Family Percidae

Perches

A family of predominantly freshwater fishes with approximately 244 species in 12 genera native to Europe, northern, West and Central Asia, and North America. Most species belong to the American subfamily Etheostominae (darters: approximately 160 species in four genera). Three genera are found in West Asia. Percidae is distinguished from Cichlidae by the presence of a single continuous lateral line (vs. lateral line interrupted, with the anterior part of the line situated at a higher level on the body than the posterior part), from Centrarchidae (a family of fish that was introduced to the region) by the presence of one or two anal spines (vs. 3–6), and from *Dicentrarchus* (Moronidae) by having 1–2 anal spines (vs. 3), and no auxiliary rows of lateral-line scales on the caudal (vs. presence). In the European part of the Black and Caspian Seas, *Sander volgensis* is a widely distributed and locally abundant species which has become invasive in Europe due to accidental stocking. It has not yet been found in the area covered by this book, but it cannot be excluded that it might be found in the future. *Sander marinus* is an additional percid found in this area. It has not been reported to enter pure freshwaters, inhabiting marine and brackish estuaries. It appears to be on the verge of extinction in the Black Sea basin, with the sole surviving population in Ukraine. In contrast, it is relatively common in the Kazakh Caspian basin, although it is rare along the coast of Azerbaijan and Iran, where it is only occasionally caught. *Sander marinus* and *S. volgensis* are included in the key to facilitate their identification. Species of *Sander* and *Perca* are commercially important food fish. *Sander lucioperca* has been introduced throughout West Asia, Northern Africa, and Europe to transform "low-value" fish stocks into high-value fisheries. As a result, it is widely introduced and responsible for the extinction or extirpation of endemic Leuciscidae and *Cobitis* species in Lakes Beyşehir and Eğirdir (Central Anatolia, Türkiye) and possibly also elsewhere.

Key to genera of Percidae in West Asia

1a - Two dorsals confluent.
……*Gymnocephalus*
1b - Two distinctly separate dorsals.
……2

2a - Pelvic and anal yellow to red; dark-grey or black blotch on posterior part of first dorsal; 5–8 bold bars on flank, usually y-shaped.
……*Perca*

2b - Pelvic and anal whitish to brown; no dark-grey or black blotch on posterior part of first dorsal; flank with no bar or with 7–20 bars.
……*Sander*

Gymnocephalus cernua; Danube, Hungary; ~70 mm SL.

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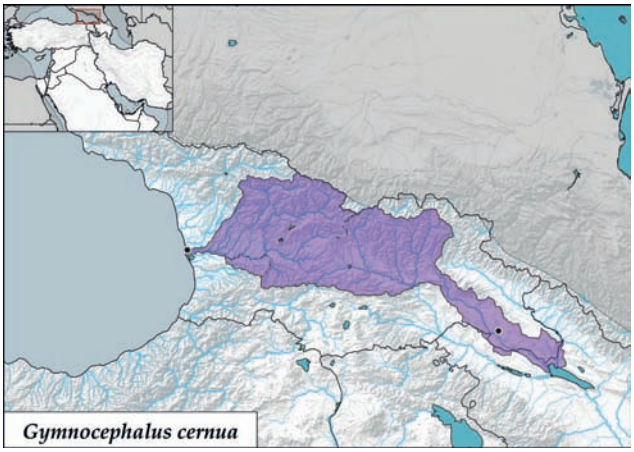
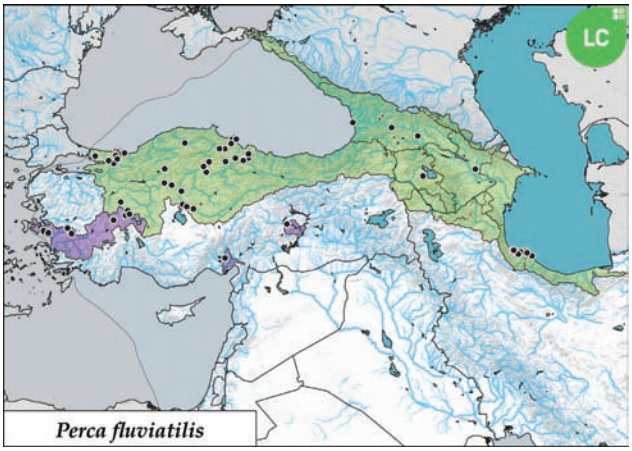




Gymnocephalus cernua

Common name. Ruffe.

