

**Warm Season Summer Annual
Sorghum Sudan
For Grazing Goats
SARE Funded:
Goat Friendly Pasture Project Report
Pulaski County Kentucky 2003**

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Purpose: The purpose of the Goat Friendly Pasture Project has three major objectives. First, to evaluate thought applied research and to demonstrate through Extension education. This effort should demonstrate to Kentucky goat producers the importance of forage and browse plants and their contribution to the economic sustainability of the meat goat industry. Secondly, to integrate annual and perennial grass as well as legumes into a production system that maximizes the use of Kentucky 31 Tall Fescue. Tall Fescue should serve as a source of pasture for the first period of grazing, April through the end of June and again October through free down. Third, goat producers must learn to utilize pasture management techniques as the primary tool for reducing gastro-intestinal parasite infections in goats.

Method: Twenty-four, dry pregnant does were randomly allocated to 6-grazing paddocks. Four goats were placed into each grazing paddock. Goats in 3 of the paddocks were rotationally grazed (R) while the latter 3 were grazed without rotation (Non-R). The overall stocking rate was 9.6 animals/acre. The stocking density for the rotated group was 49.5 animals/acre. Stocking rate for each grazing sub-division or cell was calculated by dividing the number of animals grazing within a cell or sub-division.

The rotated groups were moved forward in rotation at 7-day intervals. Rotated groups were without access to the previously grazed sections. This allowed time for the grazed pasture to regrow. At the same time, the non-rotated groups were grazed continuously without rotation and without allowing any regrowth time between grazing.

All goats were dewormed, weighted, body scored and assessed for anemia as well as sampled for gastro-intestinal parasite eggs two days before the start of the grazing study. All goats in the study grazed a sorghum sudangrass hybrid for 70 days. The hybrid was sod seeding into tall fescue on May 20 and the seeding rate was 60 lbs/acre. Two application of ammonium nitrate fertilizer was made at seeding (50 lbs N/acre) and again at first grazing. The study was started on July 7 and ended September 17. The months of July through September is considered as the peak gastro-intestinal parasite infection period. All the does in

the study were not dewormed or fed supplemental grain or concentrate during the 70-day grazing period. However, water and mineral was provided free choice.

Results: All does rotated and non-rotationally grazed, increased body weight. The non-rotated group gained 28.06 lbs for the 70-day trial. The average daily gain (ADG) for the non-rotated group was 0.40 lbs/day. On the other hand, the rotated group gained slightly less at 23.33 lbs for the 70 days and averaged 0.33 lbs/day as ADG. The reason for gain difference can perhaps be attributed to allowing forage levels in the rotational groups to become limiting.

Table 1				
Change in Weight Over Time for Goats Grazing a Sorghum Sudangrass Hybrid				
Date	7/7/03	8/7/03	9/17/03	Total
Non-R	106.67	111.08	134.73	28.06
R	107.50	115.33	103.83	23.33

Table 2				
Change in Body Condition Score for Goats Grazing a Sorghum Sudangrass Hybrid				
Date	7/7/03	8/7/03	9/17/03	Ave.
Non-R	2.83	2.88	2.91	2.87
R	2.50	2.17	2.33	2.51

All goats in the study maintained an acceptable body condition (> 2.0 in a 1-5 scale see Table 2) throughout the 70-day grazing period. Likewise, all does were observed to be only moderately anemic after 70 days without deworming (Table 4). Anemia was assessed by visual inspection of the mucus membranes of the eye and upper lip with 1 = pink and 3 = gray or anemic. Similarly, Table 3 illustrates the change in fecal egg counts per gram of feces (FECs) over the 70-day period. Initial counts were near 0 parasite eggs/gm of feces sampled. Egg counts increased overtime to 173.09 eggs per gram of feces (non-rotated) and 206.80 eggs per gram (rotated) at the end of the 70-day grazing period. All samples were analyzed and counted by the Wisconsin Direct Count Method. These numbers indicate a need for treatment but are well below levels of great concern. All test-does kidded within one to two months of the close of the 2003 study year. No adverse effects were observed due to treatment. The average kidding rate for all 24 females was 200%. All does appeared to lactate sufficiently.

