



Cattle Round Up

September 2015

Guilford County Extension Beef Newsletter



Southern Forages Seminar September 3 - Changes, Challenges and Opportunities

The Piedmont Region of Livestock Extension Agents has put together an exciting seminar focusing on forages for all livestock. Our speakers will be the authors from Southern Forages: Dr. Don Ball, Auburn University & Dr. Garry Lacefield - University of Kentucky, They will be coming to Greensboro to discuss forages:

- Influences and factors affecting forage and livestock production
- Forage management options to make operations more profitable

This seminar will be held Thursday, September 3, 2015,
6pm Registration 6:30pm Dinner/Program

Must pre-register by August 28th at: <http://go.ncsu.edu/southernforagesseminar>
Cost: \$10/person (pay at the door). This event will take place at the Guilford County Extension Center located at 3309 Burlington Rd. Greensboro, NC 27405

For more information go to: http://alamance.ces.ncsu.edu/wp-content/uploads/2015/07/2015-ball_lacefield-conference.pdf?fwd=no
or call 336-342-8235

Guilford County September 15th Cattleman's Program

On September 15th beginning at 7:00 pm at the Guilford County Agricultural Center, area Cattlemen will be getting together for to learn about some products that are out on the market. This will be a catered event, so please call if you are planning to attend this Program, CALL Ben Chase, Area Extension Livestock Agent at 800-666-3625 or 342-8235 (or Email me at ben_chase@ncsu.edu) BY FRIDAY September 11TH TO RESERVE YOUR PLACE FOR DINNER.

Please plan on attending this Cattleman's Program on Tuesday September 15th beginning at 7:00 pm at the Guilford County Agricultural Center, located at 3309 Burlington Road in Greensboro.

There will be food served at the program so please call to RESERVE YOUR PLACE FOR DINNER. (by September 11th)

Veterinary Feed Directive (VFD)

I don't know if you have heard or learned about the new animal drug regulations that will be implemented referred to as the Veterinary Feed Directive (VFD). The purpose of this regulation is to promote the judicious use of antimicrobials in food-producing animals. This strategy will bring the use of these drugs under veterinary supervision so that they are used only when necessary for assuring animal health.

The key factor is animal owners will have to have a veterinarian-client-patient relationship (VCPR) to be able to purchase such products that are medically important antibiotics that have previously been legally used in feed or water for

food-producing animals. So this will eliminate the use of such drugs for production purposes (i.e., growth promotion and feed efficiency) and bring their remaining therapeutic uses in feed and water under the supervision of licensed veterinarians.

This rule is going to be a big deal for the livestock industry.

FDA Veterinary Feed Directive (VFD) - <http://www.fda.gov/AnimalVeterinary/DevelopmentApprovalProcess/ucm071807.htm>

FACT SHEET: Veterinary Feed Directive Final Rule and Next Steps -

<http://www.fda.gov/AnimalVeterinary/DevelopmentApprovalProcess/ucm449019.htm>

More Information to come.



PRUSSIC ACID and NITRATE POISONING

Livestock producers have two challenges when it comes to managing, feeding or grazing summer annuals like sorghum, sudan sorghum hybrids or Johnson grass. There are a few steps or precautions to take to avoid problems from PRUSSIC ACID and NITRATE POISONING. (WE HAVE BEEN SEEING HIGH NITRATES!)

PRUSSIC ACID - Prussic acid, or Hydrocyanic acid, is most often produced when sorghum, sorghum-sudan crosses, Johnson grass, or wild cherry are eaten by cattle, sheep horses or goats. Under normal conditions prussic acid is not a major problem, however, conditions that interfere with normal growth, such as drought, frost, heavy trampling or physical damage, will cause an increase in the amount of free prussic acid in the plant, therefore increasing the chances for toxicity upon ingestion. The poisoning can occur under pasture conditions when animals are grazing young seedlings, young regrowth shoots, stunted growth or frosted plants. Heavy nitrate fertilization followed by abundant rainfall may also increase prussic acid level of the plant. Fatal prussic acid poisoning may also occur from the ingestion of wilted leaves from wild cherry.



The prussic acid interferes with normal oxygen exchange and can be fatal. Animals literally die from lack of oxygen. The first sign of a problem may be dead animals. The typical symptoms of prussic acid poisoning are nervousness, abnormal breathing, convulsions or trembling muscles, blue coloration of the lining of the mouth and extreme pupil dilation. Animals treated quickly in early stages can be saved by intravenous injection with a combination of sodium nitrate and sodium thiosulfate or methylene blue.

