FORAGE SUITABILITY GROUP

Sandy Soils on Ridges and Dunes of Xeric Uplands

FSG No.: G154XB111FL

Major Land Resource Area (MLRA 154): South-Central Florida Ridge

Soil Series List

Due to the large list of map units in this group, please refer to Appendix 1.

Apopka	Gainesville
Arredondo	Lake
Astatula	Orlando
Candler	Palm Beach
Eustis	Paola
Fort Meade	St. Lucie

Adapted Species List

The native forage species listed are considered adapted to grow on the soils in this group at their natural pH levels. All introduced grass and legume species will need the pH level raised to min. 5.5 (unless noted) for best production. Irrigation is not recommended in these soils, and all forages listed are adapted to dryland conditions. Consult with state extension service for current cultivar or germplasm recommendations (http://agronomy.ifas.ufl.edu/foragesofflorida/).

Perennial Species:

Grasses

Warm season (Introduced)

- Bahiagrass (*Paspalum notatum*; pH 5.0-6.5)
- Bermudagrass, (*Cynodon dactylon*)

Warm season (Native)

- Chalky Bluestem (*Andropogon virginicus* var. *glaucus*)
- Splitbeard Bluestem (*Andropogon ternarius*)
- Yellow Indiangrass (*Sorghastrum nutans*)
- Switchgrass (*Panicum virgatum*)

Legumes

Warm season (Introduced)

- Rhizoma Perennial Peanut (*Arachis glabrata*; pH 5.8-7.0)

Annual Species:

Grasses

Warm season (Introduced)

- Browntop Millet (*Urochloa ramosa*; =*Panicum ramosum*)
- Pearl Millet (*Pennisetum glaucum*)
- Sorghum(*Sorghum bicolor*; includes forage sorghum, sudangrass, and their hybrids)

Legumes and Forbs

Warm season (Introduced)

- Alyceclover (*Alysicarpus vaginalis*)
- Cowpea (*Vigna unguiculata*)
- Hairy Indigo (*Indigofera hirsuta*)

Seasonal and Total Production Estimates

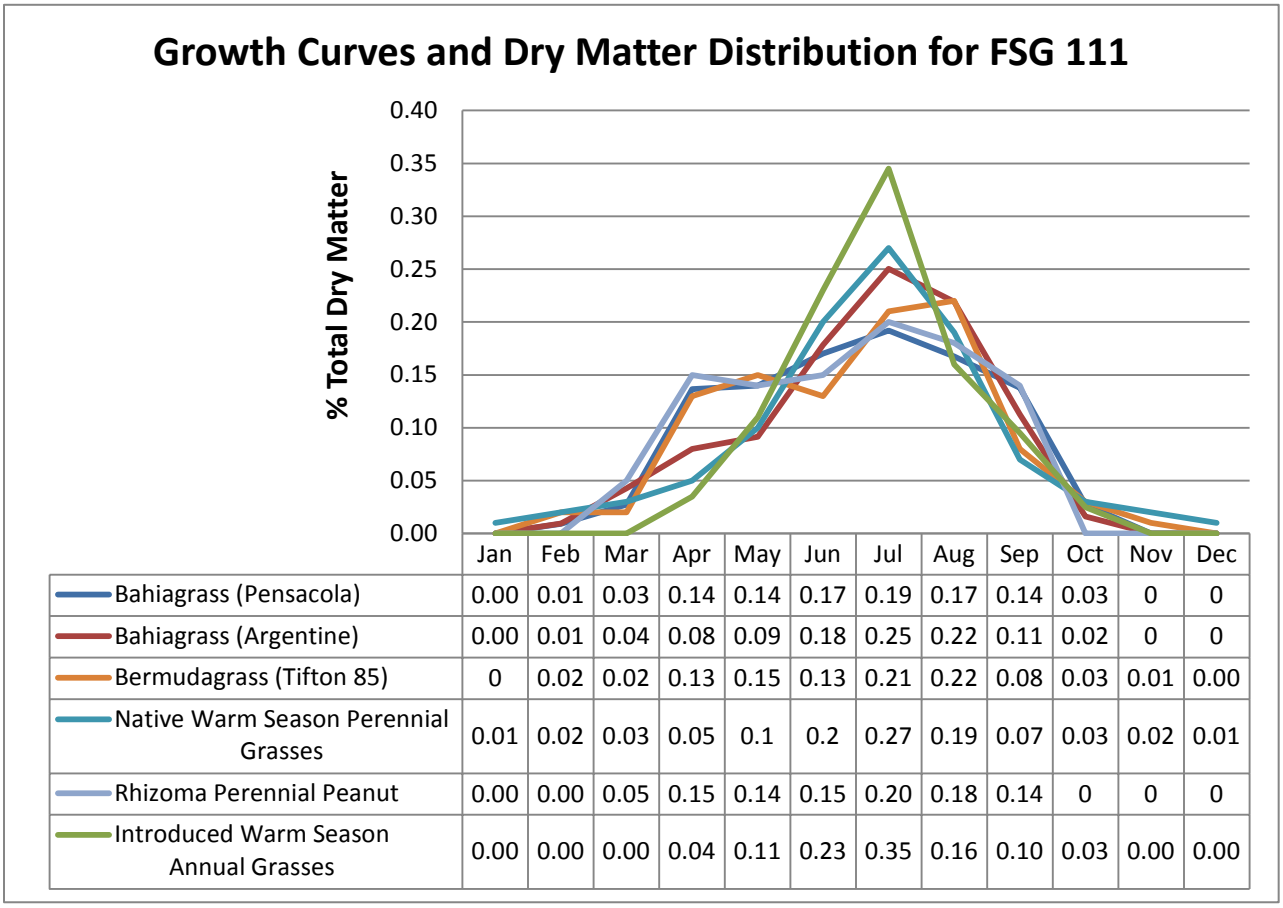
Seasonal and total forage production is limited in this group due to soils being somewhat to excessively drained. Surface and subsurface texture is predominantly sandy with low or very low available water capacity, and a seasonal high water table greater than 6 feet. These factors increase drought effects. Total annual production is driven largely by rainfall; yields can increase by > 1,000 lbs/acre in years with above average rainfall. However greatly reduced production and even stand loss associated with over grazing can occur in years with below average rainfall. Irrigation is not recommended for these soils due to poor water holding capacity. Establishment of both annual and perennial warm season forages maybe delayed due to limited rainfall in the spring and short term drought periods in the summer months. Total production of all forage species is expected to be considerably less than other FSG, with a general growth curve weighted more towards the later part of the growing season.

