

TAXONOMY OF THE GENUS *CHONDROSTOMA* (OSTEICHTHYES, CYPRINIDAE): AN UPDATED REVIEW

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Received March 25, 1997
Accepted November 19, 1997

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A b s t r a c t

An advanced diagnosis of the genus *Chondrostoma*, based on synapomorphic osteological and morphological characters, is presented. Former taxonomic revisions of the genus employed the biological species concept, and some polytypic species with two or more subspecies were recognized. This species concept is strictly only applicable in the case of sympatry. However, the genus *Chondrostoma* mostly presents allopatric units (only three cases of original sympatric species are known). Thus, to consider allopatric populations of *Chondrostoma* as species or as subspecies is a subjective decision. The phylogenetic species concept seems to be a more objective and valid approach to understand the taxonomy of this genus of primary freshwater fishes. Therefore, a review of the taxonomy of *Chondrostoma*, following the principles of the phylogenetic species concept, is proposed. Close populations or groups of populations diagnosed as distinct from other closing related groups are now accepted as valid species. This means that the genus consists of twenty-six species. Likewise, recent contributions to the taxonomy and distribution of *Chondrostoma* are briefly discussed.

Key words: freshwater fish, geographical distribution, morphology, osteology, phylogenetic species concept, systematics

Introduction

Recent taxonomic revisions of the genus *Chondrostoma* by Elvira (1987a,b, 1991), Nelva et al. (1988), Smirnov et al. (1988) and Smirnov (1992) used the biological species concept, resulting both monotypic and polytypic species. This species concept can be strictly only applicable to sympatric species, but it loses the utility when allopatric units are involved, since eventual interbreeding or not of the allopatric populations from different river basins cannot be disproved. Likewise, the biological species are inappropriate units for phylogenetic systematics (Baum 1992, and references there).

Several other species concepts have been presented, including at least (in alphabetic order): cladistic, cohesion, ecological, evolutionary, morphological, phenetic, phylogenetic and recognition (see reviews in King 1993 and Ridley 1993). More recently Mallet (1995) proposed the genotypic cluster definition of species, and Kottelat (1995) the pragmatic species concept.

After the phylogenetic species concept (first proposed by Cracraft 1983): "A species is the smallest diagnosable cluster of individual organisms within which there is a parental pattern of ancestry and descent" (and many subsequent definitions, see Nixon & Wheeler 1990, Baum 1992, Baum & Donoghue 1995). Since the smallest diagnosable group is given the rank of species, subspecies or any other infraspecific categories are unnecessary.

The genus *Chondrostoma* consists of mostly allopatric units (until present considered with more or less subjectivity as species or subspecies), with only three cases of original sympatry: *C. genei* and *C. soetta* from northern Italy, *C. kinzelbachi* and *C. regium* from the Orontes River basin, and *C. nasus* and *C. scodrense* from the Lake Scutari. Consequently, the application of the phylogenetic species concept can be a more useful approach to the research of *Chondrostoma* taxonomy. To avoid subspecies, and to increase the number of recognized species, is not an initial disadvantage (K o t t e l a t 1997). In fact, recent authors of taxonomic studies of other Eurasian cyprinid genera are not using the subspecies. See, for instance, recent papers on taxonomy of *Barbus* (D o a d r i o 1990, B i a n c o 1995), *Leuciscus* (B i a n c o & K n e z e v i c 1987, D o a d r i o 1987, B o g u t s k a y a 1994, C o e l h o et al. 1995), *Pseudophoxinus* (B o g u t s k a y a 1992), *Rutilus* (B i a n c o & T a r a b o r e l l i 1985) and *Scardinius* (I l i a d o u et al. 1996).

An heuristic revision of the genus *Chondrostoma* is presented following the principles of the phylogenetic species concept. Since the later revision by E l v i r a (1991) six formerly considered subspecies are now accepted as six valid species, whilst three synonyms are now accepted as valid species. This means that the genus actually consists of twenty-six species. Likewise, an advanced diagnosis of the genus *Chondrostoma* is offered, together with additional comments on certain species doubtful of inclusion within this genus.

