

NOBANIS – Invasive Alien Species Fact Sheet

Pseudorasbora parva

Author of this fact sheet: Andrzej Witkowski, Museum of Natural History, Wrocław University, Sienkiewicza 21, 50-335 Wrocław, Poland; Phone: ++ 48 71 375 41 53, E-mail: a.witkowski@biol.uni.wroc.pl

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Species description

Scientific names: *Pseudorasbora parva* (Temminck et Schlegel, 1846) - Cypriniformes, Cyprinidae.

Synonyms: *Leuciscus parvus* Schlegel, 1842; *L. pusillus* Temminck et Schlegel, 1846; *Fundulus virescens* Temminck et Schlegel, 1846; *Leuciscus pusillus* Temminck et Schlegel, 1846; *Micraspius mianowski* Dybowski, 1869; *Aphiocypris chinensis* Fowler, 1924; *Pseudorasbora altipinna* Nichols, 1925; *Pseudorasbora fowleri* Nichols, 1925; *P. depressirostris* Nichols, 1925; *P. monstrosa* Nichols, 1925; *P. parva parvula* Nichols, 1929; *P. parva tenuis* Nichols, 1929; *P. parva* Berg, 1949; *P. parva parva* Okada, 1960.

Common names: Stone moroco, topmouth gudgeon, false razbora (GB), střevlička východní (CZ), Blaubandbärbling, Amurbärbling, Pseudokeilfleckbarbe, Asiatischer Gründling (DE), båndgrundling (DK), Ebarasboora (EE), Rytinis gruzlelis (LT), Amūras čebačeks (LV), czebaczek amurski (PL), Tschebatchek, Čebačok amurskij (RU).

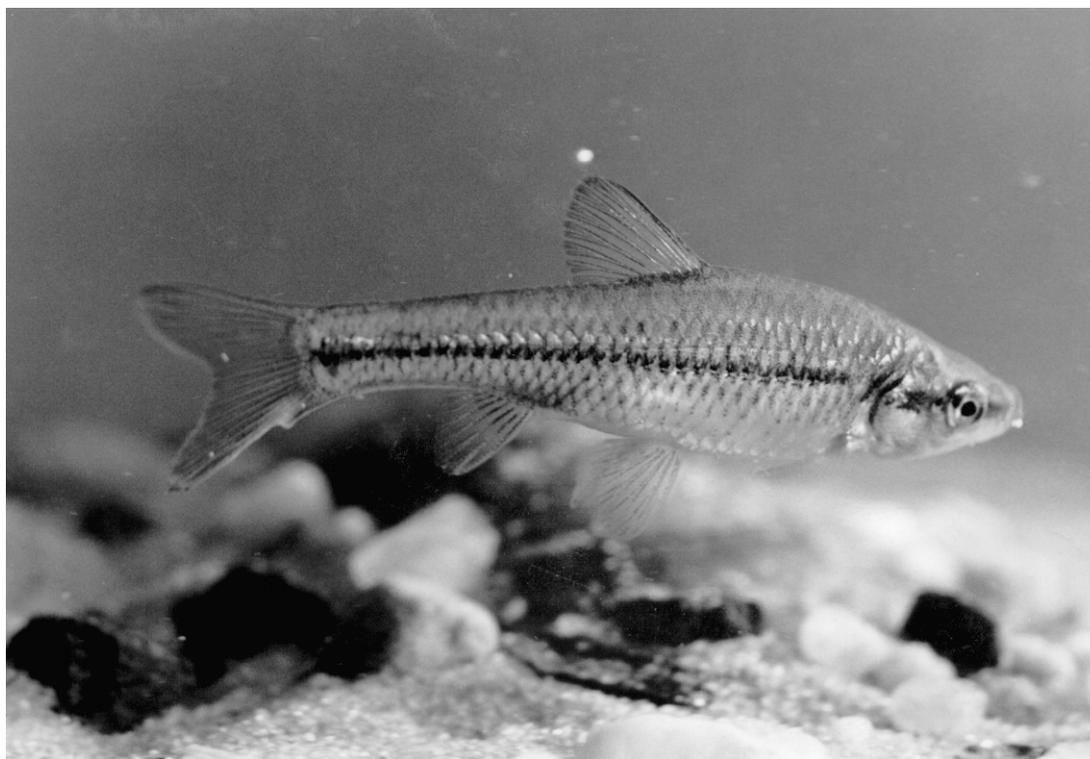


Fig. 1. *Pseudorasbora parva*, photo by Andrzej Kruk.

