COOPERATIVE EXTENSION ... UNIVERSITY OF CALIFORNIA

Livestock and Range News

TEHAMA, GLENN, COLUSA COUNTIES **September 2009**

1754 Walnut Street, Red Bluff, CA 96080 Phone (530) 527-3101 Email: jdavy@ucdavis.edu

Josh Davy
UC Farm Advisor
Livestock, Range, and Natural Resources

Prepared by Cindy McClain - Office Manager and
Spring Severson - Ag Secretary

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Beef Improvement Federation Annual Meeting Highlights, Sacramento, CA

Alison Van Eenennaam, Ph.D., CE Specialist
Dan Drake, UCCE Siskiyou County
Larry Forero, UCCE Shasta County

The Beef Improvement Federation convention was held in Sacramento in early May. This meeting was attended by over 440 registrants from 12 countries, 6 Canadian provinces, and 37 states. Genomics was a major theme of the convention. The talks ranged from extremely theoretical laboratory work to application of the technology at the ground level. We understand that not everyone had the time to attend the session and have summarized a few of the high points below.

Continuing advances in the techniques for DNA testing, particularly in the human medicine field, are cascading down to cattle work, with lower costs and tests that can now assay for thousands of genes.

Cattle genome research and data are handled very differently between dairy and beef breeds: dairy breeds have significant database recordkeeping with the USDA, while beef breeds are primarily housed with breed associations. This may have significant impact on the development of genomic information for beef breeds, and places severe constraints on some smaller breeds.

Development of DNA tests and use in breeding decisions will not easily transfer across breeds. That is, the way a gene marker is associated with a trait in one breed may not be the same it is associated with it in another breed. Early research findings emphasize results from "discovery" populations of cattle (the cattle used in the initial research on a particular gene or gene marker) do not necessarily apply to a different population or group of cattle even in the same breed. Gene markers that are found to be important in a discovery population of cattle should be tested or verified in a different group of cattle to confirm their effect.

Evolving research shows traits are likely controlled by 100s or 1000s of genes. The condition or make-up of a few genes typically will not have a major impact on a trait. The suggested model for implementing results from 100s or 1000s of genes or gene markers is a "marker-enhanced" EPD which will include existing pedigree and performance data if available for the trait. It is hoped that eventually all DNA information will be incorporated into a single EPD value that explains significant amount of the genetic variation in a trait (i.e. is highly accurate).

Results from DNA tests will be incorporated into American Angus Association EPDs sometime within the next 12 months. Producers won't necessarily see the DNA test results or need to understand them, the results will be incorporated into the EPDs that you already use. Using the DNA data should help to improve the accuracy of EPD's.
A DNA test for management, such as sorting cattle in feedlots, was also discussed. Cargill is using a DNA test to sort cattle into feeding groups, and it was reported that they receive an estimated $2 return for each $1 spent on tests. It is important to remember this is not the same as using DNA tests for breeding decisions.

Within the foreseeable future it is likely that DNA-based information will allow for the development of EPDs that are:

- More accurate
- Available for young animals (e.g. yearling bulls)
- Describe traits not currently included in genetic evaluations (e.g. cow fertility, stayability).

Today producers can prepare by determining traits that would be most helpful for their particular production conditions. This may involve "creative" thinking about traits that are not commonly described or available today.
Some of these traits might include things like the typical ribeye area of their calves at harvest, longevity,

reproductive efficiency, and tenderness, chemical composition of the meat, behavior, and disease resistance potential.

Factors that influence profitability at the ranch level are most important for immediate consideration, however factors important industry wide are also relevant, and eventually are likely key components to long-term profit.

These tools have the potential to significantly improve the predictability of beef cattle performance in the foreseeable future. Take the time to keep informed of advances in this fast-evolving field.

