



***Plant Risk Evaluator -- PRE™
Evaluation Report***

Colocasia esculenta -- Texas

2017 Farm Bill PRE Project

PRE Score: 16 -- Reject (high risk of invasiveness)

Confidence: 78 / 100

Questions answered: 18 of 20 -- Valid (80% or more questions answered)

Privacy: Public

Status: Completed

Evaluation Date: September 1, 2017

This PDF was created on August 13, 2018



Plant Evaluated

Colocasia esculenta



Image by Ron Vanderhoff, Orange County CNPS



Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Colocasia esculenta*) 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

Colocasia esculenta is grown for its starchy tuber. It has naturalized across much of the southern US and is considered invasive. It flowers infrequently but spreads vegetatively. Corms and tubers can be displaced and moved by vehicles or water. It forms dense thickets in wetlands and along waterways where it displaces native vegetation.

General Information

Status: Completed

Screener: Kim Taylor

Evaluation Date: September 1, 2017

Plant Information

Plant: *Colocasia esculenta*

If the plant is a cultivar, how does its behavior differ 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 naturalized in North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Florida, and Texas. USDA Plants indicates it is also introduced to Hawaii, Puerto Rico, and Pennsylvania. GRIN indicates it is naturalized in parts of Africa, New Zealand, Europe, North America, and the West Indies.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
- United States Department of Agriculture (2014). USDA-NRCS Plants Database.
- U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2 *Colocasia esculenta*.

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 **Very High** confidence in this answer based on the available literature.



Answer / Justification:

The species is naturalized in North Carolina, South Carolina, Georgia, Alabama, Mississippi, Louisiana, Florida, and Texas. Much of the southern US has a similar climate to 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 *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Colocasia esculenta is listed on the Invasive Plant List by the Florida Exotic Pest Plant Council, the Alabama Invasive Plant Council, the Georgia Exotic Pest Plant Council, and the South Carolina Exotic Pest Plant Council. It is also listed as invasive in Texas. "At the present, this species is listed as an "aggressive weed" in Florida, Hawaii, Puerto Rico, Jamaica, Australia (Queensland) and New Zealand and as an "invasive species" in Cuba, Costa Rica, the Galápagos Islands, and French Polynesia."

Reference(s):

- United States Department of Agriculture (2014). USDA-NRCS Plants Database.
 - Swearingen, J., & Barger C.. (2016). coco yam, wild taro: *Colocasia esculenta* (Araceae): Invasive Plant Atlas of the United States.
 - CABI (0). *Colocasia esculenta* (taro) - cabi.
 - TexasInvasives.org (0). Texas Invasives - *Colocasia esculenta*.
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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 *screeners* has a **Very High** confidence in this answer based on the available literature.



Answer / Justification:

Colocasia esculenta is listed on the Invasive Plant List by the Florida Exotic Pest Plant Council, the Alabama Invasive Plant Council, the Georgia Exotic Pest Plant Council, and the South Carolina Exotic Pest Plant Council. It is also listed as invasive in Texas. All these regions share a similar climate to Texas.

Reference(s):

- Swearingen, J., & Barger C.. (2016). coco yam, wild taro: *Colocasia esculenta* (Arales: Araceae): Invasive Plant Atlas of the United States.
 - TexasInvasives.org (0). Texas Invasives - *Colocasia esculenta*.
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5. Are other species of the same genus (or closely related genera) invasive in a similar climate?

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

Answer / Justification:

Colocasia gigantea and *C. tonoino* are listed in the Global Compendium of Weeds as naturalised, but no species in the genus are noted as invasive.

