (Table 1), which flows into the Las Rozas reservoir. In this river, we confirmed that *C. calderoni* occurs in sympatry with the Southern Iberian spined-loach (*C. paludica*). *Cobitis calderoni* is an endangered species that has suffered a sharp decline in population in recent years (Crivelli, 2006).

Southern Iberian spined-loach, *Cobitis paludica* (De Buen, 1930) (Actinopterygii, Cobitidae)

The southern Iberian spined-loach (*Cobitis paludica* De Buen, 1930) is chiefly distinguished from other Iberian *Cobitis* species, such as the Northern Iberian spined-loach (*C. calderoni*), by the presence of the lamina circularis and the distribution of body markings. In addition, the length of its caudal peduncle is about equal to its depth (Doadrio, 2002). *Cobitis paludica* is a widely distributed species in Spain, although it does not occur in the most northerly Spanish regions, being present only in some areas of the Miño and Nalón basins, where it was probably artificially introduced (Doadrio, 2002). In Spain, *C. paludica* inhabits numerous river basins, including

the Ebro, Tagus, Guadiana, Guadalquivir, Guadalete, Guadalhorce, Guadalmedina, Barbate, Jara, Piedras, Vega, Peñíscola, Odiel, Jucar, Turia, Mijares, Bullent and Racons, Albufera de Valencia, and some tributaries on the western margin of Douro basin.

In the Limia basin, *C. paludica* (Fig. 2) has been reported only in Portugal; however, we recently discovered the species in the Spanish region of this basin, in the Macaco River, a small tributary 10 km in length on the western margin of the Limia basin. The source of this river is in the Spanish region of the Sierra de Geres and it flows into the Lindoso reservoir. The newly reported population constitutes a new record for the southern Iberian spined-loach in Spain (Table 1). We also found a new record for *C. paludica* in the Serpis River basin within the Spanish Levantine region (Table 1). The Serpis is a short coastal river in the provinces of Alicante and Valencia. This river originates in the Carrasqueta Mountains with the confluence of the Polop and Troncal streams and flows into the Mediterranean Sea at Gandía (Valencia province). This new report constitutes the southernmost Mediterranean population of *C. paludica*. In general, populations of the Southern Iberian spined-loach have suffered severe depletion and have disappeared from some rivers in the Ebro basin (Doadrio, 2002).

***Barbatula* Linck, 1790 (Actinopterygii, Nemacheilidae)**

The genus *Barbatula* Linck, 1790, differs from the other European nemacheilid genus *Oxynoemacheilus* in possessing a truncated or slightly emarginated (as opposed to deeply emarginated) caudal fin and 15-16 (instead of 17) branched caudal fin rays (Kottelat & Freyhof, 2007). Iberian populations of this genus were originally considered a subspecies of the European population, however, not all authors recognized this taxonomic designation and attributed the Iberian populations to the species *Barbatula barbatula* (e.g. Kottelat 1997), but without taking into account exhaustive morphological or genetic approaches. Thus, it was believed that the Iberian Peninsula was inhabited by *B. barbatula*, but the need for a taxonomic review of the Spanish populations was suggested (Doadrio, 2002). The populations from the Douro basin were considered to have an allocthonous origin from other Spanish population as a result of translocation by fishermen. Later all Spanish populations were recognized as *B. quignardi*

(Kottelat & Freyhof, 2007). After a morphological review of the specimens collected during our monitoring project, we confirm that the Spanish populations of this genus belong to two species, the Pyrenean stone loach, *B. quignardi* (Bacescu-Mester, 1967) and the stone loach, *B. barbatula* (Linnaeus, 1758). The main morphological differences between these species are the presence of 2-4 irregular dark blotches along the dorsum between the nape and dorsal fin in *B. quignardi* that are not often present in *B. barbatula*. Other differences are the origin of the dorsal fin, which is anterior to (*B. barbatula*) or posterior to (*B. quignardi*) the pelvic fins origin; and morphometric variables related to the depth of the caudal peduncle (Kottelat & Freyhof, 2007).

