

**Australia/New Zealand Weed Risk Assessment adapted for Florida.**

**Data used for analysis published in: Gordon, D.R., D.A. Onderdonk, A.M. Fox, R.K. Stocker, and C. Gantz. 2008. Predicting Invasive Plants in Florida using the Australian Weed Risk Assessment. Invasive Plant Science and Management 1: 178-195.**

| <i>Liriope muscari (lilyturf)</i> |  |        |       |
|-----------------------------------|--|--------|-------|
| Question number                   | Question   | Answer | Score |
| 1.01                              | Is the species highly domesticated?  | n      | 0     |
| 1.02                              | Has the species become naturalised where grown?                                      |        |       |
| 1.03                              | Does the species have weedy races?   |        |       |
| 2.01                              | Species suited to Florida's USDA climate zones (0-low; 1-intermediate; 2-high)       | 2      |       |
| 2.02                              | Quality of climate match data (0-low; 1-intermediate; 2-high)                        | 2      |       |
| 2.03                              | Broad climate suitability (environmental versatility)                                |        |       |
| 2.04                              | Native or naturalized in habitats with periodic inundation                           |        |       |
| 2.05                              | Does the species have a history of repeated introductions outside its natural range? | y      |       |
| 3.01                              | Naturalized beyond native range  | y      | 0     |
| 3.02                              | Garden/amenity/disturbance weed  | n      | 0     |
| 3.03                              | Weed of agriculture  | n      | 0     |
| 3.04                              | Environmental weed   | n      | 0     |
| 3.05                              | Congeneric weed  | n      | 0     |
| 4.01                              | Produces spines, thorns or burrs   | n      | 0     |
| 4.02                              | Allelopathic   | y      | 1     |
| 4.03                              | Parasitic  | n      | 0     |
| 4.04                              | Unpalatable to grazing animals   |        |       |
| 4.05                              | Toxic to animals   | n      | 0     |
| 4.06                              | Host for recognised pests and pathogens  | n      | 0     |
| 4.07                              | Causes allergies or is otherwise toxic to humans                                     | n      | 0     |
| 4.08                              | Creates a fire hazard in natural ecosystems  | n      | 0     |
| 4.09                              | Is a shade tolerant plant at some stage of its life cycle                            | y      | 1     |
| 4.1                               | Grows on infertile soils (oligotrophic, limerock, or excessively draining soils)     | y      | 1     |
| 4.11                              | Climbing or smothering growth habit  | n      | 0     |
| 4.12                              | Forms dense thickets   | n      | 0     |
| 5.01                              | Aquatic  | n      | 0     |

|                    |  |   |          |
|--------------------|--|---|----------|
| 5.02               | Grass  | n | 0        |
| 5.03               | Nitrogen fixing woody plant  | n | 0        |
| 5.04               | Geophyte   | y | 1        |
| 6.01               | Evidence of substantial reproductive failure in native habitat                                 |   |          |
| 6.02               | Produces viable seed   | y | 1        |
| 6.03               | Hybridizes naturally   |   |          |
| 6.04               | Self-compatible or apomictic   |   |          |
| 6.05               | Requires specialist pollinators  | n | 0        |
| 6.06               | Reproduction by vegetative fragmentation   | y | 1        |
| 6.07               | Minimum generative time (years)  |   |          |
| 7.01               | Propagules likely to be dispersed unintentionally (plants growing in heavily trafficked areas) |   |          |
| 7.02               | Propagules dispersed intentionally by people   | y | 1        |
| 7.03               | Propagules likely to disperse as a produce contaminant   | n | -1       |
| 7.04               | Propagules adapted to wind dispersal   | n | -1       |
| 7.05               | Propagules water dispersed   | n | -1       |
| 7.06               | Propagules bird dispersed  | y | 1        |
| 7.07               | Propagules dispersed by other animals (externally)   | n | -1       |
| 7.08               | Propagules dispersed by other animals (internally)   | y | 1        |
| 8.01               | Prolific seed production   |   |          |
| 8.02               | Evidence that a persistent propagule bank is formed (>1 yr)                                    |   |          |
| 8.03               | Well controlled by herbicides  | y | -1       |
| 8.04               | Tolerates, or benefits from, mutilation or cultivation   | y | 1        |
| 8.05               | Effective natural enemies present in Florida, or east of the continental divide                |   |          |
| <b>Total Score</b> |  |   | <b>7</b> |

|                |                |
|----------------|----------------|
| <b>Outcome</b> | <b>Reject*</b> |
|----------------|----------------|

\*Used secondary screen from: Daehler, C. C., J.L. Denslow, S. Ansari, and H. Kuo. 2004. A risk assessment system for screening out harmful invasive pest plants from Hawaii's and other Pacific islands. *Conserv. Biol.* 18: 360-368.

