



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

Miscanthus sinensis 'Zebrinus' -- Minnesota

2017 Farm Bill PRE Project

PRE Score: 5 -- Accept (low risk of invasiveness)

Confidence: 71 / 100

Questions answered: 19 of 20 -- Valid (80% or more questions answered)

Privacy: Public

Status: Submitted

Evaluation Date: September 22, 2017

This PDF was created on June 15, 2018



Plant Evaluated

Miscanthus sinensis 'Zebrinus'



Image by MBOT



Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Miscanthus sinensis* 'Zebrinus') 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

Miscanthus 'Zebrinus' is a late-blooming cultivar, which means in Minnesota it is reproductively different from the parent species. Therefore, in this evaluation it will be considered largely on its own merits with less consideration of the earlier-blooming parent species. That said, the notion of bloom time should be considered with some caution given that factors such as climate change, mutation, and phenological adaptation could allow this cultivar to eventually produce viable seed in relatively cold climates. Given its late bloom time in Minnesota, *Miscanthus* 'Zebrinus' is a relatively safe cultivar for that region. It should also be noted that any naturalized population is highly likely to be a hybrid of the straight species and/or cultivars, making it impossible to determine parentage without genetic testing.

General Information

Status: Submitted

Screener: Mike Monterusso

Evaluation Date: September 22, 2017

Plant Information

Plant: *Miscanthus sinensis* 'Zebrinus'

Regional Information

Region Name: Minnesota



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: **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:

No evidence of this specific cultivar naturalizing was found. However, naturalized populations of *Miscanthus* theoretically could include genetic material of any given cultivar. In this case, and throughout the evaluation, the late blooming characteristic of *M. 'Zebrinus'* is taken into consideration.

Reference(s):

- United States Department of Agriculture (2017). Plants Profile for *Miscanthus sinensis* (Chinese silvergrass).
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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: **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:

The parent species is invasive in Wisconsin.



Reference(s):

- Wisconsin Department of Natural Resources (2015). Invasive species - Wisconsin DNR, *miscanthus sinensis*.
-

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

- 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:

The parent species is reported as invasive in CT, DC, GA, IL, IN, KY, MD, NC, NJ, PA, SC, TN, VA, and WI.

Reference(s):

- USDA Forest Service, Forest Health Staff (2006). Chinese silvergrass.doc - chinese-silvergrass.pdf.
-

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

- 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:

The parent species is invasive in Wisconsin.

Reference(s):

- Wisconsin Department of Natural Resources (2015). Invasive species - Wisconsin DNR, *miscanthus sinensis*.



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

Answer / Justification:

The parent species is a "non-regulated terrestrial invasive species" in Wisconsin. *Miscanthus sacchariflorus* is also noted as being invasive in Minnesota.

Reference(s):

- Wisconsin Department of Natural Resources (2015). Invasive species - Wisconsin DNR, *miscanthus sinensis*.
 - USDA Forest Service, Forest Health Staff (2006). Chinese silvergrass.doc - chinese-silvergrass.pdf.
 - Schnitzler, A., & Essl F. (2015). From horticulture and biofuel to invasion: the spread of *Miscanthus* taxa in the USA and Europe. *Weed Research*. 55, 221–225.
 - Minnesota Department of Natural Resources (2017). Invasive Terrestrial Species - Amur Silver Grass.
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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 *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

According to GBIF, most occurrences of *Miscanthus* are in Europe and SE Asia.

Reference(s):

- GBIF (2016). *Miscanthus sinensis* Andersson - GBIF Species.
-



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: **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:

The parent species... "escapes from ornamental plantings and can form large clumps along disturbed areas, displacing native vegetation." Also, any escaped specimen is a hybrid and thus is of unknown parentage, meaning 'Zebrinus' could be involved.

Reference(s):

- Swearingen, J., & Barger C. (2015). Chinese silvergrass: *Miscanthus sinensis* (Cyperales: Poaceae): Invasive Plant Atlas of the United States.
-

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

Answer / Justification:

The parent species... "is also extremely flammable and increases fire risks of invaded areas."

Reference(s):

- Swearingen, J., & Barger C. (2015). Chinese silvergrass: *Miscanthus sinensis* (Cyperales: Poaceae): Invasive Plant Atlas of the United States.
-



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

Answer / Justification:

No evidence found.

