Chinese False Gudgeon (*Abbottina rivularis*)
Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, August 2012
Revised, October 2016
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1 Native Range and Status in the United States

Native Range
From NIES (2016):

"E Continental China, Korean Peninsula, and Japan (the Nobi Plain, Kinki District, Okayama, Hiroshima, and Fukuoka Prefs.)"

Status in the United States
This species has not been reported in the United States.

Means of Introductions in the United States

This species has not been reported in the United States.

Remarks

From CABI (2016):

"Other Scientific Names
Abbottina psegma Jordan & Fowler, 1903
Abbottina rivularis Mori, 1934
Abbottina sinensis Nichols, 1943
Gobio rivularis Basilewsky, 1855
Pseudogobio rivularis Bleeker, 1871
Pseudogobio sinensis Günther, 1968
Tylognathus sinensis Kner, 1867"

"International Common Names
English: Amur false gudgeon
Local Common Names
Japan: tsuchifuki
Russian Federation: Amurskiy lzhepeskar; kitaiskiy lzhepeskar; rechnaya abbottina"

Searches based on the synonyms did not yield additional relevant information for this ERSS.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2016):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Osteichthyes
Class Actinopterygii
Subclass Neopterygii
Infraclass Teleostei
Superorder Ostariophysi
Order Cypriniformes
Superfamily Cyprinoidea
Family Cyprinidae
Genus *Abbottina* Jordan and Fowler, 1903
Species *Abbottina rivularis* (Basilewsky, 1855)"

"Current Standing: valid"

Size, Weight, and Age Range

From Froese and Pauly (2016):

"Maturity: Lm ?, range 4 - 5 cm
Max length : 18.9 cm TL male/unsexed; [Huo et al. 2012]"

From CABI (2016):

"In the Amur River sexual maturity is attained at the age of 1 year and a length of 4-5 cm. […] The longevity of *A. rivularis* is 4 years (Nikolski, 1956)."

Environment

From Froese and Pauly (2016):

"Freshwater; benthopelagic."

CABI (2016) reports depth range for this species as 0-10 m below surface level, typical water velocity as 0 cm/h, and typical water pH as 7.

Climate/Range

From Froese and Pauly (2016):

"Subtropical"

From CABI (2016):

"Water temperature (ºC temperature) 18 [-] 23 Optimum (Baensch and Fischer, 1998)"

Distribution Outside the United States

Native

From NIES (2016):

"E Continental China, Korean Peninsula, and Japan (the Nobi Plain, Kinki District, Okayama, Hiroshima, and Fukuoka Prefs.)"

Introduced

From NIES (2016):

"[Japan:] Miyagi and Niigata Prefs., Kanto District, and Biwako Lake (Shiga Pref.)"

"Kyrgyzstan"

From Froese and Pauly (2016):

"Introduced in the Mekong basin [Kottelat 2001]."

CABI (2016) reports introductions from China between 1958 and 1961 that resulted in establishment in the following countries: Kazakhstan (Mitrofanov et al. 1992), Mongolia (Neely et al. 2008), Turkmenistan (Sal'nikov and Reshetnikov 1991; Sal'nikov 1998), and Uzbekistan (Kamilov and Borisova 1966; Borisova 1972; Khurshut 2002).

Means of Introduction Outside the United States

From NIES (2016):

"[Japan:] Unknown. Possibly accidental: Hitchhiking with seed release of ayu (*Plecoglossus altivelis altivelis*)."

From CABI (2016):

"The main pathway is the transfer of fish seed between fish farms. *A. rivularis* escapes from fishponds and spreads in wild via irrigation canals."

"Outside of its native area, *A. rivularis* was first reported from Central Asia where it was unintentionally introduced in 1958 from the Yangtze River to the Karametniyaz fish farm and the Kara-Kum Canal, Turkmenistan (Sal'nikov, 1998) and from the Amur drainage to the Almaty fish farm, Kazakhstan (Mitrofanov et al., 1992). In 1961, it was introduced (with the larvae of Asian carp) into the Akkurgan (later Baliqchi) fish farm, Tashkent, Uzbekistan. It was transferred with fish seed to other fish farms of the region. *A. rivularis* has escaped from fish farms and via the extensive network of irrigation canals has spread to the plains of the Aral Sea Basin (drainages of the rivers Amu Darya, Syr Darya, Zarafshan and Qashqadarya)."

