

Liriope muscari Production and Use in the Southeastern United States

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INTRODUCTION

Liriope muscari is an evergreen, basal-leafed, herbaceous, lily-like, monocotyledonous perennial. It is commonly called lilyturf, monkey grass, border grass, or big blue lilyturf. A closely related genus, *Ophiopogon*, is also commonly called monkey grass. *Liriope muscari* is in the Liliaceae and is native to China and Japan. The species is cold hardy to U.S.D.A. Zones 6 to 10. There are four other species in the genus. *Liriope spicata* and *L. gigantea* are also commonly used as ornamental landscape plants. Lilyturf is a clumping lily. The clump enlarges by rhizomes and possesses tubers. These tubers seem to store water and have no vegetative reproductive features. The species varies in height from 7 to 70 cm.

Liriope muscari has foliage that is evergreen, basal, linear, straplike, sometimes revolute, entire, ciliate, prominently parallel veined, midrib protruding below, glabrous and glandular dotted on both sides, dark green to light green to variegated, and to 60 cm (2 ft) long by up to 20 mm (3/4 in.) across.

The plant is landscape hardy for heat, humidity, and drought and is tolerant of many pests. The inflorescence is ornamental. Racemes are up to 20 cm long. Many cultivars elevate the racemes on scapes up to 30 cm above the foliage. Flower color ranges from dark purple to shades of lavender and pink to white. The species blooms mid to late summer and persists for 8 weeks. The fruits are 1 or 2 seeded, dark black, shiny, globose capsules to about 1 cm across. Germinating seed in established landscapes and production nurseries will contaminate pure genotypes.

Liriope spicata is a creeping species and cold hardy to Zone 4. It is used as a spreading groundcover. It has narrower leaves and is shorter than *L. muscari*. The flowers are pale lavender and not as showy.

Liriope gigantea has the largest leaf of all liriopes. Commonly called evergreen giant liriop, *L. gigantea* grows up to 75 cm tall. The slender scape is dark purplish brown and flowers are light violet. The scapes are hidden beneath the canopy.

LANDSCAPE USES

Liriope muscari is one of the most useful and versatile groundcover plants for a large part of the United States. The liriop species that are commercially important can be planted from Zone 4 to Zone 10. *Liriope spicata* is useful as a mass planted groundcover in Zones 4 through 8. Chicago, Illinois; Dallas, Texas; Philadelphia, Pennsylvania; and Atlanta, Georgia; are cities within that range. *Liriope muscari* is less cold-hardy but thrives in Zones 6 through 10. It is less invasive and is the predominant species used ornamentally. *Liriope gigantea* is the least cold hardy, reliably used in Zones 8 through 10.

Lily turf can survive under a wide range of environmental conditions. They tolerate hot, dry locations such as Dallas, Texas, but they equally like hot and humid areas, such as the Gulf Coast of the Southeastern United States. They are not particular

to soil type although some organic addition to sandy soils is preferable. *Liriope* can be used on steep banks and slopes as erosion control or in areas where other plants are difficult to establish, such as under trees. It is used in border plantings along sidewalks, driveways or along landscape beds and is popular as a mass planting. Because of its tolerance to drought, it is used in planter boxes, patio urns, and as specimens in rock gardens. *Liriope* tolerates heavy shade but is slower growing and the flower stems are more elongated under shade conditions.

Plantings should be mowed to the ground to eliminate old foliage and to allow a new flush of growth in the spring. *Liriope gigantea* should not be mowed to the ground in late winter because the foliage remains upright and clean from year to year. *Liriope muscari* foliage deteriorates from the autumn through the winter months, becoming spotted, tattered, and prostrate. As spring approaches and the new flush of growth appears, the older foliage turns brown and unsightly.

CULTIVARS OF COMMERCIAL VALUE

Liriope spicata (creeping liriope) is sold as the species and is green. 'Silver Dragon' is the only *L. spicata* cultivar that has dark green leaves with silvery-white longitudinal variegation. The height is 16 to 20 cm and the variegation makes a very cool appearance in the garden. *Liriope gigantea* 'Evergreen Giant' is the tallest ornamental lilyturf growing up to 75 cm. Adapted especially well in Zones 8b through 10, it is a major landscape ornamental in Florida and is gaining popularity along the Gulf Coast of the Southeastern United States from South Carolina, to Louisiana, to San Antonio, Texas.

