University of California
Agriculture and Natural Resources
Making a Difference for California

Golden State Dairy Newsletter

Volume 13, Issue 1
March 2021

GOLDEN STATE DAIRY MANAGEMENT WEBINARS

SAVE THE DATE
Thursday, March 25, 2021
1:00-5:00 PM
https://ucanr.edu/sites/CAdairyconference/
Registration link will be "live" soon

Nutrition. 1:00 – 1:50pm
Almond hulls in lactating cow diets – the story continues. *Dr. Ed DePeters*
Current science of feed additives to reduce enteric methane emissions. *Dr. Ermias Kebreab*
What does by-product feeding look like in California? *Jennifer Heguy*

Animal Management and Health. 2:00 – 2:50pm
Polled genetics- ready for prime time? *Dr. Alison Van Eenennaam*
Feeding more milk – does it pay? *Betsy Karle*
To treat or not to treat – what and why? *Dr. Richard Pereira*

Crop Production. 3:00 – 3:50pm
Recharging groundwater aquifers by flooding alfalfa fields. *Dr. Helen Dalke*
Realized irrigation water savings from growing forage sorghum. *Dr. Bob Hutmacher*
Growing sugar beets and safflower as dairy feed in California. *Dr. Steve Kaffka*

Priority Nitrate Management Zones. 4:00 – 4:50pm
Whole farm balance to identify manure management options. *Dr. Deanne Meyer*
Getting the most out of your…fertilizing grain forage systems with manure. *Nick Clark*
Farmers' guide to Irrigation management automation. *Dr. Khaled Bali*

Also In this Issue…

Newsletter Editor:
Jennifer Heguy
UCCE Dairy Advisor
jmheguy@ucdavis.edu
(209)525-6800

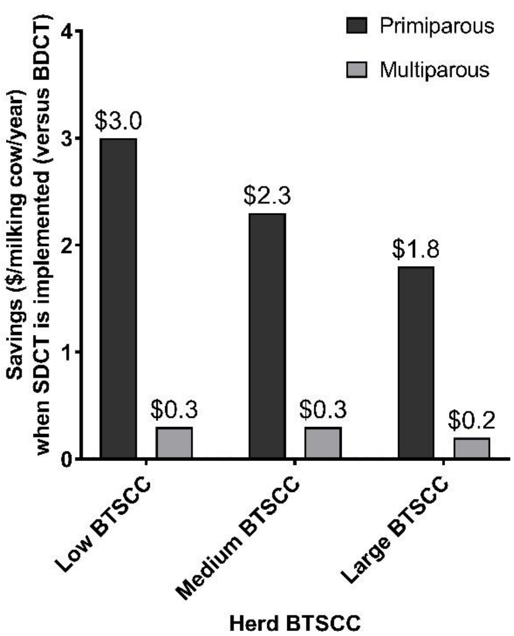
Selective Dry Cow Therapy: Economics and Impact on Antibiotic Use

Dr. Fernanda C. Ferreira – UC Davis & UC ANR & Nina Hommels – Wageningen University

For many years, blanket dry cow therapy (BDCT) has been used to control mastitis in dairy herds successfully. Farmers administer long-acting antibiotics to all cows and quarters at dry-off. An alternative to this approach is selective dry cow therapy (SDCT). With SDCT, only cows with an infection at dry-off receive antibiotics, and all cows receive internal teat sealants. Dairies in Nordic countries have been using this approach since the 1970s with great success. The reduction in antibiotic use with SDCT represents not only an economic opportunity but a step towards antimicrobial use stewardship.

