

SCRIBE NOTES
OALP Class 15, Seminar 3
"The Noble Foundation and Mid-Southern Oklahoma Agriculture and Industry"
November 17 - 19, 2010

Scribe: Shari Holloway
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Overview of the Noble Foundation

Adam Calaway, director of public relations for the Noble Foundation, addressed the class about the history of the Noble Foundation as well as where the Foundation is headed.

As a young man in the early 1900s, Lloyd Noble witnessed the value of agricultural production to Oklahoma and its people. However, he also saw the dramatic effects of poor farming practices on the land's fertility and the state's economy. As was often the case, farmers frustrated by their inability to make a living simply abandoned depleted croplands and moved to other areas of the country.

With the help of his mother, who co-signed a \$15,000 loan, the 24-year-old purchased his first drilling rig in 1921. He quickly became one of the most successful and respected onshore drilling contractors in the United States. His reputation was defined by his principles and his appreciation of technology that allowed him to drill faster and deeper than his contemporaries.

Noble used aviation to move between his headquarters in southern Oklahoma and his various drilling sites that were scattered from Canada to the Gulf Coast. From his vantage point above the rolling prairie, he confirmed the consequences of poor farming from another perspective.

Years of man's failure to return anything to the soil had resulted in a barren, nonproductive land that was susceptible to erosion and incapable of supporting a viable economy.

Noble saw the land as essential to the future successes of Oklahoma and the nation. He understood that the land would continue to be needed long after oil and gas were gone.

Noble established The Samuel Roberts Noble Foundation, named after his father, to address the challenge.

The Noble Foundation's early efforts focused on educating and encouraging area farmers and ranchers to practice land stewardship and resource conservation. Today, the Noble Foundation has grown to include three operating divisions - Agricultural, Plant Biology, and Forage Improvement - which work together in a coordinated manner to move science from the laboratory to the field in an effort to enhance production agriculture and plant improvement, while remaining true to Noble's vision of assisting farmers and ranchers.

Lloyd Noble died unexpectedly of a heart attack at age 53 on Valentine's Day 1950. While the loss of Lloyd Noble left a great void, the stewards of the Noble Foundation - largely comprised of his descendants - have continued his legacy of generosity. The work has changed through the decades, but the mission remains the same - to benefit mankind.

The Noble Foundation is comprised of three operating divisions – 1. Plant Biology, 2. Forage Improvement, and 3. Agricultural. The Foundation's service area includes 47 counties in northern Texas and southern Oklahoma that are within a 100-mile radius of Ardmore. The first step in working with a cooperator, or farmer/rancher, is to assess the abilities of the cooperator, then assess the land, and finally deliver a management plan to the cooperator at no cost. The Foundation currently works with 1,700 farmers and ranchers. In this service area there are 2.6 million cows, 16.9 million acres of farmland, and 66,000 producers.

The Foundation employs over 400 employees, including 110 Ph.D. scientists from more than 29 countries. It includes seven research farms and 12,000 acres. Sixty-five years later, the Foundation is still following true to the original mission.

The following information was pulled from the Foundation's web site and provides several statistics about the Foundation at a glance:

The Samuel Roberts Noble Foundation is an independent, nonprofit institute headquartered in Ardmore, Oklahoma. Founded in 1945, the Noble Foundation conducts direct operations, including assisting farmers and ranchers, and conducting plant science research and agricultural programs, to enhance agricultural productivity regionally, nationally and internationally.

The Noble Foundation,

- Is the largest private foundation in Oklahoma and is in the top 44 in the United States (based on asset size).
- Employs more than 370 individuals, including more than 90 Ph.D. scientists, agricultural consultants and research associates.
- Hosts a large international population, including employees from more than 25 countries and six continents.
- Houses 21 primary research laboratories focused on plant research.
- Operates a 500,000-square-foot central campus having research, program, infrastructure and administrative space.
- Operates more than 12,000 acres of farms in southern Oklahoma for research and demonstration projects.
- Assists more than 1,700 farmers and ranchers in a 47-county service area (southern Oklahoma and northern Texas) in achieving their individual financial, production, stewardship and quality-of-life goals.
- Receives extramural, research support from the National Science Foundation; U.S. Department of Agriculture/National Institute of Food and Agriculture; Oklahoma Center for the Advancement of Science and Technology; U.S. Department of Energy; National Center for Complementary and Alternative Medicine (National Institutes of Health); the State of Oklahoma (Consortium for Legume Research and Oklahoma Bioenergy Center); and the National Aeronautics and Space Administration.

In the past year, the men and women of the Noble Foundation have,

- Led 87 agricultural educational events that reached 3,025 adults and 1,086 youth;
- Led three training sessions related to farm safety for children that were attended by 82 adult participants;
- Held 12 adjunct faculty positions at seven institutions of higher education, including Oklahoma State University, Rice University, Texas A&M University, University of Oklahoma, and the University of North Texas;
- Produced breeder seed of NF27 grazing oat, NF95134A grazing wheat, NF96210 grazing triticale, Bates RS4 grazing rye, EG2101 switchgrass, and two annual medics for future licensing as new cultivars;
- Served on 13 editorial boards for scientific journals;
- Published more than 115 peer-reviewed papers in international journals including *Crop Science*, *Plant Biotechnology*, *Plant Physiology*, *Plant Journal*, *Proceedings of the National Academy of Sciences*, and *Plant Cell*;
- Received more than \$4,200,000 in new extramural funding from both public and private sources.

