U.S. Fish & Wildlife Service

Croaking Gourami (*Trichopsis vittata*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, February 2011
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Photo: BEDO. Licensed under the Creative Commons Attribution-Share Alike 4.0 International. Available: https://commons.wikimedia.org/wiki/File:Trichopsis_vittata.jpg.

1 Native Range and Status in the United States

Native Range

From Froese and Pauly (2019):

"Asia: Thailand to Viet Nam and the islands of Sumatra, Borneo and Java."

From Low (2019):

"The species occurs widely in Java, Sumatra, Borneo (Kalimantan, Sarawak), the Malay Peninsula (Singapore, Peninsular Malaysia, southern Thailand), and the Mekong and Chao Phraya River drainages of Indochina."

Status in the United States

From Nico et al. (2019):

"Locally established in Palm Beach County, Florida, from at least the late 1970s (Lee et al. 1980 et seq., Courtenay and Stauffer 1990). Thought to be extirpated (Shafland et al. 2008a, b); however, recent collections (October 2012-July 2014) reveal it is in fact established (Schofield and Pecora 2013)."

Trichopsis vittata is in trade in the United States.
From TRiN's Tropical Fish (2019):

"Croaking Grourami Trichopsis vittata
$3.00"

Means of Introductions in the United States

From Froese and Pauly (2019):

"Accidentally released from aquarium fish farms and became established since at least in the late 1970s [Lever 1996] in a localized area on the south side of Lake Worth Drainage District canal L-36, Delray Beach, Palm Beach County, Florida."

Remarks

From Low (2019):

"Recent genetic evidence has suggested that what is currently considered *Trichopsis vittata* may in fact comprise a complex of four ecologically- and morphologically-similar, but genetically distinct species (Noren et al. 2017). Nonetheless, until a comprehensive revisionary study of this taxon has been carried out, all known populations are tentatively considered conspecific."

From Panijpan et al. (2015):

"Our DNA analyses confirmed that some wild-caught fish from these places were hybrids as a result of crossing between female *T. vittata* and male *T. pumila*: the fish inherited the COI gene from maternal *T. vittata* and the RAG1 gene from paternal *T. pumila*."

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

From Fricke et al. (2019):

"**Current status:** Valid as *Trichopsis vittata* (Cuvier 1831)."

From ITIS (2019):

"Kingdom Animalia
Subkingdom Bilateria
Infrakingdom Deuterostomia
Phylum Chordata
Subphylum Vertebrata
Infraphylum Gnathostomata
Superclass Actinopterygii
Class Teleostei
Superorder Acanthopterygii
Order Perciformes
Suborder Anabantoidei
Family Osphronemidae
Subfamily Macropodinae
Genus *Trichopsis*
Species *Trichopsis vittata* (Cuvier in Cuvier and Valenciennes, 1831)"

Size, Weight, and Age Range

From Froese and Pauly (2019):

"Max length : 7.0 cm SL male/unsexed; [Baird et al. 1999]; common length : 3.9 cm TL male/unsexed; [Hugg 1996]"

Environment

From Froese and Pauly (2019):

"Freshwater; demersal; pH range: 6.0 - 8.0; dH range: 5 - 19. […]; 22°C - 28°C [Riehl and Baensch 1991; assumed to be recommended aquarium temperature]"

From Noren et al. (2017):

"It is able to survive in brackish water up to 20 psu salinity, and in temperatures down to 7.2 °C (Schofield and Schulte 2016)."

Climate/Range

From Froese and Pauly (2019):

"Tropical"

Distribution Outside the United States

Native

From Froese and Pauly (2019):

"Asia: Thailand to Viet Nam and the islands of Sumatra, Borneo and Java."

From Low (2019):

"The species occurs widely in Java, Sumatra, Borneo (Kalimantan, Sarawak), the Malay Peninsula (Singapore, Peninsular Malaysia, southern Thailand), and the Mekong and Chao Phraya River drainages of Indochina."

