EES37

UF UNIVERSITY of FLORIDA
IFAS Extension

Enviroscaping to Conserve Energy: Ground Covers for North Florida[1]

A.W. Meerow and R.J. Black[2]

INTRODUCTION

A ground cover is any low-growing plant that can be used to cover an area in the landscape. Many woody and herbaceous plants fulfill this role. And as part of passive, energy-saving landscaping (enviroscaping), ground covers can provide a surprising amount of residential energy savings during Florida's 5 to 7 months of high temperatures.

Plants release water through pores in their leaves by transpiration. As warm air passes over leaf surfaces, heat is absorbed by the water, which then evaporates, and lowers the air temperature. Called evaporative cooling, this interaction can lower air temperatures immediately surrounding vegetation by as much as 9°F (5°C). The greater the leaf-surface area in the landscape, the greater the cooling effects.

Paved surfaces around the home contribute substantially to summer heat loads. These surfaces absorb the sun's heat or reflect it back into the immediate environment, increasing the amount of discomfort experienced by people during the day. Paved areas also store heat during the day, keeping temperatures high around the home even after sunset. Temperatures over ground covers can be 15 to 25°F (8.3 to 14°C) lower than over asphalt or concrete.

TURFGRASS

Turfgrass qualifies as a ground cover. Many people find great aesthetic appeal in sweeping, well-manicured green lawns. On the practical side, no other plant can withstand as much foot traffic as turf. Maintaining a lawn in prime condition, however, requires energy-intensive mowing, regular fertilization, irrigation, and, at times, expensive pest and disease control. A quarter-acre lawn requires four times the total energy costs of a same sized landscape that has a one-sixteenth-acre lawn with the remaining area planted in low-maintenance vegetation (Parker, 1982).

1. This document is EES37, one of a series of the Environmental Horticulture Department, Florida Cooperative Extension Service, Institute of Food and Agricultural Sciences, University of Florida. Original publication date July 1993. Reviewed October 2003. Visit the EDIS Web Site at http://edis.ifas.ufl.edu.

2. Alan W. Meerow, associate professor, REC-Ft. Lauderdale, Institute of Food and Agricultural Sciences; Robert J. Black, associate professor, Consumer Horticultural Specialist, Environmental Horticulture Department, University of Florida, Gainesville FL 32611.

The Florida Energy Extension Service receives funding from the Florida Energy Office, Department of Community Affairs and is operated by the University of Florida's Institute of Food and Agricultural Sciences through the Cooperative Extension Service. The information contained herein is the product of the Florida Energy Extension Service and does not necessarily reflect the views of the Florida Energy Office.

As fossil-fuel prices rise, so do the costs of fertilizing, watering, and running a mower for a lawn. Some turfgrasses, like bermudagrass, do best with 218 pounds of nitrogen per acre per year, a 7.2 million Btu investment. A medium fertilization level of 174 pounds of nitrogen per acre per year (5.8 million Btu) is recommended for St. Augustine lawns. At the lowest fertilizer level, centipede lawns need 87 pounds of nitrogen per acre per year (2.9 million But). Choosing centipede instead of St. Augustine can save 29 million Btu of energy (equal to the energy in 232 gallons of gasoline) per acre over 10 years (Whiffen, 1993).

On average it takes a quarter of a gallon of gasoline (31,250 Btu) [combustion engine] or 1.4 kwh (15,000 Btu) [electric motor] to mow a quarter-acre lawn. Depending on location and fertilizer frequency, the lawn probably gets mowed 10 to 20 times a year. To minimize energy and time inputs, only cut one-third of the grass blade at a time and don't over fertilize (Whiffen, 1993).

Water quality and availability have become important issues in Florida. Depending on location, Florida lawns need 20 to 35 inches of water from irrigation per year. Over 8 million Btu of energy are required to supply water to a one-half-acre lawn in Orlando. If a one-half-acre yard is landscaped so one-fourth is lawn and the rest is planted with ground covers, shrubs and trees in mulched areas, over 4 million Btu of energy can be saved annually along with 224,000 gallons of water (Whiffen, 1993).

ALTERNATIVES TO TURFGRASS

There are ground covers besides turf that require a fraction of the upkeep and are frequently more adaptable to a wider range of environmental conditions. For instance, turf does not grow well in dense shade and is difficult to establish in extremely wet or dry areas. There are several other ground covers adaptable to such problem situations. Patridgeberry (*Mitchella repens*), a native of north Florida woodlands, is an excellent performer in dense shade. Lippia (*Lippia nodiflora*) has an outstanding tolerance of wet soils. Shore juniper (*Juniperus conferta*) is both highly salt and drought tolerant. Proper selection can minimize irrigation, fertilization and mowing after ground covers are established.

Herbaceous and woody ground cover species offer a variety of colors and textures far beyond the uniformity of turfgrass. They can unify the home landscape and complement trees and shrubs.

