

Asp (*Leuciscus aspius*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, April 2011
Revised, February 2019
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Available:

<https://www.fishbase.de/photos/PicturesSummary.php?StartRow=4&ID=4783&what=species&TotRec=8>. (January 2019).

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019a):

“Europe and Asia: large rivers draining to North Sea (Weser, Elbe), Baltic Sea (southern tributaries, Norway east of Oslo, southern Sweden, Kokemären drainage in southern Finland), Black Sea, Sea of Azov and Caspian Sea; Aegean Sea basin, from Maritza to Lake Volvi drainages. Absent in Black Sea basin south of Danube and Rioni (Georgia) drainages, but present in Turkey west of Ankara.”

From Freyhof and Kottelat (2018):

“Extant

Afghanistan; Armenia; Austria; Azerbaijan; Belarus; Bosnia and Herzegovina; Bulgaria; China; Croatia; Czech Republic; Estonia; Finland; Georgia; Germany; Greece; Hungary; Iran, Islamic

Republic of; Italy; Kazakhstan; Kyrgyzstan; Latvia; Lithuania; Macedonia, the former Yugoslav Republic of; Moldova; Montenegro; Norway; Pakistan; Poland; Romania; Russian Federation; Serbia; Slovakia; Slovenia; Sweden; Switzerland; Tajikistan; Turkey; Turkmenistan; Ukraine; Uzbekistan”

Status in the United States

Leuciscus aspius has not been found in the wild or in trade in the United States.

Means of Introductions in the United States

No established populations of *Leuciscus aspius* were found in the United States.

Remarks

Information searches were conducted using the names *Leuciscus aspius* and *Aspius aspius*.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to Fricke et al. (2019), *Leuciscus aspius* (Linnaeus 1758) is the current valid name for this species. It was originally described as *Cyrinus aspius* (Linnaeus 1758) and has been known previously as *Aspius aspius* (Linnaeus 1758).

From Froese and Pauly (2019b):

“Animalia (Kingdom) > Chordata (Phylum) > Vertebrata (Subphylum) > Gnathostomata (Superclass) > [...] Actinopterygii (Class) > Cypriniformes (Order) > Cyprinidae (Family) > Leuciscinae (Subfamily) > *Leuciscus* (Genus) > *Leuciscus aspius* (Species)”

Size, Weight, and Age Range

From Froese and Pauly (2019a):

“Max length : 120 cm TL male/unsexed; [Muus 1999]; common length : 55.0 cm TL male/unsexed; [Billard 1997]; max. published weight: 9.0 kg [Muus and Dahlström 1968]; max. reported age: 11 years [Biro and Furesz 1976]”

Environment

From Froese and Pauly (2019a):

“Freshwater; brackish; benthopelagic; potamodromous [Riede 2004]; depth range 10 - ? m [Billard 1997]. [...] 4°C - 20°C [Baensch and Riehl 1991] [assumed to be recommended aquarium temperature]; [...]”.

Climate/Range

From Froese and Pauly (2019a):

“Temperate; [...]; 66°N - 35°N, 3°E - 72°E”

Distribution Outside the United States

Native

From Froese and Pauly (2019a):

“Europe and Asia: large rivers draining to North Sea (Weser, Elbe), Baltic Sea (southern tributaries, Norway east of Oslo, southern Sweden, Kokemären drainage in southern Finland), Black Sea, Sea of Azov and Caspian Sea; Aegean Sea basin, from Maritza to Lake Volvi drainages. Absent in Black Sea basin south of Danube and Rioni (Georgia) drainages, but present in Turkey west of Ankara.

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Introduced

From Froese and Pauly (2019a):

“Introduced in Rhine, Northern Dvina and Lake Balkhash (Asia) [Kottelat and Freyhof 2007].”

According to CABI (2019) *Leuciscus aspius* is introduced in Belgium, China, Cyprus, France, Italy, Netherlands and Switzerland. CABI (2019) also states that although many introductions have been attempted, the introduced populations struggle to become established.

Means of Introduction Outside the United States

From CABI (2019):

“The main introductions of this species are due to both aquaculture and fisheries.”

