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ALFALFA YIELDS FROM FIELD PRODUCTION ON RANCHES PARTICIPATING IN THE SUSTAINABLE AGRICULTURE RESEARCH AND EDUCATION PROGRAM

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Background. Studies were initiated in the late 1980s to determine the factors that restricted alfalfa production on the Coastal Plain soils in the Piney Woods of East Texas. These soils, primarily in the Ultisol and Alfisol orders, are naturally acidic and require limestone to elevate soil pH into the range of 6.8 to 7.0 needed for alfalfa production. Boron becomes increasingly unavailable to clovers and alfalfa in limed acid soils. Even though the surface soil can be limed to the correct pH for alfalfa, aluminum levels in acid subsoil can be toxic to alfalfa roots. Subsoil acidity may be ameliorated by application of gypsum or limestone, but the desired effects of these treatments occur over an extensively long time. Soils in the Ultisol and Alfisol orders are highly leached and many are poorly drained. Poorly drained soils are excessively wet for alfalfa during extended periods of high rainfall. These factors necessitate that sites be carefully selected for alfalfa production that are well drained and have a pH above 5.5 from below the limed surface layer into the four-foot depth. These were the major criteria used to select sites for alfalfa production on five ranches in Rusk, Gregg, Smith, Cherokee, and Anderson Counties. Each site was limed to raise surface soil pH to 7.0, disked to incorporate the limestone and eliminate bermudagrass, rolled to pack the soil for a firm seed bed, and sprayed with Roundup for additional control of bermudagrass where needed. Sites were fertilized with phosphorus, potassium, magnesium, sulfur, and boron according to recommendations based on soil tests. Thirty-one acres of alfalfa were planted in early Dec. 1999 when rainfall provided adequate soil moisture for successful establishment. Each site was sprayed as needed for control of alfalfa weevil, leaf hopper, broadleaf weeds, and grasses. Yield estimates were clipped immediately before each harvest, oven-dried, ground, and analyzed for total nitrogen to determine crude protein. Alfalfa was fertilized in late winter each year with a blend containing phosphorus, potassium, magnesium, sulfur, and boron. Potassium also was applied after the second and fourth cuttings with the annual application exceeding 350 lb/ac. Additional sulfur and magnesium were applied after the fourth cutting for total application rates of 150 and 75 pounds per acre, respectively.

Research Findings. Yield estimates from field-scale alfalfa production three and four years after planting are presented in Tables 1 and 2. Production remained favorable three and four seasons after planting the alfalfa.

Application. A yield of 4.5 and 5 or more tons/acre in the third and fourth production seasons demonstrated that alfalfa production is sustainable on selected East Texas soils. Selection of well-drained soils with subsoil pH at 5.5 or higher is critical for alfalfa on Coastal Plain soils.

Table 1. Alfalfa hay yield on producers' ranches the 3rd year (2002) of the SARE funded project.

Variety by location	Harvest 1	Harvest 2	Harvest 3	Harvest 4	Total
	-----Pounds of 12% moisture hay/acre-----				
Griffin Ranch					
Amerigraze [†]	2,566	2,332	1,924	Deer	6,822
GrazeKing	3,073	2,070	1,705	grazed	6,847
Taylor Ranch (now part of the Threlkeld ranches)					
Amerigraze	2,454	2,837	1,711	795	7,797
GrazeKing	2,464	3,024	1,655	887	8,029
7-P Ranch					
Amerigraze	3,142	3,348	2,751	1,447	10,687
GrazeKing	4,226	3,024	2,252	660	10,162
Riley Ranch[‡]					
Amerigraze	1,611	1,707			3,317
GrazeKing	1,597	2,233			3,830

[†] Amerigraze 702

[‡] Extended grazing resulted in lower number of yield estimates

Table 2. Alfalfa hay yield on producers' ranches the 4th year (2003) of the SARE funded project.

Variety by location	Harvest 1	Harvest 2	Harvest 3	Harvest 4	Harvest 5	Total
	-----Pounds of 12% moisture hay/acre-----					
Griffin Ranch						
Amerigraze [†]	2253	2196	1708	1752	Deer	7909
GrazeKing	1967	1754	1473	1387	grazed	6580
Taylor Ranch (now part of the Threlkeld Ranches)						
Amerigraze	2377	2987	Cattle	937		6301
GrazeKing	3135	3672	grazed	1290		8096
7-P Ranch						
Amerigraze	3640	2567	2266	933		9405
GrazeKing	3444	2659	1699	821		8623
Riley Ranch[‡]						
Amerigraze	2064	1268	1663	1482	1336	7812
GrazeKing	2042	788	1522	1589	1251	7193

[†] Amerigraze 702

[‡] Extended grazing resulted in lower number of yield estimates