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Distribution of the Topmouth Gudgeon *Pseudorasbora parva* (Temminck & Schlegel, 1846) in Algeria

Saad FERAH [1,a] | Karim HADDAD [2,a] | Mehdi CHETIBI [3,a] | Matthew FORD [4,b]

1 ✉ saadferah@hotmail.com orcid.org/0000-0003-2432-2752
2 ✉ karim241267@yahoo.fr orcid.org/0000-0002-6064-9472
3 ✉ mehdi.chetibi@ecocirta.dz orcid.org/0009-0000-3478-4323
4 ✉ matt@seriouslyfish.com orcid.org/0009-0001-1712-5083
a Environmental association ÉcoCirta, Algeria
b WildFins, Berlin, Germany

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Abstract
The topmouth gudgeon, *Pseudorasbora parva* (Temminck & Schlegel, 1846), is a small freshwater fish species native to Eastern Asia, noted for its high ecological plasticity and tolerance to a wide range of environmental conditions. The species has been widely introduced beyond its native range, particularly across Europe and North Africa. In Algeria, *P. parva* is now well established, and is especially common in river basins and other freshwater systems in the northeast of the country.

Keywords: North Africa, Freshwater biodiversity, Invasive species, Expansion, Gobionidae, Fish, Distribution.

Résumé
La distribution du Goujon asiatique *Pseudorasbora parva* (Temminck & Schlegel, 1846) en Algérie
Le Goujon asiatique, *Pseudorasbora parva* (Temminck & Schlegel, 1846), est une petite espèce de poisson d'eau douce originaire de l'Asie de l'Est, connue pour sa grande plasticité écologique et sa tolérance à diverses conditions environnementales. Cette espèce a été largement introduite au-delà de son aire de repartition naturelle, notamment en Europe et en Afrique du Nord. En Algérie, *P. parva* est actuellement bien établi et devenu commun spécialement dans les bassins fluviaux et autres zones d'eau douce au nord-est du pays.

Mots-clés : Afrique du Nord, Biodiversité d'eau douce, Espèce invasive, Expansion, Gobionidae, Poisson, Répartition.

1. Introduction

Pseudorasbora parva (Temminck & Schlegel, 1846), commonly known as topmouth gudgeon, stone moroko, or simply Pseudorasbora (KEITH, 2003), is a small fish species inhabiting both freshwater and brackish environments (U.S. FISH & WILDLIFE SERVICE, 2014). It originates from Northeast Asia, where its range includes the Amur River basin (along the Russia-China border), the Yangtze and Yellow Rivers (China), the Japanese archipelago, Taiwan, and the Korean Peninsula (WITKOWSKI, 2011). In these areas, the species remains widespread, and is currently assessed as "Least Concern" on the IUCN Red List of Threatened Species (BOGUTSKAYA, 2022). *P. parva* has been introduced to various parts of Central Asia, Europe, and North Africa. In the latter region, it is established in Morocco, Algeria, and Tunisia (FORD *et al.*, 2020; KARABANOV *et al.*, 2021).

The spread of *P. parva* in Europe began inadvertently in the 1960s through the introduction of aquaculture and sport fishing species, particularly Chinese carps such as grass carp *Ctenopharyngodon idella* and silver carp *Hypophthalmichthys molitrix*. Its expansion was further facilitated by its use as an ornamental species and as live feed for carnivorous fish in hatcheries (ONDRAČKOVÁ *et al.*, 2023). Outside its native range, *P. parva* has become one of the most invasive freshwater fish globally (POULET, 2020). Since 2016, it has been included in the European Union's list of Invasive Alien Species of Union Concern (EUROPEAN COMMISSION, 2016).

