University of California
Agriculture and Natural Resources

California Dairy Newsletter

Vol. 9, Issue 1 January 2017

In this Issue…

Newsletter Editors:

Jennifer Heguy
UCCE Dairy Advisor
Merced/Stanislaus/San Joaquin
jmheguy@ucdavis.edu
209-525-6800

Noelia Silva-del-Rio
Dairy Production Medicine
Specialist, VMTRC
nsilvadelrio@ucdavis.edu
559-688-1731

Fertility Programs for High Producing Lactating Dairy Cows – Advances in First Service Timed-AI Programs

J.P. Martins, UCCE Tulare & Kings

Twenty-one years have passed since the development of **Ovsynch**, the synchronization of ovulation program used worldwide (**Figure 1**). The main objectives of Ovsynch were to produce an optimal time for artificial insemination (AI) without necessity of detection of estrus (or heat) and improve fertility of lactating dairy cows. In the first studies introducing Ovsynch for lactating dairy cows, cows inseminated after timed-AI (TAI) had similar conception rates compared with cows inseminated following heat detection (approximately 38%). Since then, Ovsynch went through several modifications to optimize conception rates following timed-AI; these improvements in the Ovsynch protocol were only possible due to a better understanding of the physiological parameters that affect the success of timed-AI in lactating dairy cows.

The **key events for the success of the Ovsynch program** and to increase the chance of pregnancy after timed-AI are: **(1)** ovulation after the first administration of gonadotropin-releasing hormone (GnRH) of the Ovsynch program; **(2)** presence of a corpus luteum (CL) at the beginning of the program or high circulating concentrations of progesterone during Ovsynch; **(3)** complete CL regression after prostaglandin F2α (PG) administration of Ovsynch; and **(4)** ovulation of an optimal size ovulatory follicle after timed-AI. Studies determined that a greater percentage of cows achieve these key events when the Ovsynch protocol is initiated on day 6 or 7 of the estrous cycle. Therefore, pre-synchronization programs were developed to increase the percentage of cows on day 6 or 7 of the estrous cycle at initiation of Ovsynch.

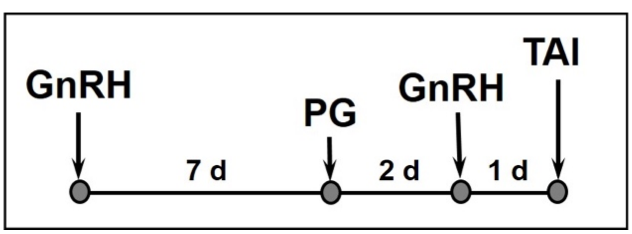


Figure 1: Original Ovsynch protocol in 1995. Ovsynch utilizes two hormone products: gonadotropin releasing hormone (GnRH) and prostaglandin F2α (PG). PG is also commonly called "lut" by dairy producers and workers in reference to the first commercial available PG product, Lutalyse. GnRH is used to cause ovulation of a follicle (ovarian structure that houses the egg) forming a corpus luteum (CL), which is a progesterone-producing ovarian structure in cows. PG has the function of regressing a CL, decreasing progesterone levels to basal or zero. TAI = timed-AI.

Currently, most successful pre-synchronization programs are: **Presynch-11 or 10, G6G and Double-Ovsynch** (**Figure 2**, page 2). Studies showed that conception rates are greater for cows receiving first service timed-AI following these programs compared to Ovsynch without pre-synchronyzation or to AI following heat detection. A recent study showed that cows timed-AI following Double-Ovsynch had 10% points greater conception rates for first service compared with AI following heat detection (49% vs. 39%, respectively) with similar average days in milk (77 days) at first AI. A difference of 13% points was also found when a Presynch program was compared to Ovsynch without presynchronization (50% vs. 37%, respectively). Since these programs can enhance fertility of lactating dairy cows they are referred to as “fertility programs or treatments”.

