



The Oklahoma Commercial Meat Goat Forage Performance Test 2008 Report

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Preface

The Kerr Center Meat Goat Program began in 2007 with the establishment of the Oklahoma Commercial Meat Goat Forage Performance Test, and expanded to include a commercial doe herd later that year.

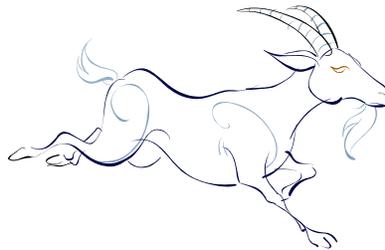
Each year, the Kerr Center teams up with the OSU Cooperative Extension Service to conduct the test. Meat goats are booming in Oklahoma agriculture, and it's important to know which lines perform best on pasture. The forage performance test helps answer that question.

The rationale behind the Oklahoma Meat Goat Forage Performance Test is to begin to identify individual bucks, as well as their sires and dams, that carry genetics expressing strong traits important in commercial meat goat production.

The test allows breeders to compare genetics within their herd to make better management decisions as to herd lines that will produce profitable progeny for future herds. This test will also provide valuable information for all goat producers and the public.

Goat producers wishing to test their bucks' performance on forage are invited to enter bucks in the test, which will run from mid-July until the end of October.

For more information on the Kerr Center program as well as links to goat resources, visit the Kerr Center website www.kerrcenter.com/stewardship/goats.html



Introduction

The U.S. meat goat industry has expanded significantly in recent years, especially in the South, where production was once largely confined to southwest Texas. Several factors have driven this growth. A rising demand for goat and lamb from growing ethnic populations is one. Another is the increased number of small farms and ranches. Most landholders entering into farming these days have small acreages that do not readily support cattle production. In such cases, small ruminants are an attractive and workable option.

Furthermore, many larger, established farmers and ranchers are discovering the benefits of adding meat goats to their cattle operation. Goats complement cattle on pasture by eating browse and weeds that cattle avoid; meat goats also provide a second income stream that is always welcome.

While these have been important factors in the changing the meat goat industry, the most compelling driver has been the show ring. Show goats have become a major source of interest and revenue for many producers, particularly due to growing demand from youth participating in 4-H and FFA competitions. This emphasis on show ring quality has had a significant effect on the commercial meat goat animal, which has been selected more for its physical appearance than for the commercial characteristics of foraging ability, foot soundness, and parasite resistance / tolerance.

In 2006, goat producers and agricultural educators approached the Kerr Center about hosting a commercial buck test. The goal of the test would be identification of the genetics required for forage-based goat production. Emphasis would be placed on weight gain using forage and minimal supplementation, parasite resistance / tolerance, and overall commercial viability.

As a result, the Kerr Center commenced the first meat goat buck test on July 16, 2007. (See *The Oklahoma Commercial Meat Goat Forage Performance Test 2007 Report* for information.) The success of the first year's test led us to schedule another test in 2008. The 2008 test began on July 14 and ended on October 21, for a test period of 102 days. Bucks were checked in on June 27 and allowed a two-week warm up period before the official start weight was taken on July 14.

Twenty producers from eight states entered 61 bucks to compete for top average daily gain and parasite resistance. Breeds represented in the test were Boer, Kiko, and crossbred Kiko/Boer.

Oklahoma Commercial Meat Goat Forage Performance Test 2008

Eligibility

Nominations were limited to approximately 70 bucks, with each producer being allowed to enter six bucks per farm. Eligible bucks were born between February 1, 2008, and April 15, 2008. The live weight at check-in had to exceed 35 lbs., and weaning had to have been completed 14 days prior to the check-in date. A minimum of one deworming and one CDT vaccination four weeks prior to entry were required. All breeds and cross breeds were allowed to compete.

Procedures

All producers were required to provide documentation of compliance with their respective states' scrapies regulations. Out of state producers had to provide their state's official inter-state health certificates showing compliance with all Oklahoma livestock shipment regulations.

Dr. Dave Sparks, Oklahoma State Extension Food-Animal Quality and Health Specialist, gave each animal a thorough health examination upon check-in. Each buck then received a de-worming with Levamisole Hydrochloride (Prohibit Drench), a CDT vaccination, and a numbered ear tag for identification. Feet were trimmed and determined to be free of foot scald/rot.