Fertilizer Affects on Production and Species Composition on Annual Range

Josh Davy – UC Livestock and Range Farm Advisor

Two replicated trials were conducted in the 2008/09 growing season west of Red Bluff and west of Williams to determine the production and species composition effects of nitrogen fertilizer (ammonium sulfate) on annual rangeland. The trial site in Red Bluff was not grazed, while the trial in Williams was lightly grazed during the spring. Grazing excluded cages were established at the Williams site so that forage production could be determined. The Williams site treatments included a control (no fertilizer), 20, 50, and 80 lbs of nitrogen fertilizer and the Red Bluff site treatments included a control, 60, and 90 lbs of nitrogen fertilizer.

Table 1. Forage production

Williams (grazed lightly)

Treatment	*Total production lbs/ acre DM*	*RDM of grazed area lbs/acre DM*	*% utilization*
Control	792	659	5%
20 lbs/acre N	1,578	774	53%
50 lbs/acre N	2,630	635	75%
80 lbs/acre N	3,552	626	79%

Red Bluff (non-grazed)

Treatment	*Total production lbs/ acre DM*
Control	1,572
60 lbs/acre N	3,656
90 lbs/acre N	3,777

Forage production increased linearly with the amount of fertilizer applied in Williams; however, there was no difference in forage production between 60 and 90 lbs of nitrogen in Red Bluff (Table 1), which could indicate a plateau in the benefit of added nitrogen. Future research will help to strengthen this question.

Of most interest is the utilization (cage exclosures vs. grazed area) of forage between treatments at the grazed site. Utilization in the control area was only 5%, compared to 79% in the area fertilized with 80 lbs/acre of nitrogen. This demonstrates a definite attraction of cattle to the fertilized areas. In evaluating the use of range fertilizer, the utilization is important because not only is more forage produced, but livestock also consume more forage, which translates to added gains or an ability to increase stocking rate.

Table 2. Medusahead composition

Williams (grazed lightly)

Treatment	*% composition*
80N	35%
50N	36%
20N	36%
Control	56%
Red Bluff (non-grazed)	
Treatment	*% composition*
61N	45%
Control	51%
92N	58%

The difference in animal concentration is also evident by the composition of medusahead, which is generally avoided by livestock. The fertilized areas show lower concentrations of medusahead (35% vs. 56%, respectively) at the grazed site compared to the control. There is no difference in medusahead composition at the site that was not grazed, indicating that fertilizer alone does not reduce the composition of medusahead, but rather the concentration of cattle grazing fertilized areas lessoned medusahead composition.

The application of fertilizer also encouraged increases in the composition of desirable grasses, namely soft chess and annual ryegrass. In the grazed areas, annual ryegrass increased from 5% in the control to 25% with the application of 80 lbs of nitrogen. Likewise, soft chess increased from 4% to 21% of the composition. Although not nearly as dramatic, soft chess also increased in the non-grazed site from 1% to 8% with the application of fertilizer. There was no effect at either site on the composition of native wildflowers or filaree due to the application of nitrogen fertilizer.

Although their was a reduction of medusahead in the grazed site, it is hypothesized that a greater reduction of medusahead is possible if the grazing pressure had been greater. Grazing pressure during the 2008/09 season was brief, and only occurred during the month of March. In fact, one of the four blocks in the trial was left nearly ungrazed in all treatments, which indicated cattle did not have the time to access this area of the pasture. During the 2009/10 growing season, subsequent trials will test the use of nitrogen as a medusahead control strategy in areas that are grazed in a continuous fashion that is typical of the stocking rates in that area, thus allowing more grazing time and greater impacts from cattle on fertilized areas. This will also allow for the economics of treatment to be analyzed.

Determining Grazing Pressure on Rangelands

by Josh Davy, livestock, range and natural resources advisor, University of California Cooperative Extension, and Melvin George, rangeland management specialist, University of California Cooperative Extension

The reality for all cattlemen utilizing rangelands is that the forage base determines the production potential of calves or yearlings when brought to market. With all the pressures from herd health to marketing of cattle, it is important not forget the basic principles of a livestock operation – forage production. Now, more than ever, it is critical for California ranchers to take a deeper look at their forage production and overall rangeland health as we are completing yet another year of drought in most parts of the state.