P. parva has been referenced in several studies on Algeria's ichthyofauna (BACHA & AMARA, 2007; KARA, 2012; CHAIBI, 2014; FORD, 2020; BAIKECHE, 2021). However, few investigations have focused specifically on this species, with the exception of PERDICES & DOADRIO (1992) who first reported its presence in North Africa, and the recent study by TABABOUCHET *et al.* (2025), which documents its occurrence at three new sites in Algeria. The present study aims to update current knowledge on the distribution and abundance of *P. parva* in Algeria, while also contributing new occurrence data.

2. Species Identification and Ecology

P. parva belongs to the family Gobionidae (BOGUTSKAYA, 2022) and the order Cypriniformes. It is a small-bodied species, typically measuring between 8 and 9 cm in length, with males generally larger than females (KOTTELAT & FREYHOF, 2007: 100). In Algeria – according to our findings – adults' size is usually 7 cm, and the largest specimen we found measured 10 cm, from the 5th pond of Djebel Ouahch (Figure 1).

The body is elongated, and the head is dorsoventrally flattened at the mouth, which is upturned – hence the common name "topmouth gudgeon" (WITKOWSKI, 2011) (Figure 2). The dorsal fin originates at the same level as the pelvic fins, while the caudal fin is large and forked. Slight dorsal hump is present between the head and dorsal fin, particularly evident in mature individuals. The lateral line bears 34 to 39 scales (WITKOWSKI, 2011).

Colouration ranges from grey to yellowish-green, with a paler ventral surface. The scales exhibit black, crescent-shaped pigmentation, especially pronounced in adults (Figure 4 & Figure 5). Juveniles typically display a distinctive black stripe extending from the mouth to

the caudal fin (Figure 3). The fins are translucent, often developing dark markings with age (Figure 4 & Figure 5) (WITKOWSKI, 2011).

Figure 1. Large *P. parva* (bottom) from the 5th pond of Djebel Ouahch (Constantine). 12 April 2025. (Photo: S. FERAH). Observation available at: inaturalist.org/observations/270033546

Figure 2. *P. parva* from the 3rd pond of Djebel Ouahch (Constantine). 12 April 2025. (Photo: S. FERAH). Observation available at: inaturalist.org/observations/269926742

Figure 3. Subadult *P. parva* from Beni Haroun Dam (Mila). 18 August 2024. (Photo: S. FERAH). Observation available at: inaturalist.org/observations/236857602

Pseudorasbora parva is a benthopelagic species (U.S. FISH & WILDLIFE SERVICE, 2014) that typically forms schools (BAENSCH & RIEHL, 1998: 406). It inhabits a wide variety of habitats, such as small canals rich in vegetation, ponds, and small lakes. Spawning generally occurs in stagnant or slow-flowing waters (KOTTELAT & FREYHOF, 2007: 99), which was consistent with our field observations (see below). However, *P. parva* has also been recorded in faster-flowing habitats, such as the Oued El-Kebir at El Kala (PERDICES & DOADRIO, 1992).

The species has an opportunistic diet, feeding on insects, crustaceans, small fishes, eggs, and aquatic vegetation (KOTTELAT & FREYHOF, 2007: 100; BOGUTSKAYA, 2022). In Europe, reproduction occurs between March and June (KOTTELAT & FREYHOF, 2007: 100) or from May to August depending on the region (BAENSCH & RIEHL, 1998: 406). Females typically spawn three to four times per season (KOTTELAT & FREYHOF, 2007: 100).

3. Distribution in Algeria

The presence of *P. parva* in Algeria has been documented since 1990, with its initial introduction likely occurring unintentionally during the stocking of *Cyprinus carpio* in the Oued El-Kebir at El Kala (PERDICES & DOADRIO, 1992). Since then, the species has been recorded in several other regions of the country, a spread that may be attributed to subsequent fish stocking activities in various artificial reservoirs, followed by natural dispersal through connected watercourses.