Adam then took us for a campus tour. He pointed out the Utility Services Building that was constructed to withstand F5 tornadoes. The building has five very large diesel generators for backup power. The building is utilized for the safety of science experiments, many which are as old as 10-years-old. A total of 1200 feet of underground tunnels connect other buildings on campus to the Utility Services Building. The tunnels will continue as the campus grows.

In the research labs, Adam pointed out that the labs differ from many other research facilities in that they are larger, allowing more space and better equipment, which attracts the best people.

At the Noble Foundation, the team effort is encouraged through the layout of the buildings and office space. The teams have adjoining office space which allows them to collaborate easier on projects. The researchers' offices are located across the hall from the labs.

Greenhouse – David McSweeney, manager

McSweeney, a native of New Zealand, gave us a tour of the greenhouses. They cover one acre, or 50,000 square feet. The Foundation's greenhouse is the single largest greenhouse research facility in the United States. In the summer months they use a swamp cooler to regulate the temperature, which drops the temperature in the greenhouse by about 15 degrees in the hot months, keeping it at about 90 degrees F. They can control the temperatures in the greenhouse about 10 months of the year. They grow the plants in the greenhouse in the same environment that the plants need to exist. The greenhouse uses a computer-controlled automatic water source that waters from the bottom of the plant and fertilizes simultaneously.

McSweeney also showed us the insect traps that they use. They are various colors to attract different types of insects. They also release beneficial insects into the greenhouses. The plant labels used are:

1. orange – plant has been genetically modified – these cannot go in field, cannot raise genetically engineered plants in the same greenhouse
2. yellow – the plant has been in the same room as the genetically engineered plants
3. white – non-genetically engineered plants
4. other colors are used for various management purposes

The greenhouses include 18 individual 500 square foot air-conditioned greenhouses (about 10,000 square feet). All of the air conditioning is water-chilled that stay +/- one-half degree. He stated that their job is not necessarily to produce healthy plants, but to produce plants at the same time each year consistently for research purposes.

Dr. Jon Biermacher – Tour of Local Field Plots & Research Park

Jon took us to the Pepsi paddocks at the main campus to discuss some of the Forage Improvement Research that is currently being done on a cool-season perennial forage that is more economical than the annual cereal forages commonly grazed in the NF service region. A summer-active variety of tall fescue (known as PDF-584) was developed that makes use of a novel endophyte that produces chemicals that protects the plants from pests and diseases, but does not produce the toxin that causes fescue toxicosis in livestock. A five-year, on-farm grazing study was conducted at the NF's headquarters farm in Ardmore between the fall of 2005 and the spring of 2010 to investigate the economics of this new fescue. The seed for this forage is scheduled to be on the market in 2011 from Pennington Seeds.

OALP Oral Presentations

Following lunch provided by the Noble Foundation, the class presented five-minute oral presentations on a variety of topics as a means for leadership development.

Dr. Twain Butler – Forage Improvement Division Program overview

Butler indicated that the mission of the Forage Improvement Division (FID) was to develop new cultivars. He discussed the FID cultivar development model and went on to discuss the new cool season perennial fescue that we had previously heard about from Jon Biermacher earlier in the day. Butler discussed the various employees in the FID and their responsibilities. The three primary forages researched at NF are switchgrass, tall fescue, and alfalfa.

Dr. Lloyd Sumner – Plant Biology Division Program overview

Sumner gave an overview of the Plant Biology Division (PBD) at the NF. There are 128 people in this division. The mission is to conduct basic biochemical, genetic and genomic research for crop improvement, enhancement of human and animal health, and production of novel products in crops. He discussed how the mission of each division is circular and that is seldom found in similar research entities.

The plant biology focus areas include:

- translated genomics
- plant natural products and metabolomics
- molecular plant-microbe interactions
- cellular and developmental biology
- technology development

**Scribe: Rhonda Regier
November 18, 2010**

Dr. John Blanton, Switchgrass Grazing

The Noble Foundation is researching switchgrass to use for bio-energy. One of the challenges switchgrass production in Oklahoma faces is the lack of market. There are no bio-fuel refineries built, and because of that, there is no switchgrass grown. We need to have the switchgrass available before a refinery will look at building here. So to even get farmers to consider growing switchgrass for bio-energy, the Foundation believes that if they can offer the grower another use for the switchgrass, they will consider growing it. The other reason is grazing.

Switchgrass is an outstanding forage, offering up to 18% crude protein when it is small - 4-5" tall. The grazing recommendations are using switchgrass after small grains pasture, and before Bermuda grass is ready for stockers. After you graze the switchgrass for a very short period, 25-60 days, you let the switchgrass grow to be later harvested for bio-energy.

