The Oklahoma Forage-Based Buck Test 2012 Report

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www.kerrcenter.com/stewardship/ok-ram-and-buck-test.html

Preface

The Kerr Center Meat Goat Program began in 2007 with the establishment of the Oklahoma Commercial Meat Goat Forage Performance Test. The test was later renamed the Oklahoma Forage-Based Buck Test, and is commonly known as the "Buck Test."

Personnel from the Kerr Center for Sustainable Agriculture and from the Oklahoma State University Cooperative Extensive Service cooperate to conduct the test each summer.

The rationale behind the Oklahoma Forage-Based Buck Test is to identify individual bucks, as well as their sires and dams, that carry genetics expressing strong traits important in commercial meat goat production on pasture.

The test allows breeders to compare genetics within their herds, making better management decisions when selecting herd lines that will produce profitable progeny for future herds. This test also provides valuable information to other goat producers not participating in the test, as well as to the public.

Goat producers wishing to test their bucks' performance on forage are invited to enter their bucks in the test, which runs from early July through late September.

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.

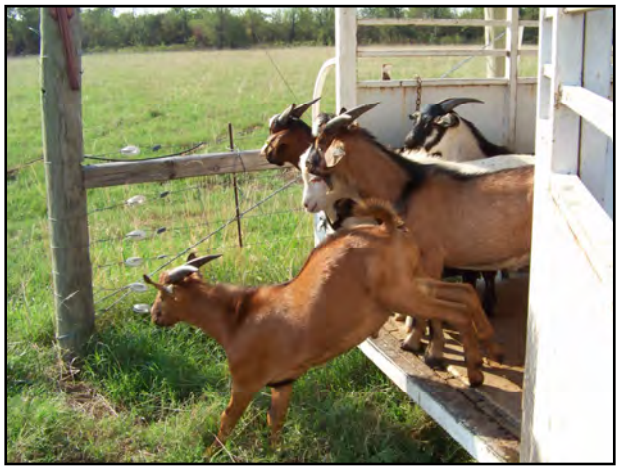
Introduction

The U.S. meat goat industry has expanded significantly in recent years, especially in the South, from a production area once largely confined to southwest Texas. This growth has been driven in part by a rising demand for goat and lamb meat by growing ethnic minority populations. The number of small farms and ranches has also been increasing steadily. Most landholders now entering into farming possess only small acreages that do not readily support cattle production. In such cases, small ruminants are an attractive and workable option.

Many larger, established farmers and ranchers are also discovering the benefits of adding meat goats to their cattle operations. 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.

However, the most compelling driver in meat goat production in recent history 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 commercially beneficial characteristics like foraging ability, foot soundness, and parasite resilience/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 beneficial for successful forage-based goat production. Emphasis would be placed on maximizing weight gain on forage with minimal supplementation, parasite resilience/tolerance, and overall commercial viability.



As a result, the Kerr Center commenced its first meat goat buck test on July 16, 2007, which was followed by subsequent tests in the following years. (See *The Oklahoma Commercial Meat Goat Forage Performance Test 2007, 2008, 2009, 2010, and 2011 Reports* for information.) The success of the early tests led to the current regular yearly test schedule.

The 2012 test began on July 2 and ended on September 20, for a total test period of 80 days. Bucks were checked in on June 21 and allowed a ten-day warm-up period before the official start weight of the test was taken on July 2. The bucks were rotated through a series of 6 paddocks during the test, with several of the paddocks being grazed more than once, depending on the forage availability in the paddocks. Two livestock guardian dogs were placed with the bucks to provide protection from predators.

Fourteen producers from seven states (Oklahoma, Texas, Arkansas, Missouri, Kansas, Illinois, and Mississippi) entered 57 bucks to compete for top average daily gain and lowest fecal egg counts. The meat goat breed represented overwhelmingly in the test was the Kiko, but there were also several Kiko crosses in the test, including Kiko/Boer crosses and Kiko/Savanna crosses.

Oklahoma Forage-Based Buck Test 2012

Eligibility

Eligible bucks were born between January 1 and March 31, 2011. The live weight at check-in had to exceed 35 lbs., and weaning had to have been completed 30 days prior to the check-in date. A minimum of one deworming and one CDT vaccination four weeks prior to entry, along with trimmed feet, were required. All breeds and crossbreeds 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 interstate health certificates showing compliance with all Oklahoma livestock shipment regulations.

Each animal was given a thorough health examination upon check-in. Each buck then received a de-worming with Levamisole (for *Haemonchus contortus*, the barber pole worm) and Valbazen (for tapeworms), a CDT booster, and a collar with a numbered tag for identification during the test. In addition, FAMACHA scoring and fecal egg counts were done for each buck. The data obtained by taking weights and doing fecal egg counts upon check-in was not used in determination of the winners of the test or in test data analysis. Fecal egg counts were done at check-in to ensure that there was a 90% reduction in fecal egg count in the bucks after worming, demonstrating the effectiveness of the wormers used at the start of the test. These initial fecal egg counts were also provided to the producers so that producers who do not routinely perform fecal egg counts on their bucks could be informed of the fecal egg counts of bucks coming directly from their operations. Weights were taken upon check-in to ensure that each buck met the minimum weight required for entrance into the test.

Having an accurate weight at the time of worming was also vital in determining the amount of wormer needed to effectively worm each buck. When administering Levamisole, in particular, it is necessary to have an accurate weight on the animal being treated. A too-low dose of Levamisole will not effectively deworm an animal, leaving a number of worms still alive in the digestive system that are somewhat immune to a low dosage of wormer. These worms will continue to reproduce and affect the animal negatively, reducing performance and causing disease or even death. A too-high

dose of Levamisole can easily cause illness and even death due to respiratory failure.

An appropriate dose of Valbazen was given to each buck at check-in to treat for tapeworms. Tapeworms very rarely cause major health problems or death in goats, but they can impact performance and negatively impact growth rates in growing yearlings.

Forages provided the bulk of the diet, which was supplemented with dried distillers grains (DDG, 0.5 lbs./head/day). A mineral and vitamin supplement manufactured specifically for goats by Vitamax was provided free choice at all times.

Any buck suspected of disease or illness would be quarantined on forage pending examination by a veterinarian. If deemed safe, the animal would be treated and returned to the test. If it were determined that the individual should not reenter the trial, it would remain in quarantine until alternative arrangements could be made with the producer. No animals were quarantined or disqualified during the 2012 test.

Weighing and parasite examinations were done approximately every 17 days. The parasite exam included FAMACHA scoring of the lower eyelid (see box, p. 15) and sampling for fecal egg counts (FEC). According to the protocol, any bucks scoring 4 or 5 on the FAMACHA scale would be dewormed and disqualified; however, no bucks scored above 3 at any time during the 2012 test.

Position within the test was determined by average daily gain (ADG) and fecal egg count (FEC).

Forages and Supplementation

Although the buck test is not a research trial on forages per se, it is possible to make general observations during the test on forage quality, forage availability, and the bucks' grazing behavior. Test paddock vegetation consists of bermuda, fescue, lespedeza, warm season native grasses, forbs, and small amounts of brush, primarily small honey locust trees.

Plans were made in early 2012 to seed the buck test pastures with Legend lespedeza, as had been done prior to the previous year's buck test, to improve upon the already existing lespedeza stand present from previous seeding. However, it was near impossible to find Legend lespedeza seed due to the previous year's drought, as producers of the seed had seen such a decrease in seed output during the summer of 2011 and were forced to retain the majority of that seed for use on further production. Instead, sorghum-sudan was broadcast in the buck test pastures at the beginning of May, but the lack of adequate rainfall after the middle of April resulted in little to no germination of that seed.

