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California Dairy Newsletter

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IN THIS ISSUE . . .

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Heat Stress in Cattle

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Outside environmental temperatures exceeding 100°F can cause significant stress on cattle. This heat stress is often enhanced by excessive humidity. When the heat index (a combination of temperature and humidity are added together to give one how hot it feels outside) exceeds 100°F, cattle may become significantly stressed resulting in decreased milk production, poor reproductive performance, increased incidences of mastitis, uterine infections, other infections, and death. An excellent example of extreme heat and humidity problems is the heat period of July 2006 which resulted in the death of approximately 20,000 animals.

Animals with **underlying chronic disease** are the first to die during extreme heat periods. The chronic illness decreases their ability to properly regulate their core body temperature. The most common chronic diseases noted are unresolved pneumonias, chronic liver abscesses, hardware disease, and lymphosarcoma. Animals with unresolved pneumonia may fail to demonstrate significant respiratory distress prior to death. Animals with hardware disease often have extensive peritoneal abscesses associated with the rumenal wall. In some cases, the wire has penetrated the diaphragm and caused necrosis and secondary pneumonia or inflammation of the pericardial sac of the heart. Chronic liver abscesses from a previous case of rumen acidosis are also a common finding in animals submitted for necropsy during these times. In lymphosarcoma (caused by bovine leukemia virus), peripheral lymph node enlargement can be seen, but often the lesions of lymphosarcoma are only internal and involve the heart, spleen, uterus and/or abomasum.

Fresh cows are severely stressed by the heat. Recently fresh cows brought to the diagnostic laboratory for examination had severe uterine infections (endometritis). These animals usually had freshened 10 and 20 days earlier. A mixed bacterial infection consisting of *E. coli*, *Arcanobacterium pyogenes*, *Proteus* and numerous anaerobic bacteria were often identified in the uterine discharge. No common cause for these uterine infections is noted; however dystocia leading to damage of the uterine wall, retained placentas, and retrograde reflux of bacteria into the uterus during delivery can cause such problems. Often these infections are associated with unclean or poorly managed calving areas. These animals die due to high fevers and poor thermoregulation caused by endotoxin release from bacteria in the uterus. Good fresh cow management and uterine discharge monitoring for the development of uterine infections are critical in protecting these animals from heat related deaths.

Moderate to severe diarrhea during periods of high heat, makes animals more susceptible to death secondary to dehydration. The identification of the agent causing the diarrhea (this can assist in identifying the source of infection) and keeping the animal hydrated are critical in keeping the animals alive and preventing further infections in other cows.

Vaccination with gram negative organisms during intense heat periods can stress cattle and in some cases, may lead to death. In many instances, these animals are vaccinated in the morning followed by deaths in the late afternoon or early evening. The cause of the fever (often over 104°F) was due to the bacterial products in the vaccine (endotoxins that develop the antibody response in the animal) which, under normal temperature conditions, would lead to only mild fever production. During extreme heat periods, these bacterial products can have a serious impact on the affected animals. These fevers, along with the intense environmental temperatures, cause ineffective heat dissipation in the animal. Herdsmen who have vaccinated in the evening in hopes of preventing heat associated vaccine deaths by allowing the animals to have a fever during the cooler period of the night can still have heat associated deaths. This is due to prolonged fevers lasting longer than 12 hours which result in stressed animals exposed to another day of intense heat. Consequently, it is wise to not vaccinate animals with fever producing vaccines during these extreme heat periods.

Over-conditioned (fat) dry cows are significantly affected by the intense heat. Animals most commonly affected are overly fat cows that are placed in the dry pen. Often, these animals had been conditioned to sprinklers and misters while in the milking pens. However, when animals are dried off, if they are placed in pens with marginal shade and inadequate misting, the animals cannot adequately keep comfortable which makes them more susceptible to heat related injuries and possibly death. **Adding additional shade and misters to the dry pens often has a beneficial effect not only to these over-conditioned cows but also to the other dry cows**. Since these animals have more difficulty managing excessive heat, over-conditioned animals should be critically evaluated during intense heat periods to see if they should remain in the herd or be replaced. Also, cattle in the dry pen are commonly the animals that receive fever producing vaccines. This may predispose these over-conditioned animals to additional temperature associated stresses due to fever and possible death.