Short Description

From Froese and Pauly (2019a):

“Dorsal spines (total): 3; Dorsal soft rays (total): 7-9; Anal spines: 3; Anal soft rays: 12 - 15. The only species of *Aspius* in Europe which can be diagnosed from other species of Cyprinidae in

Europe by the following characters: anal fin with 12-14½ branched rays; scales on lateral line 64-76; maxilla extending beyond front margin of eye; and sharp keel between pelvic-fin and anal-fin origins covered by scales [Kottelat and Freyhof 2007]. Long shape body, laterally compressed with a long sharp head. Green back with silver to blue tints. Lighter flanks. Silver white belly. Pectoral, pelvic and anal fins grey to brown. Scale formula: 11-14/64-76/5-6 [Keith and Allardi 2001].”

From CABI (2019):

“*A. aspius* has a body that is long and laterally compressed, with a long pointed snout, with a silvery colour over most of its body, with the back blackish-olive or greenish-grey. The iris is silvery, with a narrow golden circle around the pupil and a little grey pigment on the upper half. Its lips are silvery with a little grey over the upper one; however, both lips and iris are often bright red. The dorsal and caudal fins are grey and the other fins are transparent without pigment [Keith and Allardi 2001], and the peritoneum is usually silvery to brown [Coad 2011]. The dorsal fin has 7–10 branched rays, usually 8, followed by 2–3, usually 3, unbranched rays. The anal fin has 11–15 branched rays, usually 12, followed by 3–4, usually 3, unbranched rays. The pectoral fin has 14–17 branched rays and the pelvic has 7–9 fin rays. The scales have a central focus, fine circuli and few posterior and anterior radii, with lateral line scales numbering between 64 and 76. There is also a pelvic axillary scale and a scaled keel behind the pelvic fins. The lower jaw tip projects and fits into a notch in the upper jaw. Gill rakers usually number between 9–14, and are very short and club-shaped, almost reaching half way to the raker below when appressed. Gill membranes are narrowly attached to the isthmus, almost under the posterior eye margin. The species has pharyngeal teeth usually 3,5–5,3, sometimes 2,5–5,3 or with 6 teeth in the main row. The pharyngeal teeth are elongate, compressed and obviously hooked [Coad 2011].”

Biology

From Froese and Pauly (2019a):

“Occur in open water of large and medium-sized lowland rivers and large lakes [Kottelat and Freyhof 2007]. Adults inhabit lower reaches of rivers and estuaries [Billard 1997]. Prefer to stay near bridge pillars, near tributaries, under weirs, in deep currents and overgrown parts of river and in quiet bays of river bends [Vostradovsky1973]. One of the rare cyprinids which is piscivore; also prey on small aquatic birds. Juveniles are gregarious predators while adults hunt in small groups or are solitary. Juveniles and adults feed mainly on fish, especially on *Alburnus alburnus* or *Osmerus eperlanus* [Kottelat and Freyhof 2007]. Migrate upstream in tributaries for spawning in April-June [Muus and Dahlström1968; Billard 1997]. Spawn in fast-flowing water on gravel or submerged vegetation. Lake populations migrate to tributaries; semi-anadromous populations or individuals (Terek) forage mainly in estuaries and freshened parts of the sea, migrating to rivers only for spawning. Begins spawning migration in second half of October (Terek) and overwinters in the lower reaches of river.”

“Sexual maturity is reached after 4-5 years [Baensch and Riehl 1991]. Reproductive success seems to be associated with low water level and high spring temperatures. Spawning occurs

more than one season and lasts about 2 weeks. Deposits eggs which adhere to gravel or submerged plants [Ray 2005].”

From CABI (2019):

“*A. aspius* is a riverine species that inhabits main channels, side channels and backwaters [Hajdú and Kovác 2002; Valová et al. 2006; Telcean and Cupsa 2009]. It spends the winter in deep holes, emerging in spring when rivers flood and moving to the spawning grounds. These grounds include river channels, open lake areas with substantial flow and only rarely places weakly overgrown with very coarse submerged vegetation such as reeds and rushes [Shikhshabekov 1979].”