Forages provided the bulk of the diet, which was supplemented with a choice limited protein supplement in tub form. The tub contained a balanced ration of vitamins and minerals to meet the needs of the bucks. At least three tubs were made available at all times during the test period.

Any buck suspected of disease or illness was quarantined on forage pending examination by a veterinarian. If deemed safe, the animal was treated and returned to the test. If it was determined that the individual should not reenter the trial, it remained in quarantine until alternative arrangements could be made with the producer.

Weighing and parasite examinations were done monthly. The parasite exam included FAMACHA scoring of the lower eyelid and sampling for fecal egg counts (FEC). Bucks scoring 4 or 5 on the FAMACHA scale were dewormed (see box p. 10 for description of FAMACHA).

Deworming resulted in disqualification from the test, though the animal was returned to the field and data collection resumed if the health of the animal allowed. Otherwise, positioning within the test was determined by average daily gain (ADG) and fecal egg counts.

Forages

Although the buck test was not a research trial on forages per se, several observations on forage quality, quantity, and grazing were possible. Fertilization before the test was not conducted in 2008. Soil samples taken in the spring of 2008 indicated that additional fertilizer was not needed in order to produce enough forage for the bucks.

The most prevalent forages in the paddocks were Johnsongrass, Fescue, Dallisgrass, Common Bermuda, Common or Annual Ragweed, and Yellow Foxtail. Other forbs were identified as well, but were not present in large quantities. In the 2007 test, pastures were cut before the start of the test. This did not occur for the 2008 test because rainfall was short when the 2008 test began (see *Weather* below and fig. 3). This, combined with the high temperatures, led to the fear that the test would begin during drought. The weather made a drastic change in mid-August to rainy and temperate conditions. This allowed the fescue to overtake all other forages within the paddocks.

Though the protein, energy, mineral, and vitamin requirements were met (as shown in Figures 1 & 2), it was observed that the lack of forage diversity did have a negative impact upon average daily gain. Also, many similar signs of fescue toxicity were observed in the bucks. While there is no scientific data to back this observation, test staff believe that toxicity problems did play a role in some animals.

Figure 1. Crude Protein

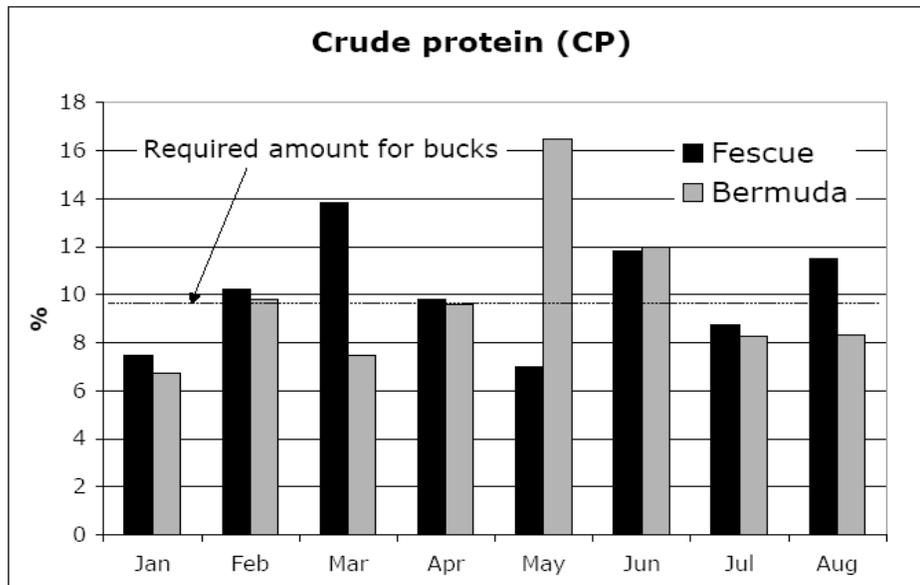
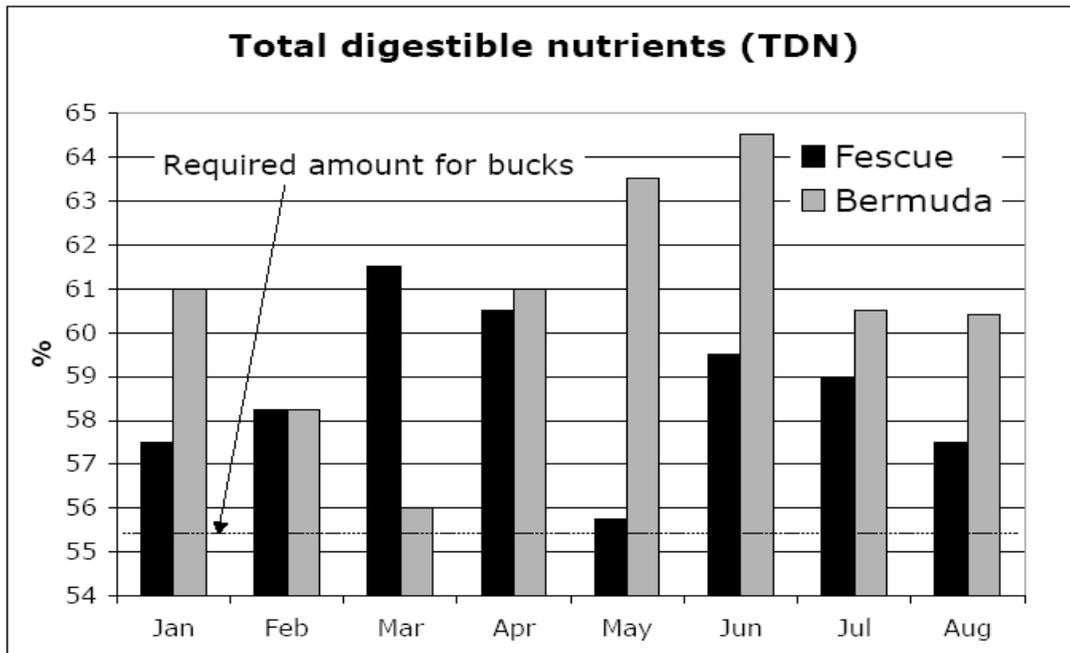


