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Making a Difference for California

Golden State Dairy Newsletter

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2021 MEETING DATES…

Kearney Alfalfa & Forage Field Day

September 23rd

Parlier, CA

For more information, please contact Nick Clark at neclark@ucanr.edu or 559-852-2788

NEW TO 2021: PRE-REGISTRATION WILL BE REQUIRED

California Animal Nutrition Conference

September 30th & October 1st

Hyatt, Sacramento

For more information, please visit: http://cgfa.org/events.html

Western Dairy Management Conference

November 1st – 4th

Peppermill, Reno

NEW DATES FOR 2021!

For more information, visit the conference website at: http://wdmc.org

Western Alfalfa & Forage Symposium

November 16th – 18th

Grand Sierra Resort in Reno, NV

For more information (including past proceedings), please visit: https://alfalfa.ucdavis.edu/

Also In this Issue…

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Don't Stress (Too Much) Over Drought-Stressed Corn

Nick Clark – UCCE Kings, Tulare & Fresno & Jennifer Heguy – UCCE Stanislaus, Merced, & San Joaquin

Drought is a familiar foe in California, and it strikes dairy farmers hard when the feed bunkers can't be filled fast enough. Corn silage, a staple in most rations, is especially sensitive to drought. Drought stress in corn can be chronic (**Figure 1**) –a little bit stressed for a long time – or acute (**Figure 2**) – very stressed over a short time. Chronic stress tends to result in small, stunted plants with small ears and poor grain fill. Acute stress at the worst time, pollination, can cause poor grain-fill on otherwise healthy-looking plants. Both types of stress cause yield loss and decreases feed quality. We have developed guidelines for mitigating drought stress in corn (*scan QR code with your phone's camera on the next page*) but deciding how to harvest drought-stressed corn and how to feed it also poses unique challenges. This brief article provides some key tips to help you harvest the best quality corn silage when drought has got you down.

Figure 1. Chronically drought-stressed corn (left) is shorter with thinner stalks and poorly developed ears and tassels.

How do I tell if the corn is ready to harvest?

Looking at the milk-line or condition of the ears is a common method for estimating whole plant moisture. What if the ears are poorly developed? If your corn has fertilized kernels, you will see blisters forming as they fill. If there's kernels, it's best to delay harvest if there are green leaves on the plant because dry matter is still accumulating. What if there are no ears to look at? You need another test for whole plant moisture. Even if all the leaves are brown, the stalk can contain up to 90% moisture which is too wet to ensile. Run a chopper down a strip or pull 20 representative whole plants and run them through a garden chipper-shredder. Mix the chopped material and grab a representative sample to check for moisture. You can dry material in a forage dryer or a microwave to test for moisture (*scan QR code on the next page with your phone's camera for detailed instructions*). You can also squeeze the sample with your hands as tight as possible. In the squeeze test, if free water drips from the ball, it's too wet to ensile. If little or no water flows and the ball roughly keeps its shape after squeezing, the corn is about ready to harvest. If no water flows and the ball loses its shape, then the corn is dryer than optimal.

Figure 2. Acute drought stress during corn pollination can cause poor grain set and ear formation (left).

What kind of quality should I expect?

When the ears are not there, silage corn tests significantly lower in starch. Because of the lack of starch, the crude protein and fiber content will test higher than a non-stressed corn, with a potential for more digestible fiber. Work with your nutritionist to submit samples to the lab for nutritional analysis. Purchased starch might be an option for supplementing the drought stressed corn in your rations.

(article continues on page 3)

What are some options I have for feeding?

Beware, drought stressed corn tends to be higher in nitrate, which poses toxicity issues in cows. Ensiling the drought-stressed corn may reduce nitrate concentration to an acceptable level; feeding as green chop is not advised without a forage test for nitrate. Since nitrate tends to accumulate near the bottom of the corn stalk, raising the cutting bar to > 10 inches will reduce yield but also lower the nitrate concentration of the harvested corn. It's best to communicate field issues with your nutritionist early, so that a sampling plan can inform feed out decisions before opening the pile and throughout the year.

Resource links:

Mitigating drought stress in corn information

Photo instructions of how to determine dry matter with a microwave oven

Buying or Selling Corn Silage this Summer? Do You Want to Adjust the Price for Dry Matter?