In past years of the test, bucks have been rotated through five test paddocks, with the order and timing of rotation being determined by forage availability within each paddock - bucks are rotated into each new paddock when forage availability in the current inhabited paddock falls below the level that is required for desired rates of weight gain. During the 2012 buck test, bucks were also rotated through a sixth brushy “browse” paddock adjacent to the numbered buck test paddocks when the forage availability fell too low in the numbered test paddocks for continued grazing. The relocation of the bucks to the browse paddock allowed the bucks to browse on quality forage in that pasture while allowing the other paddocks time for regrowth so that they could be grazed again before the end of the test period.

DATE	TEST PADDOCK
7/2 - 7/18	4
7/19 - 7/24	3
7/25 - 8/1	2
8/2 - 8/7	5
8/7 - 8/15	4
8/15 - 8/28	Browse
8/29 - 9/6	3
9/7 - 9/11	2
9/12 - 9/18	4
9/19 - 9/21	1

The decision was made to attempt to graze the 57 bucks in the extra browse pasture at the beginning of August. In previous years of the test, the bucks had only been grazed through the buck test paddocks because each of those paddocks is enclosed by predator-proof electrified woven wire fence. It was unknown whether the bucks would be adequately contained by the temporary polywire fence that would be required to enclose the browse pasture, which was usually grazed with cattle and was normally only surrounded by a single high-tensile wire.

Luckily, the bucks respected the five polywires that made up the temporary fence surrounding the browse pasture, and there were no problems with buck escape or predation.

The decision to move the bucks to the browse pasture was prompted by a noticeable drop in forage availability in the buck test paddocks. The drop in nutritional quality began to slightly affect some of the bucks negatively at the beginning of August. On August 1, diarrhea was observed in three of the bucks, foretelling the onset of heat stress. Heat stress can have an extremely negative impact on animal performance in a short amount of time - heat stress will lead to decreased feed intake and decreased immunity, making an animal more susceptible to opportunistic infections like pneumonia and to parasitic infestation. Low-quality forage, combined with sudden increases in temperature, is a major contributing factor to heat stress in production animals.

At this point, it was decided that, in order to preserve the health of the bucks, keep parasite growth to a minimum, and keep the bucks gaining, an immediate increase in nutritional quality was necessary. The bucks were moved to the browse paddock as soon as temporary fence around the area could be completed.

The bucks were also supplemented with a mixture of alfalfa and timothy hay (with a protein level of about 20%) at the rate of 0.50 to 0.70 lbs. per head per day from August 1 to the end of the test. After beginning this supplementation and moving the bucks to the higher-quality brush pasture, no more symptoms of heat stress were observed and there was no noticeable drop in feed intake or increase in parasite load. In fact, fecal egg counts dropped slightly during this period, likely due to a combination of factors including increased nutrition and more upward browsing activity that limited grazing close to the ground. The larvae of the barber pole worm only reside in the lowest two to three inches of forage, so as animals browse on brush that is one to two feet in height, they will pick up fewer parasites than if they are grazing extremely short forage.

The use of the browse pasture proved essential in meeting the nutritional needs of the bucks during the hottest part of the test. During this period the majority of the forage consumed consisted of ragweed and small honey locust trees, two of the only species in the test pastures that are heat-resistant enough to continue to grow and produce during a drought. Both of these species contain protein levels above 20%, although the protein levels in ragweed drop as it matures and becomes less palatable. Goats prefer to eat ragweed in its vegetative state, and it is most palatable and at its highest nutritional quality immediately after

flowering. The leaves of young honey locust trees are highly palatable year-round.

During the last week of the test when there was not enough quality forage left to meet the bucks' nutritional needs, they were fed two 4' x 5' round bales of ryegrass/clover hay with a protein level of 12-14%.

Soil calcium was measured at an average of 0.65% in the test pastures, while soil phosphorus was measured at average of 0.15%. The calcium to phosphorus ratio in this instance was close to 4:1, while the desired calcium to phosphorus ratio in forage for maximum animal production is 2:1. The mineral supplement provided to the bucks during the test helped to increase the phosphorus levels present in the bucks' diet to bring this ratio closer to the intended target.

Feed

Supplementation for 2012 consisted of DDG with a protein level of about 20% at a rate of 0.50 lbs. per head per day. This supplementation served to raise the overall protein levels in the bucks' diets to the necessary 11% needed to meet the desired weight gains in the bucks. The pasture forage which comprised the majority of the bucks' diet generally only possessed protein levels of 8-10%.

The combination of forage and supplementation met the bucks' protein, energy, mineral, and vitamin requirements (see "2012 Forage-Based Buck Test: Feed Analysis," p. 8). The degree to which forage alone could have met nutritional requirements is shown in Figures 1 - 3.

