Plant Risk Evaluator -- PRE™
Evaluation Report

Miscanthus sinensis var. condensatus 'Cabaret' -- Illinois

2017 Farm Bill PRE Project

PRE Score: 11 -- Accept (low risk of invasiveness)
Confidence: 58 / 100
Questions answered: 20 of 20 -- Valid (80% or more questions answered)

Privacy: Public
Status: Submitted

Evaluation Date: August 29, 2017

This PDF was created on June 15, 2018

Plant Evaluated

Miscanthus sinensis var. condensatus 'Cabaret'

Image by MBOT

Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Miscanthus sinensis var. condensatus 'Cabaret'*) 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 29, 2017

Plant Information

Plant: *Miscanthus sinensis var. condensatus 'Cabaret'*

If the plant is a cultivar, how does its behavior differs from its parent's?
"Var. condensatus has stouter culms, almost twice the diameter, with broader leaves" (MOBOT). In Taiwan, M. sinensis var. condensatus populations have been shown to be apomictic and to have sterile pollen, unlike the species. However, some taxonomists don't recognize condensatus as a distinct variety or subspecies. The leaves of 'Cabaret' are variegated with a wide white stripe down the center. It is a late-season bloomer. This cultivar is said to be a strong grower, but is less cold-hardy than the species and some other cultivars. "'Cabaret' may not be reliably winter hardy throughout USDA Zone 5 where it would benefit from a protected location." (MOBOT). It may set less viable seed than the species. 'Cabaret' was introduced in the mid-1970s by the US National Arboretum.

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." It is unknown if M. sinensis var. condensatus 'Cabaret' has contributed to these populations, but it is capable of producing viable seed in warmer climates and could be a factor.

Reference(s):

- Randall, R. (2012). A Global Compendium of Weeds. 2nd Edition..
- 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.
- 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.
- Dougherty, R. Fitzgerald (2013). Ecology and niche characterization of the invasive ornamental grass Miscanthus sinensis.
- 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: **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:

Miscanthus sinensis is invasive in Illinois and across the Eastern United States. However, there is not evidence that 'Cabaret' produces seed in Illinois and it is marginally cold hardy in this climate so it seems unlikely to contribute to naturalized populations.

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.
- The University of Georgia Center for Invasive Species and Ecosystem Health (2017). Illinois Invasive Plant List.
- Missouri Botanical Garden (2017). Miscanthus sinensis var. condensatus 'Cabaret' - Plant Finder.

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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 *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. It is unknown if M. sinensis var. condensatus 'Cabaret' has contributed to these populations, but it is capable of producing viable seed in warmer climates and could be a factor.

Reference(s):

- 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.
- 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.
- Dougherty, R. Fitzgerald (2013). Ecology and niche characterization of the invasive ornamental grass Miscanthus sinensis.
- Riches, C. (2008). Miscanthus sinensis (eulalia) Datasheet In: Invasive Species Compendium.
- 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.

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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: **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:

Miscanthus sinensis is invasive in Illinois and across the Eastern United States. However, there is not evidence that 'Cabaret' produces seed in Illinois and it is marginally cold hardy in this climate so it seems unlikely to contribute to naturalized populations.

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.
- The University of Georgia Center for Invasive Species and Ecosystem Health (2017). Illinois Invasive Plant List.
- Missouri Botanical Garden (2017). Miscanthus sinensis var. condensatus 'Cabaret' - Plant Finder.

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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):

- 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.
- Randall, R. (2012). A Global Compendium of Weeds. 2nd Edition..

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

Answer / Justification:

M. sinensis var. condensatus 'Cabaret' grows in many different climates, and seems to perform better in a warmer climate than Illinois.

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.

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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 M. sinensis var. condensatus 'Cabaret' is different from the species in flammability and response to fire.

Reference(s):

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

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

Answer / Justification:

Miscanthus sinensis var. condensatus 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):

- J. Stewart, R., Toma Y., Fernández F. G., Nishiwaki A., Yamada T., & Bollero G. (2009). The ecology and agronomy of Miscanthus sinensis, a species important to bioenergy crop development, in its native range in Japan: a review. GCB Bioenergy. 1, 126–153.
- Waggy, M. A. (2011). Miscanthus sinensis. In: Fire Effects Information System.

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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 *screener* has a **Medium** 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:

"Vegetative propagation via rhizomes is the most common means by which patches are able to expand."

Reference(s):

- Chou, C-H., Chiang Y-C., & Chiang T-Y. (2000). Genetic variability and phytogeography of Miscanthus sinensis var. condensatus, an apomictic grass, based on RAPD fingerprints. Canadian Journal of Botany. 78, 1262–1268.

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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: **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] .

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

Answer / Justification:

In an Illinois study, 'Cabaret' had 8 inflorescences but 0 viable seed in 2007, however it "was a poor performer horticulturally and had completely died out by the end our trial, likely due to a lack of winter hardiness." In a 2006 Florida study, 'Cabaret' had 35-103 inflorescences, with 47-64% viability and 54-66% germination of viable seed. Several other horticultural descriptions claim that 'Cabaret' does not set viable seed. These contradictory results lower the confidence level for this answer. Since the climate in Florida is much warmer than Illinois, evidence is still lacking that 'Cabaret' would produce viable seed here.

Reference(s):

- Marden, T. B. (2014). Southern Gardener's Handbook: Your Complete Guide: Select, Plan, Plant, Maintain, Problem-Solve - Alabama, Arkansas, Georgia, Kentucky, Louisiana, Mississippi, Tennessee.
- 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.
- Jones, L. (2004). RHS Plant Trials and Awards. Bulletin Number.
- Plant Delights Nursery (2017). Miscanthus.

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

Reference(s):

- [Anonymous] .

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:

In a 2006 Florida study, 'Cabaret' had 54-66% germination of viable seed.

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.

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

Reference(s):

- [Anonymous] .

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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.

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

Reference(s):

- [Anonymous] .

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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 *screener* has a **Medium** 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 M. sinensis var. condensatus 'Cabaret' 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.

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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 *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: 11 -- Accept (low risk of invasiveness)
Confidence: 58 / 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 18, 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.