Four factors most contribute to forage production on annual rangelands. These factors are precipitation, temperature, soil type, and plant residue in the fall.

Precipitation is the deciding factor of the beginning and end of the growing season. Temperature determines the rate of growth while soil moisture is available. Soil type establishes moisture holding capacity, nutrient levels and retention, and root depth.

Three years of drought in California have inadequately aligned temperature and precipitation, which has devastated annual range production. In some cases, forage production has been decreased by as much as 80 percent.

While Mother Nature cannot be controlled, the one forage production factor that can be controlled is plant residue left in the fall. Plant residue is often referred to as residual dry matter or RDM. Plant residue can enhance soil organic matter (soils ability to hold water and nutrients), prevent erosion, and influence species composition.

Low levels of plant residue encourage forbs such as filaree (*Erodium* ssp.) and low production grasses such as nitgrass (*Gastridium ventricosum*) and silver hairgrass (*Aira caryophyllea*). Low levels can also encourage plants such as tarweed (*Hemizonia* ssp.) and vinegarweed (*Trichostema lanceolatum*), which are limited in forage use but do provide resources for native pollinators.

High plant residue levels favor higher producing grasses such as wild oats (*Avena fatua*), ripgut brome (*Bromus diandrus*), soft chess (*Bromus hordeaceus*), and some weeds including medusahead (*T. caput-medusae).* Excessive plant residue and/or favorable weather for range production can cause grass species to shade out lower growing forbs, resulting in grass dominance.

Moderate grazing creates equal opportunity for many species by opening up the canopy and encouraging species diversity. Diversity of plant species is often greater in grazed areas because pasture utilization varies creating a blend of plant residue levels, in turn establishing patches of both grasses and forbs.

Knowing a target residue level for a particular site can help to determine if pasture utilization is at desirable levels. A common misconception about the management of residual dry matter is that adequate levels are very high and are often unattainable even if the property is not grazed. As with most things, residual dry matter management is not a one-size-fits-all target. Instead, RDM varies with rainfall, slope, and woody cover. In fact, the amounts of RDM required on most sites to encourage diversity, prevent erosion, and maintain soil organic matter is often lower than what is usually deemed adequate for cattlemen to leave as fall feed for cattle.

It is important to match site characteristics with adequate RDM levels when determining if adequate plant residue is left for the fall.

The state's 31 million acres of rangeland can be generally categorized into three types for RDM management purposes. This first type is dry annual grassland, where annual plants dominate the range and average annual rainfall is less than 12 inches. Second is also annual grassland/hardwood range that has an understory with variable oak or shrub canopy and an average annual rainfall between 12 and 40 inches. The third type of California range is coastal prairie, with mixed woody overstory, variable (often high) rainfall, and perennial grasses are common.

Target plant residue level thresholds are presented in the inset table to help determine the RDM level necessary for your rangelands. The table provides common RDM guidelines to quickly estimate necessary plant residue levels by utilizing site characteristics - rainfall, slope and woody plant cover. Higher rainfall and greater slopes require more plant residue cover, while greater densities of woody plants (trees and scrubs) lesson the necessary amount of cover. Higher slopes create greater water runoff, which can lead to less water infiltration, greater incidences of erosion, and nutrient leaching. However, woody

plants, such as oak trees have large roots that hold the soil in place and lesson the flow of water. Additionally, woody plants add nutrients and organic matter, which helps infiltration and water retention. These factors lesson the effects of slope by slowing the rate of water passage and increasing retention. With less woody cover present, more plant residue is necessary to serve this purpose.

To use the table, determine which of the three general rangeland site characteristics described before best depict your rangelands. Then incorporate site specifics such as percentage of woody cover and slope to determine the minimum RDM levels for your rangelands.

In each ranch unit, fall appraisal of RDM can identify areas of heavy or over use so that adjustments in stocking rate and distribution practices can be configured going into the next growing season. High use areas such as around water troughs, trails and gates will often have low RDM levels but the entire pasture or site should meet or exceed RDM guides on average.

