AgriLIFE EXTENSION
Texas A&M System

Summer 2009:

This web publication contains Information too extensive to be included in the mailed August 09 - Walker County Ag Program Update - and yet too valuable not to share!

102 Tam Road Suite B Huntsville, Texas 77320 (936) 435-2426
http://walker-tx.tamu.edu

Sam Houston State University Agriculture Centennial

Stanley Kelley, Chair Department of Agricultural and Industrial Sciences

This is an unprecedented time for the Department of Agricultural and Industrial Sciences at Sam Houston State University as they celebrate their Centennial Anniversary for teaching Agriculture.

In the early 1900's, the Texas Legislature determined the need for Vocational Agriculture to be taught in the public schools of Texas but they also recognized that well-trained and qualified teachers was essential to teach the young men and women about agriculture. In 1909, this initiative lead to the establishment of the Department of Agriculture at Sam Houston State University and by 1918 Sam Houston State was the only college recognized by the Federal Vocation Board as a Vocational Agriculture Teacher training institution in the United States.

In this 100 year time span, the department has expanded from teaching only courses on farming and raising livestock to technical courses in animal and plant genetics, floral design, agri-business, and alternative fuels and energy.

Today's students at Sam Houston can select degrees in General Agriculture, Agriculture Engineering Technology, Agri-business, Animal Science, Horticulture and Plant Science, Wildlife Ecology and Teacher Certification. In the past 15 years, the department has experienced exceptional enrollment growth with a record enrollment for this academic year of over 1,100 students from across the state, nation, and globe, with Ag students from Canada, France, India and China.

The department will celebrate their successes on September 25 and 26. For more information and a schedule of activities please call 936.294.1189.

Or visit http://www.shsu.edu/~agr_www/Centennial%20Celebration/centennial_celebration.html

Extension programs serve people of all ages regardless of socioeconomic level, race, color, sex, religion, disability or national origin.
The Texas A&M University System, U.S. Department of Agriculture, and the County Commissioners Courts of Texas Cooperating.

How Dry Has it Been?

Check out the Annual Rainfall graph at
http://walker-co.tamu.edu/publications/annualrainfall3609.pdf to see how this year compares to previous ones in Huntsville, TX. (1939-2009 July YTD)

Cow Country Congress

Corlay Farm & Cattle Co.
Dodge, Texas
September 25, 2009
8:30—9:00 AM Registration
Registration Fee: $10.00 per person
R.S.V.P. is required for Meal Planning prior to September 21

"Smart Fertilizer - Planning, Purchasing & Utilization"
Dr. Mark McFarland
Professor and Soil Fertility Specialist, College Station, TX

Artificial Insemination & Embryo Transfer for Small Sized Producers: Realistic Expectations, Logistics, Equipment and Practices
Dr. Jason Banta
Assistant Professor & Extension Beef Cattle Specialist, Overton, TX
Dr. Joe Paschal
Professor & Extension Beef Cattle Specialist, Corpus Christi, TX

Forage Legumes; Can They Meet Your Needs?
Alternative Methods for Legume Establishment.
Ray Smith
Professor, Legume Breeder, Texas AgriLife Research, Overton

Pasture Site Presentation:
Native Forages; Selection, Establishment & Management
Dr. Larry Redmon
Professor & State Extension Forage Specialist, College Station, TX

Lunch/Vendor Time

Concurrent Sessions:

Group A	Beef Quality Assurance –Chute Side Management
Group B	Deer Working Facilities
Group C	Tour of Deer Breeding Pens

Adjourn around 3:30 PM

For additional information visit http://walker-co.tamu.edu/publications/09CCCweb.pdf

Community Horticulture Education

(Landscape & Gardens)

Programs & Events presented by the Walker County, Texas AgriLife Extension Master Gardener Association:

- August 14, 2009 - 10:00 a.m. **"Fall Gardening"** presented by WCMG's Bill Dawson, Butch Maywald, and Mark Short at the Huntsville Public Library.
- October 8, 2009 at 6:30 p.m. **" Locally Grown or Adapted Plants for Walker County"** Featuring Bulbs, Daylilies, Shrubs, Trees etc. presented by WCMG's Jean Marsh, Gail Warren, Jenny Covington, Rhonda Hanks
- Oct. 10, 2009 - **Fall Plant Sale**
- Feb. 23, 2010-6:30 p.m. at Extension Office **"World's Healthiest Vegetables"** presented by WCMG Darnell Schreiber.
- March 9, 2010-6:30 p.m. at Extension Office **"Cooking with Herbs"** presented by WCMG Darnell Schreiber.
- March, 13, 2010 - **Spring Plant Sale**

IS YOUR HOME SAFE FROM WILDFIRES?