I have made two selections from a seedling population that are darker green, and more vigorous and robust than 'Evergreen Giant'. My hope is to determine whether or not one is more cold tolerant, moving the range of adaptability north. Currently, we are moving some of the selections to tissue culture for rapid multiplication but still need 2 or 3 years more for observation of these selections before we can confidently name and release them as cultivars.

Liriope muscari 'Big Blue' and 'Variegata' cultivars are the most commercially successful and desired cultivars of this species. 'Big Blue', introduced by Tidwell Nursery of Georgia more than 40 years ago, has broader and longer leaves and larger flower spikes than the common lilyturf. 'Big Blue' has tapered spikes and is considered typical of the species.

Liriope muscari 'Variegata' is produced in similar numbers to 'Big Blue'. 'Variegata' is gold variegated with dark violet-blue flowers and is an established garden favorite. Height is 30 to 45 cm tall. It was introduced to the United States by the U.S. Department of Agriculture in 1956. This form shows close affinities with *Liriope platyphylla*.

Commercial cultivars of secondary importance include:

- 'Christmas Tree'—spikes of non-opening flowers are shaped like a blue Christmas tree, green foliage (also called Munroe's No.2.)
- 'John Burch'—Very large variegated form, wide leaves, upright, young leaves edged with white. Cock's comb blooms, standing well above the foliage. Flowers are lavender, showy and prominent.
- 'Monroe's White'—The only large, white-flowering liriope. The long stiff spikes stand out well above the foliage. This cultivar does best in partial shade. It is also known as 'Monroe's No.1'.

- 'Majestic'—Grows 30 to 40 cm tall, producing lavender flower spikes in July and August that stand above the wide, dark green foliage. The spikes are compact. The flowers are more showy in shade than in sun.

Many cultivars have been designated by gardeners and nurserymen over the years. Some of their names are: *L. muscari*: 'Samantha', 'Silvery Midget', 'Gold-banded', 'Purple Bouquet', 'Lilac Beauty', 'Blue Spire', 'Curly Twist', 'Silver Banded', 'Border Gem', 'Crested White', 'Densiflora', 'Exiliflora', 'Franklin Mint', 'Gilner White', 'Graminifolia', 'Graminifolia alba', 'Graminifolia minor', 'Green Midget', 'Hawk's Feather', 'Peedee Ingot', 'Rocket', 'Royal Purple', and 'Sheffield'; *L. spicata*: 'Alba', 'Webster's Wide Leaf', 'Yellow Leaf', and 'Superba'; and *Liriope exliflora* 'Silvery Sunproof' (syn. *L. muscari* 'Silvery Sunproof').

The 'Superba' cultivar shows great promise as a commercial cultivar, more robust than 'Big Blue' and the leaves are very long. Observing 'Superba' in a nearby collection, the cultivar thrives and grows well all year round on poor soils, given care. The flowers are tall, profuse and silvery metallic pink.

PROPAGATION OF LILYTURF

Seed propagation of *Liriope muscari* is not commercially acceptable. Seedling variation is great even from seed lots that are collected from a cultivar stock source. The great variation reduces the desirability of plants produced for ornamental uses. The seed matures in the autumn and should be sown as soon as ripe. Under greenhouse conditions, germination is rapid. The seedlings require 1 to 2 years after germination to develop sufficiently to be transplanted into the garden. Seed sown directly outdoors in the autumn and mulched with organic matter will germinate in the spring.

The variegated forms of *Liriope* have been difficult to tissue culture. Many attempts to do so have been difficult because of the great variability in variegation of the resulting plantlets. Only the green-leaved cultivars have been commercially produced in tissue culture laboratories. *Liriope gigantea* 'Evergreen Giant' is readily available commercially, produced by tissue culture.

