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Guide to Using Rhizomal Perennial Peanut in the Urban Landscape¹

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Introduction

Common Name: Perennial peanut (Fig.1)

Scientific name: *Arachis glabrata*, Benth

Origin: Tropical South America



Figure 1. Perennial peanut canopy with yellow-gold flowers.

The perennial peanut evolved in tropical conditions and is adapted to subtropical and warm temperate climates. In the northern hemisphere, this would include locations below 32° north latitude (Florida-Georgia state line) having a long, warm growing season.

Perennial peanut was first introduced from Brazil in 1936 and since that time no insect, disease, or nematode pests have been identified that cause economic loss. Since its introduction, it has not spread into natural areas or become a nuisance plant in unimproved properties. Rhizomal perennial peanut does not reproduce by seed; therefore, it can't be carried by birds or wildlife or transported in plant material to unintended areas.

Perennial peanut has recently shown promise as an ornamental groundcover due to its high resistance to drought, nematodes, and pathogens and its minimal fertilizer needs. This translates into savings in water, energy, dollars, and reduced impacts to the environment. It is not only beneficial to the environment since it requires no supplemental nitrogen or phosphorus fertilization or pest control,

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but it also is aesthetically pleasing, can be walked on, and has edible, peanut flavored flowers.



Figure 2. Perennial peanut used on a landscape berm.

Due to rapid urbanization, water has become a precious commodity in Florida. Water management districts are encouraging the implementation of year-round water restrictions and the use of drought tolerant plants, of which perennial peanut is a good candidate. Perennial peanut has potential landscape uses as a groundcover in home landscapes (Fig. 2, Fig. 5), road medians (Fig. 3, Fig. 4), driveways and parking lot islands (Fig. 6), golf courses, along berms, septic tank mounds, and canal banks. Perennial peanut can also be used as a buffer to waterways prone to runoff high in N (Nitrogen) and P (Phosphorus).

Perennial Peanut in the Urban Landscape

Success Stories

In Florida, the city of Jacksonville uses perennial peanut in medians; Highway 19 south of Chiefland has a 30-year-old stand of 'Arblick' in the median; and Tampa Bay Skyway also has a highway planting of perennial peanut growing in limerock.

In Guanacaste Province, Costa Rica, medians, lawns, hotel entryways, and roadsides are planted with perennial peanut. Although this region is in a dry forest for 10 months of the year, these perennial peanut areas remain green without having to be mowed, fertilized, or irrigated.



Figure 3. Perennial peanut groundcover in a road median.



Figure 4. Perennial peanut four weeks after planting in a median near the ocean.

New Users

Perennial peanut is used as a forage legume for grazing, as a high-value hay crop, and has been planted as a cover crop in citrus. Several cultivars are available for use in home landscapes.

Rhizome perennial peanut has several potential advantages in the managed landscape. As its name implies, perennial peanut is long-lived and doesn't require replanting once established.



Figure 5. Perennial peanut in a formal landscape.



Figure 6. Perennial peanut groundcover used with a divided driveway.

Perennial peanut is best suited to south Florida conditions where winter frosts are infrequent. Perennial peanut has been successful in north and central Florida conditions where annual frosts occur, damaging above-ground foliage. Peanut is adapted to the droughty, infertile sands of Florida. The peanut legume, in association with *Rhizobium*, fixes

atmospheric N. This means that it requires no applied external nitrogen source. Phosphorus applications may be unnecessary in Florida sands rich in P. The peanut legume is highly resistant to plant and soil pests.

Perennial peanut may suppress weed growth, reduce nutrient leaching, and add nitrogen and organic matter to the soil. On the other hand, all cover crops have the potential to compete with trees for water and nitrogen.

Site Considerations

Climatic Information

Perennial peanut grows best in full sun (Fig. 7) and when days are long, hot, and humid. Perennial peanut will persist in partial shade (Fig. 8) with little or no mowing, but canopy thickness and groundcover will be reduced. Irrigation has proven beneficial during establishment and dry seasons.

Soil Adaptability and Preparation

Perennial peanut is adapted to a variety of well-drained soil types and does well in the sands of Florida. Perennial peanut has had mixed success in high pH soils and reclaimed phosphatic, highly colloidal clay soil in Florida. High alkaline soils may tend to cause yellow or chlorotic growth.