Texas Forest Service

- Defensible space around your home is an area cleared of brush, cedars, and other combustible materials equal to 1 1/2 times the height of your home plus 30 feet.
- Trim limbs overhanging the roof.
- Remove flammable tree debris, including leaves and twigs, from rooftops and gutters**.**
- Choose FireWise landscaping, such as hardwoods, rather than evergreens.
- Store firewood a minimum of 30 feet from your home.
- Space trees 15 to 20 feet apart and remove limbs within 15 feet of the ground.
- Remember, fire travels 16 times faster up slope. If you home is on a ridge top, keep combustible materials and plants at least 75 feet from the down slope side of your house.
- Clearly mark your home address from the main road and make sure your driveway is accessible to firefighting equipment.
- Have faucets on all sides of your home, and whenever possible, provide firefighters and additional water source such as a pool or pond.

Grassland Reserve Program

The Natural Resources Conservation Service announced on July 28, 2009 technical and financial assistance through the Grassland Reserve Program (GRP) to assist landowners

devastate by natural disasters including drought in central and south Texas, Hurricane Ike in Galveston and surrounding counties, and wildfires across north and north central Texas.

The Grassland Reserve Program (GRP) assists landowners and operators in protecting grazing uses and other related conservation values by restoring and conserving eligible grassland and certain other lands through rental contracts and easements.

For FY 2009, the primary focus of the Grassland Reserve Program is the drought- stricken areas of central and southern Texas. Eligibility criteria for the program are;

* Must remove all cattle for proposed land within 30 days of contract acceptance.
* NRCS will develop a conservation plan that includes the practice of Prescribed Grazing Use which involves livestock exclusion.
* Livestock exclusion will be required as long as the drought persists and until the recovering grasses and forbs have been allowed on full growing season.
* After grasses and forbs have fully recovered, grazing will be allowed according to a planned grazing system developed by NRCS.
* Program options for GRP include rental agreements and permanent easements.
* Rental rates are 75% of the published value.
* Rental agreements allow cost share for grazing improvements through GRP and/or EQUIP.
* Grazing improvements can include cross fencing, stock tanks, wells for livestock water, brush management, range/pasture planting, and critical area planting.
* Applications for the program are available at local USDA Service Centers in NRCS and FSA offices.
* Program sign-up is continuous.

The NRCS Web site which provides more information regarding this program is as follows:

http://www.nrcs.usda.gov/programs/GRP/

Building and Landscaping For Survivable Space

Texas Forest Service

Survivable space is your defense against wildfires. Your home within the urban wildland interface (where homes lie adjacent to or within undeveloped areas of grass, brush and trees) has the best chance of surviving a wildfire if survivable space is created and integrated into your surroundings. The landscaping within 30 to 100 feet around your home and the materials with which you build or remodel your home can make the difference in whether or not your home remains intact after a wildfire.

Survivable space doesn't have to be devoid of vegetation. On the contrary, it is space that uses vegetation – specifically selected, placed and maintained – to reduce the fire hazard rather than invite wildfire to your home. Aesthetics can be maintained even as your home's ability to survive a wildfire is increased.

Implementation of the following basic survivable space measures can significantly reduce the wildfire risk to your home and loved ones.

Building and Remodeling Fire Safety

Helpful building and remodeling tips:

- Select plants that are drought tolerant. (Contact your local Texas A&M Agricultural Extension office for a list).
- Use fire resistant roofing materials such as tile, metal or asphalt. Avoid wooden shingles.
- Inspect for gaps in roofing that can expose roof decking or roof supports.
- Enclose or box-in eaves and install metal screen behind roof vents so that sparks cannot enter the attic.
- For your home's outside walls, select heat and fire resistant siding such as metal, brick, block or stone, cement board or fire retardant treated lumber.
- Install windows made of tempered glass.
- Use drapes and shutters that are fire resistant to help reduce the likelihood of fire spread.
- Install metal screen under decks to keep sparks and embers from being blown into corners and other spots where they could lodge and ignite a fire.
- Remove boards, vegetation and other flammable materials from under decks so these won't trap sparks and burning embers that could spread a fire to the deck and house.

