

Family Gobionidae

Gudgeons

Gudgeons are a family of Cypriniformes that are most diverse in East Asia, from the Amur drainage southward to Central Vietnam; some 28 genera and 231 species are known. In West Asia, there are 17 species, all of which, except *Pseudorasbora*, being benthic fishes with a flat belly, laterally spread pectoral fins, a single pair of maxillary barbels, and 6½ branched anal rays (vs. 5½ in most Cyprinidae). Some Asian genera exhibit a markedly different morphology from that of true gudgeons. They have a more compressed body, the mouth is inferior to subterminal (even superior in *Pseudorasbora* and a few others), and they are distinguished from many other East Asian

Cypriniformes by having 6½ branched anal rays. Some species of *Sarcocheilichthys* are noteworthy for spawning in the gill cavity of unionid freshwater mussels, similar to bitterlings; they, too, have developed an ovipositor. Interestingly, gudgeons and bitterlings are closely related. One East Asian species, *Pseudorasbora parva*, was accidentally introduced to Europe and Central Asia. From both directions, it made its way to West Asia, where it is now widely established. Except for *Pseudorasbora*, all gudgeons are superficially similar, bottom-dwelling fishes with a midlateral row of dark-brown or grey blotches on the flank and spotted bodies and fins. **Further reading.** Bănărescu & Nalbant 1973 (systematics); Turan et al. 2012a (identification of Anatolian species).

Key to genera of Gobionidae in West Asia

1a - Barbels absent; mouth superior.

.....*Pseudorasbora*

1b - Barbels present; mouth inferior.

.....2

2a - Caudal peduncle 3.1–3.8 times its depth; epithelial crests on scales on back.

.....*Romanogobio*

2b - Caudal peduncle 1.5–2.5 times its depth; no epithelial crests on scales on back.

.....*Gobio*

Key to species of *Gobio* in West Asia, excluding *G. nigrescens* from Hari drainage

1a - 42–63 total lateral-line scales.

.....2

1b - 39–45 total lateral-line scales.

.....5

2a - Scales extend forward to level of pectoral origin or to half distance of pectoral origin and isthmus.

.....*G. microlepidotus*

2b - Scales on chest almost extend to isthmus.

.....3

3a - Head length 24–27 % SL.

.....*G. hettitorum*

3b - Head length 27–29 % SL.

.....4

4a - Distance between anus and anal origin 5–7 % SL; caudal-peduncle length 1.7–2.2 times in caudal-peduncle depth.
.....*G. intermedius*

4b - Distance between anus and anal origin 7–8 % SL; caudal-peduncle length 1.4–1.7 times in caudal-peduncle depth.
.....*G. maeandricus*

5a - 8–10 scales between posterior extremity of pelvic base and anus.
.....6

5b - 4–8 scales between posterior extremity of pelvic base and anus.
.....7

6a - Diameter of scales on belly approximately equal to pupil diameter.
.....*G. insuayanus*

6b - Diameter of scales on belly clearly smaller than pupil diameter.
.....*G. kizilirmakensis*

7a - Interorbital distance 1.6–2.2 times in eye diameter.
.....8

7b - Interorbital distance 1.0–1.6 times in eye diameter.
.....10

8a - No black spots on head.
.....*G. gymnostethus*

8b - Many small black spots on head.
.....9

9a - Distance between anus and anal origin 5–7 % SL; body depth at dorsal origin 22–27 % SL.
.....*G. fahrettini*

9b - Distance between anus and anal origin 7–10 % SL; body depth at dorsal origin 18–22 % SL.
.....*G. baliki*

10a - Breast completely scaled, scales extending to isthmus; snout rounded, distinctly concave anterior to nostril.
.....11

10b - Breast naked or incompletely scaled, if scales on chest present, scales extending forward to level of pectoral origin; snout pointed, not or slightly concave anterior to nostril.
.....12

11a - Pectoral reaching to or 1 scale in front of pelvic origin in mature male.
.....*G. caucasicus*

11b - Pectoral reaching 3–4 scales in front of pelvic origin in mature male.
.....*G. sakaryaensis*

12a - Head length 28–30 % SL.
.....*G. kovatschevi*

12b - Head length 24–26 % SL.
.....*G. artvinicus*

Gobio

Gobio comprises approximately 50 species distributed across a broad range of geographical locations, from Portugal to Korea. Most species (36) are found in the West Palearctic, with 14 in West Asia. *Gobio* are common in the Caucasus and Central Anatolia, where their species numbers require critical revision. The species of Lake Tuz basin (*G. hettitorum*, *G. gymnostethus*, *G. insuayanus*, *G. microlepidotus*) are very closely related, and it would be beneficial to test the morphological characters proposed to distinguish these species, which may be conspecific. A similar situation exists for all Caucasian species, where *G. artvinicus* may be conspecific with *G. caucasicus*. European species, including

G. delyamurei, *G. holurus*, *G. krymensis*, *G. brevicirris*, and Asian *G. caucasicus*, form a cluster of populations that also require taxonomic revision. The biology of West Asian gudgeons is poorly understood, but it is thought that they behave similarly to the few European species studied. They spawn at night in the open water column of lakeshores or fast-flowing sections of streams and rivers. The sticky eggs drift a short distance with the current. Larvae are benthic, and females are fractional spawners that reproduce over a long period in spring and summer. They reach maturity after the first or second winter and live for about 3–8 years, feeding on a wide range of benthic invertebrates digging out from fine substrates as mud and sand.



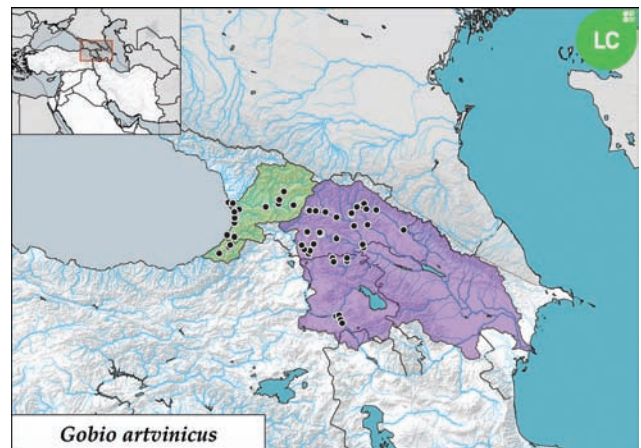
Gobio artvinicus; Çoruh, Türkiye; 50 mm SL. © M. Özuluğ.