Species identification

P. parva has an elongate body, slightly flattened on sides, resembling that of the species of the genus *Gobio*. Maximum size up to 110 mm *Tl*, though most individuals are 80-90 mm in length and 17.1-19.2 g in body mass. Life span up to 3-4 years. The head is somewhat flattened in its anterior part. The mouth is clearly in top position. The dorsal and anal fins are short. The caudal fin is big and deeply incised, with both parts of similar size. The ventral fins are located slightly anterior to the dorsal fin. The throat is covered with scales. The lateral line is complete, running in the middle of sides. The scales are large and cycloidal. Number of scales in lateral line (34) 35-38 (39). The coloration is similar in both sexes, with gray back, light sides and belly, passing from yellowish-green to silver. Young individuals have a dark stripe along the body sides; it disappears with age. In caudal part of the scales pigment forms characteristic lunate spots. The fins are pale, light yellow, only on the dorsal fin there is a darker stripe, running obliquely backwards (Berg 1949, Kotusz and Witkowski 1998, Šebela and Wohlgemuth 1984, Witkowski 1991a,b).

The sexual dimorphism becomes pronounced during spawning. In males breeding tubercles appear on the head. The greatest accumulation of sharp tubercles (ca. 14) is located in the anterior part of the head, on the frons, near nostrils and below and above the eye. Few tubercles (ca. 4) are observed also on the lower lip. In that period the males darken distinctly, and their fins become black while the operculum gets violet. The females become clearly lighter (Anheld and Tiefenbach 1991, Berg 1949, Movčan and Kozlov 1978, Muchačeva 1950).

Native range

The native range of *P. parva* is the East Asian subregion including the basins of the rivers Amur, Yang-tze, Huang-ho, Japanese islands (Kiusiu, Sikoku and the southern and central parts of Honsiu), western and southern parts of the Korean Peninsula and Taiwan (Minkiang river system) (Bănărescu 1999, Berg 1949).

Alien distribution

History of introduction and geographical spread

In Europe *P. parva* was found in many regions and river systems of Romania, including the Danube delta, already in the 1960s. It was first recorded in 1961 from southern Romania (fish farm Nucet – Dimbovita river system) (Bănărescu 1999, Bănărescu and Nalbant 1965) and Albania (Knezevič *et al.* 1978). Spreading along the Danube river, the stone moroco was recorded from Hungary in 1963. It is not excluded that it got there with fry of *Ctenopharyngodon idella*, *Aristichthys nobilis* and *Hypophthalmichthys molitrix*, imported to several local fish farm. In subsequent years it was found in most fish ponds and in open waters, including lake Balaton (Biró 1972). In 1972 the species was recorded from the European part of the former USSR – the Danube delta and Dniester (Kozlov 1974). Bănărescu (1999) is of opinion that in some areas (Volga, Don, Dniester, Neman) it was introduced much earlier, before 1961. It was probably from Hungary that it penetrated into the former Czechoslovakia. It was first recorded there in 1974 in the Tisa river catchment area (Žitnan and Holčík 1976). In Lithuania *P. parva* was introduced accidentally into lake Dunojaus in 1963 when introducing several other herbivorous fish species. However during the recent decades the species have not been observed in that lake anymore. So the status in Lithuania is unknown (possibly extinct) (Virbickas 2000). In subsequent years *P. parva* was found in Czechoslovakia in over 20 sites, including a few near the Polish border (district Karvina) (Wohlgemuth and Šebela 1987). In mid 1970s it was purposefully introduced in France (region of Sarthe) (Allardi, Canceler 1988), and then observed in the Rodan river (Allardi and Keith 1991). In 1982 and subsequent years the species was recorded from Austria (first in the March and Tulln rivers) (Weber 1984). In 1984 the stone moroco was caught in eastern Germany in the Weisse Elster river (near Gera) (Arnold

