

CONSERVATION STATUS OF ENDEMIC FRESHWATER FISH IN SPAIN

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Abstract

The present conservation status of the endemic freshwater fish of Spain is reviewed and compared with a former list made in 1986. Ten taxa (species and subspecies) are exclusively endemic to Spanish waters, 13 are Iberian endemics (Spain and Portugal), while three other species are also found in neighbouring European (France and Italy) or African (Algeria) countries. Endemic species belong to the families Clupeidae (33% of the native taxa), Cyprinidae (87%), Cobitidae (100%) and Cyprinodontidae (100%). A greater part of the endemic fish fauna is threatened, since three taxa are endangered, five vulnerable, seven rare and two insufficiently known.

Keywords: endemic, fish, conservation, Spain.

INTRODUCTION

The conservation status of endemic fish in Spain was recently reviewed by Elvira (1990). Categories of threat considered there followed the Spanish Red List made some years before (ICONA, 1986; Elvira *et al.*, 1988). The present study covers the revision by Blanco and González (1992), where changes of taxonomy and conservation status were included.

Comments on the distribution, habitat and conservation status of endemic species follow Elvira (1990), Doadrio *et al.* (1991), Blanco and González (1992) and personal data.

Spanish, Iberian, Southwestern European and Iberian-Northern African endemic species present in Spain were considered. One circum-Mediterranean endemic species living in Spain, *Blennius fluviatilis* Asso, 1801, is also listed.

Appendix 1 summarises the conservation status of the endemic fish fauna of Spain, including some national and EC regulations on conservation and management.

LIST OF SPECIES AND SUBSPECIES

Family Clupeidae

Alosa fallax rhodanensis (Roule, 1924) — *Saboga*

Distribution: Southwestern Europe (NE Spain, SE France and NW Italy). The Spanish inland population is restricted to the lower section of River Ebro (Fig. 1(A)).

Habitat: Anadromous. Coasts and lower sections of large rivers.

Conservation status: Considered as 'vulnerable' (V) (ICONA, 1986; Blanco & González, 1992).

Reasons for decline and present threats: Construction of dams, pollution of estuaries and overfishing.

Family Cyprinidae

Anaocypris hispanica (Steindachner, 1866) — *Jarabugo*

Distribution: Iberia. Very local in middle and lower River Guadiana (Spain and Portugal), and one known locality in the River Guadalquivir (Spain) (Fig. 1(B)).

Habitat: Lowland streams with a moderate current and abundant submerged plants.

Conservation status: Formerly considered as 'rare' (R) (ICONA, 1986), and presently as 'endangered' (E) (Blanco & González, 1992).

Reasons for decline and present threats: Water pollution, habitat destruction and introduction of exotic fish predators.

Barbus bocagei Steindachner, 1865 — *Barbo común*

Distribution: Iberia. Still common in the Rivers Duero and Tajo (Spain and Portugal), and Vouga, Mondego and Sado (Portugal) (Fig. 1(C)).

Habitat: Middle and lower reaches of rivers.

Conservation status: Not threatened.

Barbus comiza Steindachner, 1865 (= *Barbus steindachneri* Almaça, 1967) — *Barbo comiza*

Distribution: Iberia. Scarce in the Rivers Tajo and Guadiana (Spain and Portugal) and very rare in the River Guadalquivir (Spain) (Fig. 1(D)).

Habitat: Middle and lower reaches, in deep and slow waters, with abundant submerged plants.

Conservation status: Formerly considered as not threatened (ICONA, 1986), but presently as 'vulnerable' (V) (Blanco & González, 1992).

Reasons for decline and present threats: Water pollution, habitat destruction and introduction of exotic fish predators.

Barbus graellsii Steindachner, 1866 — *Barbo de Graells*

Distribution: Spain. Still common in the Rivers Ebro, Llobregat and Ter (Mediterranean drainage), and Oria, Artibay, Oca and Nervión (Cantabrian drainage) (Fig. 1(E)).

Habitat: Middle and lower reaches of rivers.

Conservation status: Not threatened.