"*A. rivularis* was unintentionally introduced from Khanka Lake and probably from China as a result of aquaculture activity into the Razdolnaya River (Far East Russia) (Kolpakov et al., 2008)."

"It was probably unintentionally introduced with common carp into the Mekong River; however, it could be indigenous to the upper part of the river (Vidthayanon and Kottelat, 1995)."

"*A. rivularis* was unintentionally introduced from the lower reach of the Yangtze River to most plateau lakes in Yunnan and some plateau rivers in Xizang, China, as a result of aquaculture activities into these plateau lakes and rivers (Yan and Chen, 2007)."

Short Description

From Froese and Pauly (2016):

"Lower lip continuous, with two median lobes along its posterior margin, separated by a median furrow [Kottelat 2001]. No papilla on lips. One pair of short maxillary barbels. Anus close to ventral-fin base than to anal-fin base. Body with eight rounded dusky blotches along lateral line

[Vidthayanon and Kottelat 1995]. Mouth inferior; dorsal with convex distal margin; several vertical rows of black dots on caudal [Kottelat 2001].”

Biology

From CABI (2016):

“*A. rivularis* is found in rivers, lakes, reservoirs, canals, and marshes. It keeps to the water surface in stagnant waters and inhabits the shallow zones of lentic rivers, lakes and ponds with sandy or muddy bottoms.”

“The male builds a nest 12-43 cm in diameter on the river bottom, at a depth of 8-34 cm, which it protects. In the Amur River 1711 eggs were found in a single nest (Berg, 1949).”

“In the Amur River […] spawning is fractional and takes place from June to July. Egg diameter is 2-2.5 mm. Absolute fecundity is 1198-1980 eggs (Nikolski, 1956).”

“In Kazakhstan *A. rivularis* spawns in April-August. Here absolute fecundity is 1550-7550 eggs (Mitrofanov et al., 1988).”

“In spring *A. rivularis* comes closer to shore in backwaters and bays. In autumn it moves to deeper parts (Nikolski, 1956).”

“*A. rivularis* is a benthophagous species. In the Amur River it feeds on larvae of chironomids, Heleidae, oligochaetes and plant seeds. In the middle reach of the Yangtze River it feeds on copepods, macrophytes, plant detritus, cladocerans, aquatic insects, and decapods (Xie et al., [2001]).”

“In Kazakhstan it feeds on larvae of chironomids and dipterans, crustaceans, remains of macrophytes, seeds of terrestrial plants, and algae (Mamilova, 1975).”

Human Uses

No information available.

Diseases

From Gao et al. (2008):

“A new species of *Allocreadium*, *Allocreadium danjiangensis* n. sp., is described from the intestine of several species of freshwater fish, including *Abbottina rivularis* (Basilewsky, 1855) […] In Asia, species of *Allocreadium* Loose, 1902 are among the most common and widely distributed freshwater fish parasites.”

From You et al. (2011):

“*Gyrodactylus rivularae* is the second species in the genus to be described from *A. rivularis* in eastern Asia. The other species, *G. gobioninum*, is known from this fish in the Amur River

(Gussev, 1955), and reportedly infects other cyprinid species (*G. gobio* (Linnaeus), 1758, *Hemibarbus labeo* (Pallas), 1776, *Pseudorasbora parva* (Temminck and Schlegel), 1846, *Rostrogobio amurensis* (Agassiz), 1832, *Sarcocheilichthys sinensis* Bleeker, 1871) at localities in the former Union of Soviet Socialist Republics (Amur River and Lake Khanka) and China (Heilongjiang, Liaoning, Shandong, Zhejiang, Yunnan provinces) (Gussev, 1985; Wang and Yao, 2000).

