



*Plant Risk Evaluator -- PRE<sup>TM</sup>  
Evaluation Report*

*Miscanthus sinensis* 'Graziella' -- Minnesota

*2017 Farm Bill PRE Project*

**PRE Score:** 15 -- Evaluate this plant further

**Confidence:** 75 / 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* 'Graziella'



Image by MBOT



## Evaluation Overview

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

When conducting an evaluation of a *Miscanthus* cultivar, it is difficult to not consider the parent species, especially with regard to sterility and bloom timing. *Miscanthus* 'Graziella' is an early-blooming variety that will set seed if another cultivar, or perhaps even another *Miscanthus* species, is in close proximity. Once a variety sets seed, the progeny are of a different genotype and will continue to hybridize and set seed. There is no natural or controlled environment (i.e. landscape) where this process can be guaranteed to not occur. In reviewing the documentation for these cultivars, the consensus appears to be that only completely sterile cultivars should be marketed. Bloom time represents another side of this situation. Late-blooming varieties could be considered relatively safe to plant if seed do not develop prior to the arrival of freezing temperatures. Therefore, moving forward, bloom time should be considered in conjunction with climate change.

## General Information

**Status:** Submitted

**Screener:** Mike Monterusso

**Evaluation Date:** September 22, 2017

## Plant Information

**Plant:** *Miscanthus sinensis* 'Graziella'

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

" 'Graziella' is noted for its narrow green leaves which form a substantial, rounded, arching clump of foliage typically growing 4-6' tall (to 7' when in flower)... Blooms earlier than most *Miscanthus* cultivars... Similar in appearance to *M. s.* 'Gracillimus' except blades are more erect and overall clump height is shorter." (Missouri Botanical Garden)



## 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: **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:

The parent species has naturalized in several US states.

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

#### Answer / Justification:

The parent species, *Miscanthus sinensis*, has naturalized in the Upper Peninsula of Michigan.

#### Reference(s):

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



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

#### Answer / Justification:

"It is reported 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.
  - 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.
- 

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

#### Answer / Justification:

It is a "non-regulated terrestrial invasive species" in Wisconsin.

#### 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.
-



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

### Answer / Justification:

The answer depends on the interpretation of a related species. The parent species is a non-regulated terrestrial invasive species in Wisconsin. Given that cultivars hybridize readily, it's impossible to determine if a naturalized specimen is a particular cultivar or a hybrid. *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.
- 

## 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 sinensis* 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: **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:

"*Miscanthus sinensis* escapes from ornamental plantings and can form large clumps along disturbed areas, displacing native vegetation."

#### 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: **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 grass 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.
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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 *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] .
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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 **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 **Medium** confidence in this answer based on the available literature.

**Answer / Justification:**

While *Miscanthus sinensis* does reproduce vegetatively via rhizomes, these are not considered to be naturally detached fragments.

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

**Answer / Justification:**

Chinese silvergrass spreads vegetatively by rhizomes and also by seed



**Reference(s):**

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

**Answer / Justification:**

In a 2012 study, a "clump" of *Miscanthus* 'Graziella' was shown to produce nearly 50,000 seeds.

**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."

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

#### Answer / Justification:

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:

Seeds are dispersed by wind but the average distance was shown to be 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:** 15 -- Evaluate this plant further

**Confidence:** 75 / 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 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](mailto:PlantRight@suscon.org) if additional action is required to resolve open issues.

### Issue ID # 6027

**Date Created:** November 30, 2017 - 8:39am

**Date Updated:** December 18, 2017 - 8:48am

**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%2FSzKVofF7DIHr3YmgGseulU0KXM%3D&response-content-disposition=inline%3B%20filename%3DDifferences\\_in\\_Seed\\_Set\\_and\\_Fill\\_of\\_Cult.pdf](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%2FSzKVofF7DIHr3YmgGseulU0KXM%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 -- this source was already linked to several of the questions, but the name wasn't clear as it was a PDF with a file number as the name. Updated source to reflect authors and name of paper.



## Issue ID # 6024

**Date Created:** November 30, 2017 - 8:28am

**Date Updated:** December 18, 2017 - 9:07am

**Submitted by:** Laura Van Riper

**Status:** Fixed

**Type:** Suggestion

**Severity:** Minor

**Scope:** Evaluation as a whole

## Issue Description

Most of the references have anonymous authors. These two peer reviewed papers may also provide good sources for data.

Quinn, L.: D. Allen, and J. Stewart. 2010. Invasiveness potential of *Miscanthus sinensis*: Implications for bioenergy production in the United States. *Global Change Biology-Bioenergy*. 2(6) 310-320.

Quinn, L. D. Matlaga, R. Stewart and A. Davis. 2011. Empirical evidence of long-distance dispersal in *Miscanthus sinensis* and *Miscanthus x giganteus*. *Invasive Plant Science and Management* 4 (1): 142-150.

## Issue Resolution (Screener's Response to Issue)

Issue resolved by PRE Data Manager -- went through and added corporate and primary authors to all sources. The 2011 source given above was already one of the sources, but hidden behind a file name. Updated sources so that relevant source information is reflected. 2010 source was already in the database, but is now linked to this evaluation on Q3.

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## Issue ID # 5426

**Date Created:** October 16, 2017 - 9:28am

**Date Updated:** November 28, 2017 - 11:04am



**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 on literature review that may be preconceived information. *Miscanthus* not regulated by WI law.

### **Issue Resolution (Screener's Response to Issue)**

(same response as issue 5421) [dnr.wi.gov](http://dnr.wi.gov) lists *Miscanthus sinensis* as a "Non-Restricted Terrestrial Invasive Species". The screener interprets this as meaning that a particular species does not need to be regulated in order to be considered invasive. This is also consistent with most interpretations of what is defined as "invasive". That said, the screener agrees that more references would be beneficial, and any corresponding law would provide significant support to labeling a specific plant as invasive.

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### **Issue ID # 5421**

**Date Created:** October 16, 2017 - 9:19am

**Date Updated:** November 28, 2017 - 11:16am

**Submitted by:** Tom Buechel

**Status:** Fixed

**Type:** Comment

**Severity:** Major

**Scope:** Q04. Is the species (or cultivar or variety) noted as being invasive in the US or world in a similar climate?

### **Issue Description**

Should use more than one literature review as this may be preconceived information. *Miscanthus* is still not regulated in WI.



### **Issue Resolution (Screener's Response to Issue)**

(same response as issue 5426) [dnr.wi.gov](http://dnr.wi.gov) lists *Miscanthus sinensis* as a "Non-Restricted Terrestrial Invasive Species". The screener interprets this as meaning that a particular species does not need to be regulated in order to be considered invasive. This is also consistent with most interpretations of what is defined as "invasive". That said, the screener agrees that more references would be beneficial, and any corresponding law would provide significant support to labeling a specific plant as invasive. Also note that the confidence level was changed from "high" to "medium".

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## **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](mailto: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.