Results and Discussion

Diagnosis of the Genus *Chondrostoma* Agassiz, 1835

The genus *Chondrostoma* is a monophyletic (holophyletic) group of Cyprinidae Leuciscinae, included in the Abramini lineage by H o w e s (1981, 1991). The close phylogenetic relationships between the genera *Chondrostoma* and *Anaocypris* recently proposed by B o g u t s k a y a & C o l l a r e s - P e r e i r a (1997) ought to be tested. Diagnostic characters of *Chondrostoma* are as follows (based on and extended from E l v i r a 1987a,b, E l v i r a et al. 1990). Osteological characters A-G are synapomorphic (some of them autapomorphic, see also H o w e s 1981).

Osteology:

- A) Premaxilla rather high, the ascendent process short (or lacking in some species). The posterior process is placed at the dorsal-posterior margin of the premaxilla body, with a ventral deep incisure.
- B) Maxilla shortened, the anterior and palatine processes are similar in height.
- C) Dentary short with the anterior part medially curved forming an angle of ninety degrees (or close to it) with the lateral portion. The oral surface has a conspicuous prominence where the horny layer of the lip is inserted. The coronoid process is vertical or inclined anteriorly.
- D) Ethmoid (supraethmoid) is nearly as long as wide, with the medial anterior margin slightly concave.
- E) Basioccipital with the distal portion of the pharyngeal process thin and broad, with a grooved dorsal surface. The masticatory plate is large, smooth and ovate.

- F) Pharyngeal bone (5th ceratobranchial) with the upper limb distally wider, hammer-shaped, and the lower limb thin and nearly parallel to the former.
- G) Five to seven knife-like pharyngeal teeth with smooth grinding surfaces, placed in a single row. The same number on both arches or one more on the left (other combinations are unusual).
- H) Total number of vertebrae from 42 to 49.

Other internal characters:

- a) Gill rakers short and rather numerous, fourteen to forty on the external row of the first arch.
- b) Peritoneum very dark or black.

External characters:

- 1) Body fusiform, more or less pigmented or spotted above the lateral line and whitish below.
- 2) Mouth inferior or subterminal, straight to arched like a horse-shoe; upper lip fleshy, the lower with a characteristic horny layer (synapomorphy). Without barbel.
- 3) Origins of dorsal and pelvic fins vertically opposite.
- 4) Eight to ten branched rays in dorsal fin, from twelve to eighteen in pectoral, eight or nine in pelvic, eight to twelve in anal, and seventeen (between two longer unbranched rays) in caudal fin.
- 5) The outlines of the dorsal and anal fins are usually concave, exceptionally straight or slightly convex. Caudal fin is deeply forked.
- 6) A pelvic axillary process always present.
- 7) Lateral line complete, scales from forty-four to one hundred and six.
- 8) Scales are sub-quadrate in shape (ellipsoidal in *C. phoxinus*), with a rounded posterior margin, and bear radii on the anterior and posterior fields. Focus is displaced towards the anterior margin.

R e m a r k s

Leuciscus lemmingii Steindachner, 1866 (from southwestern Iberian peninsula) and *Chondrostoma lusitanicum* Collares-Pereira, 1980 (from southern Portugal), both considered as *Chondrostoma* species by Collares-Pereira (1980a, 1980b, 1983, 1985), Nelva et al. (1988), Alves & Coelho (1994), Costa-Pereira (1995) and Bogutskaya & Collares-Pereira (1997), lack several diagnostic characters of the genus *Chondrostoma* stated before. These two species bear some common synapomorphic and other features with *Chondrostoma*, but they show different patterns at least in characters B (the palatine process of maxilla is higher and more developed than the anterior process), D (ethmoid is narrow, and longer than wide), H (total number of vertebrae from 36 to 41), 2 (mouth is subterminal, without horny layer), 4 (usually seven branched rays in dorsal, pelvic and anal fins), 5 (outlines of dorsal and anal fins are convex, and the caudal fin is slightly forked), 6 (without pelvic axillary process) and 8 (scales ellipsoidal; bearing radii through the entire scale surface in *lemmingii*). Both species were "provisionally transferred to the genus *Rutilus*" by Elvira (1987a) (a generic position accepted by Kottelat 1997). Their eventual inclusion in *Chondrostoma* would break the actual holophyletic character of the genus described by the synapomorphic (some of

them autapomorphic) and additional features stated in the diagnosis. Nevertheless, *lemmingii* and *lusitanicum*, perhaps together with the Iberian endemisms *arcasii* Steindachner, 1866 (from central-northern Iberian peninsula) and *macrolepidotus* Steindachner, 1866 (from northern Portugal), could be included into an undescribed genus (or genera) close to *Chondrostoma* (C a s a d o 1995, unpublished PhD).