Table 3			
Change in Fecal Egg Counts for Goats Grazing a Sorghum Sudangrass Hybrid			
Date	7/7/03	8/7/03	9/17/03
Non-R	0.64	27.89	173.09
R	0.18	11.33	206.80

Table 4				
Change in the Color of the Mucus Membranes				
Date	7/7/03	8/7/03	9/17/03	Ave.
Non-R	1.67	1.00	2.09	1.59
R	1.58	1.00	2.42	1.67

Discussion: The following comments are made from observations made during the 70-day study. If grazing goats do not have limited access to forage in a pasturing situation, goats will continuously consume emerging succulent regrowth and drastically reduce the carrying capacity of sorghum sudangrass. Conversely, goats that graze forages by sections graze the forage top to bottom. They are then move forward in the rotation allowing time for regrowth to occur before grazing. Secondly, if grazing is not controlled in a pasture situation, goats will socialize at one location in the field. Socializing areas were observed to be at the starting point of grazing. Consumption of short grasses and forbs growing in these socializing areas may be an infection source. On the other hand, goats grazing above the short grass, within grazing sub-divisions, may better avoid parasite infections.

Finally, goats grazing in rotation , within sub-divisions may become infected with gastro-internal parasites when the summer annual grass becomes limiting. Goats were observed grazing the short grass growing below the sudangrass when over grazing occurred during the middle portion of the grazing study. Table 3. indicates a substantially lower egg count for the rotated group at the second sampling, whereas the final sampling indicates an increase in egg numbers.

The up-right growth characteristic of sorghum sudangrass appears to provide some degree of parasite larvae avoidance by allowing the goat to graze above the infection zone. Without the opportunity to grazing above the infection zone (a zone estimated to be 4 inches above the soil line), goats are forced graze low to the ground therefore increasing the infection rate.

Forage plant acceptability: planting ease and integration with fescue

The sorghum sudangrass hybrid, used in this study has many attributes relating to both quantity of dry matter needed for an intensely managed 60 – 90 day grazing periods. Table 5 shows the rapid regrowth potential and excellent carrying capacity of the sudangrass when manage in a manner that allows regrowth to occur. Regrowth amounts for weeks 1, 2 and 3 was 274.69, 1763.45, 2715.57 lbs of dry matter following grazing. Likewise, Table 6 illustrates that the sudan grass is

Table 5 Quantity of Regrowth for Sorghum Sudangrass Weeks After Grazing				
Regrowth Period	Week 1	Week 2	Week 3	
Lbs DM/ac	274.69	1763.45	2715.57	
Stocking Rate	9.6 goats/ac			
Stock Density	49.5 goats/ac			
Table 6 Quality of Regrowth for Sorghum Sudangrass Weeks After Grazing				
Regrowth Period	Week 1	Week 2	Week 3	Ave.
RFV%	76.6	77.1	75.8	76.5
CP%	9.1	9.2	8.7	9.0
TDN%	49.5	50.3	49.4	49.7

stable in quality over a three week regrowth period, and is indicated by the relative feed values (RFV), crude protein (CP), and total digestible nutrient (TDN) values observed in samples taken at 1, 2 and 3 weeks following grazing.

Preliminary recommendations: These are preliminary recommendations gleaned from the 2003 grazing year. They are not met to be absolute, but may give some guidance for management.

- Set daily forage allowances at 8 -10% of the live body weight of the grazing animals.
- Keep foliage residue levels at 25% of the total plant foliage volume or move goats from the cell when plants are grazed to 14 inches of height. This may keep goats grazing high and avoid searching for low growing forbs and grasses.
- Set cell residence time (time spent grazing on one location) at 7 to 10 days. Return to graze regrowth at 14 to 21 day intervals. A minimum of four paddocks are needed for a 21 day grazing interval. When growth is excessive consider using companion grazers (steers, cows) and/or haymaking is essential in controlling excess growth.

Rule of Thumb: Finally, based on the 2003 dry matter yields, 1/3 acre of sorghum sudangrass is needed for each acre of permanent cool season pasture grazed (based on a 3 does/acre stocking rate).