In the published literature, *P. parva* has been reported from the Oued Soummam in Béjaïa (BACHA & AMARA, 2007),

the Aïn Touta hill reservoir in Batna (CHAIBI, 2014), Oubeira and Tonga lakes, Oued Bougous, Oued Bou Namoussa, and Messida canal in El Tarf, Foum El Gherza and Manbaa El Ghozlane dams in Biskra , and Oued Zelmou in Béchar (FORD *et al.*, 2020). Additional occurrences include Oued Sebaou between Boumerdès and Tizi-Ouzou, Oued Bougdoura, Oued Aïssi, and Oued Boubhir, and the Taksebt dam in Tizi-Ouzou (BAIKECHE *et al.*, 2021), as well as Oued Cheliff in Mostaganem, Oued Z'hor in Skikda, and Oued Djendjen in the municipality of Emir Abdelkader in Jijel (TABABOUCHET *et al.*, 2025).

In our own surveys, we recorded the presence of *P. parva* in Constantine in 2016 and in 2025 in the ponds of Djebel Ouahch, where it co-occurred with the Eastern mosquitofish *Gambusia holbrooki* (Figure 4), goldfish *Carassius auratus*, and common carp *Cyprinus carpio*. The species was also present in the Oued Beghla hill reservoir, where it was found alongside the native Numidian barbel *Luciobarbus numidiensis* (now rare) and two introduced cyprinids: common carp and common roach *Rutilus rutilus*. In the wilaya of Mila, *P. parva* was observed in the Beni Haroun dam (Figure 3), as well as 5.5 km downstream in the Oued El-Kebir, and at the river's mouth on the Mediterranean coast in Jijel (Figure 5).

Upstream of the dam, the species was absent, as we did not detect it in the Oued Ouerzeg (36°30'28.1"N 6°28'16.5"E), the final tributary of the Oued Rhumel, located 6.5 km from its mouth in the dam. Additionally, the species has become established in the Sidi Khelifa dam in Mila (Figure 6). The use of fish traps in Beni Haroun, Sidi Khelifa, Oued Beghla, and Djebel Ouahch confirmed a high abundance of *P. parva* in these water bodies.

Figure 4. Adult *P. parva* with *Gambusia holbrooki* from the 3rd pond of Djebel Ouahch (Constantine). 9 June 2016. (Photo: S. FERAH). Observation available at: inaturalist.org/observations/266654876

Figure 5. Adult *P. parva*. Oued El-Kebir (Jijel). 13 August 2016. (Photo: M. CHETIBI). Observation available at: inaturalist.org/observations/104308397

Figure 6. *Pseudorasbora parva*. Commune of Sidi Khelifa (Mila). 18 July 2024. (Photo: S. FERAH). Observation available at: inaturalist.org/observations/230253533

Additional data gathered from the GBIF.ORG (2025) database, the participatory science platform iNATURALIST.ORG (2025), and the social networking service Facebook enabled us to identify further sites where *P. parva* has become established. The locations include: the Koudiat Medouar dam in Batna; the Aïn Zada dam, located between Bordj Bou Arreridj and Sétif; the Oued Lakehal dam in Bouira; and the Ouizert dam in Mascara.

Testimonies from local fishers confirm the species' abundance in these water bodies, noting its disruptive effect on fishing activities due to its tendency to rapidly consume bait. Some have also suggested a perceived decline in other fish species abundance following its appearance, although this requires further investigation. Local fishers from Bouira refer to the species as "*lalva*" from the French word "*l'alevin*" because of its small size, and from Biskra as "spirlin" mistakenly identifying it as the European species *Alburnoides bipunctatus*, which is not present in Algeria.

All records of *P. parva* cited throughout are summarised in Figure 7 and Table 1, which illustrates its current distribution across Algeria. The data clearly show a widespread presence in the northeast of the country. In contrast, confirmed occurrences elsewhere are limited to three sites: Oued Cheliff in Mostaganem, the Ouizert dam in the southwest of Mascara, and the Boukaïs commune in the northeast of Béchar. These findings underscore the need for further research to better map the species' distribution in Algeria and to assess its potential impacts on local ichthyofauna.