Another modification on the Ovsynch program that was adopted to increase conception rates was the addition of an extra PG injection 24 hours after the PG of Ovsynch. This extra injection decreased the percentage of cows with lack of CL regression at time of timed-AI. Recent studies indicated that between 10 and 20% of cows do not respond to the last PG of the Ovsynch program and have a lack of CL regression. Chance of pregnancy for cows that do not respond to this last PG injection is close to zero. This extra PG injection significantly increased the percentage of cows with CL regression (96% vs. 85%) and resulted in an increase of 3 to 5% points in overall conception rate.

In summary, great improvements were made on synchronization of ovulation programs to enhance fertility of lactating dairy cows following timed-AI. Data from several controlled studies indicated that fertility treatments can achieve conception rates greater than 50% in high producing dairy cows. However, other factors such as heat stress, herd health and protocol compliance can contribute to the success of the program and need to be taken in consideration to enhance overall reproductive performance success.

Figure 2: Fertility program calendars: Presynch-10; Presynch-11; G6G; and Double-Ovsynch. Information on other reproductive management strategies is available from the Dairy Cattle Reproduction Council: http://www.dcrcouncil.org/protocols.aspx

Presynch-10						
M	**Tu**	**W**	**Th**	**F**	**Sa**	**Su**
				PG		
				PG		
GnRH						
PG (am)	PG (am)	GnRH (pm)	TAI (am)			

Presynch-11						
M	**Tu**	**W**	**Th**	**F**	**Sa**	**Su**
			PG			
			PG			
GnRH						
PG (am)	PG (am)	GnRH (pm)	TAI (am)			

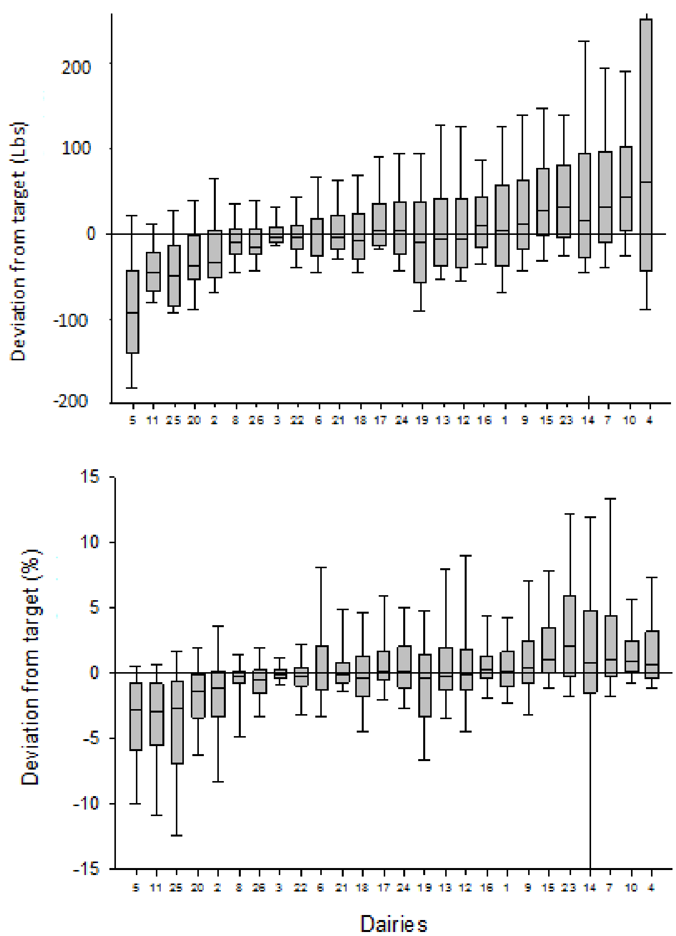
G6G						
M	**Tu**	**W**	**Th**	**F**	**Sa**	**Su**
PG		GnRH				
	GnRH					
	PG (am)	PG (am)	GnRH (pm)	TAI (am)		

Double Ovsynch						
M	**Tu**	**W**	**Th**	**F**	**Sa**	**Su**
				GnRH		
				PG		
GnRH						
GnRH						
PG (am)	PG (am)	GnRH (pm)	TAI (am)			

Total-Mixed Ration Ingredient Loading Accuracy and Precision from 26 California Dairies

