



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

Bothriochloa ischaemum -- Texas

2017 Farm Bill PRE Project

PRE Score: 17 -- 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: September 2, 2017

This PDF was created on July 06, 2018



Plant Evaluated

Bothriochloa ischaemum



Image by Ivan Bilek



Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Bothriochloa ischaemum*) 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

Bothriochloa ischaemum has been introduced for pasture improvement and erosion purposes throughout much of the southern US. The species has escaped and invaded natural areas where it is invasive, displacing native grasses.

General Information

Status: Completed

Screener: Kim Taylor

Evaluation Date: September 2, 2017

Plant Information

Plant: *Bothriochloa ischaemum*

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

This evaluation is for the species, not a particular cultivar.

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

Answer / Justification:

The species is noted as naturalized across most of the southern US.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).
 - United States Department of Agriculture (2014). USDA-NRCS Plants Database.
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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 *screeener* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

The species is noted as naturalized across most of the southern US. Much of the southern US has a similar climate to Texas.

Reference(s):

- Kartesz, J. T. (2015). The Biota of North America Program (BONAP).



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

Answer / Justification:

Listed by Texas Invasives. "This species has been introduced into 17 states in the southern part of USA and into Puerto Rico where it is invasive."

Reference(s):

- CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
 - TexasInvasives.org (0). Texas Invasives - *Bothriochloa ischaemum*.
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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 *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

Bothriochloa ischaemum is invasive in Texas which is the area of interest.

Reference(s):

- TexasInvasives.org (0). Texas Invasives - *Bothriochloa ischaemum*.
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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:

Bothriochloa bladhii is highly invasive on Pacific Islands and is listed invasive by the Missouri Department of Conservation. Neither of these regions share a similar climate with Texas.

Reference(s):

- CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
 - Invasive Plant Atlas of the United States (0). Caucasian bluestem: *Bothriochloa bladhii* (Cyperales: Poaceae): Invasive Plant Atlas of the United States.
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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 **High** confidence in this answer based on the available literature.

Answer / Justification:

Populations in North America share a similar climate but populations in Europe and Asia do not. Less than half of the total range has a similar climate.

Reference(s):

- GBIF (0). *Bothriochloa ischaemum* (L.) Keng (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:

"Very serious ecological threat due to widespread planting by ranchers and highway departments." "B. ischaemum can readily escape original planting sites where it can invade native rangelands, with negative ecological and economic consequences such as the formation of monocultures and the loss of native biodiversity. This species is a particular problem in Texas where dense monocultures are displacing native grass species." "In Texas, B. ischaemum is found to be displacing native grass species (Gabbard and Fowler, 2007)."

Reference(s):

- CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
 - TexasInvasives.org (0). Texas Invasives - *Bothriochloa ischaemum*.
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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:

It is tolerant of fire but does not appear to increase fire frequency or intensity.

Reference(s):

- CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
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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 *screeners* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

This species is often planted for cattle forage and there is no toxicity reported.

Reference(s):

- TropicalForages.info (0). Factsheet - *Bothriochloa ischaemum* Tropical Forages.
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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 *screeners* has a **Very High** confidence in this answer based on the available literature.

Answer / Justification:

This species is a grass so it does not produce 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 *screeners* has a **High** confidence in this answer based on the available literature.



Answer / Justification:

Plants "occasionally stoloniferous or rhizomatous, especially when heavily grazed or under frequently mowed."

Reference(s):

- CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
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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 *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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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:

Bothriochloa ischaemum reproduces by seed.

Reference(s):

- TexasInvasives.org (0). Texas Invasives - *Bothriochloa ischaemum*.



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

Answer / Justification:

"It produces an abundant seed bank (20-40kg of seed per hectare) which can survive a long time." "Yields of pure live seed of usually range from 20-40 kg/ha." 3.1 million seeds per kg.

Reference(s):

- CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
 - FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (0). *Bothriochloa ischaemum* fao.org.
 - TropicalForages.info (0). Factsheet - *Bothriochloa ischaemum* Tropical Forages.
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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 **Medium** confidence in this answer based on the available literature.

Answer / Justification:

"There is some post-harvest dormancy, so seed should be kept for 6-7 months before planting."

Reference(s):

- FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS (0). *Bothriochloa ischaemum* fao.org.
 - TropicalForages.info (0). Factsheet - *Bothriochloa ischaemum* Tropical Forages.
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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 *screeners* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

Liu et al. note the species has "quick reproduction". Experiments were carried out on plants in August that were sown in May of the same year while plants were in early flower.

Reference(s):

- Liu, Y., Li P., Xu G. Ce, Xiao L., Ren Z. Ping, & Bin Li Z. (2017). Growth, Morphological, and Physiological Responses to Drought Stress in *Bothriochloa ischaemum*. *Frontiers in Plant Science*. 8,
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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: **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:

In the northern hemisphere it typically flowers from June/July to September/October. "The seeding period occurs from summer through fall"

Reference(s):

- CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
 - Swearingen, J., & Barger C. (0). yellow bluestem: *Bothriochloa ischaemum* (Cyperales: Poaceae): Invasive Plant Atlas of the United States.
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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 *screeener* has a **Medium** confidence in this answer based on the available literature.

Answer / Justification:

There is no evidence suggesting spread by birds or mammals. Seeds are apparently dispersed by wind.

Reference(s):

- CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
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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 **High** confidence in this answer based on the available literature.

Answer / Justification:

Plants naturally disperse into new areas by wind or water borne seeds. "the grain exteriors are usually covered with short fine hairs. Because the grains are very light, they can be blown about by the wind in open areas."

Reference(s):

- IllinoisWildflowers.info (0). *Bothriochloa ischaemum* (Plains Bluestem) Illinois wildflowers.
 - CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
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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 *screeners* has a **High** confidence in this answer based on the available literature.

Answer / Justification:

GRIN notes the species is a "potential seed contaminant". "Seeds can be accidentally transported on vehicles, clothing, including footwear and in contaminated seed of forage grass (Hilty, 2014)."

Reference(s):

- CABI (2015). *Bothriochloa ischaemum* (yellow bluestem) Datasheet (CABI).
 - U.S. National Plant Germplasm Network (0). Taxonomy - GRIN-Global Web v 1.9.8.2 *Bothriochloa ischaemum*.
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Total PRE Score

PRE Score: 17 -- 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:

- Charlotte Reemts November 13, 2017
- Trey Wyatt November 1, 2017
- Steve Moore September 7, 2017

This evaluation has a total of 3 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.