

# Glass Knifefish (*Eigenmannia virescens*)

## Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, August 2017

Revised, December 2017

Web Version, 7/6/2018



Photo: Alex Giltjes. Licensed under the Creative Commons Attribution-Share Alike 3.0 Unported, 2.5 Generic, 2.0 Generic and 1.0 Generic license. Available: [https://commons.wikimedia.org/wiki/File:Eigenmannia\\_lineata.JPG](https://commons.wikimedia.org/wiki/File:Eigenmannia_lineata.JPG). (December 2017).

## 1 Native Range and Status in the United States

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### Native Range

From Froese and Pauly (2017):

“South America: widely distributed east of the Andes from the Orinoco [Colombia and Venezuela] to the La Plata River [Argentina] basins.”

## Status in the United States

This species has not been reported as introduced or established in the United States. Trade in *E. virescens* may occur at times in the United States but does not appear to be currently active.

From Live Fish Direct (2017):

“There are currently no Glass Knife available. Please check back later.”

From WorldWide Fish and Pets (2017):

“4” Glass Knifefish  
\$8.99  
[...]  
Out of stock”

From Doctors Foster and Smith (2017):

“Glass Knifefish  
Out of Stock”

## Means of Introductions in the United States

Introductions of this species have not been reported in the United States.

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2017):

“Kingdom Animalia  
  Subkingdom Bilateria  
    Infrakingdom Deuterostomia  
      Phylum Chordata  
        Subphylum Vertebrata  
          Infraphylum Gnathostomata  
            Superclass Actinopterygii  
              Class Teleostei  
                Superorder Ostariophysii  
                  Order Gymnotiformes  
                    Suborder Sternopygoidei  
                      Family Sternopygidae  
                        Genus *Eigenmannia*  
                          Species *Eigenmannia virescens* (Valenciennes, 1842)”

“Current standing: valid”

## **Size, Weight, and Age Range**

From Froese and Pauly (2017):

“Maturity:  $L_m$  11.0, range 11 - ? cm;

Max length: 44.0 cm SL male/unsexed; [Zuluaga-Gomez et al. 2014]; max. published weight: 113.60 g [Mendonça et al. 2015]”

## **Environment**

From Froese and Pauly (2017):

“Freshwater; benthopelagic; pH range: 6.0 - 7.0; dH range: 2 - 15.”

“[...] 20°C - 30°C [Baensch and Riehl 1995, assumed to be recommended aquarium water temperatures]”

“This gymnotiform fish can be found in colder waters of 18°C [Møller 1995].”

## **Climate/Range**

From Froese and Pauly (2017):

“Subtropical [...]”

## **Distribution Outside the United States**

Native

From Froese and Pauly (2017):

“South America: widely distributed east of the Andes from the Orinoco to the La Plata River basins.”

Introduced

No introductions reported.

## **Means of Introduction Outside the United States**

No introductions reported.

## **Short Description**

From Childs et al. (2015):

“They have a lifespan of about 3 - 6 years. The semi-transparent body of the Glass Knife Fish, occasionally with a tint of green, is flat and elongated. They don't have a dorsal fin or a caudal fin, but there is a continuous fin along the underside that moves with an undulating motion. It can be difficult to see this rippling anal fin which provides their means of locomotion. Because

their bodies are relatively stiff and their fins and much of their bodies are transparent, they appear to be jet propelled.”

## **Biology**

From Froese and Pauly (2017):

“Known to be gregarious, timid and nocturnal [Boujard et al. 1997]. Prefers deep still waters [Loureiro and Silva 2006]. Found in ponds [Cordiviola de Yuan and Pignalberi de Hassan 1985] and creeks with a substrate rich in plant debris [Planquette et al. 1996]. [...] Electric organ discharge (EOD) frequency cues have been experimentally shown to play a role in species and sex recognition in this species [Hopkins 1974]. Playback of a conspecific male's electric courtship display elicited spawning in ripe females. Diel rhythmic change in EOD may be manifested by the increase in EOD amplitude at night among dominant breeding males as they compete with other conspecifics [Hagedorn and Heiligenberg 1985]. A fractional spawner; fecundity reported at 905 eggs [Kirschbaum 1995]. Males reportedly reach 45 cm TL, females to 20 cm TL [Riehl and Baensch 1991].”