From Shed'ko (2003):

"Autopsies of *Abbottina rivularis* from southern Primorye (drainage-basin of Artyomovka River, Razdolnaya River and Khanka Lake) and southern Sakhalin Island (Maloye Chibisanskoye Lake) revealed high indices of diplostomum-infected lenses of these fishes. The metacercariae have been identified as *Diplostomum parviventosum* Dubois, 1932, *D. huromense* (La Rue, 1927), *D. helveticum* (Dubois, 1929), *D. mergi* Dubois, 1932, *Diplostomum* sp."

From Bao et al. (2012):

"*Clonorchis sinen*sis is an important human parasite in parts of the world, in particular in southeastern Asia, including China. […] Prevalence of *Clonorchis sinensis* infection in market-sold freshwater fishes in Jinzhou city, northeastern China[:] *Abbottina rivularis* [Prevalence (%)] 45.2"

Threat to Humans

From Froese and Pauly (2016):

"Harmless"

From CABI (2016):

"*A. rivularis* is considered as a pest in fish farms where it competes with commercial species for food."

From Bao et al. (2012):

"*Clonorchis sinensis*, the oriental liver fluke, is considered to be one of the major fish-borne zoonotic trematodes in some parts of Asia, including China, Korea and North Vietnam (Chen et al., 2011; Kim et al., 2009). Human beings and other piscivorous mammals become infected with *C. sinensis* when they consume raw or undercooked freshwater fishes and shrimp infected by *C. sinensis metacercaria* (Zhou et al., 2008). The parasite causes clonorchiasis and is often associated with many human diseases such as biliary calculi, cholecystitis, liver cirrhosis, and even cholangiocarcinoma (Pak et al., 2009; Xu et al., 2010)." [see also Diseases]

3 Impacts of Introductions

From CABI (2016):

"*A. rivularis* is considered as a pest in fish farms where it competes with commercial species for food."

"*A. rivularis* competes with native species, and has displaced native species in Central Asia. It probably hybridizes with the native Turkestan gudgeon (*Gobio gobio lepidolaemus*) (Mitrofanov et al., 1988)."

From Neely et al. (2008):

"Food items observed in both taxa appeared to reflect the most common benthic invertebrates at each site. Given this, dietary overlap with other small-bodied benthic invertivores is expected to be substantial. We suggest that other benthic fishes in Lake Buyr and its tributaries (*Gobio cynocephalus* Dybowsky, *Microphysogobio anudarini* Holcik and Pivnicka, *Sarcocheilichthys soldatovi* (Berg), *Saurogobio dabryi* Bleeker) may be particularly impacted by competition with Amur goby and Chinese false gudgeon. […] While [*A. rivularis*] has not yet been implicated in declines of native fishes, given its omnivorous diet and overall similarity to many of the endemic species of *Gobio* and *Microphysogobio*, the potential for negative impacts are considerable."

From Bekkozhaeva (2015):

"Appearance of different forms in the populations of gudgeon [*Gobio gobio*] in freshwaters of the South Kazakhstan can be result of environment changes and hybridization with alien *Abbottina rivularis*."

4 Global Distribution

Figure 1. Known global established locations of *Abbottina rivularis*. Map from GBIF (2016). One record from Africa was excluded due to incorrect location.

5 Distribution Within the United States

This species has not been reported in the U.S.

6 Climate Matching

Summary of Climate Matching Analysis

The climate match (Sanders et al. 2014; 16 climate variables; Euclidean Distance) was medium across nearly all of the continental U.S. Climate match was high in the north-central U.S. and low along the Pacific Coast, northern Atlantic coast, and in parts of the Interior West. Climate6 score for the continental U.S. indicates a high climate match. Climate6 scores indicate high climate match at values of 0.103 and above; Climate6 score for *A. rivularis* was 0.312.

