

# Yucatan Molly (*Poecilia velifera*)

## Ecological Risk Screening Summary

U.S. Fish and Wildlife Service, May 2011

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<https://www.inaturalist.org/observations/1752203>. (January 2018).

## 1 Native Range and Status in the United States

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### Native Range

From Froese and Pauly (2017):

“Central America: Yucatán-Quintana Roo and lower Usumacinta-Laguna de Términos systems in Mexico.”

### Status in the United States

Non-hybridized *Poecilia velifera* has not been reported as introduced or established in the wild in the United States.

From Neilson and Loftus (2018):

“Hybrid black mollies [*Poecilia latipinna* x *velifera*] have been collected in Brevard, Hillsborough, Palm Beach, and Polk counties, Florida (Buntz and Chapman 1970; Courtenay et al. 1974); Falls Creek, Madison County, Indiana (pers. comm.); and in Big Spring, Nye County, Nevada (LaRivers 1962).”

“Status: Unknown (but likely failed) in most locations. Shafland et al. (2008) do not mention this [*Poecilia latipinna* x *velifera*] as a permanently established species in Florida.”

According to the USGS Nonindigenous Aquatic Species Database point map (Neilson and Loftus 2018), hybrid *Poecilia latipinna* x *velifera* is established in Nevada and Florida.

*P. velifera* is in trade in the United States. For example:

From That Fish Place (2017):

“Assorted Sailfin Molly - *Poecilia velifera* [...] Only \$2.99”

## Means of Introductions in the United States

From Neilson and Loftus (2018):

“Likely aquarium release or escape from tropical fish farms.”

This refers to *Poecilia latipinna* x *velifera*.

## Remarks

From Neilson and Loftus (2018):

“There are many hybrid varieties of several different *Poecilia* species (including *P. latipinna*, *P. mexicana*, *P. spheonops*, and *P. velifera*) that are collectively known as 'black mollies'. Also, *P. latipinna* produces semi-melanistic individuals in its native range.”

## 2 Biology and Ecology

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### Taxonomic Hierarchy and Taxonomic Standing

From ITIS (2018):

“Kingdom Animalia  
Subkingdom Bilateria  
Infrakingdom Deuterostomia  
Phylum Chordata  
Subphylum Vertebrata  
Infraphylum Gnathostomata

Superclass Actinopterygii  
Class Teleostei  
Superorder Acanthopterygii  
Order Cyprinodontiformes  
Suborder Cyprinodontoidae  
Family Poeciliidae  
Subfamily Poeciliinae  
Genus *Poecilia*  
Species *Poecilia velifera* (Regan, 1914)”

From Eschmeyer et al. (2018):

“Current status: Valid as *Poecilia velifera* (Regan 1914). Poeciliidae: Poeciliinae.”

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

From Froese and Pauly (2017)

“Max length : 15.0 cm TL male/unsexed; [Lucinda 2003]”

From Sa-nguansil and Lheknim (2010):

“The smallest *Poecilia velifera* considered mature consisted of a male 16.8 mm SL and a female 17.1 mm SL. The largest individuals in our samples were a male 62.3 SL mm and a female 69.8 mm SL. Average SL of sexually mature males and females were  $34.3 \pm 0.3$  and  $39.0 \pm 0.2$  mm (mean  $\pm$  S.E.;  $n_{\text{males}}=1080$ ;  $n_{\text{females}} = 1655$ ).”

## **Environment**

From Froese and Pauly (2017):

“Freshwater; brackish; benthopelagic; pH range: 8.0 - 8.0; dH range: 13 - 19; [...] 25°C - 28°C [Riehl and Baensch 1991; assumed to be recommended aquarium temperatures];”

## **Climate/Range**

From Froese and Pauly (2017):

“Tropical; [...] 21°N - 16°N, 97°W - 86°W”

## **Distribution Outside the United States**

Native

From Froese and Pauly (2017):

“Central America: Yucatán-Quintana Roo and lower Usumacinta-Laguna de Términos systems in Mexico.”