From Childs et al. (2015):

“This fish has an electric organ which allows it to generate a very weak electric field around its body. The field helps with a variety of things such as identifying objects in the water, gives it spatial orientation, helps it to navigate, and helps it identify food. Males use an electric 'stereotyped' communication to court females.”

## **Human Uses**

From Froese and Pauly (2017):

“Fisheries: of no interest; aquarium: commercial.”

## **Diseases**

From Froese and Pauly (2017):

“Enteric Septicaemia of Catfish, Parasitic infestations (protozoa, worms, etc.)”

From Kent and Hoffman (1984):

“Two new species of Myxozoa from the brain of the green knife fish *Eigemannia [sic] virescens* are described: *Myxobolus inaequus* sp. n. has an unusually large spore body and extremely unequal polar capsules, and *Henneguya theca* sp. n. has an attenuated spore encased in a sheath not previously described in other Myxozoa. Only spores of the two species were observed, and infections caused no obvious pathological changes in the brain.”

From Ostrowski de Núñez (2011):

“Two new species of the cryptogonimid genus *Parspina* Pearse, 1920 are described from gymnotiform fishes of the Paraná River basin [including] *P. virescens* n. sp. from the glass knifefish *Eigenmannia virescens* (Valenciennes). [...] Species of the Cryptogonimidae Ward, 1917 are largely present in the intestine or pyloric caeca of marine and freshwater fishes, reptiles and, more rarely, amphibians.”

From Mizelle et al. (1968):

“*Urocleidoides virescens* sp. n. (Figs. 81-88)

Host and locality: *Eigenmannia virescens* (Valenciennes), Gymnotidae; Laget Sao Paulo, muddy pond near Ourem, Para, Brazil, S. A.

Location on host: Gills.”

No OIE-reportable diseases have been documented for this species.

### Threat to Humans

From Froese and Pauly (2017):

“Harmless”

## 3 Impacts of Introductions

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No information available. No introductions reported for this species.

## 4 Global Distribution

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**Figure 1.** Global distribution of *Eigenmannia virescens*, reported from South America. Map from GBIF (2017).

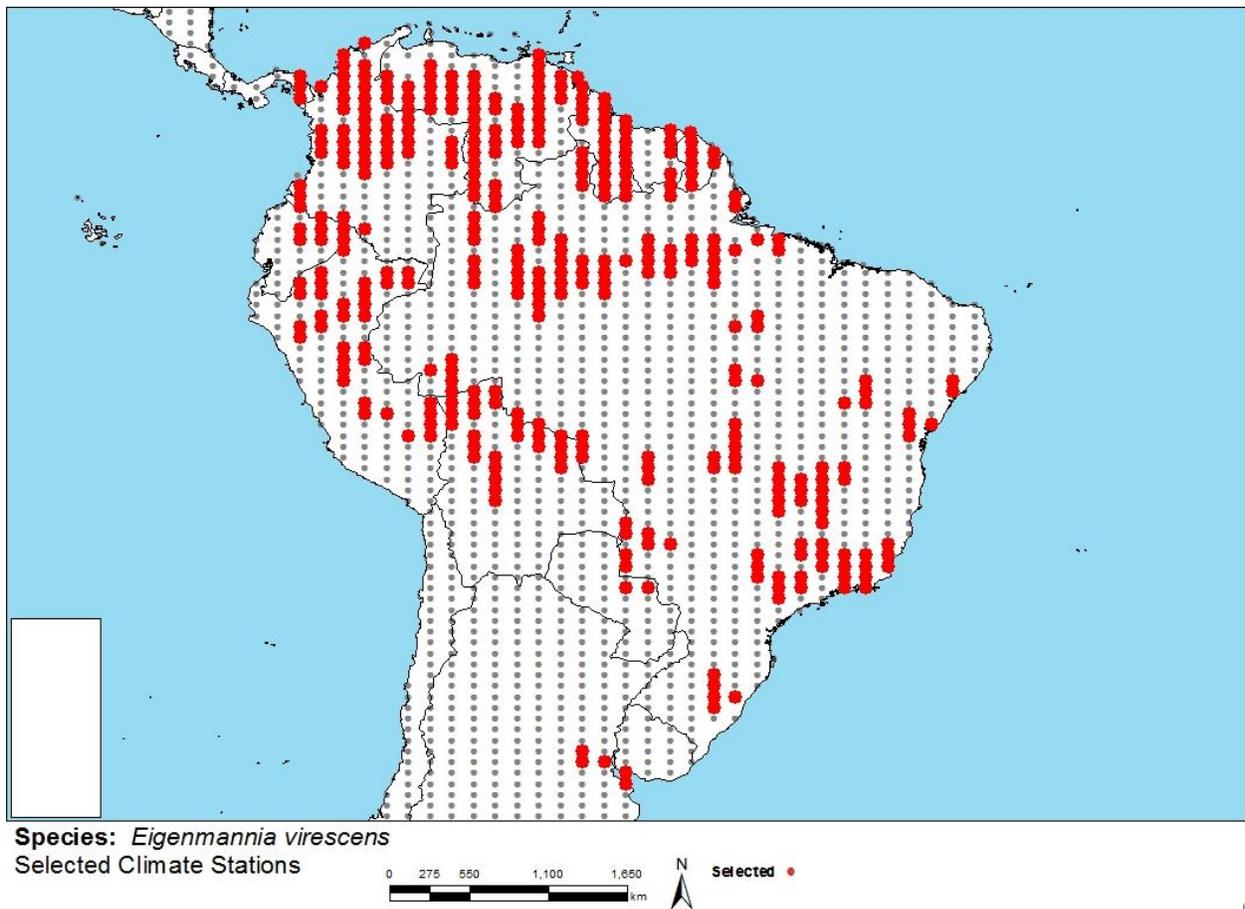
## 5 Distribution Within the United States