Jennifer Heguy - UCCE Merced, Stanislaus & San Joaquin Counties

Traditionally, corn silage is purchased on a 70/30 basis; that is 70% moisture and 30% dry matter (DM). Let's assume we're buying a field for $60/ton. What happens when the corn silage is delivered at 28% DM, is the value still $60/ton? What if it's delivered at 32% DM? Below is an equation that can be used to correct the purchase price for DM:

$$\frac{\textbf{Actual DM \%}}{\textbf{30\% DM}} \ \mathbf{x} \ \mathbf{\$/ton} = \textbf{\textit{Corrected}} \ \mathbf{\$/ton}$$

Examples:

So, at **28% DM**, the purchase price would be: 28/30 x $60/ton = **$56/ton**

And, at **32% DM**, the purchase price would be: 32/30 x $60/ton = **$64/ton**

A note of advice: Have these discussions ahead of time, so both parties agree to price corrections before trucks start delivering forage.

See this previous *California Dairy Newsletter* issue for more information on silage DM% price correction, including suggestions for collecting a representative field sample for DM determination (*scan the QR code with your phone's camera*).

Surveillance of Antimicrobial Resistance on California Dairy Farms

Dr. Emmanuel Okello, Rose Atukunda, Dr. Essam Abdelfattah, Dr. Sharif Aly - UC Davis School of Veterinary Medicine & Betsy Karle - UCCE Northern Sacramento Valley.

Antimicrobial drugs play a vital role in maintaining the health and welfare of dairy cattle. Predictably though, the use of antimicrobial drugs can contribute to the emergence and spread of antimicrobial resistance (AMR), jeopardizing the availability of a vital tool in dairy production.

To control AMR, the US Food and Drug Administration recently implemented changes in the animal drug regulations (VFD rule), increasing veterinary oversight in the use and distribution of medically important antimicrobial drugs (MIADs), or drugs that are important in the treatment of human infections, starting January 2017. In California, Senate Bill 27 (SB 27) was implemented starting January 2018. Senate Bill 27 incorporated and expanded on the elements of the VFD rule. Jointly, these regulations transitioned all MIADs from the over-the-counter status to veterinary feed directive (VFD) or prescription status and prohibited use for growth promotion.

So, what is the current state of resistance on dairy farms? To answer this question, researchers from the School of Veterinary Medicine, UC Davis, and UC Cooperative Extension conducted a surveillance study (2018-2019) to determine the prevalence of AMR on California dairy farms. A total of 2,171 *E. coli* and 2,158 Enterococcus and Streptococcus (ES) bacteria were isolated from fecal samples of 240 cows and tested for resistance against commonly used antimicrobial drugs. The study cows were distributed on ten dairies throughout California.

The study results showed very low resistance of both *E. coli* and ES against antimicrobials indicated for use in adult dairy cows. Resistance to ampicillin, ceftiofur, penicillin, enrofloxacin, danofloxacin, neomycin, gentamicin, tulathromycin and tri-sulphamethoxazole was less than 5% across all the regions of California. Surprisingly, high resistance of over 45% was detected for drugs that are not labeled for use in adult dairy cows, such as florfenicol, tiamulin, tilmicosin, and tildipirosin, and is a topic for further research. *E. coli* isolates from San Joaquin Valley and Southern California regions had higher rates of resistance compared to Northern California. Likewise, higher rates of AMR were observed in the San Joaquin Valley and Southern California for the ES bacteria as compared to Northern California, but resistance to penicillin and ampicillin was greatest in Northern California. Regional variations in AMR could be explained by the distinct management practices, herd demographics and dairy infrastructure between regions. For instance, the average herd size in Northern California was much lower compared to the other two regions. Two out of the three dairies in Northern California housed cows either on pasture or a mix of pasture and free stall barns, while the rest of the dairies housed cows solely in free stall barns. Eight dairy farms treated cows with antimicrobials at dry-off while two farms (Northern California) did not. Lastly, *E. coli* resistance was higher during the winter while ES bacteria were more resistant during the summer, indicating a seasonality effect.

