

**LIRIOPE GRAMINIFOLIA (RUSCACEAE) NEW TO THE ARKANSAS FLORA,
SECOND RECORD FOR THE USA**

BRETT E. SERVISS

Biology Department
Box H-7570
Henderson State University
1100 Henderson Street
Arkadelphia, Arkansas 71999
servisb@hsu.edu

MEGAN A. STONE

1318 O'Connell Street
Arkadelphia, Arkansas 71923
megan_ann2011@live.com

BROOK L. OLSEN

202 Hyacinth Circle
Hot Springs, Arkansas, 71913
brooklolsen@gmail.com

KEENAN B. SERVISS

Sylvia Street
Arkadelphia, Arkansas 71923

JAMES H. PECK

P.O. Box 705
Cedar Key, Florida 32625
james.peckck@gmail.com

ABSTRACT

Liriope graminifolia (L.) Baker is first reported here as new to the Arkansas flora and represents the first documented occurrence of the species in the state outside of cultivation and naturalized. Our record also apparently is only the second documented occurrence of *L. graminifolia* outside of cultivation in the USA. Thirteen distinct colonies of *L. graminifolia*, ranging from about a half-dozen plants to 100s of individuals and/or ramets, were discovered along a 3/10 of a mile (530 m) stretch of a small stream in a highly disturbed riparian habitat in Pulaski County. The Pulaski County location is bordered on two sides by residential areas. Two additional escaped occurrences of *L. graminifolia* in Clark County also are documented. Photographs of naturalized *L. graminifolia* in habitat are provided.

Liriope graminifolia (L.) Baker (grass lilyturf; creeping lilyturf — Figs. 1–2) is a stoloniferous perennial that is native to China, Pakistan, Taiwan, and Vietnam (Chen & Tamura 2000; Nesom 2010). In the USA, it previously only has been documented outside of cultivation in Texas (Nesom 2010; Kartesz 2015). *Liriope graminifolia* is reported here as new to the Arkansas flora and represents the first documented occurrence of the species in the state outside of cultivation and naturalized (Gentry et al. 2013; Serviss et al. 2016). Our record also is only the second documented occurrence of the species outside of cultivation in the USA.

Liriope graminifolia is regularly cultivated in much of the southeastern USA, including Arkansas (Hume 1961; Fantz 2008, 2009; Nesom 2010). Plants in cultivation typically produce extensive colonies via stoloniferous offsets (Nesom 2010; Serviss et al. 2016). This tendency of *L. graminifolia* to spread from source plants provides legitimate potential for escape and naturalization into areas adjacent to where plants of the species are cultivated (Serviss et al. 2016). Based on its regular occurrence in cultivation, stoloniferous habit, and ability for seed production, the discovery of *L. graminifolia* naturalized in Arkansas is not surprising.



Figure 1. *Liriope graminifolia* flowers, fruits (seeds with fleshy sarcotestas), inflorescences, and infructescences. (A–B) Close-up of flowers and young inflorescences. (C) Older inflorescence (notice the coloration has faded from purple to pale lavender). (D) Infructescences and nearly mature fruits. (E) Mature fruits — two, nearly black fruits may be seen in the photograph.



Figure 2. Naturalized plants of *Liriope graminifolia* from Pulaski County, Arkansas showing leaves, well-developed stolons, roots, and inflorescences (notice the inflorescences are equal in length or longer than the leaves — this aids in distinguishing it from the morphologically similar, *L. spicata* Lour. which typically has inflorescences positioned well below the leaves).

In 2016, 13 distinct colonies of *L. graminifolia*, ranging from about a half-dozen plants to 100s of individuals and/or ramets, were discovered along a 3/10 of a mile (530 m) stretch of a small stream in a highly disturbed riparian habitat in Pulaski County, Arkansas (Figs. 3–7). Naturalized *L. graminifolia* plants were observed growing in both semi-open and wooded areas. Plants were in flower and many ramets also possessed nearly mature fruits.



Figure 3. One of the larger colonies of naturalized plants of *Liriope graminifolia* from Pulaski County showing vegetative establishment via stoloniferous offsets (many offsets may be seen around the periphery of the main cluster of plants/ramets). Also, notice the plant of *L. muscari* (Dcne.) L. H. Bailey in the upper left corner of the photograph. Numerous naturalized individuals of *L. muscari* and the related *Ophiopogon japonicus* (Thunb.) Ker-Gawl. also were present at the Pulaski County site.

In one place of the Pulaski County site, plants of *L. graminifolia* were observed spreading from cultivated/persistent individuals of the species that were located at the edge of an unkempt yard. Spread appeared to have occurred a distance of several meters from the yard edge across an open area and through a portion of the adjacent woods of the riparian zone. While this observation attributes a plausible source and mode of establishment for one of the naturalized colonies of *L. graminifolia*, establishment of other colonies could be attributed to somewhat longer-distance bird- and/or water-mediated dispersal/transport of propagules (seeds and/or offsets). *Liriope graminifolia* is cultivated in a number of locations in Little Rock, including at least a few that occur within the vicinity of the naturalized plants. These plantings potentially provide a rich source of propagules. Subsequent spread and naturalization by *L. graminifolia* within the riparian zone probably occurred from a combination of stoloniferous offsets and seeds.