This species has not been reported as introduced or established in the United States.

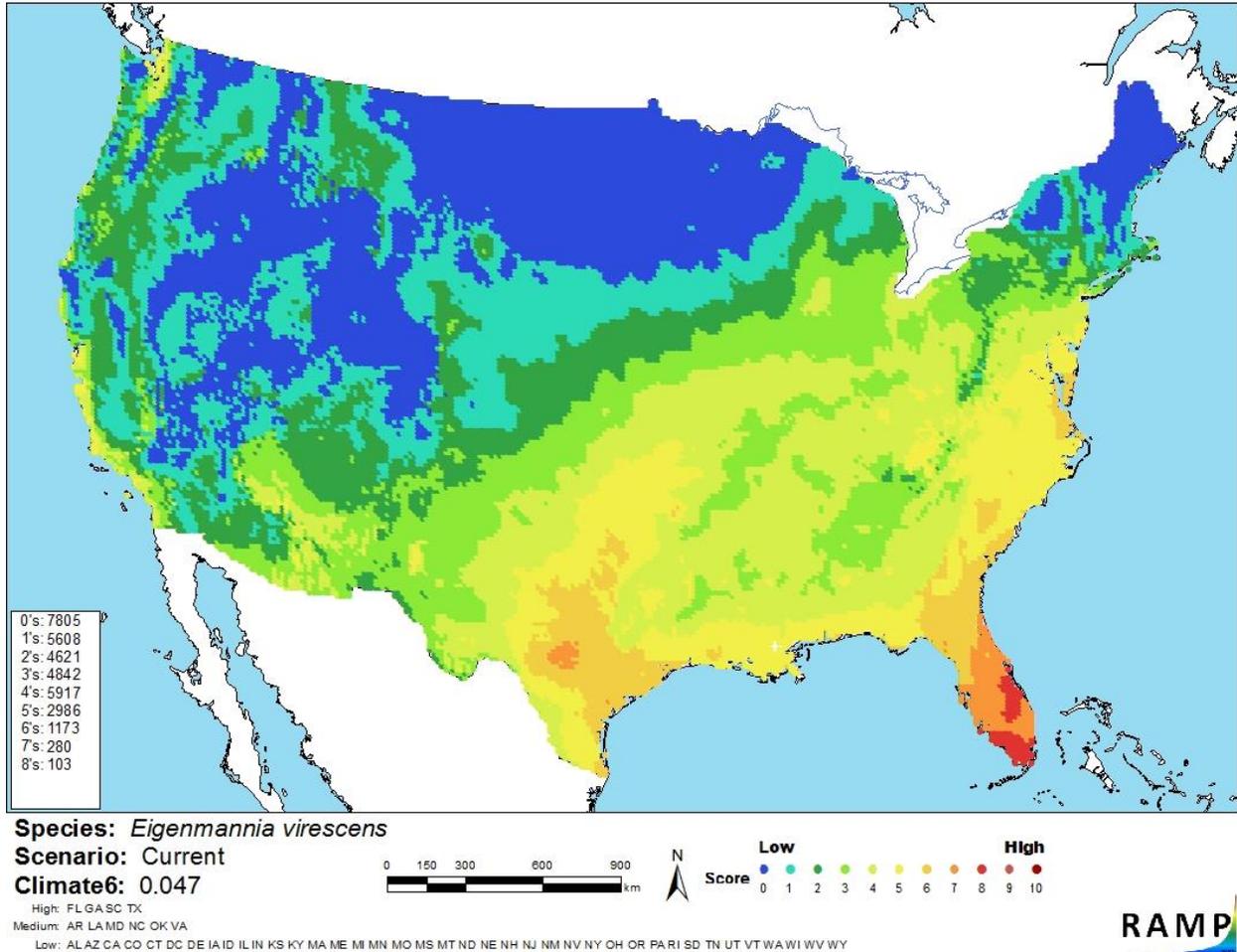
## 6 Climate Matching

### Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2014; 16 climate variables; Euclidean distance) for *Eigenmannia virescens* and the contiguous U.S. was 0.047, which is categorized as an overall medium climate match. Locally, climate matches were high in peninsular Florida. Medium matches were found in the southeastern U.S., extending as far north as Maryland and as far west as Texas. Medium matches also occurred along parts of the Pacific coastline in Washington and California. The Northeast, Upper Midwest, and much of the West showed low matches.



**Figure 2.** RAMP (Sanders et al. 2014) source map showing weather stations in South America selected as source locations (red; Panama, Colombia, Venezuela, Guyana, French Guiana, Suriname, Brazil, Ecuador, Peru, Bolivia, Paraguay, Uruguay, Argentina) and non-source locations (gray) for *Eigenmannia virescens* climate matching. Source locations from GBIF (2017).



**Figure 3.** Map of RAMP (Sanders et al. 2014) climate matches for *Eigenmannia virescens* in the contiguous United States based on source locations reported by GBIF (2017). 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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
$\geq 0.103$	High

## 7 Certainty of Assessment

The biology and ecology of *Eigenmannia virescens* is moderately known. *Eigenmannia virescens* has never been introduced outside of its native range. Due to the lack of information on the species and potential impacts of introduction, the certainty of this assessment is low.

## 8 Risk Assessment

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### Summary of Risk to the Contiguous United States

