



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

Liriope muscari 'Variegata' -- Georgia

2017 Farm Bill PRE Project

PRE Score: 15 -- Evaluate this plant further

Confidence: 51 / 100

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

Privacy: Public

Status: Submitted

Evaluation Date: November 30, 2017

This PDF was created on August 13, 2018



Plant Evaluated

Liriope muscari 'Variegata'



Image by Fine Gardening



Evaluation Overview

A PRE™ screener conducted a literature review for this plant (*Liriope muscari* 'Variegata') 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

'Variegata' differs from *Liriope muscari* in leaf color. Given this, much of this evaluation was based off of information from the parent species, *L. muscari*. Little is known about the Reproductive strategies/Dispersal of *L. muscari* and 'Variegata', so many of the justification answers in these sections were based on assumption and/or single source information. The Invasive History and Climate Matching section was based mainly on the parent species *L. muscari*, which may have led to a high overall PRE Score for this cultivar.

General Information

Status: Submitted

Screener: Lila Uzzell

Evaluation Date: November 30, 2017

Plant Information

Plant: *Liriope muscari* 'Variegata'

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

'Variegata' features medium green leaves which are variegated with creamy yellow margins (Missouri Botanical Gardens). Source:

<http://www.missouribotanicalgarden.org/PlantFinder/PlantFinderDetails.aspx?kempercode=d930>

Regional Information

Region Name: Georgia



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

Answer / Justification:

There is no mention of the cultivar being naturalized where not native, but given that this cultivar only differs by leaf color, it is safe to assume that it has naturalized in the same areas as its parent species (*L. muscari*). *L. muscari* is mentioned in the Global Compendium of Weeds as "naturalized" in the US. It has been reported in several southern US states and is labeled as invasive by the GA and SC EPPC.

Reference(s):

- Missouri Botanical Garden (0). *Liriope muscari* 'Variegata' - Plant Finder.
- GBIF (0). *Liriope muscari* (Decne.) L.H.Bailey- GBIF.
- Missouri Botanical Garden (0). *Liriope muscari* - Plant Finder.
- Hawaiian Ecosystems at Risk (HEAR) project (2007). *Liriope muscari* information from the Global Compendium of Weeds (GCW).
- Swearingen, J., & Barger C. (2015). monkeygrass: *Liriope muscari* (Liliales: Liliaceae): Invasive Plant Atlas of the United States.

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



Answer / Justification:

There is no mention of the cultivar being naturalized where not native, but given that this cultivar only differs by leaf color, it is safe to assume that it has naturalized in the same areas as its parent species (*L. muscari*). *L. muscari* is mentioned in the Global Compendium of Weeds as "naturalized" in the US. It has been reported in several southern US states and is labeled as invasive by the GA and SC EPPC.

Reference(s):

- Missouri Botanical Garden (0). *Liriope muscari* 'Variegata' - Plant Finder.
 - GBIF (0). *Liriope muscari* (Decne.) L.H.Bailey- GBIF.
 - Missouri Botanical Garden (0). *Liriope muscari* - Plant Finder.
 - Hawaiian Ecosystems at Risk (HEAR) project (2007). *Liriope muscari* information from the Global Compendium of Weeds (GCW).
 - Swearingen, J., & Barger C. (2015). monkeygrass: *Liriope muscari* (Liliales: Liliaceae): Invasive Plant Atlas of the United States.
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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 *screeener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

the parent species, *L. muscari*, is noted as invasive in Georgia and South Carolina. The cultivar itself has not been labeled as invasive, but give that it only differs from its parent species by leaf color, it can be assumed that it shares the same invasive characteristics. Since the cultivar is not specifically listed as invasive, I have left my confidence level "Low".

Reference(s):

- Missouri Botanical Garden (0). *Liriope muscari* 'Variegata' - Plant Finder.
 - GBIF (0). *Liriope muscari* (Decne.) L.H.Bailey- GBIF.
 - Missouri Botanical Garden (0). *Liriope muscari* - Plant Finder.
 - Swearingen, J., & Barger C. (2015). monkeygrass: *Liriope muscari* (Liliales: Liliaceae): Invasive Plant Atlas of the United States.
 - Georgia Invasive Species Task Force (2017). List of Non-native Invasive Plants in Georgia - Georgia Invasive Species Task Force.
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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 *screener* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

the parent species, *L. muscari*, is noted as invasive in Georgia and South Carolina. The cultivar itself has not been labeled as invasive, but given that it only differs from its parent species by leaf color, it can be assumed that it shares the same invasive characteristics. Since the cultivar is not specifically listed as invasive, I have left my confidence level "Low".