Introduced

From Akash and Hossain (2017):

"The species [*Trichopsis vittata*] was first found in Bangladesh in 2012 (Hossain et al. 2012). Morphometric and morphomeristic attributes of feral specimens collected from Bangladesh have been documented (Islam 2014) and it was again reported by Hossain (2014)."

"Figure 2 and Table S1 [in source material] clearly denote the spread of *T. vittata* in Bangladesh over the last four years with a north-eastwardly colonization pattern."

From Knight and Balasubramanian (2015):

"During recent (April to June 2014) surveys of the water bodies around Chennai [India], we recorded two species, *Trichopsis vittata* and *Macropodus opercularis* belonging to the family Osphronemidae. Specimens of *Trichopsis vittata* […] were collected from an irrigation channel that conveys water from the Chembarampakkam Lake […]."

It is unknown if the collection in India represents an established population.

According to Froese and Pauly (2019), *T. vittata* has been reported as introduced to the Philippines but it is unknown if the population has become established.

Means of Introduction Outside the United States

From Akash and Hossain (2017):

"We opine that the establishment of *T. vittata* in the country is likely owing to aquaculture acting as an invasion vector."

From Knight and Balasubramanian (2015):

"There is an unconfirmed report of a well established non-native population in Dhaka, Bangladesh [has been confirmed since this publication] (Andrew Rao pers. com. 2014). The role of inter-basin water transfer playing a role in introducing non-native species into an ecosystem cannot be ruled out."

Short Description

From Froese and Pauly (2019):

"Anal spines: 6-8. Has 24-28 branched anal-fin rays; 13 transverse scale rows; and 2 or more stripes along the body [Rainboth 1996]. Anal fin with a few elongate, filament-like rays extending backwards almost to tip of caudal fin; black blotch above pectoral base [Kottelat 2001]."

Biology

From Froese and Pauly (2019):

"Found in flooded fields in the middle Mekong [Taki 1978]. Feed on zooplankton, crustaceans and insect larvae. Eggs sink to the bottom and were then collected by one or both parents and were embedded among the foam bubbles in the nest [Britz and Cambray 2001]. An air-breathing species [Huang et al. 2011]."

From Low (2019):

"The species occurs in a wide range of habitats, including freshwater marshes, ponds, lakes, peatlands, slow-flowing streams, floodplains, rice fields, irrigation canals and roadside ditches. It is partial to sluggish, open habitats with dense growths of submerged vegetation, and can tolerate a degree of anthropogenic disturbance and pollution (Linke, 1991, Ng and Tan 2005, Noren et al. 2017, pers. obs. B.W. Low 2012–2018)."

From Noren et al. (2017):

"The male is territorial and builds a small inconspicuous bubble nest among the vegetation, in which the eggs are deposited and guarded by the male until the larvae become free-swimming (Britz et al. 2001, Liengpornpan et al. 2006)."

From Ladich and Schleinzer (2015):

"[…] *Trichopsis vittata*, a freshwater fish from Southeast Asia possessing a highly specialized sound-generating mechanism found only in a single genus. The croaking gourami produces pulsed sounds by stretching and plucking two enhanced pectoral fin tendons during rapid pectoral fin beating. Croaking sounds typically consist of a series of double-pulsed bursts with main energies between 1 and 1.5 kHz."

From Bischof (1996):

"[…] *T. vittata* was the only species to utter croaks in series [Ladich et al., 1992a]."

Human Uses

From Low (2019):

"There is no targeted fishery for the species, but it is occasionally sold in markets as part of mixed catches. It is commonly seen in the aquarium trade (Noren et al. 2017)."

Diseases

No records of OIE-reportable diseases (OIE 2019) were found for *Trichopsis vittata*.

According to Poelen (2014), *Trichopsis vittata* is a host for *Heteronchocleidus bushkielli*, and *Paracapillaria philippinensis*.

