
The objective was to investigate concurrent changes in ruminal bacterial diversity and animal performance in goat response to plant tannins using a modern pyrosequencing approach.

Two grazing experiments were performed to 1) investigate the effects of supplementing condensed tannins-containing pine bark powder on average daily gain, ruminal fermentation, and rumen microbial diversity dynamics (Experiment 1), and 2) to quantify the influence of different sources of extracted tannins supplementations on ruminal fermentation and rumen microbial diversity changes of goats grazing fresh forages (Experiment 2). In experiment 1, 20 Kiko-Boer cross male goats (; initial body weight= 39.7 ± 2.55 kg) were randomly assigned to 2 experimental diets (alfalfa pellet vs. pine bark powder). Alfalfa pellet (no tannin as a control) or pine bark powder (11% condensed tannins) was supplemented at 0.5% body weight for targeted total dry matter intake of 1.2% body weight. The remaining dry matter intake of each diet was obtained from grazing for 55 days. In experiment 2, 12 Kiko-Boer cross goats were used to measure average daily gain, ruminal fermentation, and gut microbial population in the rumen of goats grazing bermudagrass. The animals were randomly assigned to 3 experimental diets: 1) no tannins (control), 2) chestnut extract at 100 g/d, and 3) quebracho tannin extract at 100 g/day.

In experiment 1, average daily gain and rumen fermentation status as measure of volatile fatty acids production were similar between diets. Bacterial population in pine bark powder-supplemented group was greater for (20.5 vs. 33.2%) and (67.2 vs. 57.3%) phylum compared with control group, respectively. In experiment 2, average daily gain was greatest ($P < 0.05$) for chestnut tannins extract (278.6 g/d) than quebracho tannins extract (150 g/d) and the control (42.9 g/d). Goats grazing bermudagrass pasture with chestnut tannins extract had greater ($P < 0.05$) concentrations of acetate, propionate, butyrate, and total volatile fatty acids compared to those in quebracho tannins extract and control. Bacterial population in chestnut tannins extract-supplemented group was greatest for (51.5, 52.9, and 35.3%) phylum compared with quebracho tannin extract and control group, respectively. Current study shows that tannins from plants can exhibit a positive or negative effect both on rumen fermentation and on rumen microflora, and it is possible that this effect is depending on sources of tannins or tannin-containing diet.

These results indicated that feeding pine bark or tannin extracts supplementation selectively reduced bacteria population and rumen fermentation. Using bTEFAP we have examined the microbiota in the feces of goat. Rumen microbial population is very dynamic and tannin inclusion impacts specific members of the microbial population. There is also possible adaptation of ruminal microbiota to tannin and beneficial effect of tannin on some class of rumen microbes has been observed. However, there is need for detailed study involving effect of varying concentration of tannins on rumen bacteria, archaea and fungal diversity of goats in response to ingestion of different sources of tannin-containing diet..

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1. To determine the grazing/browsing behavior and distribution patterns of meat goats confined in small plots and
 2. To relate the grazing/browsing behavior and distribution patterns of meat goats with weather conditions and available forages.

The study was conducted at the research facility of Tuskegee University, Alabama within a two-acre plot with five virtual zones: Zone 1 was dominated with tall fescue and hairy vetch, and consisted of artificial shelter, tree shade, water supply, and mineral supplement; Zone 2 was dominated with briar; Zone 3 consisted of tall fescue and few browse; Zone 4 basically had tall fescue, and some browse; and Zone 5 dominated with browse species. Diurnal distribution patterns and grazing/browsing behavior of goats were observed for two consecutive days in March, April, May, and July 2014. Diurnal behavior was classified into five categories: grazing, browsing, lying, loafing, and staying in the shelter. Similarly, diurnal observation period was divided into morning (dawn-noon), early afternoon (noon-3PM), and late afternoon (3PM-dusk). Height of the ground vegetation was measured and available forage biomass was determined before bringing goats to the study plots. Before- and after

To assess the performance of selected browse species grown in the greenhouse.

Mulberry (L.), White lead tree (Lam.), Bush Indigo (L.) and
Mimosa (L.)

To determine the initial soil quality and tree parameters in a newly-developed silvopasture system.

A silvopasture was developed by thinning down (3 plots, 1-acre each) the 8- year old mixed species of pines (loblolly, and longleaf,) and hardwood stand located at the Atkins Camp Site of Tuskegee University, Tuskegee, AL. Soil quality (compaction, pH, nutrient status, and organic matter) and tree parameters (height and diameter at the breast height (DBH) were measured after the stand was thinned and plots were tilled.

Among soil parameters, phosphorus was low (7lbs./acre), magnesium high (57lbs./acre), pH low (5.2), median organic matter 2.4%, and average soil compaction was 84 ± 4.0 psi. The median number of trees per acre for loblolly and longleaf pine was 72 and 47 respectively. Both tree height (H) and diameter (D) at breast height were higher for loblolly (H: 23 ± 0.02 ft.; D: 5 ± 0.1 in) than longleaf pine (H: 21 ± 0.3 ft.; D: 4 ± 0.1 in).

This research is ongoing with the incorporation of selected cool-season and warm-season forages, and grazing those forages with meat goats. The expected results will be very useful for goat producers and professionals in the Southeast.

Prescribed burning is practiced routinely in longleaf pine stands to remove hardwood and shrub undergrowth.

The primary objective of this study was to examine the effects of different sire types (Boer vs. Kiko) on reproduction and performance of purebred Kiko dams as well as growth and health performance of their offspring.

Doe performance was analyzed by evaluating prolificacy (litter size), fecundity (fertility x prolificacy), and birth types (single, twins, or triplets). Progeny performance was evaluated for the effect of breed, gender, and litter size on weight, and average daily gain (ADG). A total number of 19 Kiko does were used in this study, 11 of which were bred to a Kiko buck and 8 to a Boer buck.

Results revealed individual breed combination prolificacy values (1.9 and 1.75kids/doe) for the Kiko Sired Group and Boer Sired group respectively. There were non-significant sire differences for gestation length (150.38 ± 2.66 vs. 147.64 ± 3.108 days, $P=0.06$) for Boer and Kiko respectively. Weights of Kiko dams assigned to Boer and Kiko sires at breeding were similar (45.63 ± 10.17 vs. 42.39 ± 6.91 , kg, $P=0.41$). At weaning, dams breed to Boer and Kiko sire weighed the same (52.77 ± 14.64 and 42.76 ± 7.13 , kg, $P = 0.10$). Litter size at birth and at weaning did not differ among sire breed (1.75 ± 0.46 , $P= 0.37$ vs. 1.90 ± 0.30 and 1.50 ± 0.53 vs. 1.75 ± 0.46 , $P = 0.33$) respectively. Boers sired kids were significantly heavier at birth but not at weaning (3.41 ± 0.48 vs. 2.78 ± 0.53 kg, $P= 0.001$ and 13.82 ± 2.78 vs. 12.43 ± 3.47 kg, $P = 0.26$). This suggests a growth-improvement potential for progeny when utilizing Boer sires. Non- significant differences were observed for ADG (0.15 ± 0.03 vs. 0.13 ± 0.03 kg/d) for Boer and Kiko sired kids respectively. Birth and weaning weights were heaviest, although not significant ($P >0.05$) for male kids