Ranchers should analyze their RDM on rangelands in the late fall, October through November. This should be prior to the first significant rain. It is important to measure at this time of year because the amount of RDM that is present on the range during the first rainfall is a critical factor in soil protection and the creation of a favorable microenvironment to promote healthy plant production for the next season.

To help determine what RDM levels look like, there are multiple manuals with examples using landscape-view photos that depict different RDM levels. Most of these manuals show views that can help determine a range of RDM that best fits your site (350-700 lbs/acre, 700-1,000 lbs/acre, 1,000-1,500 lbs/acre, etc.). These manuals can be very practical for matching your corresponding areas to photos for estimating a general plant residue cover.

An alternative method, which can be incorporated as part of a monitoring program on rangelands uses clipping of representative plots to determine RDM. To do so, measure a 1 square foot plot (quadrant). If the area is grazed and the target levels in this article are used, remove summer annual plants (tarweed, starthistle, vinegarweed) and leaves, and then clip the remaining plant material within the quadrant. Collect and then weigh the plant material (1 gram per square foot = 96 pound per acre). Multiple clippings are required to account for the variation of the site.

Minimum RDM guidelines in lbs/acre dry matter				
1. Annual grassland with < 12 inches of rain per year				
	Slope %			
Woody cover %	0-10	10-20	20-40	>40
0-25	300	400	500	600
25-50	300	400	500	600
50-75	N/A	N/A	N/A	N/A
75-100	N/A	N/A	N/A	N/A
2. Annual grassland with 12-40 inches of rain per year				
	Slope %			
Woody cover %	0-10	10-20	20-40	>40
0-25	500	600	700	800
25-50	400	500	600	700
50-75	200	300	400	500
75-100	100	200	250	300
3. Coastal prairie (perennial) with >35 inches of rain per year				
	Slope %			
Woody cover %	0-10	10-20	20-40	>40
0-25	1,200	1,500	1,800	2,100
25-50	800	1,000	1,200	1,400
50-75	400	500	600	700
75-100	200	250	300	350

Your local University of California Farm Advisor or Natural Resources Conservation Service Range Specialist can help you become calibrated in RDM estimation. Additionally, workshops on rangeland management, including RDM are offered annually for land mangers.

While Mother Nature cannot be controlled, meeting target RDM levels can ensure rangeland with its best chance of capitalizing on production next season.

ANR publication 8092 Guidelines for Residual Dry Matter on Coastal and Foothill Rangelands in California (http://californiarangeland.ucdavis.edu/Publications%20pdf/8092.pdf).

Dryland Hay Variety Trials in Glenn County

Josh Davy and Doug Munier,– UC Farm Advisors
Edited by Larry Forero and Dan Drake

Two dryland hay variety trials were conducted in Stonyford and Elk creek over the 2008/2009 growing season. Tables 1 and 2 outline the varieties, maturity dates, yield as well as crude protein and Total Digestible Nutrients (TDN) for the two locations. In early spring, an application of liquid nitrogen, combined with a broadleaf weed treatment, was applied at the Stonyford plot. The Elk Creek site was neither fertilized nor sprayed. The two sites behaved very differently. Both sites had comparable soils. Drought conditions and cold temperatures suppressed early production at the Stonyford site. The Elk creek site had warmer temperatures and more favorable soil moisture.

Table 1. Maturity dates, yield and quality of dryland hay varieties at Stonyford (planted 11/21/08)

Variety	*Date-Heading*	*Yield-Heading Lbs/acre*	*Date-Soft Dough*	*Yield-Soft Dough Lbs/acre*	*Crude Protein% Heading*	*Crude Protein% Soft Dough*	*TDN% Heading*	*TDN% Soft Dough*
Triticale (Camelot)	4/23/09	N/A	5/26/09	4,063b[1]	13.0b[1]	9.9a[1]	50.6a[1]	54.5a[1]
Cayuse Oats	5/26/09	N/A	N/A	3,540ab	10.6a	N/A	49.3a	N/A
Forage mix*	4/23/09	N/A	5/26/09	3,306a	16.7c	11.0b	53.0a	51.3a
Wheat (Triple IV)	4/23/09	N/A	5/26/09	3,198a	14.7b	9.8a	53.1b	54.9a