Species Account

Species are listed alphabetically except for the nominal species which is described first (Table 1). A full list of synonyms can be found in Elvira (1987a,b). Comments are only devoted to changes or new contributions after the taxonomy proposed by Elvira (1987a,b, 1991). Recent papers on biochemical and genetic taxonomy are also reported. Present knowledge on karyology of *Chondrostoma* species was compiled by Ráb & Collares-Pereira (1995).

***Chondrostoma nasus* (L., 1758)**

Chondrostoma nasus nasus: Elvira 1987a,b, 1991.

Chondrostoma nasus nasus: Nelva et al. 1988.

Chondrostoma nasus borysthenicum (partim): Nelva et al. 1988.

Chondrostoma nasus ohridanus: Nelva et al. 1988.

Chondrostoma ohridanum: Banarescu 1991.

Chondrostoma nasus: Smirnov 1992.

Chondrostoma nasus ohridanus: Maric 1995.

Chondrostoma nasus ohridanus: Rakaj & Flloko 1995.

Distribution

Central Europe. Main river basins include: Nieman, Wisla, Oder, Rhine, Meuse, Somme (Atlantic Ocean), Drin, Mat (Mediterranean Sea), Danube, Dniester and southern Bug (Black Sea).

Nelva (1988) stated the original distribution of the species in France, where it was introduced into the Rivers Seine, Loire and Rhône. Meanwhile, Smirnov (1992) delimited its eastern range, including the river basins of Dniester and southern Bug.

Remarks

Lusková et al. (1995a) described the haemogram of a sample from Czech Republic. The allozyme variation was studied by Dobrovolov et al. (1987) (Bulgaria), Gollmann (1995) (Austria), Lusková et al. (1995b) (Czech Republic), Lusková et al. (1995c) (Czech and Slovak Republics) and Gollmann et al. (1996) (Austria).

In spite of Banarescu (1991) accepted *C. ohridanum*, and Nelva et al. (1988), Maric (1995) and Rakaj & Flloko (1995) accepted *C. nasus ohridanus*, the population of nase with a straight mouth living in the Lake Ohrid and in the River Drin (Macedonia-Albania) is here considered as *C. nasus*, an opinion followed by Economidis & Banarescu (1991) and Kottelat (1997). Large samples from the area examined by Grupché & Dimovski (1977) (n=100), Soric (1983) (n=70) and Elvira (1987b) (n=109) show a morphological pattern indistinct from other populations of

C. nasus (Elvira 1987b). Likewise, the osteological characters of Ohrid nase described by Elvira (1987b) are those of *C. nasus*. Nevertheless, further genetic and morphological studies could show any difference worth considering this population as a different taxon.

***Chondrostoma angorense* Elvira, 1987**

Chondrostoma nasus angorensis: Elvira 1987a,b, 1991.

Chondrostoma regium (partim): Nelva et al. 1988.

Chondrostoma nasus angorensis: Banarescu 1991.

Distribution

Sakarya and Kizilirmak River basins (northern Anatolia, Asia).

***Chondrostoma arrigonis* (Steindachner, 1866)**

Chondrostoma toxostoma arrigonis: Elvira 1987a,b, 1991.

Chondrostoma arrigonis: Nelva et al. 1988.

Chondrostoma arrigonis: Banarescu 1989, 1991.

Chondrostoma arrigonis (partim): Kottelat 1997.

Distribution

Júcar River basin (eastern Spain, Europe).

***Chondrostoma colchicum* Derjugin, 1899**

Chondrostoma colchicum colchicum: Elvira 1987a,b.