Landscaping Fire Safety

Helpful landscaping tips:

- Select plants that are:
- Drought tolerant
- High in moisture content
- Easily pruned and maintained
- Select trees such as oaks and maples that have open branching, which can help retard fire spread.
- Plant small trees and shrubs away from larger trees to avoid creating a ladder of vegetation that could lead a ground fire up into the tree crowns.
- Plant the right tree in the right place. Avoid planting potentially large trees and shrubs under utility lines.
- Avoid planting vegetation with high oil and resin content, such as pines, cedars and junipers. These types of plants burn quickly and can greatly increase the rate of fire spread.
- Restrict the use of flowerbeds and shrubbery against your house. Nonflammable mulches such as rock or crushed brick are preferred.
- Keep lawns mowed to a height of two inches or less.
- Maintain at least 30 feet of survivable space between your home and surrounding wildland.

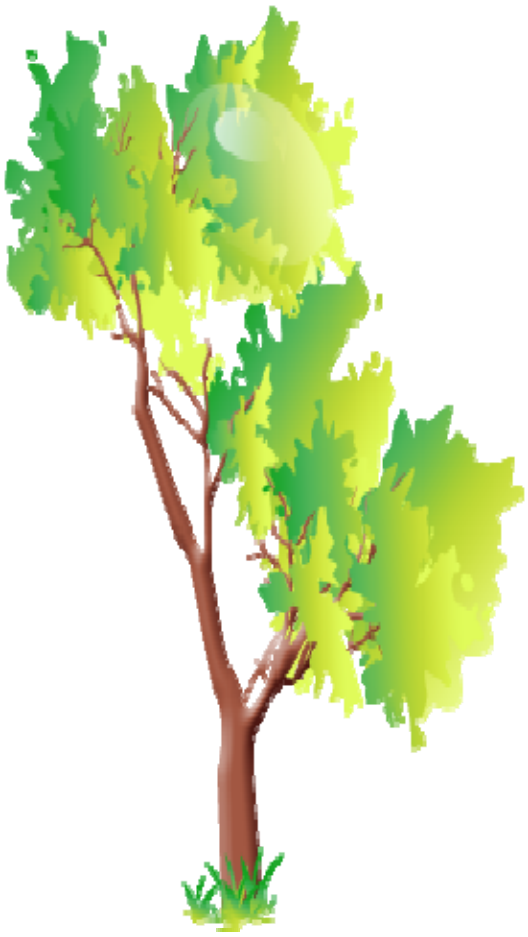
Good Information "Revisited"

Sometimes I like to go back through our "old" information and see what we were concerned about during the time it was printed. Not surprisingly, I have run across several years where the shortage of rainfall was the issue of the day. In the Summer 1999 issue of *Walker County Livestock & Pasture News*, I found an article on watering trees. This information is still valid and applicable. The reason I find this interesting is that we sometimes seem to forget that we have been through dry periods before and that it will be dry again. Our planning and conservation methods often are a victim of the "Out of sight, Out of mind" syndrome. Keeping conservation practices in the forefront of our home landscape education is one of the purposes of our Walker County LEAF-PRO educational programs.

Watering Trees in Dry Weather

During periods of dry weather we need to be aware of the needs of our landscape trees. These plants provide aesthetics and value to our property. Although trees are valuable assets to our property, watering decisions need to be made carefully for economic reasons. Most trees require 1-3 inches of rain per month to remain healthy. If you water during dry spells you need to know the equivalent rates.

1 inch of rain = 5 gallons of H2O per square yard.
2 inches of rain = 10 gallons of H2O per square yard.
3 inches of rain = 15 gallons of H2O per square yard.



How does this affect your landscape? If a tree has a canopy area of roughly 10' x 10' this = 100 square feet which is 11.11 square yards. (This is a small tree!)

To water a (10' x 10' canopy) tree
1 inch: 5 x 11.11 = 55 gallons
2 inches: 10 x 11.11 = 111 gallons
3 inches: 15 x 11.11 = 166 gallons

If you have a yard with a number of trees, it is not hard to see how your water bill could suffer. Water conservation is going to be a continuing concern for the future. You can make a difference with educated decisions regarding home water use. Contact the Walker County Texas AgriLife Extension Office for additional information.

Forage Testing for Nitrates and Prussic Acid

Tony Provin, State Soil Chemist and Laboratory Director
Soil & Crop Sciences
Texas AgriLife Extension Service
College Station, TX 77843-2474

The current drought has many producers attempting to salvage failed corn, sorghum and similar crops by grazing or baling the stover for later use as animal feed. The Texas AgriLife Extension Service Soil, Water and Forage Testing Laboratory (SWFTL) has received numerous corn and sorghum samples containing highly elevated nitrates, often at levels significantly high enough to prevent safe use of the forage. Agricultural producers can follow several steps to minimize nitrates in the baled forages, including raising the cutter height to leave the high nitrate lower stalk in the field.