According to Senapin et al. (2014), *T. vittata* is a host for *Euclinostomum* sp. infection.

Threat to Humans

From Froese and Pauly (2019):

"Harmless"

3 Impacts of Introductions

From Nico et al. (2019):

"The impacts of this species are currently unknown, as no studies have been done to determine how it has affected ecosystems in the invaded range. The absence of data does not equate to lack of effects. It does, however, mean that research is required to evaluate effects before conclusions can be made."

The following concerns *potential* impacts from introduction for *Trichopsis vittata*:

From Knight and Balasubramanian (2015):

"Though the ecological impacts of neither *Trichopsis vittata* or *Macropodus opercularis* have been documented, it is quite obvious that like *T. trichopterus*, they would also compete for niche space with native species such as *Trichogaster lalius* and *Pseudosphromenus cupanus* (Knight 2010b). As both *T. vittata* and *M. opercularis* are air-breathers and exhibit parental care, they will be able to ensure better survival of their young, even in stagnant and polluted water systems with high biological oxygen demand (BOD) where other fish species may not be able to survive and reproduce."

4 Global Distribution

Figure 1. Known global distribution of *Trichopsis vittata*. Locations are in Bangladesh, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, Indonesia, Sweden, and the United States Map from GBIF Secretariat (2019). The location in Sweden does not represent an established population, the specimen was purchased from a pet shop, and was not used to select source points for the climate match.