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

Answer / Justification:

No evidence found.

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



Answer / Justification:

"Chinese silvergrass regenerates by sprouting from the rhizomes and by tillering."

Reference(s):

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

Answer / Justification:

Reproduction via rhizomes is not considered the same as by fragmentation. Also, *Miscanthus sinensis* is a clump-forming perennial that reproduces primarily by seed.

Reference(s):

- Global Invasive Species Database (2011). GISD - *Miscanthus sinensis*.
-

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

Answer / Justification:

One study demonstrated that 'Zebrinus' produced over 16,000 seeds/plant.



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.
-

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

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

Answer / Justification:

One study demonstrated that 'Zebrinus' produced over 16,000 seeds/plant.

Reference(s):

- Dougherty, R., Quinn L., Voigt T., & Barney J. (2015). Response of Naturalized and Ornamental Biotypes of *Miscanthus sinensis* to Soil-Moisture and Shade Stress. *Northeastern Naturalist*. 22, 372–386.
 - 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.
-

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?

Reference(s):

- [Anonymous] .
-



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

Answer / Justification:

"...seed set and/or the production of more rhizomes occurs within the first growing season." This assumes it is grown in an area with a long enough growing season.

Reference(s):

- Victorian Resources Online, Agriculture Victoria (2017). Chinese Silvergrass (*Miscanthus sinensis*).
-

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

Answer / Justification:

Miscanthus sinensis flowers and sets seed once/year.

Reference(s):

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



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

Answer / Justification:

Miscanthus sinensis seeds are dispersed by wind.

Reference(s):

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

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

Answer / Justification:

If seeds were produced, they are dispersed by wind but the average distance is likely 5-10 meters.

Reference(s):

- Waggy, M. A. (2011). *Miscanthus sinensis*. In: Fire Effects Information System.
 - 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.
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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 *screeners* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

No evidence found.

Reference(s):

- [Anonymous] .
-

Total PRE Score

PRE Score: 5 -- Accept (low risk of invasiveness)

Confidence: 71 / 100

Questions answered: 19 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:

- Tom Buechel

October 16, 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.

Issue ID # 6025

Date Created: November 30, 2017 - 8:38am

Date Updated: December 18, 2017 - 9:31am

Submitted by: Laura Van Riper

Status: Fixed

Type: Suggestion

Severity: Minor

Scope: Evaluation as a whole

Issue Description

Madeja et al. 2012 could be a good published reference to add.

[Differences in seed set and fill of cultivars of *Miscanthus* grown in USDA cold hardiness zone 5 and their potential for invasiveness](#)

G Madeja, L Umek, [K Havens](#) - Journal of Environmental Horticulture, 2012 - academia.edu

https://s3.amazonaws.com/academia.edu.documents/46987346/Differences_in_Seed_Set_and_Fill_of_Cult20160703-1992-ffxocq.pdf?AWSAccessKeyId=AKIAIWOWYYGZ2Y53UL3A&Expires=1512063443&Signature=a%2FSzKVof7DIHr3YmgGseulU0KXM%3D&response-content-disposition=inline%3B%20filename%3DDifferences_in_Seed_Set_and_Fill_of_Cult.pdf

Issue Resolution (Screener's Response to Issue)

Issue resolved by PRE Data Manager -- source was already linked to Q13 and Q14 but hidden behind file name. Updated source in PRE to reflect authors and title.



Issue ID # 5423

Date Created: October 16, 2017 - 9:26am

Date Updated: November 28, 2017 - 12:01pm

Submitted by: Tom Buechel

Status: Fixed

Type: Comment

Severity: Major

Scope: Q05. Are other species of the same genus invasive in a similar climate?

Issue Description

Used one literature review that may not be entirely accurate information. The information may be preconceived as *Miscanthus* is not regulated by WI law.

Issue Resolution (Screener's Response to Issue)

The screener agrees that additional references would support the response and score. In this case, an additional reference was added (US Forest Service) and the confidence level lowered from "high" to "medium". Legal status, while providing solid support for invasive status, is not a factor in most definitions of invasive.



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.