Since nitrate accumulation and prussic acid formation occur in different parts of the plant, no one sample will adequately address both potential threats. Producers should sample multiple plants and segregate the lower stalks into ground-8" and 8-16" samples. The cutting heights are only suggestions and should be based on the producers equipment and ability to bale the hay in standing stalks. The more aggressive sampling protocol will allow a producer to better understand the concentrations of nitrates in the lower stalk and then raise or lower the cutter bar to maximize forage baled or minimize the nitrates in the baled hay. While stalk nitrate levels are highest in these lower stalks, a producer may elect to measure the nitrate concentrations in the remaining plant to provide added assurance that it is safe for grazing, in the event the lower 16" of stalk is highly elevated with regard to nitrates.

Prussic acid accumulation only occurs in a select number of crops and weeds. In general, concern is mostly directed to sudangrass, sorghum, johnsongrass, shattercane and any crosses or hybrids of these species. A more complete listing is available in E-543, Nitrates and Prussic Acids in Forages. For these species, prussic acid can form in the newest leaves or recently damaged leaves. Samples collected for prussic acid analysis should be comprised of the newest leaves and damaged leaves. Sampling instructions for prussic acid is described in this publication or producers can contact the Texas Veterinary Medical Diagnostic Laboratory (TVMDL) for further sampling and testing information. Unlike nitrates, prussic acid will dissipate after cutting; however, tight bales may require more than 9 months for prussic acid levels to decline below levels of concern. Nitrates levels will remain constant unless significant water leaches through the bale, a factor often reducing the feeding value of the hay to near zero. Ensiling high nitrate forages can result in a reduction of nitrates from 30-70%, depending on the initial level of nitrates and the overall energy value of the nitrates. Nitrate reductions of 30-50% are more commonly observed. During ensiling, nitrates are converted to gaseous nitrous oxides, often referred to silo gas. Silo gas is often red to brown in appearance and is highly toxic. Extreme caution should be used when working in or around silos and surface piles where high nitrate forages are being or have been ensiled. Additionally, producers should test ensiled materials for nitrates prior to feeding. If the crop is still green and good rain is in the near-term forecast, delaying cutting may allow for nitrates in the plant to be converted to protein and other nitrogen containing compounds and structures. Generally, 3-5 days is required, following

adequate rainfall, for significant nitrate reductions.

A number of sources can be located both on the web and through university publications citing defining safe nitrate levels. The cited values will vary considerably and are often significantly more conservative of the 1% nitrate value historically recognized by the Texas Veterinary Medical Diagnostic Laboratory (TVMDL). Producers should be cautioned that the TVMDL 1% level assumes that cattle are healthy, have good conditioning and have an overall high energy level in their diets. Prior to feeding forages with nitrate levels in the 0.5-1% range which are going to be fed to weak, lactating and animals with reduced body condition scores, producers should consult their veterinarian. Producers should also avoid using average nitrate values within the forage, as more timid or later feeding cattle will likely be exposed to a higher percentage of lower stalk material, thus resulting in the consumption of unsafe levels of nitrates. The use of a bale grinder can be used to reduce selective feeding. Grinding nitrate tainted forages with clean forages, thus lowering the nitrate levels to less than 1%, is another management option available to some producers.

Both the SWFTL and TVMDL routinely analyze forages for nitrates, while the TVMDL is the sole prussic analyzing laboratory within the Texas A&M University System. Both laboratories prioritize these samples during times of drought and attempt to provide next business day results.

What is the big deal about animal antibiotic usage?

By Dairy Herd staff | Tuesday, July 21, 2009

Therapeutic vs. non-therapeutic antibiotic usage in food animals has recently come under debate in Washington D.C., and repeatedly in California. Mike Apley, a veterinary clinical pharmacologist at Kansas State University, offers the following comments on therapeutic and non-therapeutic animal antibiotic usage:

“Therapeutic antibiotic use definitely includes the case where we have an animal displaying clinical signs of a disease and we intervene with a drug. Our best chance for therapeutic success is to address the infection as early as possible in the disease process. This is the basis for the label claims for prevention and control of disease outbreaks.

“In the case of non-therapeutic antibiotic use, if we take this as lacking any components of the therapeutic definition, then it would be the use of a drug in the absence of clinical disease. We now get into the discussion of whether addressing disease in the incubation stage is an appropriate use of antimicrobials; this discussion almost always includes the consideration of the mixed incubating and non-incubating status of animals in a population where antimicrobials may be applied to the population as a whole. The question now becomes clinical vs. subclinical disease, especially when we know there is a high probability of disease occurrence.

“The definition of non-therapeutic use contained in H.R. 1549, currently in the U.S. House of Representatives is “…any use of the drug as a feed or water additive for an animal in the absence of any clinical sign of disease in the animal for growth promotion, feed efficiency, weight gain, routine disease prevention, or other routine purpose.”