The number of abortions commonly increases during excessive periods of heat. In fetuses presented for examination during these periods, we often fail to identify a cause of these abortions. This finding would suggest that the increased abortions may be due to heat associated stress. In addition, vaccination of animals with gram negative vaccines may lead to excessive heat induced abortions. Although the dairy producer may assume that the abortions are due to heat related problems, one needs to submit these fetuses to their veterinarian or regional diagnostic laboratory to insure that infectious agents (leptospirosis, *Campylobacter*, IBR, BVDV, Listeria, or *Neospora*) are not the cause of the abortions.

The feed ration management is important during heat. If the TMR ration is left out in the extreme heat and sun for too long of a time, the ration can spoil resulting in intestinal upset, decreased feed intake at later feedings, diarrhea, and decreased milk production.

Outbreaks of bacterial septicemias in calves are often an overlooked problem associated with extensive heat period that can last for 3 to 4 weeks after the end of the heat period. Most of the septicemias noted are caused by *E.coli* in 3 to 8 day old calves. However, *Salmonella* infections (*Salmonella* Typhimurium, *S.* Newport, and *S.* Dublin) were also common causes of septicemia. These septicemias are often associated with poor colostrum and milk management at the dairy due to colostrum/milk degradation and contamination from improper handling and storage resulting in bacterial overgrowth prior to ingestion by the calf. Older calves with septicemias can also have similar problems due to improper storage of milk resulting in bacterial contamination after pasteurization. Once milk is prepared for calves, it should be maintained such that spoilage will not occur resulting in excessive numbers of pathogenic bacteria growing in the milk product.

In extreme heat, tending to the needs of all your animals is critical. Keeping them from overheating will help minimize death losses in both cows and calves and help maintain milk production and conception rates in the cows. Keeping all the animals cool with shade and misters and making fresh clean water available at all times are important in keeping animals stress free during excessive heat. It is important to be cautious with administrating gram negative vaccines during this time period and do not administer these during days when the temperature and humidity result in a heat index of over 100°F. In calves, it is important to insure colostrum and milk products are of good quality and stored properly to insure that these products are free of infectious organisms.

How to Collect a Corn Sample to Determine Dry Matter Prior to Harvest

Noelia Silva-del-Río, UCCE Tulare County, Dennis Craig and Vernal Gomes of Mycogen

The dry matter of the crop standing in the field can be estimated by evaluating the greenery of the canopy, breaking down the stalk and examining the kernel milk line. But, how well does that relate to actual dry matter? We suggest you to take a new approach that may help you to more accurately determine the dry matter of the crop standing in the field.

Step 1. Take a representative sample of the field. **Select 10-20 plants** at different locations away from the head or tail of the field. Enter the field several rows from the edge. You can use a machete or pruning shears.

Step 2. Hand feed the plant to a **chopper** (you can use a chipper shredder). Place a bag to collect the chopped material.

Step 3. Mix the chopped material **well** and take a **representative sample**: *Method 1* (more accurate): divide your sample in quarters and discard two opposite quarters. Mix the other two quarters and repeat until you get a 1lb sample, or volume of 5-7 cups. *Method 2*: Mix the pile well and collect 5-7 cups of forage throughout the pile**.**

Step 4. Place your **sample in a plastic bag and keep on ice.** Take the sample quickly to a lab or to your dairy for dry matter determination. It is important to get the wet weight as soon as possible.

Step 5. Use approximately **100 g for microwave method or 200 g for Koster** Tester (1lb = 454 g). You may also find a nearby lab where you can get timely results.

Research Update: Variability in Dry Matter Content of Harvested Corn for Silage

Jennifer Heguy, UCCE Stanislaus/San Joaquin, Betsy Karle, UCCE Glenn/Tehama, Patricia Price, SRA, UC Davis, & Deanne Meyer, UCCE Waste Management Specialist, UC Davis

Do you know how much dry matter is being removed from your corn fields and placed into your silage structure? The answer to this question has many implications, including: cost of harvesting forage, maintaining accurate feed inventory as well as regulatory compliance.