Figure 2. Total Digestible Nutrients (TDN)



Supplementation

In the 2007 test, it was observed that hand feeding the bucks allowed for more food aggressive animals to consume more than their fair share of supplement. In 2008, a protein supplement in free choice form was used. This would allow for continual access to the supplement and would increase the opportunities for all bucks to receive the maximum amount of supplement they needed.

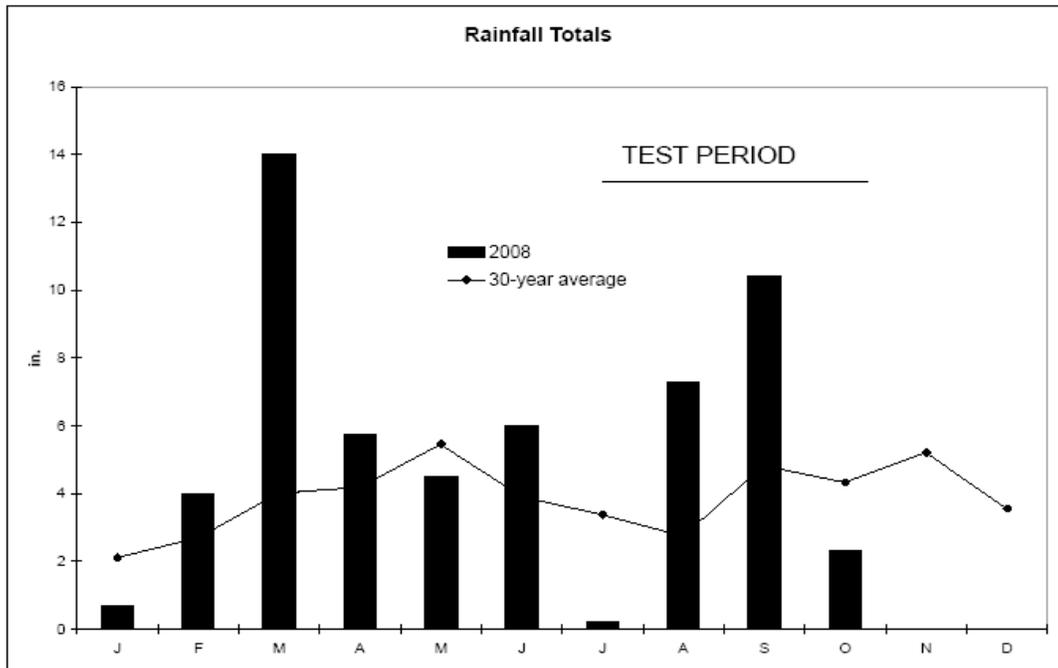
However, using this approach did not reproduce the rate of gains observed on the hand fed soybean supplement in 2007. It is surmised that while the protein levels within the supplement were adequate, it was bound with molasses in amounts that inhibited the desired foraging effect. Too many sugars (in the form of molasses in this case) can reduce the appetite-stimulating effect that protein has on the consumption of forage - exactly the opposite of the desired effect.