[1]Means within a column with different letters are significantly different (P<0.05)

Table 2. Maturity dates and yield of dryland hay varieties at Elk Creek (planted 11/17/08)

Variety	*Date-Heading*	*Yield-Heading Lbs./acre*	*Date-Soft Dough*	*Yield-Soft Dough Lbs/acre*	*Crude Protein% Heading*	*Crude Protein% Soft Dough*	*TDN% Heading*	*TDN% Soft Dough*
Triticale (Camelot)	4/3/09	5,945a[1]	5/23/09	8,944b[1]	9.3a[1]	5.3a[1]	50.0b[1]	51.7b[1]
Triticale (63063)	4/3/09	6,195a	5/23/09	7,504a	8.9a	5.7ab	48.0b	51.8b
Wheat (PR1404)	4/16/09	6,034a	5/23/09	7,665a	9.6a	5.8ab	45.4b	52.2b
Triticale (Lance/Merlin)	4/23/09	7,723b	6/1/09	8,909b	8.0a	6.3b	45.0a	49.6a
Triticale (Forerunner)	4/23/09	6,776ab	6/1/09	7,983ab	7.8a	5.8ab	45.2a	49.1a

[1]Means within a column with different letters are significantly different (P<0.05)
[3]Cayuse oats were not able to make it past heading and were sampled when all other varieties were in soft dough
[4]Forage mix contained 15% cayuse oats, which was still in the boot stage, thus increasing protein
*forage mix consisted of Swan oats (35%), Montezuma oats (10%), Cayuse oats (15%), Belford barley (10%), Super Kirkwin wheat (20%), and Tetraploid annual ryegrass (10%).

Tables 1 and 2 show the forage quality results at heading (approximately one week after the boot) and the soft dough stage. All varieties performed well, yield and quality were mostly determined by the timing of harvest (Tables 1 and 2). The forage samples were analyzed for crude protein acid detergent fiber (from which Total Digestible Nutrients [TDN] is estimated), and nitrate-nitrogen (NO_3-N). Crude protein is the total nitrogen multiplied by 6.25. TDN is a common measure of energy. NO_3-N is commonly found in cereal crops and in excess amounts can be toxic to livestock (0.4%+). No varieties had high levels of nitrate nitrogen.

Smaller plants (less stem area), and a mid-season application of nitrogen, may have contributed to higher protein (CP) levels at Stonyford. Soft dough samples had higher digestibility (lower NDF) and slightly higher energy (TDN) compared to heading due to higher grain content in the later sampling. However, the earlier harvest at heading had higher protein (CP).

Harvest time was the most critical factor in the quality of hay. Boot stage harvest provided the highest protein level, though the formation of grain in the soft dough stage increased digestibility and energy. If higher protein hay is desired, harvest at heading but choosing a later maturing variety makes it easier to time a heading stage harvest because it is easier to dry and there is less likelihood of the hay being rained on at harvest. Earlier maturing varieties may be more susceptible to harvest losses due to spring rains. If high protein levels (>10% CP) are not required, early maturing varieties provide a better opportunity for filling grain in a droughty spring, which can increase energy and digestibility. In some cases, a combination of early and late varieties in different fields may be the best choice to help spread out harvest times. For a list of different cereal grain varieties, and their associated characteristics, visit the UC small grains website at http://agric.ucdavis.edu/crops/cereals/cereal.htm

Figures 1 and 2 depict the CP and TDN content for the Camelot Triticale variety at Elk Creek. Note that for CP (Figure 1) both CP concentration and yield decreased with maturity of the plant. It also points out that regardless of plant maturity at time of harvest in this trial, grain hays were marginally adequate at best in meeting the crude protein requirement of lactating cows. For TDN (Figure 2), the data indicates dry cows will generally receive adequate amounts energy from soft dough harvested grain hays.