Gobio artvinicus

Common name. Colchic gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in West Asia by: ○ 39–42 total lateral-line scales / ○ chest between pectorals naked or covered by scales / ○ scales on belly approximately equal or slightly larger than pupil diameter / ○ scales on base of pectoral usually embedded / ○ pectoral reaching 3–4 scales in front of pelvic origin in mature male / ○ head length 24–26 % SL / ○ head width at anterior eye-margin 11–12 % SL / ○ distance between pelvic origin and anal origin 2.8–3.3 times in distance between anus and anal origin / ○ 6 scales rows between lateral line and dorsal origin / ○ 4–5 scales between lateral line and anal origin / ○ 4–6 scales between anus and anal origin / ○ 5–6 scales between posterior extremity of pelvic base and anus / ○ interorbital distance 1.1–1.6 times in eye diameter /

- snout pointed, not or slightly concave anterior to nostril /
- 5–8 mid-lateral blotches. Size up to 107 mm SL.



Distribution. Eastern Black Sea basin from Rioni (Georgia) south to Çoruh (Türkiye). Non-native and spreading in Kura and Aras drainages.

Habitat. A wide range of lowland and foothill streams and rivers, usually in slow to moderately fast-flowing waters on sand or gravel bottoms. Absent from high altitude streams with fast currents and low water temperatures.

Biology. No data.

Conservation status. LC.

Remarks. This species is much more variable than originally described, and the diagnostic characters need to be

re-examined in the future. While fish from the Çoruh have a bare or incompletely scaled chest, the scales of populations from the Rioni and the Caspian basin cover the chest. There is some confusion about this species with *G. caucasicus*, which occurs in the adjacent Caucasian Black Sea basin and Caspian basin of Russia, and *G. artvinicus* is likely a synonym of *G. caucasicus*.

Further reading. Turan et al. 2016a (description); Epitashvili et al. 2020 (distribution); Kaya et al. 2020a (distribution); Yeşilçiçek 2022a (size).



Gobio baliki; Büyük Melen drainage, Türkiye; 86 mm SL.

Gobio baliki

Common name. Melen gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 40–42 total lateral-line scales / ○ chest completely scaled, scales extending forward to isthmus / ○ head length 24–28 % SL / ○ body depth at dorsal origin 18–22 % SL / ○ distance between anus and anal origin 7–10 % SL / ○ numerous small black spots on head / ○ depth of anal approximately equal to length of pelvic / ○ snout pointed / ○ 6–7 scales rows between lateral line and dorsal origin / ○ 4–5 scales between lateral line and anal origin / ○ 5–6 scales between anus and anal origin / ○ 5–6 scales between posterior extremity of pelvic base and anus / ○ 8–9 mid-lateral blotches. Size up to 93 mm SL.

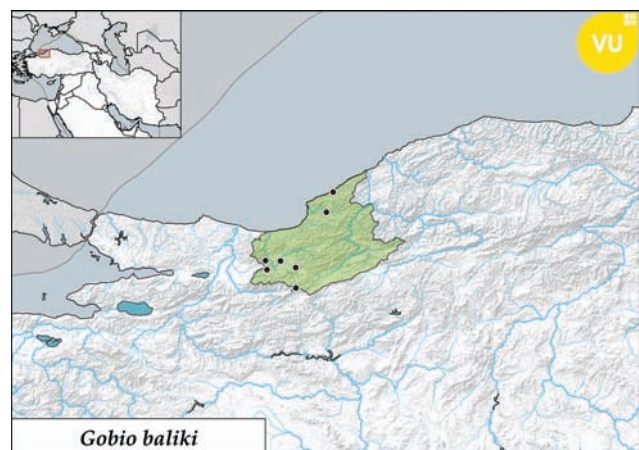
Distribution. Türkiye: Büyük Melen drainage.

Habitat. Streams and small rivers with fast-flowing water on sandy or gravelly bottoms.

Biology. No data.

Conservation status. VU; seems to be in decline due to many threats.

Further reading. Turan et al. 2017a (description).





Gobio caucasicus; Sochi, Russia; ~70 mm SL.

Gobio caucasicus

Common name. Caucasian gudgeon.

Diagnosis. Distinguished from *Gobio* species in Caucasus by:

- pectoral reaching to or one scale in front of pelvic origin in mature male / ○ chest scaled between pectorals, scales extending forward beyond pectoral base (at least in some individuals of any population) / ○ head width at anterior eye-margin 9–10 % SL / ○ distance between pelvic origin and anal origin 3.3–4.1 times in distance between anus and anal origin / ○ head length 26–28 % SL / ○ head depth at nape 16–17 % SL, at eye 48–62 % HL / ○ head width 15–17 % SL, 58–62 % HL / ○ eye diameter 4–6 % SL, 3.1–3.7 times in head depth, 1.4–1.5 times in interorbital distance (at 50–60 mm SL) / ○ depth of caudal peduncle 33–36 % HL / ○ snout rounded, distinctly concave anterior to nostril. Size up to 100 mm SL.

Distribution. Russia: Caucasian Black Sea basin. In Kuma, Terek, and Sulak drainages in Caspian basin.

Habitat. Lowland and foothill streams and rivers, usually in slow to moderate-flowing waters on sandy or gravelly bottoms. Absent from high altitude streams with fast currents and low water temperatures.

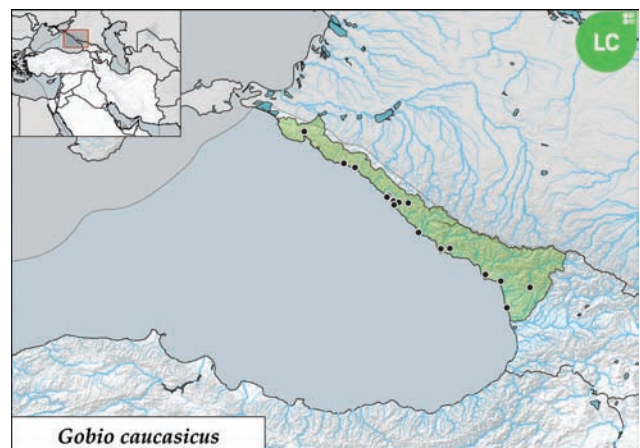
Biology. No data.

Conservation status. LC.