Cool season forage production is very limited due to decreased and sporadic rainfall during winter months (November-March), therefore no cool season forages are recommended and no production data is given.

Expected Range in Dry Matter Production and Animal Unit Months (AUM) for Different Forages				
Forage	**Range in Dry Matter Yield, lb/acre**		**Range in AUM/acre†**	
Bahiagrass (0 lb N/acre)[5]‡	2,500	3,500	1.6	2.2
Bahiagrass (60 lb N/acre)[5,9]	4,000	6,000	2.6	3.8
Bermudagrass (400 lb N/acre)[4]	14,000	20,000	9.0	12.8
Switchgrass, Alamo[1]	6,000	8,000	3.8	5.1
Rhizoma Perennial Peanut, Florigraze[3,7]	7,000	10,000	4.5	6.4
Pearl Millet (limited irrigation,≈400 lb N/acre) [6]	8,000	16,000	5.1	10.3
Alyceclover[8]	3,000	5,000	1.9	3.2
Hairy Indigo[2]	6,000	12,000	3.8	7.7

†Animal Unit Month based on 50% grazing efficiency and 2.6% intake per day.
‡Superscript numbers refer to references.

Production Curves:



	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Bahiagrass (Pensacola)	0.00	0.01	0.03	0.14	0.14	0.17	0.19	0.17	0.14	0.03	0	0
Bahiagrass (Argentine)	0.00	0.01	0.04	0.08	0.09	0.18	0.25	0.22	0.11	0.02	0	0
Bermudagrass (Tifton 85)	0	0.02	0.02	0.13	0.15	0.13	0.21	0.22	0.08	0.03	0.01	0.00
Native Warm Season Perennial Grasses	0.01	0.02	0.03	0.05	0.1	0.2	0.27	0.19	0.07	0.03	0.02	0.01
Rhizoma Perennial Peanut	0.00	0.00	0.05	0.15	0.14	0.15	0.20	0.18	0.14	0	0	0
Introduced Warm Season Annual Grasses	0.00	0.00	0.00	0.04	0.11	0.23	0.35	0.16	0.10	0.03	0.00	0.00

Physiographic Features

Dominantly very deep, nearly level to sloping, well to excessively drained soils formed in eolian or sandy marine deposits. These soils occur on summits, shoulders, and back slopes of marine terraces. They have 40 inches to greater than 80 inches of fine sand or sand. Diagnostic subsurface horizon is an argillic horizon below 40 inches or is absent. The organic matter content of the surface layer is dominantly very low or low. Unless limed, the reaction in the surface layer ranges from extremely acid to slightly acid.

