

Mosaic Plant (*Ludwigia sedioides*)

Ecological Risk Screening Summary

U.S. Fish & Wildlife Service, May 2021

Revised, May 2021

Web Version, 8/10/2021

Organism Type: Aquatic Plant

Overall Risk Assessment Category: Uncertain



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[https://commons.wikimedia.org/wiki/File:Ludwigia_sedioides_\(Humb._%26_Bonpl.\)_H.Hara.jpg](https://commons.wikimedia.org/wiki/File:Ludwigia_sedioides_(Humb._%26_Bonpl.)_H.Hara.jpg) (May 2021).

1 Native Range and Status in the United States

Native Range

From Munz (1959):

“Cuba and Jamaica, Guatemala, Honduras and El Salvador, Panama, Colombia to Guiana, Brazil and Bolivia.”

From POWO (2021):

“This species [*Ludwigia sedioides*] is accepted, and its native range is S. Mexico to Tropical America.”

From Yakandawala and Yakandawala (2007):

“*Ludwigia sedioides*, commonly known as Mosaic flower or False loosestrife, is a herbaceous perennial and is native to south [sic] America.”

From Barbosa et al. (2014):

“Although this species has a broad natural distribution (ranging from Mexico and Central America to Brazil) [...]”

POWO (2021) lists *Ludwigia sedioides* as native in Bolivia, northern Brazil, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guyana, Honduras, Jamaica, Mexico (Gulf and Southeast regions), Nicaragua, Panamá, Paraguay, and Venezuela.

Status in the United States

Ludwigia sedioides is in trade in the United States. No records of *Ludwigia sedioides* in the wild in the United States were found.

From Pond Megastore (2021):

“Mosaic Plant (*Ludwigia sedioides*)
Temporarily out of stock... more being made
Price:
\$10.95”

Means of Introductions in the United States

No records of introductions of *Ludwigia sedioides* in the wild in the United States were found.

Remarks

Ludwigia sedioides is sometimes misspelled as *Ludwigia sedoides* (e.g. POWO 2021).

WFO (2021) lists *Jussiaea sedioides* Humb. & Bonpl. as a synonym. This synonym was used to search for information in addition to the valid name, *Ludwigia sedioides* (Humb. & Bonpl.) H.Hara.

2 Biology and Ecology

Taxonomic Hierarchy and Taxonomic Standing

According to WFO (2021), *Ludwigia sedioides* (Humb. & Bonpl.) H.Hara is the valid name for this species.

From GBIF Secretariat (2021):

Kingdom Plantae
Phylum Tracheophyta
Class Magnoliopsida
Order Myrtales
Family Onagraceae
Genus *Ludwigia* L.
Species *Ludwigia sedioides* (Humb. & Bonpl.) H.Hara

Size, Weight, and Age Range

From Munz (1959):

“[...] petioles [...], 1-9 cm. long; leaf-blades [...], 5-20 mm. long and wide, [...]; pedicels 1-3 cm. long; bracteoles [...], less than 1 mm. long; [...] petals [...], 10-13 mm. long, 8-10 mm. wide; [...]”

Environment

From Jimenez (2016):

“*Ludwigia sedioides*, [...] grow in the pond’s shallower areas.”

From Munz (1959):

“In quiet water.”

From Barbosa et al. (2014):

“Morphometric variables (fetch, slope and depth) explained a significant portion of variation in the coverage of *L. sedioides*, indicating that sheltered localities, with low slope ($<5 \text{ cm.m}^{-1}$) and moderate depths (~30–80 cm), are suitable for colonization and growth.”

Climate

From Flora & Fauna Web (2021):

“Preferred Climate Zone Tropical, Sub-Tropical / Monsoonal”

Distribution Outside the United States

Native

From Munz (1959):

“Cuba and Jamaica, Guatemala, Honduras and El Salvador, Panama, Colombia to Guiana, Brazil and Bolivia.”

From POWO (2021):

“This species [*Ludwigia sedioides*] is accepted, and its native range is S. Mexico to Tropical America.”

From Yakandawala and Yakandawala (2007):

“*Ludwigia sedioides*, commonly known as Mosaic flower or False loosestrife, is a herbaceous perennial and is native to south [sic] America.”