"Another thing lost on the vast majority of the human population is that the issues surrounding each drug/pathogen combination are different. This legislation reflects the unsophisticated approach of legislative bodies to scientific issues. I was shocked in the California hearing to hear methicillin-resistant staph aureus (MRSA) and E. coli O175:H7 presented as diseases in humans due to antibiotic use in animals. If you work in an animal production unit where MRSA is present in the animals, research shows you may be colonized by that strain of MRSA. However, the strains of MRSA associated with community disease outbreaks in humans are predominantly different from the strains encountered in animals. E. coli O157:H7 is a disease that the cattle industry takes very seriously and is working very hard to address (a new vaccine has just been released). However, the inability to use antibiotics to treat O157:H7 is not due to antibiotic resistance, it is due to the antibiotics actually increasing toxin release by the bacteria. Another major piece of misinformation presented in the California hearing was the Union of Concerned Scientists (UCS) claim that 70 percent of the antibiotics produced in the United States are used for nontherapeutic purposes in food animals. This highly flawed "study" even includes drugs that aren't marketed in the United States in the estimates.

"Vancomycin is an important drug for the treatment of resistant Gram (+) infections in humans. It is a glycopeptide; this group is banned from use in food animals in the United States and has never had a label for such use. Vancomycin-resistant enterococci (VRE) are a big problem in human therapeutics, and an example of where a human resistance problem can't be pinned on animal agriculture.

"Synercid® is a streptogramin that is also very important for resistant Gram (+) infections in humans. A close relative in the same streptogramin group, Virginiamycin, is approved for feed use in cattle, poultry and swine. A recent risk assessment by the Food and Drug Administration Center for Veterinary Medicine was unable to show any link between this use in animals and Synercid® resistance in humans.

"Do the food animal industries need to carefully evaluate the impact of our antimicrobial use on food borne Salmonella pathogens? You bet, but when people start throwing around resistance problems like MRSA, foodborne pathogens like E. coli O157:H7, or the UCS report numbers in the resistance discussion, it is a clear sign they are looking for anything they can bend to advance their agenda.

"Also, the media continually mixes route of administration with purpose. There are clear therapeutic antibiotic uses which may be delivered through the feed.

"Use for strictly growth promotion is confusing because the increases in gain and or feed efficiency may come from subclinical disease suppression or prevention. The logical progression of this argument is then how much of the necessity of prevention or control is due to the nature of the production systems. That is the crux of the issue. Another confusing concept is that while the percentage of pathogen isolates that are "resistant" may increase during antibiotic use in the feed, the overall load of the pathogen in the animal may decrease.

"So, the debate now moves to the issue of what happened in Denmark. My interpretation of the

numbers is that total antibiotic use went down with the feed ban, but the amount used for disease treatment rose sharply. There is also debate on exactly what happened to human resistance levels. A peer-reviewed report on what happened in Denmark will be published soon in the *Journal of the American Veterinary Medical Association.*

"I do not for a minute propose that antibiotic use in animal agriculture occurs in a vacuum. As an industry, we are responsible for the safety of our product and the people that consume it. I just ask that, in this internet-driven, junk-science age, our legislative representatives take a minute to insist their staffers find actual credible evidence to factor into their decisions.

"A bookend to these comments comes from Carl Sagan: 'We live in a society exquisitely dependent on science and technology, in which hardly anyone knows anything about science and technology.'"

Beef Cattle Browsing

Editor: *Dr. Stephen Hammack, Professor & Extension Beef Cattle Specialist Emeritus*
July 2009

RELATIONSHIP OF EYE WHITE AND TEMPERAMENT

A group of 147 heifers, bulls, and steers of mixed British-Continental genetics were used to study the relationship of percentage of eye white and temperament. Temperament was based on subjective chute behavior score and on timed chute escape velocity. Eye white percentage was determined from analyses of video camera images. Eye white averaged 30.1% for heifers, 31.4% for bulls, and 28.6% for steers. Correlations between eye-white percent and chute behavior score were all significant (P<.0001) and were highest for bulls. Correlations with escape velocity were numerically lower but were all significantly higher (at least P<.05), with the highest correlation in heifers. The authors stated that "eye white could be used as a quantitative tool to assess temperament." (Univ. of Guelph, Ontario, Canada; J. Animal Sci. 87:2168)

FACTORS AFFECTING ESTROUS BEHAVIOR

Mature Angus and Angus X Hereford cows (64 head) were evaluated, with half kept in a drylot (DL) measuring 65 yards by 110 yards and the other half in a 30-acre pasture (PS). Estrous cycles were synchronized using two injections of prostaglandin followed by administration of additional prostaglandin to result in 1, 2 to 3, 4 to 6, or >7 cows being in estrus at the same time.