Chondrostoma colchicum colchicum: Nelva et al. 1988.

Chondrostoma colchicum colchicum: Banarescu 1991.

Chondrostoma colchicum: Elvira 1991.

Chondrostoma colchicum colchicum: Smirnov 1992.

Distribution

Rivers of southwestern Caucasus (Asia), including Tuapse, Sochi, Ashe, Mzymta, Rion, Coruh and Yesilirmak.

Remarks

See comments on *C. kubanicum*.

***Chondrostoma cyri* Kessler, 1877**

Chondrostoma oxyrhynchum cyri: Elvira 1987a,b.

Chondrostoma cyri cyri: Nelva et al. 1988.

Chondrostoma oxyrhynchum cyri: Banarescu 1991.

Chondrostoma oxyrhynchum: Elvira 1991.

Chondrostoma oxyrhynchum cyri: Smirnov 1992.

Distribution

Kura River basin (southeastern Caucasus, Asia).

Remarks

Elvira (1987a,b) considered two subspecies of nase living in northeastern (*C. oxyrhynchum oxyrhynchum*) and southeastern (*C. oxyrhynchum cyri*) Caucasus.

Nevertheless, Elvira (1991), after the study of larger samples, did not find enough differences to accept them as two distinct taxa. However, Smirnov (1992) found their morphologies different enough to accept them as subspecies. Consequently, both are here considered as two valid species.

***Chondrostoma duriense* Coelho, 1985**

Chondrostoma polylepis duriensis Coelho, 1985.
Chondrostoma polylepis polylepis: Elvira 1987a,b, 1991.
Chondrostoma polylepis duriensis: Nelva et al. 1988.
Chondrostoma polylepis polylepis: Banarescu 1991.
Chondrostoma polylepis duriensis: Coelho 1992.
Chondrostoma polylepis: Kottelat 1997.

Distribution

Northwestern Iberian peninsula (Europe). Main river basins include: Eo, Masma, Oro, Eume, Allones, Donas, Tambre, Ulla, Umia, Minho, Limia, Cávado, AVE and Douro.

Remarks

Coelho (1983, 1985, 1992) found that morphological and allozyme differences of northwestern Iberian populations of nase were sufficient to consider them as a distinct taxon from *C. polylepis*.

***Chondrostoma genei* (Bonaparte, 1839)**

Distribution

Northeastern Italy (Europe). Main river basins include: Vomano, Tronto, Esino, Cesano, Metauro, Foglia, Po, Adige, Brenta, Piave, Livenza, Tagliamento, and Isonzo (Adriatic Sea).

Bianco (1993) stated the original distribution of the species in Italy, where it was introduced into the Rivers Centa, Magra, Arno and Tiber (Tyrrhenian Sea).

***Chondrostoma holmwoodii* (Boulenger, 1896)**

Chondrostoma holmwoodii holmwoodii: Elvira 1987a,b, 1991.
Chondrostoma holmwoodii: Banarescu 1991.
Chondrostoma holmwoodii: Balik 1995.

Distribution

River basins of Bakir and Gediz (western Anatolia, Asia).

***Chondrostoma kinzelbachi* Krupp, 1985**

Chondrostoma kinzelbachi: Nelva et al. 1988.
Chondrostoma kinzelbachi: Banarescu 1991.
Chondrostoma kinzelbachi: Elvira 1991.

Distribution

Orontes River basin (Turkey and Syria, Asia).

***Chondrostoma knerii* Heckel, 1843**

Distribution

Neretva River basin and some neighbouring lakes (western Balkans, Europe).
There is a unique record from Zadar.

***Chondrostoma kubanicum* Berg, 1914**

Chondrostoma colchicum kubanicum: Elvira 1987a,b.
Chondrostoma colchicum kubanicum: Nelva et al. 1988.
Chondrostoma colchicum kubanicum: Banarescu 1991.
Chondrostoma colchicum: Elvira 1991.
Chondrostoma colchicum kubanicum: Smirnov 1992.

Distribution

Kuban River basin (northwestern Caucasus, Europe).