Reference(s):

- Missouri Botanical Garden (0). *Liriope muscari* 'Variegata' - Plant Finder.
 - GBIF (0). *Liriope muscari* (Decne.) L.H.Bailey - GBIF.
 - Missouri Botanical Garden (0). *Liriope muscari* - Plant Finder.
 - Swearingen, J., & Barger C. (2015). monkeygrass: *Liriope muscari* (Liliales: Liliaceae): Invasive Plant Atlas of the United States.
 - Georgia Invasive Species Task Force (2017). List of Non-native Invasive Plants in Georgia - Georgia Invasive Species Task Force.
-

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:

The parent species, *L. muscari* and another species in the same genus, *L. spicata* are invasive to Georgia. They are both listed as a category 3 invasive: " Exotic plant that is a minor problem in Georgia natural areas, or is not yet known to be a problem in Georgia but is known to be a problem in adjacent states."



Reference(s):

- Georgia Invasive Species Task Force (2017). List of Non-native Invasive Plants in Georgia - Georgia Invasive Species Task Force.
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6. Is the species (or cultivar or variety) found predominately in a climate matching the region of concern?

- 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:

Cultivar: grows in Zones 5 to 10 Parent Species: >50% of the areas where this plant is found match Georgia's climate region. *L. muscari* is found in FL, GA, SC, and TX. It is also found in China, Japan, and New Zealand.

Reference(s):

- Missouri Botanical Garden (0). *Liriope muscari* 'Variegata' - Plant Finder.
 - GBIF (0). *Liriope muscari* (Decne.) L.H.Bailey- GBIF.
-

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:

Parent species: This species is listed as invasive by Georgia, but is listed as a category 3- "Exotic plant that is a minor problem in Georgia natural areas, or is not yet known to be a problem in Georgia but is known to be a problem in adjacent states." Missouri Botanical Gardens describes *L. muscari* as: "Clumps slowly expand by short stolons, but do not spread aggressively like *Liriope spicata*." Since this species is listed by Georgia and South Carolina as invasive, I have left my confidence level "medium". Invasive qualities typically include that there is a possibility of this plant smothering native community.

Reference(s):

- Missouri Botanical Garden (0). *Liriope muscari* - Plant Finder.
 - Swearingen, J., & Barger C. (2015). monkeygrass: *Liriope muscari* (Liliales: Liliaceae): Invasive Plant Atlas of the United States.
 - Georgia Invasive Species Task Force (2017). List of Non-native Invasive Plants in Georgia - Georgia Invasive Species Task Force.
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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 *screeners* has a **Low** confidence in this answer based on the available literature.

Answer / Justification:

Lack of evidence.

Reference(s):

- [Anonymous] .
-

9. Is the plant a health risk to humans or animals/fish? Has the species been noted as impacting grazing systems?

- 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:

Parent species: "Poison Part: Berries; Poison Delivery Mode: Ingestion; Symptoms: No cases known, but caution due to relationship with known toxic plants; Toxic Principle: Unknown; Severity: CAUSES ONLY LOW TOXICITY IF EATEN"

Reference(s):

- NC State Extension (0). *Liriope muscari* - NC State.
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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 **Low** confidence in this answer based on the available literature.

Answer / Justification:

Lack of evidence.

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

Answer / Justification:

'Variegata': "This plant spreads slowly by rhizomes and forms thick tubers that look like small potatoes."



Reference(s):

- Gilman, E. F. (2015). *Liriope Muscari* 'Variegata' IFAS.
-

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: **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:

'Variegata': "An easy to grow, clump-forming groundcover"; "Variegated lilyturf may be propagated by division of the clumps or tubers. It will also grow from seed if the pulp is removed." Parent Species: "Clumps slowly expand by short stolons, but do not spread aggressively like *Liriope spicata*." The majority of the descriptions on this species and cultivar are how to propagate it vegetatively. There is no mention of this plant reproducing vegetatively naturally, but it can be assumed that it does this naturally since there is very little information about its seed dispersal. Propagation via division seems more common. Given my assumption, I have left my confidence level "low" since there is no direct evidence of this.