The Foundation carried out a three year study on using switchgrass for stocker grazing. They took off 700 pounds, 1400 pounds, and 2100 pounds of forage for this study. They concluded that after 100 days, the stockers gained 2 pounds per day, 36 days, 2½ pounds, and 23 days, 3.4 pounds gain per day. The switchgrass offered 150-200 pounds of gain per acre. They noted that regardless of the stocking rate, the stockers could keep up with the switchgrass growth. But how did that grazing affect the use of switchgrass for bio-energy? Their study yielded 1400 pounds of switchgrass without stocking versus 700 pounds with any stocking rate. They concluded that they need additional stocking rate studies. The cattle gained the most at first, and quality of the switchgrass dropped off toward the end of 100 days.

Shawn Norton and Dr. Jaga Mosali, Variety Trials (in the deer fence)

The Noble Foundation has an impressive variety trial near the Red River as well as several other farms. This particular location has two-acre plots set up in a linear configuration. There are 24 blocks in this trial with a John Deere GPS irrigation system that can water specific blocks individually. Irrigation is through an almost man-free system that has a 4-inch drag hose. The hose only has to be connected in two locations to take care of the entire variety trial. These trials offer the Foundation results of pipeline irrigation for their research; from biology lab research, to forage greenhouses, to small plots. After evaluating the small plots, then larger field plots can be studied in larger adjacent field trials. Several of the trial studies include tall wheatgrass seed increases, alfalfa, bio-fuel based projects, and many others.

Across the road, the Foundation is evaluating a wheat/millet project. This combination has potential for early forage in September with the millet and then wheat grazing after a freeze has killed the millet. Sesame trials are new for them. They are also doing small grain variety trials, monitoring forage production from stand establishment through end of season. They also have been studying their small grains with forage production and then half-way through stopping forage clipping and taking yield to grain harvest. They have wheat, triticale, oats and rye in their small grain trials. They were very proud of their new Hagi forage harvester which is valued at \$180,000. This sophisticated machine has a scale on-board along with a computer to collect data. The machine cuts, weighs, and quality samples the forage. The samples are given a wet weight, and then dried for 7 days to get a dry weight. This is so much better than previous sampling methods: hand clipping or using a lawn mower and dumping the bag for every plot. Dr. Jaga shared that they were doing variety trials on annual ryegrass, soybeans, and summer crops such as sorghum and sudans. He said most of their trials were with convention tillage, but a few were no-till. The Foundation has a 10-year-old no-till pasture program that can offer large no-till study options.

Dr. Charles Rohla and Kevin Pierce, Pecan Production

On the Red River Pecan Orchard, the Foundation has many acres of native and paper shell pecan trees to conduct research. Pecans are native only to North America. The US provides 80% of the world crop at 270 million pounds; Mexico provides another 10%, while the other 10% comes from Brazil, Australia, Israel, Africa, and a few others. Pecans are alternate-bearing and will have one good crop out of three years. Demand for pecans has gone up this year because of demand from China. The price last year was \$1.60 per pound, but this year's crop is bringing \$2.50 per pound. The Red River Pecan Orchard has many varieties planted, but mainly Pawnee and Kanza. Kanza is an early harvester, October 10th, and has higher value because it takes advantage of the "holiday market". Pecans yield 1500-3000 pounds per acre on good years. Most native pecans are harvested after Thanksgiving. Site selection is the number one determining factor with planting a pecan orchard. Irrigation and fertilization make huge differences as well. Lack of either will eliminate entire crops. A pecan tree uses 200 gallons of water per tree per day. One of the biggest challenges to pecan production is wildlife. A 1980-90 study of native pecans concluded that three times

as much of the crop that was harvested was lost to crows, squirrels, and blue jays. Oklahoma is the only state in which the Wildlife Department traps crows with bait stations. The poison has a delayed reaction, allowing the crows to fly to roost to die so birds don't know where they received the poison. Over one million birds are eliminated yearly. Pecan harvest was demonstrated. The "shaker" shakes the tree causing the nuts to fall off. The entire ground up to 40-50 feet away shook like an earthquake. It was strange. I bet the underground animals were shocked. The shaker is pto-driven with weights offset to shake the tree. Next a rake was pulled to pick up any large sticks and branches. Then the pecan harvester picked up the pecans using fingers and a fan, while a chain moves the heavier material through the cleaner. Then manual labor is used to pick off trash; 4-6 people per cleaning table. New cleaning technology has reduced this to 1-2 people. It takes three harvesters to keep up with one shaker.

The number of trees in a mature stand is determined by the tree variety size; 50% shade at high noon on the orchard floor. Pecans have a tap root that is as deep as the tree is tall, but it does not pull water. The active roots of a pecan tree are in the top 36 inches, and moving out three times the drip line up to 180 feet diameter. The highest demand for nitrogen begins at bud break. Generally 100 pounds of nitrogen per acre is recommended. But pecans are very inefficient, taking up only 27% of the nitrogen that is applied. Pecan orchards are not soil tested, but leaf samples are used to determine fertilizer use. They have started looking at foliar applied nitrogen; six pounds urea foliar, three times per year. The biggest concern is leaf burn of the trees. High pH in the plants results in poor absorption of zinc, so zinc is foliar applied. Insect pests include pecan nut casebearer in early June. You can have significant loss of yield if you have an infection. Male casebearer moths emerge five days before females, so they determine the threshold by trapping males. Also pecan weevils live in the soil, and come out in August-September, after rain events. The weevils crawl up the tree making foliar applied Warrior chemical with air-blast sprayers necessary. A new pest problem starting in Texas is stinkbugs.