Soil tests should be made prior to planting to determine needs for phosphate (P), potassium (K), sulfur (S), and other nutrients. When Mehlich-I soil test level is below 30 ppm P, apply 0.7 pounds $P_2O_5/1000\text{ ft}^2$. K should be applied at 1.4 pounds $K_2O/1000\text{ ft}^2$ when Mehlich-I soil test level is below 20 ppm K. Apply 0.35 pounds magnesium (Mg) as magnesium sulfate per 1000 ft^2 if Mehlich-I soil test is below 30 ppm Mg. Perennial peanut performs well in a wide range of soil pH. Modify soil pH only if measured pH is outside the range of 5.0 to 7.5. Research has shown that perennial peanut responds positively to applied elemental sulfur at 0.5 to 0.7 pounds per 1000 ft^2 . Since perennial peanut is a legume with nitrogen-fixing capability, it does not require the application of nitrogen fertilizer.

Salt Tolerance for Coastal Areas

Perennial peanut can tolerate salt spray, salt drift, and short term saltwater flooding. There are several successful coastal plantings of perennial peanut in St. Augustine, Key West, Marco Island, and Bonita Springs. These plantings are in good condition and have not been affected by salt.

Weed Control

Weed problems can be reduced if the site is properly prepared before planting. All existing vegetation should be killed or removed. If perennial broadleaf weeds or grasses are present before planting, apply a nonselective herbicide, such as Roundup®. Soils with known disease or nematode incidence do not negatively affect perennial peanut

Planting Considerations

Cultivars

'Ecoturf' and 'Arblick' are available cultivars for landscape use. Both 'Ecoturf' and 'Arblick' were selected for landscape application due to their lower growth habit and profuse flowering. Planting material for 'Ecoturf' and 'Arblick' are available in limited supply. 'Florigraze' was released in 1978 for use in pastures and has been used recently in citrus groves and along roadways. 'Florigraze' also appears to be suitable for landscape use.

Source

Perennial peanut is propagated vegetatively using rhizomes (modified underground stems) that concentrate in a 1.5- to 3-inch-thick mat, just below the soil surface. It can be purchased as cut sod, rolled mats of sod, or in nursery containers.

Pre-plant Care of Rhizome

Rhizome sod should be planted as soon after digging as possible. Rhizome sod cannot be stored for more than five days without deterioration, even under the best conditions. Rhizome sod should be stored in a shady, cool location and covered with black plastic or a tarp to prevent drying. Rhizome sod that is being transported should be covered with a tarp to prevent drying. Perennial peanut in containers can be held for an extended period with proper care.

Planting Time

Perennial peanut has been traditionally planted from January through March, when it is not actively growing. Unfortunately, this is the time of year when there is limited rainfall throughout Florida. Perennial peanut can be successfully established anytime if irrigation is available, or during the summer rainy season (June – August) in Florida. Normal spring rains are important for proper root and top development. When soil moisture is low, a percentage of shoots will die due to lack of supporting roots. Irrigation during this initial development period provides insurance against plant loss or complete planting failure. Once a root system has developed, irrigation is not required. However, to maintain a strong vegetative cover, irrigation will be required during periods of low or no rain. Water, fertilizer, and weed control are all important inputs that can maximize plant density during the first growing season.

Planting Methods and Density

Several systems can be used for planting perennial peanut in a landscape setting.

Plants can be established from solid set sod, sod strips, sod plugs, or from plants grown in nursery containers. With all the above-mentioned methods except solid sod, the planting density can be adjusted to allow the perennial peanut to fill-in between planted material. Strip planting (Fig. 7) can be done using sod strips as they are delivered or cut into smaller strips, but strips should not be narrower than 8 to 10 inches. Rows can be 12 but not more than 18 inches apart.

Sod plugs can be cut from the delivered sod pieces and cut into smaller squares and planted in checkerboard layout. Sod plugs should be planted on centers no more than 12 to 18 inches apart. Plants in one-gallon nursery containers can be planted the same as sod plugs.