“The asp is the only piscivorous species in the family Cyprinidae. In its early juvenile phase feeds on crustaceans, bottom fauna, terrestrial insects that have fallen into the water, and fish larvae [Maitland 1977]. The most important food item for adults is bleak *Alburnus alburnus*, followed by roach *Rutilus rutilus*, and goldfish *Carassius auratus*; older asp are also able to handle fish not easily caught by younger asp due to the presence of spines, such as perch *Perca fluviatilis*, ruffe *Gymnocephalus cernuus*, and monkey goby *Neogobius fluviatilis*, or of a deep body, such as ide *Leuciscus idus* [Krpó-Cetkovic et al. 2010]. The asp also feeds on *Osmerus eperlanus*, *Gasterosteus* sp., *Gobio gobio*, *Leuciscus cephalus*, *Chondrostoma nasus*, and *Leucaspius delineatus* [Trzebiatowski and Leszczewicz 1976].”

Human Uses

From Froese and Pauly (2019a):

“Fisheries: commercial; aquaculture: commercial; gamefish: yes”

Diseases

No OIE-reportable diseases (OIE 2020) were found to be associated with *Leuciscus aspius*.

According to CABI, several parasites and nematodes are found within *Leuciscus aspius*, including: *Dactylogyrus tuba*, protozoan parasite *Chilodonella* sp, protozoan *Myxobolus dispar*, nematode *Eustrongylides excisus*, and parasite *Argulus foliaceus*.

Threat to Humans

From Froese and Pauly (2019a):

“Harmless”

3 Impacts of Introductions

Although this species has been recorded as introduced, no impacts of introductions were available.

4 Global Distribution

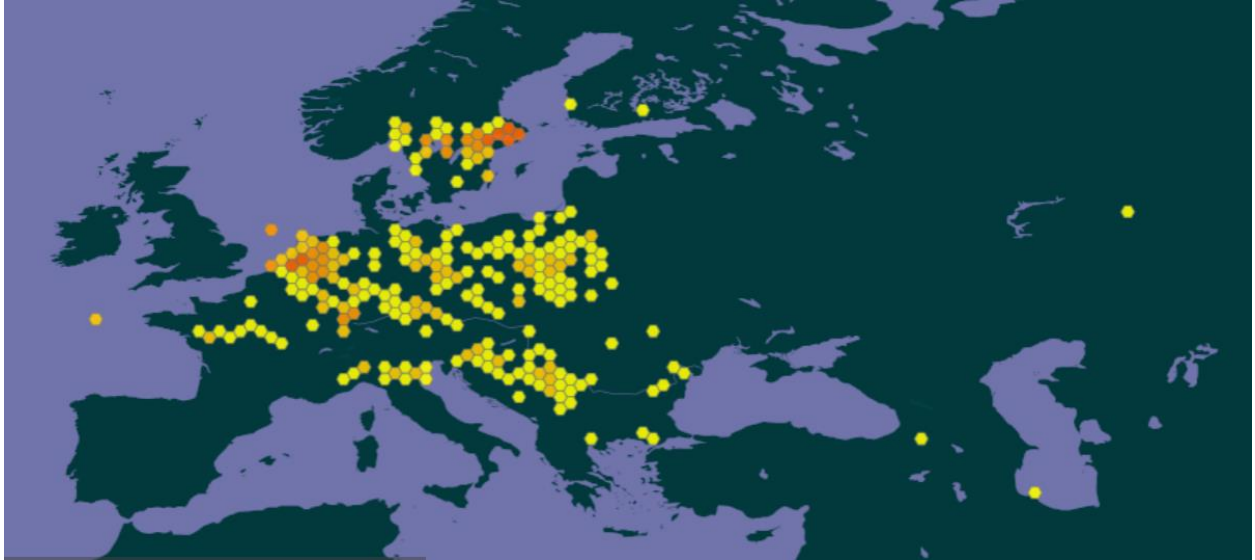


Figure 1. Known global distribution of *Leuciscus aspius*. Map from GBIF Secretariat (2019). Locations are in Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Finland, Georgia, Germany, Greece, Hungary, Islamic Republic of Iran, Italy, Lithuania, Macedonia, Moldova, Montenegro, Norway, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Turkey and Ukraine. Locations found in Celtic Sea and North Sea were not considered to be valid observations and were not included in the climate assessment.