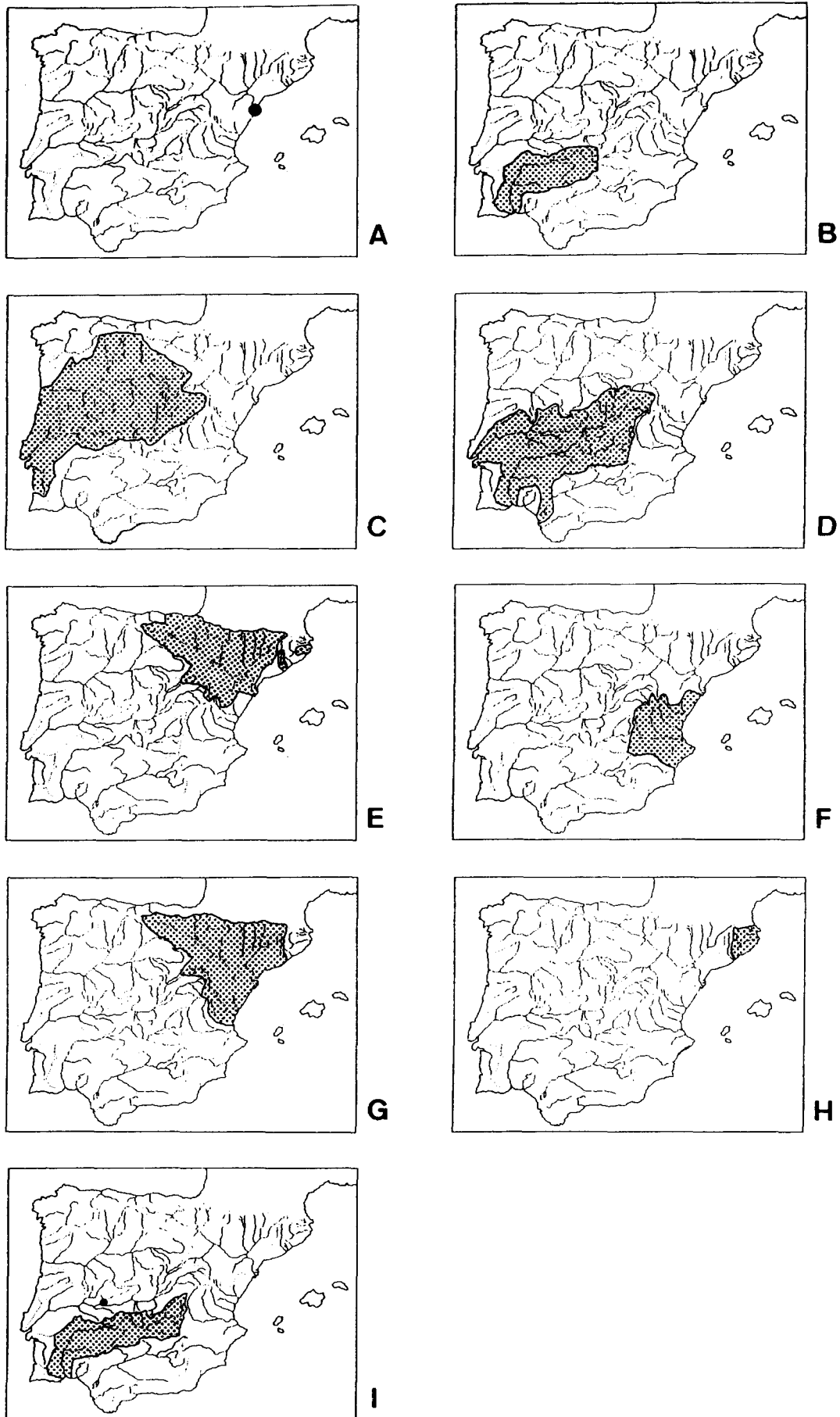


Fig. 1. Iberian distribution of endemic Mediterranean freshwater fish occurring in Spain (redrawn from Doadrio *et al.*, 1991). A, *Alosa fallax rhodanensis*; B, *Anaocypris hispanica*; C, *Barbus bocagei*; D, *Barbus comiza*; E, *Barbus graellsii*; F, *Barbus guiraonis*; G, *Barbus haasi*; H, *Barbus meridionalis*; I, *Barbus microcephalus*. (From Doadrio, I., Elvira, B. & Bernat, Y. (eds) (1991). *Peces continentales españoles. Inventario y clasificación de zonas fluviales*. Colección Técnica, ICONA, Madrid. Reprinted by permission.)