Figure 4. Plants/ramets from a portion of the largest observed colony of naturalized *Liriope graminifolia* from Pulaski County. This colony consisted of probably 100s of plants/ramets and extends from the edge of the riparian zone well into the woods along the stream. These plants appeared to have spread from individuals of *L. graminifolia* that were persistent from cultivation in an adjacent yard — spread from the persistent plants appeared to be predominately accomplished from stoloniferous offsets and occurred over a distance of several meters from the original area of cultivation.



Figure 5. Another, distinct colony of naturalized *Liriope graminifolia* from Pulaski County. The portion of the riparian zone where this colony occurs is a semi-wooded, flattened expanse just above the stream bank; this area contained several scattered colonies of *L. graminifolia*. A number of the plants/ramets in these colonies had nearly mature fruits.



Figure 6. Small colony of naturalized *Liriope graminifolia* from Pulaski County (distinct from those shown in previous figures). These plants were smaller than most of the others and appeared to have only recently produced flowers. This colony was growing in a flat, semi-open area near the edge of the riparian zone.



Figure 7. Similar colony of *Liriope graminifolia* to that shown in Fig. 6; this colony was smaller and the entirety of it is represented by the 10–12 ramets seen in the photograph. The ramets of this colony were still connected via stolons and it occurred in a mowed area at the edge of the riparian zone.

Additionally, we document a second occurrence of *L. graminifolia* outside of cultivation in Arkansas. Two small, escaped colonies of *L. graminifolia* were discovered growing in highly disturbed areas on the Henderson State University (HSU) campus in Clark County (Fig. 8). *Liriope graminifolia* is regularly cultivated on the campus and plants have been observed spreading from cultivated material via stoloniferous offsets (Serviss et al. 2016). Cultivated plants of *L. graminifolia* on the campus also produce fruit. The two colonies are separated by over 50 m and thus represent two independent escaped occurrences. The method of escape is unknown, although dispersal via seed is likely.



Figure 8. Escaped plants of *Liriope graminifolia* from Clark County, Arkansas. . (A) Serviss 8361. (B) Serviss 8360. Cultivated plants of the species are in the vicinity of both groups of escaped plants; however, spread from stoloniferous offsets is not likely as both groups are several meters from the nearest cultivated individuals. Rather, establishment via seeds probably occurred.

There appears to be an inherent degree of variation in regard to inflorescence length (including scape), flower and rachis coloration, and leaf width that occurs in Arkansas material of *L. graminifolia* — this variation may be observed in both cultivated and naturalized plants. Inflorescences may fade considerably subsequent to anthesis (Fig. 2A–C). Leaf width also is variable, from narrow and grass-like to considerably wider (see key below). Fantz (2008) and Nesom (2010) provide detailed descriptions of the species. Some photographs of cultivated *L. graminifolia* provided in the online appendix by Nesom (2010) show plants with very pale lavender to whitish-pink inflorescences, similar in color and form to much of the Pulaski County material. It is important to note, however, that horticultural selection, hybridization, polyploidy, or specific environmental factors, such as shading and available moisture, or some combination thereof, may have contributed to the variation observed in Arkansas material of *L. graminifolia* — identifications of some plants may be equivocal.

Liriope graminifolia is easily confused with *L. spicata* Lour., which is well-naturalized in Arkansas (Serviss et al. 2016). Overlap between the two species exists in regard to both vegetative and reproductive characters. *Liriope graminifolia* sometimes has wider leaves than *L. spicata* and is possibly less aggressive in regard to colonization and spread from stoloniferous offsets. These differences are supported by Fantz (2008) — attributed to *L. exiliflora* (L.H. Bailey) H.H. Hume, which is synonymous with *L. graminifolia* (Nesom 2010). Arkansas material of *L. graminifolia* and

L. spicata may be distinguished using the following key (in part, modified from Nesom 2010 — see also Fig. 9).

1. Scapes mostly equal to or taller than the leaves, (15–)20–44(–53) cm long, inflorescences conspicuous and often positioned well above the leaves, rachis of inflorescence (4–)5–13 cm long, flowers purple, lilac, or lavender, but flowers and rachis sometimes fading with age to pale lavender or pinkish–white; leaves variable in width, 2–12 mm wide ***Liriope graminifolia***
1. Scapes and inflorescences mostly shorter than the leaves and often obscured by them, scapes 12–29 cm long, rachis of inflorescence 2–5(–8) cm long, flowers white to pale pink or pale violet; leaves 3–8 mm wide ***Liriope spicata***