1985). Since 1987 this species has established permanent populations in western Germany (Arnold 1990). Using the Main-Danube canal and then the Rhine, it has spread in western Europe where now it is present (since 1992) in Belgium and the Netherlands (Golzan *et al.* 2002, Pollux and Korosi 2006). In these areas (Germany, Benelux) it has probably spread as a result of private stocking/introductions as well, because it is often kept in ponds and sold as ornamental fish or bait fish, (S. Nehring, pers. comm.). In the 1970s and 1980s it was found in Bulgaria, northern Greece, Turkey and in the western part of the Balkans (Serbia and Montenegro) - in lakes Skardar, Prespa, Ohrida and in Aliakmaon river (Bianco 1988, Erk'akan 1984, Jankovic and Karapetkova 1992, Rosecchi *et al.* 1993, Wildekamp *et al.* 1997). In Poland *P. parva* was recorded for the first time as late as 1990; it got there with stocking material of carp, imported in the 1980s, probably from Hungary (Witkowski 1991a,b). In subsequent years (till 2000) the species was recorded from most lowland rivers of Poland (Witkowski 2002). In recent few years the stone moroco was found also in northern Italy (Bănărescu 1999, Perdices and Doadrio 1992), in Iberian Peninsula (Caiola and de Sostoa 2002) and southern England (Domaniewski and Wheeler 1996, Gozlan *et al.* 2002). In 2002 the first finding of *P. parva* in scandinavia was done in Denmark (Olesen *et al.* 2003) in a small lake. In 2003 it was further found in a small river (Olesen T. M., pers. comm.). Thus in slightly less than 50 years *P. parva* colonised almost entire Europe, Central Asia and North Africa (ca. 32 countries) (Gozlan *et al.* 2010a).

Pathways of introduction

The species was introduced in Europe with stocking material of herbivorous fishes (*Ctenopharyngodon idella*, *Aristichthys nobilis*, *Hypophthalmichthys molitrix*) imported from China. Only in a few instances *P. parva* was introduced purposefully, as an ornamental fish (Beyer 2004) or as a food for predatory fishes in hatcheries (Cacic *et al.* 2004). In a great majority of cases it was an accidental introduction or natural expansion of the range through river systems. From the initial introductions the species has within 50 years spread to almost entire Europe, northern Africa (Algeria), central Asia (Kazakhstan, Uzbekistan, Iran), either naturally or accidentally, with stocking material of other species (Arnold 1985, Coad and Abdoli 1990, Gozlan *et al.* 2002, Perdices and Doadrio 1992). In Denmark, regular trade with *P. parva* for aquarists was seen in 2004 (Olesen, pers. comm.). The fish was imported from Germany and this is probably the pathway of introduction to Denmark. Since the first introductions of *P. parva* outside its natural range, approximately 5 new countries were invaded in each decade, with an average of 3.9 years (SD=5.19) between the first introduction and the first detection (Gozlan *et al.* 2010a, Witkowski 2009).

Alien status in region

A review of literature on the ichthyofauna of lowland rivers of Central Europe (Witkowski *et al.* 2000, 2004) indicates that the species is now a constant component of the Central European fauna, and is often a dominant. In Poland, in the autumn of 1993, when a pond of ca. 5 ha (fish farm Ruda Sułowska) was emptied, ca. 300 kg of the species was caught. Similarly high abundance of *P. parva* was noted in some ponds of the southern Czech Republic, where its density ranged from 370 to 14 331 indiv./ha, and the biomass was 2.28-8.12 kg/ha (Adamek and Sukop 2000). In Germany, in Austria and in the European part of Russia the species is locally abundant. In Denmark only low densities of *P. parva* has been found until today (Olesen, pers. comm.). In Lithuania the status is that the species is probably extinct from the lake where *P. parva* was introduced accidentally (Virbickas 2000). *P. parva* has not reached Estonia, Lithuania and Latvia (See also table 1).