Weather

As stated above, at the start of the test it looked as though this would be the first test with drought conditions. In late June and during July rainfall had almost ceased and temperatures hovered in the nineties and above. The highest temperature recorded during the test was 107° F on August 3.

Two weeks after the record heat, Hurricane Gustav came ashore and became the first hurricane/tropical storm to hit Oklahoma in almost 60 years, followed not long after by Hurricane Ike. Both of these events brought above average rains to the area, along with temperate conditions that continued throughout September and October (see Figure 3). The reasons for discussing the weather during the test are its effects on the health of the bucks and on parasite growth. Warm, wet conditions are the perfect breeding ground for parasites and bacteria.

Figure 3. Rainfall Totals



Internal Parasites

One of the main goals of the buck test was to examine parasite resistance and tolerance, particularly the role that genetics might play in resistance to *Haemonchus contortus* (barber pole worm). The barber pole worm is a blood-sucking parasite that pierces the lining of the abomasums, causing blood plasma and protein loss (Schoenian, 2006; see box). Common symptoms are anemia and swelling of the fluids under the jaw (bottle jaw). If left untreated, death frequently occurs.

Anthelmintics or dewormers are commonly used to control barber pole worm, but it has shown a great propensity to develop drug resistance – due, most likely, to overuse of these materials.

During the test, FAMACHA scoring and fecal egg counts (FECs) were used to estimate parasite load. The FAMACHA scoring tool assesses the level of anemia the goat is suffering due to the barber pole worm. If an individual scored low (1-3), it was not wormed. If an animal received a score of 4 or 5, it was wormed with Levamisole (Prohibit) or Doramectin (Dectomax).

Fecal egg counts were analyzed at every examination to help determine levels of infection. This also allowed assessment of paddock contamination from the shedding of worm eggs. A McMaster counting slide was used for counting “Strongyle-type” eggs (*Haemonchus*, *Ostertagia*, and *Trichostrongylus*).

During the 2007 test very little parasite loading was observed, and only 4 bucks were disqualified. That was not the case in 2008. After the hurricanes had passed through the test area, optimal growing conditions for parasites ensued. Warm, humid weather conditions prevailed, and a growth of fescue cover on the paddocks shaded parasites from the sun and wind. By the close of 102 days, four bucks had been lost to anemia caused by the barber pole worm, and 19 animals had been disqualified and wormed.

All the bucks that required worming were treated with Cydectin Oral Drench. Fecal egg counts for some bucks were over 17,000 eggs per gram of feces. However, the top eleven bucks scored below 5,500 eggs/gram on their egg counts, and some scored below 2,000 eggs per gram of feces at the end of the test. Since all animals had been under the same conditions for 102 days, it is safe to say that certain bucks displayed resistance to the parasites.

IN BRIEF: The FAMACHA Test

The FAMACHA system was developed in South Africa in response to the emergence of drug resistant worms. The system utilizes an anemia guide to evaluate the eyelid color of a sheep/goat to determine the severity of parasite infection (as evidenced by anemia) and the need for deworming.

A bright red color indicates that the animal has few or no worms or that the animal has the capacity to tolerate its worm load. An almost white eyelid color is a warning sign of very bad anemia; the worms present in the animals gut are in such numbers they are draining the animal of blood. If left untreated, the animal will soon die.

The FAMACHA chart contains five eye scores (1-5), which have been correlated with packed cell volumes (percentage of blood made up of red blood cells, also called hematocrit). Animals in categories 1 or 2 (red or red-pink) do not require treatment whereas animals in categories 4 and 5 (pink-white and white) do.