The following points should be kept in mind:

- Prussic acid poisoning is not cumulative and upon removal from the forage source animals not showing evidence of being poisoned will likely not be adversely affected. Normally, grazing of the target plants can resume 4-6 days after a killing frost. Since frosts may not occur uniformly within the county, it is suggested that animals be taken off the target crops until it is certain that the plants have been frozen to below 26 degrees at least once.
- Do not turn hungry animals out on questionable forage. If feed is questionable, feed good quality hay or silage first.
- Graze these type plants only when they reach at least 15 - 18 inches tall.
- Don't graze plants during or shortly after drought when growth is reduced and plant has been stressed.
- Do not graze for 2 weeks after a non-killing frost.
- Do not graze wilted plants or young plant shoots (tillers).
- Do not graze at night when frost is likely.
- Prussic acid poisoning is not a problem when crops are cured for hay or ensiled for more than 4 weeks.
- If high N is applied to soil that is low in phosphorus and potassium, plants may be at greater risk.
- Don't allow access to wild cherry leaves, wilted or not! (Alfalfa and White Clover can also produce Prussic Acid)

Nitrate Poisoning

Nitrate is the form of nitrogen taken up in the greatest amounts from the soil by plants. Under normal conditions plants break down nitrates into ammonium ions and assimilate them into amino acids or protein, but under various forms of stress, like drought conditions, this process stops and the plant continues accumulating nitrates to toxic levels in the plant.



shutterstock - 114574264

Factors that can contribute to Nitrate Accumulation - Light Intensity may also influence nitrate levels of plants. Low light conditions caused by cloudy weather tend to elevate nitrate concentration. - High Soil N Levels tend to set the stage for excessive plant nitrate accumulations. Soils that carry high levels of N from excessive manure or fertilizer N applications or because applied fertilizer N was not taken into soil solution due to drought conditions are predisposing factors. - Nitrate Accumulators - Plants that tend to have higher levels of nitrate over a wide range of environmental conditions such as: Ragweed, Pigweed, Lambsquarter, Sorghums, Small Grains, & other Summer & Winter Annuals have been known to be nitrate accumulators. - Stage of Growth can also affect nitrate concentration in plants. Nitrate levels tend to be highest in immature, actively growing plants that have been "shut down" or stunted by drought. Also, immediately after a drought when young shoots are actively growing, plants tend to be high in nitrate. - Plants commonly accumulate nitrates if they're stressed especially if the drought stress was preceded by heavy N fertilization. - Relatively high levels of nitrate in forage may be considerably dissipated during the fermentation process if the forage is ensiled (as much as an 80% reduction). However it should be noted that extreme caution should be taken with high nitrate forage that is being ensiled because poisonous nitrogen gases may be evolved from the silo for several weeks during the fermentation process.

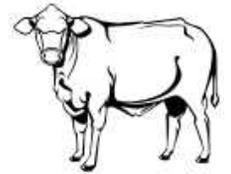
Management Options Trying to Prevent Nitrate Problems

- Split Nitrogen applications so there is the plant has less chance to take up excess. - Cut or graze ONLY the upper part of plant canopy. Nitrate concentration is higher at the base of the plant and lower in the leaves. So it makes sense to leave as much stubble as possible when harvesting hay or silage. Raise the cutter bar to leave the lower 1/3 to 1/4 of the plant. This also true in pastures; by not forcing animals to graze pastures to low stubble heights we can help offset potential problems with high nitrate forage. - Wait to 7 days to harvest after a drought-ending rain. Nitrate levels are highest just after regrowth, and it will take several days of active growth for levels to go down again. Nitrates are non-volatile, and will remain in non-ensiled plants after cutting and baling.
- Test all suspect forages for Nitrates, (by taking representative samples) including hay, silage and pasture before being fed. A little effort here can save a lot. Even if some of your forages show elevated nitrate levels, they can often be fed if you know what you have. Negative effects can often be eliminated by dilution with other feeds or supplements. - Check Water Sources - If for some reason your water source is also high in nitrate, this can really complicate matters if you are also feeding or grazing high nitrate forage. Anything above 10 parts per million nitrate nitrogen in the water could be a problem. Pregnant animals appear to be most sensitive to elevated nitrate levels. Generally horses and other monogastrics tend to be more tolerant than ruminants.