From Barbosa et al. (2014):

“Although this species has a broad natural distribution (ranging from Mexico and Central America to Brazil) [...]”

POWO (2021) lists *Ludwigia sedioides* as native in Bolivia, northern Brazil, Colombia, Costa Rica, Cuba, Ecuador, El Salvador, Guyana, Honduras, Jamaica, Mexico (Gulf and Southeast regions), Nicaragua, Panamá, Paraguay, and Venezuela.

Introduced

From Yakandawala and Yakandawala (2007):

“A recent survey conducted to identify and document aquatic plant diversity of Sri Lanka has resulted in the identification of three exotic plant species,[...], and *Ludwigia sedioides* (Onagraceae) occurring extensively in the natural water bodies in Gampaha and Kurunegala districts in the country.”

“Further, species of [...] and *Ludwigia sedioides* were observed extensively covering the respective water bodies.”

“*Ludwigia sedioides* was also found forming dense mats on the surface of the water bodies. During the dry period of the year, the plants that occurred on the drier part of the water body were forming dense mats on the moist soil. The interviews carried out with the local people in the Gampaha district provided information that these plants were recent introductions to the area”

From Debarawatta et al. (2016):

“*Ludwigia sedioides* L. is one such escape initially spotted in a single water body in the wet zone of the country (Yakandawala and Yakandawala, 2007). According to recently concluded studies from the initial water body now it has spread into 36 different pools/ditches and water bodies and recognized as a potential invasive plant in Sri Lanka (Yakandawala et al., 2014). However, none of the other countries yet reported this plant as an invasive or potential invasive plant.”

From POWO (2021):

“Introduced into: Lesser Sunda Is. [Indonesia and East Timor], Thailand”

Means of Introduction Outside the United States

From Debarawatta et al. (2016):

“Ornamental plants in Sri Lanka accounts for over 368 species and cultivars and 76% of these are exotics while 30% of these plants were recorded for their invasive behavior elsewhere in the world (Yakandawala, 2012). Hence there is a greater chance for these plants to become invasive in the future. One such escape is *L. sedioides* where from a single water body in 2006 (Yakandawala and Yakandawala, 2007), now it has spread rapidly and invaded into 36 different places in the wet zone of Sri Lanka (Yakandawala et al., 2014).”

From Yakandawala and Yakandawala (2007):

“All these three species [...] and *Ludwigia sedioides*, recorded during the present survey, as occurring in natural water bodies, are plants that have not been recorded as naturally occurring in Sri Lanka. They are popular as aquarium plants and are currently being propagated and exported by growers.”

Short Description

From Munz (1959):

“Floating herb; stems slender, green, quite glabrous, rooting freely at nodes, with long quite naked branches and leaves crowded in terminal rosettes; petioles somewhat flattened, often reddish, glabrous or somewhat strigose beneath, 1-9 cm. long; leaf-blades rhombic-ovate, rather thick, acute at base, more obtuse at apex, crenate-serrate in upper half, minutely glandular-punctate, glabrous and shining above, finely strigose beneath, 5-20 mm. long and wide, with ca. 6 inconspicuous veins on each side of midrib and no submarginal vein; flowers solitary, in a few axils only; pedicels 1-3 cm. long; bracteoles swollen, less than 1 mm. long; sepals 4 (5), glabrous, oblong-ovate, obtusish to acute, 5-nerved, 6-8 mm. long, 3-5 mm. wide; petals yellow, round-obovate, emarginate, subsessile, 10-13 mm. long, 8-10 mm. wide; disc quite plane, hairy; stamens subequal, glabrous, the filaments white, somewhat widened basally, 3-4 mm. long; anthers 2 mm. long; style white, 3.5 mm. long; stigma subcapitate, somewhat 4-lobed, ca. 2 mm. wide; ovary obconic, 4-angled, glabrous, 8-10 mm. long; capsule narrowly obconic, 4-angled, glabrous, 10-13 mm. long, 3 mm. wide at summit, sometimes without median nerve on each face; seeds brown, shining, narrowly obovoid, curved at apex, ca. 0.6 mm. long, with inconspicuous raphe.”