Animals in category 3 may or may not require treatment depending upon other factors. Mature animals in category 3 (pink color) probably do not require treatment, whereas lambs or kids should be treated. The frequency of examination depends upon the season and weather pattern, with more frequent examination usually necessary in July, August, and September, the peak worm season.

- Susan Schoenian, *"Sheep 201. A Beginner's Guide to Raising Sheep."*
www.sheep101.info/201/index.html

Health

Most health problems encountered in the 2008 test were directly linked to the parasite problems discussed in the paragraph above. Some other common goat ailments did occur throughout the test, including but not limited to, foot scald and sore mouth.

The sore mouth presented itself 15 days into the test, and 34% of the test herd was treated for cases of the disease. None of the sore mouth was serious enough to warrant veterinary intervention (both test veterinarians were consulted as to method of treatment), and it was soon in control.

Foot scald or foot rot was prevalent due to wet conditions caused by heavy morning dew and the rains. Along with the warm temperatures, this made for ideal conditions for bacterial growth. Foot scald was treated with a 5% copper sulfate solution and LA200 antibiotic.

Respiratory sickness is common among young goats, especially when they are stressed. Twelve bucks were treated for respiratory ailments with a combination of antibiotics, steroids, and vitamin B complex. Four bucks never fully recovered from their bouts of pneumonia and were removed from the test with the owners' consultation.

Average Daily Gain

Weights were taken four times, on July 14, September 9, October 21, and October 22. The last weight was an average of October 21 and October 22 to account for fill (the feed and water in the digestive tract of an animal consumed before weighing).

The final ADG ranged from 0.19 lbs./day to -0.02 lbs./day. There was sufficient forage available to the bucks; however, test staff believe the weather and a lack of variety in the forages prevented the bucks from gaining to their optimal potential. It cannot be said with scientific certainty that fescue toxicity played a role, but many of the same symptoms one sees in cattle were apparent in the bucks. Rough hair coat, inability to deal with heat, and foot problems were present in some of the bucks.

Results

Results for the test are listed in Table 1 on page 13. Information in the table includes the consigner's last name, state, test identification number for the buck, breed, total start weight in pounds, total end weight in pounds, average daily gain (end weight-start weight/102 days on test), starting fecal egg count, and ending fecal egg count.

Conclusion

During the first year of the buck test we thought we learned a lot about what goats could and couldn't do on improved forages, but in the second year we found we still had much to learn. I don't think even a drought could have taught us the lessons that two hurricanes and a prolific growth of parasites in fescue cover did. You can learn the most from failure so long as you recognize what went wrong and take action to make it better. We plan on making a number of changes to improve both forage and buck health. Planned changes are listed in detail on the next page.

Still it must be noted that the top bucks in the test during 2008 withstood and thrived even with the adverse weather and forage conditions. As the goat industry in the South grows, these are the conditions that producers and their animals will face and have to deal with. The more tools we can provide the producers with to make selection decisions within their herd, the better off the entire industry will be.—MP

Changes for the 2009 Test

Animal

- Take weights & FEC every 17 days
- When bucks are accepted at entry take FEC; worm with 3 classes of wormers
- Get 2nd FEC 7-10 days after initial worming
- Bucks will be sent home if a 90% reduction in FEC after the initial worming is not observed
- Have a control group of wethers (5-10) that are not wormed routinely
- Change the dates of birth to Jan 1 through March 31
- Must be weaned 30 days prior to entry
- Producers must provide birth date and weaning date to verify
- Place cut cedar trees in test pastures for rubs

Forages

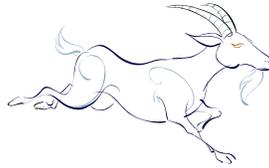
- Use heifers/steers in a lead follow system to manage grass canopy
- Plant lespedeza, red clover, white clover, and chicory, inter-seeded with fescue/Bermuda

Supplementation

- Combine soybean meal or cottonseed meal limited with salt in four free choice mineral feeders
- Include an ionophore in free choice ration
- Free choice mineral supplementation