DL cows had shorter (P<.02) interval to estrus after the last prostaglandin treatment, averaging 61.8 hours compared to 72.8 hours for PS. As more cows were in estrus at the same time, the number of mounts per cow increased (P<.001) and the duration of estrus increased (P<.01). If only one cow was in estrus she received 11.0 mounts in 11.6 hours of estrus. If more than 7 cows were in estrus each cow received 50.4 mounts in 17.3 hours of estrus. DL cows were in estrus longer (P<.04), 16.4 hours versus 14.2 hours for PS. Increasing the number of cows in estrus and concentrating cows in drylot could improve results of AI programs. (Okla. St. Univ.; J. Animal Sci.: 87:1998)

IMPACT OF WATER TROUGHS ON USE OF RIPARIAN AREAS

Cattle may adversely affect riparian areas. Providing other sources of water could minimize this affect. A study was conducted over three years on tall fescue/common bermudagrass pasture in the Piedmont area of Georgia. One pasture had water troughs placed 90 to 100 yards from streams. GPS collars were used to study cattle location and movement. When the temperature-humidity index (THI) was from 62 to 72, cows with troughs spent 63 percent less time (52 minutes/day) in riparian zones. But when the THI was from 72 to 84 there was no difference between groups with and without troughs. The authors concluded that sources of water away from riparian zones may improve surface water quality when THI level is not stressful. (Univ. of Georgia and USDA-ARS; J. Animal Sci. 87:2151)

WHOLE SOYBEANS FOR BEEF COWS

Higher levels of dietary fat have been shown in some studies to have positive effects on beef cow reproduction. Whole raw soybeans have shown the most consistent effects. In this study, 166 dry spring-calving Angus and Angus X Hereford cows wintering on free-choice bermudagrass hay were fed four times/week either 3 lb/feeding of whole soybeans (SB) or 3.5 lb/feeding of soybean meal-hulls (SMH). The supplements were formulated to provide the same daily amounts of protein and energy, but with higher fat from whole soybeans.

During the first 50 days of supplementation, SMH gained more weight (22 lb, $P<.001$) and more Body Condition Score (0.18 units, $P<.004$) than SB. However, these effects dissipated by the time calves were weaned. Birth weight of calves from SMH cows tended ($P>.06$) to be heavier (4.4 lb), but average weaning weights were exactly the same. First-service conception rates and overall pregnancy rates were not significantly different. A subset of 24 cows was used to measure hay consumption and digestibility was that fat was higher in SB, but that did not result in any overall effects on cow or calf performance. (Texas A&M Univ. and Okla. St. Univ.; J. Animal Sci. 86:1868)

Effects of Summer Heat Stress in cattle

From Beef Cattle Penning, Vol. 2 Spring 2009, Texas AgriLife Extension Beef Cattle

Dr. Bruce Carpenter
Associate Professor and Livestock Specialist
Texas A&M AgriLife Center - Ft. Stockton

Texas is a hot place in the summer and anyone who has to be outside everyday looking after cattle or doing other ranch work certainly knows that. Chances are, if you're feeling heat stress, so are your cattle. Though cattle sweat relatively little, they can cool themselves in other ways: They respire (pant) to cool themselves and we've all probably noticed altered grazing patterns in the summer, or maybe if it is hot enough, and they have a chance, you may even notice them standing in a pond or dirt tank. These things all help the animal cope but are they enough? That depends on a few other factors and how they interact. First, what stage of production are the cattle in? Are cows safely pregnant by June or July, or are they attempting to breed in those months? Bull fertility can suffer from heat stress as well. In what region of the state are the cattle located? Regions with both heat and high humidity are more stressful than those where lower humidity can allow some nighttime cooling. Breed type may also affect an animal's ability to cope.

Heat Index. Meteorologists use a formula to calculate a heat index to describe how hot the

environment actually feels to people and to provide some guidelines for human activity and the risk of heat-related health problems. Researchers at Oklahoma State University have further refined this concept to develop the
Oklahoma Mesonet Cattle Stress Index (which can also predict cold stress).
See: http://agweather.mesonet.org/models/cattle/description.html

Cows and Heat Stress. Probably the biggest concern regarding cows are potential negative affects on fertility. Looking at cows in general (i.e. without heat-stress), most studies agree that fertilization is the rule, and failure to conceive is the exception (though it can and does happen; see bull section below). It is thought that about 30% of embryos die between conception and day 14; and another 5-10% or so during pregnancy recognition (day 14-19). After placental attachment at about day 42, losses become minimal. Total pregnancy loss in beef cows is thought to range from a low of about 42 % to a high of about 72%.