Climatic Features

Freeze-free period (>28° F 9 years in 10 at least): averages 316 d (range 278-365 d)

Length of growing season (>32° F 9 years in 10 at least): averages 285 d (range 243-365 d)

Annual minimum temperature (° F in month of January): average 50.2 (range 45.2-59.2)

USDA Plant Hardiness Zone:
9a (20-25° F, Ocala)
9b (25-30° F, Orlando)

Mean annual precipitation (inches): averages 51.09 (range 47.70-67.03)

Soil Properties

Percent Slope: 0 to 8 percent

Surface Texture: Fine sand, sand, loamy fine sand, loamy sand, gravelly sand

Sand Content of Surface Layer: 81 to 99 percent

Clay Content of Surface Layer: 0.1 to 10 percent

Organic Matter Content of Surface Layer: 0.5 to 5 per cent

Cation Exchange Capacity of Surface Layer (meq/100g): 0.3 to 7.1

Effective Cation Exchange Capacity of Surface Layer (meq/100g): 0.1 to 6.7

Bulk Density of Surface Layer (g/cc): 1.3 to 1.7

Saturated Hydraulic Conductivity of Surface Layer: Rapid or very rapid

Soil Reaction of Surface Layer: 3.5 to 6.5 (unless limed)

Available Water Capacity (0 to 30 inches): 0.1 to 1.0 inch per inch

Depth to Finer Textured Material: 40 to more than 80 inches

Depth to Bedrock: Greater than 80 inches

Drainage Class (Agronomic): Well, somewhat excessive, excessive

Depth to Seasonal High Water Table (during wet periods): More than 6 feet

Flooding: None

Ponding: None

Monthly precipitation (inches) and temperature (F):

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Precip avg	3.04	2.89	3.69	2.40	3.52	6.86	7.17	7.36	6.22	2.79	2.38	2.47
Avg Min	48.1	49.6	54.4	58.5	65.0	70.7	72.3	72.5	71.0	61.0	56.6	51.0
Avg Temp	60.0	61.5	66.4	68.6	76.6	80.8	81.8	81.8	80.4	74.2	67.5	61.5
Avg Max	70.8	72.9	77.9	82.4	87.7	90.6	91.7	91.4	89.5	84.0	77.9	72.2

Climate Station Locations (averages from 1971 to 2000; see Appendix 2)

FSG Documentation

Inventory Data References:

1. -------. 2000. Plant materials adaption study final report, Belleview-Perry sprayfield. Brooksville, FL, USA: US Department of Agriculture, Natural Resources Conservation Service, Brooksville Plant Material Center Brooksville, Florida. 25 p.
2. Baltensperger, D.D., E.C. French, G.M. Prine, O.C. Ruelke, and K.H. Quesenberry. Hairy indigo a summer legume for Florida. Gainesville, FL, USA: University of Florida, Institute of Food and Agricultural Sciences, Agriculture Experiment Station, Circular S-318. 12 p. Available at: http://ufdc.ufl.edu/UF00055246/00001. Accessed 17 December 2012.
3. Beltranena, R., J. Breman, and G. Prine. 1981. Yield and quality of Florigraze rhizoma peanut (*Arachis glabrata* Benth.) as affected by cutting height and frequency. Proceedings Soil Crop Science Society Florida 40:153-156.
4. Coleman, S., and M. Williams. 2007. Bermudagrass yield and quality through the grazing season. In: Proceedings USDA-ARS STARS Field Day; 25 May 2007; Brooksville, FL, USA. Brooksville, FL, USA: US Department of Agriculture, Agriculture Research Service.
5. Engibous, J.C., W.J. Friedmann, and M.B. Gillis. 1958. Yield and quality of pangolagrass and bahiagrass as affected by rate and frequency of fertilization. Soil Science Society of America Journal. 22:423-425. Available at: https://www.agronomy.org/publications/sssaj/abstracts/22/5/SS0220050423. Accessed 17 December 2012.
6. Green, V.E., Jr., D.W. Gorbet, L.S. Dunavin, Jr., H.A. Peacock, J.T. Johnson, R.S. Kalmbacher, C.G. Chambliss, R.J. Allen, Jr., G.M. Prine, A.M. Akhanda, B.R. Tyree, and P.H. Everett. 1978. Statewide uniform tests with grain sorghums, silage sorghums, annual summer grasses (sorghum x sudangrasses and pearl millets) and sweet sorghums (sorgos). Gainesville, FL, USA: Department of Agronomy, University of Florida, Agronomy Research Report AG 78-7. 95 p.
7. Williams, M.J. 1994. Growth characteristics of rhizoma peanut and nitrogen-fertilized bahiagrass swards. Agronomy Journal 86:819-823. Available at: https://www.agronomy.org/publications/aj/abstracts/86/5/AJ0860050819. Accessed 17 December 2012.
8. Williams, M.J., C.G. Chambliss, and J.D. Brolmann. 1993. Potential of 'Savanna' stylo as a stockpiled forage for the subtropical USA. Journal of Production Agric. 6:553-556.
9. Williams, M.J., and R.S. Kalmbacher. 1996. Renovation effects on bahiagrass productivity. Agronomy Journal 88:191-198. Available at: (https://www.agronomy.org/publications/aj/abstracts/88/2/AJ0880020191. Accessed 17 December 2012.