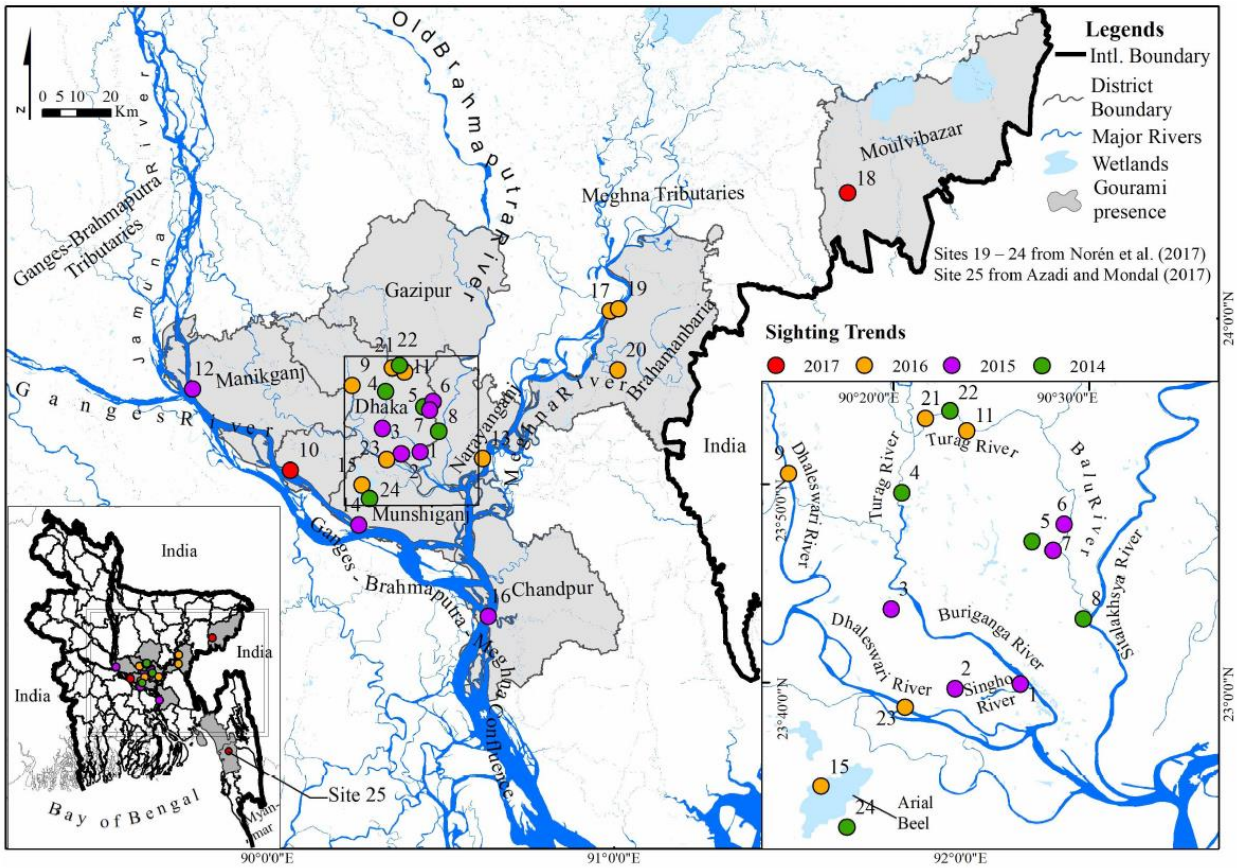

Figure 2. Known distribution of *Trichopsis vittata* in Bangladesh. Map from Akash and Hossain (2017; Figure 2), licensed under Creative Commons BY 4.0 International.

5 Distribution Within the United States

Figure 3. Known distribution of *Trichopsis vittata* in the United States. Map from Nico et al. (2019).

6 Climate Matching

Summary of Climate Matching Analysis

The climate match was low for most of the contiguous United States. Peninsular Florida has a high match. The southern Atlantic Coast had a medium match along with the Texas Gulf Coast and small areas of the Gulf Coast in Louisiana and Georgia. The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for contiguous United States was 0.018, medium (scores greater than 0.005, but less than 0.103, are classified as medium). The only State to receive a high individual Climate 6 score is Florida. Georgia, South Carolina, and Texas all received medium individual Climate 6 scores while all remaining States received low individual Climate 6 scores.