Country	Not found	Not established	Rare	Local	Common	Very common	Not known
Austria				X			
Belgium				X			
Czech Republic						X	
Denmark				X			
Estonia	X						
European part of Russia				X			
Finland	X						
Faroe Islands	X						
Germany				X			
Greenland	X						
Iceland	X						
Ireland	X						
Latvia	X						
Lithuania		X					
Netherlands							
Norway	X						
Poland					X		
Slovakia							
Sweden	X						

Table 1. The frequency and establishment of *Pseudorasbora parva*, please refer also to the information provided for this species at www.nobanis.org/search.asp. Legend for this table: **Not found** –The species is not found in the country; **Not established** - The species has not formed self-reproducing populations (but is found as a casual or incidental species); **Rare** - Few sites where it is found in the country; **Local** - Locally abundant, many individuals in some areas of the country; **Common** - Many sites in the country; **Very common** - Many sites and many individuals; **Not known** – No information was available.

Ecology

Habitat description

In both its original distribution range and in secondarily invaded areas the stone moroco inhabits shallow lakes, carp ponds, irrigation canals, ditches, slow sections of lowland rivers and their oxbows. It prefers much vegetated places (Berg 1949, Kapusta *et al.* 2008, Kozlov 1974, Muchačeva 1950, Witkowski 2000) but in Denmark the only two finding sites are characterised by being relatively vegetation free (Olesen, pers. comm.).

Reproduction and life cycle

P. parva spawns when one year old. In the Amur river basin the spawning starts when the water reaches the temperature of 15-19 °C (May-August), whereas in Europe it spawns earlier – in April-June (Giurca and Angelescu 1971, Baruš *et al.* 1984). The fertility of *P. parva* ranges from a few hundred to a few thousand eggs: Amur – 388-3060; Czech Republic – 2018-5326; Danube - 610-3200; Dnieper – 800-4200. The eggs are ellipsoidal (major diameter 2.0- 2.5 mm), sticky and yellowish. The species belongs to the indifferent (litho-phytophilous) reproductive guild (Baruš *et al.* 1984, Kozlov 1974, Movčan and Smirnov 1981, Muchačeva 1950). The spawning is multi-litter and takes place in the littoral. The eggs are laid on plants, sand, stones, mollusc shells and other

substrata. Before spawning the female carefully cleans the substratum for egg-laying. During one act it lays up to several dozen eggs. One male may spawn with a few consecutive females. The male guards the eggs till hatching, and aggressively drives away other, often larger, fish (Šebela and Wohlgemuth 1984). The embryonic development at the water temperature of 20-28 °C takes 4-8, and the larval development 41-42 days (Kozlov 1974, Makajeva and Zaki Mochamed 1982, Póltorak 1995, Šebela and Wohlgemuth 1984).

Dispersal and spread

The species owes its rapid expansion mainly to the small body size and biology (fx. high oxygen, temperature range of oxygen – mode of life (hiding in densely vegetated parts of water bodies), multi-litter spawning and parental care. Apart from this, its expansion is favoured by human activities – stocking open waters and water bodies subject to intense fish farming. Its spread is also aided by anglers, since it is often used as a bait-fish for predatory fishes. From places it invaded as a result of unintentional introduction (fish ponds), it rapidly penetrates into open waters (Błachuta *et al.* 1993).

Impact

Affected habitats and indigenous organisms

Where it occurs in masses in fish ponds, it competes for food with farmed fish species (Kozlov 1974, Movčan and Smirnov 1981). Most importantly it consumes larger species of planktonic crustaceans which results in an increase in the quantity of phytoplankton, and further in increasing eutrophication of the water bodies (Adamek and Sukop 2000). Besides, it feeds on juvenile stages of many locally valuable native fish species (Žitnan and Holčík 1976). Potential hybridisation between *P. parva* and sunbleak *Leucaspis delineatus*, a threatened species in Europe, constitutes a serious threat (Gozlan, Beyer 2006).