Pecans will have a bumper crop every 12-13 years. Non-managed orchards will have a crop only every 5-7 years. Paper shell pecans require much more management and need weevil sprays every 14 days, while natives only have 1-2 spray applications per year.

Native pecans are worth roughly \$0.01 per nut this year. The oldest pecan tree is in Mexico; it is 2500 years old. The profit available on 10-year old Pawnee trees is very good. A Texas grower earned well this year; the price is \$2.60 per pound. On a 55 acre orchard that was harvested on October 12 and sold on October 15, with a total of 96,000 pounds, he yielded almost \$250,000 profit. It takes 12-14 years to pay off the investment of orchard establishment. From start-up to first harvest will take 4-5 years. Initial cost for 7-8 years establishment is \$2800-4000 per acre. The cost depends on spending \$600-3500 for irrigation, and it does not include equipment costs. Equipment cost examples are \$24,000 for harvester and \$8000-9000 for mist blower sprayer, if you purchase Savage equipment. Almond harvesters have faster harvesters that are over \$100,000 each. Their sprayers can cost up to \$80,000.

Dr. Deke Aikire, Half-sib Project

This project was a five calf crop study started in 2003. Not all cattle were half-sibs; also used good quality cattle for comparison. The study had 200 half-sib heifers and 200 traditional heifers chosen on good grading carcass traits. (See hand-out attachment for data tables) Calves from this study performed similarly in the feed yard. The 400 heifers were artificially inseminated and cleaned up with full brothers to A.I. sire. They used Angus and Limousin sires. Open cows were removed from the study. They feed out 60 calves from the four groups. Even though the due dates were synchronized with A.I., calves were born 1-2 weeks before and after due dates. Several conclusions were that half-sibs had more calving ease with lighter calves; Limousin sired calves had higher birth weights and slightly higher weaning weights possibly due to hybrid vigor; traditional cows have higher weaning weights also due to hybrid vigor. There were very small differences in average daily gain (ADG), although Angus out-performed Limousine. Sire seemed to determine the quality grade with the Angus having significantly better grading. The Foundation chose proven sires for high accuracy for carcass consistency. They summarized the study and did not see a statistical difference in variability of half-sib and traditional cows. The next study may be cow-efficiency, using sexed semen. The Foundation recommendation is to choose good proven sires with good cross-bred females to determine your market.

Dr. Ryan Reuter, Tour of Oswalt Facilities

Oswalt Road Ranch was given to the Noble Foundation by the DeJoice-Coffey Trust. It covers 5,000 acres, and 4,500 acres are being used for grazing projects currently. One aspect of their location is a commodity storage

facility. This facility allows them to manage feed costs by buying commodities in bulk. Bulk commodities are \$20-25 per ton cheaper than bagged commodities and are much easier to handle. They can also access some commodities not sold in bags. They purchase truckload quantities, but also purchase commodities in “super sacks”; 1,500 to 2,000 pound bags. Smaller producers that don’t have bulk facilities can use super sacks to combat bagged feed prices. The Foundation’s commodity storage facility allows them to replicate ranchers’ practices of using grass traps with supplemental feed. They are also doing switchgrass hay storage studies. They have big square bales that are either covered with a tarp, sealed, or out in the open.

The cattle-working facilities would make your mouth water. We all had to have someone push our jaws up as we oohed and aahed. The facility included an approximate 80 X 120 feet metal shed over concrete slab and textured concrete where the cattle were worked. It was built with custom pipe and W & W panels. It had 10 large sorting and holding pens, an alley on outside of all the pens, and double alleys going into the working shed. It had dual chutes. One chute was a “Silencer” which has set up for yearling heifers. It was amazing - with load cells and hydraulic everything. They weigh each animal every time it goes through the chutes. It had rubber louvers to keep the cattle from seeing the chute operator. It was \$26,000 for this chute. There was also a CS Headgate Chute. It was set up for working cows. It had a spring-hinged head gate that would give if a cow hit it hard; this would help avoid bruising of their shoulders. The whole idea was to reduce stress of the 1,000-1,500 cows and 3,000 stockers using the facility. They also demonstrated their remote controlled crowd tub. It has a value of \$7,500. They also remotely control a hydraulic turret gate, drop gate, and sorting gate. The hydraulic pumps are stored in a separate shed and fluid is piped to the facility from under the concrete floor. Then the hoses come up and are dispersed through the pipe at the top of the panels. This keeps the noise levels down dramatically. The Foundation’s goal is to demonstrate new technology to producers so they can find one or two things to include in their operation.

GrowSafe Demonstration

GrowSafe is a company based in Canada. The Foundation is testing this equipment to gain-test bulls to check feed efficiency, track feed intake of individual animals as well as feed response individually. The animals have an ear tag with an electronic sensor. The GrowSafe feed bunks have load cells (scales) in which a computer continuously weighs the bunk. The computer identifies the individual animal and weighs the bunk before and after the animal leaves. Then it inventories the amount of feed intake of all animals in the pen in daily detail. This study began in June 2010. They have had two trials through it so far, but have the facility booked through 2014. They plan to add four more to equal eight bunks per pen to feed up to 32 cattle per pen. They have the option of splitting the pen with a hot wire to have four studies going at once.

