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Potential of interseeded soybean and grain sorghum as a forage for dairy cattle

Abstract

Soybeans interseeded with grain sorghum (soy-sorghum) was compared to corn silage as a silage crop for ruminant animals over a 3-year period. Results indicate that DM yields are comparable if soy-sorghum is seeded early (June 6) but less than corn silage when seeded late (June 28). Liquid manure may be substituted for commercial fertilizer without a significant decrease in soy-sorghum DM yield per acre.; Dairy Day, 1985, Kansas State University, Manhattan, KS, 1985;

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POTENTIAL OF INTERSEEDED SOYBEAN AND GRAIN

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SORGHUM AS A FORAGE FOR DAIRY CATTLE - II

UJ.E. Shirley and J. Koger¹

Summary

Soybeans interseeded with grain sorghum (soy-sorghum) was compared to corn silage as a silage crop for ruminant animals over a 3-year period. Results indicate that DM yields are comparable if soy-sorghum is seeded early (June 6) but less than corn silage when seeded late (June 28). Liquid manure may be substituted for commercial fertilizer without a significant decrease in soy-sorghum DM yield per acre.

Introduction

Soybean interseeded with grain sorghum for use as a silage crop for livestock has the potential of replacing corn silage and alfalfa in some farm operations. Soy-sorghum fits well into a double-crop system and is more drought tolerate than corn. Previous research suggests that the crop can be harvested in the vegetative stage through the soft dough stage of grain sorghum. Maximum dry matter yield is obtained when the grain sorghum is in the soft dough stage (at 90 to 125 days post-seeding dependent on moisture conditions and seeding date). A wide array of varieties and seeding dates have been used by producers. Dry matter yield per acre has been quite variable, probably because of the variable seeding dates and varieties used.

This study was conducted to examine seeding date, multi-year yields and production cost.

Procedures

Trial 1 involved a three-year comparison of dry matter (DM), total digestible nutrients (TDN), and crude protein (CP) yield per acre between soy-sorghum and corn when harvested as ensilage. Accepted cultural practices were used for the crops. Seeding rates were 26,000 kernels/acre for corn and 120 lbs soybeans plus 20 lbs of grain sorghum seed/acre for soy-sorghum.

Trial 2 compared early (June 6) versus late (June 28) seeding dates for soy-sorghum. Cultural practices were similar to those employed in trial 1.

Trial 3 compared commercial fertilizer versus liquid manure from a beef feedlot (total confinement on slots) as a fertility program for soy-sorghum production.

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Results and Discussion

Corn silage yields over the 3-year period averaged 7.5 tons of DM/acre compared to 6 tons of DM/acre for the soy-sorghum (Table 1). This is partially confounded with seeding dates for the soy-sorghum. Soy-sorghum DM yield shown is an average of both early and late seeded plots. The TDN and CP content of corn silage and soy-sorghum were 67.5% and 8.23%; 60.2% and 11.89%, respectively.

Table 1. Dry matter, crude protein, and total digestible nutrient yields/acre for corn and soy-sorghum silages.

Crop	Dry Matter (tons)	Crude Protein (%)	TDN (% DM)
Corn silage	7.5 (12) ²	8.23 (12)	67.5 (12)
Soy-sorghum	6.0 (7)	11.89 (7)	60.2 (7)

¹Three year study at Richmond, Kentucky (1978, '79, '80)

²Numbers in parentheses are the no. of plots used.

The percent protein of soy-sorghum ranged from 9.5 to 16.4 on a dry basis. Sampling error can be quite high in a mixed crop silage because the protein content of soy leaves and seed pods tend to be higher than that of grain sorghum leaves and grain head.

Effect of seeding date on DM yield of soy-sorghum is shown in Table 2. Earlier seeded crops tend to mature later and receive the benefit of elevated soil

Table 2. Effect of seeding date on DM yield of soy-sorghum

<u>Seeding Date</u>	<u>DM Yield/Acre</u>
June 6	8.73 tons
June 28	5.42 tons

moisture at seeding time. The June 28 date corresponds to wheat harvested for grain, thus ample time is available to obtain a respectable forage yield in a double-crop situation.

Production cost per acre and the affect of liquid manure on DM yield and production cost are depicted in Table 3. Cost figures are based on 1980 values which can be converted to current values since inputs are noted.

Table 3. Influence of liquid manure on production cost and DM yield of soy-sorghum

Item	Commercial Fertilizer	Liquid Manure
— per acre basis —		
DM yield (tons)	8.73	8.25
Production inputs		
120 lbs soybean seed	\$25.50	\$25.50
20 lbs grain sorghum seed	9.30	9.30
Innoculant for soybeans	1.50	1.50
30 lbs of actual nitrogen	6.40	--
90 lbs of P ₂ O ₅	15.48	--
120 lbs of K ₂ O	11.22	--
one (1) ton of lime	7.00	7.00
4714 gal liquid manure ^b	--	10.51 ^a
Total production cost ^b	<u>\$76.40</u>	<u>\$53.81</u>

^a Value of liquid manure reflects labor, machinery, equipment operation cost, and ownership cost of specialized equipment. It does not include cost of the holding facility.

^b Labor, machinery, equipment, and land were not included because of the extreme variability of these cost among farms.

Soy-sorghum requires a lower production cost than corn and is quite adaptable to liquid manure as a replacement for commercial fertilizer. Soybeans and grain sorghum are more drought tolerate than corn and early-seeded, soy-sorghum DM yields are similar to those for corn silage, thus, soy-sorghum deserves further investigation as a silage crop for ruminants.