Remarks

Elvira (1987a,b) considered two subspecies of nase living in northwestern (*C. colchicum kubanicum*) and southwestern (*C. colchicum colchicum*) Caucasus. Nevertheless, Elvira (1991), after the study of larger samples, did not find enough differences to accept them as two distinct taxa. However, Smirnov (1992) found morphologies differed enough to accept them as subspecies. Consequently, both are here considered as two valid species.

***Chondrostoma meandrense* Elvira, 1987**

Chondrostoma holmwoodii meandrensis Elvira, 1987a.
Chondrostoma holmwoodii meandrensis: Elvira 1987b, 1991.
Chondrostoma holmwoodii meandrensis: Wilkens & Dohse 1993.

Distribution

Büyük Menderes River basin (western Anatolia, Asia).

***Chondrostoma miegii* Steindachner, 1866**

Chondrostoma toxostoma miegii: Elvira 1987a,b, 1991.
Chondrostoma toxostoma miegii: Nelva et al. 1988.
Chondrostoma miegii: Banarescu 1989.
Chondrostoma toxostoma miegii: Banarescu 1991.
Chondrostoma toxostoma: Kottelat 1997.

Distribution

Northeastern Spain (Europe). Main river basins include: Asón, Nervión, Oca, Urola, Urumea (Atlantic Ocean), La Cenia, Ebro and Llobregat (Mediterranean Sea).

***Chondrostoma orientale* Bianco & Banarescu, 1982**

Chondrostoma cyri orientale Bianco & Banarescu, 1982.
Chondrostoma orientale: Elvira 1987a,b, 1991.
Chondrostoma cyri orientale: Nelva et al. 1988.
Chondrostoma orientale: Banarescu 1991.

Distribution

Pulwar River (Iran, Asia).

***Chondrostoma oxyrhynchum* Kessler, 1877**

Chondrostoma oxyrhynchum oxyrhynchum: Elvira 1987a,b.

Chondrostoma oxyrhynchum: Nelva et al. 1988.

Chondrostoma oxyrhynchum oxyrhynchum: Banarescu 1991.

Chondrostoma oxyrhynchum: Elvira 1991.

Chondrostoma oxyrhynchum oxyrhynchum: Smirnov 1992.

Distribution

Northeastern Caucasus (Europe). Main river basins include: Kuma, Terek, Sulak, Rubas-Tschai and Samur.

Remarks

See comments on *C. cyri*.

***Chondrostoma phoxinus* Heckel, 1843**

Distribution

Karst regions of western Balkans (Europe), both in endorheic (Glamoc, Livno and Duvno basins) and in fluvial drainages (Sinj basin, placed in the Cetina River basin).

***Chondrostoma polylepis* Steindachner, 1865**

Chondrostoma polylepis polylepis: Elvira 1987a,b, 1991.

Chondrostoma polylepis polylepis: Nelva et al. 1988.

Chondrostoma polylepis polylepis: Banarescu 1991.

Chondrostoma polylepis polylepis: Coelho 1992.

Chondrostoma polylepis (partim): Kottelat 1997.

Distribution

Central Iberian peninsula (Europe). River basins of Vouga, Mondego, Alcoa, Tagus and Sado. Doadrio & Elvira (1986) stated its distribution in Spain, where it was introduced into the Júcar River basin (Elvira 1987b).

Remarks

Coelho (1992) and Brito & Coelho (1996) described the allozyme variation of this taxon.

***Chondrostoma prespense* Karaman, 1924**

Chondrostoma prespensis: Elvira 1987a,b, 1991.

Chondrostoma nasus prespensis: Nelva et al. 1988.

Chondrostoma prespensis: Economidis 1991, 1995.

Chondrostoma prespensis: Economidis & Banarescu 1991.

Chondrostoma prespensis: Rakaj & Filloko 1995.

Chondrostoma prespense: Kottelat 1997.

Distribution

Lakes Prespa (Megali Prespa) and Maliquit (Mikri Prespa) in the central Balkans (Europe).

***Chondrostoma regium* (Heckel, 1843)**

Distribution

Southern Anatolia and Near East (Asia). Lake Beysehir, and river basins of Göksu, Seyhan, Ceyhan, Kueik, Orontes (Mediterranean Sea) and Tigris-Euphrates (Persian Gulf).