Remarks. The gudgeons of the Caucasian Black Sea basin of Russia are usually identified as *G. caucasicus*. This species has been described based on syntypes from the European Caspian basin (often identified as *G. holurus*) and syntypes from the Rioni in Georgian Black Sea basin (conspecific with *G. artvinicus* based on molecular data). Molecular data (COI) show that some populations of “*G.*

caucasicus” from the Black Sea basin are closely related to the Caspian *G. holurus*; others are closely related to *G. kubanicus*, *G. brevicirris* and *G. krymensis* from the European Black Sea basin. Finally, some populations represent a distinct molecular lineage, but the situation needs to be better understood. As different molecular lineages are found in sympatry, introgressive hybridisation is likely to have played a major role. This makes it difficult to classify species based on mtDNA alone. The identity of *G. caucasicus* still needs to be solved, as no lectotype has been identified. For now, we identify *G. holurus* as conspecific with *G. caucasicus*, as two of three syntype localities are within the range of this species.

Further reading. Berg 1949b (description); Kottelat & Freyhof 2007 (diagnosis as *G. holurus*); Turan et al. 2016a (characters as *G. cf. caucasicus*).





Gobio fahrettini; Ilgın basin, Türkiye; ~90 mm SL.

Gobio fahrettini

Common name. Ilgın gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 39–42 total lateral-line scales / ○ chest completely scaled, scales extending forward to or almost to isthmus / ○ head length 26–30 % SL / ○ distance between anus and anal origin 5–7 % SL / ○ body depth at dorsal origin 22–27 % SL / ○ numerous small black spots on head / ○ snout long, with rounded tip, 11–14 % SL / ○ caudal peduncle length 1.6–2.2 times its depth / ○ 6–7 scales rows between lateral line and dorsal origin / ○ 6–8 scales between posterior extremity of pelvic base and anus / ○ 6–8 mid-lateral blotches. Size up to 122 mm SL.

Distribution. Türkiye: Lake Ilgın basin.

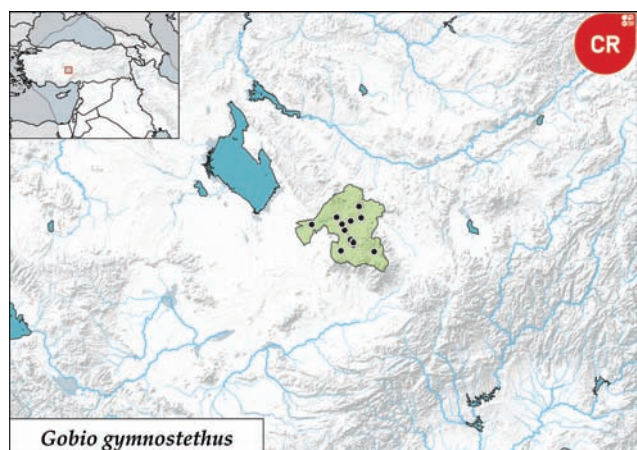
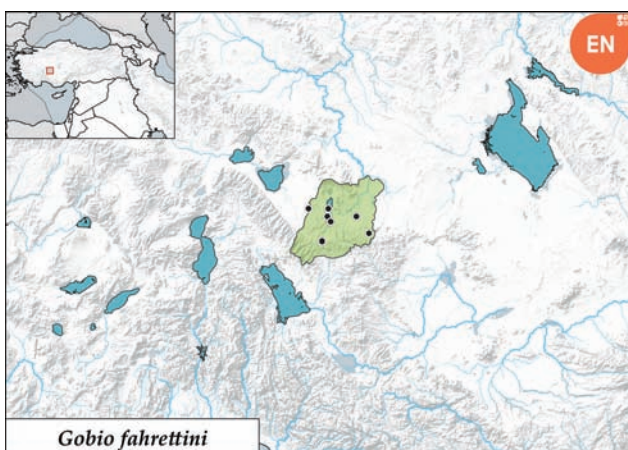
Habitat. Slow to moderate-flowing streams with sandy or gravelly bottoms.

Biology. No data.

Conservation status. EN; appears to be declining within its very small range.

Remarks. Some individuals of *G. fahrettini* share their mitochondrial DNA with *G. microlepidotus*, and the two species may have hybridised in the past. The reasons for this hybridisation are not known, but the artificial introduction of *G. microlepidotus* into the Ilgın basin cannot be excluded.

Further reading. Turan et al. 2018b (description).





Gobio gymnostethus; Melendiz drainage, Türkiye; ~120 mm SL.

Gobio gymnostethus

Common name. Cappadocian gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 41–44 total lateral-line scales / ○ chest completely scaled, scales extending forward to or almost to isthmus / ○ head length 25–28 % SL / ○ 5–6 scales between posterior extremity of pelvic base and anus / ○ interorbital distance 1.6–1.9 times in eye diameter / ○ no black spots on head / ○ 6 scale rows between dorsal origin and lateral line / ○ pelvic not reaching behind anus in female / ○ interorbital distance 1.6–2.2 times in eye diameter /

○ head profile behind nostrils markedly convex. Size up to 140 mm SL.

Distribution. Türkiye: Melendiz drainage.

Habitat. Slow to moderate-flowing streams with sandy or gravelly bottoms.

Biology. No data.

Conservation status. CR; abundant but declining within its very small range, which is heavily impacted by water extraction and dams.

Further reading. Ladiges 1960 (description); Naseka et al. 2006 (identification).



Melendiz, here in Ihala valley, is the largest remaining tributary of Lake Tuz and the habitat of a rich fish fauna.



Gobio hettitorum; Karaman; Türkiye; ~120 mm SL.

Gobio hettitorum

Common name. Taurus gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 44–46 total lateral-line scales / ○ chest completely scaled, scales extending forward to isthmus / ○ head length 24–27 % SL / ○ 10–14 scales between posterior extremity of pelvic base and anus / ○ interorbital distance approximately 1.6–1.8 times in eye diameter / ○ 8–10 scale rows between dorsal origin and lateral line / ○ caudal length 17–20 % SL / ○ anal length 15–17 % SL. Size up to 124 mm SL.

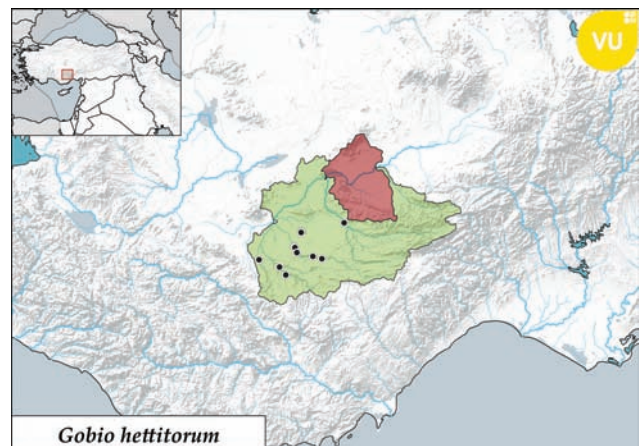
Distribution. Türkiye: Yeşildere, Deliçay, Gödet, and Ayrancı drainages (Karaman), and Ereğli marshes.