The GrowSafe Beef design is the only one in existence. The Foundation is testing this prototype along with many adjustments from the manufacturer. This system monitors the individual water intake and intake behavior of each individual animal in the pen. Digital precision flow-meters monitor how much and how fast the animals drink. It also has a scale that weighs the front half of the animal to monitor the gain of the animals. It is also equipped with a bar nozzle that can spray a dye on a particular animal that has reached a desired, pre-determined weight. This could be used in the feed yard to determine which animals are ready for slaughter and not just potluck the entire pen. This could reduce slaughtering “green” cattle, which have not gained enough to grade.

The major objective of this study is to learn how to manage individual animals to get maximum efficiency. This unit has six stations and each station can service 100 head of cattle. It also has the capability to individually dose medicine for the cattle. It would drain the medicine after the individual animal left the station.

The discussion turned to efficiency of steers versus heifers. Females mature at a lighter weight and grow slower. Earlier in their lifespan is where the most difference occurs, so that is why steers are preferred to stockers for going into feed yards. At slaughter, it does not matter. Dr. Reuter’s opinion is that heifers are 10% less efficient than steers. Females have a tendency to have more fat, but will lose weight when heifers cycle. So many feedlots give implants to heifers to keep them from ovulating.

Dr. Jon Biermacher, Cull Cow Project

Cull cows represent 15-30% of spring calving annual revenue. Typical ranchers have the strategy of culling and selling open cows immediately after weaning in the fall. Cows are in relatively poor condition, and fall has the lowest seasonal prices for cull cows. October prices are fairly low so if you can hold on until February-April, you will get a better price. Can you add value to culled cows? There are two strategies to handle cull cattle held over for

spring selling; one is run cows on stockpiled native grass or dry lot on low cost feed ration. The dry lot system includes feeding rye hay with 10% crude protein in mid October. Start feeding the cows 25% CP cubes at approximately 5 pounds per day per head in December through March. The native grass system is just to graze stockpiled native grass pastures, and only supplement with hay and cubes during icy periods. The Foundation project compared 48 culled cows; 24 on native grass, and 24 on dry lot. These cows were average BCS of 5.5 and were four years old. They collected weight and USDA grade and dressing percentages in October, November, January, February, and March. They calculated and simulated net returns (revenue minus costs) at each grading period. Revenue was figured as price of grade and DP times cow weight. Accumulated costs were feed, hay, labor, pasture, and interest. Pen-fed cattle gained and grass-fed cows held weight, but none of the periods were profitable. In February and March, they sold the cows and the grass-fed gained up to \$23 per head. Native grass at 111 days averaged a net return of \$22.90. The limitations of the study are that it was only one year of data, which should be evaluated carefully; it was a small sample size. The producers' resources are the key and results do not include the net value of rebred cows. They put the open cows in with cleanup bulls, and had 70% rebred. Do not put rebred cows back into herds, but sell as bred cows, often in March. It does not take much to keep heavy open cows, but if cows are thin, you will receive a low price. Best use of the data would be to take all three years and look at an average. Dr. Clem Ward and Dr. Biermacher are putting together a decision tree.

Ken Gee, Feral Hog Captures

The Foundation has completed one year of field work on a project to evaluate the efficacy of drop nets versus corral traps for feral hog capture with the USDA and Texas A&M. In 2007, feral hogs were present in all but two counties in Oklahoma. Hog density is heaviest along the Red River with over 60 hogs per square mile. Throughout the rest of the counties, most have a population of 15-60 hogs per square mile. The potential problem with feral hogs is property damage, disease transmission, and competition with native wildlife for resources. Feral hogs are not considered wildlife. Hogs do not commune with deer and 90% of the time, hogs win out the food source. There are several types of hog traps: box or cage traps, corral traps, pitfall traps, and drop nets. Corral traps use 16-foot panels with 4 inch mesh, with a split door on each end. The two-door saloon door has a spring and a trip wire is buried at the end of the one way doors so they could go in but not get out. Drop nets were 60 X 60 feet nylon twine with 4 inch mesh. A rope is attached to certain points with a release mechanism. The trap can be set off remotely within 200-300 feet. Cameras send an infrared signal to a radio system to send a message so you can go check the traps. You need to get to the trap to take care of the animals within five minutes or they will chew or tear up the net. The Foundation conducted a study on three properties in Love County. They split two properties and randomly assigned corral, net traps, and a control area in the winter and spring of 2010-2011. They conducted these studies after the hogs' food sources were exhausted. Of the multiple traps, they evaluated the efficiency based on the capture of the estimated identifiable hog population. One year of data revealed that net traps were 77% effective and corral traps were 31.4% effective. Net traps obviously required monitoring and corral traps did not have to be manned. The catch by unit effort was one hog per 1.87 hours with the drop net, and one hog per 2.44 hours with the corral trap. Nets can be used for up to 25 years or more. Next, they plan to study if control areas become sanctuaries for the hogs. They trapped over 200 hogs off the Oswalt Ranch property, mostly during the twilight hours. They learned that you have lots of drops right before or right after dark.