Biology

From Debarawatta et al. (2016):

“It is an herbaceous perennial submerged plant with floating leaves. Propagation studies conducted with *L. sedioides* revealed that top cuttings and stem cuttings both have the capability

of reproduction and 6 cm fragment is the most suitable cutting type for regeneration (Debarawatta and Yakandawala 2009).”

“*Ludwigia sedioides* produces unspecialized stem fragments. Not like specialized fragments [sic] such rhizomes, tubers and turions, these fragments can be formed throughout the year.”

“A high propagule pressure was witnessed in *L. sedioides* and it is important to note that even a 1 cm fragment has the ability to regenerate into a new plant. The significantly high regeneration ability was recorded in fragments of top cuttings compared to stem cuttings. Hence, as all the fragments of different lengths irrespective of maturity stage were capable of surviving, it is important to remove all the fragments during any attempts in mechanical control. As fragments can be formed throughout the year immediate action is suggested to prevent further spread.”

From Barbosa et al. (2014):

“According to Pott and Pott (2000), *L. sedioides* is evergreen and produces flowers over the year, [...]”

Human Uses

From Debarawatta et al. (2016):

“As up-to-date it has been widely used as an ornamental aquatic and not yet been considered as an invasive in any other country, in depth information on biology, propagation, allopathic effects etc. are not available.”

From Yakandawala and Yakandawala (2007):

“This is also used as a floating aquatic plant in the landscape industry. The red and green diamond shape leaves occur in rounded clusters and gives an attractive appearance for the floating plant. Propagation of *L. sedioides* is by snipping off a rosette, with a section of stem attached, from the main stem [...]. The main stem may then develop into another rosette.”

Diseases

No information regarding diseases of *Ludwigia sedioides* was found.

Threat to Humans

No information on threats to humans could be found.

3 Impacts of Introductions

Only potential impacts of introductions could be found relating to *Ludwigia sedioides*.

From Debarawatta et al. (2016):

“As *L. sedioides* is not yet recognized as a problematic plant elsewhere except in Sri Lanka.”

“Similar to other countries in Sri Lanka too, some of these plants have escaped the controlled environments and invaded into natural areas and cause irreversible damage to the aquatic ecosystems. One such escape is *L. sedioides* where from a single water body in 2006 (Yakandawala and Yakandawala, 2007), now it has spread rapidly and invaded into 36 different places in the wet zone of Sri Lanka (Yakandawala et al., 2014).”

From Debarawatta et al. (2017):

“A recent study revealed that the plant has invaded water bodies of the Gampaha and Colombo Districts in Sri Lanka. Due to its rapid growth, efficient mode of reproduction and aggressive nature, it has been identified as potential invasive plant in Sri Lanka which could have a negative impact on agriculture, environment and recreational activities in water bodies of the wet zone in the future.”

From Yakandawala and Yakandawala (2007):

“*Ludwigia sedioides* was also found forming dense mats on the surface of the water bodies. During the dry period of the year, the plants that occurred on the drier part of the water body were forming dense mats on the moist soil.”

4 History of Invasiveness

Ludwigia sedioides has established in Sri Lanka. It is also reported as introduced in Indonesia, East Timor, and Thailand. A review of the literature found only potential impacts from the introductions. History of Invasiveness is classified as Data Deficient.

5 Global Distribution



Figure 1. Known global distribution of *Ludwigia sedioides*. Observations are reported from South America (Brazil, Columbia, Venezuela). Map from GBIF Secretariat (2021).

Cuba, Jamaica, Guatemala, Honduras, El Salvador, Nicaragua, Panama, Bolivia, Ecuador, and Paraguay are all listed as part of the native range for *Ludwigia sedioides* but no georeferenced observations were available to represent those populations in the climate match.

Plants of the World Online (2021) lists *L. sedioides* as introduced to Thailand, but no additional information was found, and no georeferenced observations were available.

Yakandawala and Yakandawala (2007) states that there is a population of introduced *L. sedioides* in Sri Lanka (Gampaha and Kurunegala). No georeferenced points were available but the description of the populations' location was detailed enough to use in selecting source points for the climate match.

Jiménez (2016) provided a georeferenced observation for *Ludwigia sedioides* in Costa Rica. This was used to select source points for the climate match.

6 Distribution Within the United States

Ludwigia sedioides has not been reported in the wild in the United States.

