Forage

Clover breeding

Forage improvement research at the FAES traces to its earliest days – the first forage grass variety was released in 1892, and the first forage legume variety was released in 1896. By 1915, almost 1700 plant introductions had been tested and evaluated as potential new varieties. Important early releases included **Pangola** digitgrass and **Pensacola** bahiagrass (1936), **Argentine** bahiagrass (1945), and **Floranna** sweetclover (1951). These early releases provided the grass and legume pasture base on which Florida's beef cattle industry developed after World War II. Private plant breeding companies remain reluctant to invest in forage breeding programs for the limited market areas in the southeastern U.S. Thus, FAES forage breeding programs will likely remain important for the livestock producers of Florida.

Alfalfa

The alfalfa breeding program at FAES was begun in 1950 by Earl Horner. Prior to his work, alfalfa was not well adapted to the environmental conditions of the Southeast and there were no varieties available. Horner's efforts lead to the release of **Florida 66.** Additional evaluation and selection lead to the release of **Florida 77**, which had superior yield and persistence compared to other commercial nondormant alfalfa varieties. Field selection for growth and vigor continued, with David Baltensperger and David Wofford assuming responsibility for the program after the 1987 retirement of Horner. After Baltensperger's departure in 1989, Wofford continued the selection and evaluation program. In 1996, **Florida 99** was released, a variety with improved resistance to the spotted alfalfa aphid. Research on alfalfa has continued, with new germplasm sources being added to the breeding material to expand genetic diversity.

White Clover

In 1952, Earl Horner started a program to develop white clover varieties. Initially, he evaluated plants from commercial varieties, plant introduction lines, and local ecotypes under grass-sod field conditions in Gainesville. The primary selection criteria were persistence, vigor during the second year of growth, and flowering. By 1973, he had identified 35 genotypes that performed better than others for persistence, yield and flowering. These were intercrossed and tested with the assistance of Charles Dean. After several years of multiple location evaluations, the variety Osceola was released. This variety continues to be the most widely sold white clover in the U.S. A nematode-tolerant version of Osceola will be released in 2003.

In the late 1980s, Baltensperger and Wofford began a selection program to develop a multifoliate clover (4-leaf type). After a few generations of crosses and selections, they released **Legendary Good Luck** white clover. Fifty percent of the individuals in this variety's population produce 4-leaf leaflets. Another attractive trait was the joint selection for a

Ryegrass forage

Red clover

deep red leaf mark gene that enhances the visual appeal of the plants. Legendary Good Luck is currently marketed to the fashion jewelry industry.

Red Clover

Red clover has always shown good yields in forage evaluations in central and north Florida. In the 1980s, a program of breeding and selection focused on development of a nondormant variety with improved levels of root-knot nematode resistance. This program, directed by Ken Quesenberry, released the variety **Cherokee** in 1990 and in 2002 released an improved Cherokee type that is currently undergoing seed increase. Cherokee has had a significant impact on cool-season pasture production across the southeastern U.S.

Grasses and Legumes

Several grasses and legumes indigenous to South America, Southeast Asia and Africa were introduced into Florida over the last century by FAES scientists. For example, in 1894, velvetbean, a native of India, came to Florida through the West Indies. Florida scientists discovered various velvetbean cultivars to be very good forage plants and acreage grew to 5 million acres in the South by 1914.

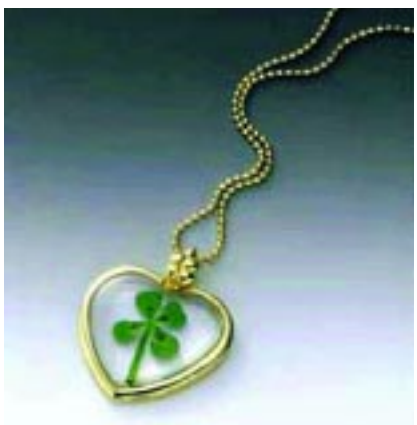
Bahiagrass is the dominant pasture grass used by the beef cattle industry in Florida. **Pensacola** Bahiagrass is estimated to be produced on 60 percent of Florida pastures. It was found growing wild near the ocean docks at Florida City by county agent E.H. Finlayson in 1943. Pensacola was officially entered into the National Plant Germplasm System in 1977 by the FAES.