| section | # questions answered | satisfy minimum? |
|---------|----------------------|------------------|
| A       | 6                    | yes              |
| B       | 11                   | yes              |
| C       | 16                   | yes              |
| total   | 33                   | yes              |

Data collected 2006-2007

| Question number | Reference  | Source data   |
|-----------------|--|---|
| 1.01            |  | cultivated, but no evidence of selection for reduced weediness  |
| 1.02            |  |   |
| 1.03            |  |   |
| 2.01            |  |   |
| 2.02            |  |   |
| 2.03            | Missouri Botanical Garden, Kemper Center for Home Gardening ( <a href="http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100">http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100</a> ).   | Native range: China, Taiwan, Japan  |
| 2.04            |  |   |
| 2.05            | 1. Fagan, Dirr, and Pokorny (1981) Effects of depulping, stratification, and growth regulators on seed germination of <i>Liriope muscari</i> . HortScience 16: 208-209. 2. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida. 3. Missouri Botanical Garden, Kemper Center for Home Gardening ( <a href="http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100">http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100</a> ). | 1. " <i>Liriope muscari</i> , big blue lirioppe, is one of the most commercially important ground covers in the southern landscape, and is widely used in the southwest and California." 2, 3. used horticulturally |
| 3.01            | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.   | Naturalized in South Carolina, Georgia, Mississippi, Louisiana, and Maryland.   |
| 3.02            |  | no evidence   |
| 3.03            |  | no evidence   |
| 3.04            |  | no evidence   |
| 3.05            |  | no evidence   |
| 4.01            | Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.  | no description of these traits  |
| 4.02            | 1. Hruska, Dirr, and Pokorny (1982) Investigation of anthocyanic pigments and substances inhibitory to seed germination in the fruit pulp of <i>Liriope muscari</i> . Journal of the American Society for Horticultural Science 107: 468-473. 2. USDA, NRCS. 2005. The PLANTS Database, Version 3.5  | 1. Several compounds isolated from the fruit pulp of <i>Liriope muscari</i> significantly inhibited seed germination of <i>Cucumis sativus</i> L. 'Poinsett'. BUT 2. not allelopathic                               |

|      |   |  |
|------|---|--|
|      | ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.   |  |
| 4.03 |   | no description of this   |
| 4.04 |   |  |
| 4.05 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.  | no toxicity  |
| 4.06 | 1. Gilman (1999) <i>Liriope muscari</i> . University of Florida, IFAS Extension, FPS-347 ( <a href="http://hort.ufl.edu/shrubs/LIRMUSA.PDF">http://hort.ufl.edu/shrubs/LIRMUSA.PDF</a> ). 2. Missouri Botanical Garden, Kemper Center for Home Gardening ( <a href="http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100">http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100</a> ). 3. Fagan, Dirr, and Pokorny (1981) Effects of depulping, stratification, and growth regulators on seed germination of <i>Liriope muscari</i> . HortScience 16: 208-209. | 1. "no serious pests are normally seen on the plant...No diseases are of major concern." 2. "No serious insect or disease problems. Slugs and snails are occasional visitors." 3. insect and disease resistant |
| 4.07 | 1. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. 2. Hortcopia 4.0.   | 1. no toxicity 2. "This plant is considered mostly allergy free and causes little or no allergy problems in most people."  |
| 4.08 |   | no evidence  |
| 4.09 | 1. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. 2. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida. 3. Hortcopia 4.0. 4. Missouri Botanical Garden, Kemper Center for Home Gardening ( <a href="http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100">http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100</a> ).          | 1. shade tolerant 2. "prefers partial to deep shade" 3. full shade to full sun BUT 4. full sun to part shade   |
| 4.1  | 1. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida. 2. Gilman (1999) <i>Liriope muscari</i> . University of Florida, IFAS Extension, FPS-347 ( <a href="http://hort.ufl.edu/shrubs/LIRMUSA.PDF">http://hort.ufl.edu/shrubs/LIRMUSA.PDF</a> ). 3. Fagan, Dirr, and Pokorny (1981) Effects of depulping, stratification, and growth regulators on seed germination of <i>Liriope muscari</i> . HortScience 16: 208-209.  | 1. "tolerates a wide range of soils" 2. soil tolerances: alkaline; clay; sand; acidic; loam 3. attributes include "adaptability to a wide range of soil types"   |
| 4.11 | Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.   | clumping herb  |
| 4.12 | Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.   | "forms dense, grasslike mats of medium texture" [but is an herbaceous, low-growing plant]  |