FIGURE 1. AVAILABLE FORAGE

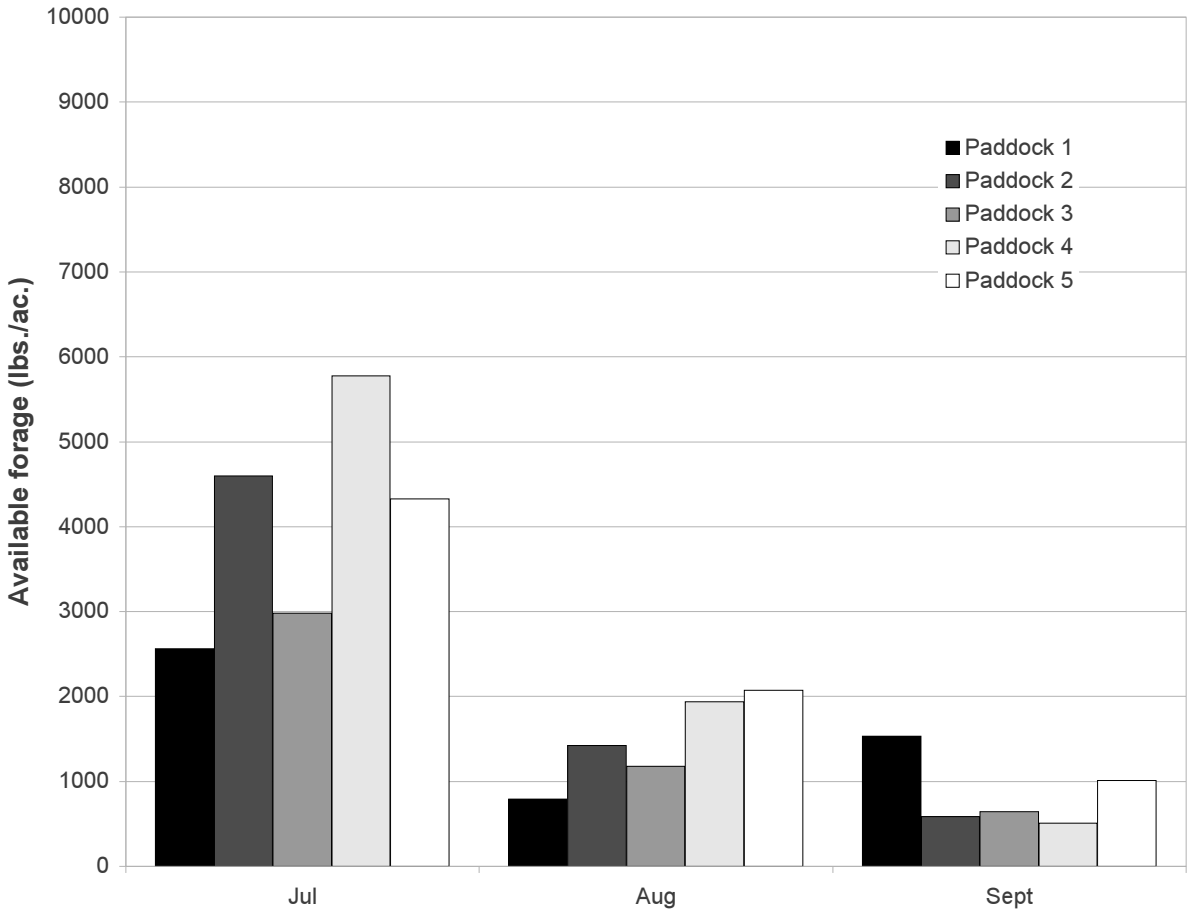


FIGURE 2. CRUDE PROTEIN

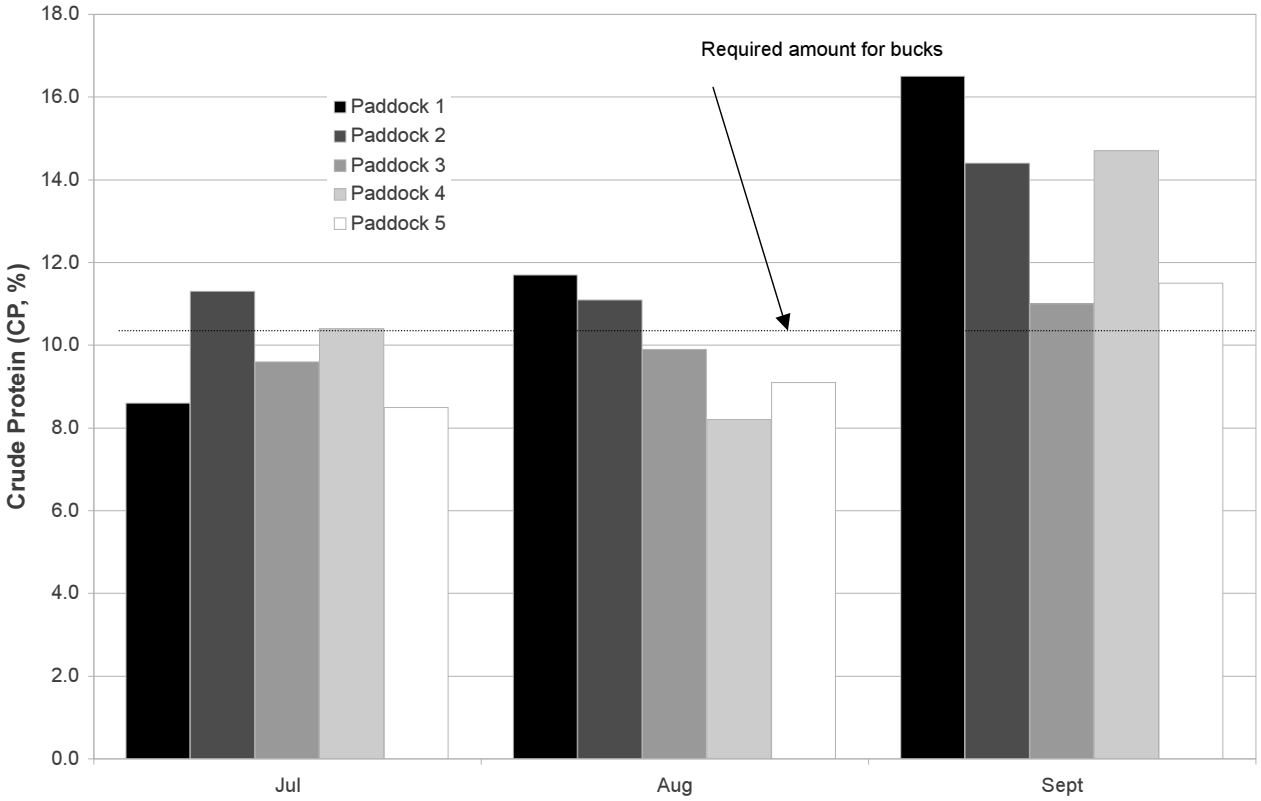
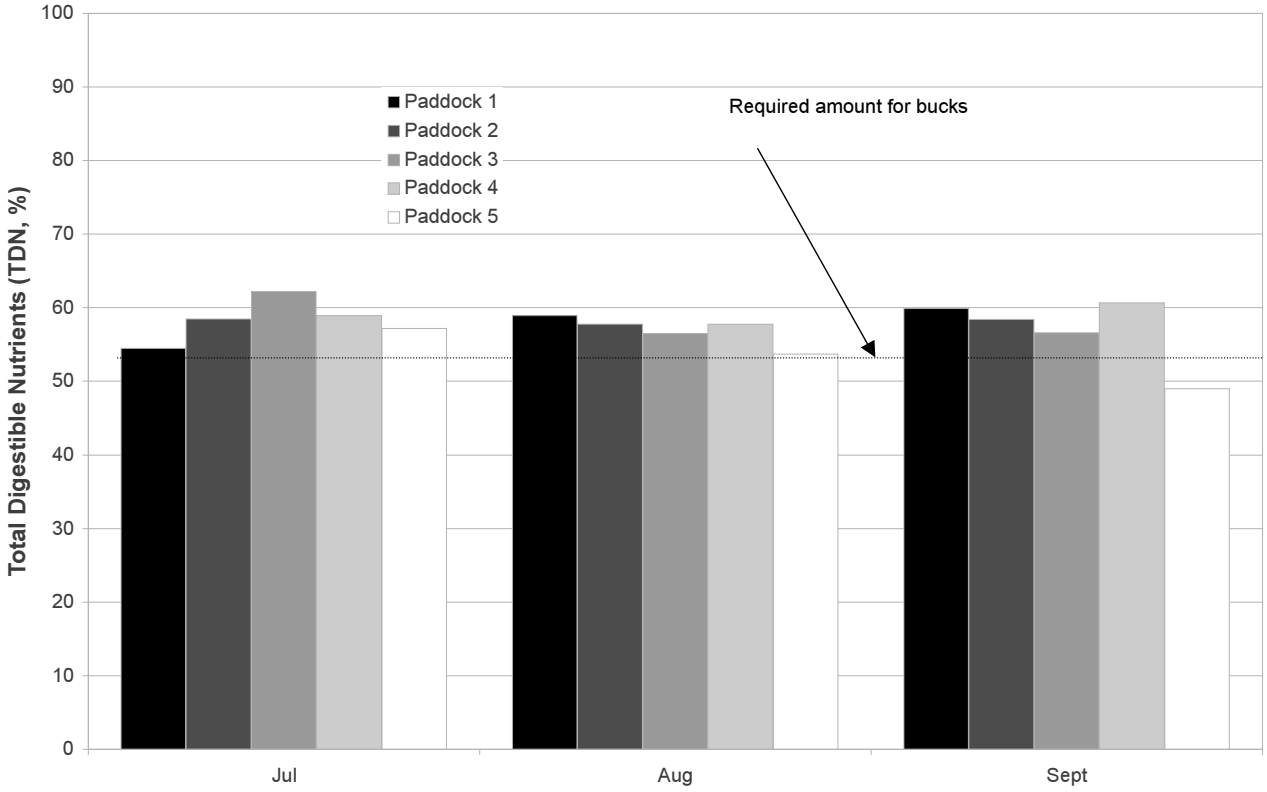


FIGURE 3. TOTAL DIGESTIBLE NUTRIENTS (TDN)



2012 Forage-Based Buck Test: Feed Analysis

Predicted Gain vs. Actual Gains

Forage samples from the paddocks that the bucks have been grazing have been collected and as a nutritionist I always want to see if the actual weight gains reflect what forage they have available. To answer this question we need to assume or collect information on many pieces to the puzzle and utilize any information we have to solve the total puzzle.