Ken Gee, Burning Strategies for Native Range Management

The Foundation is looking at one aspect of proper management of native range. They are looking for the effects of burning on vegetation, wildlife habitats, and stocker cattle products and economics. They will divide the Oswalt Ranch into six areas with three control areas. They will burn three pastures, one-third on an annual basis. They believe this is a potential viable enterprise with a stocker operation and have markers of vegetation surveyed and can monitor vegetation after burns. This is a 10-year project, but they would like to add up to 20 years. They will graze the native range from April 15 through July 15. They will burn in the spring; February. They are now taking aerial photos to help document vegetation.

Jack & Jackie Cunningham, Tour of Cunningham Farm and Ranch, Springer, OK

The Cunningham family moved to Oklahoma from southwest Texas in 1981, where it was very dry, and they ran one cow per 30-50 acres. This was a big change for them, and they now raise pecans, wheat, and stockers. The Foundation has helped the Cunningham family with feed rations, insect consulting, and variety recommendations. This year, the Foundation recommended that they treat their wheat with Gaucho XT. The Foundation came to them to do their research. The Cunningham family learned that the treated wheat yielded 500 pounds of extra forage versus the untreated in one plot, and this was not on their best ground. On their Murray County place, the elevation

is higher, it is drier, and that is where they pre-condition their stockers with much success. They chose this over the bottom land which had such high moisture and caused sickness and huge death losses. The Cunninghams buy 600 pound stockers and turn them quickly; 100-150 days. They buy sale barn stockers. They used to feed out cattle, but now run on grass; the performance in the cattle has increased. They feed all commodity feeds, given the price and what they are running it on. They plan to run stockers on wheat, grass, and dry stock. They like to make at least two turns on wheat and one turn on grass. Acquiring the numbers of cattle is becoming more challenging. They like to use a killed virus and refuse to use a modified live virus to treat stockers because of wrecks in years past. If they buy cattle today, they are on the farm by that night and are worked. They give them an antibiotic and in two weeks give a booster. Their pull rate is less than 10%. They used to rope and doctor calves, but stopped this practice. They now ease them to pens and isolate them. This has resulted in a reduced death loss. They use horses to work their cattle, and only use dart guns to medicate the cattle when treating hoof rot. The only problem with dart guns is that it is hard to know which animal you have treated and you cannot isolate them.

The Cunninghams use hedges to market their cattle. They feel that the hedge levels out their risk, but doesn't necessarily make more money. They never sell more than one truckload at a time - they spread it out. They sell one load, and get out of the hedge that day it sells. They go and watch the cattle sell. They sort the cattle themselves so the animals just have to be unloaded and sold, reducing stress from sorting at the sale barn. They run all steers and buy cattle at El Reno, Ada, Red River, Sulfur, Caddo, and Atoka. They do not like to get cattle from too far east because they seem to have more ear than they like and not have the sheath they want. They usually wait to hedge, if they are in a down market. They usually buy steers if they want to turn them a little quicker. They used to band the bulls, but had trouble, so they cut them now. They also band the horns and cut them. They like to sell cattle with a little flesh on them. They graze wheat, ryegrass, and fescue. They feed 5 pounds per day of soy hulls on toxic fescue and get along well. There is a lot of ryegrass in their Bermudagrass pastures. They split their applications of nitrogen on their Bermudagrass. They feel that they get better nitrogen efficiency with two applications. They use anhydrous on their wheat, but only urea on their Bermudagrass. They fertilize in the fall and spring. No-till did not work for them as well as conventional tillage. They plant Phanta variety wheat. They think that no-till would work where they do not have cattle, but compaction is a problem. They plant the last of August or first of September when the soil temperatures are not too high. One year they flew on their wheat when it was too wet. The Cunningham farm that we visited is 71 acres. They run a stocking rate of 135 cattle on the 71 acres which weigh 630 pounds for 90 days. They feed ¾% of body weight a mixture of 1/3 corn gluten and 2/3 soy hulls. They weigh 750-800 pounds after 90 days. They have tried cutting field into cells, but that did not work because it is so wet in the bottom-land. If it rains, the cattle will stomp out the cell they are in, but when not in cells the cattle move around the outside edge of the field and graze the drier areas first. The Cunninghams have no employees and operate on less than 2000 acres. They contract price fertilizer at the port and apply with their own spreader. They operate their own truck and purchase their own feed. They market their cattle at Oklahoma City West. They feel this is best because they do not have the shrink that they would if they hauled them to the feed yard.

Final quote by Jack Cunningham was, "It's not what you make that counts, but what you keep."

Scribe: Kurtis Sears
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Mannsville Ag Center - Mannsville, Oklahoma Aaron Custer, Owner

Friday morning we started our day with a visit to Mannsville, Oklahoma to the Mannsville Ag Center. Owner, Aaron Custer, gave us a tour of his operation. Mr. Custer started the feed store in 1998 in Coalgate. He outgrew that operation and in 2003 purchased an old peanut facility from peanut growers. In October 2004, he finished the feed plant and built his retail and wholesale facility. Currently, the Ag Center employs 15 people and also has a retail outlet in Lone Grove. Aaron previously sold fertilizer to area producers but due to the competition and thin margins he is no longer in that business. He still does have a small spraying business that he operates in the spring.