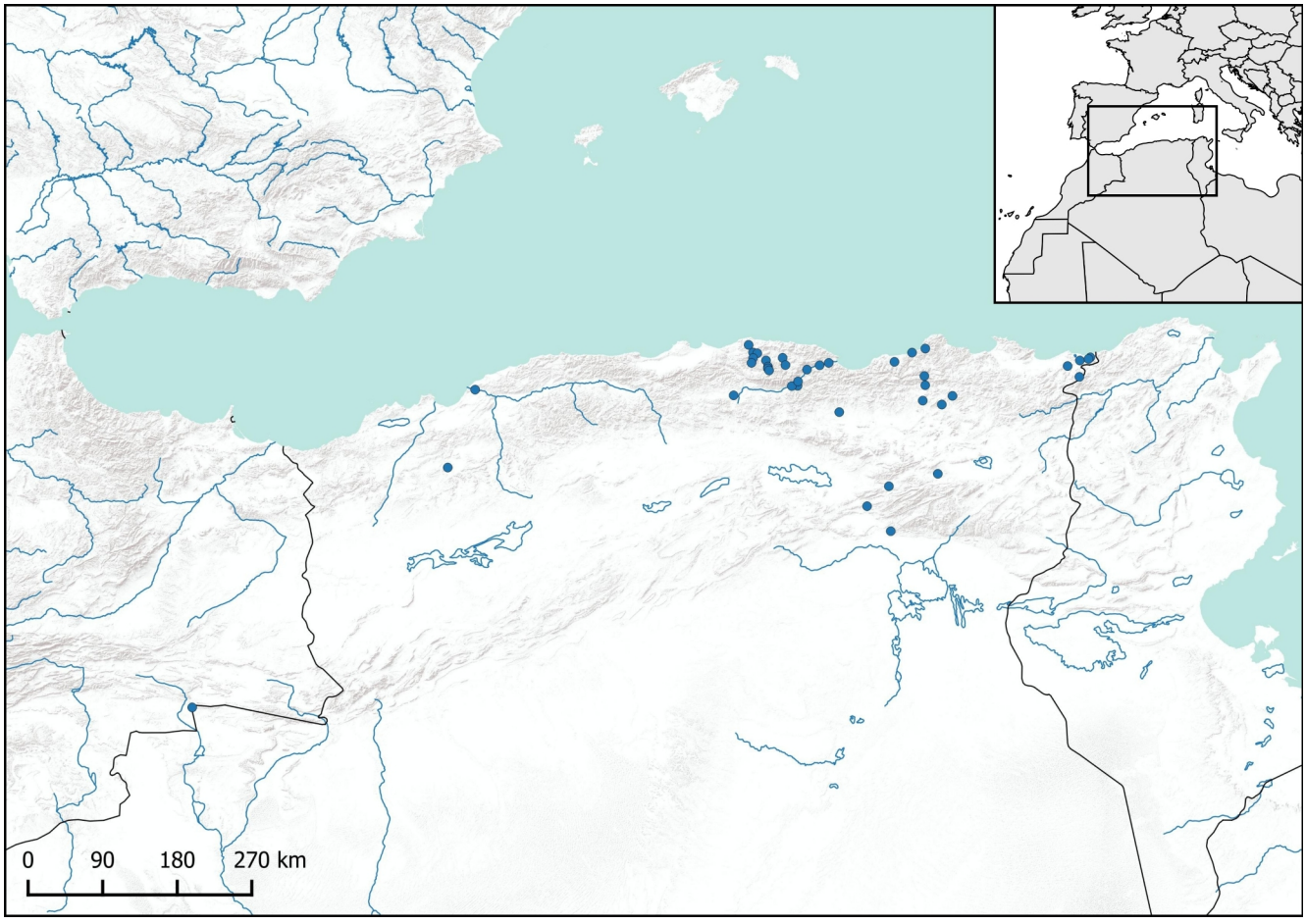

Figure 7. Current distribution of *Pseudorasbora parva* in Algeria. (combined sources: our data, bibliography, iNaturalist, GBIF, Facebook – Status as of 30 March 2025).

