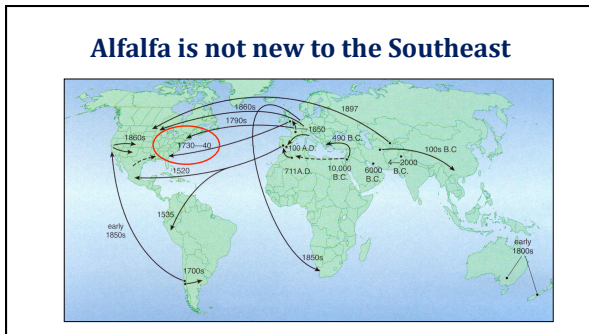


UGA Alfalfa Research and Cultivar development

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UGA Alfalfa Research and Cultivar development

- Mission of the program:
 - Research and Development of cool season forage crop cultivars for Georgia and the southeast.
 - Provide genetic solution to major challenges facing alfalfa production in the region.



Alfalfa is not new in the Southeast

Alfalfa (Medicago sativa).—This plant makes such heavy yields in favorable locations that it has received special attention at the experiment stations, but has given widely varying results. On moderately rich and sandy soils it has proved quite valuable for soiling purposes, furnishing cuttings as early as February, with frequent successions until late in the summer, while on dry hills or heavy clay, and on soils where there is a lack of drainage its growth has been weak and unsatisfactory. It has made a better growth on the alluvial soil of the Louisiana Station than any other hay and pasture plant which has been tested, and is the only plant yet found which will successfully occupy the ground throughout the entire year. At that station the first sowing was made in October, 1890; and in June, 1892, twenty months after planting, fourteen cuttings, averaging nearly 13 tons per acre, had been taken from the land. Another field sowed in March, 1892, had given

Why is the adoption of alfalfa is still slow ?

Choice of the right cultivar

217 Years ago !

10/4/1795, George Washington to Jefferson:

“Lucern has not succeeded better with me than with you; but I will give it another, and fairer trial before it is abandoned altogether”

11/20/1801, William Maclure to Jefferson:

“...perhaps the clover, lucern & other grasses which grow in the upper parts of Germany might succeed with you where the English and Dutch seeds have failed...”

.... In the country around the Hartz Mountains they use pulverized Gypsum as a top dressing for their Lucern & Cloverand frequently cut the lucern seven times.....”

Unique Challenges in the southeast

Aluminum (Al^{3+}) is highly rhizotoxic and is a major stress factor to plants on acid soils

Soil pH 6.5 pH 5.2 pH 5.5

A manageable problem !

- Liming materials come in several forms
 - Calcitic products contain calcium-based neutralizers
 - Dolomitic sources contain both calcium and magnesium
 - Both are effective for changing soil pH
- When Ca/Mg ratios in the soil are low, calcitic limestone should be used
- Particle size matters more
- The pH of unlimed plots become more acidic over time

Alfalfa rooting depth and subsurface pH

Depth (cm) vs pH and Aluminum concentration (ppm)

Current Goals UGA Alfalfa Breeding Program

Low pH tolerant cultivars ?

- Field evaluation of 1570 accessions at Tifton in soil with a 4.8 pH
- A total of 1,260 plants tracing back to 112 origins
- Evaluated for yield against common check varieties grown in the region.
- Top 116 entries equal or better than checks (100 to 137 %) selected for crossing

Other Goals UGA Alfalfa Breeding Program

Alfalfa cultivars with tolerance to common problems

- Selection for resistance to Potato Leaf Hopper in alfalfa
- Identification of sources of resistance
- Selection for root knot nematode resistance

Alfalfa cultivars for interseeding in bermudagrass

Germlasm evaluation for adaptation, Population development, Selection for yield and persistence under grazing

Experimental population in yield testing

Entry	Rank	Avg Yld
GA04S005 FSH	1	1917.35
Bulling 501	2	1905.2
GA04S001	3	1888.59
GA04S002 A3S	4	1868.38
GA04S004 FSH	5	1850.74
GA04S003 FSH	6	1792.86
GA04S006 FSH	7	1776
Bulling 805	8	1726.49
GA04S008 A3S	9	1726.91
GA04S009 FSH	10	1715.5
GA04S009 A3S	11	1670.19


