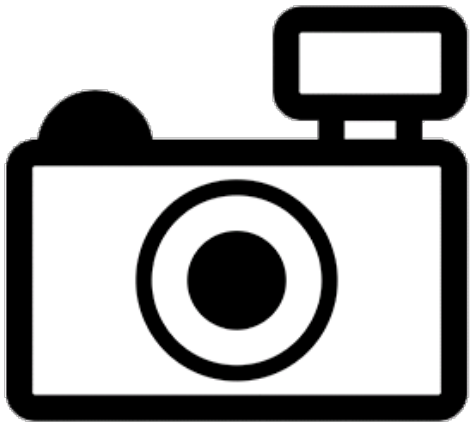
Ludwigia inclinata (a plant, no common name)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, March 2022
Revised, June 2022
Web Version, 8/10/2022

Organism Type: Plant
Overall Risk Assessment Category: Uncertain



1 Native Range and Status in the United States

Native Range

From Prado et al. (1994):

"It is known from Mexico and the West Indies southward throughout most of Brazil (MUNZ, 1947)."

From POWO (2022):

"[…] its [*Ludwigia inclinata*] native range is S. Mexico to Tropical America."

According to POWO (2022), *Ludwigia inclinata* is native to Bolivia, Brazil, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panamá, Peru, Suriname, and Venezuela.

Status in the United States

No records of introduction to the wild of *Ludwigia inclinata* in the United States were found.

L. inclinata is in trade within the United States (e.g. Amazon 2022; Buce Plant 2022; DustinsFishtanks 2022).

Means of Introductions in the United States

This species is not currently known to be introduced to and spread within the United States.

Remarks

The basionym for this species is *Jussiaea inclinata* L.fil (GBIF Secretariat 2022).

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to World Flora Online (2022), *Ludwigia inclinata* (L.f.) M.Gómez is the accepted name for this species.

From CABI (2019):

Domain: Eukaryota
Kingdom: Plantae
Phylum: Spermatophyta
Subphylum: Angiospermae
Class: Dicotyledonae
Order: Myrtales
Family: Onagraceae
Genus: *Ludwigia*
Species: *Ludwigia inclinata*

Size, Weight, and Age Range

From Buce Plant (2022):

“Height: 6-20””

Environment

From Buce Plant (2022):

“pH: 5.0-8.0”

From JD Aquatics (2022):

“Temp: 18c-30c [assumed to be recommended aquarium temperature]”

From Pott and Pott (2004):

"Some species are exclusive to […] seasonal streams (e.g. *Ludwigia inclinata* (L. f.) Raven […]"

Climate

This species persists in altitudes of 100-700 meters above sea level (GBIF Secretariat 2022).

Distribution Outside the United States

Native

From Prado et al. (1994):

"It is known from Mexico and the West Indies southward throughout most of Brazil (MUNZ, 1947)."

From POWO (2022):

"[…] its [*Ludwigia inclinata*] native range is S. Mexico to Tropical America."

According to POWO (2022), *Ludwigia inclinata* is native to Bolivia, Brazil, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Nicaragua, Panamá, Peru, Suriname, and Venezuela.

Introduced

Ludwigia inclinata is recorded as present in United Kingdom (CABI 2019) but this was not corroborated elsewhere in the literature and no georeferenced observations were found.

Means of Introduction Outside the United States

No information on means of introduction outside the United States was found.

Short Description

From Buce Plant (2022):

"Ludwigia Inclinata [sic] is a beautiful plant with exceptional gold and red leaves that make a dramatic contrast to the usual green foliage. […] L. Inclinata [sic] plants have oblong, rounded leaves with a wavy texture that grow in opposite pairs along the length of the stem."

From Prado et al. (1994):

"*L. inclinata*, which grows underwater during the flood period but also develops a terrestrial form during the dry periods, […]. Generally, the aquatic form of *L. inclinata* develops rapidly during the *enchente* [flood] and *cheia* [full]. It forms submerged beds of long, wavy, red leaves. Flowering is most intense during *vazante* [ebb], when short stems bearing leaves with typical characteristics of the terrestrial form appear above the surface. Flowers appear on these but also on short, leafless stalks that are formed by the submerged parts of the plants and extend above

the surface of the water. As the water disappears during the *seca* [dry], beds of the typical terrestrial form of the species develop on the moist sediment. The terrestrial plants have thick, fleshy stems bearing relatively short, green, ovoid leaves and often flowers. The species disappears during prolonged dry periods […]."

