Plant Risk Evaluator -- PRE™
Evaluation Report

Ipomoea batatas -- Texas

2017 Farm Bill PRE Project

PRE Score: 12 -- Accept (low risk of invasiveness)
Confidence: 72 / 100
Questions answered: 18 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Completed

Evaluation Date: September 24, 2017

This PDF was created on August 13, 2018

Plant Evaluated

Ipomoea batatas

Image by MBOT

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Ipomoea batatas*) in an effort to understand the invasive history, reproductive strategies, and the impact, if any, on the region's native plants and animals. This research reflects the data available at the time this evaluation was conducted.

Summary

Ipomoea batatas is a widely cultivated food crop that is also used ornamentally. It is natualized primarily in portions of the Southeastern U.S. and is listed as a prohibited noxious weed in Arizona. It spreads vegetatively and rarely flowers.

General Information

Status: Completed
Screener: Kim Taylor
Evaluation Date: September 24, 2017

Plant Information

Plant: *Ipomoea batatas*

If the plant is a cultivar, how does its behavior differs from its parent's?
This evaluation is for the species, not a particular cultivar.

Regional Information

Region Name: Texas

Climate Matching Map

To answer four of the PRE questions for a regional evaluation, a climate map with three climate data layers (Precipitation, UN EcoZones, and Plant Hardiness) is needed. These maps were built using a toolkit created in collaboration with GreenInfo Network, USDA, PlantRight, California-Invasive Plant Council, and The Information Center for the Environment at UC Davis.

Click here to see the generated climate matching map for this region. This climate match database is hosted by GreenInfo Network and publicly accessible.

Evaluation Questions

These questions are based in an original article published at the University of California, Davis, and can be found on the PLOS One website, here: https://doi.org/10.1371/journal.pone.0121053

Invasive History and Climate Matching (Questions 1 - 6)

1. Has the species (or cultivar or variety, if applicable; applies to subsequent "species" questions) become naturalized where it is not native?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Kartesz indicates the species is natrualized in New York, Pennsylvania, Kentucky, Virginia, North and South Carolina, Florida, Alabama, Mississippi, Louisiana, and Texas. The species is only indicated as naturalized in a few counties within each state. USDA Plants indicates the species is also present in Kansas, Utah, Hawaii, Puerto Rico, and the US Virgin Islands. The U.S. National Plant Germplasm System indicates the species is widely naturalized in the tropics.

Reference(s):

- U.S. National Plant Germplasm Network (0). Ipomoea batatas (L.) Lam. (GRIN).
- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
- USDA, & NRCS (2017). The Plants Database.

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2. Is the species (or cultivar or variety) noted as being naturalized in the US or world in a similar climate?

- Answer: **Yes**, which contributes **2** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Areas where Ipomoea batatas is naturalized with a similar climate to Texas include Virginia, North and South Carolina, Florida, Alabama, Mississippi, Louisiana, and Texas.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).

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3. Is the species (or cultivar or variety) noted as being invasive in the U.S. or world?

- Answer: **Yes**, which contributes **2** points to the total PRE score.
- The *screener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Ipomoea batatas is listed as a prohibited noxious weed in Arizona. Ipomoea batatas is designated an "agricultural weed, casual alien, cultivation escape, naturalised, weed" in the Global Compendium of Weeds. The Pacific Island Ecosystems at Risk indicates the species is invasive in the Galapagos Islands, Juan Fernández Islands, Micronesia, Fiji, French Polynesia, and other Pacific Islands.

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Ipomoea batatas (PIER species info).
- Global Compendium of Weeds (GCW) (0). Ipomoea batatas information from the Global Compendium of Weeds (GCW).
- USDA, & NRCS (2017). The Plants Database.

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4. Is the species (or cultivar or variety) noted as being invasive in the US or world in a similar climate?

- Answer: **Yes**, which contributes **3** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Ipomoea batatas is listed as a prohibited noxious weed in Arizona, which shares a climate with Texas.

Reference(s):

- USDA, & NRCS (2017). The Plants Database.

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5. Are other species of the same genus (or closely related genera) invasive in a similar climate?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Ipomoea aquatica is listed invasive in sevaral U.S. states with a similar climate to Texas, including North Carolina, South Carolina, Florida, California, and Texas. Ipomoea coccinea is invasive in Georgia. Ipomoea purpurea is invasive in Georgia and Florida. Ipomoea hederacea is invasive in Florida.