***Chondrostoma scodrense* Elvira, 1987**

Chondrostoma scodrensis Elvira, 1987a.

Chondrostoma scodrensis: Elvira 1987b, 1991.

Chondrostoma skodrense: Banarescu 1991.

Chondrostoma scodrensis: Economidis & Banarescu 1991.

Chondrostoma scodrensis: Maric 1995.

Chondrostoma scodrensis: Rakaj & Filoko 1995.

Chondrostoma scodrense: Kottelat 1997.

Distribution

Lake Scutari and River Rieka, a north-western tributary of that lake (western Balkans, Europe).

Remarks

The species is no longer detectable or has become extinct (Maric 1995).

***Chondrostoma soetta* Bonaparte, 1840**

Distribution

Northern Italy (Europe). Main river basins include: Po, Adige, Brenta, Sile, Piave, Livenza, Tagliamento and Isonzo.

***Chondrostoma toxostoma* (Vallot, 1837)**

Chondrostoma toxostoma toxostoma: Elvira 1987a,b, 1991.

Chondrostoma toxostoma toxostoma: Nelva et al. 1988.

Chondrostoma toxostoma toxostoma: Banarescu 1991.

Chondrostoma toxostoma (partim): Kottelat 1997.

Distribution

Southern France (Europe). Main river basins include: Adour, Gironde (Atlantic Ocean), Aude, Hérault, Rhône and Var (Mediterranean Sea).

Nelva (1988) stated the original distribution of the species in France, where it was introduced into the Loire River basin.

***Chondrostoma turiense* Elvira, 1987**

Chondrostoma toxostoma turiensis Elvira, 1987a.

Chondrostoma toxostoma turiensis: Elvira 1987b, 1991.

Chondrostoma arrigonis: Kottelat 1997.

Distribution

River basins of Turia and Mijares (eastern Spain, Europe).

***Chondrostoma vardarense* Karaman, 1928**

Chondrostoma vardarensis: Elvira 1987a,b, 1991.

Chondrostoma vardarensis: Dobrovolo v et al. 1987.
Chondrostoma nasus vardarensis: Nelva et al. 1988.
Chondrostoma nasus vardarensis: Banarescu 1991.
Chondrostoma vardarensis: Economidis & Banarescu 1991.
Chondrostoma vardarensis: Ahnelt & Elvira 1991.
Chondrostoma vardarensis: Economidis 1991, 1995.
Chondrostoma vardarensis: Kottelat 1997.

Distribution

Southeastern Balkans (Europe). Main river basins include: Aaos (Adriatic Sea), Pinios, Aliakmon, Vardar, Struma, Mesta and Evros (Aegean Sea).

Remarks

Dobrovolo v et al. (1987) (Bulgaria) and Gollmann et al. (1996) (Greece) described the allozyme variation of the species, which seems to be rather different from that of *C. nasus*.

***Chondrostoma variable* Jakowlew, 1870**

Chondrostoma nasus borysthenicum Berg, 1914.
Chondrostoma variabilis: Elvira 1987a,b, 1991.
Chondrostoma nasus variabilis: Nelva et al. 1988.
Chondrostoma nasus borysthenicum (partim): Nelva et al. 1988.
Chondrostoma nasus variable: Banarescu 1991.
Chondrostoma variabilis: Smirnov 1992.

Distribution

River basins of Dnieper, Don, Volga, Ural and Emba (eastern Europe).

Remarks

Elvira (1987a,b) included nase from Dnieper (*C. nasus borysthenicum* Berg, 1914) as a synonym of *C. nasus nasus*. Elvira (1991) still considered nase from Dnieper "provisionally as *C. nasus nasus*", while those from Don as *C. variable*. Smirnov (1992) studied the morphological pattern of the species in large samples from the former USSR. His results confirm the validity of *C. variable* as a distinct taxon from *C. nasus*.

***Chondrostoma willkommii* Steindachner, 1866**

Chondrostoma polylepis willkommii: Elvira 1987a,b, 1991.
Chondrostoma willkommii: Nelva et al. 1988.
Chondrostoma polylepis willkommii: Banarescu 1991.
Chondrostoma willkommii: Coelho 1992.
Chondrostoma willkommii: Kottelat 1997.