In the 1970s and '80s, research on forage improvement increased statewide. FAES scientists at Gainesville, Ft. Pierce and Ona were actively involved in testing and evaluation of new plant introductions from around the world, and in the breeding and selection of new cultivars. Important forage legume cultivars generated from these efforts include **Florida** Carpon Desmodium, released by Al Kretschmer in 1979, and Florigraze rhizome peanut, released by Gordon Prine in 1981. Forage grass releases of significant impact in the 1980s were **Florico** and **Florona** stargrass, released in 1988 by Paul Mislevy, and **Floralta** limpograss, released in 1984 by Ken Quesenberry and a statewide team of cooperators. Currently, these three grasses are estimated to be grown on over 200,000 acres in central and south Florida. They have shortened the winter forage deficit gap for beef cattle producers by as much as two months.

Annual Ryegrass

Plant breeding of annual ryegrass began in the 1950s when T.E. Webb used mass selection to develop the annual ryegrass variety Florida Rust Resistant from local ecotypes, domestic varieties and plant introductions. **Florida Rust Resistant** was released by W.H. Chapman in 1962. In 1971, G.M. Prine discovered a seeding stand of annual ryegrass ecotype near Kinderlou, Georgia. Four cycles of recurrent mass selection from a population composed of **Kinderlou**, Florida Rust Resistant, **Magnolia**, **Gulf** and some unknown reseeding ecotypes at Gainesville, Florida, resulted in the release of **Florida 80** annual ryegrass in 1982. The crown-rust-resistant variety **Surrey** was released in 1989 and became another important variety.

In recent years, the annual ryegrass breeding program, under the direction of G.M. Prine, has emphasized cooperative research between programs in Florida, Oregon and North Carolina. Crown rust resistance and



'Legendary Good Luck" clover

Examining cool-season forage varieties

adaptation to the Southeast was selected for in Florida. The Oregon plantings gave added disease resistance to stem rust and better seed production. Selections in North Carolina combined a cold-hardy, crown-rust-susceptible North Carolina Mountain ecotype with Florida's best crown-rust-resistant breeding population. This resulted in the variety **Florlina**, jointly released by FAES and NCSU.

The program cooperated with Ulf Feuerstein of Deutsche Saatveredelung in Germany to double the chromosomes of Surrey to produce a new tetraploid cultivar, **Jumbo**, which was released by FAES in 1997. The original Surrey cultivar was selected for two additional cycles to produce the variety **Stampede** in 1995. In 2001 and 2002, the annual ryegrass program focused on cooperative releases with commercial ryegrass seed companies, which resulted in the release of 10 new cultivars.

Forage Varieties Released by FAES

Crop	Variety	Date of Release
Alfalfa	Florida 66	1969
	Florida 77	1980
	Florida 99	1997
Annual Ryegrass	Florida Rust Resistant	1962
	Florida 80	1982
	Surrey	1989
	Big Daddy	1993
	Natchez	1994
	Stampede	1995
	Jumbo, Florlina	1997
	King, Surrey II, Fantastic, Ed, Brigadier, Graze-N-Grow, Prine	2001
	Beef Builder III, FL X 1997 4X late, FL X2001 4X LF midlate	2002
Bahiagrass	Pensacola	1943
	Argentine	1945
Bermudagrass	Florakirk	1994
Elephantgrass	Mott	1987
Blue Lupine	Florida No. 1	1939
	Ritchey	1963
Carpon desmodium	Florida	1979
Crimson clover	Flame	1984
Digitgrass	Pangola	1936
Hairy indigo	Early	1946
	Late	1947
Limpograss	Floralta	1984
Red clover	Cherokee	1990
	FLMR7	2002
Pangolagrass	Pangolagrass	1936
Paspalum	Suerte Atra	1995
Rhizoma peanut	Florigraze	1981
	Arbrook	1986
Stargrass	McCaleb	1975
	Ona	1979
	Florico, Florona	1988
Sweetclover	Floranna	1951
Stylo	Savanna	1991
Velvetbean	Florida	1896
	Osceola, Alachua, Wahulla	1908
White clover	Osceola	1977
White clover (4-leaf)	Legendary Good Luck	1994