Reference(s):

- Invasive Plant Atlas of the United States (0). red morning-glory: Ipomoea coccinea (Solanales: Convolvulaceae): Invasive Plant Atlas of the United States.
- Invasive Plant Atlas of the United States (0). swamp morning-glory: Ipomoea aquatica (Solanales: Convolvulaceae): Invasive Plant Atlas of the United States.
- Invasive Plant Atlas of the United States (0). tall morning-glory: Ipomoea purpurea (Solanales: Convolvulaceae): Invasive Plant Atlas of the United States.

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6. Is the species (or cultivar or variety) found predominately in a climate matching the region of concern?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Less than half of the species range has a similar climate to Texas.

Reference(s):

- GBIF (0). Ipomoea batatas (L.) Lam. (gbif).

Impact on Native Plants and Animals (Questions 7 - 10)

7. Does this plant displace native plants and dominate (overtop or smother) the plant community in areas where it has established?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

The Pacific Island Ecosystems at Risk indicates the species has a "climbing or smothering growth habit".

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Ipomoea batatas (PIER species info).

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8. Is the plant noted as promoting fire and/or changing fire regimes?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

The species does not promote fire.

Reference(s):

- Wagner, W.L.., Herbst D.R.., & Sohmer S.H.. (1999). Manual of the flowering plants of Hawai'i.
- Pacific Island Ecosystems at Risk (PIER) (0). Ipomoea batatas (PIER species info).

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9. Is the plant a health risk to humans or animals/fish? Has the species been noted as impacting grazing systems?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

This species is widely cultivated as a food crop. It is not toxic. "The vines and leaves were used as pig food, or if old, as padding under floor mats. The tubers also were used as bait for opelu (mackerel scad) or to fatten hogs"

Reference(s):

- Wagner, W.L.., Herbst D.R.., & Sohmer S.H.. (1999). Manual of the flowering plants of Hawai'i.
- Pacific Island Ecosystems at Risk (PIER) (0). Ipomoea batatas (PIER species info).

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10. Does the plant produce impenetrable thickets, blocking or slowing movement of animals, livestock, or humans?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

This species does not form thickets.

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Ipomoea batatas (PIER species info).

Reproductive Strategies (Questions 11 - 17)

11. Does this species (or cultivar or variety) reproduce and spread vegetatively?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

"The long, thing stems that creep on the surface produce roots where nodes make contact with the soil." "Cuttings of stem fragments, 20–50 cm long and having 3–5 nodes, are traditionally planted in family farms, while tuber roots bearing numerous adventitious buds are used as clonal propagation for commercial production. In addition, isolated leaf cuttings can easily be rooted, produce tubers and regenerate shoots at the petiole end."

Reference(s):

- Sihachakr, Haicour, Alves C., Umboh, Nzogne, Servaes, et al. (1997). Plant regeneration in sweet potato (Ipomoea batatas L., Convolvulaceae). Euphytica. 96, 143–152.
- Pacific Island Ecosystems at Risk (PIER) (0). Ipomoea batatas (PIER species info).

12. If naturally detached fragments from this plant are capable of producing new plants, is this a common method of reproduction for the plant?

- Answer: **Yes**, which contributes **1** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Smith (1991) notes the species "distribution suggests possibly water dispersal of tubers or stem fragments." "Cuttings of stem fragments, 20–50 cm long and having 3–5 nodes, are traditionally planted in family farms, while tuber roots bearing numerous adventitious buds are used as clonal propagation for commercial production. In addition, isolated leaf cuttings can easily be rooted, produce tubers and regenerate shoots at the petiole end."

Reference(s):

- Smith, A.C.. (1991). Flora Vitiensis Nova - A New Flora of Fiji (Spermatophytes Only). 5,
- Sihachakr, Haicour, Alves C., Umboh, Nzogne, Servaes, et al. (1997). Plant regeneration in sweet potato (Ipomoea batatas L., Convolvulaceae). Euphytica. 96, 143–152.

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13. Does the species (or cultivar or variety) commonly produce viable seed?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Seeds are viable, but this is not a usual means of reproduction for the plant. "Flowers are not (or only rarely) produced in some cultivars, and seed productions in likewise erratic." "Bloom Time: Rarely flowers Bloom Description: Pale pink to violet (cultivars mostly non-flowering)" "Although species plants produce pale pink to violet trumpet-shaped flowers, ornamental varieties usually do not flower." "Capsule rarely produced"

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Ipomoea batatas (PIER species info).
- efloras.org (0). Ipomoea batatas in Flora of China @ efloras.org.

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14. Does this plant produce copious viable seeds each year (> 1000)?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

"Seeds 0-1(-4)" Fruits are rarely produced.