BQA: When to Cull Your Cattle

Source: BQA - Chute Side Quality, Defect and Culling Guide- Beef Checkoff Program
Each year decisions must be made about the fate of a brood cow and the need to maximize productivity and profitability. Every cattle producer holds on to a cow thinking to giving her one more year when its probably not the sound economic choice.



Pregnancy rate is a very important factor to consider when making culling decisions and animals with low performance rates or found open should move to the top of the culling list. If she doesn't have a calf she is not paying her production cost. Pregnancy rate is the most know factor that is considered, there are however some other factors that should be considered as well; they are aging, udder scoring, body condition scoring (BCS), disposition, eyes, and structure.

1. – Age - Aging your cattle can allow better record keeping for your herd as well as influence your decision to cull. As a cow ages you should look at her teeth to see the wear on the teeth and how many she has left, cattle need teeth to graze and eat efficiently. Also, younger cows in the herd should be genetically superior to the older cows. Cattle with broken mouths or badly worn teeth or are young but not superior, should be culled.
2. – Udders - Udder condition of cows is not only linked to milk production, which affects calf performance, but the udders physical structure can impede the calf's access to milk which can lead to decreased growth despite adequate milk. The following udder scoring system uses a scale of 1-5, with 1 being the poor classification and 5 being the superior classification.
3. – Body Condition - Body Condition Scoring or BCS is a useful management tool for distinguishing differences in nutritional needs for the cows in the herd. BCS range from 1 to 9, with a score of 1 being extremely thin and 9 being very obese. Cows should have a BCS of 5 to 7 at calving and a 5-6 at breeding. Fat slaughter cows have more trim and wastage when harvested and thin cows will bruise more easily. Cattle that are not at these optimal ranges are using more resources than the 5-7 cattle and therefore costing more money which eats into the profitability of the operation.

Beef cows will utilize nutritional resources in the following manner:

Highest Priority: Maintenance, Growth
To Lactation, Fetal growth,
Lowest Priority: Breeding, Body reserve



4. - Disposition – One of the most important traits to consider when culling is disposition. One cow with a bad attitude can ruin the dynamic of the entire herd and cause many safety issues. This trait can also be passed on to their offspring and disposition problems can cause a decrease in reproduction rates as well as other performance characteristics, all of which decreases profitability and safety. One method in which this trait can be measured is by using a chute score. These scores are determined while the animals are in the chute and when they exit the chute. Cattle with a high score should be culled as they pose safety concerns for both animal and handler. Cattle with poor temperament (typically) have poorer gains and a higher percentage of dark cutting carcasses (both of) which are less profitable for the producer. Cattle Chute Scores **Score 1**- Docile. Mild disposition. Gentle and easily handled. Stands and moves slowly during processing. Undisturbed, settled, somewhat dull. Does not pull on headgate when in chute. Exits chute calmly. **Score 2**- Restless. Quieter than average, but may be stubborn during processing. May try to back out of chute or pull back on headgate. Some flicking of tail. Exits chute promptly. **Score 3** – Nervous. Typical temperament is manageable, but nervous and impatient. A moderate amount of struggling, movement and tail flicking. Repeated pushing on headgate. Exits chute briskly. **Score 4** – Flighty (Wild). Jumpy and out of control, quivers and struggles violently. May bellow and froth at the mouth. Continues tail flicking. Defecates and urinates during processing. Frantically runs fence line and may jump when

penned individually. Exhibits large flight zone and exits chute wildly. **Score 5** – Aggressive. May be similar to Score 4, but with added aggressive behavior, fearfulness, extreme agitation, and continuous movement which may include jumping and bellowing while in chute. Exits chute frantically and may exhibit attack behavior when handled alone. **Score 6** – Very Aggressive. Extremely aggressive temperament. Thrashes about or attacks wildly when confined in small, tight places. Pronounced attack behavior. Cattle with Chute scores of 5 and 6 should be culled.



5. – Eyes - Monitoring the eyes of beef cattle on a routine basis is important. Repeated examinations allow the producer to become familiar with the normal appearance of the eye which makes spotting problems much easier. Regular exams will allow to market animals in a timely manner. Lacking good eye sight can lead to production decreases as well as safety concerns. Cattle with confirmed case of cancer eye should be culled, because as the problem progresses the cull value of the cow decreases dramatically. Extreme cases will result in condemnation of the carcass.