Start with the weight of the animal. The average weight for all goats was 72 lbs. Therefore, if we calculate for the average we obviously over- and underestimate dry matter intake for some of these individual goats based on their weight, but at least we are in the ball park. The University of Maryland has a nice spreadsheet to help calculate nutrient requirements.

This year we are feeding 0.5 lbs. of custom mix per head per day, and since we are feeding DDG primarily, we should expect a positive associative effect on forage consumption. (How much is still a good question.)

STEP 1.
The NRC requirements for a 72-lb. meat goat gaining 0.33 lb. per day are:
Dry matter intake (DMI) = 3.11% of body weight (BW), or 2.24 lbs./day
Total digestible nutrients (TDN) = 1.34 lb./day
Crude protein (CP) = 0.31 lb./day

STEP 2.
Calculate CP and TDN for each feed ingredient
Supplement Intake
0.5 lbs. x 0.90 DM % = 0.45 lb. DM supplied
0.5 lbs. x 0.25 CP % = 0.11 lb. CP supplied
0.5 lbs. x 0.78 TDN% = 0.35 lb. TDN supplied

STEP 3. Forage
72-lb. goat x 3.11% of BW = 2.24 lbs. DM
2.24 - 0.45 lbs Supplement = 1.79 lbs. of forage

STEP 4.
1.95 lbs. x 0.57 TDN% = 1.11
1.95 lbs x 0.096 CP% = 0.19

STEP 5. Crude Protein Total

DDG	0.11
+Forage	0.197
Supplied	0.31

STEP 6. TDN Total

DDG	1.37
+Forage	0.35
Supplied	1.02

Did we meet the requirements?

Yes, if we knew exactly what they were eating in forage we would have a confidence level that was very high. Actual gains are very close to the math. This year our limiting factor was available forage due to drought conditions; therefore we wisely supplemented with alfalfa/clover hay for a short period of time at a rate of 1.5 lb. per head per day to achieve the desired gains.

- Brian Freking

Weather

Weather has a strong influence on the health of the bucks and on parasite growth. Warm, wet conditions are the perfect breeding ground for parasites and bacteria.

A total of 6.85 inches of rain fell during the test. The amount of rainfall during the test was not far below average for the time of year, but even this slightly-below-average rainfall, coming as it did after two previous years of below-average rainfall, greatly contributed to decreased forage availability during the test. Temperatures (Figure 5) were also only slightly above average, but again, the 2012 test came upon the heels of one of the hottest years in Oklahoma on record, so even slightly-above-average temperatures contributed to the amount of heat stress placed on the test pastures and on the bucks in the test.

Weather has a strong influence on the health of the bucks, and especially on parasite growth. Warm, wet conditions are the perfect breeding ground for parasites and bacteria, while hot and dry or cold and dry conditions serve to greatly retard the life cycle of the barber pole worm, lengthening the time the worm will require to build up to a level in its host which will be detrimental to the host's health.

To successfully reproduce, the barber pole worm must complete a life cycle that includes spending part of its life inside a suitable host and part of its life on pasture. Mature adult worms living inside the host's digestive system lay eggs which pass out of the host's system in the host's feces, where they hatch and release. In order for those larvae to leave the fecal pellet, a certain amount of moisture is required to break up the feces: this is generally estimated to be a minimum rainfall of 2 inches/month. Once the worm reaches the larval stage it will move out of the feces into surrounding forage where it will potentially be picked up by a host animal when the forage is consumed, in whose digestive system the worm will mature into an egg-laying adult.

When rainfall is low and conditions are dry, the barber pole worm eggs within a fecal pellet will remain in suspended animation, sometimes for months at a time, without developing into the larval form which can be ingested by the worm's host. As the worm's life cycle can be as short as 7-10 days in warm, wet conditions, this suspended animation will have a large positive effect on lengthening the worm's life cycle and keeping parasite build-up in the worm's host to a minimum. Especially hot weather (above 95 degrees) will usually be lethal to worm larvae exposed to sunlight. Cold weather will generally

FIGURE 4. MONTHLY RAINFALL

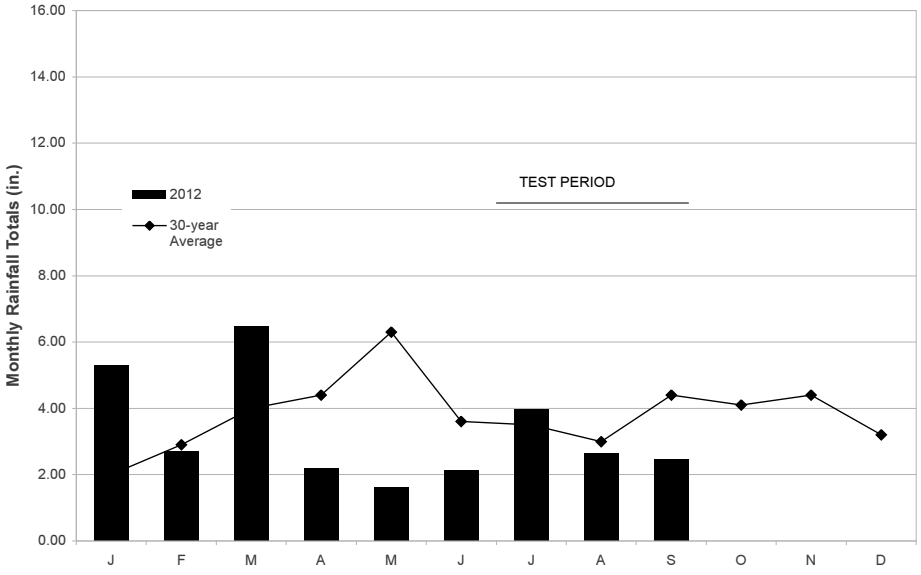
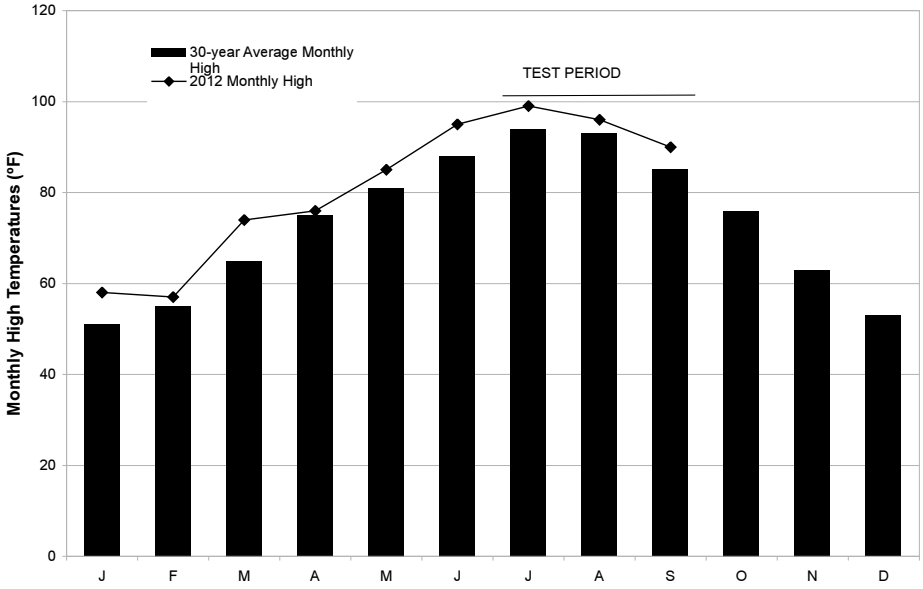


FIGURE 5. MONTHLY HIGH TEMPERATURES



have less of a negative impact on the larvae's' survivability, but hard freezes can kill off barber pole worms in the larval stage.