The point is that early embryo losses are high enough already without adding heat stress to the equation. Heat stress appears to exasperate losses during the same critical periods described above. Two studies showed that heat stressed dairy cows lost the majority of embryos before either day 7 or day 14 of conception.
Another study reported that when rectal temperatures increased from 101.3 degrees to 104 degrees post-artificial insemination, that pregnancy rates fell from 42% to 0%. Some reasons for embryo death may include changes in uterine
environment, changes in proteins critical for pregnancy, and reduced corpus luteum function by the ovary.

Failure to conceive can be another reason for reduced fertility in cows. Heat stress may cause ovulation or conception failure may due to reduced follicle
quality or suppressed estrus. During heat stress cows sometimes fail to display normal estrus behavior or may show estrus more during the nighttime hours. The latter could be a consideration for AI programs. Overall reproductive rates from one OSU trial are shown in Table 1.

Table 1. Effects of Imposed Heat Stress on Reproduction in Beef Cows (Biggers, 1986;Oklahoma State University)

	Control	Mild	Severe
Day Temp. (F)	71	97	98
Night Temp (F)	71	91	91
Rel. Hum (%)	43	27	38
Rectal Temp (F)	102	102.5	103.6
Pregnancy (%)	83	64	50

Bulls and Heat Stress. It has been well documented that bulls experience reduced semen quality during summer months in many regions of the Southern U.S. Oklahoma researchers reported reduced motile sperm, reduced sperm
production, and an increase in the percent of abnormal and aged sperm. In this study bulls were maintained in controlled chambers at 73 degrees for 8 weeks. Heat stressed bulls were then subjected to 88 to 95 degree temperatures for 8 weeks,
followed by 8 more weeks of 73 degrees. Heat stressed vs. control bulls consumed 35% more water, respired 55% more, and had a rectal temperature one degree higher.

Producers with early fall breeding programs or with fall bull sales which include semen testing should be mindful of the potential effects of summer heat stress. It takes sperm cells about 60 days to mature in the testis. So for example, bulls that begin breeding on October 1 could have reduced semen quality due to heat stress which may have occurred back in August. It is also likely that bulls may reduce their breeding activities during times of heat stress.

Heat Stress and Calves. Calves that are heat stressed consume less feed and likely suckle less. Data on 8,000 calves from Texas shows reduced weaning weights for calves born May – September (Table 2).

Table 2. Effect of month of birth on adjusted weaning weight of calves (Sprott, 2000)

Trial	Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec
1	388	427	430	417	416	374	424	478	465			
2	477	491	477	467	432	424	434	414	398	432	447	474
3	361	394	415	438	396	341	314	320	349	359	357	

Trial 1, Burleson Co. 1976
Trial 2, Webb Co. 1969
Trial 3, Calhoun Co. 1976-79

Managing Heat Stress. The most economically important effects of heat stress are on fertility and calf vigor.
Therefore, the first management step for most of Texas, is to allow neither summertime breeding seasons nor
summertime calving seasons. There may be regional exceptions in Far West Texas, or on the high planes where nighttime cooling is a regularity and/or summertime rainfall is likely. If cattle don't have access to shade, you may want to
consider erecting some structures. Fly control may be important (i.e. ear tags, etc.) as cattle may avoid shade as a means of avoiding flies. Make sure cattle have adequate water at all times. Water consumption may double that of winter,
approaching 2 gallons per hundred pounds of animal weight per day (i.e. 20 gallons for a 1000 lb animal). And finally, while no breed is immune to heat stress, select breeds of cattle that best tolerate your environmental conditions.

Beef Cattle
Research in Texas

Beef cattle research at Texas A&M covers a wide spectrum of topics to provide scientific information to Texas beef producers. Current programs focus on production topics such as nutrition, management, breeding and selection, and reproduction. Our researchers are based in all geographic locations in Texas and also collaborate with other scientists across the nation.

You can access online pdf versions of Beef Cattle Research in Texas at http://animalscience.tamu.edu/academics/beef/research/index.htm

Preparing for the Next Drought

Larry A. Redmon
State Forage Specialist, College Station

Hindsight is 20-20. The question is, what lessons can we learn from 20-20 hindsight to minimize the negative effects of the next drought? Because there certainly ***will be*** a next drought.