One additional planting method, although not recommended for urban landscapes, involves placing rhizome pieces into furrows and covering with loose soil. If this practice is tried, the rhizomes shouldn't be placed more than 1.5 to 2 inches deep. The



Figure 7. Perennial peanut during establishment from strip planting.

distance between planted rows of rhizomes should be kept to no more than 12 to 18 inches. Coverage time (fill-in) usually will increase as distance between rows decreases. Planting should be followed by a packing-roller that leaves the ground leveled, preserves soil moisture, and achieves good rhizome-soil contact. Irrigation should follow planting and roller packing.

Maintenance Considerations

Invasiveness in Planned Landscapes

The perennial peanut spreads by underground rhizomes in the urban landscape. Edging practices can be used to keep the plant confined. Perennial peanut has not become a nuisance weed in the planned landscape.

Irrigation

Once established, rhizomal perennial peanut may require irrigation during dry periods to maintain a thick canopy. Soil-plant moisture status should be carefully monitored during dry months.

Mowing

Mowing is not required, but appearance will be enhanced. Mowing stimulates new vegetative shoots, making a thick canopy and encouraging flowering. Mowing at 3 to 4 inches every 3 to 4 weeks is usually adequate.

Nutrient Management and Fertilizer

Like all legumes, perennial peanut obtains its nitrogen from *Rhizobium* species bacteria associated with the plant's root system. Because perennial peanut is propagated by rhizomes that carry the bacteria, it isn't necessary to inoculate the rhizomes at planting. The perennial peanut needs no applied N, but requires P, K, and Mg. Since Florida soils usually contain adequate P, these nutrients can be supplied with the addition of a common fertilizer of potassium-magnesium sulfate (analysis 0-0-22-22S-11Mg) found at most garden stores.



Figure 8. Perennial peanut used in a mall area with partial sun and shade.

Weed Control

Weed control is the major management problem during establishment. Eliminating competitive weeds ensures greater survival during the dry months before the summer rainfall and allows the plants to grow and spread more rapidly. Keeping the perennial peanut canopy clear for maximum sunlight penetration is critical to proper development and speeds establishment. Common bermuda grass, torpedo grass, and nutsedge are the most persistent weed problems. Mowing should be done whenever weeds are shading the perennial peanut. Mow weeds at a level just above the foliage of the perennial peanut. Mowing has been found to be the least expensive weed control method.

Other methods of weed control do not appear to reduce establishment time. For grassy weeds such as crabgrass, bermudagrass, and bahiagrass, the herbicides Fusilade®, Poast®, Select®, and Prism® are cleared for use during establishment. Basagran® is effective for control of yellow nutsedge as well as a few other select broadleaved weeds. It is approved for use on perennial peanut during establishment.



Figure 9. Perennial peanut along a street and commercial building.

Herbicide recommendations in this publication are contingent upon their continued registration by the Environmental Protection Agency. If a registration is canceled, the herbicide can no longer be recommended. The use of product trade names does not constitute a guarantee or warranty of the products named and does not signify approval to the exclusion of similar products.

Economic Considerations

Enterprise budgets were developed to compare the costs of growing St. Augustinegrass versus perennial peanut. Establishment costs were developed separately from annual maintenance costs. Costs of applying fertilizer, herbicides, and pest control products were based on typical rates charged by commercial lawn-care companies.

During the summer of 2002, sixteen commercial lawn-care companies participated in a telephone survey to solicit cost information for lawn-care services. These companies operated in the Naples/Ft Myers region of southwest Florida. Services included sod installation, fertilizer applications and chemical treatments, and grass mowing. All companies handled St. Augustinegrass lawns. Few companies had any experience with perennial peanut groundcover. Sod installation was priced on a square foot basis and included both the grass and labor to lay the sod.

As a rule, lawn-care companies charge a flat fee per lawn service. Mowing services averaged \$35 per residential lot. Fertilizer and chemical application treatment ranged from \$4 to \$7 per 1,000 ft² for each treatment. Fees include not only material costs but also labor and equipment costs. Given that an average residential lot in southwest Florida is only 5,000 ft², the cost of fertilizer or chemical products is small relative to the labor and equipment cost to apply a specific treatment. Consequently, specific fertilization, chemical products, and application rates are not listed in this publication. For specific management recommendations and chemical rates, consult the Florida Lawn Handbook for St. Augustinegrass and EDIS document SS-AGR-19 for perennial peanut.