6. – Structure - Also very important is the structure of the cattle. Monitoring structural soundness is a necessary management practice that aids the producer in maintaining a cowherd that has minimal lameness problems. The two most common types of lameness are arthritic joints and foot and hoof problems. Excess hoof growth can lead to curling toes and eventual misalignment of the feet and leg bones. Lamé cows can create problems when they enter the marketing chain and return fewer dollars to the producer. Down cattle are no longer allowed to be marketed or slaughtered, they must be mobile. Keep this in mind when culling based on structure, the cow must be able to get on and off the trailer several times before it reaches its final destination. If this cannot be done it can create major problems in the system and should not be marketed.

7. Injections – Injection sites – All intramuscular (IM) & subcutaneous (SQ) injections must be given in the neck region. IM injections must be within the triangle shape region of the animal's neck. Improperly administered injections increase tissue damage that ultimately reduces the animals value and quality due to the occurrence of lesions, abscesses, scar tissue in the muscle, and trim losses.

It is key to have a well-rounded and balanced approach to culling cattle, not just if she has a live calf each season. Safety, productivity, and profitability can all be affected by using this approach in culling decisions. If you “give her one more year” she may not make it on and off the trailer and you have just lost the sale of that slaughter cow, which could be your profit for the year. Some of these factors can also be applied to the bulls in your herd, the health and mobility of the bull can have a large impact on the profitability and productivity of your operation.

Culling Management: - Do not market cull animals that pose a public health threat. - Ensure ALL marketed animals have cleared proper withdrawal times. - Do not market cull animals that have a terminal condition. - Do not send cull animals to market that are disabled. - Market cull animals BEFORE they become severely emaciated. - Do not market cull animals with advanced eye lesions.



HAY DIRECTORY - A Hay Directory is maintained by the North Carolina Cooperative Extension Service for the Rockingham County and Guilford County area. This directory is intended as a service to both hay producers and buyers in the area. If you are in need of hay or would like to be added (or removed) from this list please call me at 1-800-666-3625 or 342-8235 and let me know your name, address & phone #, type of hay, number of bales, (square or round bales) and weight per bale.

MANAGE YOUR PASTURES!

If you have hay to sell, please let me know!



DON'T FORGET - Soil Testing Charging A Fee During Peak Season

NCD&CS Agronomic Division

- Peak-season Soil Testing Fee

There is a \$4 fee charged for all soil samples processed by the NCD&CS Agronomic Division during its busiest season: December through March. (No fee April through November).

So if you are planning to take soil test, go ahead and get them sent in to avoid the fee.

GET YOUR SOIL SAMPLES TAKEN & SENT IN!



Beef Cattle E-Mail List – If you would like to be added to a Beef Cattle E-mail list for Rockingham or Guilford Counties, please send me an E-mail at: ben_chase@ncsu.edu and put in the body of the message your Name, U.S Mailing Address & Phone #, & the Email mailing list you wish to be on. This will make it easier, quicker and cheaper to get information to you.



Butner Bull Test & Sale - This year is one of the largest groups of Bulls that has been in the NCSU BCIP Bull Test at Butner in several years. The Sale that is held each year will be held on December 18, 2015 at the Granville County Livestock Arena with the Sale starting at noon. This is a good opportunity for you to find a Bull that could meet the needs of your herd.

Fall Feeder Calf Sales How Sales Operate - All sales are cooperatively conducted by the N. C. Cattlemen's Association, the N. C. Department of Agriculture and Consumer



Services, the N. C. Cooperative Extension Service, market operators, and producers. – The Feeder Cattle Sales Committee of the N.C. Cattlemen's Association established the operating guidelines for the sales. All cattle sold by hundredweight at auction with auctioneer settling any disputed bids. The number of cattle per pen may vary from one to 50 or more. The sale is for the entire pen having fewer than 20 cattle. If a pen is cut, at least 10 cattle must remain in the pen. Calves selling at assembled sales are to be vaccinated for Blackleg and Malignant Edema. Cattle selling directly from the farm may have additional treatments and will be designated.

Aug. 26 Siler City(C) Carolina Stockyards - 919/742-5665 7:00 p.m.

Sept. 3 Norwood (Value-Added BQA) Stanly County Livestock Market - 704/474-7681 7:00 p.m.