Even when the production system is irrigated, drought will always be part of the risk associated with forage production, and by extension, livestock production. One immediate, and dramatic, strategy that can mitigate the negative effects of future drought events is to adjust the stocking rate of the cow herd to 75% of what could be maintained based on long-term precipitation and forage production records. This stocking rate ***should*** be based on several years' observations of the quantity of forage produced under typical management strategies. There are many ways to arrive at this figure, but working backwards from full stocking is the easiest strategy. Also, do not forget how cow size has changed over the years. If your ranch would run 100 cows 25 years ago, and the average cow size was 900 to 1000 lbs, and your current average cow size is 1250 to 1300 lbs, then you are going to have to cut more than 25 cows to arrive at a 75% stocking rate.

When stocked at 75%, livestock producers will usually not be overstocked during most drought years. This prevents having to purchase feed in an attempt to "feed your way out of a drought". The 75% stocking rate will also reduce the need to sell cows at a time when many others are being sold. During years of good forage production, stocker calves may be used as flex grazers to utilize excess forage. Calves may come from the producer's own herd or may be purchased or grazed on a gain or per head per day basis. Excess forage in good years may also be harvested and sold as hay, or sold to local hay producers wishing to harvest more acres.

Forages should never be grazed "to the roots" under any circumstance; removal of most or all green leaves deprives the plant of the ability to convert sunlight into carbohydrates (energy) vital to plant growth. Decreased carbohydrate production results in decreased root production, thus reducing the plant's ability to obtain necessary water and nutrients from the soil. The relationship between leaves and roots is critical at all times, but especially during drought. Besides allowing the plant to carry out optimum photosynthetic activity, adequate green leaf residue also reduces soil moisture evaporation and allows for better infiltration of precipitation that is received. Pastures where there is little or no forage residue have low infiltration rates of precipitation and much of the moisture received will run off. For bermudagrass, a target residue height should probably be no less than 4", other species will be different depending on their growth habit. Some of the tall grasses should not be grazed shorter than 8" to 10".

If you do not make your own hay, drought management hay should be purchase in non-drought years and properly stored. Properly stored hay will retain its nutritive value for years. Buying hay in drought years is a losing proposition. Typically the price of hay is high and often you are forced to buy what you can get, and it can be low in nutritive value. To stretch limited hay supplies, use corn or other plant by-products as substitutes for hay. Forage, however, should generally comprise 50% of the diet. One lb of corn will replace about 2.25 lbs of hay or use

450 lbs of corn to substitute for a 1000-lb round bale of hay. Be aware, however, that attempting to "feed your way out of a drought" can be very expensive. Don't be afraid to sell the cattle!

Fertilizer is never inexpensive, and all fertilizer nutrients have increased in cost dramatically. Thus, the first inclination of livestock producers is to not fertilizer during drought. This is seldom a wise strategy. Maintaining the proper soil nutrient status helps forages tolerate and survive drought. While nitrogen is generally the most limiting factor to plant production behind moisture, phosphorus and potassium are critical for root development, water use relations, and overall plant vigor. Thus, a well-balanced fertility program can help plants survive drought better than plants that are nutrient stressed and recover more rapidly after the drought has ended.

If fertilizer has already been applied, but there has been no significant precipitation, the fertilizer is still in the upper soil profile. With the exception of urea as a nitrogen source, which is subject to volatilization loss as ammonia gas to the atmosphere under certain conditions, the fertilizer investment in the pasture program will not have been wasted. When precipitation does occur, the plant will re-initiate growth and plant uptake of the fertilizer nutrients will take place.

If fertilizer has not been applied, the tendency of many producers is to take a "wait and see" attitude regarding a break in the prevailing dry weather pattern. This strategy reduces financial risk but may result in missing the first good precipitation event. Pay attention to weather forecasts and if it appears that the pattern may change and offer a higher potential for precipitation, make every attempt to get the fertilizer in the field before that first rain.

The following key points should be remembered regarding preparation for the next, and inevitable, drought event.

- Realize that drought will always be part of the risk associated with forage and livestock production; no one is immune.
- For commercial livestock producers, attempting to feed their way out of a drought is usually not economically viable and careful consideration should given as to whether or not this strategy should be attempted.
- The cow herd should be stocked for 75% of what the forage resource can produce based on long-term records.
- Well-fertilized forages tolerate drought and recover from drought better than poorly fertilized forages.
- It is generally better to have fertilizer in the field waiting on a precipitation event, than to withhold fertilizer until "times get better".

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If you have questions or would like more information call us at (936) 435-2426.

Walker County Extension Office:
102 Tam Road Suite B,
Huntsville Texas 77320
http://walker-tx.tamu.edu

Sincerely,

Reggie Lepley
County Extension Agent – Agriculture
Walker County