ON-FARM ALFALFA ESTABLISHMENT DEMONSTRATIONS IN THE SOUTHERN REGION SUSTAINABLE AGRICULTURE RESEARCH AND EDUCATION PROGRAM

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Background. Farmers and ranchers on Coastal Plain soils in the southern U.S. have not had sustained success in maintaining a dependable, high-quality, warm-season perennial forage legume for livestock production. Alfalfa serves this purpose in the North, but it has not become a reliable forage on Coastal Plain soils due to its root-growth sensitivity to soil acidity, livestock producer unfamiliarity with alfalfa, and the humid conditions that restrict efficient hay curing.

Commercial alfalfa production on Coastal Plain soils can be a reality. Alfalfa has the potential to generate more income without supplemental irrigation than most field crops grown in the South. Various harvesting methodologies such as wrapping high-moisture hay bales in plastic, green chopping, ensiling in plastic bags or bunkers, and grazing are potential alternative harvesting strategies for producers in the Coastal Plain region. The environmental and economic benefits of alfalfa production are positive. Curtailing N fertilization on Coastal Plain soils slows the increase in soil acidity that occurs in forage grass production systems fertilized with high N rates. Decreased nitrification lowers the potential for nitrate leaching into ground and surface waters. Plant nutrient uptake and use efficiency of fertilizers is improved at soil pH levels near neutrality. Improved milk production and weight gains have been demonstrated for livestock fed alfalfa compared to bermudagrass. Research on small plots demonstrated the feasibility of alfalfa production on a number of soils in East Texas, and economic estimates from research on alfalfa production for hay show the potential for net returns to exceed $400/acre annually.

Studies were needed on soil management for reliable establishment and sustainable production of alfalfa, and to evaluate alternative mechanical harvesting and livestock grazing schemes in the southern region of the U.S. to develop production risk management guidelines. Five livestock and forage grower-stakeholders agreed to cooperate with us in establishment, management, and harvest methodologies for alfalfa on at least five acres on each of their ranches.

Research Findings. Sites on cooperators' ranches were selected by soil sampling the surface-6-in. depth and subsoil depths to four feet. The most favorable site on each ranch was determined by site and soil characterization and soil analysis. The ideal soil needed to have a pH above 5.5 at all depths. Below pH 5.5, aluminum becomes toxic to alfalfa roots, limiting their growth, and therefore, restricting access to stored subsoil water. Limestone and fertility levels of the surface 6-in. depth of soil from each site were determined. Fertilizer recommendations were based on our previous research on alfalfa on Coastal Plain soils. Due to late spring notification of

the success of our grant request, selected sites were limed and fertilized in the summer of 1999. Sites were disked several times to remove the warm-season grasses. The soil at each site was firmed with a weighted roller to prepare the seedbed for planting alfalfa. Due to the drought, seeding was delayed from the normal seeding time in early October until adequate precipitation was received in late November. All sites were seeded the first 11 days in December. Fortunately, mild weather occurred through December, and good stands were obtained at all sites.

Table 1 shows the cost of alfalfa establishment at each of the ranches up to the first harvest. The greatest variation in input costs was for limestone applied to raise pH in the surface 6-in. depth to 6.8 - 7.0. Cost of limestone varied from $28.00/acre for a maintenance application of one ton/acre when pH was already at 7.0 to $105.67/acre for four tons/acre when pH was 5.4. The cost of fertilizer applied for establishment of alfalfa ranged from $52.49 to $69.02/acre. Weed control costs varied based on the number of treatments needed. Site 4 was sprayed with Roundup™ for annual ryegrass control at planting. An additional treatment for annual ryegrass using Poast Plus™ was need in mid-winter and broadleaf weeds were sprayed with Pursuit™ in February. All sites were sprayed for control of the alfalfa weevil larvae using Sevin XLR Plus™.

Table 1. Input costs for alfalfa establishment on ranches in five counties surrounding Overton.

Treatment/Input	Site 1	Site 2	Site 3	Site 4	Site 5
Soil sample analysis, 0-6 in.	20.00	20.00	20.00	20.00	20.00
Subsoil depths, pH /Al	25.00	20.00	20.00	25.00	25.00
Limestone applied	259.35	221.00	276.74	564.30	163.31
Disking[1]	195.00	232.50	180.00	160.20	150.00
Seedbed preparation[2]	32.50	38.75	60.00	26.70	58.00
Fertilization, total applied	341.40	419.70	314.91	367.82	400.33
18-46-0 in blend	(90.02)	(110.93)	(83.13)	(154.80)	(168.35)
0-0-60 in blend	(60.13)	(74.00)	(55.50)	(51.70)	(56.40)
0-0-22-11-23 in blend	(115.25)	(141.77)	(106.25)	(99.00)	(107.91)
15% B Granubor in blend	(76.00)	(93.00)	(70.00)	(62.32)	(67.67)
Alfalfa seed	507.00	651.00	468.00	416.52	452.40
Planting/rental & rolling	97.50	116.25	90.00	80.25	87.00
Weed control[1,3]	333.97	315.27	188.28	377.43	348.00
Insect control[1,4]	108.62	144.58	100.26	89.23	96.92
Fencing and materials					
Total	1920.34	2179.05	1718.19	2127.45	1800.96
Acres	6.50	7.75	6.00	5.34	5.80
Cost per acre	295.44	281.17	286.37	398.40	310.51

[1] Operation of a tractor + disk or sprayer valued at $10.00/acre
[2] Operation of a tractor + roller valued at $5.00/acre
[3] Poast Plus at 1½ pints/acre valued at $6.71/acre; Pursuit at 2.16 ounces/acre valued at $9.30; Roundup Ultra at five quarts/acre valued at $50.00/acre and at 1quart/acre valued at $10.00.
[4] Sevin XLR Plus at 1 quart/acre valued at $6.71/acre.