Habitat. Small streams with clear water and sand and gravel bottoms.

Biology. No data.

Conservation status. VU; appears to be declining in its small range due to the desiccation of streams. Extirpated from Ereğli around 2010.

Further reading. Ladiges 1960 (description); Naseka et al. 2006 (identification).



Gobio insuayanus; Insuyu, Türkiye; ~130 mm SL.

Gobio insuyanus

Common name. Cihanbeyli gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 39–45 total lateral-line scales / ○ head length 25–30 % SL / ○ chest completely scaled, scales extending forward to or almost to isthmus / ○ 8–10 scales between posterior extremity of pelvic base and anus / ○ scales on belly approximately equal to pupil diameter / ○ 8–9 scale rows between dorsal origin and lateral line / ○ predorsal length 48–52 % SL. Size up to 135 mm SL.

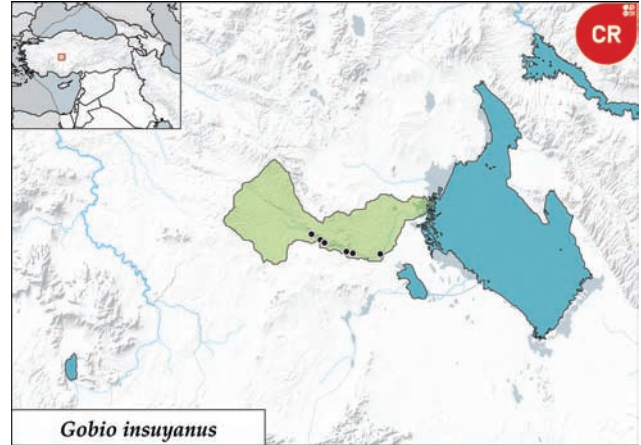
Distribution. Türkiye: Insuyu (Cihanbeyli) drainage in western Lake Tuz basin.

Habitat. Springs and spring-associated streams with slow to moderately fast-flowing waters on sandy and gravelly bottoms, often among very dense aquatic vegetation.

Biology. Lives up to 7 years. Omnivorous, feeding mainly on detritus and macroinvertebrates such as gammarids and dipteran larvae.

Conservation status CR; restricted to one site and in serious decline due to desiccations of its habitat.

Further reading. Ladiges 1960 (description); Naseka et al. 2006 (identification); Johnson et al. 2025 (biology)



Insuyu is increasingly under pressure due to water extraction.

Gudgeons and the history of Lake Tuz basin. The present-day Lake Tuz (Türkiye) is an inhospitable environment for freshwater species. It is the second-largest lake in Türkiye, with a surface area of 1,665 km². It is also one of the largest hypersaline lakes in the world. During the last glacial pluvial period, Central Anatolia received significantly more rainfall than it does today, and Lake Tuz was a vast freshwater lake. Two high lake-level stages have been identified, dated approximately 20,000–17,000 years ago during the glacial maximum and again 13,000 years ago, during the Younger Dryas period. At the high lake stages, the water level rose by more than 15 m above the present lake level. This resulted in the lake area spreading widely to the southern edge of the basin, encompassing the cities of Ereğli and Karaman. In the Holocene, the lake level fell, and extensive lake terraces were formed in the southeast part of the basin. In the wetter periods, Lake Tuz was most likely inhabited by freshwater fishes. It can be speculated that these were the species surviving today within its former catchment area, including *Cobitis turcica*, *Oxynoemacheilus eregliensis*, *O. axylos*, *Seminemacheilus ekmekciae*, *Anatolichthys anatoliae*, *Garra kemali*, *Pseudophoxinus*, and *Gobio* species. The large Lake Tuz basin has dried out since and become so hypersaline that even exceptional floods cannot

support freshwater fish's survival in its waters. Fishes survived this postglacial desiccation event in the streams and springs that once flowed to Lake Tuz. There, they became isolated, and some evolved into the currently recognised species. Furthermore, the system has been employed as a model for the evolution of new species in allopatry in populations that are small, isolated, and exhibit stream-specific characters. This is particularly evident in the genus *Gobio*. It is obvious that low-resolution molecular markers, such as COI or Cytochrome b, are not suitable for differentiating the recently separated species within the Lake Tuz gudgeon complex, which includes *G. gymnostethus*, *G. hettitorum*, *G. insuayanus*, and *G. microlepidotus*. **Further reading.** Kashima 2010 (Lake levels of Lake Tuz).



Gobio intermedius; Lake Eber basin, Türkiye; ~120 mm SL.

Gobio intermedius

Common name. Eber gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 42–49 total lateral-line scales / ○ chest completely scaled, scales extending forward to isthmus / ○ head length 27–29 % SL / ○ distance between anus and anal origin 5–7 % SL / ○ caudal-peduncle length 1.7–2.2 times in caudal-peduncle depth / ○ 8–10 scales between posterior extremity of pelvic base and anus / ○ interorbital distance approximately 1.4–1.6 times in eye diameter / ○ 8–9 scale rows between dorsal origin and lateral line / ○ caudal length 12–17 % SL anal length 20–24 % SL. Size up to 127 mm SL.

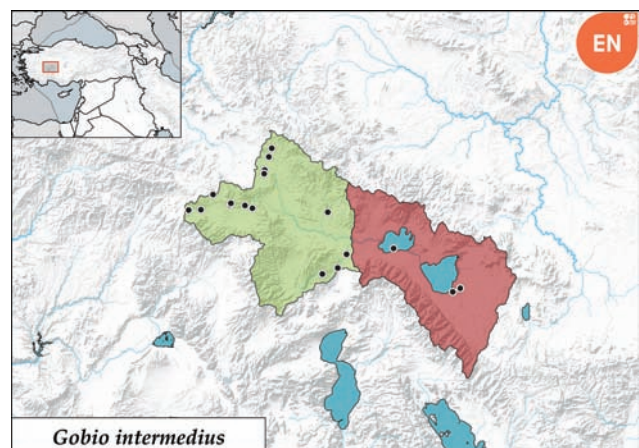
Distribution. Türkiye: Lakes Eber and Akşehir basins.

Habitat. Streams with moderate current on gravel to sandy bottoms. Also found in lakes.

Biology. No data.

Conservation status. EN; Lakes Akşehir and Eber dried up. Both occasionally have water, but it is highly polluted, and water level is less than 1 m in summer and almost anoxic. Fish

are now largely confined to a few headwaters of Akarçay, which are heavily polluted, dammed and seasonally dry. **Further reading.** Battalgil 1944 (description); Naseka et al. 2006 (diagnosis).