Distribution

Southern Iberian peninsula. Main river basins include: Guadiana, Odiel, Guadalquivir, Guadalete, Guadiaro and Guadalhorca (Doadio & Elvira 1986).

Remarks

Coelho (1992) described the allozyme variation of this taxon.

Table 1. List of species of the genus *Chondrostoma* and their general areas of distribution.

Genus <i>Chondrostoma</i>	Species	River(s) and region(s)	Continent
	<i>Chondrostoma nasus</i> (L., 1758)	from Somme to southern Bug (central Europe)	Europe
	<i>Chondrostoma angorense</i> Elvira, 1987	Sakarya and Kizilirmak (northern Anatolia)	Asia
	<i>Chondrostoma arrigonis</i> (Steindachner, 1866)	Júcar (eastern Spain)	Europe
	<i>Chondrostoma colchicum</i> Derjugin, 1899	from Tuapse to Yesilirmak (southwestern Caucasus)	Asia
	<i>Chondrostoma cyri</i> Kessler, 1877	Kura (southeastern Caucasus)	Asia
	<i>Chondrostoma duriense</i> Coelho, 1985	from Eo to Douro (northwestern Iberian peninsula)	Europe
	<i>Chondrostoma genei</i> (Bonaparte, 1839)	from Vomano to Isonzo (northeastern Italy)	Europe
	<i>Chondrostoma holmwoodii</i> (Boulenger, 1896)	Bakir and Gediz (western Anatolia)	Asia
	<i>Chondrostoma kinzelbachi</i> Krupp, 1985	Orontes (Turkey and Syria)	Asia
	<i>Chondrostoma knerii</i> Heckel, 1843	Neretva and neighbouring areas (western Balkans)	Europe
	<i>Chondrostoma kubanicum</i> Berg, 1914	Kuban (northwestern Caucasus)	Europe
	<i>Chondrostoma meandrense</i> Elvira, 1987	Büyük Menderes (western Anatolia)	Asia
	<i>Chondrostoma miegii</i> Steindachner, 1866	Ebro and neighbouring rivers (northeastern Spain)	Europe
	<i>Chondrostoma orientale</i> Bianco & Banarescu, 1982	Pulwar (Iran)	Asia
	<i>Chondrostoma oxyrhynchum</i> Kessler, 1877	from Kuma to Samur (northeastern Caucasus)	Europe
	<i>Chondrostoma phoxinus</i> Heckel, 1843	Sinj, Glamoc, Livno and Duvno areas (western Balkans)	Europe
	<i>Chondrostoma polylepis</i> Steindachner, 1865	from Vouga to Sado (central Iberian peninsula)	Europe
	<i>Chondrostoma prespense</i> Karaman, 1924	Lakes Prespa and Maliqit (central Balkans)	Europe
	<i>Chondrostoma regium</i> (Heckel, 1843)	from Lake Beysehir to Orontes, and Tigris - Euphrates (near East)	Asia
	<i>Chondrostoma scodrense</i> Elvira, 1987	Lake Scutari (western Balkans)	Europe
	<i>Chondrostoma soetta</i> Bonaparte, 1840	from Po to Isonzo (northern Italy)	Europe
	<i>Chondrostoma toxostoma</i> (Vallot, 1837)	from Adour to Var (southern France)	Europe
	<i>Chondrostoma turiense</i> Elvira, 1987	Turia and Mijares (eastern Spain)	Europe
	<i>Chondrostoma vardarense</i> Karaman, 1928	Aoos, and from Pinios to Evros (southeastern Balkans)	Europe
	<i>Chondrostoma variabile</i> Jakowlew, 1870	from Dnieper to Emba (eastern Europe)	Europe
	<i>Chondrostoma willkommii</i> Steindachner, 1866	from Guadiana to Guadalhorce (southern Iberian peninsula)	Europe

Acknowledgements

This study was supported in part by the Spanish National Scientific Programme of the D.G.I.C.Y.T., grant number PB92-0025.

LITERATURE

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