*Eigenmannia virescens* is widespread east of the Andes in South America, with the native range extending from the Orinoco River basin in Columbia and Venezuela to the La Plata River basin in Argentina. *E. virescens* has a medium climate match in the United States. The species is listed on the websites of several U.S.-based aquarium suppliers, but no websites were actively selling the species currently. No introductions have been reported, and without information on introductions or establishments outside of its native range, the potential impacts of establishment of *Eigenmannia virescens* in the contiguous United States are impossible to discern. The overall risk of this species is uncertain.

### Assessment Elements

- **History of Invasiveness (Sec. 3): Uncertain**
- **Climate Match (Sec. 6): Medium**
- **Certainty of Assessment (Sec. 7): Low**
- **Overall Risk Assessment Category: Uncertain**

## 9 References

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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.**

Childs, K., C. Brough, and J. Roche. 2015. Glass Knife Fish. Animal-World Pet and Animal Information. Available: <http://animal-world.com/encyclo/fresh/Knifefish/GlassKnifefish.php#Description>. (August 2017).

Doctors Foster and Smith. 2017. Tropical fish for freshwater aquariums: glass knifefish. LiveAquaria, Rhinelander, Wisconsin. Available: <http://www.liveaquaria.com/product/2688/?pcatid=2688>. (December 2017).

Froese, R., and D. Pauly, editors. 2017. *Eigenmannia virescens*, Valenciennes. FishBase. Available: <http://www.fishbase.org/summary/Eigenmannia-virescens.html>. (July 2017, December 2017).

GBIF (Global Biodiversity Information Facility). 2017. GBIF backbone taxonomy: *Eigenmannia virescens*, Valenciennes. Global Biodiversity Information Facility, Copenhagen. Available: <https://demo.gbif.org/species/2402039>. (July 2017).