Gobio kizilirmakensis; Filyos drainage, Türkiye; ~110 mm SL.

Gobio kizilirmakensis

Common name. Filyos gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 40–43 total lateral-line scales / ○ chest completely scaled, scales extending forward to or almost to isthmus / ○ head length 26–29 % SL / ○ scales on belly smaller than pupil / ○ caudal-peduncle length 2.1–2.7 times its depth / ○ 5–6 scale rows between anus and anal origin / ○ 8–10 scale rows between posterior extremity of pelvic base and anus / ○ 8–9 mid-lateral blotches. Size up to 111 mm SL.

Distribution. Türkiye: Ulusu in Filyos drainage.

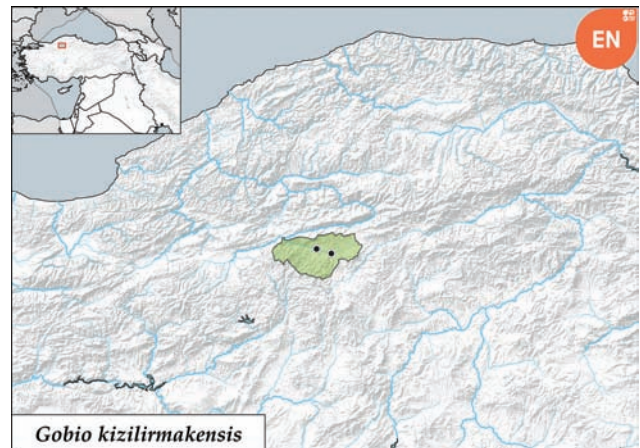
Habitat. Moderately fast-flowing streams and small rivers with sandy or gravelly bottoms.

Biology. No data.

Conservation status. EN; appears to be declining within its very small range. Some food factories around Çerkes heavily pollute the Ulusu.

Remarks. Despite its name, this species does not occur in Kızılırmak drainage. The Ulusu was considered a tributary of Kızılırmak, but it belongs to Filyos.

Further reading. Turan et al. 2016a (description); Yoğurtçuoğlu et al. 2020a (distribution).



Gobio kovatschevi; Bakacak, Biga Peninsula, Türkiye; 100 mm SL.

Gobio kovatschevi

Common name. Thracian gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 39–44 total lateral-line scales / ○ chest naked, incompletely or completely scaled / ○ head length 28–30 % SL / ○ 4–5 scales between posterior extremity of pelvic base and anus / ○ interorbital distance 1.4–1.6 times in eye diameter / ○ 5–6 scale rows between dorsal origin and lateral line / ○ pelvic reaching behind anus in female / ○ head profile behind nostrils straight or slightly convex / ○ snout pointed, not or slightly concave anterior to nostril. Size up to 102 mm SL.

Distribution. Türkiye and Bulgaria: Black Sea basin from Provadiskaya (near Varna, Bulgaria) south to İstanbul and Biga Peninsula south to Tuzla. Also, in Büyük Melen drainage in Central Black Sea basin.

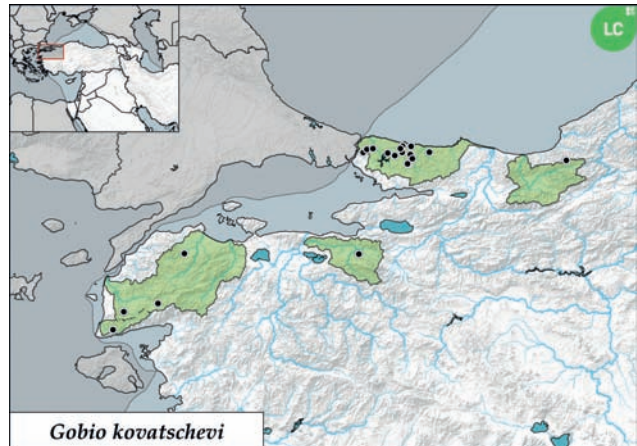
Habitat. Upper and middle reaches of a small, slow-flowing stream with a sandy or gravelly bottom.

Biology. No data.

Conservation status. LC.

Remarks. In Europe, *G. kovatschevi* appears to have had some contact with *Gobio* from the Danube, as two different types of mtDNA are found in this species, indicating past introgressive hybridisation.

Further reading. Chichkoff 1937 (description); Kottelat & Freyhof 2007 (diagnosis).



Gobio maeandricus; Işıklı spring, Türkiye; 130 mm SL.

Gobio maeandricus

Common name. Işıklı gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ● 53–56 total lateral-line scales / ○ chest completely scaled, scales extending forward to, or almost to isthmus / ○ head length 27–29 % SL / ○ distance between anus and anal origin 7–8 % SL / ○ caudal-peduncle length 1.4–1.7 times in caudal-peduncle depth / ○ 10–12 scales between posterior extremity of pelvic base and anus / ○ 9–10 scale rows between dorsal origin and lateral line. Size up to 138 mm SL.

Distribution. Türkiye: Lake Işıklı basin in upper Büyük Menderes drainage and Karadirek near Sandıklı, an isolated basin that flows through underground to Lake Işıklı.

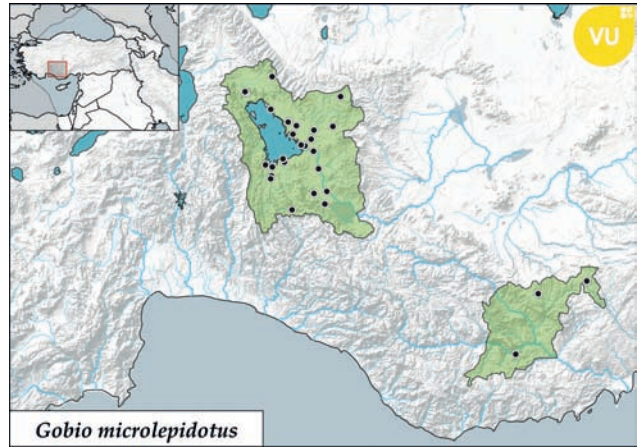
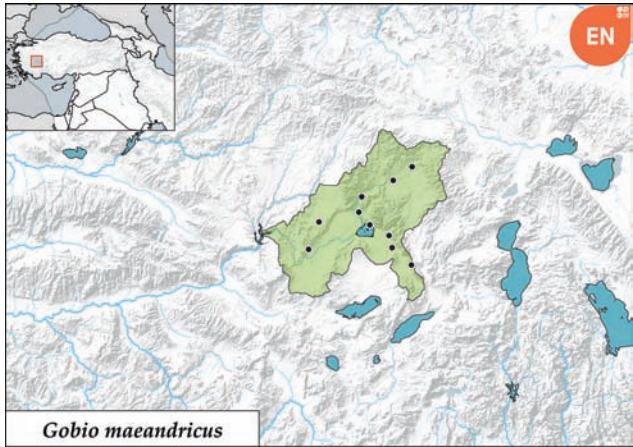
Habitat. Slow to moderate-flowing streams with sandy and gravelly bottoms, often with very dense aquatic vegetation.