In general, the species *B. quignardi* occupies a more restricted area than *B. barbatula*. The former species is endemic to Spain and France, while *B. barbatula* is distributed throughout Eurasia (Kottelat & Freyhof, 2007). In Spain *B. quignardi* (Fig. 2) occupies the Ebro basin, the eastern Cantabrian rivers of the Bidasoa and Nervión basins and the Ter river in the Cataluña Community. Populations from the Douro basin belong to the species *B. barbatula* (Fig. 2) and have an allocthonous origin, probably from European rivers. *B. barbatula* occurs in three of the main tributaries of the eastern margin of the Douro basin, the Cea, Esla, and its tributary Órbigo (Table 1), the first two populations being new records of the stone loach for Spain.

Freshwater blenny, *Salaria fluviatilis* (Asso, 1801) (Actinopterygii, Blenniidae)

The freshwater blenny (*Salaria fluviatilis*) is a small scaleless fish with long dorsal and anal fins that extend along the dorsum and most of the ventral part of the body. It also possesses a small filiform tentacle above each eye (Kottelat & Freyhof, 2007), which has been considered a taxonomic character (Kottelat, 2004). There is a marked sexual dimorphism with males possessing a conspicuous cephalic crest, particularly marked during the breeding season. The Iberian distribution range of *S. fluviatilis* extends to several Spanish rivers: the Ebro, Jucar, Bullent, Fluviá, Verde, Guadaiza, and Guadiana. The species is absent from the northwestern quadrant of the Iberian Peninsula and has probably disappeared from Albufera de Valencia and the Segura River (Doadrio, 2002). Historically, its populations were

locally abundant but have suffered a severe decline during the last recent years (Doadrio, 2002). Within the last two years, we found a new record for *S. fluviatilis* (Fig. 2), in the Hozgarganta River, a tributary of the Guadiaro basin (Table 1), which is a short Spanish river flowing into the Mediterranean Sea. We also confirmed a previous report of its presence in the Bullent River (Fig. 2, Table 1), a small basin in the Levantine region of Spain flowing from the discharge of a karstic aquifer in the form of springs into the Mediterranean Sea.

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ABSTRACT

Over the last two years (2008-2010) we performed a monitoring project to update the Spanish freshwater fish fauna. We have collected in 785 sampling localities homogeneously distributed throughout Spain each year. We find as the most important result of this study the occurrence of several species that constitute new records for some rivers or basins in Spain: *Lampetra planeri*, *Petromyzon marinus*, *Barbus haasi*, *Iberochondrostoma lemmingii*, *Squalius alburnoides*, *Squalius carolitertii*, *Squalius malacitanus*, *Cobitis calderoni*, *Cobitis paludica*, and *Salaria fluviatilis*. Finally we corroborate the existence of *Barbatula barbatula* in the Duero basin and the assignation of the northeastern populations of this genus to *B. quignardi*.

Key words: Distribution data, freshwater fish, new records, Spain.

RESUMEN

Nuevos datos de distribución de especies autóctonas de peces de agua dulce de España

Entre los años 2008 y 2010 hemos realizado un proyecto de monitorización para actualizar la base de datos de la ictiofauna continental española. Se ha llevado a cabo en 785 estaciones de muestreo cada año, repartidas homogéneamente por toda España. Entre los datos más sobresalientes se incluyen nuevas citas para algunas cuencas y ríos de España de *Lampetra planeri*, *Petromyzon marinus*, *Barbus haasi*, *Iberochondrostoma lemmingii*, *Squalius alburnoides*, *Squalius carolitertii*, *Squalius malacitanus*, *Cobitis calderoni*, *Cobitis paludica* y *Salaria fluviatilis*. También se ha confirmado la presencia de *Barbatula barbatula* en la cuenca del Duero y la adscripción de las poblaciones de este género del Noreste de la Península Ibérica a *B. quignardi*.

Palabras clave: Datos de distribución, peces de agua dulce, nuevas citas, España.

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