Table 1. List of all cited records of *P. parva* in Algeria, with their location data (combined sources: our data, bibliography, iNaturalist, GBIF, Facebook – Status as of 30 March 2025):

Location's name	Wilaya	Latitude & longitude
Oubeira lake	El Tarf	36.8454, 8.38749
Tonga lake	El Tarf	36.8645, 8.5045
Oued Bougous	El Tarf	36.66279, 8.3854
Oued Bou Namoussa	El Tarf	36.781, 8.22144
Messida canal	El Tarf	36.8829, 8.5298
Oued Z'hor	Skikda	36.91868, 6.27653
Oued Djendjen	Jijel	36.75341, 5.86429
Oued El Kebir (Kheïri Oued Adjoul)	Jijel	36.86646, 6.09788
Oued El Kebir (Hamala)	Mila	36.61249, 6.27966
Beni Haroun dam	Mila	36.51038, 6.29682
Sidi Khelifa dam	Mila	36.33737, 6.27197
Oued Beghla hill reservoir	Constantine	36.30352, 6.53177
3rd pond of Djebel Ouahch	Constantine	36.39953, 6.66708
5th pond of Djebel Ouahch	Constantine	36.40568, 6.67091
Oued Soummam (Amalou)	Béjaïa	36.46853, 4.57089
Oued Soummam (Leflaye)	Béjaïa	36.60732, 4.68271
Oued Soummam (El Kseur)	Béjaïa	36.66484, 4.85095
Oued Soummam (Oued Ghir)	Béjaïa	36.69836, 4.97237
Oued Sahel	Béjaïa	36.41223, 4.49146
Oued Bousselam	Béjaïa	36.41996, 4.56836
Taksebt dam	Tizi Ouzou	36.67561, 4.11919
Oued Aïssi (Takhoukht)	Tizi Ouzou	36.60976, 4.15197
Oued Aïssi (route Ouadhias)	Tizi Ouzou	36.58867, 4.15197
Oued Aïssi (Assif Larbaa)	Tizi Ouzou	36.56735, 4.16999
Oued Boubhir	Tizi Ouzou	36.64053, 4.3866
Oued Bougdoura (Bougdoura)	Tizi Ouzou	36.6908, 3.94146
Oued Bougdoura (Assif Boghni)	Tizi Ouzou	36.63655, 3.92442
Oued Sebaou (Tadmait)	Tizi Ouzou	36.75277, 3.93506
Oued Sebaou (Dbk)	Tizi Ouzou	36.74755, 3.9936
Oued Sebaou (Freha)	Tizi Ouzou	36.71887, 4.34224
Oued Sebaou (Baghlia)	Boumerdès	36.83314, 3.86794
Oued Lakehal dam	Bouira	36.25925, 3.71425
Aïn Zada dam	Sétif & Bordj Bou Arreridj	36.15793, 5.15222
Oued Cheliff	Mostaganem	36.02242, 0.23157
Ouizert dam	Mascara	35.12187, -0.01516
Foum El Gherza dam	Biskra	34.86377, 5.92138
Manbaa El Ghozlane dam	Biskra	35.128, 5.5915
Koudiat Medouar dam	Batna	35.52966, 6.5148
Aïn Touta hill reservoir	Batna	35.36369, 5.86871
Oued Zelmou	Béchar	32.1183, -2.8988

4. Ecological Impact

The designation of *P. parva* as an invasive alien species by the European Union (EUROPEAN COMMISSION, 2016) is largely due to its high reproductive capacity rate, which places it in direct competition with the fry of native fish species (Bogutskaya, 2022). The species can become dominant in invaded ecosystems (ŠPELIĆ & PIRIA, 2023), driven by several traits: its depletion of zooplankton populations, predation on the eggs and fry of other fishes, broad habitat tolerance, and resilience to environmental stressors such as pollution, elevated temperatures, and reduced water levels (KARA, 2012).