ITIS (Integrated Taxonomic Information System). 2017. *Eigenmannia virescens*, Valenciennes. Integrated Taxonomic Information System, Reston, Virginia. Available: <https://www.itis.gov/servlet/SingleRpt/SingleRpt#null>. (July 2017).

- Kent, M. L., and G. L. Hoffman. 1984. Two new species of Myxozoa, *Myxobolus inaequus* sp. n. and *Henneguya theca* sp. n. from the brain of a South American knife fish, *Eigenmannia virescens* (V.). *Journal of Protozoology* 31(1):91-94.
- Live Fish Direct. 2017. Buy live Glass Knife *Eigenmannia virescens*. Live Fish Direct, Draper, Utah. Available: <https://www.livefishdirect.com/store.php?fid=1058>. (December 2017).
- Mizelle, J. D., D. C. Kritsky, and J. W. Crane. 1968. Studies on monogenetic trematodes. XXXVIII. Ancyrocephalinae from South America with the proposal of *Jainus* gen. n. *American Midland Naturalist* 80(1):186-198.
- Ostrowski de Núñez, M. C., N. J. Arredondo, and A. A. Gil de Pertierra. 2011. Two new species of *Parspina* Pearse, 1920 (Digenea: Cryptogonimidae) from freshwater fishes (Gymnotiformes) of the Paraná River basin in Argentina. *Systematic Parasitology* 80:67-79.
- Sanders, S., C. Castiglione, and M. H. Hoff. 2014. Risk Assessment Mapping Program: RAMP. U.S. Fish and Wildlife Service.
- WorldWide Fish and Pets. 2017. Buy glass knifefish online. WorldWide Fish and Pets, New Haven, Connecticut. Available: <https://www.worldwidefishandpets.com/product/4-glass-knifefish/?v=7516fd43adaa>. (December 2017).

## 10 References Quoted But Not Accessed

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**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. 1995. *Aquarien Atlas*, volume 4. Mergus Verlag GmbH, Verlag für Natur-und Heimtierkunde, Melle, Germany.
- Boujard, T., M. Pascal, F. J. Meunier, and P. -Y. Le Bail. 1997. *Poissons de Guyane. Guide écologique de l'Approuague et de la réserve des Nouragues*. Institut National de la Recherche Agronomique, Paris.
- Cordiviola de Yuan, E., and C. Pignalberi de Hassan. 1985. Fish population in the Paraná River: lentic environments of Diamante and San Pedro areas (Argentine Republic). *Hydrobiologia* 127:213-218.
- Hagedorn, M., and W. Heiligenberg. 1985. Court and spark: electric signals in the courtship and mating of of gymnotoid fish. *Animal Behaviour* 33:254-265.
- Hopkins, C. D. 1974. Electric communication: functions in the social behavior of *Eigenmannia virescens*. *Behaviour* 50:270-305.

- Kirschbaum, F. 1995. Reproduction and development in mormyriiform and gymnotiform fishes.. Pages 267-301 in P. Moller, editor. Electric fishes: history and behavior. Fish and Fisheries Series 117. Chapman & Hall, London.
- Loureiro, M., and A. Silva. 2006. A new species of *Brachyhypopomus* (Gymnotiformes, Hypopomidae) from Northeast Uruguay. *Copeia* 4:665-673.
- Mendonça, H. S., D. S. Silva-Camacho, S. M. Pinto, and F. G. Araújo. 2015. Length-weight relationships of 14 fish species from a lowland tropical reservoir in southeastern Brazil. *Journal of Applied Ichthyology* 31:970-972.
- Møller, P. R. 1995. Electric fishes: history and behavior. Chapman & Hall, London.
- Planquette, P., P. Keith, and P. -Y. Le Bail. 1996. Atlas des poissons d'eau douce de Guyane, volume 1. Collection du Patrimoine Naturel volume 22, MNHN, Paris & INRA, Paris.
- Riehl, R., and H. A. Baensch. 1991. Aquarien Atlas, volume 1. Mergus, Verlag für Natur-und Heimtierkunde, Melle, Germany.
- Zuluaga-Gómez, A., T. Giarrizzo, M. Andrade, and A. Arango-Rojas. 2014. Length-weight relationships of 33 selected fish species from the Cauca River Basin, trans-Andean region, Colombia. *Journal of Applied Ichthyology* 30:1077-1080.