Hot and dry weather conditions are therefore ideal when it comes to internal parasite control in goats, but these conditions also limit forage growth and consumption.

Internal Parasites

One of the main goals of the Oklahoma Forage-Based Buck Test is to examine parasite resistance and tolerance, in particular the role that genetics might play in goat resistance to *Haemonchus contortus* (barber pole worm). It has been established that post-weaning weight gain in yearlings and carcass quality are highly heritable in goats compared to traits associated with fertility levels, which have low heritability. However, not enough research has been done to determine which genetic traits have the highest influence on high yearling weight gain and superior carcass quality. A positive correlation between low fecal egg counts and high weight gain in yearling bucks in the buck test could help to further the hypothesis that an inherited high resistance to internal parasites, primarily the barber pole worm, plays a strong role in promoting high rates of gain and superior carcass quality.

The barber pole worm is a blood-sucking parasite that pierces the lining of the abomasum, causing blood plasma and protein loss (Schoenian, 2006; see box next page). Common symptoms are anemia, diarrhea, loss of appetite, depression, and swelling of the fluids under the jaw (bottle jaw). If barber pole worm is left untreated, death frequently occurs, usually as a result of anemia or an opportunistic infection which takes advantage of the animal's weakened condition. Even if the parasite level in an animal is not high enough to be fatal, the animal will experience decreased production as the animal directs the majority of nutrient intake toward combating the parasitic infestation and not toward putting on weight or building muscle that is vital in the production of a good carcass.

Anthelmintics or dewormers are commonly used to control barber pole worm, but the parasite has shown a great propensity to develop drug resistance - due, most likely, to overuse of these materials. There is a history in meat goat production of improperly using or

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.

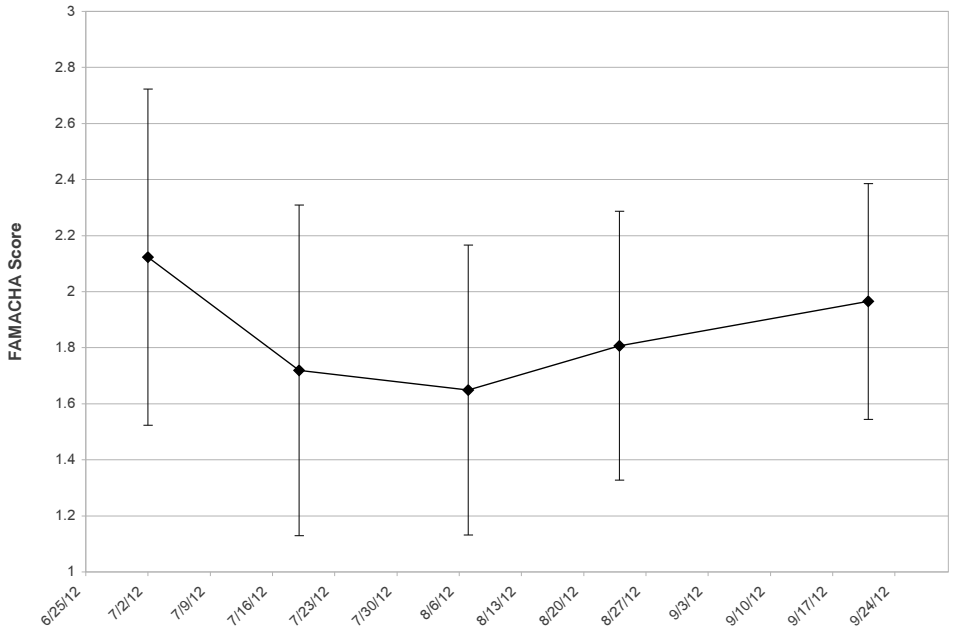
A bright red color indicates that the animal has few or no worms or that the animal has the capacity to tolerate its worm load. An almost white eyelid color is a warning sign of very bad anemia; the worms present in the animals gut are in such numbers they are draining the animal of blood. If left untreated,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

FIGURE 6.
FAMACHA SCORES



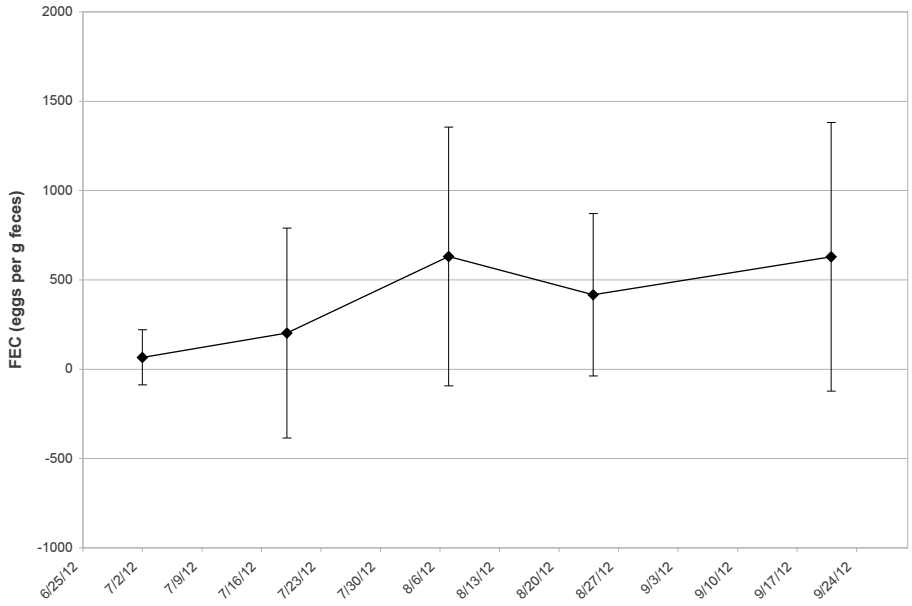
overusing chemical dewormers. Because high levels of barber pole worm infestation have proven to be so deadly to goats, producers often take the precaution of worming the majority of production animals regardless of each animal's natural resistance toward the parasite. In these systems, a whole herd may be treated with a chemical dewormer when only a portion of the herd actually possesses a level of parasite infestation high enough to be detrimental to the individual animal's health. Over time, these practices have contributed to the establishment of a parasite species which is largely resistant to most chemical dewormers. In a manner similar to the development of antibiotic-resistant strains of bacteria, the overuse of chemical dewormers has bred a class of treatment-resistant parasites by ensuring that the majority of barber pole worms left alive to reproduce are those that are resistant to treatment.