Multi-location yield testing in pure and mixed stands

Forage yield and FDR of advanced experimental

Pure stand				Overseeded in Bermudagrass			
Genotypes	N	Yield (kg/ha)	FDR	Genotypes	N	Mean	FDR
GAMS1405-FSH	36	10435.8	9	GAMS1406-FSH	20	6620.2	8
GAMS1404-FSH	37	10156.3	9	Bulldog 505	20	6524.5	5
GAMS1401-A35	37	10112.6	9	GAMS1403-FSH	20	6518.3	8
Bulldog 505	37	10057.5	5	GAMS1404-FSH	20	6491.2	9
600RR	37	10053.9	6	GAMS1401-A35	20	6449.8	9
GAMS1402-FSH	37	9981	8	GAMS1406-A35	20	6446	8
GAMS1406-FSH	37	9887.5	8	Bulldog 805	20	6415.7	8
GAMS1403-FSH	37	9815.5	8	600RR	20	6376.5	6
GAMS1405-A35	37	9296.5	9	GAMS1402-FSH	20	6363.7	8
GAMS1406-A35	37	9130.2	8	GAMS1405-A35	20	6274.7	9
Bulldog 805	37	8838.6	8	GAMS1405-FSH	20	6159.3	9
LSD		1327		LSD		676.78	
CV%		19.78		CV%		14.52	

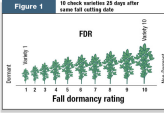
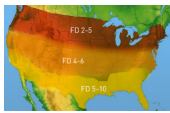
Incorporation of cold tolerance in non-dormant alfalfa germplasm

- Annual forage distribution can be improved through prolongation of the vegetative and stay-green period
- Dormancy controls autumn/winter growth...



Frost injury to tap root

18 check varieties 25 days after latest cutting date

Using Stem Density to Evaluate Alfalfa Stands

Density (stems/ft ²)	Action
Over 55	Stem density not limiting yield
40-55	Stem density limiting yield potential
Under 40	Stem density severely limiting yield
	Consider replacing.

Yield (tons/acre) = (Stems/ft² × 0.1) + 0.38

Alfalfa potential as a deterrent to BSM



BSM cost hay producers over \$150 million.

Pyrethroids application at \$12-18/acre per hay clipping.

Research to determine low cost and environmentally safe management alternative



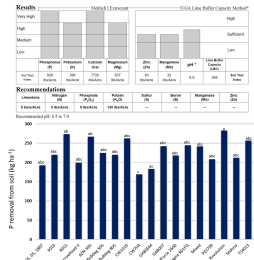
a) & b) Alfalfa plots in coastal bermudagrass mixture showing no BSM damage to bermudagrass. c) Coastal bermudagrass without alfalfa, showing BSM damage.

Research objectives

Investigate the potential of alfalfa as deterrent to BSM under a hay harvest system in different bermudagrass cultivars

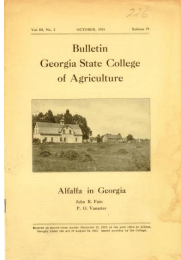
Extent of genetic variation in alfalfa germplasm in ability to deter BSM and prospective for selection of alfalfa cultivars with high potential of deterrence

An effective P management tool



- Alfalfa removal of total P in the range of 169 to 283 kg ha⁻¹
- The high P accumulation in alfalfa tissue and uptake present an opportunity to use alfalfa as a tool in the management of pastures heavily amended with poultry litter


Managing Alfalfa In Georgia



Recommended Management Steps in 1914

- Use well drained soil
- Use well prepared, firm seed bed
- Add lime and P & K fertilizer
- Choose adapted variety
- Inoculate with Rhizobium
- Plant in fall of the year
- Harvest in early bloom stage

What was true 100 years ago is still true today for growing alfalfa in a traditional way (pure stand)!



From www.georgiaforages.com

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