## Introduced

From Sa-nguansil and Lheknim (2010):

“There are confirmed and unconfirmed reports of non-native *P. velifera*, or possible hybrids, as collected or observed at one or more sites in [...] South America: Brazil, Colombia and Peru; Asia: Israel, Singapore, Taiwan, Vietnam and Thailand (Welcomme 1988; Ng et al. 1993; Fuller et al. 1999; Shen 1993; Kuo et al. 1999; Golani 2000; Magalhães et al. 2002; Vidthayanon and Premcharoen 2002; Welcomme and Vidthayanon 2003; Ortega et al. 2007). Some, not all, represent established populations [...]”

According to Froese and Pauly (2019), *P. velifera* is introduced and established in Colombia, Israel, Vietnam, and Thailand; introduced and probably established in Singapore; and introduced with unknown status in Taiwan.

## Means of Introduction Outside the United States

From Sa-nguansil and Lheknim (2010):

“It has been introduced to many countries around the world via the aquarium fish trade and also as a biological control agent for insects, especially mosquitoes (Courtenay and Meffe 1989; Lever 1996).”

“*Poecilia velifera* was reportedly first imported into Thailand in ca. 1960 via the aquarium trade (Welcomme and Vidthayanon 2003). Additional stocks were brought into Thailand from Taiwan in 1987 for controlling algal flocs in shrimp ponds in the estuary mouth of the Chao Phraya River (Welcomme and Vidthayanon 2003). As a result, a flourishing wild population was reported in 2002 (as *Poecilia sphenops* Valenciennes, 1846) in a brackish water system of the Chao Phraya River, central Thailand (Vidthayanon and Premcharoen 2002; Nico et al. 2007).”

According to Sa-nguansil and Lheknim (2010), *P. velifera* has been used as a biological control agent for insects and algae.

## Short Description

From Regan (1914):

“Depth of body  $2\frac{1}{2}$  to 3 in the length, length of head  $3\frac{1}{2}$  to  $3\frac{4}{5}$ . Diameter of eye  $3\frac{1}{2}$  in the length of head, interorbital width 2. 27 scales in a longitudinal series. Dorsal 18-19; base a little longer than distance from end of snout (♀) or  $1\frac{2}{3}$  to twice that distance (♂); longest rays  $\frac{4}{5}$  (♀) or  $1\frac{2}{3}$  to 2 (♂) as long as head. Anal 10. Pectoral as long as head; pelvics reaching origin of anal (♀) or with the second ray produced and as long as the intromittent organ (♂). Caudal rounded (♀) or with the lower angle somewhat produced (♂). Least depth of caudal peduncle a little less than length of head. Olivaceous; 3 or 4 dark bars almost covered by the pectoral fins; back and sides with dark brown longitudinal stripes, broader ones along and narrower ones between the series of scales; series of pearl-like white spots between the stripes, 2 spots on each scale; these markings much more conspicuous in the male. Dorsal fin dark, with numerous pale spots; in males a series of more or less distinct large dark spots in the distal part of the fin; caudal

nearly immaculate (♀) or the upper  $\frac{2}{3}$  with dark and pale spots and the lower  $\frac{1}{3}$  plain, black-edged (♂).”

## Biology

From Froese and Pauly (2017):

“Feeds on worms, crustaceans, insects and plant matter [Mills and Vevers 1989].”

From Sa-nguansil and Lheknim (2010):

“Although *Poecilia velifera* has been widely introduced, there is no information on the reproductive biology of the introduced populations (e.g., sex ratio, size at maturity, fecundity) and little is known even about native populations. This information is important because poeciliids usually exhibit great phenotypic plasticity, the environment having a big influence on its phenotype (Reznick and Miles [1989]; Trexler 1989). Therefore, the life history traits of this fish are expected to differ from place to place.”

“During our study, *Poecilia velifera* was found to occupy near-shore shallow water, not more than 1 m deep. The preferred habitats were sheltered areas such as mangroves, flooded grassland, canals in shrimp ponds, and shallow lakesides with garbage [...].”

From Hankison et al. (2006):

“*P. velifera* is restricted to coastal habitats, such as anchialine cenotes, tidal pools and salt marshes, never higher than c. 20 m above sea level, [...].”