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| 5.01 |   | terrestrial   |
| 5.02 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.  | Liliaceae   |
| 5.03 | USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.  | does not fix nitrogen [and herbaceous]  |
| 5.04 | 1. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.<br>2. Horticipia 4.0. 3. Anderson (1987) Variable root systems in <i>Liriope muscari</i> . American Journal of Botany 74: 605. 4. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA.                               | 1. forms tubers 2. "forms thick tubers that look like small potatoes"<br>3. " <i>Liriope muscari</i> has a fibrous root system with three distinct morphologies. The roots may be fine and smooth, contractile with wrinkles or have areas of swollen tissue sometimes called "tubers"...The "tuber" structures arise near the root apex and continue to expand for some time."<br>BUT 4. not propagated by bulbs, corms, or tubers |
| 6.01 |   |   |
| 6.02 | 1. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.<br>2. Hruska, Dirr, and Pokorny (1982) The propagation of <i>Liriope muscari</i> 'Variegata' and <i>Ophiopogon japonicus</i> from seeds. HortScience 17: 51. 3. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. | 1. propagate by seed 2. "After warm stratification for 6 weeks, depulped seeds of <i>Liriope muscari</i> L. 'Variegata'...germinated 77%..., compared to about 25% for intact fruits." BUT 3. not propagated by seed  |
| 6.03 |   |   |
| 6.04 |   |   |
| 6.05 | Krewer, Delaplaine, and Thomas (1996) Screening plants as supplemental forages for pollinating bumblebees ( <i>Bombus</i> spp.). HortScience 31: 750.   | "In 3 years of trials, the following plants have shown promise as supplemental bumblebee forages in south Georgia:...monkey grass ( <i>Liriope muscari</i> )..."  |
| 6.06 | 1. USDA, NRCS. 2005. The PLANTS Database, Version 3.5 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). Data compiled from various sources by Mark W. Skinner. National Plant Data Center, Baton Rouge, LA 70874-4490 USA. 2. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.  | 1. growth form: rhizomatous, rapid vegetative spread rate 2. spreads by rhizomes  |
| 6.07 |   |   |
| 7.01 |   |   |
| 7.02 | 1. Fagan, Dirr, and Pokorny (1981) Effects of   | 1. " <i>Liriope muscari</i> , big blue lirioppe,  |

|      |  |  |
|------|--|--|
|      | depulping, stratification, and growth regulators on seed germination of <i>Liriope muscari</i> . HortScience 16: 208-209. 2. Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida. 3. Missouri Botanical Garden, Kemper Center for Home Gardening ( <a href="http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100">http://www.mobot.org/gardeninghelp/plantfinder/Plant.asp?code=L100</a> ). | is one of the most commercially important ground covers in the southern landscape, and is widely used in the southwest and California." 2, 3. used horticulturally   |
| 7.03 |  | no evidence  |
| 7.04 | Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.  | fruit is small, fleshy, berry-like, 0.5 in wide [no evidence of adaptations for wind dispersal]  |
| 7.05 |  | no evidence  |
| 7.06 | Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.  | fruit is small, fleshy, berry-like, 0.5 in wide [no evidence regarding dispersal, but fruit is berry-like]   |
| 7.07 | Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.  | fruit is small, fleshy, berry-like, 0.5 in wide [no evidence of any means of attachment]   |
| 7.08 | Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.  | fruit is small, fleshy, berry-like, 0.5 in wide [no evidence regarding dispersal, but fruit is berry-like]   |
| 8.01 |  |  |
| 8.02 |  |  |
| 8.03 | 1. Collins, McNiel, and Weston (2001) Evaluation of sulfentrazone for weed control and phytotoxicity in field-grown landscape plants. Journal of Environmental Horticulture 19: 189-194. 2. Hurt and Vencill (1994) Evaluation of three imidazolinone herbicides for control of yellow and purple nutsedge in woody and herbaceous landscape plants. Journal of Environmental Horticulture 12: 131-134.  | 1. "Phytotoxicity was mainly associated with contact of the herbicide with developing foliage, but sulfentrazone was particularly damaging to the herbaceous species <i>Liriope [muscari]</i> and <i>Hemerocallis</i> , where damage was observed throughout the plants...The most sensitive species evaluated in this study were: <i>Abies</i> , <i>Liriope</i> , and <i>Hemerocallis</i> ." BUT 2. Three herbicides did not appear to affect green liriop ( <i>Liriope muscari</i> ) growth. |
| 8.04 | Dehgan, B. (1998) Landscape Plants for Subtropical Climates. University Press of Florida.  | "Can be heavily sheared (actually mowed) every few years to remove ragged old foliage." BUT "It will not withstand foot traffic."  |
| 8.05 |  |  |