Diagnosis. Distinguished from other species of Percidae in West Asia by: ● two dorsals confluent. Size up to 200 mm SL.

Distribution. In West Asia non-native to upper Kura and Rioni (Georgia). In Europe, native to Trace in Türkiye and Caspian, Black, Baltic, and North Sea basins, north to about 69°N in Scandinavia. In Black sea basin south to Kuban.Also, in Aral basin, Arctic Ocean basin eastward to Kolyma. Introduced into France west of Rhine, northern Italy, northern Great Britain, Neretva (Croatia, Bosnia-Herzegovina), and Great Lakes region, North America and likely elsewhere.

Habitat. Eutrophic lakes, lowland and foothill streams. Prefers still or slow-flowing waters with soft bottoms and no vegetation. Most common in estuaries of large rivers, brackish lakes with salinities up to 10–12 ‰ and reservoirs. Generally increases in abundance with increasing eutrophication.

Biology. Females live up to 10 years, males up to 7. First spawn at 1–3 years, male a one year earlier than female. Spawns March–May until July in northern Europe on various substrates at depths of about 3 m or less. Spawns at temperatures above 6°C in north and above 10°C in south. Usually, a single female spawns with several males. Eggs become sticky in contact with water and adhere to rocks or plants. Females may spawn intermittently, laying eggs in two or more portions, usually separated by about 30 days in summer. Eggs from first batch are larger than those from second. Larvae have no or only a short pelagic larval stage, early transition to benthic life, secretive and solitary, do not form schools. Survival of larvae is poor below 10°C and above 20°C. Crepuscular or nocturnal. Well-developed cephalic lateral-line system and tapetum lucidum in the eyes make it an efficient predator at night and in turbid waters. Usually feeds on benthic chironomid larvae and amphipods, which can be detected in upper layers of substrate through sensory channels on head. Pelagic in coastal lakes and tidal estuaries, feeding on zooplankton and fish. When coexisting in deep lakes, *Perca fluviatilis* and *G. cernua* sometimes occur at different depths, with *G. cernua* being more abundant in deeper layers.

Conservation status. Non-native.

Further reading. Hölker & Thiel 1998 (biology); Craig 2000 (biology); Epitashvili et al. 2020 (records from Georgia).

Perca fluviatilis

Common name. Perch.

Diagnosis. Distinguished from other species of Percidae in West Asia by: ● pelvic and anal yellow to red / ● dark-grey or black blotch on posterior part of first dorsal / ● 5–8, usually y-shaped bold dark-grey bars on flank / ○ two distinctly separate dorsals / ○ 56–77 total lateral-line scales. Size up to 600 mm SL, usually about 200 mm SL, females grow larger than males.

Distribution. Black Sea and western Caspian basins, south to Sefid (Iran). Increasingly stocked in many reservoirs outside its native range, particularly in Türkiye, and often illegally by anglers. Native throughout Europe to northernmost tip of Scandinavia, except Iberian Peninsula, central Italy, and Adriatic basin. In Aegean from Maritza to Aliakmon drainages. Native in Siberia, in rivers draining to Arctic Ocean east to Kolyma (replaced by *P. flavescens* in North America). Introduced in Aral basin (replaced by *P. schrenkii*), Ebro delta (Spain), central and southern Italy,

Perca fluviatilis; Odra drainage, Germany; ~160 mm SL.

Lake Skadar (Montenegro, Albania), Amur (Siberia), Australia, and South Africa (list not exhaustive).

Habitat. A wide range of habitats from estuarine lagoons, lakes, and rivers of all types to medium-sized streams.