From Ramamoorthy (1979):

"This is a very distinctive species of uncertain affinities. In no other speces of the genus are the lower leaves whorled. *Ludwigia verticillata* Munz, originally assigned to sect. *Dantia*, refers to a form of this species in which the epipetalous anthers have been lost; P. H. Raven (pers. Comm.) has studied populations in marshy places on the Isthmus of Tehuantepec in Oaxaca, Mexico, in which plants with 4 stamens occur intermingled with others with 8 stamens, and are indistinguishable otherwise. As in many aquatic species, the morphology is highly variable, and the name *Ludwigia potamogeton* (Buchell ex Mich.) Hara, here relegated to synonymy, has been used to refer to plants with somewhata narrower leaves and less inflated stems. This species [*Ludwigia inclinata*] is primarily autogamous and is the only one in the genus in which two types of leave arrangement occur, […]"

Biology

From Silveira et al. (2020):

"Feces from Astyanax lacustris, Poptelaparaguayensis, Moenkhausia sanctafilomena and Moenkhausia bonita produced 15 seedlings of herbaceous plant of the species Ludwigia inclinata, Ludwigia leptocarpa and a non-identified monocotyledon. A total of 30.4 g of fecal mass was recovered with a rate of 0.49 seedling gram(-1). There is a positive relation between the number of seedlings obtained and the amount of fish fecal mass (g)."

Human Uses

Ludwigia inclinata is a plant used in aquariums and was listed for sale at multiple online retailers (e.g. Amazon 2022; Buce Plant 2022; DustinsFishtanks 2022; JD Aquatics 2022; My Home Nature 2022).

From POWO (2022):

"It is used as a medicine."

Diseases

No information on diseases was found for *Ludwigia inclinata*.

Threat to Humans

No information on threat to humans was found for *Ludwigia inclinata.*

3 Impacts of Introductions

No information regarding impacts of introduction of *Ludwigia inclinata* were found.

4 History of Invasiveness

Ludwigia inclinata has been reported as introduced in the United Kingdom but the establishment status is unknown. This species is present in the aquarium trade, but the trade volume and duration are unknown. The history of invasiveness is classified as No Known Nonnative Population.