With the support of the California Department of Food and Agriculture, we conducted **a theoretical economic analysis on the feasibility of implementing SDCT in California herds. We also estimated the potential reduction in antibiotic use if dairy farmers adopt SDCT.** We obtained DHIA data from AgriTech, and from six large dairy herds in the San Joaquin Valley known for excellent cow health record-keeping. We used this data to create an economic model representing California dairy farms with different bulk tank somatic cell count (BTSCC). We used the model to evaluate the probability of primiparous and multiparous cows having mastitis in the subsequent lactation if treated (or not) with antibiotics at dry-off. We considered that all cows would receive an internal teat sealant at dry-off. We also varied milk price scenarios, internal teat sealant effectiveness, and dry-cow antibiotic price.

Our calculations indicate that there are opportunities to implement SDCT in California dairy farms**.** Primiparous cows benefit more than multiparous from an SDCT program. Also, herds with low BTSCC would benefit the most from implementing SDCT. In Figure 1, we show an example of the reduction in costs per milking cow per year (primiparous and multiparous) if SDCT is implemented compared to a BDCT approach according to herd BTSCC. For instance, in a conservative scenario, and assuming a milk price of $18/cwt, a herd with a medium BTSCC of 200,000 cells/ml could save $2.30 and $0.30 per primiparous and multiparous milking cow per year, respectively. Also, 22% of the primiparous and 89% of the multiparous cows would receive antibiotics at dry-off. The savings in cost per cow per year and reduction in antibiotic use may vary according to the mastitis situation of individual herds.



Although the economic benefits shown here may be perceived as small or of little impact for large herds, our results showed a potential for a reduction in the use of antibiotics in dairy farms with no negative economic impact. The mastitis management program of every herd should be evaluated before the implementation of an SDCT program.

Interested in evaluating if your dairy may be ready to implement SDCT? Please contact fcferreira@ucdavis.edu.

Cow Bunching on California Dairies

Dr. Wagdy ElAshmawy, Dr. Sharif Aly – UC Davis School of Veterinary Medicine, Dr. Alec Gerry – UC Riverside & UC ANR, Dr. Fernanda Ferreira – UC Davis & UC ANR

Many California dairies have observed their cows "bunching." This is a protective aggregating behavior against *Stomoxys calcitrans (L.),* commonly known as stable flies. Their bite is painful, representing an enormous amount of stress to cows. Bunching negatively impacts cattle health, productivity, and welfare.

We conducted a study on the epidemiology of bunching on 20 dairies from Tulare and Kings Counties during the stable fly season (April through July 2017). We observed that cow bunching varied between dairies and pens within the same dairy. The greatest occurrence of bunching occurred in June followed by May and July. Bunching varied with ambient temperature and relative humidity, with a greater probability of occurrence reported when the ambient temperature was ≤ 86ºF. In contrast, relative humidity of > 50% was protective against cow bunching. Dairies with an average weekly stable fly count on fly traps of ≥ 150 flies had eight times higher odds of bunching in comparison to dairies with fewer flies. Dairies that fed wet distillers grains had four times higher odds of bunching in comparison to dairies that did not include wet distillers' grain in their ration. Dairies bordered by crops from three or more sides had five times higher odds of bunching in comparison to dairies bordered by crops from two sides or less. Cleaning the fence line manure before and during the fly season was associated with lower odds of bunching on the study dairies. Bunching also varied between pens in the same facility. Pens with a greater number of flies, free-stall pens, far-off dry cow and lactating cow pens (compared to close-up pens), and pens bordered with crops had higher odds of bunching. Pens in the middle of the dairy were protected against bunching. Cows in pens with molasses added to their ration had higher odds of bunching in comparison to pens without molasses.

A 2012 study estimated that losses due to stable flies in the dairy industry was $360 million per year. Our group is measuring the economic losses associated with bunching in California. We know that there is a reduction in milk production when cows bunch and that this drop in milk yield depends on temperature, humidity, days in milk, and lactation number. Stay tuned for updates on bunching economics!