The practice of treating all production animals without regard to an individual animal's level of resistance to parasites will also limit the ability of a producer to select breeding stock that carries a higher level of parasite resistance. If a herd is routinely treated with chemical dewormers as a whole, a producer will not be able to identify the animals that do not routinely require treatment in order to build a more parasite-resistant herd and limit the overall need to chemically deworm the majority of animals in the herd. (Note: the term "parasite-resistant" in reference to a herd or individual animal refers to comparative levels of resistance between animals, as animals and herds are either more or less resistant to parasites. No animal or herd is completely resistant to the effects parasites.)

A desire to identify animals requiring deworming and avoid the unnecessary treatment of animals with higher levels of parasite resistance led to the development of the FAMACHA system of eye scoring.

Fecal egg counts were analyzed at every examination to determine the exact level of parasitic infection in each buck. While the FAMACHA system is an excellent tool to help identify animals in need of deworming and is generally a good indicator of parasite load, fecal egg counts can be necessary to quantify the exact levels of infestation. For example, in cases when an animal has a FAMACHA score of 3, a fecal egg count may be done to verify whether the animal indeed has a high enough parasite load to necessitate treatment with a chemical dewormer. In these cases the animal's overall condition should be taken into consideration when deciding whether intervention is

FIGURE 7.
FECAL EGG COUNTS



necessary: if the animal appears in poor health and is experiencing decreased production, it may be necessary to deworm even if the fecal egg count is not high enough to normally dictate treatment. In this case, the animal may possess a low resistance to parasites and can quickly succumb to the effects of barber pole worm infestation even at low parasite loads.

Conversely, there may be circumstances when an animal exhibits a FAMACHA score of 1 or 2 while actually maintaining a high parasite load which is not affecting the animal negatively because it also possesses a high resistance to the negative impacts of parasite infestation. Although it may not be necessary to treat this individual animal in order to preserve its own health and level of production, it may be necessary to treat that animal with a chemical dewormer to prevent the parasites in its system from continuing to produce eggs which will eventually infest other, less-resistant animals - that is, an individual animal may need to be treated to help maintain the overall health of the herd.

All fecal egg counts during the buck test were performed using a modified version of the McMaster technique to separate parasite eggs from fecal pellets through use of a floatation solution. Parasite eggs were then counted by using a McMaster fecal egg counting slide with an imprinted grid. For purposes of determining each fecal egg count, only barber pole worms (*Haemonchus contortus*) were counted, although the presence of tapeworms or coccidia eggs was also noted.

After an egg count was determined for each fecal sample, that number was multiplied by 50 to determine the number of eggs present per gram of feces - this number was recorded as the fecal egg count (FEC) for the animal at the time that fecal sample was taken. Some deworming protocols indicate the necessity for treatment when an animal's fecal egg count is

over 1,000-2,000 eggs/gram. This may be necessary in goats which have such low levels of parasite resistance that they cannot continue to be productive animals with this level of parasite load. However, as one of the goals of the Oklahoma Forage-Based Buck Test is to document parasite resistance in yearling animals, it would be counter-intuitive to deworm at such a low level of infestation. The baseline fecal egg count that would necessitate deworming during the buck test is therefore generally 4,000-5,000 eggs/gram, although each buck would be viewed on a case-by-case basis, with bucks showing obvious signs of suffering from parasite infestation not necessarily needing to reach the 4,000 eggs/gram mark before being treated.

Parasite loads remained consistently low through the duration of the 2012 buck test. The average final FEC was 628.9 eggs/gram, and the average FEC for the entirety of the test was 386.3 eggs/gram, far below the minimum number of eggs/gram that may indicate necessary treatment.

Hot, dry weather conditions prevailed, and there was limited growth of forage cover to shade parasites from the direct sunlight that is fatal to barber pole worm larvae. No instances of loss, major illness, or deworming/disqualification occurred during the entire 80-day run of the test.

Health

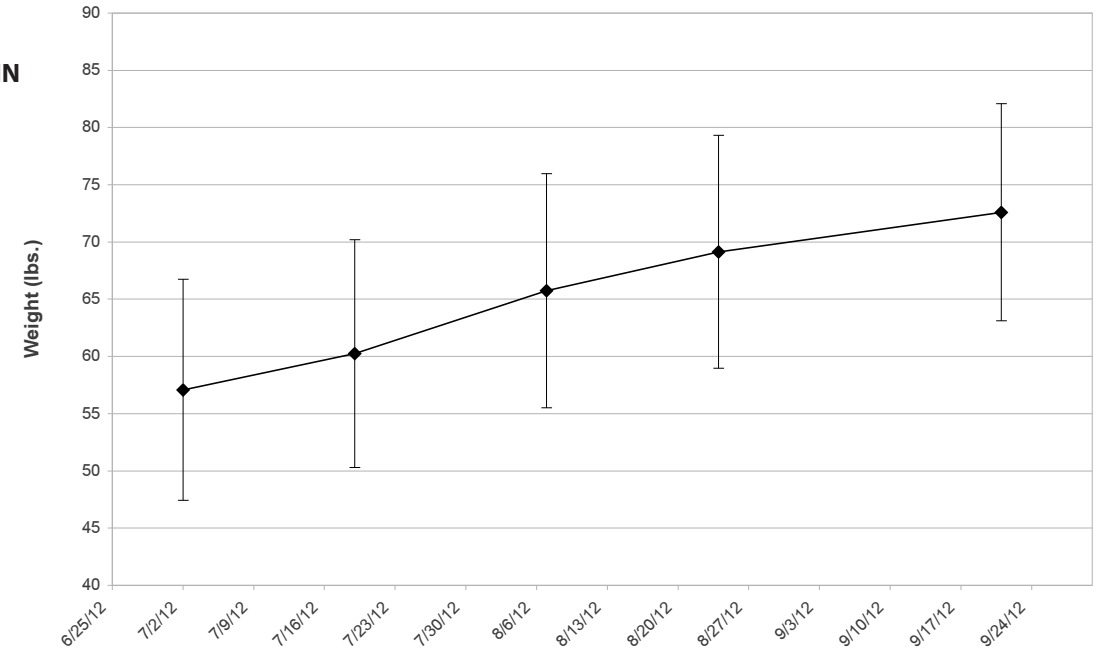
The health of the bucks in the 2012 test was exceptionally good. Only four cases of sore mouth were treated, all at the beginning of the test, and only one buck required a second treatment. Sore mouth is a highly contagious viral disease transmitted through saliva. It is most often seen in yearlings post-weaning, especially in groups of newly-introduced goats from different farms or ranches. Painful sores around the mouth can, if left untreated, dramatically reduce feed intake. Each case during the 2012 buck test was caught early enough that the sore mouth was able to be treated before it could negatively impact animal performance.

All of the bucks were also treated for coccidia after high numbers of coccidia eggs were noted in the fecal egg counts performed in early July. Coccidia outbreaks are common in goat yearlings post-weaning, especially those who have experienced the stress of a relocation like that experienced by the bucks at the beginning of the buck test. The main symptoms of a goat suffering the effects of coccidiosis are diarrhea, lack of appetite, and dehydration that can lead quickly to greatly decreased performance and death. Coccidia in the bucks was treated with Corid® in the bucks' water tank at a dosage of eight ounces per 50 gallons for five consecutive days.

None of the common ailments encountered in previous tests were observed in 2012. No bucks were treated for pneumonia, foot scald, or internal parasites.