Reference(s):

- Wagner, W.L.., Herbst D.R.., & Sohmer S.H.. (1999). Manual of the flowering plants of Hawai'i.

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15. Is there significant germination (>25%) of seeds the next growing season, with no requirement of an infrequent environmental condition for seeds to germinate (i.e. fire) or long dormancy period?

Answer / Justification:

"Propagation: Pre-soak the seed for 12 hours in warm water, or scarify the seed, and sow in individual pots in a greenhouse in early spring. The seed usually germinates in 1 - 3 weeks at 22°c."

Reference(s):

- Plants For A Future (PFAF) (0). Ipomoea batatas Sweet Potato, Black Sweet Potato, Sweet Potato Vine PFAF Plant Database.

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16. Does this plant produce viable seed within the first three years (for an herbaceous species) to five years (for a woody species) after germination?

Reference(s):

- [Anonymous] .

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17. Does this plant continuously produce seed for >3 months each year or does seed production occur more than once a year?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

"Main Bloom Time: Late summer, Mid summer."

Reference(s):

- Plants For A Future (PFAF) (0). Ipomoea batatas Sweet Potato, Black Sweet Potato, Sweet Potato Vine PFAF Plant Database.

Dispersal (Questions 18 - 20)

18. Are the plant's propagules frequently dispersed long distance (>100 m) by mammals or birds or via domestic animals?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

The propagules do not appear to be bird dispersed. The fruit are not fleshy and there is no evidence of animal dispersal.

Reference(s):

- Wagner, W.L.., Herbst D.R.., & Sohmer S.H.. (1999). Manual of the flowering plants of Hawai'i.
- Pacific Island Ecosystems at Risk (PIER) (0). Ipomoea batatas (PIER species info).

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19. Are the plant's propagules frequently dispersed long distance (>100 m) by wind or water?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

"Capsules rarely formed, brown, ovoid, sparsely pubescent, becoming glabrate. Seeds 0-1(-4), orbicular, glabrous or with wings of short hairs." [No evidence that plant is dispersed by wind, despite wings of short hairs]"

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). Ipomoea batatas (PIER species info).

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20. Are the plant's propagules frequently dispersed via contaminated seed (agriculture or wildflower packets), equipment, vehicles, boats or clothing/shoes?

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

There is no evidence of this.

Reference(s):

- [Anonymous] .

Total PRE Score

PRE Score: 12 -- Accept (low risk of invasiveness)
Confidence: 72 / 100
Questions answered: 18 of 20 -- Valid (80% or more questions answered)

PRE Score Legend

The PRE Score is calculated by adding the point totals for each (answered) question.
< 13 : accept (low risk of invasiveness)
13 - 15 : evaluate further
> 15 : reject (high risk of invasiveness)

Questions Answered Legend

It is important to answer at least 16 questions to consider a PRE Score as "valid".
>= 16 : valid (80% or more questions answered)
<= 15 : invalid (not enough questions answered)

Organization Ownership and Content Privacy

Organization: 2017 Farm Bill PRE Project
Content Privacy: Public

Evaluation Reviewers

The PRE approach is to base decisions on science and make decisions by consensus of diverse horticultural stakeholders. The literature review and process of answering PRE's questions are based on science; the decisions of which plants to prioritize are based on consensus. To ensure this process is in place and that PRE is collaborative, volunteer stakeholders are recruited from each region to review evaluations. The following experts in their profession (plant science, conservation, or horticultural trade) have participated as volunteer PRE reviewers for this evaluation:

• Hans Landel	December 18, 2017
• Steve Moore	September 26, 2017

This evaluation has a total of 2 reviewer(s).

Evaluation Issues

The following section lists all public issues for this evaluation. Issues provide a way for stakeholder reviewers to communicate any concerns or suggestions they might have with the plant or evaluation. Please email PlantRight@suscon.org if additional action is required to resolve open issues.

There are currently no issues associated with this evaluation.

About PRE and this Plant Evaluation Report

The PlantRight Plant Risk Evaluator -- PRE is an online database and platform enabling those involved in non-native, terrestrial plant production to know before they grow if a plant poses a regional invasive risk. This tool offers many benefits, and we encourage you to visit the PRE website (https://pre.ice.ucdavis.edu) for more information.

If you are a nursery trade association, or involved in the research, development or distribution of horticultural plants we invite you to join the PRE community. If you are a plant scientist, affiliated with a horticultural college or botanic garden, and would like to learn more about becoming a PRE Screener, please drop us an email, PlantRight@suscon.org, requesting a PRE Account.

PRE beta funding is provided by Sustainable Conservation (http://www.suscon.org/) and a USDA Farm Bill grant.