Noelia Silva-del-Rio & Yolanda Trillo, Veterinary Medicine Teaching & Research Center

Feed is the single largest expense on a dairy, representing over 55% of the production cost in California. Based on the economic importance of feeding, it would be expected that ingredient loading into the mixer wagon is done with high accuracy and precision. However, in a study of 26 California dairies using a feed management software, we found that deviation from target weight on individual ingredients included in high-cow and high-cow-premix rations ranged from -78.7% to 21.9%. Figure 1 shows the large variation across dairies on loading accuracy and precision expressed as lbs (panel A) and percentage (panel B). Dairy 1 was the largest dairy with 6,900 milking cows and dairy 26 the smallest with 1,100 milking cows.



The most skilled feeders worked on dairy 3; they loaded ingredients with great precision (note the smaller boxes in the figures) and accuracy (note the boxes centered around target, 0, in the figures). This dairy was unique, with an on-staff feed manager that evaluated feeders' performance regularly as well as inventory. However, on dairy 5 (far left) accuracy was very poor. This dairy assigned a large tolerance level to ingredients, resulting in most ingredients being loaded under the target weight. Feeders on dairy 4 (far right) were the least precise (large box - panel A); however, the mixer wagon was large and loading errors were diluted when expressed in percentage (hence the relatively smaller box in panel B).

Dairy producers using a feed management software should take advantage of their records and evaluate feeder's accuracy and precision. Our data offers an opportunity to benchmark feeder performance on California dairies. Dairy 3 had outstanding accuracy and precision, so why don't you aim for the same?

Field Research on Sorghum Forages for the California Dairy Industry

Jeff Dahlberg, Kearney Agricultural Research & Extension Center

Beginning in 2011, UC-ANR researchers began testing sorghum forage hybrids in multi-location sites to evaluate their potential for forage production in the San Joaquin Valley. Drought and poor water allocations sparked interest in forage sorghums, primarily because of sorghum's inherent drought tolerance. Research trials have been grown at the Kearney Agricultural Research and Extension (KARE) Center and the Westside Research and Extension (WREC) Center and in 2016 an additional site was planted at the UC Davis Research Farm (UC Davis). A website was created (www.sorghum.ucanr.edu) where results from these evaluations have been posted over the last several years.

The reports provide a summary of yield, agronomic traits and nutritional analyses. Table 1 is from our 2016 research efforts, and represents some of the information that one can find in these on-line reports.

Lodging can be an issue in growing forage sorghums here in California and farmers need to be aware that sorghum forages need to be managed differently than corn silage. There are several types of forage sorghum, many that produce grain and several that do not. There are also BMR sorghums, sometimes called brown-midrib forages, that have reduced lignin and in many cases improved digestibility. All these require different management strategies to optimize yields and forage quality.

This past year saw the first reported cases of Sugarcane Aphid (SCA) in California (http://cekern.ucanr.edu/files/247779.pdf). Several forage fields in the San Joaquin Valley reported heavy infestation of SCA and silage samples have been collected to evaluate the impact on silage quality. Insecticide options are also being explored as we begin to understand control options to limit the impact of this insect on both production and quality in California.

UC-ANR continues to evaluate management strategies to minimize lodging issues, optimize irrigation levels and management of fertilizer applications. Given the limited amount of irrigation used in these studies, low inputs and high yields, the potential does exist in sorghum forages to save water and fertilizer, both costly inputs in the production of forages in the state. Sorghum selection should consider a combination of factors to optimize quality, yield and standability (lodging resistance). Additional management of feed rations is needed to optimize the potential of sorghum crops to supplement the feeding needs of dairies in the state.

Table 1. Summary of key forage characteristics by type of forage grown at four locations: KARE (2 planting dates), WREC, and UC Davis in 2016.