Barbus guiraonis Steindachner, 1866 — *Barbo mediterráneo*

Distribution: Spain. Locally common in the Mediterranean Rivers Mijares, Palancia, Turia, Júcar, Serpis and Bullent (Fig. 1(F)).

Habitat: Middle and lower reaches of rivers.

Conservation status: Considered as 'rare' (R) (Blanco & González, 1992) because of its restricted area of distribution.

Reasons for decline and present threats: Main threats are water pollution, habitat destruction and introduction of exotic fish predators.

Barbus haasi Mertens, 1924 — *Barbo de cola roja*

Distribution: Spain. Scarce populations in the Mediterranean Rivers Llobregat, Francolí, Ebro, Mijares, Palancia and Turia (Fig. 1(G)).

Habitat: Springs and mountain streams, sometimes in middle reaches.

Conservation status: Formerly considered as not threatened (ICONA, 1986), but presently as 'rare' (R) (Blanco & González, 1992).

Reasons for decline and present threats: Its local populations are threatened by pollution and habitat destruction (construction of small dams and desiccation).

Barbus meridionalis Risso, 1826 — *Barbo de montaña*

Distribution: Southwestern Europe (NE Spain, SE France and N Italy). Spanish populations restricted to the Mediterranean Rivers Muga, Fluviá, Ter, Daró, Tordera and Besós (Fig. 1(H)).

Habitat: Springs and mountain streams.

Conservation status: Formerly considered as not threatened (ICONA, 1986), but presently as 'vulnerable' (V) (Blanco & González, 1992).

Reasons for decline and present threats: Water pollution and habitat destruction (desiccation and construction of small dams).

Barbus microcephalus Almaça, 1967 — *Barbo cabecicorto*

Distribution: Iberia. Locally abundant in the River Guadiana (Spain and Portugal), it seems to be rare in the River Tajo (Spain) (Fig. 1(I)).

Habitat: Middle and lower reaches of rivers with deep and slow waters.

Conservation status: Formerly considered as 'insufficiently known' (K) (ICONA, 1986), and presently as 'rare' (R) (Blanco & González, 1992).

Reasons for decline and present threats: Water pollution, habitat destruction, dams and introduction of exotic fish predators.

Barbus sclateri Günther, 1868 — *Barbo gitano*

Distribution: Iberia. Still common in the Rivers Mira and Arade (Portugal), Guadiana (Spain and Portugal), and Guadalquivir, Guadalete, Guadiaro, Guadalhorce and Segura (Spain) (Fig. 2(A)).

Habitat: All river sections with moderate current and depths.

Conservation status: Not threatened.

Chondrostoma polylepis polylepis Steindachner, 1865 (= *Chondrostoma polylepis duriensis* Coelho, 1985) — *Boga de río*

Distribution: Iberia. Still common in the Rivers Eo, Eume, Allones, Tambre, Ulla and Umia (Spain), Miño, Limia, Duero and Tajo (Spain and Portugal), and Cavado, Ave, Vouga, Mondego, Alcoa and Sado (Portugal). Locally introduced in the River Júcar (Mediterranean drainage) (Fig. 2(B)).

Habitat: All river sections, with a strong current.

Conservation status: Not threatened.

Chondrostoma polylepis willkommii Steindachner, 1866 — *Boga del Guadiana*

Distribution: Iberia. Still common in the Rivers Guadiana (Spain and Portugal), and Odiel, Guadalquivir, Guadalete, Guadiaro and Guadalhorce (Spain) (Fig. 2(C)).

Habitat: All river sections with a strong current.

Conservation status: Not threatened.

Chondrostoma toxostoma arrigonis (Steindachner, 1866) — *Madrilla, loina*

Distribution: Spain. Locally common in the River Júcar (Fig. 2(D)).

Habitat: All river sections, mainly middle reaches.

Conservation status: The species was formerly considered as not threatened (ICONA, 1986), but presently this subspecies is 'rare' (R) (Blanco & González, 1992).

Reasons for decline and present threats: Scattered populations are threatened by water pollution, habitat destruction, introduction of exotic fish predators and hybridization with introduced *Chondrostoma polylepis polylepis*.

Chondrostoma toxostoma miegii Steindachner, 1866 — *Madrilla*

Distribution: Spain. Still common in the Rivers Urumea, Oria, Urola, Deba, Artibay, Oca, Butrón, Nervión, Agüera and Asón (Cantabrian drainage), and Llobregat, Ebro and Cenia (Mediterranean drainage) (Fig. 2(E)).