5 Distribution Within the United States

No established populations of *Leuciscus aspius* were found in the United States.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Leuciscus aspius* was high throughout nearly all of the contiguous United States. The highest areas of match in the contiguous United States were found surrounding the Great Lakes area and along the Rocky Mountain range. Only a few small areas of low match were found in Washington, Oregon, Arizona, Louisiana, and Florida. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.406, high (scores 0.103 and greater are classified as high). Most States had high individual climate scores. Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas had low individual climate scores, while Kansas, Maine, Nebraska, North Carolina, Oklahoma, Rhode Island, and Tennessee had medium individual climate scores.

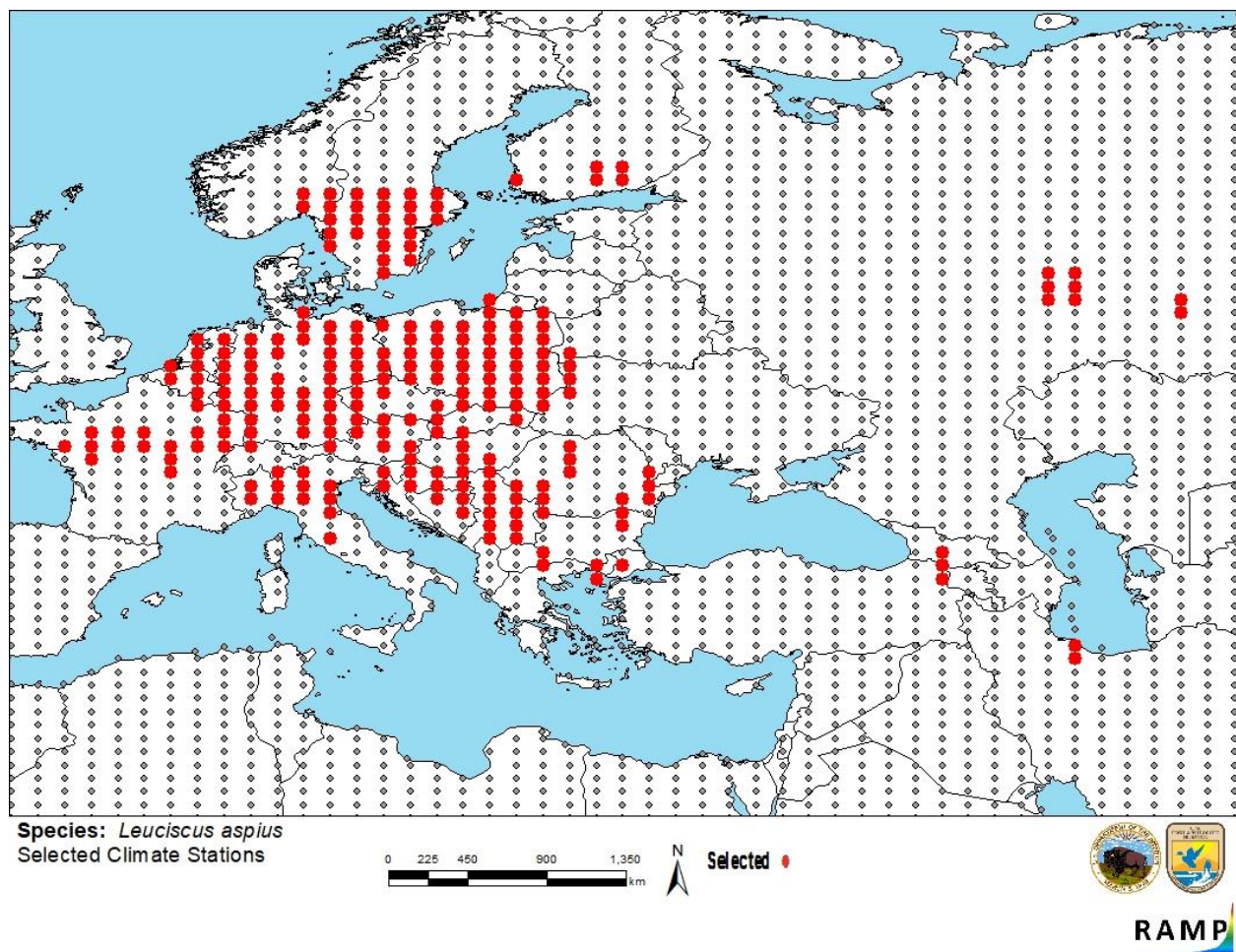


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in Europe selected as source locations (red; Austria, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Finland, Georgia, Germany, Greece, Hungary, Islamic Republic of Iran, Italy, Lithuania, Macedonia, Moldova, Montenegro, Norway, Poland, Romania, Russian Federation, Serbia, Slovakia, Slovenia, Sweden, Switzerland, Turkey, Ukraine) and non-source locations (gray) for *Leuciscus aspius* climate matching. Source locations from GBIF Secretariat (2019).

Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

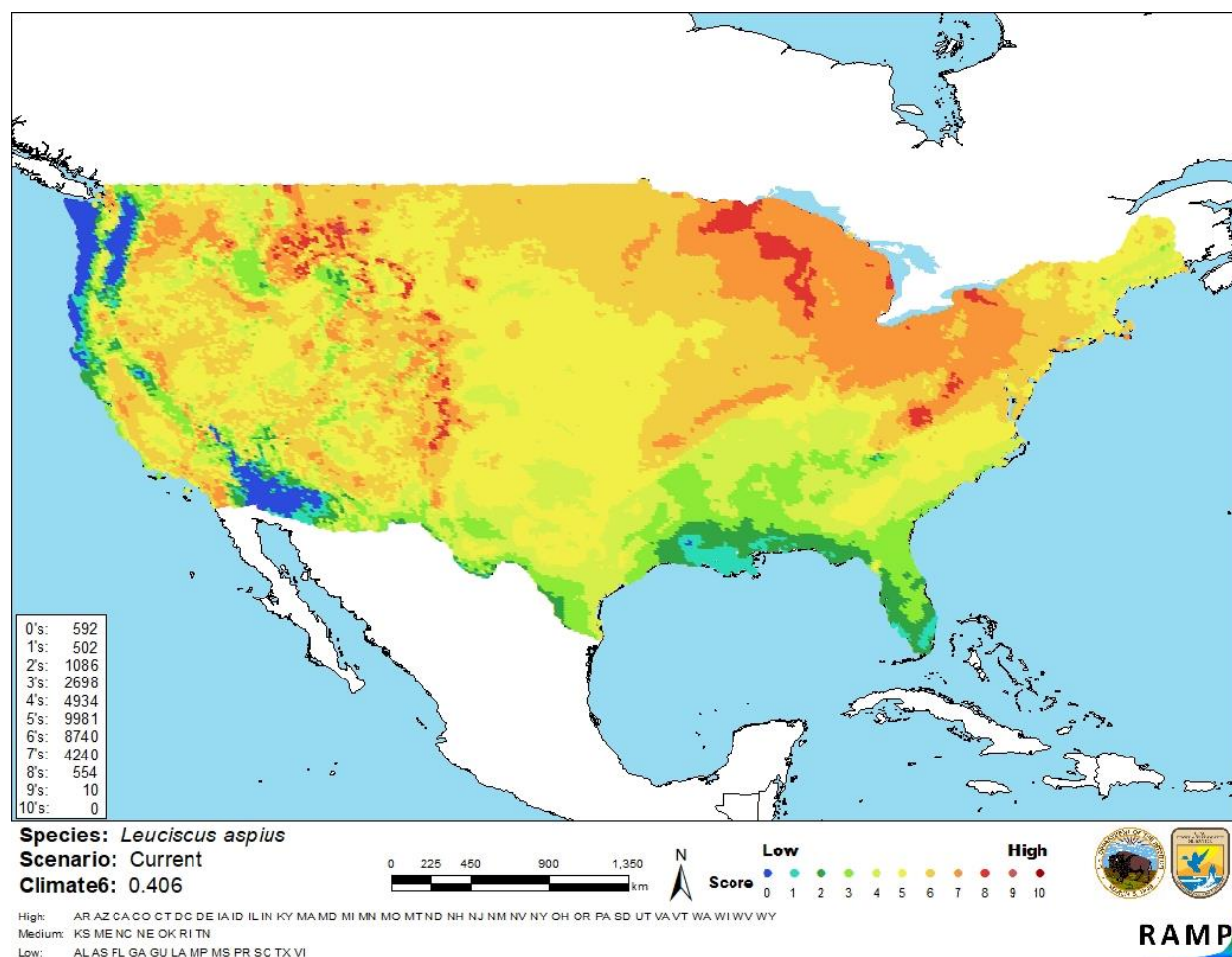


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Leuciscus aspius* in the contiguous United States based on source locations reported by GBIF Secretariat (2019). Counts of climate match scores are tabulated on the left. 0 = Lowest match, 10 = Highest match.

The High, Medium, and Low Climate match Categories are based on the following table:

Climate 6: Proportion of (Sum of Climate Scores 6-10) / (Sum of total Climate Scores)	Climate Match Category
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

7 Certainty of Assessment

There is information available on *Leuciscus aspius* from a wide variety of scientific sources. There are records of introduction of *Leuciscus aspius* outside of their native range, but no

information regarding actual impacts due to introduction is available. Due to the lack of information of impacts of introduction, the certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

Asp (*Leuciscus aspius*) is a cyprinid fish found throughout much of Europe and western Asia. *L. aspius* is potamodromous and found throughout fresh and brackish waters. This species has been introduced to Belgium, China, Cyprus, France, Italy, Netherlands, and Switzerland for sport fishing and aquaculture purposes. Although *L. aspius* has been introduced into other countries, there are no documented impacts of its introduction. The climate match for the contiguous United States was high with most States having an individually high climate score. Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina, and Texas each had low individual climate scores, while Kansas, Maine, Nebraska, North Carolina, Oklahoma, Rhode Island, and Tennessee had individually medium climate scores. The certainty of this assessment is low. The overall risk assessment category for *L. aspius* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): High**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information: No additional remarks**