Biology. Lives up to 21 years, usually to about 6 years. Males spawn first time at 1–2 years, females at 2–4 years. Spawns February–July, depending on latitude and altitude, when temperature reaches about 6°C. May undertake short spawning migrations. Females usually spawn with several males once a year. Female circles spawning site, followed by one male, while other males remain stationary. A string of eggs is released as female swims in a clockwise spiral, folding herself into a U-shape. All eggs are released and fertilised within approximately 5 seconds in a single strand, which becomes twisted and entangled in spawning substrate. Feeding larvae are positively phototactic, live in open water, and feed on pelagic organisms. Currents can widely disperse them. Opportunistic diurnal feeders, feeding mainly at sunrise and sunset on all available prey. Larvae and small juveniles usually feed on planktonic invertebrates. Many juveniles come close to shore during first summer to feed on benthic prey. Often becomes piscivorous at about 120 mm SL. Stocks with different life histories may co-occur in some lakes (littoral, benthic, pelagic zooplanktivorous), sometimes with varying spawning sites and times.

Conservation status. LC.

Further reading. Craig 2000 (biology); Svanbäck & Eklöv 2002 (morphology).

Key to species of *Sander* in Asia

1a - 14–17½ branched rays in second dorsal (Northern Black Sea and Caspian basins; marine).
……*S. marinus*
1b - 18–22½ branched rays in second dorsal.
……2

2a - Canine teeth absent; 70–83 total lateral-line scales.
……*S. volgensis*
2b - 1–2 enlarged canine teeth in anterior part of each jaw; 80–97 total lateral-line scales.
……*S. lucioperca*

Large reservoirs such as Hirfanlı at the Kızılırmak have often been stocked with *Sander lucioperca* and several other non-native species.

Sander lucioperca; Danube delta, Romania; ~150 mm SL.

Sander lucioperca; Danube, Germany; ~500 mm SL. A. Hartl.

Sander lucioperca

Common name. Pikeperch.

Diagnosis. Distinguished from other species of *Sander* in West Asia by: ○ 1–2 enlarged canine teeth in anterior part of each jaw / ○ 18–22½ branched rays in second dorsal / ○ 80–97 total lateral-line scales. Size up to 1000 mm SL.

Distribution. Native to Caspian, Baltic, Black, and Aral basins; Elbe (North Sea basin) and Maritza (Aegean basin) drainages. North to about 65°N in Finland. Introduced into Central Anatolia (Lakes Beyşehir and Eğirdir and Seyhan reservoirs), Iranian Tigris, Kor basin, Lake Urmia, and Namak basins, and possibly elsewhere. Introductions began in Great Britain in 1878, followed by Italy, Strymon drainage (Greece) and continental Europe west of Elbe, Ebro, Tagus, and Jucar drainages in Iberian Peninsula, Onega and Severnaya Dvina in White Sea basin and widely introduced in North Africa, Ob and Amur drainages (Asian Russia), Lake Issyk-Kul (Kyrgyzstan), Balkhash, and many smaller basins in central Kazakhstan.

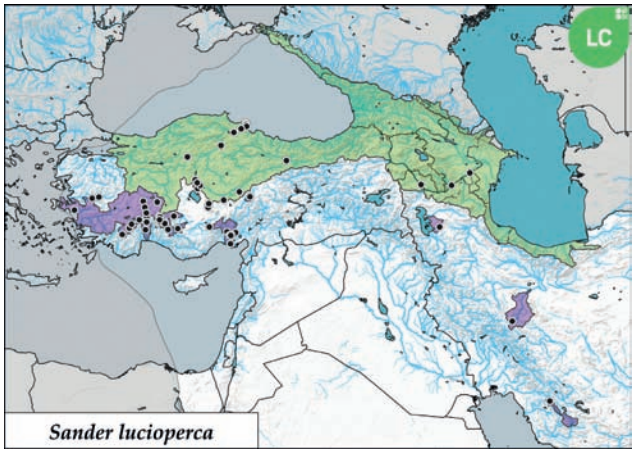
Habitat. Large, turbid rivers and eutrophic lakes; brackish coastal lakes and estuaries. Often declines if turbidity is reduced.