## Human Uses

From Froese and Pauly (2017):

“Fisheries: of no interest; aquarium: commercial”

According to Sa-nguansil and Lheknim (2010), *P. velifera* has been used as a biological control agent for insects and algae.

*P. velifera* is in trade in the United States. For example:

From That Fish Place (2017):

“Assorted Sailfin Molly - *Poecilia velifera* [...] Only \$2.99”

## Diseases

No OIE-listed diseases (OIE 2019) have been documented for this species.

Poelen et al. (2014) list the following as parasites of *Poecilia velifera*: *Saccocoelioides sogandaresi*, *Atrophecaecum astorquii*, *Ascocotyle diminuta*, *Ascocotyle tenuicollis*,

*Stunkardiella minima*, *Clinostomum complanatum*, *Posthodiplostomum minimum*, *Ascocotyle macrostoma*, *Ascocotyle megalcephala*, *Ascocotyle nana*, *Proteocephalus brooksi*, and *Ascocotyle mollieniscicola* (Strona et al. 2013).

## Threat to Humans

From Froese and Pauly (2017):

“Harmless”

## 3 Impacts of Introductions

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From Sa-nguansil and Lheknim (2010):

“Although the impact of non-native *Poecilia velifera* on an ecosystem is not clearly understood, potential ecological effects may result from predation and competition for food and space.”

## 4 Global Distribution

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**Figure 1.** Known global distribution of *Poecilia velifera*. Map from GBIF Secretariat (2018). Point in Italy was excluded from climate match analysis because the specimen was collected in a stream near a hot spring. Point in India was excluded because records appeared to be those of aquarium specimens.

## 5 Distribution Within the United States

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Non-hybridized *Poecilia velifera* has not been reported as introduced or established in the wild in the United States. However, there are reports of introduced hybrid *P. latipinna x velifera*, as shown below.