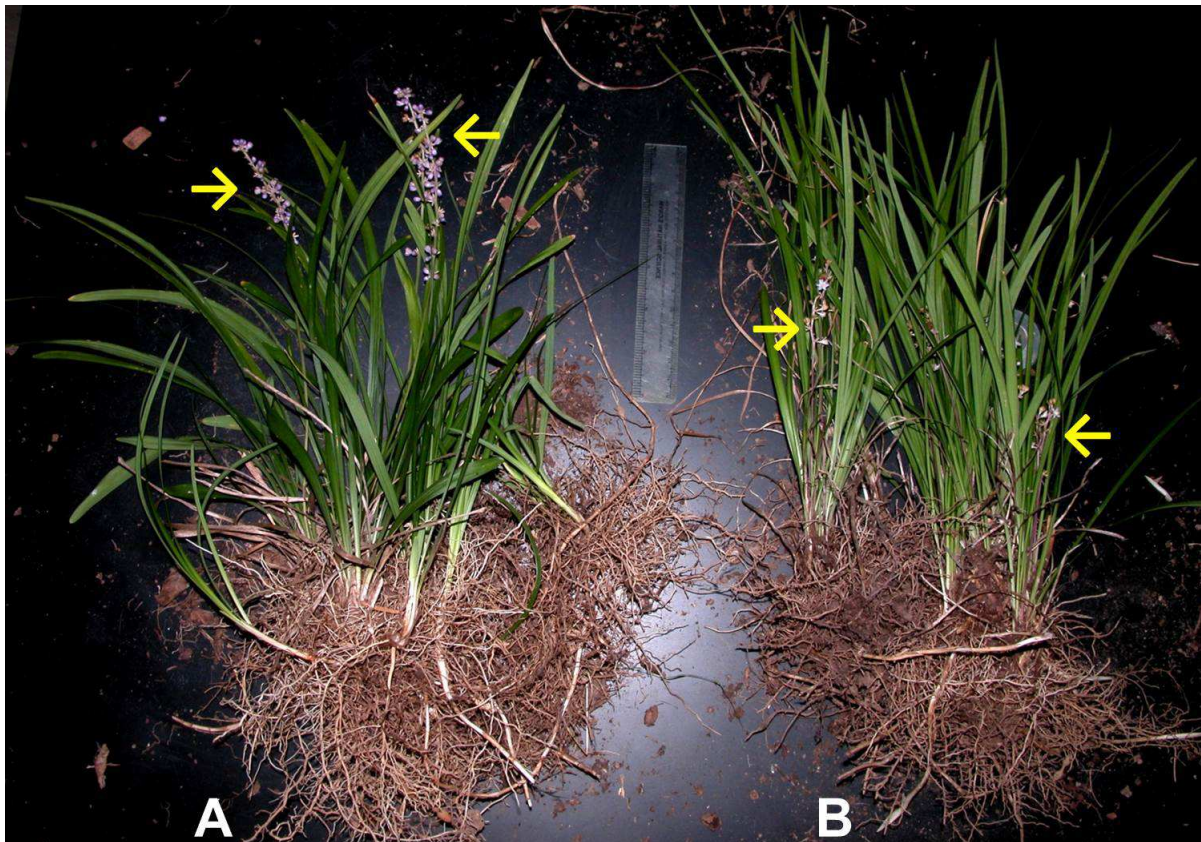


Figure 9. Comparison of reproductive plants of *Liriope graminifolia* and *L. spicata* (from cultivated material). Plants were growing in the same location at the same time when collected. (A) *L. graminifolia*. (B) *L. spicata*. Some inflorescences on both plants are designated with yellow-colored arrows. Notice both plants possess well-developed stolons; however, *L. graminifolia* has purple flowers and longer inflorescences that are positioned equal to or above the leaves, as compared to *L. spicata* with its white-colored flowers and smaller, shorter inflorescences that are positioned well below the leaves. Also notice the plant of *L. graminifolia* has slightly wider leaves.

Voucher specimens: **ARKANSAS**. Clark Co.: Small colony of escaped plants consisting of about 7 ramets in highly disturbed area near edge of Garrison Center, plants in flower, HSU campus, Arkadelphia, 23 Aug 2016, *Serviss* 8361 (HEND); small colony of escaped plants in shaded, highly disturbed area immediately S of the Reynolds Science Building, plants in flower and spreading vegetatively via stoloniferous offsets, HSU campus, Arkadelphia, 10 Aug 2016, *Serviss* 8360 (HEND). Pulaski Co.: Thirteen distinct, naturalized colonies present along a 3/10 of a mile stretch of stream and highly disturbed riparian zone, plants spreading vegetatively via stoloniferous offsets and

also possibly from seeds, many plants with flowers and nearly mature fruits, Hidden Valley Dr. between Rodney Parham Dr. and Pleasant Valley Dr., Little Rock, 2 Sep 2016, *Serviss* 8367 (HEND).

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