In late 2005 early 2006, Mr. Custer set out to expand and diversify his operation. He built his LCM (Loss Circulation Material) plant which supplies green materials to oil companies to use as "mud" in their drilling operations. The main mixture for this material is either pecan or walnut shells hammer milled or a mixture of cedar fibers that they truck in. Previously, they produced their own cedar fiber but found that it was more economical to

purchase and truck it in as opposed to making their own. The “Nut House” was the building in which the process of breaking down the pecan and walnut shells into a usable product for LCM. The walnut shells are shipped in from California and the pecan shells are purchased locally from pecan growers. The sacking operations can fill one truck load of 24 tons every day.

Next, we toured the warehouse where bulk commodities were stored and they were mixing their custom rations for their customers. About 80% of their orders are custom made. Their specialty feed mix is their bucking bull ration called Pro Bull Max. Approximately 35% of his feed business comes from bucking bull rations. The bull rations are also sold in retail outlets in Arizona and North and South Carolina. The rations were formulated with the help of D&H Cattle Company. They tweaked their ration for max performance. Much like an athlete that is slim and muscular, they found the bulls performed the best on a high protein diet (16-18%) and feed 1% of their body weight. His bull ration has been demand driven. They have found him because of the great performance on his rations. The Ag Center has targeted their feeds to a specialized group and does not try to compete with the larger feed mills due to the thinner margins that they are not able to operate at.

They also have formulated a ration for bottle calves and calf ropers called Precision Calf Feeds. Customers are experiencing added gain at a reduced cost. Aaron’s brother-in-law, Kent Donicker, helped develop the precision calf ration. He feeds the ration free choice and top dresses with CTC. The calves also have access to high quality bermudagrass hay. Soybean hulls are not used in the rations due to low TDN.

Savage Equipment Madill, Oklahoma - Basil Savage, Owner

Loren Damron, employed with Savage Equipment for over 30 years, gave us a tour of the company located in Madill, Oklahoma. Savage Equipment was started as a company in the early 1970s. In the late 1980s they started manufacturing Pecan Harvesting Equipment. The company is still a family-owned business with Basil and his two sons Clay and Steve Savage. The accounting, engineering, parts, and sales departments are all located on premises within the manufacturing plant. The company employs about 50 people currently. Savage Equipment Company has become the premier equipment dealer in the world for pecan harvesting equipment. They have shipped machines into 12 different countries including Israel and Australia. The company has equipment for all phases of the pecan harvest: sprayers for spraying the trees, rakes to clean the orchard, shakers to put the nuts on the ground, harvesters to pick up the pecans, cleaning operations to blow out the debris, sizing equipment that sizes the pecans and sorts them, and pecan cracking and shelling equipment. Overall, they manufacture 80 different pieces of equipment. Their highest volume sellers are the crackers, harvesters, and shakers.

Clay Flowers visited with us and demonstrated the pecan crackers to the group. The crackers are pneumatic and use a 13-18 chain. The standard setting of 16 equates to one-inch wide. Every whole number variance from 16 is 1/16 of an inch. Currently, they sell two models of the crackers. The 400 nut per minute cracker costs \$14,835 and the 1200 per minute cracker costs approximately \$45,000. They are looking into modifying the crackers to accommodate macadamia nuts and walnuts. A full line of harvesting equipment set up will cost a minimum of \$50,000.

Next, we looked at the CNC machines that were making parts for the crackers. Savage Equipment manufactures almost everything in their equipment with the exception of the cylinders.

Steve Savage and Jerry Murrack were working on a new pecan sorting machine. The machine will be able to sort a good pecan from other debris by its color. This will replace the conveyor belt and having to sort everything by hand. It has been proven to be 95-97% accurate and the 24 valves can sort 6,000 pounds per hour at a cost of \$32,885 and the 48 valve can sort 12,000 pounds per hour and costs about \$65,000. They have 21 machines in operation currently. They manufacture three machines per week on 52 man-hours for each unit. They brought in Cal Gray from Virginia to be their head engineer for this project.

The pre-fabrication operations have two different lines. The silver line is their all-stainless machines and their red line is for their steel harvesting equipment manufacturing. They have a metal shearer, bender and automated plasma torch that can cut up to 2-inch metal plate. The equipment goes from the assembly line to the wash area, to paint booth, final assembly, and then to apply decals and serial numbers.

January and February are typically their slowest months of production. Outside the manufacturing plant in their finished line they had a large harvester with PTO and hydraulics (cost of \$22,935), small harvester (\$8,985), 1,000 gallon sprayer (\$15,000), and 500 gallon sprayer (\$8-9,000 depending on fan spray size). They also had a 28 inch tree shaker and a pecan sizer that splits pecans into various sizes.