- **Overall Risk Assessment Category: Uncertain**

9 References

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 10.

CABI. 2019. *Aspius aspius* (Asp) [original text by G. Copp]. In Invasive Species Compendium. CAB International, Wallingford, U.K. Available: <https://www.cabi.org/ISC/datasheet/92623>. (January 2019).

Fricke, R., W. N. Eschmeyer, and R. van der Laan, editors. 2019. Catalog of fishes: genera, species, references. Available: <http://researcharchive.calacademy.org/research/ichthyology/catalog/fishcatmain.asp>. (January 2019).

Freyhof, J., and M. Kottelat. 2018. *Leuciscus aspius* (amended version of 2008 assessment). The IUCN Red List of Threatened Species 2018: e.T2178A136077402. Available: <https://www.iucnredlist.org/species/2178/136077402>. (January 2019).

Froese, R., and D. Pauly, editors. 2019a. *Leuciscus aspius* (Linnaeus, 1758). FishBase. Available: <https://www.fishbase.de/summary/Leuciscus-aspius.html> (January 2019).

- Froese, R., and D. Pauly, editors. 2019b. *Leuciscus aspius* (Linnaeus, 1758). In World Register of Marine Species. Available: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=1015724>. (February 2019).
- GBIF Secretariat. 2019. GBIF backbone taxonomy: *Leuciscus aspius* (Linnaeus, 1758). Global Biodiversity Information Facility, Copenhagen. Available: <https://www.gbif.org/species/5851603>. (January 2019).
- OIE (World Organisation for Animal Health). 2020. OIE-listed diseases, infections and infestations in force in 2020. Available: <http://www.oie.int/animal-health-in-the-world/oie-listed-diseases-2020/>. (March 2020).
- Sanders, S., C. Castiglione, and M. Hoff. 2019. Risk assessment mapping program: RAMP, version 3.1. U.S. Fish and Wildlife Service.

10 References Quoted But Not Accessed

Note: The following references are cited within quoted text within this ERSS, but were not accessed for its preparation. They are included here to provide the reader with more information.