Biology. Lives up to 17 years. Spawns first time at 3–10 years, usually at 4. Spawns April–May, exceptionally late February–July, depending on latitude and altitude, when temperatures reach 10–14°C (lowest temperature for egg incubation 11.5°C). May undertake short spawning migrations. Individuals foraging in brackish water migrate to freshwater habitats (migrations of up to 250 km have been recorded). Homing well developed, even neighboring populations may be relatively isolated. Male territorial digging shallow pit of about 50 cm in diameter and 5–10 cm deep in sand, gravel, or among exposed plant roots, on which eggs are laid, usually in turbid water and at 1–3 m depth. Spawns in pairs at dawn or night. Female remains above nest while male circles rapidly around it, about 1 m from nest. Male then assumes vertical position, and both swim rapidly around, releasing eggs and sperm. Female leaves nest after all eggs are released. Male defends nest and fans eggs with pectoral fins. Female spawn once a year. Feeding larvae positively phototactic feeding on pelagic organisms after leaving nest for open water. Piscivorous, feeding mainly on gregarious pelagic fish. Stomach contents from Lake Eğirdir revealed a high predation rate on native species, particularly *Anatolichcthys iconii*.

Conservation status. LC.

Remarks. Introduced in Lake Eğirdir from Austria in 1955 and was commercially fished between 1960 and 2000. Since then, stocks have declined sharply due to overfishing.

Further reading. Craig 2000 (biology); Lappalainen et al. 2003 (biology); Küçük et al. 2009b (introduction and effects in Eğirdir).



Pikeperch in Anatolian Lakes: what has been learned? The introduction of piscivorous fishes has been a common practice worldwide, aiming to increase fisheries' economic value. This phenomenon gained particular momentum following the Second World War. One of the most notable instances is the introduction of the Nile Perch *Lates* sp. to Lake Victoria (East Africa) in the mid-1950s. This has left a lasting impression on the collective memory as one of the most egregious instances of biomanipulation, with the Nile Perch serving as the primary catalyst for the decline and extinction of hundreds of native haplochromine cichlid fishes. However, similar applications have been undertaken almost concurrently in the history of West Asia. The piscivorous *Sander lucioperca* was introduced in several Western and Central Anatolia lakes, including Lake Eğirdir (in 1955) and Beyşehir (1978 and 1980), with the primary objective of enhancing fisheries. Within a decade of the introductions, most of the native species had disappeared from the catches in these lakes. However, their recovery began in the early 2000s, following the overfishing of pikeperch. Two endemic pelagic species did not survive and are now extinct: *Pseudophoxinus handlirschi* (from Eğirdir) and *Alburnus akili* (from Beyşehir). These are the first extinctions reported to be an immediate consequence of species introduction in West Asia. It is curious to note that *Sander* was introduced to Lake Beyşehir nearly fifteen years after its introduction to Eğirdir, despite the apparent decline of Eğirdir fish fauna. Today, even among the local

scientific community members, there is a tendency to condemn early scientists for the disruptive impact of *Sander* introductions they stirred up. It is important to consider the context in which introductions were made. At the time, the value of local biodiversity was not yet recognised, and there was an opportunity to increase the commercial value of fisheries. It was in the early 1990s that it became apparent that the decline of species or their extinction was irreversible. However, it would appear that we have not learned from these cases. Indeed, the situation is becoming increasingly serious. There is no evidence of a reversal in the introduction of non-native invasive species. The massive wave of non-native species spread, and new introductions for commercial purposes or simply to release aquarium fish have only just begun. The invasion of *Perca fluviatilis* throughout Anatolia is a case in point, with other species, such as *Micropterus nigrescens*, likely to follow. However, the conservation of endemic and native fauna remains undervalued.

Lake Gölcük in Central Anatolia was the only habitat of *Anatolichthys splendens* before *Sander lucioperca* and others had been introduced.