Establishment costs of both perennial peanut and St. Augustinegrass are outlined in Table 1. In both cases, it was assumed that sod would be used to establish equivalent areas. Perennial peanut sod is more expensive to establish than St. Augustinegrass sod. Including the labor to install the sod, perennial peanut would cost an estimated \$1,250 per 1,000 ft², more than four times as expensive as St. Augustinegrass sod. For either St. Augustinegrass or perennial peanut groundcover, a starter fertilizer

application is necessary. Sufficient water is critical for either St. Augustinegrass or perennial peanut during the first 30 days after establishment. St. Augustinegrass sod, however, requires more than 60 percent greater water volume during establishment than does perennial peanut. If planting of St. Augustinegrass or perennial peanut occurs during the summer rainy season, minimal supplemental irrigation would be required. For the purpose of this paper and cost comparison, it was assumed that the entire volume of water would be supplied by supplemental irrigation and priced at residential rates.

Table 1 indicates that more than \$900 dollars (per 1,000 ft²) of additional cash would be needed to establish perennial peanut versus St. Augustinegrass. On an annual basis, establishment costs depends on the expected life. As shown in Table 1, annual establishment costs decrease as expected life increases. Several lawn-care companies interviewed during 2002 indicated that fungal diseases and pest pressures force many St. Augustinegrass lawns to be replaced every ten years. Evidence from perennial peanut plots suggests a high degree of tolerance to a variety of pests. Therefore, one could expect a perennial peanut groundcover to last significantly longer than St. Augustinegrass. However, for the purposes of this document, it was assumed that St. Augustinegrass lawns received an adequate level of management, thereby sustaining a healthy stand indefinitely.

The economic benefits from perennial peanut emerge from a comparison of annual maintenance costs between a perennial peanut groundcover and St. Augustinegrass sod. Table 2 itemizes estimated annual maintenance costs by four categories – fertilization, pesticides (chemical treatments), irrigation water, and mowing. As mentioned previously, the costs of lawn mowing and applications of fertilizer and lawn chemicals are based on rates charged by commercial lawn care companies. These rates fully account for material, labor, equipment, and related overhead expenses.

The annual maintenance cost of a well-established perennial peanut groundcover is estimated to be \$64 per 1,000 ft². Annual maintenance costs of a St. Augustinegrass lawn

surpass \$350 per 1,000 ft², more than five times higher than perennial peanut. Most of the cost savings with perennial peanut are realized in lower mowing costs. The low-growing perennial peanut requires mowing only once every four weeks during the rainy season, as mowing is necessary mainly for weed control.

The perennial peanut's drought tolerance means that supplemental irrigation is not necessary during the dry season. Conversely, nearly 20,000 gallons of irrigation water is required to maintain 1,000 ft² of St. Augustinegrass through the dry season in south Florida at an estimated cost of \$56 per 1,000 ft².

Given the estimated savings in annual maintenance costs, a perennial peanut groundcover would offset the higher establishment costs within 3.2 years. For every year afterwards, an annual cost savings of nearly \$300 per 1,000 ft² of perennial peanut groundcover would be realized.

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Table 1. Table 1: Establishment costs per 1000 ft² of St. Augustinegrass (SA) and Perennial Peanut (PP) sod. Establishment period assumed to be first 30 days after sod installation.

	Comments	St. Augustinegrass (SA)			Perennial Peanut (PP)		
		Price	Amt	Cost	Price	Amt	Cost
Sod Installation	Price includes sod and labor to lay	\$1.25/ft ²	1000	300.00	\$1.25/ft ²	1000	\$1,250.00
Fertilizer	SA: 1.0 lb-N, P & K rates per soil test. PP: Starter fertilizer with P & K per soil test.	\$5/1000 ft ²	1.0	5.00	\$5/1000 ft ²	1.0	5.00
Irrigation water	SA: 1/4", 2x/day for 14 days, then 1/4" 1x/day for 16 days. PP: 1/4", 3x/wk for 30 days	See note	6,846 gals	17.00	See Note	2,337 gals	5.50
Initial Mow	SA: 1x per 30 days PP: no mowing required	\$7/1000 ft ²	1.0	14.00	\$7/1000 ft ²	0	0.00
Total Establishment Cost				\$336.00	\$1,260.50		
Difference in initial establishment costs							
Annual Establishment Cost							
		Years of Life			Years of Life		
		10	15	20	10	15	20
Depreciation	(Est Cost/years)	33.60	22.40	16.80	126.05	84.03	63.03
Avg. Interest	(Total cost/2) * 5%			8.40			31.50
Annual Establishment Cost (\$/yr)		\$42	\$31	\$25	\$158	\$116	\$95

Table 1. Table 1: Establishment costs per 1000 ft² of St. Augustinegrass (SA) and Perennial Peanut (PP) sod. Establishment period assumed to be first 30 days after sod installation.