Biology. No data.

Conservation status. EN; appears to be declining within its very small range.

Remarks. Extirpated *Gobio* populations from Lake Burdur basin may have belonged to this species.

Further reading. Naseka et al. 2006 (description); Güçlü et al. 2013 (distribution).



Pamukkale: Mass tourism is a significant feature of Türkiye's tourism industry, contributing heavily to its economy.



Gobio microlepidotus; Lake Beyşehir basin, Türkiye; 150 mm SL.

Gobio microlepidotus

Common name. Beyşehir gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 43–48 total lateral-line scales / ○ scales on chest extending forward to level of pectoral origin or to half distance of pectoral origin and isthmus / ○ head length 24–28 % SL / ○ 9–11 scales between posterior extremity of pelvic base and anus / ○ 8–10 scale rows between dorsal origin and lateral line / ○ scales on pectoral base often deeply embedded in skin. Size up to 171 mm SL.

Distribution. Türkiye: Lake Beyşehir basin and upper Göksu and Limon drainages in Mediterranean basin.

Habitat. Slow to moderate-flowing streams with sandy and gravelly bottoms, often with very dense aquatic vegetation.

Biology. No data.

Conservation status. VU; appears to be in decline within its small range.

Remarks. *Gobio battalgilae* is a synonym.

Further reading. Battalgil 1942 (description); Naseka et al. 2006 (description as *G. battalgilae*); Turan et al. 2018b (identification); Turan & Bayçelebi 2019 (Mediterranean records).



Gobio nigrescens; Hari drainage, Iran; 95 mm SL.

Gobio nigrescens

Common name. Hari gudgeon.

Diagnosis. Distinguished from *G. caucasicus*, the geographically most adjacent species in Caspian basin by: ○ pectoral reaching 3–5 scales in front of pelvic origin in mature male / ○ no scales on chest and between pectorals. Size up to 95 mm SL.

Distribution. Hari drainage in Afghanistan, Iran, and Turkmenistan. Amu Darya and Zeravshan in Central Asia (recorded from Uzbekistan). Also, in Kashaf (Iran).

Habitat. Slow to moderate-flowing streams and rivers with sandy or gravelly bottoms.

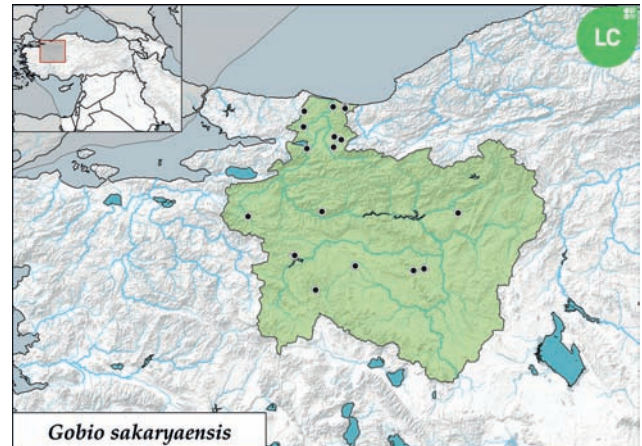
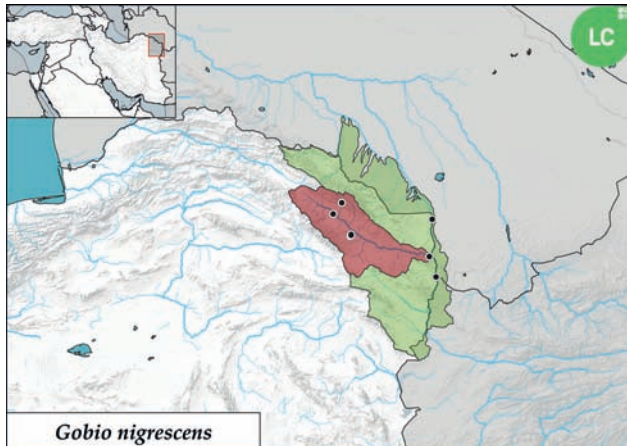
Biology. No data.

Conservation status. LC; extirpated from Kashaf drainage.

Remarks. This species is not related to other West Asian gudgeons but belongs to a group of Central Asian and Siberian species. It is sometimes identified as *G. lepidolaemus* from the adjacent Aral basin, from which it differs in chest without scale (vs. covered with scales), more scale rows on the caudal peduncle ($\frac{1}{2}3/1/3\frac{1}{2}$ vs. $\frac{1}{2}2/1/2\frac{1}{2}$) and 16

circumpeduncular scales (vs. 12–14). *Gobio* populations found in Morghab and rivers of Kopek Dag in Turkmenistan are awaiting identification and may belong to this species.

Further reading. Mousavi-Sabet et al. 2016a (description); Sheraliev & Peng 2021 (distribution in Uzbekistan).



Gobio sakaryaensis; Sakarya drainage, Türkiye; ~100 mm SL.

Gobio sakaryaensis

Common name. Sakarya gudgeon.

Diagnosis. Distinguished from other species of *Gobio* in Anatolia by: ○ 39–42 total lateral-line scales / ○ chest completely scaled, scales extending forward to isthmus / ○ head length 27–30 % SL / ○ pectoral reaching 3–4 scales in front of pelvic origin in mature male / ○ 6–8 scales between posterior extremity of pelvic base and anus / ○ interorbital distance 1.4–1.6 times in eye diameter / ○ 6–7 scale rows between dorsal origin and lateral line / ○ pelvic reaching

behind anus in female / ○ head profile behind nostrils straight or slightly convex / ○ snout rounded, distinctly concave anterior to nostril. Size up to 120 mm SL.

Distribution. Türkiye: Sakarya drainage.

Habitat. Small to medium-sized lowland and foothill streams with moderately fast-flowing water, sand, and gravel bottoms, and pool-riffle microhabitats.

Biology. No data.

Conservation status. LC.

Further reading. Turan et al. 2012a (description).