Two weeks before the conclusion of the test, the bucks were treated for external parasites - namely blood-sucking midges. These external parasites generally appear in large numbers along the backs and around the horns of the bucks immediately after a rain. Because there were few substantial rains during the 2012 buck test, the midges only appeared in large enough numbers as to require treatment once. Midges are not life-threatening to goats, but they can be highly irritating and lead to decreases in production. In some cases, the constant biting of the midges in a concentrated area can lead to developing sores, generally along the spine of the animal where the midges can remain out of the animal's reach. External parasite control consisted of four ounces of pure cedar oil mixed in 48 ounces of regular vegetable oil, applied as needed using a pump

FIGURE 8. WEIGHT GAIN



sprayer along the back and around the horns. This treatment will remain effective for 2-3 weeks before reapplication is necessary, and has the added benefit of being non-toxic to the bucks in case of accidental ingestion.

Average Daily Gain

Weights were taken five times, on July 2, July 19, August 7, August 24, and September 19-20. The last weight used in determination of the average daily gain for each buck throughout the test was an average of the weights taken on September 19 and 20 to account for fill (the feed and water consumed p re-weighing that is still present in the digestive tract of an animal at weighing).

The highest average ADG for an individual buck was a three-way tie, with an average throughout the test of 0.33 lbs. per day. Overall, bucks averaged an ADG of 0.21 lbs. This ADG is on track with the 2010 and 2011 tests, when average daily gains were 0.22 and 0.23 lbs. per day, respectively.

Loin Eye Area

The loin eye is one of the highest-priced cuts from a meat goat, equivalent to the rib eye in cattle. A larger loin eye area (LEA) is also an indicator that an animal will have a higher percentage of yield at slaughter and an indicator of superior carcass quality.

Ultrasonic measurement of LEA allows meat goat producers to measure a heritable and commercially valuable carcass trait without taking the animal to slaughter. This information, along with performance measures, can inform breeding decisions that will produce better commercial meat goat lines.

Average loin eye area in the 2012 test was 6.53 cm^2.

Source: Cole, K.V. 2005. Improving Carcass Merit with Ultrasound Scanning. Maryland Sheep and Goat Producer 4(4): 3-5.

Scrotal Circumference

The scrotal circumference (SC) of a buck is a direct indicator of that buck's semen production capacity, and therefore his ability to cover a number of does in a timely manner. The offspring (both bucks and does) from a buck with a larger scrotal circumference will also reach puberty quicker than will the offspring of a buck with a smaller scrotal circumference. SC is measured at the widest part of the scrotum in millimeters or centimeters. There is no currently no age- or breed-based standard for scrotal circumference in meat goats, as there is in cattle and sheep. It is hoped that the scrotal circumference measurements taken at the conclusion of the Oklahoma Forage-Based Buck Test can provide information that can be used to create a scrotal circumference standard for use in selecting breeding bucks. It is generally accepted that a mature buck should have a scrotal circumference of around 25 cm or greater to be considered an acceptable herd sire. Additionally, the testicles should have tone, about the consistency of a flexed biceps muscle.

Average scrotal circumference in the 2012 test was 24.5 cm.

Results

Results for the test are listed in Table 1 on page 18. Information in the table includes the following information for each buck entered in the 2012 buck test: consigner's last name, test identification number for the buck, the start weight and end weight in pounds, average daily gain ((end weight - start weight) ÷ 80 days on test), final fecal egg count at the conclusion of the test and average fecal egg count throughout the test, loin eye area (LEA) in cm^2, and scrotal circumference (SC) in cm.

Changes Made for the 2012 Test

In all previous years of the test, each buck was given an ear tag upon check-in with a number denoting that buck's test ID number. For the 2012 buck test, an attempt was made to instead fit each buck with a removable collar which was marked with that buck's test ID number. There were benefits as well as detriments to this ID system. The collars negated the necessity of marking each individual buck in the test with a permanent ear tag which had the possibility of becoming infected during the test. The test ID numbers on the collars were much easier to read from a distance than an ear tag, making it easier to identify bucks during the test which may need individual medical attention, as well as while working the bucks, when it is vital that each buck be clearly identified to ensure the accuracy of collected data.

However, the collars did have to adjusted several times during the test to keep them from becoming too tight on the growing bucks. During the first half of the test, almost all of the collars stayed on the bucks, with only three of the bucks losing their collars before the middle of August. When the bucks were rotated through the browse pasture, more than a third of them lost their collars over a period of a couple of weeks, and by September 12, when all the remaining collars were removed, half of the bucks had lost their collars. It seems, therefore, that it would be worthwhile to use the collars in a future test, as long as the bucks were not placed on brush at some point during the test, and the collars were left loose enough that they would not become too tight during the test and require readjustment or removal.

2012 Meat Goat Forage Buck Test Winners

Fifty-seven bucks owned by fourteen producers in seven different states competed in the 2012 test. Overall, the bucks gained an average of 0.21 pounds per day of the test.

Wes Pinneo (right) receives his awards from Erin Campbell-Craven (left).

Mary Kay Sinclair (center) and Mary Howard (left) receive their awards from Erin Campbell-Craven (right).

Grand Champion - ADG (three-way tie)
Breed: Kiko
ADG: 0.33 lb.
Owner: Wes Pinneo, B Bar W Kikos, Kincaid, Kansas

Breed: Kiko
ADG: 0.33 lb.
Owner: Wes Pinneo, B Bar W Kikos, Kincaid, Kansas

Breed: Kiko
ADG: 0.33 lb.
Owner: Wes Pinneo, B Bar W Kikos, Kincaid, Kansas

Reserve Grand Champion - ADG
Breed: Kiko
ADG: 0.32 lb.
Owner: Mary Kay Sinclair and Mary Howard, Kikogal Ranch, Coffeen, Illinois

Grand Champion - FEC
Breed: Kiko
Average FEC: 37.5
Owner: Terry Hankins, Sarah, Mississippi

Reserve Grand Champion - FEC (two-way tie)
Breed: Kiko
Average FEC: 50
Owner: Mary Kay Sinclair and Mary Howard, Kikogal Ranch, Coffeen, Illinois

Breed: Kiko
Average FEC: 50
Owner: Dick and Sally Rutherford, Bear Creek Kikos, Carlinville, Illinois

Top Herdsman - ADG
Wes Pinneo, B Bar W Kikos, Kincaid, Kansas
ADG: 0.33 lb.

Reserve Top Herdsman - ADG
Mary Kay Sinclair and Mary Howard, Kikogal Ranch, Coffeen, Illinois
ADG: 0.28 lb.