7 Climate Matching

Summary of Climate Matching Analysis

Almost the entire contiguous United States had a low climate match with small areas of medium match in southeastern Texas, southeast Arizona, and southern coastal California. Northern Florida also had a medium match while southern Florida had a high match. The overall Climate 6 score (Sanders et al. 2018; 16 climate variables; Euclidean distance) for the contiguous United States was 0.009, medium. (Scores between 0.005 and 0.103, exclusive, are classified as medium.) Florida was the only state to have an individual high Climate 6 score while all other States had low individual scores.

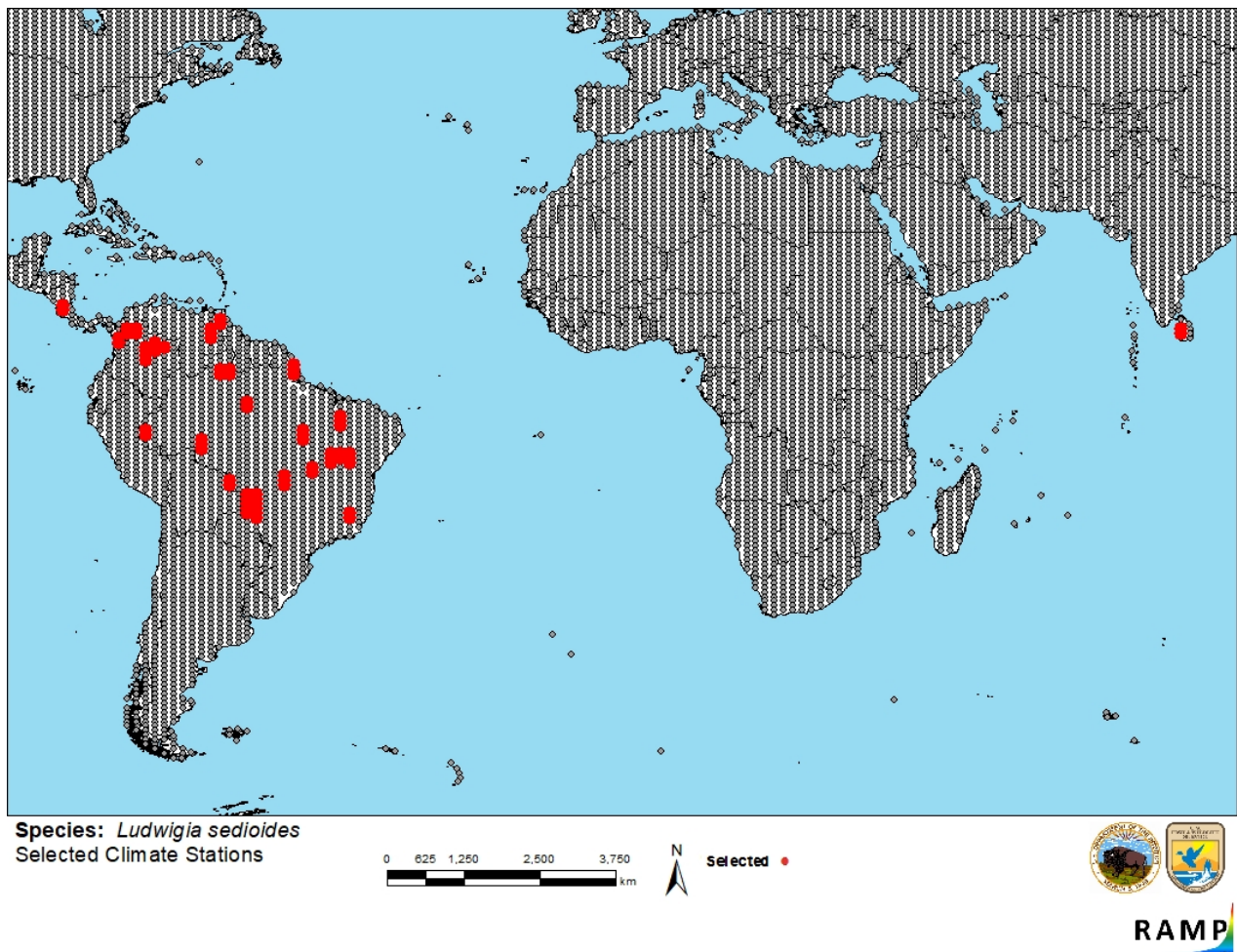


Figure 2. RAMP (Sanders et al. 2018) source map showing weather stations in Nicaragua, Costa Rica, Brazil, Colombia, Venezuela, and Sri Lanka selected as source locations (red) and non-source locations (gray) for *Ludwigia sedoides* climate matching. Source locations from Yakandawala and Yakandawala (2007), Jiménez (2016), and GBIF Secretariat (2021). Selected source locations are within 100 km of one or more species occurrences, and do not necessarily represent the locations of occurrences themselves.