<p>Notes</p> <ol style="list-style-type: none"> 1. Irrigation costs based on the 2002 water-pricing schedule for a residential user in the city of Ft. Myers. 2. Water consumption formula: (in./application) rate * frequency * ft/12 in. * 1,000 ft² * 7.48 gal/ft³ = gal per application. 3. Fertilizer, chemical treatments, and mowing prices based on typical charges of commercial landscape companies servicing residential homes. 4. Average home lot size assumed to be 5,000 ft². 5. Pests, drought, and excessive rainfall stresses St. Augustinegrass (SA) lawns. It is assumed that St. Augustinegrass lawns are replaced every 8 years. Depreciation costs represent the annual amount of money that would have to be set aside to replant an SA lawn. 6. "Average Interest" represents the opportunity cost of spending money on lawn establishment rather than investing the same amount of money in a "safe" interest-bearing asset. Selection of an interest rate (i.e. 5%) is arbitrary but attempts to reflect current market conditions. 	
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Table 2. Table 2. Annual maintenance cost per 1000 ft² of established St. Augustinegrass (SA) and Perennial Peanut (PP) groundcover.

	Comments	St. Augustinegrass (SA)			Perennial Peanut (PP)		
		Price	Amt	Cost	Price	Amt	Cost
Fertilizer ¹	<p>SA: 1.0 lb-N per application P & K based on soil test.</p> <p>PP: annual sulfur application</p>	\$5/app	3 app	\$15.00	\$5/app	1 app	\$5.00
Pesticides ¹	<p>SA: various herbicides, fungicides, and pesticides</p> <p>PP: grass herbicide.</p>	\$5/app	6 app	30.00	\$5/app	2 app	10.00
Irrigation water ²	<p>SA: 1/2" 2x/wk for 32 wks (dry season). None during wet season.</p> <p>PP: no irrigation water.</p>	\$2.80 per 1000 ft ²	19,947 gal	56.00	\$2.80 per 1000 ft ²	0.0 gals	0.00

Table 2. Annual maintenance cost per 1000 ft² of established St. Augustinegrass (SA) and Perennial Peanut (PP) groundcover.

Wet Season Mow (20 wks) ³	SA: 1x per 1 wk PP: 1x per 4 wk	\$7/mow	20	140.00	\$7/mow	5	35.00
Dry Season Mow (32 wks) ³	SA: 1x per 2 wk PP: 1x per 12 wk	\$7/mow	16	112.00	\$7/mow	2	14.00
Annual Maintenance Cost				\$353			\$64
Annual Establish Cost (20 yr life)				\$25			\$95
Total Annual Cost				\$378			\$159

Notes:

1. Fertilization and chemical treatments costs include both material and application costs. Prices were collected as part of a telephone survey of commercial landscaping companies in the Ft. Myers/Naples area. Fertilizer chemical application costs ranged between \$20 and \$35 per residential lot. Average residential lot assumed to be 5,000 ft².
2. Irrigation notes:
 - a. Dry season: Oct 1 – May 30 or ~ 32 weeks.
 - b. Wet season: June 1 – Sept. 30, or ~ 20 weeks.
 - c. SA irrigated during the dry season at a rate of 1/2 inch, 2 times per week. No irrigation during the rainy, or wet season.
 - d. PP does not require any irrigation during the dry season.
 - e. Water price based on the 2002 rate schedule for residential users in the city of Ft. Myers irrigating a standard lot of 5,000 ft². Monthly water consumption for lawn irrigation estimated to 13,370 gallons.
3. Mowing costs based on rates charged by commercial landscaping companies for mowing and trimming services on a standard lot size of 5,000 ft².