Table 1. 2008 Commercial Meat Goat Forage Performance Test Results

	Consigner	Test		Start	End	ADG-	Start	End
		ID	Breed	Weight (lbs.)	Weight (lbs.)	102 d (lbs./d)		
1	ADAMS	61	Kiko	32	51.5	0.19	900	1100
2	ELDER	1	Kiko	40	56	0.16	1,000	1350
3	SPARKS	5	Kiko	37	52.5	0.15	350	3400
4	SANDNESS	31	Kiko	62	76.5	0.14	4850	5450
5	ARMSTRONG	2	Kiko	48	60	0.12	1400	450
6	ADAMS	47	Kiko	51	63	0.12	2000	5250
7	SPARKS	4	Kiko	38	49.5	0.11	350	1550
8	RAYNES	6	Kiko	32	43.5	0.11	450	2250
9	SHIVERS	20	Kiko	48	59	0.11	0	3350
10	MAYER	50	Kiko	37	47.5	0.1	350	2250
11	WALLER	22	Kiko	65	74.5	0.09	150	2650
12	KIVETT	33	Kiko	38	47	0.09	0	5450
13	EVANS	38	3/4 Kiko, 1/4 Boer	45	54	0.09	2900	6050
14	ADAMS	60	Kiko	47	56	0.09	450	5250
15	WILBINS/BOH	36	Kiko	51	59.5	0.08	550	4700
16	BARNES	39	Kiko	50	58.5	0.08	400	2000
17	DSL	19	Kiko	48	56	0.08	0	1850
18	KIVETT	32	Kiko	37	45	0.08	0	9600
19	BARNES	42	Kiko	68	75.5	0.07	500	25500
20	SANDNESS	46	Kiko	47	54.5	0.07	6700	22,500
21	DSL	27	Kiko	43	50	0.07	50	500
22	MAYER	59	Kiko	50	56.5	0.06	800	2500
23	WARE	44	Kiko/Spanish/Boer	50	56	0.06	7500	13750
24	ADAMS	62	Kiko	41	47	0.06	1650	2300
25	SPARKS	8	Kiko	35	40	0.05	100	4850
26	FREEMAN	17	Kiko	46	50	0.04	2250	2800
27	SHIVERS	18	Kiko	40	44	0.04	0	100
28	MAYER	35	Kiko	51	55	0.04	250	900
29	SANDNESS	57	Kiko	41	45	0.04	950	4250
30	SHIVERS	21	Kiko	36	39	0.03	50	4500
31	SANDNESS	34	Kiko	55	58	0.03	6000	12,550
32	MALOY	30	Boer/Kiko	44	45.5	0.01	4400	3300
33	BARNES	48	Kiko	68	69.5	0.01	150	1650
34	GUFFEY	49	Kiko	46	47.5	0.01	350	2750
35	FREEMAN	16	Kiko	48	47	-0.01	850	1850
36	WALLER	23	Kiko	38	35.5	-0.02	50	7850



2008 Meat Goat Forage Buck Test Results

Fifty-five goat bucks from 21 farms in 8 different states competed in the 2008 test. Overall, the bucks gained an average of 0.07 pounds per day of the test; champions gained weight more than twice as fast.

Grand
Champion
Breed: Kiko
Average Daily
Gain: 0.19 lb.
Owner: Craig
Adams, Illinois



2008 Buck Test Winner - Nitro

Reserve Grand
Champion
Breed: Kiko
Average Daily Gain: 0.16 lb.
Owner: Fred Elder, Tennessee

Third Place
Breed: Kiko
Average Daily Gain: 0.15 lb.
Owner: Linda Sparks, Oklahoma

Top Herdsman by Average Daily Gain
Craig Adams, Illinois (0.13 lbs./day)

Top Herdsman by Fecal Egg Count
Richard Mayer, Kentucky (1,883 eggs)

Appendix A: Rules, Regulations and Protocol
2008 Oklahoma Commercial Meat Goat Forage Performance Test
Kerr Center for Sustainable Agriculture, Inc.
in partnership with
Oklahoma Cooperative Extension Service

Objective:

To identify individual bucks as well as their sires and dams that carry genetics expressing strong traits important in commercial meat goat production. Additionally, this test will allow breeders to compare genetics within their herd to make better management decisions as to herd lines that will produce profitable progeny for future herds. This test will also provide valuable information for all goat producers and the public.