Sept. 8 Clinton (C) Sampson County Livestock Arena - 910-592-7455 or 910/592-7161 7:00 p.m.

Sept. 9 Canton (C) WNC Regional Livestock Center - 828/646-3700 7:00 p.m.

Sept. 10 Norwood (C) Stanly County Livestock Market - 704/474-7681 7:00 p.m.

Sept. 24 N. Wilkesboro (C) Wilkes Livestock Exchange - 336/838-3442 or 336-927-5370 7:00 p.m.

Tele-Auction Available At All Sales - To participate in the tele-auction call the N. C. Cattlemen's Association office at (919) 552-9111 or (919) 422-9108 (Bryan Blinson's cell) or the Livestock Market the day of sale.



Avian Influenza – How this could be very serious, Lets Be Prepared

Taken from Power Point Presentation, Avian Influenza: Managing the Risk by Dr. Donna Carver, Prestage Department of Poultry Science
Initial risk is introduction of virus via waterfowl during the fall migration. Spread of virus via horizontal transmission from other infected premises.

Avian Influenza: Potential mitigating factors, Surface water temperatures - August water temperatures will be 82° (28° C) Minnesota had water temperatures in the mid to upper 50s (13°C) in March and April. AI survives up to 100 days in water that is 4°C but only 5 days in water that is 25°C

Wild Bird Species That Tested Positive for HPAI in the United States (December 2014-May 20, 2015)

1. American Green-winged Teal (*Anas crecca*)
2. American Wigeon (*Anas americana*)
3. Gadwall (*Anas strepera*)
4. Mallard (*Anas platyrhynchos*)
5. Northern Pintail (*Anas acuta*)
6. Northern Shoveler (*Anas clypeata*)
7. Wood Duck (*Aix sponsa*)
8. Cooper's Hawk (*Accipiter cooperii*)
9. Peregrine Falcon (*Falco peregrinus*)
10. Red-tailed Hawk (*Buteo jamaicensis*)
11. Bald Eagle (*Haliaeetus leucocephalus*)
12. Canada Goose (*Branta canadensis*)
13. Cinnamon Teal (*Anas cyanoptera*)
14. Lesser Snow Goose (*Chen caerulescens*)
15. Ring-necked Duck (*Aythya collaris*)
16. Snowy Owl (*Bubo scandiacus*)



So What's the Point? Birds will migrate through NC during the months of September and October. There is a high probability that the ducks (and other birds) will be positive for HPAI You cannot control migratory birds but you can contain your birds in a safe environment.

Exclude then Contain - Minimize Risk of Waterfowl - Observe waterfowl, raptors – look for sick birds - Keep people away from immediate area around surface water - Consider ducks positive - Exclude passerines from houses - Exclude rodents and other animals that seek food.

Avian Influenza: major issues - Spread of virus via horizontal transmission from other infected premises. Strict biosecurity focused on high risk areas (and those with which we have some control) Rather than waiting for a positive duck or premises to test positive, assume there are positive birds out there and keep your birds safe.

High Risk Areas - Surface water – keep birds, pets, people away from ponds, lakes, wetlands, etc. - Free living animals / birds should be excluded - People visiting your production area - Remember that swine can become infected with HPAI and like ducks show little to no symptoms.

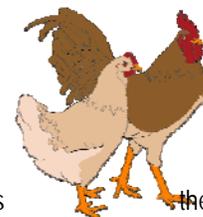
What to do now? Put practices into place that will protect your birds and pigs - Will require containment areas for birds to limit exposure to waterfowl and other birds - Start controlling movement of, people, feed, equipment, rodents, wild birds, other products (vegetables, fruits, eggs)

Prepare and Practice - Biosecurity should include waste management - Cleaning and disinfecting equipment - Pest control (beef it up) - Decrease people on the farms (if you hire people) - Don't wait until September to think about this or prepare

We have some things in our favor... We are aware of the potential problem - Learn from MN and IA - Our environment is less favorable for virus survival than in IA and MN - Our risk factors are not the same as MN and IA - We have had time to prepare

Avian Influenza: potential mitigating factors, Awareness of the potential situation, Implementation of prevention strategies. Emergency preparation (for the introduction of the virus) Knowledge that sick or dead birds (wild) should be tested for virus (raptors, geese etc.) Assume all ducks to be positive

Points to make are: - there is no evidence that humans can become infected with this HPAI - - the US has best surveillance system in the world for HPAI - - NC has not had HPAI to date - if detected HPAI infected flocks will not enter the food chain so poultry meat and eggs will continue to be a healthy wholesome food product - - people who own backyard



or pastured poultry should keep them contained (away from wild birds) September and October. - poultry should have no access to surface water during the fall migration (Sept-Oct).