5 Global Distribution

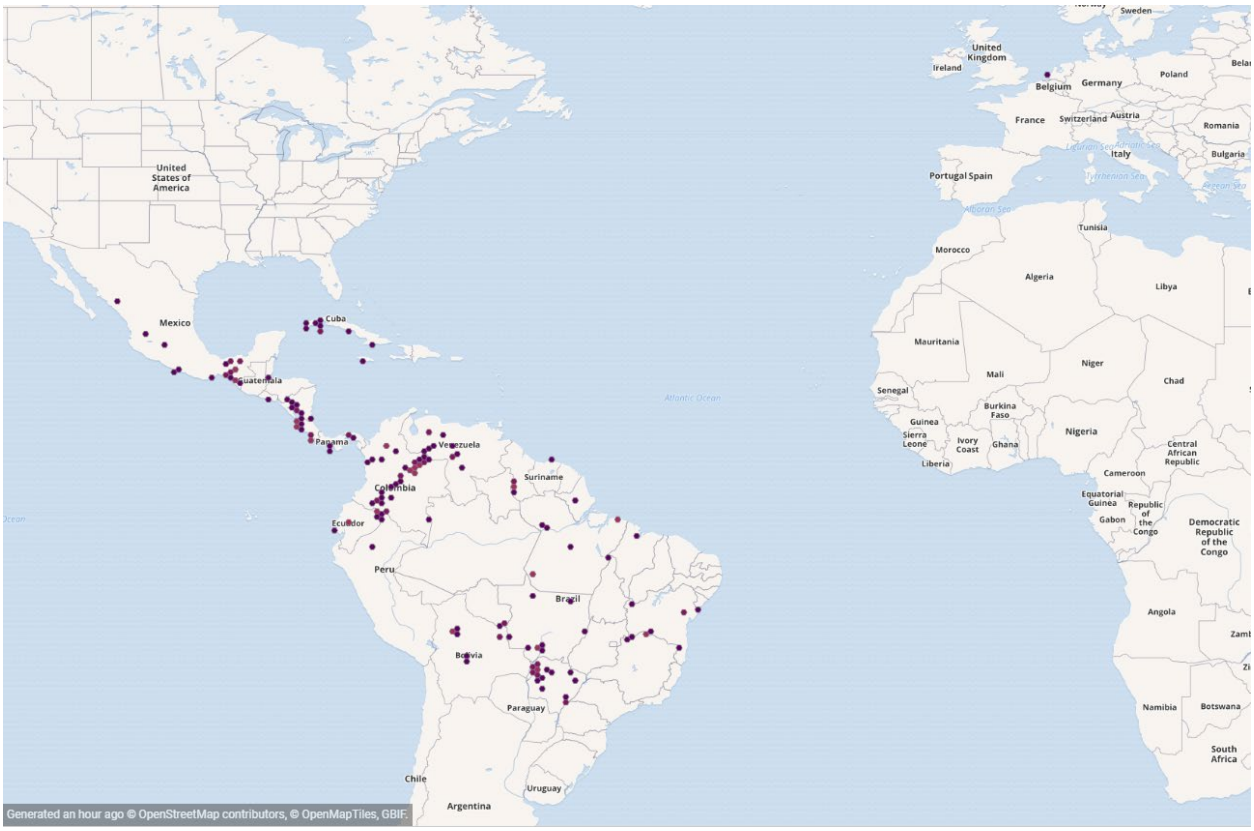


Figure 1. Known global distribution of *Ludwigia inclinata*. Observations are reported from Mexico, Central America, and South America. Map from GBIF Secretariat (2022). The record in the Netherlands is the result of a shipment from Malaysia intercepted at an import facility (GBIF Secretariat 2022) and does not represent an established population. It was not used in the climate match.

No georeferenced observations representing the possible introduction in the United Kingdom were found.

6 Distribution Within the United States

Ludwigia inclinata has not been reported in the wild within the United States.

7 Climate Matching

Summary of Climate Matching Analysis

The climate match for *Ludwigia inclinata* to the contiguous United States was high in Florida and the southern Atlantic Coast. Small areas of high match were also found along the Gulf Coast. Much of the more northern areas of the contiguous United States had low matches, as well as most of the West and an area of the interior southeast. Everywhere else had medium matches. The overall Climate 6 score (Sanders et al. 2021; 16 climate variables; Euclidean distance) for the contiguous United States was 0.079, Medium. (Scores greater than 0.005 and less than 0.103 are classified as medium.) States with a high individual Climate 6 score are Alabama, Florida, Georgia, Louisiana, North Carolina, South Carolina, and Texas. Arizona, California, Mississippi, New Mexico, and Virginia had a medium individual score. All other States had low individual scores.