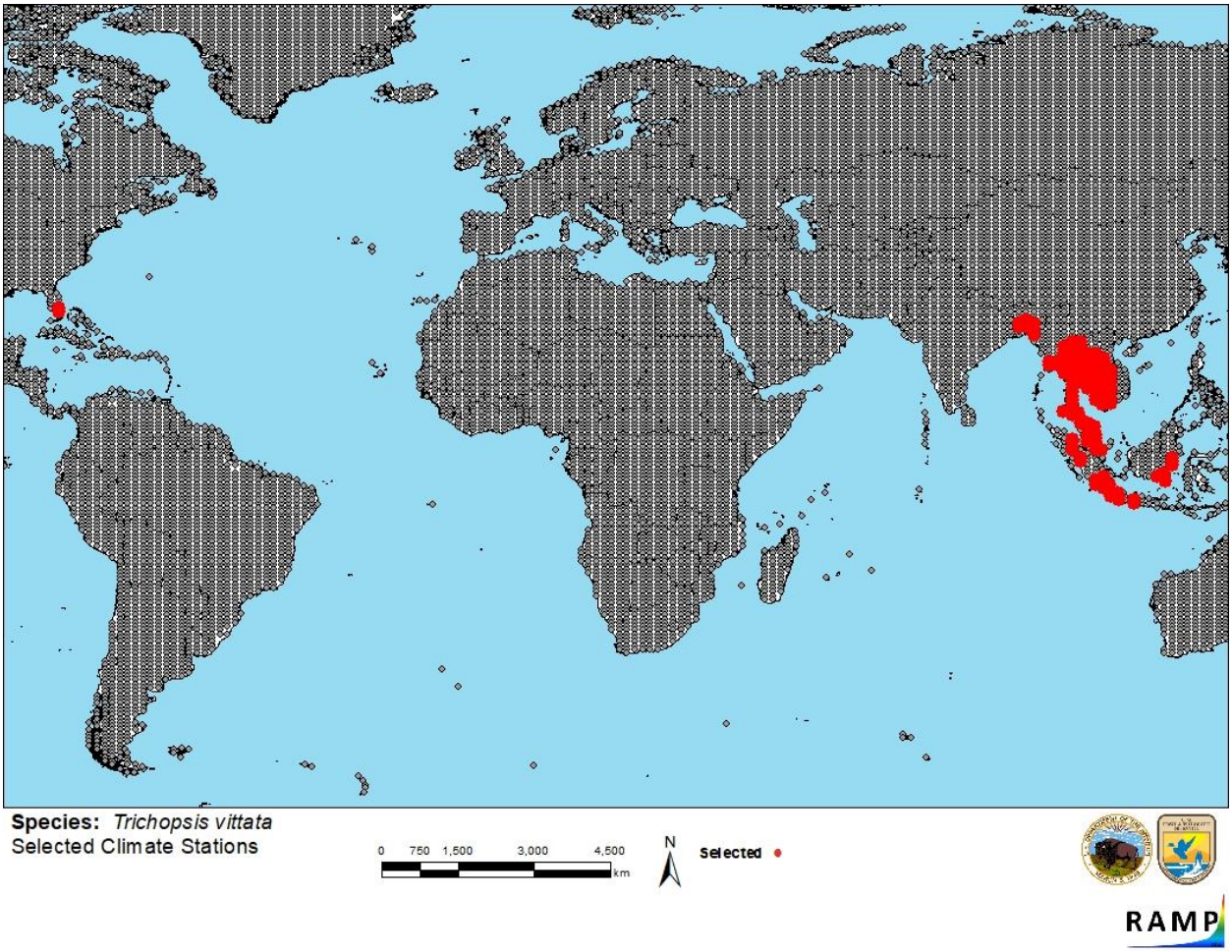

Figure 4. RAMP (Sanders et al. 2018) source map showing weather stations in Southeast Asia and in Florida in the United States selected as source locations (red; Bangladesh, India, Myanmar, Laos, Thailand, Cambodia, Vietnam, Malaysia, Indonesia, United States) and non-source locations (gray) for *Trichopsis vittata* climate matching. Source locations from Akash and Hossain (2017) and 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.