IF YOU SEE SIGNS IN YOUR BIRDS OR ANY OTHER BIRDS – REPORT IT!

Call it in!!! NCD&CS 919-733-7601 Federal 1-866-536-7593

If you have Poultry, you are required to register. A common question that I have been getting is How to register your Poultry? It is a pretty simple process by going to the North Carolina Dept. of Ag & Consumer Services - NCFARMID website (<http://www.ncagr.gov/ncfarmid/>) and register or contact the Office of the State Veterinarian, N.C. Department of Agriculture and Consumer Services at 919-733-7601



FORAGE TIPS: *September-October – With cooler temperatures coming and late summer/early fall rains coming this will jump start fall growth of cool season pastures. *Scout pastures, identify perennial weeds and woody brush, and determine appropriate method of control. *Lime and fertilize pastures/hayfields based on soil test results. *Closely monitor livestock and do not over graze. This allows plants to send reserves to lower stems and roots. *To get maximum use of available grass, utilize cross fencing. This will stretch out forage and decrease wastage. *Evaluate your current situation and consider overseeding or planting for fall & winter grazing with rye, ryegrass, etc. in late September. Small grains can provide grazing from December through May *With the high price of fertilizer it is very important to take soil samples for fall plantings. Come by and pick up your free soil sample boxes and sheets. *Fertilize and lime cool season grasses. Apply lime to pastures with pH below 5.8, if proper ph is not maintained, fertilizer may not be utilized by the plant. *Plant cool season grasses (fescue, orchardgrass, clovers, etc.) as late as October 25. *Finish grazing warm season grasses before grazing cool season. *Apply nitrogen to warm-season grasses after each cutting (or 4 to 6 weeks) *Graze bermudagrass to a 2-4 inch stubble and harvest excess every 4-6 weeks. * Be aware of potential of Nitrate & Prussic Acid poisoning from animals if grazing FLOODED, stunted, highly fertilized summer annuals. *Keep good forage records. * If on fields, DRAG PASTURES TO BREAK UP/Spread MANURE PILES (This helps with fertility and flies). - Rotate/Clip pastures as needed. *Be cautious of combustion - Hay Fires - Hay in round bales should not contain no more than 18% moisture and square bales no more than 20%.*



CATTLE REMINDERS: SEPTEMBER – OCTOBER - ALL CATTLE: *Provide (and check) clean fresh water. Cull animals that need to be culled. *Monitor Body Condition Scores. *Continue parasite control. *Provide High Magnesium mineral supplement. *Deworm & treat for grubs. *Monitor for health problems. *Check cattle regularly*. FALL CALVES: *Maintain condition on cows; graze cows on lower quality pasture. *Prepare for herd sire selection & vaccinate herd prior to breeding, & fertility check bulls. *Separate herd into management groups (first calf heifers, mature cows, open heifers). *Start heifer replacements on development program. *Vaccinate replacement heifers. *Provide Magnesium mineral supplement. Cows should consume 1 oz. of mgo/hd/day *Wean & sale calves. *Prepare for calving season, keeping calving area clean *Observe frequently once calving starts. Make sure calf consumes colostrum within 4 hours of birth. ID, castrate, & dehorn calves. Look at giving newborn calves Vitamin A & D injections. *Make sure you have the bull power for breeding season. *Make sure cows are getting enough energy after calving. SPRING CALVES: *Evaluate bulls on calf performance. *Deworm & Vaccinate calves. *Select replacement heifers and feed to gain 1.5-1.75 lbs per day. *Wean & watch markets to market calves. *Look for unsound cows that should be culled and identify and cull bulls that have sired groups of calves that are below average performance. *Make replacement heifer selections. *Pregnancy check cows. *Body condition score cows at weaning and separate thin cows. *Prepare to wean calves.



Ben Chase, Extension Agent

Agriculture, Livestock
342-8235, ben_chase@ncsu.edu



Please Don't Forget Our Troops!

The use of brand names or any listing or mention of products or services does not imply endorsement by the NC Cooperative Extension Service nor discrimination against similar products or services not mentioned.