Plant Risk Evaluator -- PRE™
Evaluation Report

Miscanthus sinensis 'Gracillimus' -- Illinois

2017 Farm Bill PRE Project

PRE Score: 16 -- Reject (high risk of invasiveness)
Confidence: 61 / 100
Questions answered: 20 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Submitted

Evaluation Date: August 23, 2017

This PDF was created on June 15, 2018

Plant Evaluated

Miscanthus sinensis 'Gracillimus'

Image by MBOT

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Miscanthus sinensis 'Gracillimus'*) 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: Submitted
Screener: Emily Russell
Evaluation Date: August 23, 2017

Plant Information

Plant: *Miscanthus sinensis 'Gracillimus'*

If the plant is a cultivar, how does its behavior differs from its parent's?
'Gracillimus' is one of the oldest and most popular cultivars of Miscanthus. The leaf blades of this cultivar are narrower than the species, providing an overall finer texture. 'Gracillimus' blooms later than the species, which may reduce seeding especially in colder climates with a shorter growing season. According to two sources, it is sometimes grown from seed and can show some variability as a result.

Regional Information

Region Name: Illinois

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

Answer / Justification:

"Miscanthus sinensis has been a popular garden ornamental for more than a century and is now found in gardens in many warm temperate areas of the world. Naturalized populations have established from garden escapes in North America, Latin America, New South Wales in Australia and sporadically in Western Europe." M. sinensis 'Gracillimus' is capable of producing viable seed that can travel great distances, and it has been one of the most popular and widely planted cultivars for many years. It seems likely 'Gracillimus' has naturalized, but there is not evidence to definitively prove this cultivar as a parent to naturalized populations, resulting in low confidence for this answer.

Reference(s):

- Randall, R. (2012). A Global Compendium of Weeds. 2nd Edition..
- Madeja, G., Umek L., & Havens K. (2012). Differences in seed set and fill of cultivars of Miscanthus grown in USDA cold hardiness zone 5 and their potential for invasiveness. Journal of Environmental Horticulture. 30, 42.
- Quinn, L. D., Allen D. J., & J. Stewart R. (2010). Invasiveness potential of Miscanthus sinensis: implications for bioenergy production in the United States. GCB Bioenergy. 2, 310–320.
- Dougherty, R. Fitzgerald (2013). Ecology and niche characterization of the invasive ornamental grass Miscanthus sinensis.
- Meyer, M.H.. (2015). Ornamental Uses of Miscanthus.
- The University of Georgia Center for Invasive Species and Ecosystem Health (2017). Illinois Invasive Plant List.
- Riches, C. (2008). Miscanthus sinensis (eulalia) Datasheet In: Invasive Species Compendium.

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

Answer / Justification:

Miscanthus sinensis is invasive in Illinois and across the Eastern United States. M. sinensis 'Gracillimus' is capable of producing viable seed that can travel great distances, and it has been one of the most popular and widely planted cultivars for many years. It seems likely 'Gracillimus' has naturalized, but there is not evidence to definitively prove this cultivar as a parent to naturalized populations, resulting in low confidence for this answer.

Reference(s):

- Randall, R. (2012). A Global Compendium of Weeds. 2nd Edition..
- Madeja, G., Umek L., & Havens K. (2012). Differences in seed set and fill of cultivars of Miscanthus grown in USDA cold hardiness zone 5 and their potential for invasiveness. Journal of Environmental Horticulture. 30, 42.
- Quinn, L. D., Allen D. J., & J. Stewart R. (2010). Invasiveness potential of Miscanthus sinensis: implications for bioenergy production in the United States. GCB Bioenergy. 2, 310–320.
- Dougherty, R. Fitzgerald (2013). Ecology and niche characterization of the invasive ornamental grass Miscanthus sinensis.
- Meyer, M.H.. (2015). Ornamental Uses of Miscanthus.
- The University of Georgia Center for Invasive Species and Ecosystem Health (2017). Illinois Invasive Plant List.
- Riches, C. (2008). Miscanthus sinensis (eulalia) Datasheet In: Invasive Species Compendium.

---

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

Answer / Justification:

Miscanthus sinensis is invasive in Illinois and across the Eastern United States. M. sinensis 'Gracillimus' is capable of producing viable seed that can travel great distances, and it has been one of the most popular and widely planted cultivars for many years. It seems likely 'Gracillimus' has naturalized, but there is not evidence to definitively prove this cultivar as a parent to invasive populations, resulting in low confidence for this answer.