Take-home messages:

Bunching is expensive, but there are ways to minimize its occurrence. To reduce bunching on your facility, focus your effort during the stable fly season (May through July) to reduce the number of stable flies on your facility, specifically in pens adjacent to crop fields. Cleaning the fence line manure before and during the fly season will reduce stable fly habitat. Alsynite traps can be used as a tool to monitor the abundance of stable flies on dairies to determine timing of insecticide application and identify pens under high risk of stable fly attacks.

Proposed Change to the Regulation of Genetically Engineered Food Animals

Dr. Alison Van Eenennaam – UC Davis & UC ANR

Until now, the Food and Drug Administration (FDA) has had authority over genetically engineered (GE) food animal species developed for agricultural purposes. This differs from GE plants where Federal authority lies within the United States Department of Agriculture (USDA).

Recently, the USDA published an advance notice of proposed rulemaking entitled "Regulation of the Movement of Animals Modified or Developed by Genetic Engineering" [Federal Register, 12/28/2020].

This proposal contemplates moving regulation of GE food animal species developed for agricultural purposes from the FDA to USDA. USDA would establish a flexible, risk and science based regulatory framework for GE animals modified for agricultural purposes. FDA would continue its review of animals modified or developed using genetic engineering intended for non-agricultural purposes, including medical and pharmaceutical purposes, and gene therapies.

Why does this matter to dairy producers? Until now, all GE animals, including dairy cattle genome edited to carry the polled allele and therefore to be genetically hornless, have been regulated by the FDA as new animal drugs. This approach triggers a long and multimillion dollar drug approval process before milk, meat and eggs from these animals can be sold commercially. This timely and expensive process stifles innovation. To date, only two GE food animals have ever been approved by the FDA. The first was the AquAdvantage fast-growing salmon approved in 2015. Last December, the GalSafe pig was approved for food or human therapeutics. Neither product is currently available in the US market.

A memorandum of understanding (MOU) between the USDA and FDA was signed in January, 2021. It outlines responsibilities concerning the regulation of certain farm animals modified or developed using genetic engineering for agricultural purposes, and intended for human food. Under this framework, USDA would safeguard animal and human health by providing end-to-end oversight from pre-market reviews through post-market food safety monitoring. The MOU also allows for the transition of portions of FDA's pre-existing animal biotechnology regulatory oversight to USDA.

Under the proposed regulatory framework for GE animals, USDA's Animal and Plant Health Inspection Service would conduct a safety assessment of GE animals. Attention will focus on GE modifications or alterations that may increase the animal's susceptibility to pests or diseases of livestock, including zoonotic diseases, or ability to transmit the same. This is similar to the approach the USDA uses for the regulation of GE crops which are now grown by more than 17 million farmers globally.

One federal agency with oversight over both GE plants and GE animals makes sense. Such an approach will enable **both** plant and animal breeders to have access to biotechnology innovations to introduce useful sustainability traits (disease resistance, climate adaptability, and food quality attributes) into U.S. agricultural breeding programs. This concept was supported by over 300 scientists.

Under the proposed rule, the Food Safety and Inspection Service would continue their pre-slaughter food safety assessment. This assessment ensures that the slaughter and processing of animals would not result in a product that is adulterated or misbranded.

Bacteria, Viruses and Parasites, Oh My! What Causes Scours in Dairy Calves?

Betsy Karle – UCCE Northern Sacramento Valley & Dr. Noelia Silva del Rio – UC Davis & UC ANR

Scours during the preweaning period are responsible for a significant amount of illness and death loss. Digestive issues are, and have been for decades, the most common disease in young calves. As calves develop and acquire immunity and gut microflora, they are faced with pathogen challenges (bacteria, viruses, parasites). These pathogens are present in the environment and can prey on the immature immune system, impacting calf health. In this article, we briefly discuss some of the most common bacteria, viruses and parasites that cause scours. Note that, in most cases, multiple pathogenic agents can be found in sick animals making it difficult to point out one agent as the main cause.