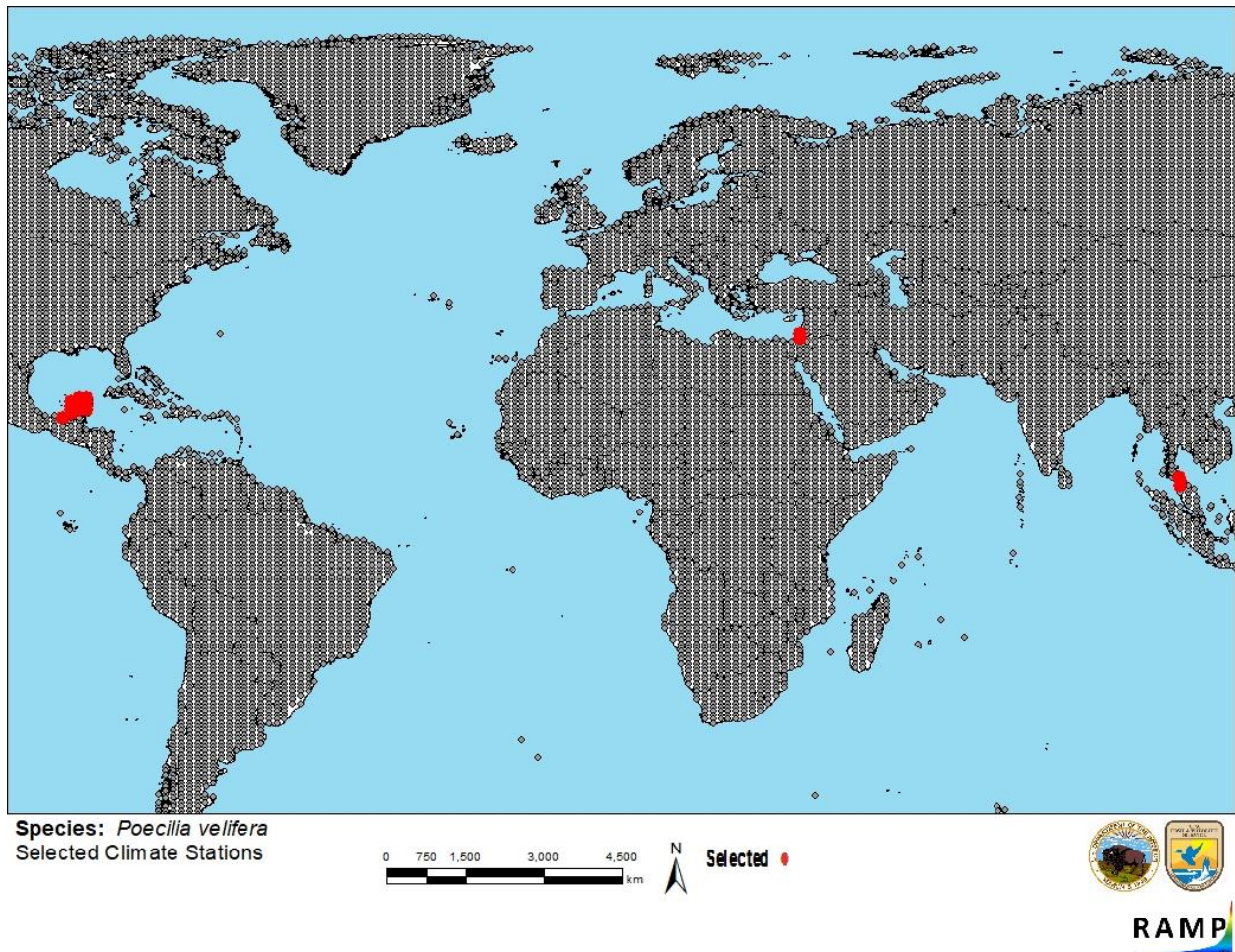


**Figure 2.** Known distribution of *Poecilia latipinna x velifera* in the United States. Map from Neilson and Loftus (2018). Yellow diamonds represent established populations; the orange diamond in Indiana represents a failed population. Because these points represent a hybrid molly species, they were not included in climate match analysis.