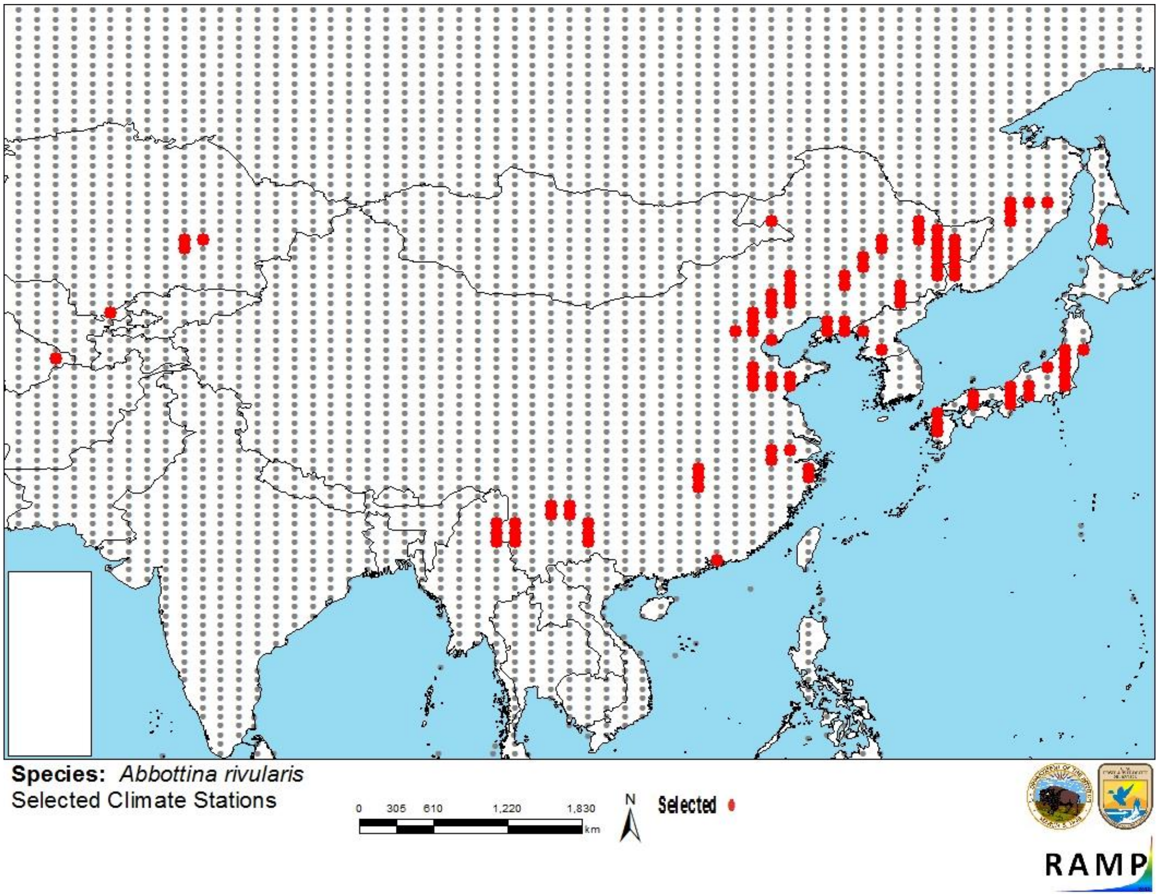

Figure 2. RAMP (Sanders et al. 2014) source map showing weather stations selected as source locations (red) and non-source locations (gray) for *Abbottina rivularis* climate matching. Source locations from CABI (2016) and GBIF (2016).