Figure 1

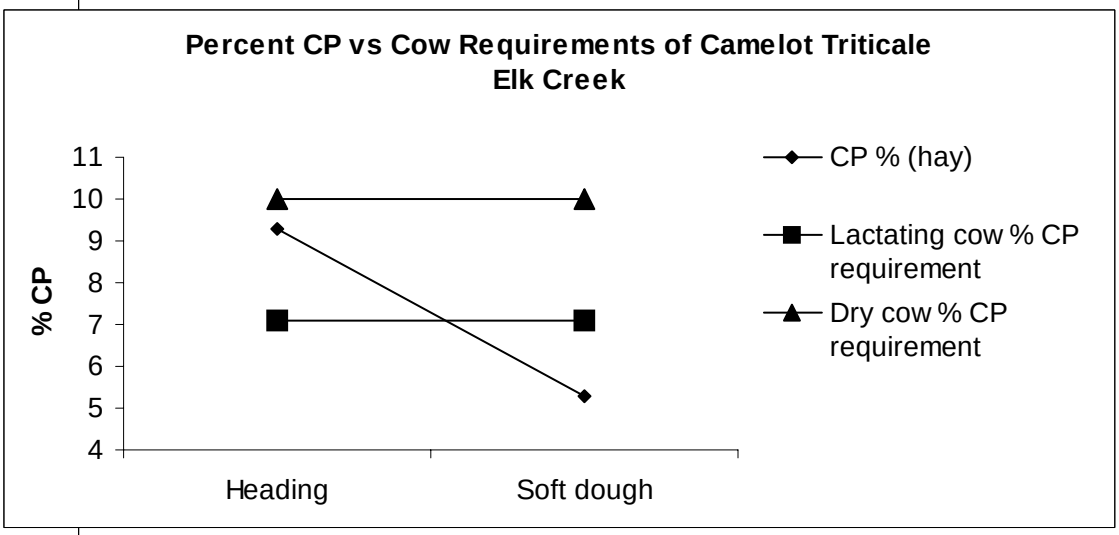
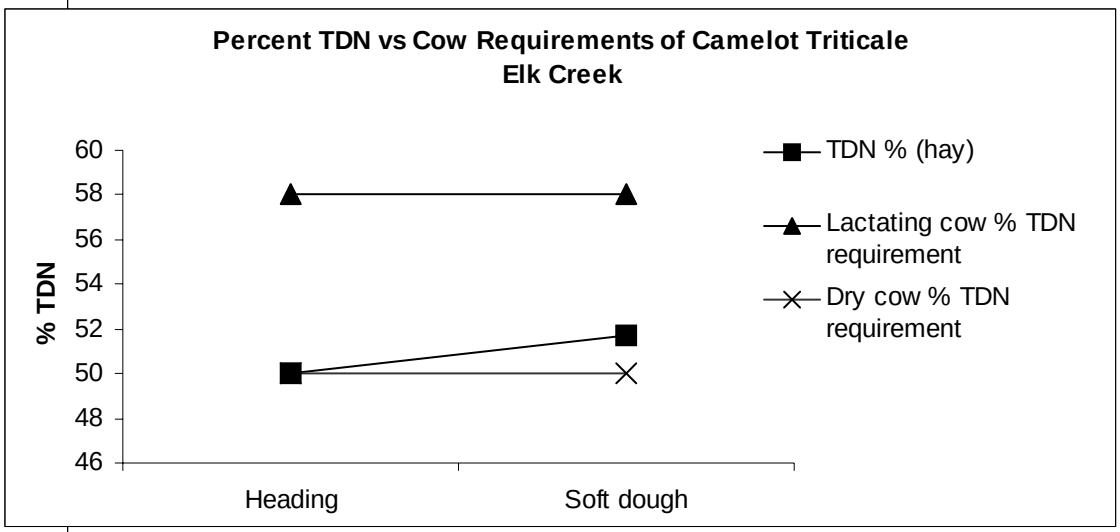


Figure 2



Producers growing their own grain hay to feed to their cows may want to select harvest maturity based on how they will be feeding the hay. More mature grain hays alone may be adequate for dry cows and thus could be fed without other feeds. To feed lactating cows, grain hays would need to be supplemented with some better quality hay or other supplement to balance the cows nutrient needs.