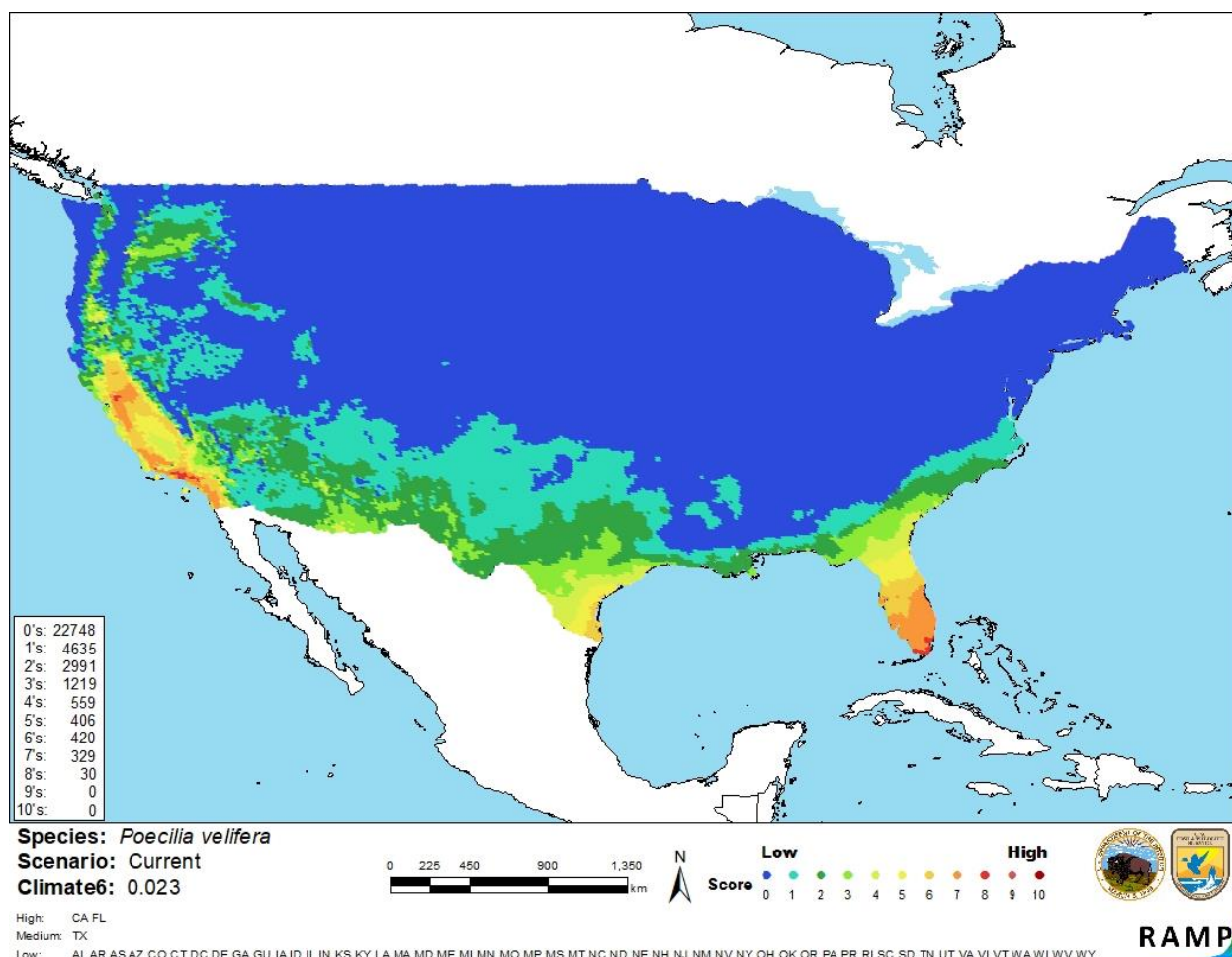
## 6 Climate Matching

### Summary of Climate Matching Analysis

The Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.023, which is a medium climate match. (Scores between 0.005 and 0.103 are classified as medium.) The climate score was high in Florida and California, and Texas had a medium score. All other States had a low Climate 6 score. Locally, Florida had a high climate match in the southern part of the State and a medium match in the north. Southern Texas had a medium climate match, and California had a mix of high and medium matches. There were areas of medium-low climate match throughout the Southern, Southwestern, and Northwestern United States.



**Figure 3.** RAMP (Sanders et al. 2018) source map showing weather stations selected as source locations (red; Mexico, Israel, Thailand) and non-source locations (gray) for *Poecilia velifera* climate matching. Source locations from GBIF Secretariat (2018) and Sa-nguansil and Lheknim (2010).



**Figure 4.** Map of RAMP (Sanders et al. 2014) climate matches for *Poecilia velifera* in the contiguous United States based on source locations reported by GBIF Secretariat (2018) and Sanguansil and Lheknim (2010). 0=Lowest match, 10=Highest match.

The “High”, “Medium”, and “Low” climate match categories are based on the following table:

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

## 7 Certainty of Assessment

There is little information available on the biology of *Poecilia velifera*. This species has been introduced outside of its native range, but impacts of its introduction in those countries have not been documented. Further information is necessary to adequately assess the risk this species poses to the contiguous United States. Certainty of this assessment is low.

## 8 Risk Assessment

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### Summary of Risk to the Contiguous United States

*Poecilia velifera*, the Yucatan Molly, is a species of poeciliid native to Mexico that is utilized worldwide in the aquarium trade. In some areas, it has been used to control pest species. *P. velifera* has been introduced to South America, Europe, and Asia; it is established in Colombia, Israel, Vietnam, and Thailand. There have been no adverse impacts reported from these introductions. History of invasiveness is classified as “none documented.” This species has not been introduced to the United States, but a hybrid of *Poecilia latipinna* and *Poecilia velifera* is established in California and Florida. These two states have a high climate match with *Poecilia velifera*, which has a medium climate match overall with the contiguous United States. Further information on impacts of introductions of *P. velifera* is necessary to adequately assess the risk this species poses to the contiguous United States. Certainty of this assessment is low, and the overall risk assessment category 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: Hybrid of *Poecilia latipinna* and *Poecilia velifera* is established in the United States.**
- **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.**

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## 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.**

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