- Baensch, H. A., and R. Riehl. 1991. Aquarien atlas, band 3. Melle: Mergus, Verlag für Natur- und Heimtierkunde, Germany.
- Billard, R. 1997. Les poissons d'eau douce des rivières de France. Identification, inventaire et répartition des 83 espèces. Lausanne, Delachaux & Niestlé.
- Biro, P., and G. Furesz. 1976. The growth of Asp (*Aspius aspius* L.) in Lake Balaton and the selective effects of commercial fisheries on population structure. Ann. Inst. Biol. Acad. Sci. Hung. Tihany 43:47–67.
- Coad, B. W. 2011. Website of the ichthyologist Brian W. Coad. Available: <http://www.briancoad.com>.
- Hajdú, J., and V. Kovác. 2002. Fishfauna of several water bodies in the Large Danube Island area. Folia faunistica Slovaca 7:75–81.
- Junger H., K. Kotrschal, and A. Goldschmid. 1989. Comparative morphology and ecomorphology of the gut in European cyprinids (Telostei). Journal of Fish Biology 34(2):315–326.
- Keith, P., and J. Allardi, coordinators. 2001. Atlas des poissons d'eau douce de France. Muséum national d'Histoire naturelle, Paris. Patrimoines naturels 47:1–387.
- Kottelat, M., and J. Freyhof. 2007. Handbook of European freshwater fishes. Publications Kottelat, Cornol, Switzerland, and Freyhof, Berlin.

- Krpo-Cetkovic, J., A. Hegedis, and M. Lenhardt. 2010. Diet and growth of Asp, *Aspius aspius* (Linnaeus, 1758), in the Danube River near the confluence with the Sava River (Serbia). *Journal of Applied Ichthyology* 26:513–521.
- Maitland, P. S. 1977. The Hamlyn guide to freshwater fishes of Britain and Europe. Hamlyn Publishing Group, London.
- Muus, B. J., and P. Dahlström. 1968. Süßwasserfische. BLV Verlagsgesellschaft, München.
- Muus, B. J. 1999. Freshwater fish. Scandinavian Fishing Year Book, Hedehusene, Denmark.
- Ray, G. C. 2005. Connectivities of estuarine fishes to the coastal realm. *Estuarine, Coastal and Shelf Science* 64:18–32.
- Riede, K. 2004. Global register of migratory species - from global to regional scales. Federal Agency for Nature Conservation, Final Report, R&D-Projekt 808 05 081, Bonn.
- Shikhshabekov, M. M. 1979. On the reproduction of *Rutilus frisii kutum* (Kamensky), *Aspius aspius* (L.), *Vimba vimba persa* (Pallas), and *Scardinius erythrophthalmus* (L.) in Dagestan water bodies. *Voprosy Ikhtiologii* 19:195–239.
- Telcean, I. C., and D. Cupsa. 2009. The backwaters and drainage canals as natural refuges for the lowland rivers' fish fauna (Somes, Crisuri, and Mures Rivers - north-western Romania). *Biharean Biologist* 3(1):37–44.
- Trzebiatowski, R., and T. L. Leszczewicz. 1976. A contribution to knowledge of biology and economic importance of *Aspius aspius* (L.) of the Szczecin Firth. *Acta Ichthyologica et Piscatoria* 6(2):103–118.
- Valová Z., P. Jurajda; and M. Janác. 2006. Spatial distribution of 0+ juvenile fish in differently modified lowland rivers. *Folia Zoologica* 55:293–308.
- Vostradovsky, J. 1973. Freshwater fishes. The Hamlyn Publishing Group, London.
- Zarski, D., D. Kucharczyk, M. Kwiatkowski, K. Targonska, K. Kupren, S. Krejszeff, M. Jamróz, A. Hakuc-Bazowska, R. Kujawa, and A. Mamcarz. 2008. The effect of stocking density on the growth and survival of larval Asp, *Aspius aspius* (L.), and European Chub, *Leuciscus cephalus* (L.), during rearing under controlled conditions. *Archives of Polish Fisheries* 16(4):371–381.