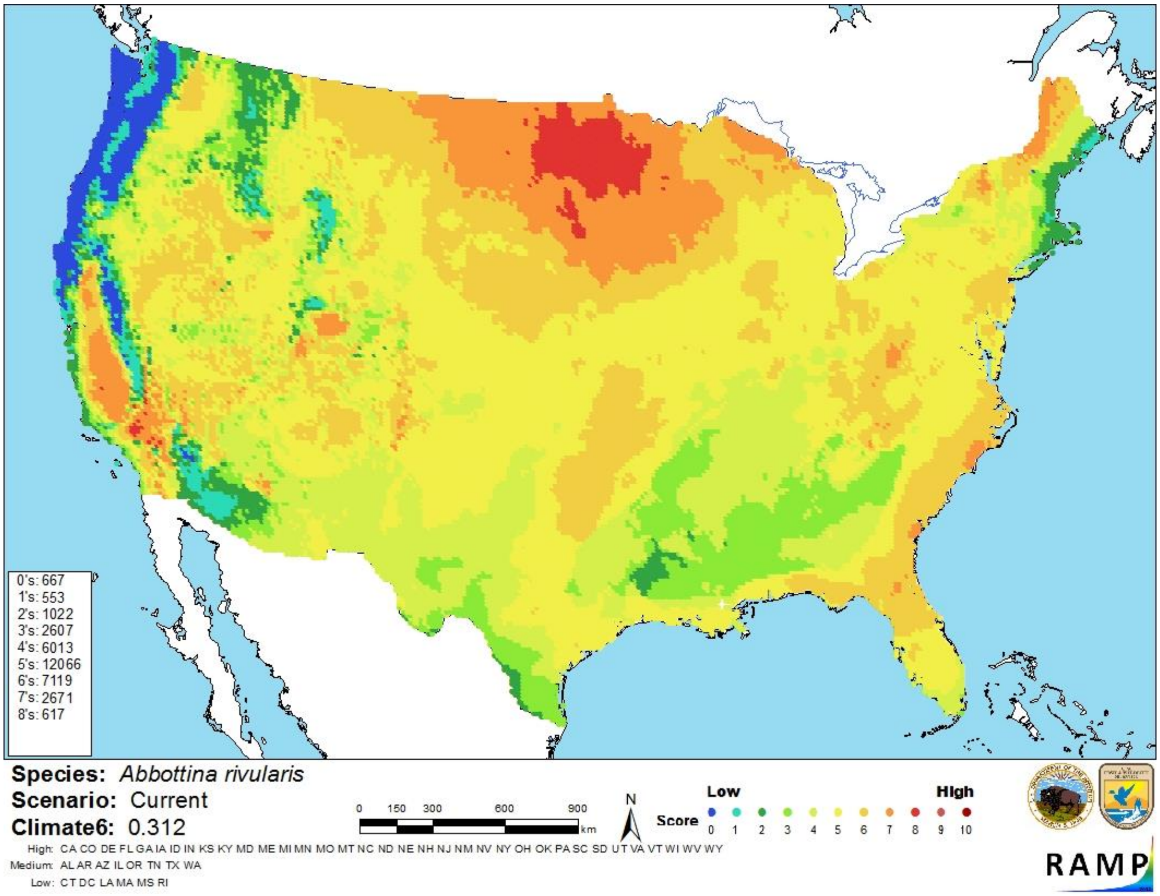

Figure 3. Map of RAMP (Sanders et al. 2014) climate matches for *Abbottina rivularis* in the contiguous United States based on source locations reported by CABI (2016) and GBIF (2016). 0= Lowest match, 10=Highest match. Counts of climate match scores are tabulated on the left.

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≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

7 Certainty of Assessment

A moderate amount of information is available on the biology and distribution of *A. rivularis*. Less information is available on impacts of the species where it has been introduced, particularly ecological impacts, and the information has not been attributed to peer-reviewed studies. Certainty of this assessment is low.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The Chinese false gudgeon (*Abbottina rivularis*) is native to China, the Korean peninsula, and Japan, but has been introduced unintentionally throughout Asia because of aquaculture activity. The species is purported to be a pest in fish farms, competing with commercial species. It is also suspected of hybridizing with a native goby in Central Asia. However, scientifically-defensible information on impacts was lacking. *A. rivularis* has a high climate match with the contiguous United States, with medium match or higher in nearly all locations. Overall risk posed by this species is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec.6): High**
- **Certainty of Assessment (Sec. 7): Low**
- **Overall Risk Assessment Category: Uncertain**

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

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