Top Herdsman - FEC
Mary Kay Sinclair and Mary Howard, Kikogal Ranch, Coffeen, Illinois
Average FEC: 76.67

Reserve Top Herdsman - FEC
Terry Hankins, Sarah, Mississippi
Ending FEC: 99.17

TABLE 1. 2012 COMMERCIAL MEAT GOAT FORAGE PERFORMANCE TEST RESULTS

	Consigner	Test ID	Start weight (lbs.)	End weight (lbs.)	ADG 80 d (lbs./d)	Final FEC (eggs/g)	Average FEC (eggs/g)	LEA (cm^2)	SC (cm)
1	Pinneo	27	44	70.5	0.33	1550	650.0	6.15	25.0
2	Pinneo	31	52	78.5	0.33	850	770.0	6.27	23.5
3	Pinneo	56	50	76.0	0.33	250	950.0	8.14	22.5
4	Sinclair/Howard	20	58	83.5	0.32	500	180.0	6.14	25.0
5	Stemme/Haggarty	49	47	71.0	0.30	800	540.0	7.01	26.0
6	Barnes	25	67	90.0	0.29	700	280.0	7.30	23.0
7	Barnes	29	59	82.0	0.29	350	160.0	6.19	23.0
8	Gullion/Guffey	44	58	81.0	0.29	200	200.0	8.03	23.5
9	Sinclair/Howard	26	48	70.5	0.28	50	50.0	5.56	23.0
10	Pinneo	54	48	70.0	0.28	300	140.0	7.46	26.5
11	Pinneo	57	57	79.0	0.28	150	250.0	7.10	28.0
12	Sparks	51	52	73.5	0.27	1050	700.0	5.89	28.0
13	Hays	40	51	72.0	0.26	200	240.0	7.36	26.5
14	Higgins	24	43	63.5	0.26	100	240.0	6.78	24.0
15	Hankins	4	55	74.5	0.24	2200	570.0	7.36	24.0
16	Pinneo	34	60	79.5	0.24	500	220.0	6.74	22.5
17	Gullion/Guffey	53	49	68.5	0.24	550	490.0	5.20	25.5
18	Sinclair/Howard	36	58	77.0	0.24	300	460.0	6.79	24.5
19	Hays	55	52	71.0	0.24	850	275.0	5.38	23.0
20	Sparks	3	68	86.5	0.23	600	790.0	7.80	25.5
21	Gullion/Guffey	8	52	70.5	0.23	2850	850.0	5.94	24.0
22	Sparks	12	56	74.5	0.23	1000	460.0	4.70	27.0
23	Brown	30	69	87.5	0.23	450	630.0	6.40	25.5
24	Sparks	43	67	85.5	0.23	950	420.0	7.45	28.0
25	Hays	47	50	68.5	0.23	100	110.0	6.20	24.0
26	Sinclair/Howard	11	46	64.0	0.23	850	380.0	5.60	22.5
27	Adams	41	67	85.0	0.23	800	480.0	6.40	26.0
28	Sparks	52	53	71.0	0.23	100	100.0	6.72	25.0
29	Hankins	21	43	60.5	0.22	0	37.5	4.80	25.0
30	Barnes	23	58	75.5	0.22	100	90.0	7.60	26.0
31	Sinclair/Howard	42	47	64.5	0.22	200	120.0	4.53	22.5
32	Adams	48	77	94.5	0.22	100	270.0	7.76	23.0
33	Kiesau	14	53	70.0	0.21	1400	720.0	6.66	24.5
34	Adams	15	73	90.0	0.21	3000	1310.0	6.70	29.0
35	Brown	33	56	73.0	0.21	0	60.0	5.99	25.0
36	Atkinson	5	62	78.0	0.20	500	310.0	8.00	23.0
37	Sinclair/Howard	6	55	71.0	0.20	200	233.3	6.44	25.0
38	Hankins	16	44	60.0	0.20	350	110.0	6.18	26.5
39	Sinclair/Howard	45	54	70.0	0.20	450	170.0	6.22	22.0
40	Atkinson	46	56	72.0	0.20	250	275.0	7.43	24.0
41	Barnes	10	73	88.0	0.19	150	310.0	10.70	27.0
42	Kiesau	17	61	75.0	0.18	900	420.0	7.20	26.0
43	Stemme/Haggarty	19	57	71.0	0.18	200	830.0	5.72	25.5
44	Hankins	13	43	56.5	0.17	300	260.0	5.67	25.0
45	Brown	28	77	89.0	0.15	550	270.0	6.33	27.0
46	Stemme/Haggarty	22	76	87.5	0.14	1450	970.0	7.96	23.0
47	Atkinson	32	65	76.0	0.14	100	90.0	7.40	24.5
48	Rutherford	35	61	71.5	0.13	450	150.0	7.50	23.0
49	Adams	37	54	64.5	0.13	600	320.0	5.67	22.5
50	Hankins	7	37	47.0	0.13	50	150.0	4.78	20.5
51	Sinclair/Howard	38	48	58.0	0.13	550	160.0	4.90	23.0
52	Adams	2	65	74.5	0.12	400	400.0	5.77	22.0
53	Sinclair/Howard	39	60	68.5	0.11	100	60.0	5.80	22.0
54	Hankins	1	56	64.0	0.10	200	470.0	6.15	24.0
55	Rutherford	9	67	74.5	0.09	0	50.0	6.14	24.5
56	Rutherford	50	77	82.5	0.07	450	800.0	7.80	25.5
57	Adams	18	62	57.0	-0.06	3700	1020.0	4.20	22.0

Appendix A: Rules, Regulations and Protocol

2012 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 economically important traits 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:

Nominations due: Friday, June 15, 2012

Check-in: Thursday, June 21, 2012 1pm-5pm

Warm-up: June 22, 2012 - July 1, 2012

Test Period: July 2, 2012- September 20, 2012

Meat Goat Field Day & Buck Test Awards: September 22, 2012

Entry Requirements:

a) A producer group will consist of 1 or more bucks that were born between January 1, 2012 and March 31, 2012. All breeds and crossbreds are accepted.

b) To be considered for the Herdsman Award you must have a group of 3 or more bucks.

c) Producers must provide Birth Date and Weaning Date to verify.

d) Bucks must weigh a minimum of 35lbs at check-in.

e) Bucks must be weaned 30 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.

f) Bucks must be tagged with a scrapie tag from their state of origin. No exceptions.

g) 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.

h) 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.

i) 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 a test ID at the time of check-in.

c) Bucks will be wormed with two or three different

classes of wormer at the time of check-in. A second fecal egg count will be conducted 10 days after check-in.

d) Bucks that do not show a 90% reduction in their egg count after the initial worming will not be allowed to enter the test.

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

f) 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.

g) Every effort will be made to accommodate the producer if a buck must leave the test.

h) In the case of death, a full necropsy will be performed by the On-Site Veterinarian at the expense of the owner.

i) 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.

j) Bucks that score a 4 or 5 on the FAMACHA scale during the test will be de-wormed and disqualified.

k) All decisions made by the Test Manager, Test Veterinarian and On-Site Veterinarian will be final.

l) Weights, FAMACHA Scores and fecal egg counts will be taken every 17 days with the results posted within 3 days on the Oklahoma Forage-Based Buck Test Facebook page. Ultra sounding for loin eye area will be provided by Reproductive Enterprises Inc.

Results:

a) Buck ranking within the test will be classified by Average Daily Gain and Fecal Egg Count.

b) To compete for Grand Champion Herdsman, each producer must enter 3 or more bucks. This award will be determined by the average of the top 3 bucks for each producer in Average Daily Gain and Fecal Egg Count.

Educational Information

a) A summary sheet containing all data collected for the bucks will be supplied to each producer. A test summary with an overview of forage and weather during the test, along with other important information, will also be distributed.

b) A Field Day will be held at the test site in September to view the bucks, tour the forage test and discuss performance on forage for the meat goat industry.

c) All test data and results will be made public.

Technical Advisory Committee

Test Nutritionist- Brian Freking,
Le Flore County Extension Educator

Test Staff

Test Veterinarian- Ann Wells, D.V.M.,
Kerr Center Program Director

Test Manager- Erin Campbell-Craven,
Kerr Center Program Assistant

Test Herdsman- Andy Makovy,
Kerr Center Livestock Herdsman

Test Assistants- Carrie Shirley and Rock Gremillion,
Kerr Center Interns