Reference(s):

- Missouri Botanical Garden (0). *Liriope muscari* 'Variegata' - Plant Finder.
 - Gilman, E. F. (2015). *Liriope Muscari* 'Variegata' IFAS.
 - Missouri Botanical Garden (0). *Liriope muscari* - Plant Finder.
-

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

- Answer: **No**, which contributes **0** points to the total PRE score.
- The *screeners* has a **Very Low** confidence in this answer based on the available literature.



Answer / Justification:

Parent species: This plant can quickly germinate, and each berry contains two seeds. The amount of berries produced per plant is not given. Not enough information is available to answer this question for this cultivar.

Reference(s):

- SF Gate, Home Guides (0). How to Gather Liriope Seeds.
 - Scheper, J. (2009). Liriope muscari Plant Profile- floridata.
-

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

- 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:

Parent species: Liriope berries contain two seeds per berry. It is unknown how many berries are produced per plant, but based off of Liriope images and the description of the berry, it does not seem as though plant produces >1000 seeds each year.

Reference(s):

- SF Gate, Home Guides (0). How to Gather Liriope Seeds.
 - Missouri Botanical Garden (0). Liriope muscari 'Variegata' - Plant Finder.
 - Scheper, J. (2009). Liriope muscari Plant Profile- floridata.
 - Swearingen, J., & Barger C. (2015). monkeygrass: Liriope muscari (Liliales: Liliaceae): Invasive Plant Atlas of the United States.
-

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: **No**, which contributes **0** points to the total PRE score.
- The *screeener* has a **Very Low** confidence in this answer based on the available literature.



Answer / Justification:

Lack of information.

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 / Justification:

no information.

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

Answer / Justification:

'Variegata': "Bloom Time: August; Erect, showy flower spikes with tiered whorls of dense, violet-purple flowers rise above the leaves in late summer. Flowers give way to blackish berries which often persist into winter." Bloom time tends to be around August or September, and lasts a short time. Very little is known about seed production other than it "persists into winter".

Reference(s):

- Missouri Botanical Garden (0). *Liriope muscari* 'Variegata' - Plant Finder.



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: **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:

no evidence, but morphological features of the berries suggest dispersal by birds.

Reference(s):

- [Anonymous] .
-

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

Answer / Justification:

no evidence

Reference(s):

- [Anonymous] .
-



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

Answer / Justification:

no evidence

Reference(s):

- [Anonymous] .

Total PRE Score

PRE Score: 15 -- Evaluate this plant further

Confidence: 51 / 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:

This evaluation does not have any reviewers.



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 # 6177

Date Created: December 21, 2017 - 3:34am

Date Updated: February 21, 2018 - 10:24am

Submitted by: Professor Allan Armitage

Status: Fixed

Type: Suggestion

Severity: Major

Scope: Evaluation as a whole

Issue Description

i am not sure how important the cultivar designation is in this evaluation. The responses for questions 1-5 are all valid, if only the species was in question, however, I don't consider them accurate if only the cultivar is being considered.

There is little doubt that *L. muscari* has escaped and is difficult to contain and eradicate in many areas of Georgia. However, I don't believe this can be said about 'Variegata'. I can't recall any escaped populations of 'Variegata' in my travels. To suggest that 'Variegata' is as potentially aggressive as the species is not borne out by observation.

It may be argued that seed of 'Variegata' may result in seedlings of the species, but I have no evidence of that. I don't see 'Variegata' as invasive in Georgia and believe the rating should reflect that.

Issue Resolution (Screener's Response to Issue)

This is hard with cultivars. Many cultivars have very little information provided to properly answer these question- so if they only differ in characteristics such as leaf color or shape, then we typically use the parent species to answer PRE questions. I've re-analyzed this evaluation, being more picky about specifically referring to the cultivar. It now falls in the "evaluate further" category. I hope this is a good compromise.





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.