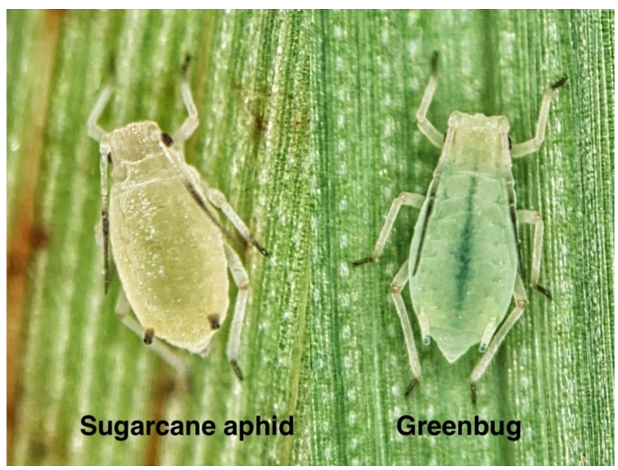
Sorghum Type[1]	% Lodging @ Harvest[2]	Tons/ac @65% Moist.[2]	% Crude Protein[2]	% ADF[2]	% NDF[2]	WT Acre in water[2]	% Lignin[2]	% NDF D30[2]	% NDF D240[2]	Milk lbs/ton DM[2]	Relative Feed Quality (RFQ)[2]
BMR (16)	22.29 c	21.04 bc	7.23 b	37.2 c	55.8 cd	0.888 bc	4.78 c	52.7 a	70.9 a	2544.5 a	106.90 a
NonBMR (15)	23.86 c	21.17 bc	6.86 bc	36.8 c	53.8 d	0.89 bc	5.31 b	44.3 b	63.5 bc	2487.6 a	95.99 ab
PS (2)	21.04 c	25.35 a	6.18 c	45.8 a	66.2 a	1.08 a	6.21 a	42.4 bc	66.7 b	1793.4 c	61.45 d
SGBMR (2)	69.38 a	17.87 c	7.60 b	37.2 c	53.3 d	0.770 c	5.24 b	44.8 b	63.8 bc	2547.1 a	96.51 ab
SGNonBMR (1)	20.00 c	24.05 ab	6.18 c	40.9 b	59.1 bc	1.03 ab	6.14 a	40.1 c	62.4 c	2154.8 b	71.56 cd
SGPSBMR (1)	42.92 b	21.00 bc	6.24 c	41.1 b	61.2 b	0.893 bc	5.35 b	50.7 a	70.5 a	2318.1 ab	87.29 bc
Millet (1)	1.00 d	13.19 d	9.07 a	39.2 bc	60.4 b	0.608 d	5.19 bc	52.3 a	71.0 a	2182.3 b	95.18 ab
Trial Avg.	25.35	21.12	7.02	37.75	55.71	0.892	5.15	47.98	67.13	2459.9	97.93

[1]Number in parentheses is the number of hybrids in each sorghum type. BMR = brown midrib; PS = Photoperiod sensitive; SG = Sudangrass.
[2]Means followed by the same letter do not significantly differ using LSD (P=0.01)

Sugarcane aphid a new pest in California sorghum

Nicholas Clark – UCCE Kings, Tulare, & Fresno Counties & Jeffery Dahlberg – Kearney Agricultural Research & Extension Center

In summer of 2016, several reports from the southern San Joaquin Valley came in about aphids in forage sorghum that were difficult or impossible to control with typical applications of dimethoate and chlorpyrifos. By the end of August, CDFA identified the species of this newly emerged pest as the sugarcane aphid – *Melanaphis sacchari* – now an invasive species. Previously, the sugarcane aphid (SCA) was a pest only in the south of the USA and Mexico, then more recently moved to the southwest. SCA are distinguishable from the greenbug aphid – *Schizaphis graminum* – by the lighter color from pale green to orange, and by the shorter cornicles with black tips on the rear of the insect (Figure).