Although *P. parva* is generally described as "peaceful" (BAENSCH & RIEHL, 1998: 406), we observed a school at Beni Haroun on 18 August 2024 harassing an injured common bream *Abramis brama*. In addition, during a personal experiment conducted from 8-15 June 2016, we housed 13 *P. parva* specimens with *Gambusia holbrooki* in a 5200 cm^3 aquarium. We recorded aggressive intraspecific interactions among *P. parva*, with larger individuals attacking smaller conspecifics and biting their fins. This behaviour may reflect the establishment of social hierarchies or territorial defence, particularly given the restricted volume of the aquarium, which the *P. parva* individuals occupied predominantly near the bottom.

P. parva is also considered problematic due to its role as a vector of parasites, posing a significant threat to freshwater fish species, at least in Europe. Notably, the species can carry *Sphaerothecum destruens* (rosette agent), or a closely-related "rosette-like" pathogen, which, has been associated with mortality in salmonids such as Atlantic salmon *Salmo salar*, brown trout *Salmo trutta*, and rainbow trout *Oncorhynchus mykiss*. Infected wild fish have transmitted the parasite to farmed populations, resulting in economic losses. The parasite has also affected other species including common bream, common carp, and common roach. GOZLAN *et al.* (2009) linked the decline of sunbleak *Leucaspius delineatus* to the introduction of *P. parva*.

Other parasites reported in association with *P. parva* include *Ancyrocephalus parvae*, *Dactylogyrus squameus*, *Bivaginogyrus obscurus*, *Gyrodactylus gobioninum*, *G. prostae*, *G. pseudorasborae* (ONDRAČKOVÁ *et al.*, 2023), and *Anguillicola crassus* (CESCO *et al.*, 2001; SIRUGUE & GOURLIN, 2016).
Interestingly, non-native *P. parva* subpopulations appear to exhibit greater resistance to parasitic infections than their native counterparts in China, which may have facilitated their successful establishment in novel environments (ONDRAČKOVÁ *et al.*, 2023).

The phenomenon of exotic fish species acting as vectors of parasites is also documented in other introduced taxa, including the Prussian carp *Carassius gibelio*, grass carp *Ctenopharyngodon idella*, and Japanese eel *Anguilla japonica* from Asia, as well as the pumpkinseed *Lepomis gibbosus*, the brown bullhead *Ameiurus nebulosus*, and black bullhead *A. melas* from North America (ONDRAČKOVÁ *et al.*, 2023). However, most of the parasites associated with these hosts are species-specific and do not typically transmit to native fauna. Notable exceptions include *Pseudodactylogyrus bini* and *P. anguillae*, which were transmitted from the Japanese eel to the European eel *Anguilla anguilla*, contributing to population declines of the latter in Europe.

5. Conclusion

The presence of *P. parva* in Algeria exemplifies the broader issue of exotic species dispersal within North African aquatic ecosystems. First reported in 1990 in the wilaya of El Tarf, the species has since been introduced to numerous additional sites, particularly across the northeast of the country. Research conducted in other regions, notably Europe, highlights the threats posed by *P. parva* to native ichthyofauna, including the transmission of pathogens, high reproductive output, and tolerance to suboptimal environmental conditions. Continuous monitoring of its distribution and ecological impacts is therefore essential to evaluate the long-term consequences for Algerian freshwater systems. Simultaneously, it is recommended that surveillance and management measures be implemented to regulate the introduction and spread of this species, with the aim of mitigating its potential negative effects on native aquatic biodiversity and ecosystem functioning.

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