Reference(s):

- Randall, R. (2012). A Global Compendium of Weeds. 2nd Edition..
- Madeja, G., Umek L., & Havens K. (2012). Differences in seed set and fill of cultivars of Miscanthus grown in USDA cold hardiness zone 5 and their potential for invasiveness. Journal of Environmental Horticulture. 30, 42.
- Quinn, L. D., Allen D. J., & J. Stewart R. (2010). Invasiveness potential of Miscanthus sinensis: implications for bioenergy production in the United States. GCB Bioenergy. 2, 310–320.
- Dougherty, R. Fitzgerald (2013). Ecology and niche characterization of the invasive ornamental grass Miscanthus sinensis.
- Meyer, M.H.. (2015). Ornamental Uses of Miscanthus.
- The University of Georgia Center for Invasive Species and Ecosystem Health (2017). Illinois Invasive Plant List.
- Riches, C. (2008). Miscanthus sinensis (eulalia) Datasheet In: Invasive Species Compendium.

---

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

Answer / Justification:

Miscanthus sinensis is invasive in Illinois and across the Eastern United States. M. sinensis 'Gracillimus' is capable of producing viable seed that can travel great distances, and it has been one of the most popular and widely planted cultivars for many years. It seems likely 'Gracillimus' has naturalized, but there is not evidence to definitively prove this cultivar as a parent to invasive populations, resulting in low confidence for this answer.

Reference(s):

- Randall, R. (2012). A Global Compendium of Weeds. 2nd Edition..
- Madeja, G., Umek L., & Havens K. (2012). Differences in seed set and fill of cultivars of Miscanthus grown in USDA cold hardiness zone 5 and their potential for invasiveness. Journal of Environmental Horticulture. 30, 42.
- Quinn, L. D., Allen D. J., & J. Stewart R. (2010). Invasiveness potential of Miscanthus sinensis: implications for bioenergy production in the United States. GCB Bioenergy. 2, 310–320.
- Dougherty, R. Fitzgerald (2013). Ecology and niche characterization of the invasive ornamental grass Miscanthus sinensis.
- Meyer, M.H.. (2015). Ornamental Uses of Miscanthus.
- The University of Georgia Center for Invasive Species and Ecosystem Health (2017). Illinois Invasive Plant List.
- Riches, C. (2008). Miscanthus sinensis (eulalia) Datasheet In: Invasive Species Compendium.

---

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

Answer / Justification:

Miscanthus sinensis is invasive in Illinois and across the Eastern United States. Miscanthus sacchariflorus is also an invasive species.

Reference(s):

- Randall, R. (2012). A Global Compendium of Weeds. 2nd Edition..
- The University of Georgia Center for Invasive Species and Ecosystem Health (2017). Illinois Invasive Plant List.
- Riches, C. (2008). Miscanthus sinensis (eulalia) Datasheet In: Invasive Species Compendium.

---

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

Answer / Justification:

Miscanthus sinensis 'Gracillimus' grows in many different climates.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

Miscanthus sinensis displaces native plants where it is established.

Reference(s):

- Waggy, M. A. (2011). Miscanthus sinensis. In: Fire Effects Information System.

---

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

- 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:

Miscanthus sinensis is highly flammable, is noted for promoting fire in areas where it has established, and may even respond favorably to fire. There is no evidence that 'Gracillimus' is different from the species in flammability and response to fire.

Reference(s):

- Waggy, M. A. (2011). Miscanthus sinensis. In: Fire Effects Information System.

---

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

Answer / Justification:

Miscanthus sinensis is palatable to livestock. There are not reports of health risks to humans (other than cuts from handling the sharp leaf blades) or animals/fish.

Reference(s):

- Waggy, M. A. (2011). Miscanthus sinensis. In: Fire Effects Information System.

---

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

Answer / Justification:

Reports of Miscanthus sinensis creating impenetrable thickets blocking human or animal movement were not found in the literature.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

Miscanthus sinensis propagates by rhizomes and by tillering in its native habitat. In the garden, 'Gracillimus' usually spreads slowly to form a large clump.

Reference(s):

- Riches, C. (2008). Miscanthus sinensis (eulalia) Datasheet In: Invasive Species Compendium.
- Waggy, M. A. (2011). Miscanthus sinensis. In: Fire Effects Information System.