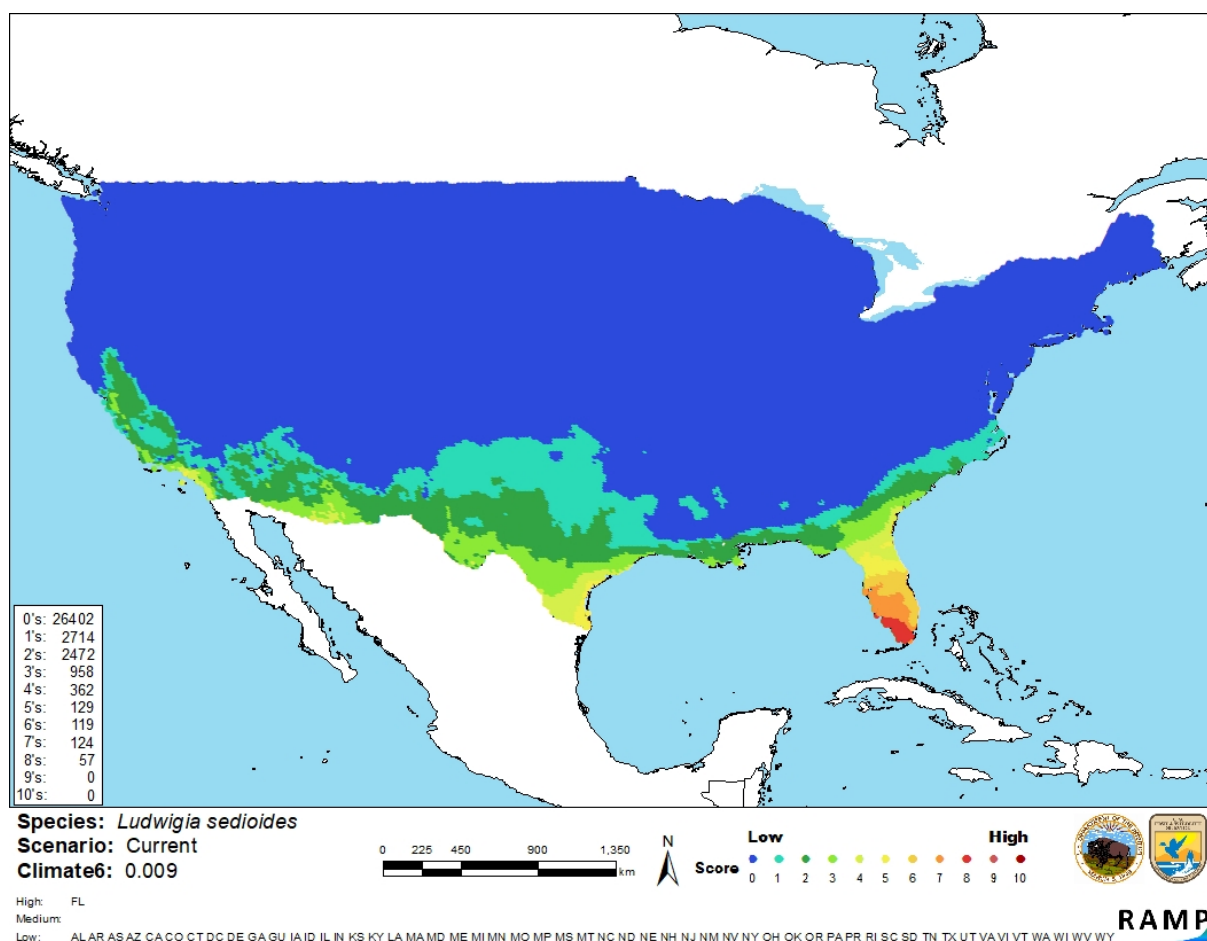


Figure 3. Map of RAMP (Sanders et al. 2018) climate matches for *Ludwigia sedioides* in the contiguous United States based on source locations reported by Yakandawala and Yakandawala (2007), Jiménez (2016), and GBIF Secretariat (2021). Counts of climate match scores are tabulated on the left. 0/Blue = Lowest match, 10/Red = 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
$0.000 \leq X \leq 0.005$	Low
$0.005 < X < 0.103$	Medium
≥ 0.103	High