Habitat: All river sections.

Conservation status: Not threatened.

Chondrostoma toxostoma turiensis Elvira, 1987 — *Madrilla, madrija*

Distribution: Spain. Very local in the rivers Turia and Mijares (Fig. 2(F)).

Habitat: Middle reaches rich in submerged plants.

Conservation status: The species was formerly considered as not threatened (ICONA, 1986), but presently this subspecies is 'rare' (R) (Blanco & González, 1992).

Reasons for decline and present threats: The scarce populations are threatened by water pollution, habitat destruction (desiccation) and introduction of exotic fish predators.

Iberocypris palaciosi Doadrio, 1980 — *Bogardilla*

Distribution: Spain. A very local distribution in the Guadalquivir River basin: Rivers Guadalquivir, Jándula, Rumber and Robledo (Fig. 2(G)).

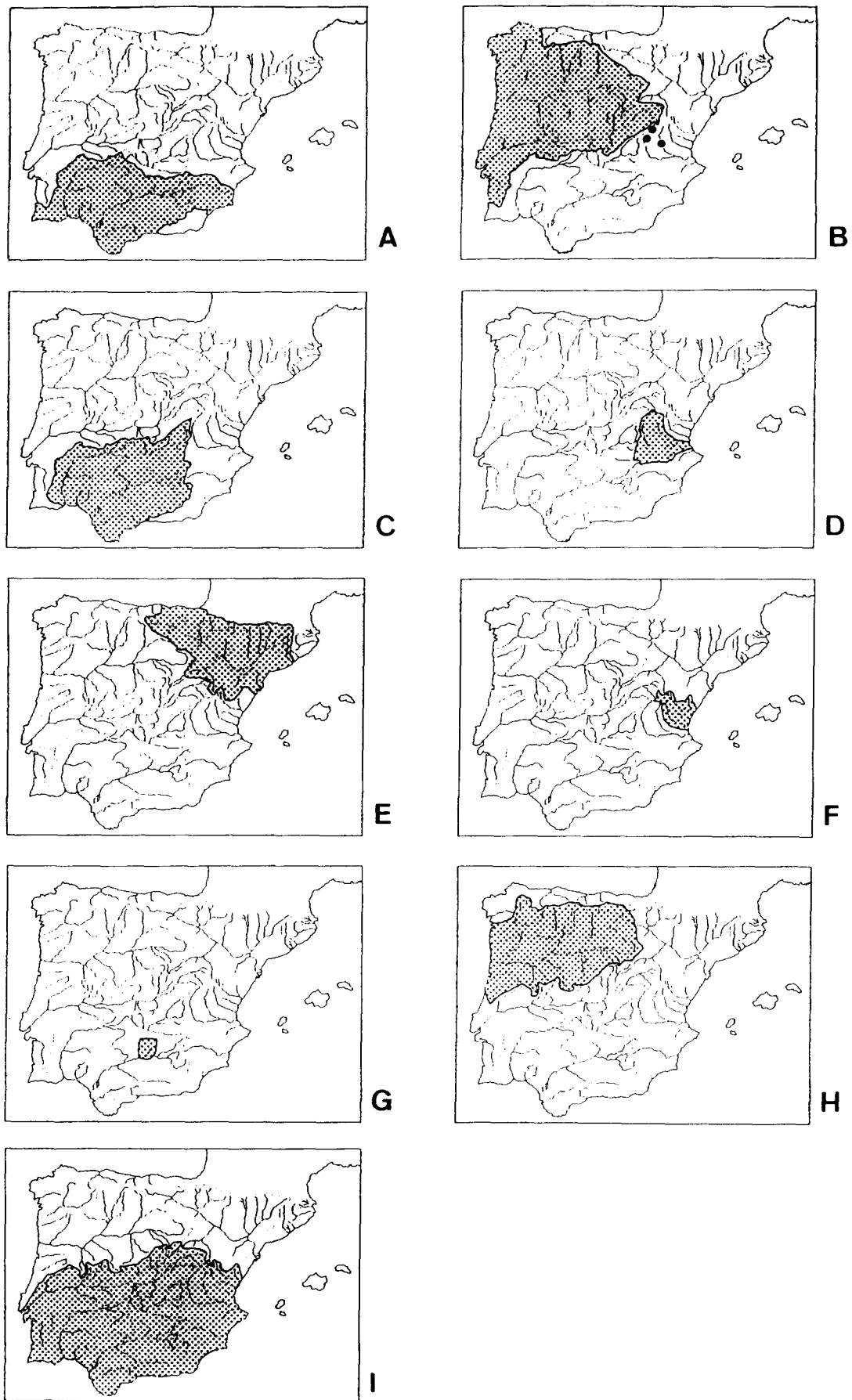


Fig. 2. Iberian distribution of endemic Mediterranean freshwater fish occurring in Spain (redrawn from Doadrio *et al.*, 1991). A, *Barbus sclateri*; B, *Chondrostoma polylepis polylepis*; C, *Chondrostoma polylepis willkommii*; D, *Chondrostoma toxostoma arrigonis*; E, *Chondrostoma toxostoma miegii*; F, *Chondrostoma toxostoma turiensis*; G, *Iberocypris palaciosi*; H, *Leuciscus caroliterii*; I, *Leuciscus pyrenaicus*. (From Doadrio, I., Elvira, B. & Bernat, Y. (eds) (1991). *Peces continentales españoles. Inventario y clasificación de zonas fluviales*. Colección Técnica, ICONA, Madrid. Reprinted by permission.)