Pseudorasbora

A genus of six small species found in East Asia. *Pseudorasbora parva* is one of the world's most successful invasive fish species. It was first introduced from China to Europe in the early 1960s as a by-product of Chinese carp aquaculture. Following the initial introduction, the establishment of *P. parva* populations in European water bodies happened quickly and reached Anatolia and the Caucasus. Consequently, in less than six decades, *P. parva* has become widespread in central and western Europe, Türkiye, and Central Asia. Genetic analysis of the European *P. parva* invasion indicates that two Chinese lineages from southern and northern China constitute the gene pool of all European and Anatolian populations. These two lineages exhibit a large hybrid zone in Central China, suggesting that fish from that area may have been originally introduced to Europe. The initial introduction of *P. parva* into the Iranian inland waters (first recorded in 1991) was distinct from other Eurasian countries, as it originated from Japan. This is likely associated with commercial links between Japan and Iran in the 1980s when Iran was politically isolated from Europe. Since then, the Japanese lineage of *P. parva* has also spread to eastern Türkiye and has found contacts with the Chinese *P. parva* in the border area of Iran and Azerbaijan. **Further reading.** Hardouin et al. 2018 (phylogeography); Baltazar-Soares et al. 2020 (Dispersal in Europe); Ganjali et al. 2020 (invasion of Iran).

Pseudorasbora parva

Common name. Stone moroko.

Diagnosis. Distinguished from other species of Gobionidae in West Asia by: ● mouth small, superior / ● barbels absent / ○ dark-grey midlateral stripe outside spawning time / ○ 33–38 total lateral-line scales / ○ 7½ branched dorsal rays / ○ no dorsal or ventral keels. Size up to 95 mm SL.

Distribution. Very widespread in West Asia except Arabian Peninsula. In Anatolia mostly in western and central parts but increasing in Eastern Anatolia. Still rare in Iraq. Iran, including Hari drainage and Sistan and Mashkid basins. Also in Central Asia, Afghanistan, and Pakistan. Native to Japan and Amur to Zhujiang (Pearl River) drainages (Siberia, Korea, China).

Habitat. Ubiquitous, in a large variety of habitats. Most common in well-vegetated small channels, ponds, and small lakes. Usually spawns in still or very slow-flowing water.

Biology. Lives up to 3, rarely 5 years. First spawns at 1 year if larger than 35 mm SL. Male larger than female, with deeper body and darker colour. Male with bluish-grey breeding colour and a few very large nuptial tubercles on snout. Spawns March–June until October in Lake Eğirdir. Female spawns usually 3–4 times in a season. Male clear surface of a spawning site on stones or plants. Eggs are attached to substrate and guarded by male until larvae hatch. Feeds on various small crustaceans, insects, and plant material.

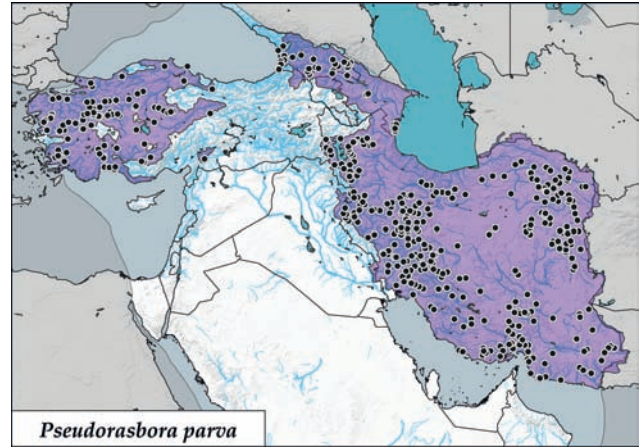
Conservation status. Non-native; introduced as a weed with stocked carp. Usually not abundant in fast-running waters. Proliferates locally in ponds and other artificial habitats, quickly becoming numerically dominant and a serious food competitor for native species. Also associated as a vector of *Sphaerothecum destruens*, a generalist pathogen.

Remarks. First introduced in Romania in 1961 with fry of *Ctenopharyngodon idella* from middle Changjiang [Yangtze], and from Amur into Russia and Ukraine, from where it colonised most of West Asia, North Africa, and Europe, either by active invasion, as stocked or released bait, or accidentally mixed with fry of other species.

Further reading. Bănărescu 1999a (biology); Britton et al. 2007 (effects); Hardouin et al. 2018 (phylogeography); Ganjali et al. 2020 (Iran); Küçük et al. 2024b (biology).



Pseudorasbora parva; Büyük Menderes drainage, Türkiye; ~80 mm SL.



Nuptial tubercles on the head of a male *Pseudorasbora parva*.



Romanogobio macropterus; Kura drainage, Türkiye; ~100 mm SL. © M. Özuluğ.

Romanogobio

The genus comprises 17 species native to the West Palearctic, with three species occurring in East Asia. Both species in West Asia and numerous European species can be distinguished from *Gobio* species by the presence of epithelial crests on the scales of the dorsal half of the body (vs. absence). In contrast, *Romanogobio* species exhibit a slenderer body than the *Gobio* species. *Romanogobio persus* and *R. macropterus* have long been treated as conspecifics, but morphological and molecular characters distinguish them well. They are related to European species found in adjacent rivers in the north, including *R. ciscaucasicus* from Dagestan, *R. parvus* from the Kuban, *R. albipinnatus* from the Volga, and *R. tanaiticus* from the Don. All but one species (*R. benacensis*) are a highly rheophilic inhabitant of large to very large rivers with fast-flowing waters. They are nocturnal bottom dwellers, often restricted to the rivers' middle and deeper parts.

Romanogobio macropterus

Common name. Caucasian stone gudgeon.

Diagnosis. Distinguished from *R. persus* by: ● 41–45, usually 42–43 total lateral-line scales / ● 38–42, usually 40–41 total vertebrae / ● supraorbital and infraorbital canals usually connected. Size up to 110 mm SL.