ESTABLISHMENT OF GROUND COVERS

Generally, ground covers are established in two years, although some require slightly more or less time. During this period, a regular program of irrigation, fertilization and weed control insures strong, rapid growth. Mulch aids water retention in new plantings and helps the spread of ground covers that root along their stems. Once established, many ground covers need only an occasional trimming to keep them tidy and within their designated area.

SELECTING A GROUND COVER

The table will help home gardeners and landscape professionals select ground covers appropriate for north Florida site conditions. Each species has the expected height of the mature plant, along with the color of both leaves and flowers. Relative salt and drought tolerance is indicated as well. The drought tolerance ratings refer to Florida conditions only and should be interpreted as follows — High: survives without supplemental irrigation after establishment; Moderate: requires supplemental irrigation during very dry periods to maintain satisfactory appearance and health; and Low: little or no drought tolerance. Drought tolerance also varies with soil and other environmental conditions. 'X' indicates whether a particular ground cover can be used in each of five landscape situations. Finally, the "Comments" section has special notes about each species.

Turfgrass is still the best ground-cover choice for outdoor areas that have heavy recreational use. For situations where turf serves no practical purpose, alternative ground covers perform equally well or better at a fraction of the energy inputs required by a lawn.

REFERENCES

Parker, J.H. 1982. *An energy and ecological analysis of alternate residential landscapes.* J. Environ. Sys. 11:271-288.

Whiffen, H.J.H. 1993. *E^2 & E energy efficiency & environmental news.* UF/IFAS Energy Extension Service, Feb., Gainesville, FL

Table 1.

Scientific Name - Common Name* = Native	Height	Light	Drought Tol.	Salt Tol.	Description	Under trees	Banks & slopes	Edging	Sea-side	Open areas	Comments
Ajuga reptans - Bugle weed, Carpet bugle	2", 12" in flower	S,PS	L	L	Dark green foliage, purple flowers in early summer	X	X	X			Nematode sensitivity; bronze-leaved *var. rubra* commonly grown in Florida
Aspidistra elatior - Cast iron plant	20-30"	Sh	L	M	Green foliage (variegated form also available)	X					Slow growing. Some frost protection may be necessary in north Florida.
**Licania michauxii* - Gopher apple	3-12"	S	H	H	Leaves dark green above, downy white below; red fruit in summer				X	X	Tolerates drought and poor soils.
Cyrtomium falcatum - Holly fern	24"	Sh	L	M	Glossy green foliage	X	X	X			Shade-tolerant.
**Dichondra carolinensis* -Dichondra	1-2"	S,Sh	M	L	Bright green foliage	X		X		X	Prefers moist soil; withstands some foot traffic; susceptible to Alternaria fungus.
Euonymus fortunei var. radicans - Winter creeper	24"	S,PS	M	M	Leaves green with whitish veins	X	X			X	Prefers moist, fertile soils; shearing occasionally recommended; cultivars 'Colorata,' 'Baby' & 'Silver Edge' adapted to Florida.
Ficus pumila - Creeping fig	12"	S,PS	H	M-H	Fine-textured green leaves		X		X		Occasional shearing required; will climb up walls and trees; stems grow thick and woody with age.

Table 1.

Scientific Name - Common Name* = Native	Height	Light	Drought Tol.	Salt Tol.	Description	Under trees	Banks & slopes	Edging	Sea-side	Open areas	Comments
Gardenia jasminoides 'Prostrata' (*G. radicans*) - Dwarf gardenia	6"	S,PS	M	N	Small, glossy green leaves; white flowers spring and summer	X					Moist, acid soils.
**Gelsemium sempervirens* - Carolina jessamine	6"	S,PS	H	L	Yellow flowers in early spring	X	X			X	All parts poisonous; slow-growing; prefers moist soil.
Hedera canariensis - Algerian ivy	6"	Sh	M	H	Dark green foliage	X	X	X			Prefers moist shade; larger leaves but less aggressive than *H. helix*; variegated form available.
Hedera helix - English ivy	6"	Sh	M	H	Dark green foliage	X	X	X			Prefers moist shade; many cultivars with varying leaf shape; coarse-textured (finer than *H. canariensis*); will climb up trees and walls.
Hemerocallis spp. - Daylily	6-12", 12-36" in flower	S,PS	H	H	Light green leaves; summer flowers in yellow, pink, orange brown and bicolors		X		X	X	Relatively pest free; drought tolerant.
Ilex crenata 'Helleri' - Japanese holly	1-3'	S,PS	M	L	Dense, shiny dark green foliage		X			X	Best on moist, fertile soil. Similar in form to *I. vomitoria 'Schellings Dwarf.'*

Table 1.