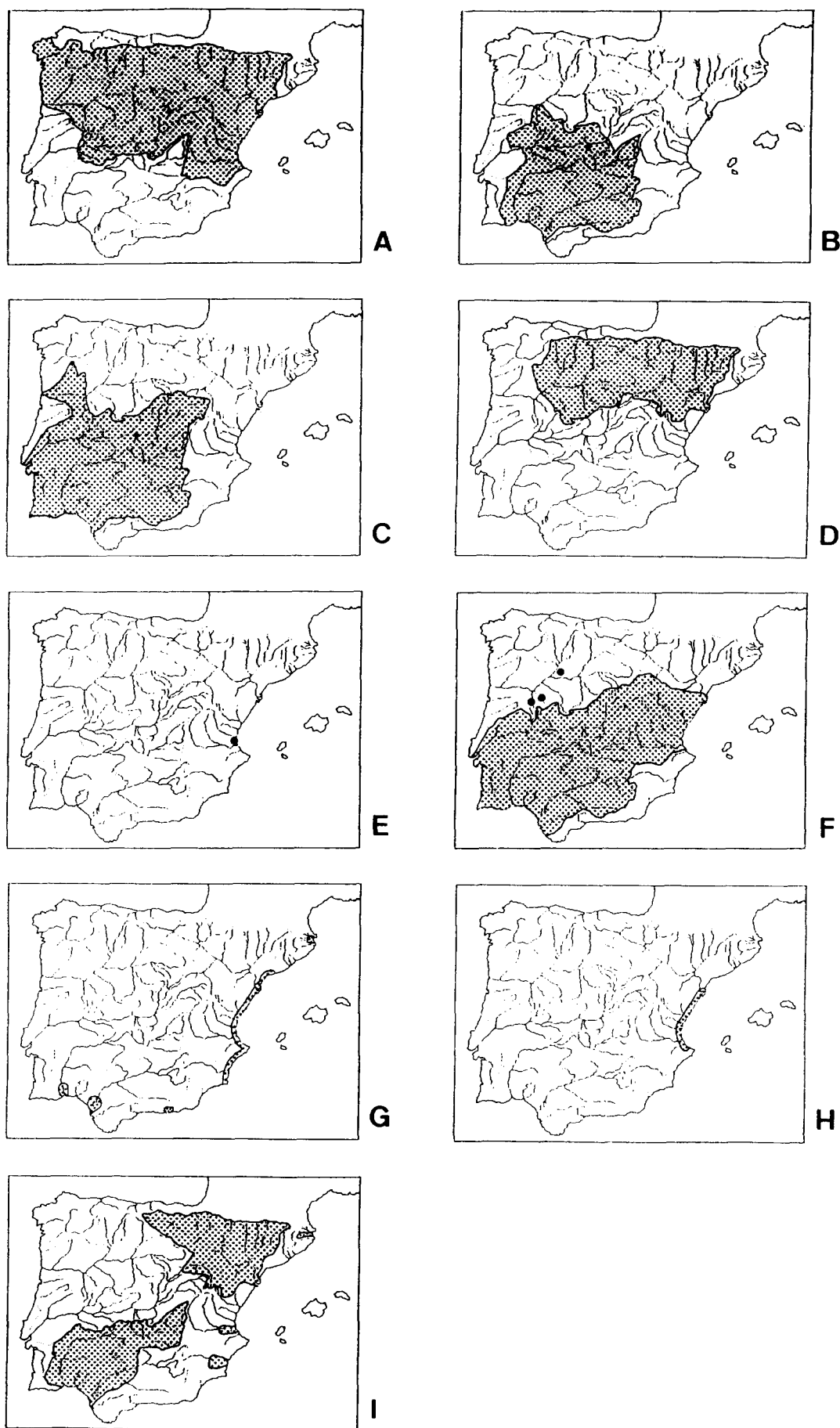


Fig. 3. Iberian distribution of endemic Mediterranean freshwater fish occurring in Spain (redrawn from Doadrio *et al.*, 1991). A, *Rutilus arcasii*; B, *Rutilus lemmingii*; C, *Troidophoxinellus alburnoides*; D, *Cobitis calderoni*; E, *Cobitis haasi*; F, *Cobitis paludica*; G, *Aphanis iberus*; H, *Valencia hispanica*; I, *Blennius fluviatilis*. (From Doadrio, I., Elvira, B. & Bernat, Y. (eds) (1991). *Peces continentales españoles. Inventario y clasificación de zonas fluviales*. Colección Técnica, ICONA, Madrid. Reprinted by permission.)

Habitat: Mountain and middle reaches of rivers, with moderate flow and abundant submerged plants.

Conservation status: Considered as 'insufficiently known' (K) (ICONA, 1986; Blanco & González, 1992).

Reasons for decline and present threats: Habitat destruction (construction of dams), water pollution and introduction of exotic fish predators.

Leuciscus carolitertii Doadrio, 1987 — *Bordallo*

Distribution: Iberia. Locally abundant in the Rivers Lérez and upper Ebro (Spain), Miño, Limia and Duero (Spain and Portugal), and Mondego (Portugal) (Fig. 2(H)).

Habitat: All river sections.

Conservation status: Presently considered as 'rare' (R) (Blanco & González, 1992).

Reasons for decline and present threats: Potential threats are introduction of exotic fish predators, habitat destruction and water pollution.

Leuciscus pyrenaicus Günther, 1868 — *Cacho*