Dates:

Check-in: June 27, 2008 (Friday) 8am-7pm

Warm-up: June 28, 2008- July 13, 2008 (approximately 2 weeks)

Test Period: July 12, 2008- October 21, 2008 (101 days)

Performance Sale, Field Day & Awards: October 25, 2008

Entry Requirements:

- a) A producer group will consist of 1 or more bucks (maximum of 6) that were born between February 1, 2008 and April 15, 2008. All breeds and crossbreeds are accepted.
- b) To be considered for the Herdsman Award you must have a group of 3 or more bucks.
- c) Bucks must weigh a minimum of 35lbs at check-in.
- d) Bucks must be weaned 15 days prior to entry, had a minimum of 1 de-worming and 1 CDT vaccination 4 weeks prior to entry, and have their feet trimmed. No exceptions.
- e) Bucks must be tagged with a scrapie tag from their state of origin. No exceptions.
- f) All out of state bucks must be accompanied by an official inter-state health certificate and in compliance with all Oklahoma shipment requirements. For information: Oklahoma Department of Agriculture, Food & Forestry, and (405) 522-6142.
- g) Entry fee of \$120 per buck will be required to secure a position within the test. The entry fee will cover feed supplementation, medication, wormer, routine veterinarian services and other test costs.
- h) Producers will be responsible for all vet fees incurred in the case of treatment for serious injury, disease or necropsy (in the case of death).

Test Protocol:

- a) Bucks will be given a thorough examination by a veterinarian at check-in. Goats showing signs of sore mouth, CL, foot rot or other communicable disease will not be allowed to enter the test.
- b) Bucks will receive a CDT vaccine, worming, fecal test, FAMACHA score and an ear tag with test ID at the time of check-in.
- c) Bucks that display symptoms of disease or illness during the test will be held in quarantine (on forage) until it is determined by the Test Manager or either the

Test Veterinarian or On-Site Veterinarian that they may re-enter the general population or must leave the test.

- d) Low performing bucks may need to be removed from the test. This decision will be made by the Test Manager in consultation with the producer.
- e) Every effort will be made to accommodate the producer if a buck must leave the test.
- f) In the case death, a full necropsy will be performed by the On-Site Veterinarian at the expense of the owner.
- g) Sufficient forage will be provided for the bucks to perform up to their genetic potential. A feed supplement containing protein, vitamins, minerals and other additive ingredients will be provided as needed to maximize the utilization of forage.
- h) Bucks that score a 4 or 5 on the FAMACHA scale will be de-wormed.
- i) All decisions made by the Test Manager, Test Veterinarian and On-Site Veterinarian will be final.
- j) Test results will be determined by average daily gain (ADG) and fecal egg count.

Results:

- a) Buck ranking within the test will be classified on a scale of Gold, Silver and Bronze.
 - 1) Gold- Bucks must have an average daily gain of .25lbs per day or better and their fecal egg count can never be above 750 during the test. Cannot be dewormed at any point during the test.
 - 2) Silver- Bucks must have an average daily gain of .21lbs per day or better and their fecal egg count can never be above 1,000 during the test. Cannot be dewormed at any point during the test.
 - 3) Bronze- Bucks must have an average daily gain of .17lbs per day or better and their fecal egg count can never be above 1250 during the test. Cannot be dewormed at any point during the test.
- b) All bucks ranked gold, silver, or bronze can be sold in the performance sale at the end of the test.
- c) To compete for Grand Champion Herdsman, each producer must enter 3 or more bucks. This award will be determined by the average of gold, silver and bronze bucks for each producer.

Educational Information

- a) A summary sheet containing all data collected for the bucks will be supplied to each producer. A test summary with forage, weather and other important information will also be distributed.
- b) A Field Day will be held at the test site on October 25, 2008 to view the bucks, tour the forage test and discuss performance on forage for the meat goat industry. Additionally, awards will be given to the top performers.
- c) All test data and results will be made public.

Information collected on individual bucks:

Breed
Birth Date
Sire (Optional)
Dam (Optional)
Beginning Weight

Midpoint Weight
Final Weight
Average Daily Gain
All FAMACHA Scores
Scrotal Circumference
Medical Records

Technical Advisory Committee

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Test Nutritionist- Jack Wallace, OCES Southeast District Animal Nutritionist
Test Veterinarian- Dave Sparks, OCES Area Food-Animal Quality and Health
Specialist
Leflore County Educator- Brian Freking

Test Staff

Test Manager- Mary Penick, Kerr Center Livestock Specialist
Test Herdsman- Andy Makovy, Kerr Center Livestock Herdsman

On-Site Veterinarian

Leon Mitchell, DVM