8 Certainty of Assessment

Limited information is available on the biology and ecology of *Ludwigia sedioides*.

Georeferenced points were not available for a large portion of its range, reducing certainty in the interpretation of the climate match. This species has been reported as established in Sri Lanka, however, only potential impacts have been documented. The certainty of assessment is Low.

9 Risk Assessment

Summary of Risk to the Contiguous United States

Ludwigia sedioides, Mosaic Plant, is an aquatic plant native to regions of Central and South America, and the Caribbean. *Ludwigia sedioides* is commonly traded within the United States. There is no evidence of established populations in the United States. History of Invasiveness is classified as Data Deficient. *Ludwigia sedioides* is established in Sri Lanka. However, the literature search found only potential impacts from introduction. The overall climate match for *Ludwigia sedioides* in the contiguous United States is Medium. Only Florida, Texas, southeastern Arizona, and California had areas of medium or high match; the remainder of the contiguous United States had a low match. The overall risk assessment category for *Ludwigia sedioides* is Uncertain.

Assessment Elements

- **History of Invasiveness (Sec. 4): Data Deficient**
- **Overall Climate Match Category (Sec. 7): Medium**
- **Certainty of Assessment (Sec. 8): Low**
- **Remarks/Important additional information:** No additional remarks
- **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.

- Barbosa MVM, Kobayashi JT, Pelicice FM. 2014. Morphometric and biotic variables as potential predictors of *Ludwigia sedioides* (Humb. & Bonpl.) Hara in a large Amazonian reservoir. *Annales de Limnologie - International Journal of Limnology* 50:163–171.
- Debarawatta D, Yakandawala K, Attanayake T. 2016. Regeneration ability of fragments of *Ludwigia sedioides* (Humb. & Bonpl.) H. Hara: A potential invasive plant in Sri Lanka. *Pakistan Journal of Weed Science Research* 22(4):499–510.
- Debarawatta D, Yakandawala K, Attanayaka T. 2017. Genetic and morphological diversity of *Ludwigia sedioides* in Sri Lanka: A potential invasive aquatic plant. Page 84 in *Weed science for people, agriculture, and nature. The 26th Asian-Pacific Weed Science Society Conference*. Kyoto, Japan.
- GBIF Secretariat. 2021. GBIF backbone taxonomy: *Ludwigia sedioides* (Humb. & Bonpl.) H. Hara. Copenhagen: Global Biodiversity Information Facility. Available: <https://www.gbif.org/species/5545123> (May 2021).
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- Munz PA. 1959. Flora of Panama. Part VII. Fascicle IV. Missouri Botanical Garden Press. 46(3):195–256.
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- Sanders S, Castiglione C, Hoff M. 2018. Risk Assessment Mapping Program: RAMP. Version 3.1. U.S. Fish and Wildlife Service.
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- World Flora Online. 2021. World Flora Online – a project of the World Flora Online Consortium. Available: www.worldfloraonline.org (May 2021).

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.

- Debarawatta RDN, Yakandawala K. 2009. An alien ornamental aquatic *Ludwigia sedioides* L., a threat to Sri Lankan water bodies? Pages 381–385 in Proceedings of the 9th Agricultural Research Symposium. Wayamba University of Sri Lanka.
- Pot VJ, Pot A. 2000. Plantas aquáticas do Pantanal. Corumbá, Brazil: EMBRAPA.
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- Yakandawala K, Debarawatta RDN, Yakandawala DMD, Abeynayake NR. 2014. Potential invasive aquatics: to prevent or to cure? National Symposium on Invasive Alien Species (IAS 2014) 27th of November 2014, Sri Lanka Foundation Institute.