Our objective was to determine if differences exist in calculating dry matter (DM) removal based on various intensities of sub-sample and composite collection. We collected a representative sample and noted the forage weight from every truck unloaded from a single corn field on three dairies. Actual DM removed was calculated by summing truckload weight * DM for all collected samples. Field DM removal totals were calculated using two composite sampling methods (sequence and interval). Sequence values are the average of sample DM within an hour of harvest; for example, forages from trucks that unloaded between 9a and 10a (see **Figure 1**). Interval values are the average of every 10th sample collected, for example, forage that was unloaded at 9a, 10a, 11a, etc.

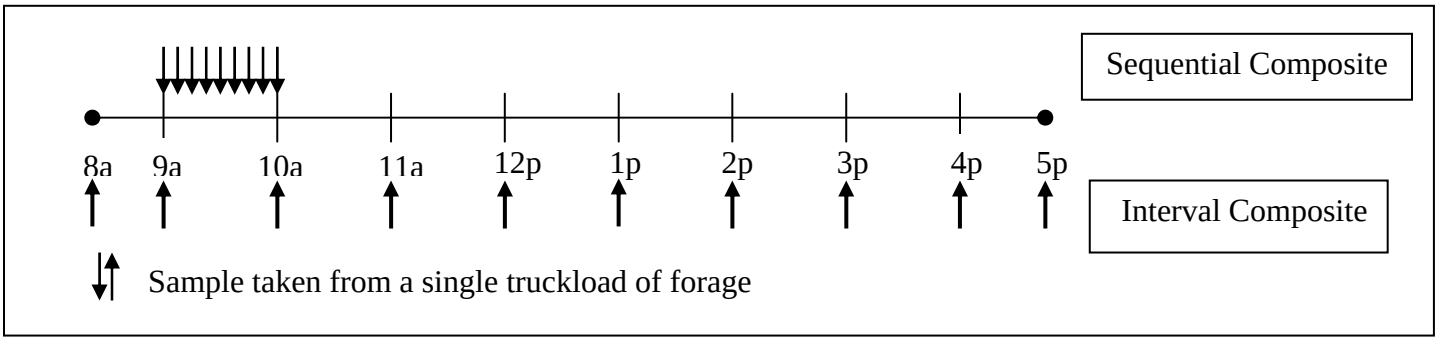

Figure 1. Example of truckload samples taken to create Sequential (top) and Interval (bottom) composites.

We found that taking a single sample of forage to estimate DM removal of an entire field yielded results that varied greatly from the actual DM removed. Using any one individual sample to estimate DM removal could underestimate harvested forage by 21.5% or overestimate forage removal by 20.4%. Sequential composites were less varied, and interval samples were the least varied of all methods tested (see **Table 1**).

	Individual	**Sequential**	**Interval**
% difference**	-21.5 to + 20.4	-5.14% to + 5.15	-2.71% to + 2.40
DM difference (lbs)	± 135,000	± 33,000	± 16,500

**Calculated vs actual

Table 1. Differences between estimated field DM removal and actual field DM removal based on method of sampling on one cooperator dairy.

Through more intense sampling, it was found that under- and overestimations were reduced. Interval samples across all dairies were ± 3% of actual DM harvested.

An Update on Bulk Tank Milk (BTM) Quality in California

Noelia Silva-del-Río and Carol Collar, UCCE Tulare and Kings Counties

We have recently summarized BTM quality and pathogen culture data from California dairies. Dairy producers can compare their milk quality to industry benchmarks derived from our summary to help define achievable goals for their operations. The data set contained information from 559 dairies (n=57,875 BTM loads) over a 12 month period. Milk loads, (1 - 7/day) representing all cows from each dairy, were sampled weekly.

BTM QUALITY: SCC, SPC, LPC AND COLI

Table 1. SCC, SPC, LPC and Coli counts in California BTM, top 25% herds, bottom 25% herds and median counts from Oct-08 to Sep-09.

	SCC (cells/mL)	SPC (CFU/mL)	LPC (CFU/mL)	Coli (CFU/mL)
25% Top Herds	< 156,698	< 2,969	< 43	< 25
25% Bottom Herds	> 252,679	> 5,729	> 129	> 63
Median[1]	202,208	3,534	74	39

[1]The median is the middle value. Half of the herds are below the median.