Distribution: Iberia. Still common in the Rivers Tajo and Guadiana (Spain and Portugal), Sado, Mira and Arade (Portugal) and Odiel, Guadalquivir, Guadalete, Barbate, Jara, Guadiaro, Guadalhorce, Vélez, Guadalfeo, Verde, Guadalest, Algar, Gorgos, Girona, Serpis, Júcar, Turia and Mijares (Spain) (Fig. 2(I)).

Habitat: All river sections.

Conservation status: Not threatened.

Rutilus arcasii (Steindachner, 1866) — *Bermejuela*

Distribution: Iberia. Very local in Portugal, River Duero, but common in Spain, Rivers Ulla, Umia, Marín, Miño, Duero and Tajo (Atlantic drainage), and Francolí, Ebro, Mijares, Palancia, Júcar and Serpis (Mediterranean drainage) (Fig. 3(A)).

Habitat: Mainly in mountain streams, but also in the middle reaches.

Conservation status: Not threatened.

Rutilus lemmingii (Steindachner, 1866) (*Chondrostoma lemmingii* after Collares-Pereira, 1983) — *Pardilla*

Distribution: Iberia. Very local in the River Duero (Spain) and scarce populations in the Rivers Tajo and Guadiana (Spain and Portugal), and Odiel and Guadalquivir (Spain) (Fig. 3(B)).

Habitat: Middle and lower reaches of rivers, with slow current and abundant submerged plants.

Conservation status: Formerly considered as not threatened (ICONA, 1986), but presently as 'rare' (R) (Blanco & Gonzalez, 1992).

Reasons for decline and present threats: The scarce populations are threatened by the introduction of exotic fish predators, habitat destruction (desiccation) and water pollution.