Being a vector of infectious diseases, it constitutes a serious threat to both native and farmed fishes in Europe. Parasite specific to *P. parva* that has been reported is *Dactylogyrus squameus* and this has facilitated their dispersal to the Czech and Slovak Republics and Italy (Galli *et al.* 2007, Ondračková *et al.* 2004). A range of native generalist pathogens are associated with invasive *P. parva*, these are typically zoosporic fungi (Czeczuga *et al.* 2002), parasites such as *Diplostomum spataceum* in Georgia (Kakalova and Shonia 2008) and viruses such as fry rhabdovirus (PFR) in Germany (Ahne and Thomsen 1986). This virus which causes acute disease of *Esox lucius* fry has been isolated from *P. parva*. The two most severe parasites found associated with *P. parva* in its invasive range are *Anguillicola crassus* and rosette agent *Sphaerothecum destruans* (Gozlan *et al.* 2005, 2009, 2010b). The identification of *P. parva* as a healthy carrier for the intercellular parasite *S. destruans* is a concern in that this pathogen has been responsible for mass mortalities of salmonid fishes in USA (Arkush *et al.* 1998) and has since been associated with the decline of native European fish species including *Leucaspis delineatus* (Gozlan *et al.* 2010a,b).

Genetic effects

No genetic effects have been reported.

Human health effects

No human health effects have been reported.

Economic and societal effects (positive/negative)

In open waters of southern Europe *P. parva* has probably contributed to a decrease in abundance or even disappearance of some autochthonous cyprinids (*Scardinius erythrophthalmus*, *Carassius carassius*, *Rhodeus sericeus*, *Gobio gobio*, *Leucaspis delineatus*) (Giurca and Angelescu 1971, Žitnan and Holčík 1976). According to Bănărescu (1999) and Rosecchi *et al.* (1993) in rivers the species has probably modified the structure of the native communities of aquatic invertebrates. In ponds, during a mass occurrence, it depletes food basis of farmed species (carp), decreasing their productivity (Adamek and Sukop 2000).

Management approaches

Prevention methods

In most European countries introduction of foreign fish species into open waters is prohibited. It is difficult, however, to successfully counteract penetration through canal-connected river systems and illegal (private) fish stocking. Considering the present distribution and the high abundance in many areas, it is practically impossible to eliminate the species or limit its numbers. However, stocking material imported for fish farms or in order to stock open waters should be checked especially carefully for its „purity”. Besides, using the stone moroco as live bait for predatory fishes should be abandoned. In Poland releasing some alien fish species, including stone moroco, in the water bodies where they were caught, is strictly prohibited (Degree of the Minister of Agriculture and Village Development, and the Regulations of Amateur Angling - Polish Angling Union) (Witkowski 2006). Direct trade with the fish in Europe should be stopped. There has been a proposal to add *P. parva* to the Estonian list of worst alien species (minister's regulation) that can not be brought into Estonia (C. Birnbaum, pers. comm.). *Pseudorasbora parva* is placed on the Grey List of Invasive Alien Species in Germany and Austria (Nehring *et al.* 2010, Wiesner *et al.* 2010).

Eradication, control and monitoring efforts

In pond carp farms it is recommended, before introducing carp, for a short time to keep (and then remove) native predatory fishes – pikeperch and pike (Giurca and Angelescu 1971). Adamek and Sukop (2000) think, however, that *P. parva*, because of its small size, is of no interest to native predators (pikeperch – *Sander lucioperca*, pike – *Esox lucius*, wels – *Silurus glanis*), and only perch (*Perca fluviatilis*) may be potentially dangerous to it.

Information and awareness

There are no reports of information or awareness campaigns regarding the species.

Knowledge and research

Further, detailed studies on the biology, and especially the effect of the species on the native communities of hydrobionts (fishes, invertebrates) and the aquatic environment are necessary.

Recommendation or comments from experts and local communities

None

References and other resources

Contact persons

Thorsten Møller Olesen (DK), Vandmiljøkontoret, Nordjyllands Amt, Niels Bohrs Vej 30, 9220 Aalborg Øst, Phone: +45 9635 1422, Fax: 9815 2009, E-mail: tmo@nja.dk

Ēriks Aleksejevs (LV), Latvian Fish Resources Agency, Laboratory of Inland Waters
Riga, Daugavgrivas Str. 8, LV-1048; E-mail: eriks.aleksejevs@latzra.lv

Stefan Nehring (DE), Federal Agency for Nature Conservation, Konstantinstrasse 110, D-53179
Bonn; Phone: +49-228-84911444; E-mail: stefan.nehring@bfm.de

Links

Species summary [Pseudorasbora parva](#) – Fish Base

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