State Correlation: (NA)

Forage Suitability Group Approval:

Greg Hendricks, State Resource Conservationist

Tom Weber, State Soil Scientist

FL NRCS
December 2012

Appendix 1: Map Unit List

Apopka fine sand, 0 to 5 percent slopes	Fort Meade fine sand, 0 to 5 percent slopes
Apopka fine sand, 5 to 8 percent slopes	Fort Meade loamy fine sand, 0 to 5 percent slopes
Apopka sand, 0 to 5 percent slopes	Fort Meade sand, 0 to 5 percent slopes
Apopka sand, 5 to 8 percent slopes	Gainesville loamy fine sand, 0 to 5 percent slopes
Arredondo fine sand, 0 to 5 percent slopes	Gainesville loamy sand, 0 to 5 percent slopes
Arredondo fine sand, 5 to 8 percent slopes	Gainesville loamy sand, 5 to 8 percent slopes
Arredondo fine sand, bouldery subsurface, 0 to 5 percent slopes	Gainesville sand, 0 to 5 percent slopes
Arredondo sand, 0 to 5 percent slopes	Gainesville sand, 5 to 8 percent slopes
Arredondo sand, 5 to 8 percent slopes	Lake fine sand, 0 to 5 percent slopes
Astatula and Candler sands, 0 to 5 percent slopes	Gainesville sand, 0 to 5 percent slopes
Astatula fine sand, 0 to 5 percent slopes	Lake fine sand, 5 to 8 percent slopes
Astatula fine sand, 0 to 8 percent slopes	Lake sand, 0 to 5 percent slopes
Astatula sand, 0 to 8 percent slopes	Lake, clayey surface, 0 to 5 percent slopes
Astatula sand, banded substratum, 0 to 8 percent slopes	Orlando fine sand, 0 to 5 percent slopes
Astatula sand, dark surface, 0 to 8 percent slopes	Orlando sand
Candler clay, overwash, 0 to 2 percent slopes	Palm Beach fine sand, 0 to 8 percent slopes
Candler fine sand, 0 to 5 percent slopes	Paola fine sand, 0 to 5 percent slopes
Candler fine sand, 5 to 8 percent slopes	Paola fine sand, 0 to 8 percent slopes
Candler sand, 0 to 5 percent slopes	Paola sand, 0 to 5 percent slopes
Candler sand, 5 to 8 percent slopes	Paola sand, 0 to 8 percent slopes
Candler sand, bouldery subsurface, 0 to 5 percent slopes	St. Lucie fine sand, 0 to 5 percent slopes
Candler Variant fine sand, 0 to 5 percent slopes	St. Lucie sand
Candler-Apopka complex, 0 to 5 percent slopes	St. Lucie sand, 0 to 5 percent slopes
Eustis sand	

Appendix 2: Climate Station Locations		
COOP ID (FL=08)	**Location**	**County**
945	Bradenton	Manatee
6414	Ocala	Marion
6628	Orlando Intl. Air.	Orange
7851	St. Leo	Pasco
7886	St. Petersburg	Pinellas
8824	Tarpon Springs	Pinellas
478	Bartow	Polk
4707	Lake Alfred Exp Stn	Polk
4797	Lakeland	Polk
5973	Mountain Lake	Polk
9707	Winter Haven	Polk
1978	Crescent City	Putnam
2915	Federal Point	Putnam
6753	Palatka	Putnam
7982	Sanford Orlando	Seminole
1163	Bushnell	Sumter
2229	Deland	Volusia