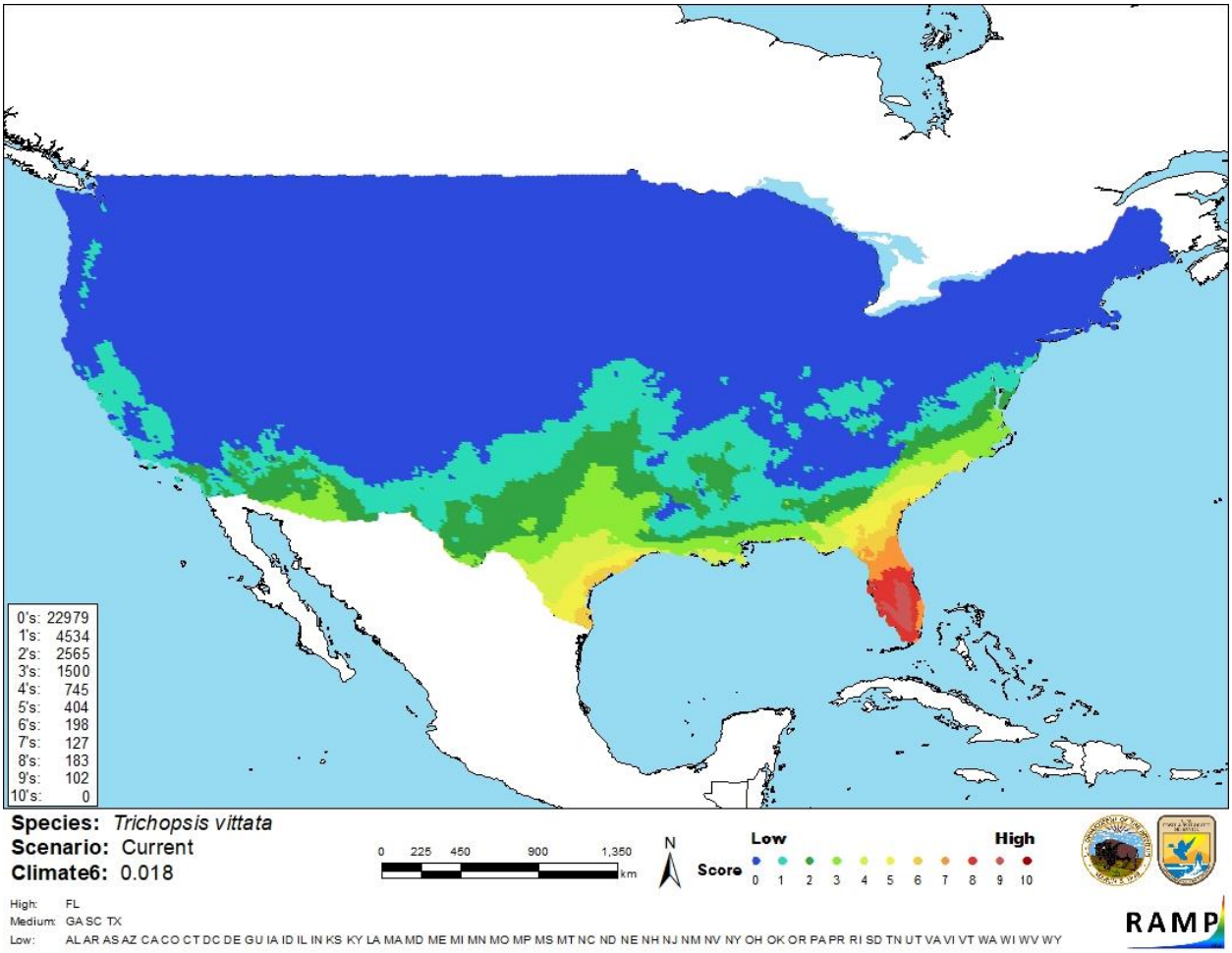

Figure 5. Map of RAMP (Sanders et al. 2018) climate matches for *Trichopsis vittata* in the contiguous United States based on source locations reported by Akash and Hossain (2017) and GBIF Secretariat (2019). 0 = Lowest match, 10 = Highest match.

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

7 Certainty of Assessment

The certainty of this assessment is low. There is an abundance of information available on the biology, environment and distribution of *Trichopsis vittata*. There are records of introduction and at least one established population. No information was found regarding actual impacts of introduction.

8 Risk Assessment

Summary of Risk to the Contiguous United States

The Croaking Gourami (*Trichopsis vittata*) is a freshwater fish native to Southeast Asia. Native to Cambodia, Laos, Malaysia, Myanmar, Singapore, Thailand, Vietnam, and Indonesia. *T. vittata* is a unique air-breathing fish that produces pulsed sounds by stretching and plucking their two enhanced pectoral fin tendons. This species is regularly found in the aquarium trade. Croaking Gourami have been introduced outside of their native range. *T. vittata* has become established in Florida in the United States where they were accidentally released from an aquarium fish farm. A non-native, established population is also present in Bangladesh and *T. vittata* has been reported as introduced in India and the Philippines but it is uncertain if these populations have become established. The overall climate match for the contiguous United States is medium. Florida and coastal Texas had a high match, much of the South Atlantic and Gulf Coasts had a medium match, and all remaining areas had a low match The certainty of assessment is low. The overall risk assessment category of *Trichopsis vittata* is uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 3): None Documented**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Remarks/Important additional information:** No additional information.
- **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.

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