The authors appreciate the Landini family and the Stonyford Ranch for their generous help throughout this project. The generous seed donation from JJ Gross of John Taylor Fertilizer, Lockwood Seed, and RSI for the trial is also very much appreciated.

Beef and Horse Vaccination and Treatment Plans for the Northern Sacramento Valley

Glenn Nader, UCCE Sutter/Yuba Counties

A valuable exercise for producers is to develop an animal vaccination and treatment plan with their veterinarian. The concept is that they are more valuable to the operation in developing prevention programs than just reacting to assist with the problems when they occur. The University of California veterinarians, advisors, and staff have developed and annually reviewed vaccination and treatment guidelines for beef cattle and horses at the Sierra Foothill Research and Extension Center in Browns Valley, Ca. Although each ranch can experience some different animal health problems, the guidelines provide a starting point for discussions with your veterinarian. If you do not currently have a working relationship with a veterinarian, these vaccination and treaetment guidelines provide a framework from which you can begin cultivating a relationship with a large animal practioner.

The guidelines can be found at http://groups.ucanr.org/sierrafoothill/SFREC_Animal_Health_Programs/
If you are not able to access the information on the internet, call a local extension office Redding (224-4900), Red Bluff (527-3101) or Yuba City (822-7515) and ask them to mail a copy to you.

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Australian Beef Research Scientist will Attend TCCA Meeting

Australian research scientist Dr. Malcolm McPhee will attend and conduct an informal presentation at the Tehama County Cattlemen's meeting on September 16th at 6:30 PM (note the earlier time). All are welcome to attend to see and discuss with an outside perspective on dealing with drought and finishing cattle. His research is in the distribution of beef cattle and their fat deposition, which has led to the development of a program called *BeefSpecs*. Some of his current projects include:

- *StockPlan* - a workshop to assist producers make management decisions in dry spells or in drought.
- Development of a *Bos Indicus* model for predicting total body fat.
- Improvements/upgrades to Drought Pack, FSA Pack, and ImPack; 3 decision support tools available to *StockPlan* participants.
- Intramuscular fat in Sheep muscle.
- Phenotypic prediction of beef cattle.
- Assisting beef producers meet carcass specifications.
  Development of *BeefSpecs* a decision support tool to predict P8 fat (mm).

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This newsletter contains articles written by University of California Farm Advisors and Specialists. Our aim is to provide the ranching community in the Sacramento Valley with science based information. We welcome your feedback and encourage you to call or email us.

Larry Forero, Shasta-Trinity UCCE, 1851 Hartnell Ave., Redding, CA 96002 lcforero@ucdavis.edu 530-224-4900
http://ceshasta.ucdavis.edu

Glenn Nader, Sutter-Yuba UCCE, 142 Garden Highway, Suite A, Yuba City, CA 95991-5512 ganader@ucdavis.edu
530-822-7515 http://cesutter.ucdavis.edu

Josh Davy, Tehama-Glenn-Colusa UCCE, 1754 Walnut Ave., Red Bluff, CA 96080 jsdavy@ucdavis.edu 530-527-3101
http://cetehama.ucdavis.edu

Dan Drake, Siskiyou UCCE, 1655 South Main Street, Yreka, CA 96097 djdrake@ucdavis.edu 530-842-6931
http://cesiskiyou.ucdavis.edu

COOPERATIVE EXTENSION ... UNIVERSITY OF CALIFORNIA

Livestock and Range News

TEHAMA, GLENN, COLUSA COUNTIES **September 2009**

1754 Walnut Street, Red Bluff, CA 96080 Phone (530) 527-3101 Email: jdavy@ucdavis.edu

Livestock and Range News is a newsletter published by the Farm Advisor's office containing research, news, information, and meeting notices related to the areas of livestock production, irrigated pasture, range, and natural resource management

Northern California Ranch Update

In this issue: