



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

Ruellia brittoniana 'Chi Chi' -- Texas

2017 Farm Bill PRE Project

PRE Score: 18 -- Reject (high risk of invasiveness)

Confidence: 80 / 100

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

Privacy: Public

Status: Completed

Evaluation Date: April 19, 2017

This PDF was created on July 06, 2018



Plant Evaluated

Ruellia brittoniana 'Chi Chi'



Image by @ Juniper Level Botanic Gdn, NC



Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Ruellia brittoniana* 'Chi Chi') 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.

General Information

Status: Completed

Screener: Kim Taylor

Evaluation Date: April 19, 2017

Plant Information

Plant: *Ruellia brittoniana* 'Chi Chi'

If the plant is a cultivar, how does its behavior differs from its parent's?

The wildtype produces about 3 times as many seeds as 'Chi Chi', though 'Chi Chi' does produce viable seeds and has higher germination rates than the wildtype. Otherwise, there are no major differences between 'Chi Chi' and the parent species.

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 **Medium** confidence in this answer based on the available literature.

Answer / Justification:

The parent species is naturalized in Texas, Florida, Georgia, Louisiana, South Carolina, Mississippi, Alabama, Hawaii, Oregon, China, Australia, Taiwan. The Chi Chi cultivar is available in many of these locations and most likely contributes to the naturalized population.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
- United States Department of Agriculture (2014). USDA-NRCS Plants Database.
- Global Compendium of Weeds (GCW) (0). *Ruellia brittoniana* information from the Global Compendium of Weeds (GCW).
- GBIF (0). *Ruellia simplex* Wright - gbif.
- U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2.
- Invasive Plant Atlas of the United States (0). Britton's wild petunia: *Ruellia simplex* (Scrophulariales: Acanthaceae): Invasive Plant Atlas of the United States.

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 **Medium** confidence in this answer based on the available literature.



Answer / Justification:

It is naturalized in the Southeastern US, China, and Australia. The Chi Chi cultivar is available in many of these locations and most likely contributes to the naturalized population.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
 - United States Department of Agriculture (2014). USDA-NRCS Plants Database.
 - GBIF (0). *Ruellia simplex* Wright - gbif.
 - U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2.
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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 *screeener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Listed on the Invasive Plant Atlas of the US as an invasive plant. Listed by Florida as an invasive plant. The Chi Chi cultivar is available in these locations and most likely contributes to the naturalized population.

Reference(s):

- Invasive Plant Atlas of the United States (0). Britton's wild petunia: *Ruellia simplex* (Scrophulariales: Acanthaceae): Invasive Plant Atlas of the United States.
 - TexasInvasives.org (0). Texas Invasives - *Ruellia brittoniana*.
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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 *screeener* has a **Medium** confidence in this answer based on the available literature.



Answer / Justification:

The parent species is listed as invasive in Florida which shares a similar climate for much of the state.

Reference(s):

- Invasive Plant Atlas of the United States (0). Britton's wild petunia: *Ruellia simplex* (Scrophulariales: Acanthaceae): Invasive Plant Atlas of the United States.
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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 *screeners* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

Several species of *Ruellia* are listed as threats to Pacific Ecosystems, including *R. blechum*, *R. brevifolia*, *R. devosiana*, *R. prostrata*, *R. squarrosa*, and *R. tuberosa*. None of these are problematic in areas with a similar climate though.

Reference(s):

- Pacific Island Ecosystems at Risk (PIER) (0). *Ruellia brittoniana* (PIER species info).
-

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 *screeners* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Naturalized populations in the SE US, Australia, and parts of China are within the same climate match. The native range is mostly a different climate. This makes it about a 50:50 split.



Reference(s):

- GBIF (0). *Ruellia simplex* Wright - 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:

"In 2001, the Florida Exotic Pest Plant Council (FLEPPC) upgraded Mexican petunia from a Category II (potential problem) to Category I due to "altering native plant communities by displacing native species, changing community structures or ecological functions, or hybridizing with natives" and its status has not changed since (FLEPPC 2015)."

Reference(s):

- Smith, A. M., & Wilson S. B. (2016). Natural Area Weeds: Mexican Petunia (*Ruellia simplex*).
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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] .



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

Answer / Justification:

This is an herbaceous perennial that does not form thickets.

Reference(s):

- [Anonymous] .
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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 *screeener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

"Mexican petunia can also resprout from crowns or rootstocks when cut back or killed back by frost" "Stands of Mexican-petunia can also spread via underground stems or rhizomes."

Reference(s):

- Florida Invasive Plants (FLIP) (0). Plant Details - FLIP.
 - UF/IFAS Center for Aquatic and Invasive Plants (0). *Ruellia simplex* – UF/IFAS Center for Aquatic and Invasive Plants.
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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:

All vegetative material must be removed to prevent regrowth. Seitz (2015) found that approximately 10,000 stems/year are dispersed through streams during major stormwater events.

Reference(s):

- Smith, A. M., & Wilson S. B. (2016). Natural Area Weeds: Mexican Petunia (*Ruellia simplex*).
 - Florida Invasive Plants (FLIP) (0). Plant Details - FLIP.
-



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

- 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:

Texas Invasives notes that it reseeds heavily. Pier notes it is propagated by seed. "There are tall cultivars of Mexican-petunia ("Purple Showers," pink-flowered "Chi Chi," and white-flowered "Snow White") as well as dwarf cultivars ("Katies") in the three flower colors. All these cultivars, with the exception of "Purple Showers" are fertile and potentially invasive." "With the exception of 'Purple Showers', all cultivars produced seed. Estimated seed production per season was greatest for the wildtype, with plants generating almost 3 times the amount of seed than the second highest seed producer, Chi Chi."

Reference(s):

- Krumfolz, L., & Wilson S. (2002). Varying Growth and Sexual Reproduction Across Cultivars of *Ruellia brittoniana*. SNA Research Conference. 47, 99–103.
 - Pacific Island Ecosystems at Risk (PIER) (0). *Ruellia brittoniana* (PIER species info).
 - UF/IFAS Center for Aquatic and Invasive Plants (0). *Ruellia simplex* – UF/IFAS Center for Aquatic and Invasive Plants.
 - TexasInvasives.org (0). Texas Invasives - *Ruellia brittoniana*.
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14. Does this plant produce copious viable seeds each year (> 1000)?

- 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:

Texas Invasives notes that it reseeds heavily. Fruit a cylindrical capsule containing 4-20 tiny seeds (Langeland et al., 2008). "prolific production of seed, and lack of germination requirements such as scarification or stratification. " Krumfolz and Wilson (2002) recorded a mean 135.9 pods produced per season, with a mean 21.3 seeds per pod and an estimated seed production per plant per year of 11,578.68. This is much less than the wildtype with 32,464.13 seeds/year but still a copious amount of viable seeds.



Reference(s):

- Krumfolz, L., & Wilson S. (2002). Varying Growth and Sexual Reproduction Across Cultivars of *Ruellia brittoniana*. SNA Research Conference. 47, 99–103.
 - CABI (0). *Ruellia simplex* (Mexican petunia) - CABI.
 - UF/IFAS Center for Aquatic and Invasive Plants (0). *Ruellia simplex* – UF/IFAS Center for Aquatic and Invasive Plants.
 - TexasInvasives.org (0). Texas Invasives - *Ruellia brittoniana*.
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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: **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:

Seeds generally have high germination rates, and can germinate in both light and dark conditions. "prolific production of seed, and lack of germination requirements such as scarification or stratification. " "In the greenhouse, germination was similarly high for all cultivars (91-100%)" Krumfolz and Wilson (2002) found that 'Chi Chi' had higher germination rates than the wildtype in all conditions tested. "Seeds lack dormancy mechanisms and are ready to germinate almost immediately after leaving the capsule. With no requirement for a cold treatment or seed coat damage scarification or stratification, seeds have high a germination rate occurring over a broad range of temperatures (Smith et al. 2015) with and without light (Wilson and Mecca 2003)."

Reference(s):

- Krumfolz, L., & Wilson S. (2002). Varying Growth and Sexual Reproduction Across Cultivars of *Ruellia brittoniana*. SNA Research Conference. 47, 99–103.
 - Smith, A. M., & Wilson S. B. (2016). Natural Area Weeds: Mexican Petunia (*Ruellia simplex*).
 - UF/IFAS Center for Aquatic and Invasive Plants (0). *Ruellia simplex* – UF/IFAS Center for Aquatic and Invasive Plants.
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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 **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Krumfolz and Wilson (2002) found that Chi Chi grown 126 days from seed produced a mean of 26.33 flowers per plant, so viable seed is produced in the first year.

Reference(s):

- Krumfolz, L., & Wilson S. (2002). Varying Growth and Sexual Reproduction Across Cultivars of *Ruellia brittoniana*. SNA Research Conference. 47, 99–103.
-

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

- 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:

Flowers June through October. Noted as alternating between producing flowers and fruit through most of the year in Florida.

Reference(s):

- Smith, A. M., & Wilson S. B. (2016). Natural Area Weeds: Mexican Petunia (*Ruellia simplex*).
 - Plant Explorer Longwood Gardens (0). *Ruellia simplex* 'Chi Chi' - Plant Explorer.
-



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

Answer / Justification:

"The mucus-like gel produced by these seeds when wet glues them to the soil surface when it dries (Gutterman et al. 1973), and can also help them stick to animals' fur or birds' feathers, helping their dispersal." It is not clear if this is a common means of dispersal, but it is likely that it plays a significant role in long distance dispersal and establishment of new populations.

Reference(s):

- Smith, A. M., & Wilson S. B. (2016). Natural Area Weeds: Mexican Petunia (*Ruellia simplex*).
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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 *screeener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

"plants in the Acanthaceae have an explosive mechanism of seed dispersal. This helps Mexican petunia achieve seed dispersal up to 8–10 feet (Witzum and Schulgasser 1995)...Previous research found that seeds are not buoyant (Seitz 2015), but this characteristic does not inhibit dispersal. Seitz (2015) found that approximately 30,000 seeds/year and 10,000 stems/year are dispersed through streams during major stormwater events."

Reference(s):

- Smith, A. M., & Wilson S. B. (2016). Natural Area Weeds: Mexican Petunia (*Ruellia simplex*).



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 *screeener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

There is no evidence that this is a significant source of dispersal though it is possible that the mucus-gel produced by seeds when wet would allow them to stick to equipment.

Reference(s):

- Smith, A. M., & Wilson S. B. (2016). Natural Area Weeds: Mexican Petunia (*Ruellia simplex*).
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Total PRE Score

PRE Score: 18 -- Reject (high risk of invasiveness)

Confidence: 80 / 100

Questions answered: 20 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:

- Jed Aplaca January 2, 2018
- Steve Moore August 30, 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.