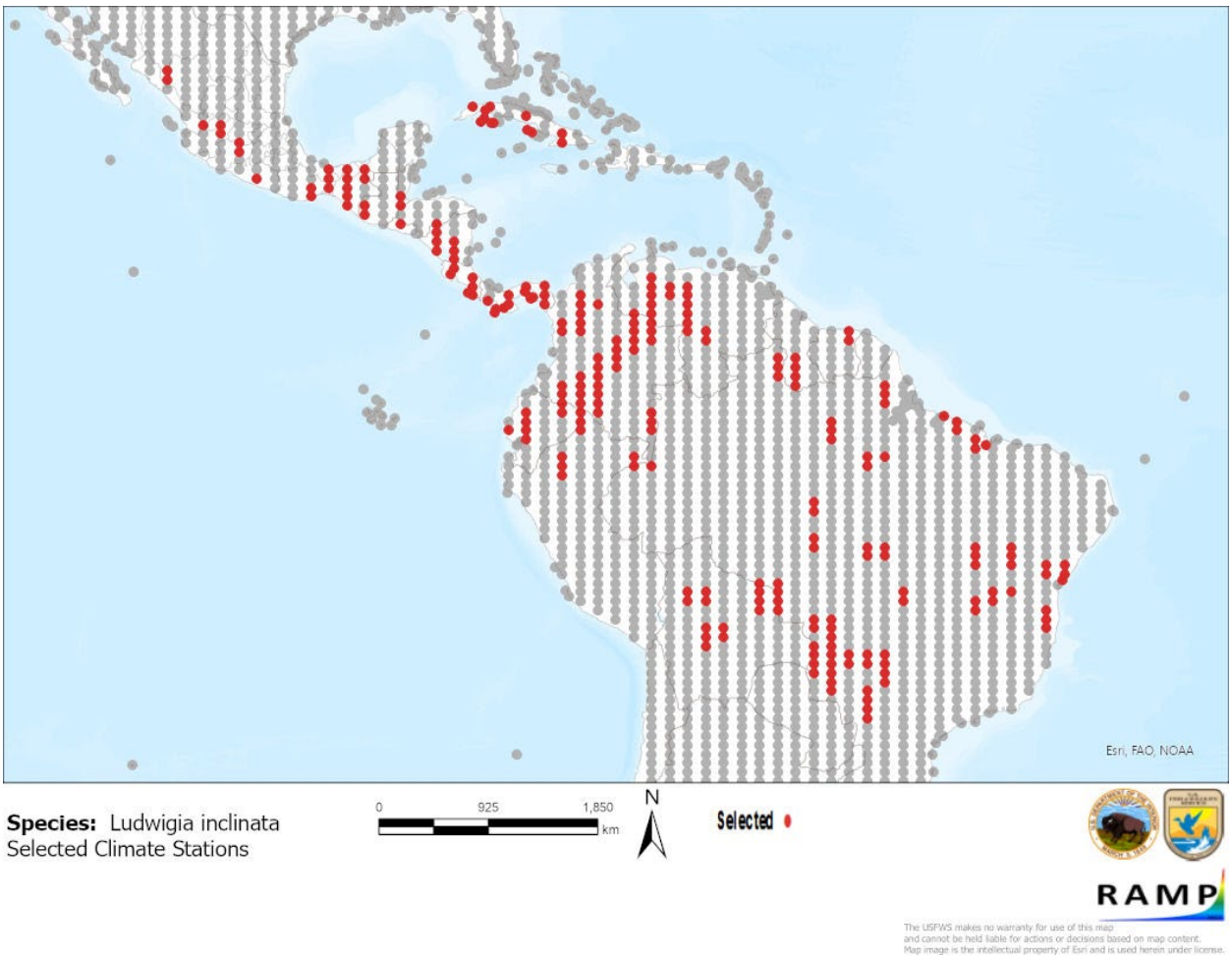


Figure 2. RAMP (Sanders et al. 2021) source map showing weather stations in Mexico, South America, and Central America selected as source locations (red; Belize, Bolivia, Brazil, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico, Nicaragua, Panama, Peru, Suriname, Venezuela) and non-source locations (gray) for *Ludwigia inclinata* climate matching. Source locations from GBIF Secretariat (2022). Selected source