Bacteria:

E. coli: It is the most common cause of scours and affects calves in the first week of life. Calves typically get infected with *E. coli* in the calving area as it is present in manure, mud and other material. Therefore, a clean environment and an excellent colostrum management are helpful in preventing disease. Dehydration in affected calves is usually severe. Vaccinations are available to help prevent *E. coli*.

Salmonella: It infects calves usually after two weeks of age all the way up to adults. Treatment can be difficult as there are many different types of Salmonella, some of which are associated with high mortality rates. Excellent colostrum management and a clean environment are the best ways to prevent Salmonella.

Viruses:

Rotavirus: This virus can cause very watery, sometimes yellowish-green diarrhea. Calves are typically affected around two-four weeks of age and will often be quite depressed. Vaccines that protect against rotaviruses are available.

Coronavirus: (this kind is different than COVID-19!) This virus usually occurs a bit later than rotavirus and is sometimes associated with mucousy diarrhea. Vaccines that protect against coronaviruses are available.

Bovine viral diarrhea virus: BVDV can cause bloody diarrhea, high fever, severe depression and pneumonia. Colostral antibodies from immune dams are protective, so BVDV is often not seen until after three months of age. If the dam is exposed while the calf is in utero (<125 days), the calf can become a persistent infection (PI) carrier. Effective vaccination programs can prevent BVDV.

Protozoa:

Cryptosporidia: This parasite survives well in the environment. It typically affects calves from one-three weeks of age and is characterized by watery diarrhea. “Crypto” spreads readily, does not respond to antibiotics and is resistant to most disinfectants. No vaccines are available to prevent crypto. A clean environment, using hot water to clean feeding equipment, and leaving pens vacant – preferably in the sun – for at least a week between calves are key management practices to reduce infection rates.

Lab analysis of fecal samples and necropsies of dead calves can help to identify which pathogen(s) are causing scours. Before submitting samples, work with your lab and herd veterinarian for guidance on which animals to sample. Sometimes samples from healthy animals can be informative, too.

Remember that antibiotics are effective at killing many kinds of bacteria but **are not effective against viruses and parasites**. Supportive therapy, including rehydration with fluids and/or electrolytes, is critical for scouring calves as dehydration and acidosis can be more lethal than the toxic effects of a pathogen. Be sure that calves have access to fresh and clean water and avoid withholding milk as a treatment strategy. Most calves that arrive at a diagnostic lab for necropsy are undernourished and have very little to no body fat. **Adequate nutrition is imperative** to give calves the energy reserves needed to fight disease. Some herds have found positive results feeding upwards of two gallons of milk daily during the first weeks of life!

Summary of enteric pathogens from 2,311 necropsied calves less than 35-days old with diarrhea at California Animal Health & Food Safety (CAHFS) Lab-Tulare over 4-years (2008–2011)

Pathogen	Positive (%)	Average Age (Days)	Age Range (Days)
Cryptosporidium	37.2	13	3–33
Coronavirus	30.5	10.4	1–30
Rotavirus	26.6	10.5	1–32
Salmonella	15.7	11.6	1-30
E coli (attaching and effacing)*	10.5	12.0	1–31
E coli (K99)*	4.5	2.3	1–7
Bovine viral diarrhea virus	1.3	16.1	2–30

*K99 - enterotoxigenic (produces toxins) and attaching and effacing (cytotoxic damage to the intestinal mucosa).
Table adapted from Blanchard, P.C., 2012. Diagnostics of dairy and beef cattle diarrhea *Veterinary Clinics: Food Animal Practice*, *28*(3), pp.443-464.

While it's unlikely that scours can be eliminated from farms, attention to preventative management practices will go a long way on reducing the impact of digestive disease in your herd. A clean environment, excellent colostrum management, appropriate vaccinations, reduced stress and outstanding nutrition are the building blocks for success. Be sure to work closely with your herd veterinarian to develop prevention and treatment protocols that use the right drug for the bug and laboratory analyses to determine your herd's specific disease challenges.