Reference(s):

- Global Compendium of Weeds (GCW) (0). Global Compendium of Weeds: species index.
-

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 *screeener* 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). *Colocasia esculenta* (L.) Schott - gbif.
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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 *screeener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

"Taro invades wetland areas and colonizes lake banks, forming dense growth. Outcompetes native species, thus altering natural habitat and ecosystem processes; reduces biodiversity. It will form dense stands along lakes and rivers where it completely eliminates native plant species." "*C. esculenta* is an invasive fast-growing weed with the potential to displace native vegetation (Queensland Department of Primary Industries and Fisheries, 2011). It has become naturalized outside its native distribution range and grows forming dense thickets along rivers, lake shores, and in wetlands displacing native shoreline vegetation and replacing native aquatic plants (Langeland et al., 2008; Queensland Department of Primary Industries and Fisheries, 2011; PIER, 2012). It is also affecting native vegetation in moist secondary forests and in disturbed areas along roadsides where dense populations are able to emerge." "It easily invades wetland edges, swamps, blackwater streams and riverine forests. *Colocasia esculenta* can form dense stands outcompeting native plants."

Reference(s):

- Swearingen, J., & Barger C.. (2016). coco yam, wild taro: *Colocasia esculenta* (Arales: Araceae): Invasive Plant Atlas of the United States.
 - CABI (0). *Colocasia esculenta* (taro) - cabi.
 - TexasInvasives.org (0). Texas Invasives - *Colocasia esculenta*.
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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 *screeener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

There is no evidence of this.

Reference(s):

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

Answer / Justification:

"If taro is not prepared and cooked well, the acidity will cause itchiness in the mouth and throat. All parts of taro can cause stomach aches, if ingested without cooking. Contact with sap can irritate sensitive skin." GRIN indicates the species may be poisonous to mammals.

Reference(s):

- Moore, L. (0). Plant Guide - *Colocasia esculenta*.
 - U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2 *Colocasia esculenta*.
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10. Does the plant produce impenetrable thickets, blocking or slowing movement of animals, livestock, or humans?

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

Answer / Justification:

It grows "forming dense thickets along rivers, lake shores, and in wetlands displacing native shoreline vegetation and replacing native aquatic plants."

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.
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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 *screeners* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"slender stolons also often produced, along with offshoot corms" "Reproduces primarily vegetatively, via culm fragmentation and budding at the base of the plant." Taro can reproduce both sexually as well as vegetatively by corms, tubers, and root suckers.

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.
 - TexasInvasives.org (0). Texas Invasives - *Colocasia esculenta*.
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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 *screeener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"Fragments of corms and tubers can be easily dispersed by streams and floods."

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.
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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 *screeener* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"Fruit is a many-seeded berry, densely packed and forming a fruiting head. Seeds are ovoid to ellipsoid, less than 2 mm long, with copious endosperm" " It has the ability to reproduce both sexually by seeds and vegetatively" "Under natural conditions, reproductive activity in *C. esculenta* occurs only occasionally."

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.
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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 *screeener* has a **High** confidence in this answer based on the available literature.



Answer / Justification:

The fruit is a "many-seeded berry" sexual reproduction is rare so large amounts of seed are not produced each year.

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.
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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:

There is little available information on germination rates.

Reference(s):

- [Anonymous] .
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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?

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

Answer / Justification:

Plants can reach full size within their first year

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.



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

Answer / Justification:

Plants flower infrequently.

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.
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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 *screeners* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

There is no direct evidence of dispersal by animals but the fruit is a "many-seeded berry" and seeds have "copious endosperm" which may be attractive to animals, facilitating dispersal. However, since plants flower infrequently animal dispersal is not a frequent method of long distance propagule dispersal.

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.
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19. Are the plant's propagules frequently dispersed long distance (>100 m) by wind or water?

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

Answer / Justification:

"Fragments of corms and tubers can be easily dispersed by streams and floods."

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.
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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: **Yes**, which contributes **1** points to the total PRE score.
- The *screeners* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

"Corms and tubers can also be dispersed by movement of soil by vehicles and farming machinery."

Reference(s):

- CABI (0). *Colocasia esculenta* (taro) - cabi.
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Total PRE Score

PRE Score: 16 -- Reject (high risk of invasiveness)

Confidence: 78 / 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 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.