Division is the primary method of *Liriope* propagation. Propagules are called pips or bibs. A bib of *L. muscari* 'Variegata' given optimum conditions will multiply to a clump of five bibs in one year. *Liriope muscari* 'Big Blue', under similar conditions, will multiply to eight bibs in one year.

Our nursery is located in U.S.D.A. Zone 8b. The traditional start date for propagation is February 15 each year. At that time the liriope is dormant and the danger of extreme cold (below -9C) is past. Clumps are cropped of foliage to 10 cm. Raised-bed, field-grown, or containerized liriope can be used for division. We prefer growing containerized stock for propagation. We are able to maintain genetic uniformity with containers more easily than those from raised beds or in the ground.

The optimum time for division is 15 March to 15 April, prior to the first flush. The soil is removed and the roots are cropped. The clump is divided into single plant propagules. The top is further cropped to 5 cm and the roots are cropped to 2.5 cm.

The bibs are transplanted into 8- cm or 10-cm diameter plastic containers. The 8-cm liner, when matured, will be transplanted into 2-litre, 3-litre, or 4-litre containers for growing on. The 10 cm is sold at maturity in a tray of 16 units. *Liriope muscari* 'Big Blue' will produce a saleable 10 cm in 6 months maximum. The

'Variegata' requires 10 months. The 10-cm trays are boxed, three trays per box to our customers.

Our company produces 1.4 million units per year, so we have to divide all year round. Division after 15 September is hazardous. The new division will have little time to reestablish prior to the winter. *Liriope* responds quickly to regenerate root growth in the spring and summer heat. During the heavy spring growth (15 April to 15 May) we stop propagation because the new divisions are easily killed by dividing the soft new tissue.

PRODUCTION

Bibs planted after 1 October are put in cold frames to protect against frost. *Liriope* exhibits two primary growth cycles: a very heavy flush in the spring and another flush in September. The September cycle is half that of the spring cycle. 'Variegata' requires the spring and autumn growth to become saleable. 'Big Blue' can be saleable as a 10-cm container on the spring growth alone. Half of the plants produced after this will be saleable following the autumn cycle. All of our production is at a full sun site.

The growing medium is mostly 1-cm milled pine bark, with some Canadian peat moss (25 : 3.5, v/v). *Liriope* is a heavy feeder. The medium is amended with approx. 6 kg per m³ of 6N : 6P : 6K fertiliser with micronutrients; 3 kg of dolomitic lime, 2.4 kg of calcitic lime, and 12 kg. of 16N : 10P : 10K slow-release fertiliser. *Liriope* grows well with NO₃ levels of 30 ppm in the soil solution, however, 0.9 kg per 10 m² of 12N : 6P : 6K fertiliser can be used to boost NO₃ levels if needed.

Because of the high fertility levels and *liriope*'s nature, we water heavily throughout the growing season. Too little water encourages spider mite problems and leaf spotting. These problems do not occur with vigorous, well-watered plants. As in the landscape, old foliage is removed in production prior to the spring growth. *Liriope* held more than 12 months in a container becomes unsightly, diseased, and unsalable. Production and marketing should be timed to avoid having old *Liriope* left on the nursery.

Our crops receive a general fungicide application every 14 to 21 days. Scouting for red spider infestation should be done every 7 days and a preventative miticide application should be on a 14- to 21-day schedule. Hot spots of mite infection should be acted upon aggressively. We have had total success using predatory mites to control red spider mite populations and eliminate both fungicide and miticide application.

Our company produces over 1.4 million *liriope* per year. Sixty percent is marketed as 10 cm and the remainder as 2-litre, 3-litre, or 4-litre containers. 'Big Blue' and 'Variegata' are the primary cultivars. 'Evergreen Giant' currently sells in 3-litre and 4-litre containers. We sell 300,000 per year of that cultivar. We also think we could sell more than 500,000 'Evergreen Giant' in 10-cm pots. *Liriope spicata* 'Silver Dragon' is produced but is only 3% of our total. *Liriope muscari* is a rewarding crop to grow. Homeowners use it in large quantities and the total demand is more than we currently produce.