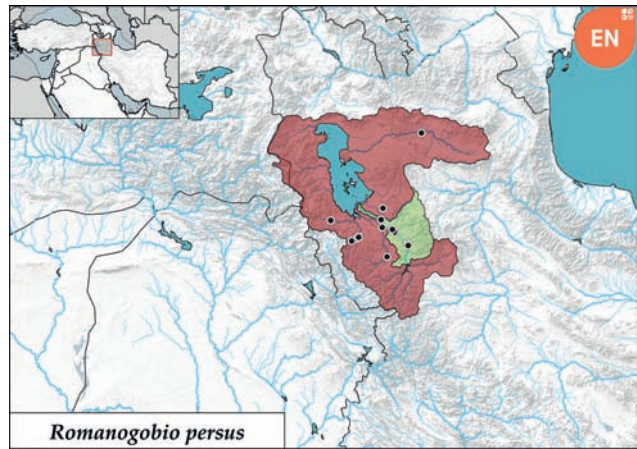
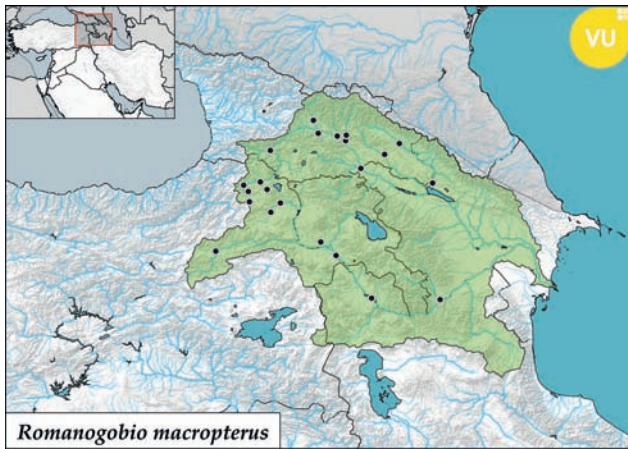
Distribution. Kura and Aras drainages.

Habitat. Fast-flowing stretches of rivers and streams with gravel and rocky substrate.

Biology. Lives up to 3 years and usually matures at 2 years. Spawns late April–June at water temperatures between 12–18°C. Fractional spawner, female usually spawn three times in a season. Feeds on aquatic invertebrates.

Conservation status. VU; has declined sharply due to hydropower development and pollution.

Further reading. Naseka et al. 1999 (morphology, biology); Kaya et al. 2020a (distribution).



Romanogobio persus; Lake Urmia basin, Iran; 73 mm SL.

Romanogobio persus

Common name. Persian gudgeon.

Diagnosis. Distinguished from *R. macropterus* by: ● 40–42, usually 40–41 total lateral-line scales / ● 37–40, usually 38–39 total vertebrae / ● usually no connection between supraorbital and infraorbital canals. Size up to 73 mm SL.

Distribution. Iran: Lake Urmia basin, in southern and eastern tributaries.

Habitat. Fast-flowing sections of streams and rivers with gravel or rock bottoms.

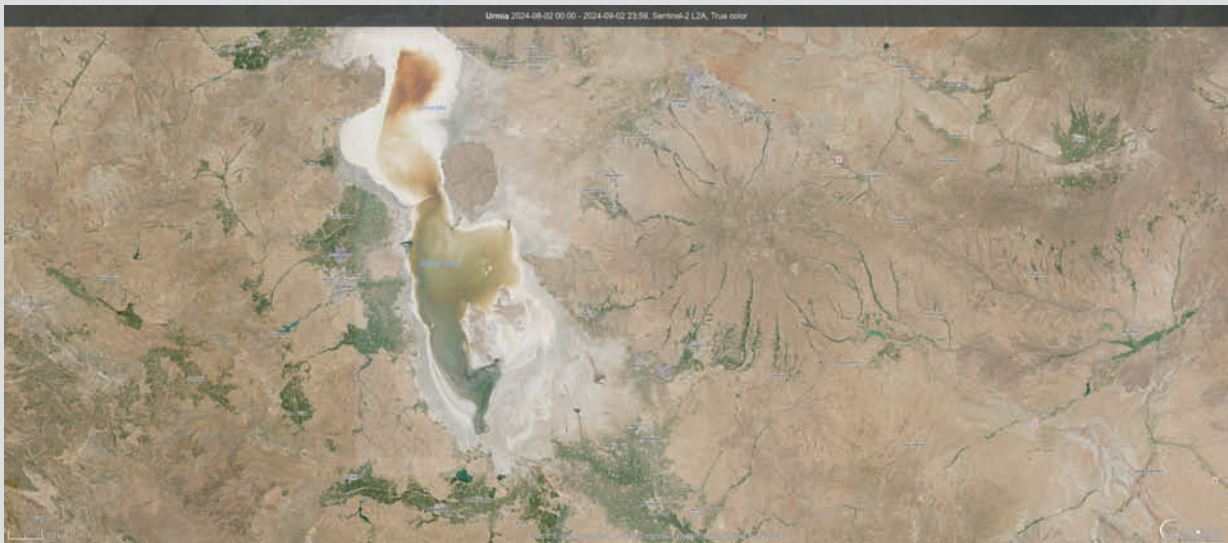
Biology. Feeds on aquatic invertebrates.

Conservation status. EN; appears to decline within its very small range. Extirpated from Mahabad, Gedar and Talkheh drainages and seems to occur now only in middle Zarrineh.

Further reading. Naseka et al. 1999 (morphology, distribution).



No water was visible when driving around Lake Urmia in autumn 2018.



Copernicus Service information 2024.

Lake Urmia. Lake Urmia (or Orumiyeh) is situated in northwestern Iran at an altitude of 1,250 m. With a total surface area ranging from 4,750 to 6,100 km² and a maximum depth of 16 m, it was once the largest lake in West Asia and one of the largest permanent hypersaline lakes in the world. Lake Urmia is a tectonic lake formed by the folding caused by the collision of the Arabian plate with the Eurasian plate. It may be only 0.5 million years old, and its biogeographic affinities are with the Aras adjacent to the north. During periods of higher humidity in the past, Urmia was a freshwater lake of considerable size, allowing fish to migrate between tributaries. As the lake dried out and became a 'salt lake', it was once one of the largest natural habitats for the crustacean *Artemia urmiana*, which was of considerable economic importance. However, in the latter decades of the 20th century and the early years of the 21st century, the environmental conditions around Lake Urmia deteriorated rapidly. In 2013, *A. urmiana* was declared extinct in the lake due to the extremely high salinity levels. The lake's salinity has risen to more than 300 g/L due to a combination of drought, the construction of dams, and increased groundwater pumping from the surrounding area. This has led to the desiccation of large areas of the lake. The inflowing streams and rivers have been blocked by dams, which have choked the water supply from the mountains that tower on the two sides of the lake. By the end of 2017, the lake had shrunk to 10 % of its former size (and 1/60 of the water volume in 1998). Plans for the recovery of the lake have been in place for several years, including the drainage of large amounts of water from the Aras to Lake Urmia. However, despite these efforts, the situation has stayed the same, and the lake has dried out. **Further reading.** National Geography Organization of Iran 2003 (Lake Urmia).