Overall, resistance to commonly used antimicrobials indicated for use in adult dairy cattle was very low across all regions regardless of season, with some variations between regions. These findings confirm the effectiveness of these drugs at keeping dairy cows healthy and are an indication of the exceptional effort by dairy producers to ensure dairy cattle health and sustainable production.

To view the full journal article, scan the QR code with your phone's camera.

Nutrient Content of Anaerobic Digester Digestate

Nicholas Clark – UCCE Kings, Tulare & Fresno, Dr. Anthony Fulford – UCCE San Joaquin, Stanislaus & Merced, Joy Hollingsworth – UCCE Fresno, Madera, Kings & Tulare and Dr. Deanne Meyer – UC Davis & UCANR

The purpose of anaerobic digesters is to treat carbon in manure. The biogas is collected, scrubbed and used to power vehicles.

Data from a current project funded by the California Dairy Research Foundation provide insight to the nutrient content of digestate, the effluent coming out of the digester. Samples were taken at five freestall dairies with anaerobic digesters. September samples represented summer conditions (**Figure 1**). January samples represented winter conditions. Five samples were collected in 2.5 days in each season. Cows had feedline soakers and access to corrals in summer. Cows had no access to corrals and soakers did not run in the winter.

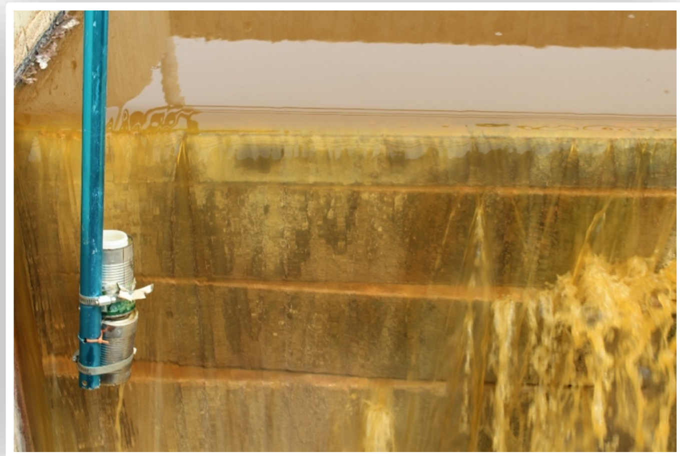

Figure 1. Low solids digestate sampled in September.

Preliminary analysis of data shows a distinct seasonal change in the composition of digestate. The physical and chemical components of digestate were lower in summer than winter (**Table 1**). This was expected. In summer water is used to cool cows and less manure is collected. The flush-lane collection is more dilute than in winter. Results within each dairy were consistent within a season. The ammoniacal nitrogen fraction averaged 71.5% in summer and 53.8% in winter.

Table 1. Characteristics of manure samples from digestate systems across five commercial dairies in the San Joaquin Valley

Constituent	**Range (percent)**	
	Summer	Winter
Total solids (percent)	0.31 to 1.16	1.34 to 3.05
Volatile solids (percent)	0.16 to 0.49	0.85 to 2.01
Carbon (mg/l)	225 to 416	618 to 1180
Total nitrogen (mg/l)	375 to 1016	923 to 1830
Phosphorus (mg/l)	48 to 145	146 to 361
Potassium (mg/l)	408 to 927	720 to 1124
Electrical conductivity (dS/m)	4.88 to 9.17	5.14 to 9.08

Understanding seasonal variability of digestate is important for proper manure sampling and utilization. Consider the range of electrical conductivity values above. Forage corn has an average salinity tolerance threshold of 1.8 dS/m and a yield reduction slope of 7.4. That is, forage corn yield is expected to decline by 7.4% for every dS/m above 1.8 in irrigation water. If a corn crop were irrigated with the least saline effluent shown above, we would expect a yield reduction of at least 17.6% due to season-long salinity stress. Higher saline waters are more likely to cause acute salinity injury called specific ion toxicity. This injury is mostly commonly called “salt burn,” and looks like dried leaves starting at the bottom of the plant. More knowledge of the nutrient and salinity concentrations, for example, can help make better fertilizer value and crop safety predictions when blending the digestate with irrigation water.

University of California Cooperative Extension

California Dairy Newsletter

Fresno, Madera and Kings Counties

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