Texoma Peanut Company - Madill, Oklahoma

The final tour stop of the day was the Texoma Peanut Company, also known as the Clint Williams Company. The peanut company specializes in bulk peanut drying, handling and storage, operation-buying, and storing peanuts. Mr. Williams' son-in-law, Alan Ortloff, started in 1973. Those that welcomed us included Alan Ortloff, Steve Ortloff, Ollie Hall, Rodney Coe, Jeff Schrock, and Tony Gunter. In 1961, Mr. Williams was handling and digging peanuts. Clint Williams founded the Clint Williams Company in 1968. At that time it was strictly a shelling company that could shell approximately five tons per hour. Currently they are shelling up to 25 tons per hour. In 1991 the Clint Williams Company started blanching peanuts.

Steve Ortloff and Rodney Coe gave us a tour of the plant. The Texoma Peanut Company has three types of processing facilities: custom processing, blanching, and custom cleaning. They send out "bar ready" peanuts to candy bar manufacturers which means they guarantee five pieces or less of foreign material per truckload. A truckload is 400 bags. Their business is 50% in the U.S. and 50% export, and they handle all four types of peanuts: Spanish, runner, Virginia and Valencia. The runner peanuts are grown for peanut butter and candies. The Virginia peanuts are the in-shell ball game peanuts. The Valencia peanuts have three or four kernels per peanut. Due to competing acres in Oklahoma with cotton, the peanut company has started the "Arkansas Project" in which they are trying to expand acres of peanuts into Arkansas.

They are the only processing plant in Oklahoma. Some competing companies are Birdsong Peanut Company and the Golden Peanut Company. Both of those plants have multiple locations. Due to the peanut butter recall a few years ago, the amount of paperwork has dramatically increased. They now spend approximately 25% of their resources on paperwork dedicated to food safety.

The in-shell plant processes approximately 35 loads per day. The cold storage warehouse is between 38-42 degrees. They have 12 buying points across the U.S. They employ 400 employees. The in-shell plant takes out the debris by gravity separation and bags in 50 pound bags or the big tote bags. When the peanut arrives, the moisture content is 15-20%. In the cold storage, the moisture will drop to 8-10% before being shipped out.

The cleaning machine uses gravity separation and color separation which uses an infrared and color sorter. The rejects that are kicked out go back through the sorter again before being made into bird seed.

The hand-sorting room has three sizes of peanuts at one time and they are looking for broken or cracked shells and stems that could cause a fire in the roaster. The storage capacity is 35 million peanuts in Madill and 35 million in Durant. They use a barcode system to track the peanuts. The in-shell tempering bags keep the peanuts at 25-30% humidity where they are prepared for hauling and to prevent mold. The bags are 50 pounds and 900-pound super bags. The warehouse is organized to have access to all the peanuts and the lot numbers are mapped. Most of the peanuts are pre-sold.

The shelled peanut warehouse stores the peanuts at 38-42 degrees and 70% humidity. Peanuts can be stored for several years in that setting. Normally, about two years would be the maximum shelf life. The shelled peanuts need to contain a high amount of oleic acid. This allows the peanuts to stay fresh.

The shells are hammer-milled and go into cattle feed. They indicated the dust generated from this operation is very minimal and they are well below the guidelines of EPA.

The production schedule is to shell peanuts as demand dictates and operate the plant 24 hours per day when fully operational. The producer warehouse for sheller sorting has a photo cell and is able to sort various sizes of peanuts. They can sort 30,000 pounds of shelled peanuts per hour.

It is evident that the sanitation and cleanliness adhered to is second to none. They have rodent traps and bait stations throughout the plant and check them routinely and document if any trappings have occurred.

The storage bins for the shelled peanuts can hold 50,000 pounds of peanuts. Before going into the bin, the peanuts are sized and sifted through screens. They get about \$50 per ton for the shells, \$0.20 per pound for the oil, and \$0.60 for the peanuts.

Burlap sacks are no longer used. They take automated samples for quality control and have farmer graded peanuts and finished grade peanuts.

The Clint Williams processing division, built in 1991, is where the peanuts are cleaned and blanched. They take both an in-bound and out-bound sample. The lab in the division keeps samples for 90 days on each order for quality assurance. The U.S. grading system has a small window and will not actually let them sell a smaller peanut. The testing room tests the peanuts for aflatoxins and has a fry tester, dry roaster, and a moisture machine. For safety and cleanliness, all employees are required to wash their hands and wear hair nets.

The blanching machines take the skin off the peanut. The buff blanchers are used for the whole peanuts and the split blanchers are used for the split peanuts. There are only two sorting machines and these machines do 50% more work than what ten machines previously were handling. The peanuts are then run through a metal detector. The magnets are able to pick out a #1 bird shot or a peanut. M&M's are the pickiest about the testing the peanuts have been through. There is only a small amount of cold storage in the processing division. The peanuts are put into bags of 110 pounds or 2200-pound totes.

When a truck is backed up to the dock and has not been attended to, a flashing light bulb indicates a truck needs attention. Steve indicated this has improved efficiency.

BancFirst - Lunch

Lunch was served at BancFirst in Madill and Vicki Byrd from OALP Class 5 gave us a little background regarding Madill. There are approximately 3,500 people that live in the town and 15,000 people live in Marshall County. Madill is known for their large manufacturing base for a variety of different companies.