Tropidophoxinellus alburnoides (Steindachner, 1866) ('*Rutilus alburnoides* complex' after Collares-Pereira 1983) — *Calandino*

Distribution: Iberia. Local in the River Duero (Spain and Portugal); but still common in Rivers Tajo and

Guadiana (Spain and Portugal), Sado, Mira and Arade (Portugal), and Odiel and Guadalquivir (Spain) (Fig. 3(C)).

Habitat: All river sections, but mainly middle reaches.

Conservation status: Not threatened.

Family Cobitidae

Cobitis calderoni Bacescu, 1961 — *Lamprehuela*

Distribution: Spain. Scattered populations in Rivers Duero and Ebro, and very local in River Tajo (Fig. 3(D)).

Habitat: Upper and middle reaches, with shallow waters and stony bottom.

Conservation status: Formerly considered as 'insufficiently known' (K) (ICONA, 1986), but presently as 'vulnerable' (V) (Blanco & González, 1992).

Reasons for decline and present threats: Habitat destruction, water pollution and introduction of exotic fish predators.

Cobitis haasi Klausewitz, 1955 — *Raboseta*

Distribution: Spain. Only known from the 'Albufera de Valencia', where it is presently very rare (Fig. 3(E)).

Habitat: Catchment of Albufera Lake, in small streams with slow current, sandy bottoms and submerged plants.

Conservation status: Considered as 'insufficiently known' (K) (Blanco & González, 1992).

Reasons for decline and present threats: Habitat destruction (desiccation) and water pollution.

Cobitis paludica (de Buen, 1930) — *Colmilleja*

Distribution: Iberia. Scattered populations in the Rivers Tajo and Guadiana (Spain and Portugal), Sado, Mira and Arade (Portugal), and Piedras, Odiel, Guadalquivir, Guadalete, Bullent, Racons, Júcar, Turia, Mijares and Ebro (Spain). Presumably introduced by fish anglers in the Spanish Duero (Fig. 3(F)).

Habitat: Middle and lower reaches, with shallow waters, sandy bottom and submerged plants.

Conservation status: Considered as 'vulnerable' (V) (Blanco & González, 1992).

Reasons for decline and present threats: Introduction of exotic fish predators, water pollution, habitat destruction and use as live bait for angling (although this is forbidden by law).

Family Cyprinodontidae

Aphanius iberus (Valenciennes, 1846) — *Fartet*

Distribution: Iberia and North-western Africa. Scattered populations in the marshes of the rivers Guadiana and Guadalquivir (Atlantic drainage), as well as in several littoral wetlands of the Mediterranean coast (Fig. 3(G)). The species (possibly an undescribed subspecies) also lives in Algeria.

Habitat: Marshes and littoral wetlands. The species is highly euryhaline and eurythermic.

Conservation status: Considered as 'endangered' (E) (ICONA, 1986; Blanco & González, 1992).

Reasons for decline and present threats: Habitat destruction (desiccation), water pollution and potential competition with introduced exotic toothcarps *Gambusia holbrooki* (Agassiz, 1859) and *Fundulus heteroclitus* (Linnaeus, 1766).

Valencia hispanica (Valenciennes, 1846) — *Samaruc*

Distribution: Spain. Very rare in a few localities (perhaps only six!) along the Mediterranean coast (Fig. 3(H)).

Habitat: Littoral freshwater wetlands rich in submerged plants.

Conservation status: Considered as 'endangered' (E) (ICONA, 1986; Blanco & González, 1992).

Reasons for decline and present threats: Habitat destruction (desiccation), water pollution and potential competition with the acclimatized exotic mosquito fish *Gambusia holbrooki*.

Family Blenniidae

Blennius fluviatilis Asso, 1801 (*Salaria fluviatilis* after Bath 1977) — *Fraile*

Distribution: Circum-Mediterranean. Spanish distribution includes the Rivers Guadiana and Guadalquivir (Atlantic drainage), and Segura, Júcar, Ebro and Fluviá (Mediterranean drainage) (Fig. 3(I)).

Habitat: Middle and lower reaches of rivers. Mainly in shallow waters, with stony bottom and moderate to high flow.

Conservation status: Considered as 'endangered' (E) (ICONA, 1986; Blanco & González, 1992).

Reasons for decline and present threats: Habitat destruction (dams and reservoirs), water pollution and introduction of exotic fish predators.