---

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: **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:

Fragments of Miscanthus sinensis rhizomes easily produce new plants, but fragmenting does not seem to be a frequent natural occurrence.

Reference(s):

- [Anonymous] .

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

- 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:

Viable seed set can vary widely among different climates and across different years, but it is not uncommon for Miscanthus sinensis 'Gracillimus' to produce viable seed.

Reference(s):

- Madeja, G., Umek L., & Havens K. (2012). Differences in seed set and fill of cultivars of Miscanthus grown in USDA cold hardiness zone 5 and their potential for invasiveness. Journal of Environmental Horticulture. 30, 42.
- Wilson, S. B., & Knox G. W. (2006). Landscape Performance, Flowering, and Seed Viability of 15 Japanese Silver Grass Cultivars Grown in Northern and Southern Florida. HortTechnology. 16, 686–693.
- Meyer, M.H., & Tchida C.L. (1999). Miscanthus Anderss. produces viable seed in four USDA hardiness zones. Journal of Environmental Horticulture. 17, 137-140.

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

Answer / Justification:

There is evidence that M. sinensis 'Gracillimus' is capable of producing copious viable seeds, but there is not evidence that plants do so each year. In a recent Illinois study, a mean of 6,103 seeds per plant were found in 2010, but only 188 seeds per plant were found in 2007. In a 2006 Florida study, viability for 'Gracillimus' ranged from 11-57%. 'Gracillimus' is a late-flowering cultivar which may not have time to complete its life cycle before frost in colder climates. Self-incompatibility may also play a role in isolated plantings.

Reference(s):

- Madeja, G., Umek L., & Havens K. (2012). Differences in seed set and fill of cultivars of Miscanthus grown in USDA cold hardiness zone 5 and their potential for invasiveness. Journal of Environmental Horticulture. 30, 42.
- Wilson, S. B., & Knox G. W. (2006). Landscape Performance, Flowering, and Seed Viability of 15 Japanese Silver Grass Cultivars Grown in Northern and Southern Florida. HortTechnology. 16, 686–693.
- Meyer, M.H., & Tchida C.L. (1999). Miscanthus Anderss. produces viable seed in four USDA hardiness zones. Journal of Environmental Horticulture. 17, 137-140.

---

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

Answer / Justification:

Miscanthus sinensis 'Gracillimus' had 87-100% germination of viable seed in a Florida study in 2006.

Reference(s):

- Wilson, S. B., & Knox G. W. (2006). Landscape Performance, Flowering, and Seed Viability of 15 Japanese Silver Grass Cultivars Grown in Northern and Southern Florida. HortTechnology. 16, 686–693.

---

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

Reference(s):

- [Anonymous] .

---

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

Answer / Justification:

'Gracillimus' is said to need a long, hot summer to flower in late autumn. It may not flower every year in northern latitudes.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

Seeds of Miscanthus sinensis 'Gracillimus' could potentially be spread by attaching to animals. However, there are not descriptions of this phenomenon available in the literature.

Reference(s):

- [Anonymous] .

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

Answer / Justification:

Miscanthus sinensis seeds are primarily dispersed by wind. In a study of long-distance dispersal of M. sinensis, a small percentage of seeds were captured 300 and 400 meters from their source plant. There is no evidence that 'Gracillimus' seeds are different than the species in their ability to be carried by wind. Water dispersal is also possible for plants growing along streams.

Reference(s):

- Quinn, L. D., Matlaga D. P., J. Stewart R., & Davis A. S. (2011). Empirical Evidence of Long-Distance Dispersal in Miscanthus sinensis and Miscanthus × giganteus. Invasive Plant Science and Management. 4, 142–150.
- Riches, C. (2008). Miscanthus sinensis (eulalia) Datasheet In: Invasive Species Compendium.

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

Answer / Justification:

"In a suitable habitat and climate it [M. sinensis] can be spread accidentally beyond gardens as rhizomes discarded in garden waste or contaminated soil. Pieces of rhizome 4 cm long can be used to propagate the species and smaller fragments may well give rise to feral stands." No other evidence of dispersal by humans, though seeds could potentially attach to clothing.

Reference(s):

- Riches, C. (2008). Miscanthus sinensis (eulalia) Datasheet In: Invasive Species Compendium.

Total PRE Score

PRE Score: 16 -- Reject (high risk of invasiveness)
Confidence: 61 / 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:

- Richard Hawke September 19, 2017

This evaluation has a total of 1 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.