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

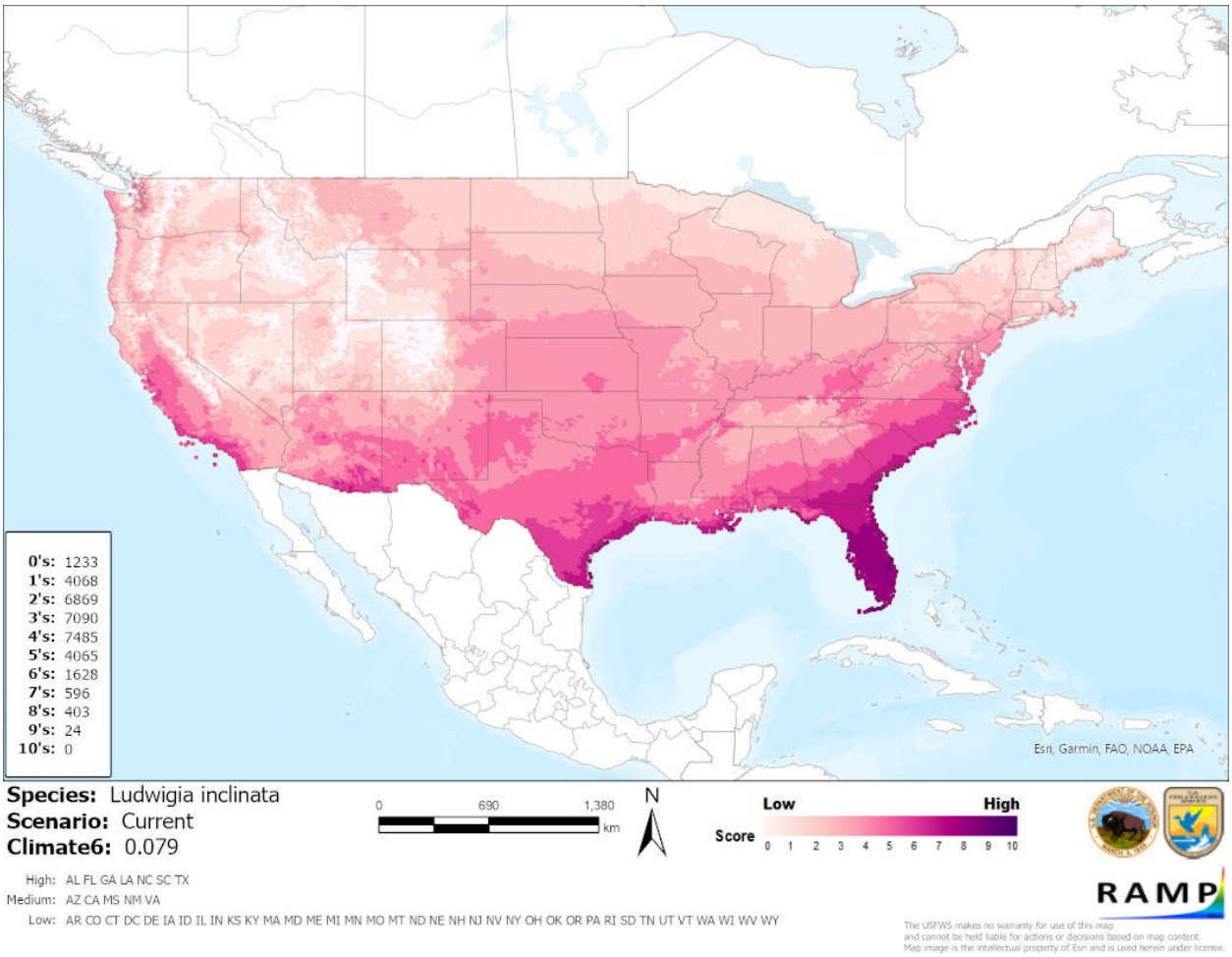


Figure 3. Map of RAMP (Sanders et al. 2021) climate matches for *Ludwigia inclinata* in the contiguous United States based on source locations reported by GBIF Secretariat (2022). Counts of climate match scores are tabulated on the left. 0/Pale Pink = Lowest match, 10/Dark Purple = Highest match.

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

Climate 6: (Count of target points with climate scores 6-10)/ (Count of all target points)	Overall Climate Match Category
0.000≤X≤0.005	Low
0.005<X<0.103	Medium
≥0.103	High

8 Certainty of Assessment

The certainty of assessment is Low. *Ludwigia inclinata* is stated to be introduced to the United Kingdom however, there is no information on impacts of introduction and history of invasiveness. Some of the literature regarding this species was not available in English.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Ludwigia inclinata is a freshwater plant native to Mexico, Central America, and South America. Introductions outside of its native range have been reported in the United Kingdom but establishment is unknown. It is present in the aquarium trade but there is no substantial trade history. The history of invasiveness is classified as No Known Nonnative Population. Overall climate match with the contiguous United States is Medium. Areas of high match include Florida, the southern Atlantic Cost, and small areas of the Gulf Coast. The certainty of this assessment is Low due to a lack of information regarding this species' history of invasiveness. The overall risk assessment category for *Ludwigia inclinata* is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): No Known Nonnative Population**
- **Overall Climate Match Category (Sec. 7): Medium**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks, Important additional information:** No additional information
- **Overall Risk Assessment Category: Uncertain**

10 Literature Cited

Note: The following references were accessed for this ERSS. References cited within quoted text but not accessed are included below in Section 11.

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Ramamoorthy TP. 1979. A sectional revision of *Ludwigia* Sect. Myrtocarpus S. Lat. (Onagraceae). Annuals of the Missouri Botanical Garden 66(4):893–896.

Sanders S, Castiglione C, Hoff M. 2021. Risk Assessment Mapping Program: RAMP. Version 4.0. U.S. Fish and Wildlife Service.

Silveira R, Leao-Neto WM, da Silva FHB. 2020. Small-sized fish as possible seed dispersers: disclosing novel fish and plant species interactions in the Pantanal wetland. Studies on Neotropical Fauna and Environment 55:36–43. (Abstract only.)

World Flora Online. 2022. *Ludwigia inclinata* (L.f.) M.Gómez. World Flora Online – a project of the World Flora Online Consortium. Available: http://www.worldfloraonline.org/taxon/wfo-0000443165 (May 2022).

11 Literature Cited in Quoted Material

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.

Munz PA. 1947. Onagraceas. Flora Brasílica 41:62–113.