CONCLUSIONS

The degree of endemism of primary and secondary freshwater fishes in Spain is remarkable. Twenty-five of the 29 (86%) Spanish native species and subspecies belonging to Cyprinidae, Cobitidae and Cyprinodontidae (Blanco & González, 1992) are endemic to the area.

Unfortunately, the current conservation status of these important endemic species has not been taken

seriously. A total of 18 taxa of the 27 included in this report are under threat. However, no national conservation or restoration programmes involving any particular species or subspecies have yet been undertaken.

The main negative factors affecting the endemic fish fauna (see also Elvira, 1990) are: (1) habitat destruction, due to strong desiccation, construction of dams and channelling of river courses; (2) pollution of waters; and (3) introduction of exotic fishes (Elvira, in press, recorded 18 acclimatized species), including some predatory species, a type of fish previously absent from Iberian fresh waters.

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APPENDIX 1. LIST OF THE ENDEMIC FISH SPECIES OCCURRING IN SPANISH FRESH WATERS.

	Geographic distribution ^a	IUCN category ^b						
		ICONA (1986)	Blanco & González (1992)	Bern (1988) ^c	Thr. spp. (1990) ^d	Hab. Dir. (1992) ^e	Fishery (1989) ^f	Market (1989) ^g
CLUPEIDAE								
<i>Alosa fallax rhodanensis</i>	S,F,I	V	V	III		II,V	•	
CYPRINIDAE								
<i>Anaocypris hispanica</i>	S,P	R	E	III	II	II,IV		
<i>Barbus bocagei</i>	S,P	NT	NT	III		V	•	•
<i>Barbus comiza</i>	S,P	NT	V	III		II,V	•	•
<i>Barbus graellsii</i>	S		NT			V	•	
<i>Barbus guiraonis</i>	S		R			V	•	
<i>Barbus haasi</i>	S	NT	R			V	•	
<i>Barbus meridionalis</i>	S,F,I	NT	V	III		II,V	•	
<i>Barbus microcephalus</i>	S,P	K	R	III		V	•	
<i>Barbus sclateri</i>	S,P		NT	III		V	•	
<i>Chondrostoma polylepis polylepis</i>	S,P	NT	NT	III		II	•	•
<i>Chondrostoma polylepis willkommii</i>	S,P	NT	NT	III		II	•	•
<i>Chondrostoma toxostoma arrigonis</i>	S	NT	R	III		II	•	•
<i>Chondrostoma toxostoma miegii</i>	S	NT	NT	III		II	•	•
<i>Chondrostoma toxostoma turiensis</i>	S	NT	R	III		II	•	•
<i>Iberocypris palaciosi</i>	S	K	K		II	II		
<i>Leuciscus carolitertii</i>	S,P		R				•	
<i>Leuciscus pyrenaicus</i>	S,P		NT	III			•	
<i>Rutilus arcasii</i>	S,P	NT	NT	III		II		
<i>Rutilus lemmingii</i>	S,P	NT	R	III		II		
<i>Tropidophoxinellus alburnoides</i>	S,P	NT	NT	III		II		
COBITIDAE								
<i>Cobitis calderoni</i>	S	K	V	III				
<i>Cobitis haasi</i>	S		K	III				
<i>Cobitis paludica</i>	S,P		V	III				
CYPRINODONTIDAE								
<i>Aphanius iberus</i>	S,P,A	E	E	III	I	II		
<i>Valencia hispanica</i>	S	E	E	II	I	II*,IV		
BLENNIIDAE								
<i>Blennius fluviatilis</i>	Medit.	E	E	III	II			

^aS, Spain; P, Portugal; F, France; I, Italy; A, Algeria.

^bE, endangered; V, vulnerable; R, rare; K, insufficiently known; NT, not threatened.

^cAnnexes to the Bern Convention (II, Annex II, 'species strictly protected'; III, Annex III, 'protected species').

^dSpanish Catalogue of Threatened Species (I, Annex I, species catalogued 'in danger of extinction'; II, Annex II, species catalogued 'of special interest').

^eCouncil Directive of the EC on the Conservation of Natural Habitats (II, Annex II, 'species of Community interest whose conservation requires the designation of special areas of conservation'; II*, priority species included in Annex II; IV, Annex IV, 'species of Community interest in need of strict protection'; V, Annex V, 'species of Community interest whose taking in the wild and exploitation may be subject to management measures').

^fSpecies subject to fishery in Spain.

^gMarketable species in Spain.