Hold the Date: Genome Editing for Polled
Saturday, April 17, 11 AM - NOON (PST)

Picnic Day at UC Davis is going to be held virtually this year on Saturday, April 17. A group of researchers at UC Davis are interested in YOUR thoughts regarding the use of genome editing to introduce the polled allele into dairy genetics. This event will take place in the form of a discussion webinar led by a panel of experts, including scientists, an ethicist, and a dairy farmer. The webinar will be 45-60 minutes in length depending on the questions from participants and will be hosted entirely online via Zoom as part of the UC Davis Virtual Picnic Day. Please register for this webinar on the use of genome editing in agriculture.

http://ucanr.edu/survey/publicengagement

If you register, you will **receive a $5 Starbuck's gift card** for answering several questions before the webinar, participating in the webinar, and answering the questions after the webinar. Questions? Please contact Dr. Alison Van Eenennaam, UC Cooperative Extension Specialist, Department of Animal Science, UC Davis. Email: alvaneenennaam@ucdavis.edu.

New UCCE – Field Crops Agronomy and Weed Management Advisor in Northern SJV

Hi, all! My name is **José Luiz Dias,** and I have recently joined the University of California Cooperative Extension (UCCE) team as the new Field Crops Agronomy and Weed Management advisor serving Merced, Stanislaus, and San Joaquin Counties. The primary crops I will be working with include corn, alfalfa, cotton, dry beans, and small grains.

Background.
I am originally from Brazil, and I have a bachelor's degree in Agronomy. In 2011, I came to the U.S. for an internship at the Range Cattle Research and Education Center – University of Florida to work with weed science in pasture and rangelands systems. In 2013, I obtained my MS degree in crop protection-weed science, working with sugarcane herbicide tolerance to soil-applied residual herbicides. In 2019, I earned a Ph.D. from the University of Florida in agronomy-weed science, where I studied how to implement integrated management practices to control giant smutgrass (*Sporobolus indicus* (*L.*) var. *pyramidalis*) populations in bahiagrass (*Paspalum notatum*) pastures. After graduation, I spent a little bit over a year in Wisconsin as a postdoc at the University of Wisconsin – Madison. During my time in Wisconsin, I participated in agronomy and weed science applied research in cropping systems such as alfalfa, silage corn and cool season grass-clover mixed swards.

Working with UC Cooperative Extension.
As a UCCE field crops agronomy and weed management advisor, I plan to work closely with growers, consultants, and industry personnel to develop applied research and extension activities in the Northern SJV. I am very interested in developing applied tools and management practices to address present and likely future weed management issues. Weed biology, ecology, integrated weed management strategies and herbicide resistance are some of the main weed science topics I am interested in addressing in my research and extension program. I also plan to address agronomic needs such as variety performance trials, nutrient and soil fertility management, soil salinity, and integrated pest management.

Do you think you have herbicide resistant weed populations in your field? Are you struggling with weed management and believe you might be dealing with herbicide resistant weeds in you farm? If you do, please, feel free to contact me! I would really enjoy scheduling a time to meet at your farm to talk about the issue and collect some seeds.

Possible collaborator for a 2021 safflower herbicide safety trial. Are you planning to plant safflower in 2021? If you would like to know more details about this project and/or know someone that might be interested in collaborating with us, please, feel free to contact me at any time!

Sharing information.
An extension program can only be effective and deliver meaningful results if we work together with industry and growers. Please help me help you by sharing what you think are the most significant problems facing agronomic field crops in Merced, San Joaquin, and Stanislaus counties. Feel free to call me at the Merced County office (209) 385-7403 or email me at jdias@ucanr.edu.

University of California Cooperative Extension

Golden State Dairy Newsletter

Merced, Stanislaus & San Joaquin Counties

March 2021

Jennifer Heguy, Dairy Advisor

Merced, Stanislaus & San Joaquin Counties