Scientific Name - Common Name* = Native	Height	Light	Drought Tol.	Salt Tol.	Description	Under trees	Banks & slopes	Edging	Sea-side	Open areas	Comments
**Ilex vomitoria 'Schellings Dwarf'* - Dwarf yaupon holly	1-3'	S	M	H	Small, glossy green leaves		X		X	X	Extremely compact form of native species; fast growing.
**Ipomoea pes-caprae* - Beach morning glory, railroad vine	4-6"	S	H	H	Light green foliage; pink-lavender flowers in summer		X		X	X	Sandy soils; best along seashore.
**Iva imbricata* - Beach elder	1-3'	S	H	H	Small, glossy green leaves				X		Excellent dune stabilizer; spreads horizontally, rooting along stems.
Juniperus chinesis - Chinese juniper	1-3'	S	H	L-M	Foliage blue-gray to green		X	X		X	Cultivars 'Parsonii', 'Parsonii Variegata', *var. pro-cumbens*, *'Nana'*, and *var. procumbens 'Aureovariegata'* best suited as ground covers; see EH Fact Sheet 34.
Juniperus conferta - Shore juniper	1-2'	S,PS	H	H	Green to blue-green foliage		X	X	X	X	Fast grower; drought tolerant; most salt tolerant juniper; cultivars 'Compacta' and 'Blue Pacific' are particularly dwarfed.
Juniperus horizontalis - Creeping juniper	12"	S,PS	H	L	Green to blue-green foliage; may turn purple in winter		X	X		X	Drought tolerant; cultivars 'Bar Harbor' and 'Blue rug' ('Wiltonii') are particularly successful in north Florida.

Table 1.

Scientific Name - Common Name* = Native	Height	Light	Drought Tol.	Salt Tol.	Description	Under trees	Banks & slopes	Edging	Sea-side	Open areas	Comments
**Lippia* (*Phyla*) *nodiflora* - Lippia, Match weed	3"	S,Sh	H	H	Leaves greenish to purplish; red, purple and white flowers most of the year		X		X	X	Drought and wet tolerant; takes some foot traffic; easily established.
Liriope muscari - Lily turf, Liriope, Big blue lily turf	12"	Sh	H	M	Dark green leaves; purple flowers in spring followed by black fruit	X	X	X			Resembles turf grass; forms dense mat; excellent edging; drought tolerant; no heavy foot traffic. Variegated forms tolerate full sun.
Liriope spicata - Creeping lily turf, Creeping liriope	6-18"	Sh	H	M-H	Dark green foliage; purple to white flowers in summer	X	X	X			Drought tolerant; faster growing than *L. muscari*.
**Mitchella repens* - Patridge berry, Twin berry	1-2"	Sh	L	L	Dark, glossy green foliage; red fruits	X	X	X			Best in shade with moist, acid soils. Takes some foot traffic.
Ophiopogon japonicus - Dwarf lily turf, Mondo grass	6-12"	Sh	H	M-H	Dark, glossy green leaves	X	X	X		X	Drought resistant; tolerates poor soils; good edging; no heavy foot traffic; flowers usually hidden by leaves.
Saxifraga stolonifera - Strawberry geranium, Mother-of-thousands	6-10"	PS	M	L	Dark, green foliage; white flowers in late spring	X	X	X			Spreads by runners; tolerates rocky soil; variegated form available.
Selaginella involvens - Erect selaginella	12"	Sh	L	L	Light green, ferny foliage	X	X	X			Moist soils.

Table 1.

Scientific Name - Common Name* = Native	Height	Light	Drought Tol.	Salt Tol.	Description	Under trees	Banks & slopes	Edging	Sea-side	Open areas	Comments
Setcreasea pallida 'Purple Heart' - Purple heart	14"	S,PS	H	H	Purple foliage, pink flowers in summer	X			X	X	Hardy to 25¡F; performs well under trees; prune for more compact growth.
Trachelospermum asiaticum - Small-leaf Confederate jasmine	8-12"	S,Sh	M	M	Dark, glossy green foliage	X	X			X	One of the best ground covers for North Florida; forms thick mat that suppresses weeds.
Trachelospermum jasminoides - Confederate jasmine, Star jasmine	8-12"	S,Sh	M	M	Dark green foliage, new growth contrasting light green; highly fragrant white flowers in mid to late spring		X			X	Performs best as a vine due to long, twining stems; resists trampling.
Tulbaghia violacea - Society garlic	30"	S	M	M	Lilac-colored flowers in spring			X		X	Does not flower well in shade; wet-dry periods induce frequent flowering.
**Uniola paniculata* - Sea oats	3-6'	S	H	H	Pale green foliage, attractive seed heads				X		Excellent sand dune stabilizer.
Vinca major - Periwinkle	12"	S,PS	M	L	Glossy green leaves, lilac-blue flowers in spring	X	X	X			Best in part shade; performs well in northernmost Florida; not to be confused with Madagascar periwinkle (*Catharanthus roseus*).
**Zamia pumila* (*Z. floridana*) - Coontie, Florida arrowroot	12-36"	S,Sh	H	H	Glossy, dark green, fernlike foliage	X	X	X		X	Drought resistant; no shearing or mowing.