BTM information from Oct-08 to Sep-09 on SCC, SPC, LPC and Coli is summarized in **Table 1.** The data presented was log10 transformed. *[Log transformation of data is a tool use in statistical analysis to decrease variation by squeezing together larger values and spreading smaller values. Therefore, if we have large outlier values (i.e. high SCC only one time) the mean will only increase slightly.]*

BTM CULTURES: *MYCOPLASMA SPP., STREPTOCOCCUS AGALACTIAE AND STAPHYLOCOCCUS AUREUS.*

When *Mycoplasma spp., Strep. ag.* or *Staph. aureus* are identified in BTM, it almost always indicates that there are infected quarters in the herd. *Staphylococcus aureus* is shed in low numbers and an attainable goal is less than 50 CFU/mL. BTM pathogen culture results from Jan-08 to Dec-08 are presented in **Figure 1**.

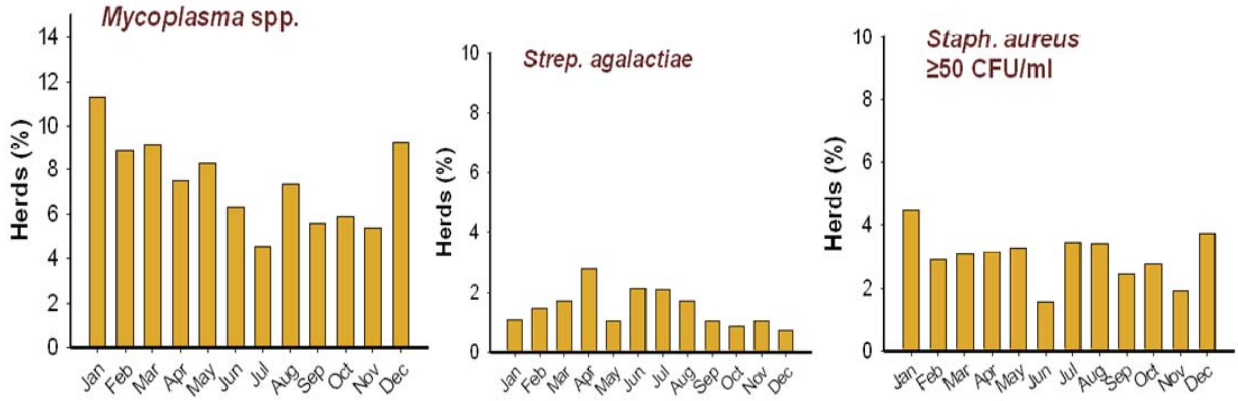

Figure 1. Percentage of herds with at least one positive culture a month for mycoplasma spp. (Left), Strep agalactiae (Center), bacterial counts equal or greater to 50 CFU of Staph aureus (Right).

In our study, a total of 7.4% of the herds were positive for *Mycoplasma* spp., while in previous studies (APHIS, 2003), 9.4% of herds from the western USA were positive. *Strep. ag.* has not been eradicated. Similar BTM prevalence has been reported in North America (Keefe, 2006). *Staph. aureus* herd level prevalence of BTM samples less than 0 CFU/mlL was under 5% throughout the year.

Meet Dr. Heidi Rossow

Hedi recently took the position of Assistant Professor of Ruminant Nutrition Management at the Veterinary Medicine Teaching and Research Center in Tulare.

What is your background?
My family owned a ranch in Hollister, California but I grew up in the heart of Silicon Valley. So I have tried to blend both worlds, cattle and computers, to understand cattle nutrition. In college, I lived at the campus dairy and became interested in how nutrition impacts the health and production of dairy cows. I always understood facts better if I could attach numbers to them and see if they 'added up'. That led to learning some really complicated math, and then finally learning how to use math to understand nutrient flow in and out of the cow in milk and manure. I'm still learning, and doing research to find answers.

How are your efforts relevant to the California dairy industry?
The number of cows in the Tulare area presents an amazing opportunity to do this kind of work and apply it to real situations. I'm working on computer programs that will take what a cow eats and predict how much milk she produces and what ends up in manure. This is valuable information for nutritionists, veterinarians and producers to alter the way cows are fed and manipulate manure nutrient excretion. It could also be used to predict what would happen if the cow was fed different feeds in different management scenarios. I'm looking forward to working with the dairies, nutritionists and veterinarians to put some of these ideas into practice.

Contact Heidi at: Phone: 559-688-1731 Ext. 230; Email: heidi.rossow@gmail.com

New Cattle Ear Tag for Horn Fly Management

Alec Gerry, UCCE Entomology, UC Riverside

Y-Tex Coporation has recently registered (in 2010) a new ear tag called "XP 820" **for beef and non-lactating dairy cattle** in California. The XP 820 ear tag is registered for control of horn flies and several tick species with control lasting up to several months. The label also indicates that the tags will reduce face flies when two treated tags are used per animal.

This new cattle ear tag is the first to contain abamectin (a macrocyclic lactone) which provides these tags with a different chemistry than other tags available with organophosphate (OP) and synthetic pyrethroid chemicals. Abamectin has not previously been used for control of cattle pests in the United States. This new chemistry will make these tags effective against flies which are already resistant to insecticides in other chemical classes currently available with ear tags. Rotate the use of the XP 820 ear tags with other ear tags containing different insecticide chemistries to reduce the development of insecticide resistance within targeted fly populations.

For more information on the XP 820 cattle ear tag, visit the Y-Tex Corporation web site at: www.ytex.com . The University of California does not recommend any specific company or product and has not evaluated the efficacy of the XP 820 ear tags.

A Few Reminders for WDR Compliance

Deanne Meyer, UCCE Waste Management Specialist, UC Davis dmeyer@ucdavis.edu

It's hard to believe it was 3 years ago (June, 2007) when most producers in the Central Valley received the brown envelope with the brown book identifying the General Order for Existing Milk Cow Dairies. In the last three years, dairy operators have honed skills on record keeping, sampling, and understanding results. Everyone should have their Waste Management Plan and Nutrient Management Plan available on farm. The day-to-day operation of dairies has certainly changed.

There are a few areas in the General Order to review so producers do not receive violation notices for incomplete submittals or during an on-farm inspection.

1. Submission of groundwater results for ALL supply wells on the property. Copies of the lab sheets and chain of custody forms need to be submitted as part of the annual report. Don't forget to pull samples of your supply wells so you will have results to submit with next year's annual report.

2. Pond marker. Earlier in the process, it may have been a challenge to identify where to stick a marker. If you didn't have your waste management plan completed, it may have been a challenge to identify how much space would be needed to capture runoff, and the 25-year, 24-hour storm, as well as still have adequate freeboard (2' if partially or completely above ground; 1' if 100% in ground). Now that the Waste Management Plan is complete, it is easier to determine where to install a pond marker.

3. Every sample you take needs a chain of custody form. Some of these (supply well, tile drain, and off site discharge samples) will require submission of the chain of custody form, along with the sample, to the laboratory. Whether you need to submit a chain of custody form or not, it is crucial to maintain copies of said form on site for every sample collected.

4. For your nutrient management plan obligations, take samples of liquid manure every three months (if you're irrigating with it during that time), samples of **solid manure** at least twice a year, sample all **manure manifested off-site** (and complete manifest form), **sample plant matter harvested** in each crop from each field, and **sample your irrigation water sources** (this may be wells and surface water).

Dairy Cattle Reproductive Short Course

Where: Fresno State in the Center for Irrigation Technology Conference Room (CATI) (Corner of Chestnut and Barstow)
Time: October 14, 2010 from 9:00 am to 4:00 pm.
Topics: Review of reproductive hormones, a synchronization program, abortion disease and diagnosis, treatment of reproductive problems, a reproductive program for fresh cows, and a refresher on A.I. techniques on live cows.
Language: English and Spanish.
Cost: $80.00 per person (includes course materials and lunch).
More information at: http://ucanr.org/2010reproductiveshortcourse or call Dr. Gerald Higginbotham, UCCE Dairy Advisor for Fresno/Madera Counties, at 559-456-7558.

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Jennifer Heguy, Farm Advisor