Sugarcane aphid is a rapid reproducer with a new generation in less than one day. This insect is a parthenogenic (reproduces asexually), viviparous (gives live birth) reproducer with telescoping generations (the newly birthed nymph is already pregnant with the next generation). It's not surprising then that populations in host fields can spike from 50 to 500 aphids per leaf in two weeks (United Sorghum Checkoff, 2016). Hosts include *Sorghum spp.*, including forage and grain sorghums, Sudangrass, sorghum-Sudan hybrids, and the weed Johnsongrass. SCA will feed and reproduce readily on these species, whereas it may feed on corn, crabgrass, and Barnyardgrass but neither reproduce nor survive long. Good weed control is a start at curbing influxes of SCA into crops. Visit the UC Integrated Weed Management Page and consult your PCA to help develop a rigorous weed control program (http://ipm.ucanr.edu/PMG/WEEDS/pmg-info.html).

Populations of SCA have been reported to be distributed throughout a sorghum field, but early infestations may be localized on field edges. Infestation starts in the lower canopy and moves upward. SCA tends to congregate on the underside of leaves or in shaded areas of the canopy, but can be observed on stalks of the upper canopy in heavily infested areas. Feeding damage comes both from sap sucking on leaves and stalks as well as from the deposit of honeydew – excrement – on leaves. Sap sucking reduces translocation of photosynthates from leaves to plant sinks such as newly formed leaves and grain heads. Deposition of honeydew supports growth of sooty mold on leaf surfaces, which reduces the amount of light reaching chloroplasts in leaves, thus reducing photosynthesis. Both of these phenomena have the ultimate effects of early leaf senescence, delayed maturity, and reduced grain fill in grain and forage sorghums. A possible problem with heavy honeydew in a field may be the gumming of chopping equipment at harvest. Early control of SCA can protect yields and quality and make harvesting less difficult.

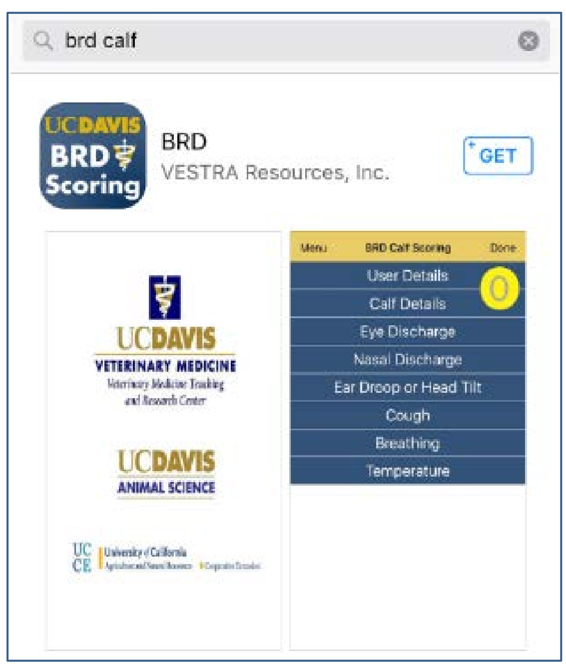
Control recommendations are based almost exclusively on studies performed on sorghum grown for grain production, so the following are not recommendations, but are probably guidelines for how we can begin to develop pest management tools for SCA in California produced sorghum for silage. Scouting should be frequent and early. Yield loss greatly increases when infestation occurs at earlier stages. Currently, the United Sorghum Checkoff recommends a treatment threshold of 50 aphids/leaf on 25% of the plants grown for grain. Currently, flupyradifurone (registered) and sulfloxafor (not registered for SCA on sorghum in CA) have been shown to provide good knockdown plus the greatest residual control of SCA in sorghum, although dimethoate and chlorpyrifos knock populations down quickly as well. Flupyradifurone and sulfloxafor are more selective materials and are softer on beneficials that predate or parasitize SCA, whereas chlorpyrifos and dimethoate are not. Tank mixes should be explored more, but spray timing studies have shown that when flupyradifuron and/or sulfloxafor are the first sprays in the season, SCA control and yield protection are better than when the first treatments are chlorpyrifos, even when followed by the more selective insecticides. Neonicotinoid seed treatments were shown to provide effective control for 40 days, and may be more important for late planted sorghum which will mature more slowly toward the end of the season. Other tactics of effective control may include spot treatment to knockdown and suppress early infestations on field edges, early harvest of field edges (if a late stage infestation), or early harvest of the crop (if the whole field is infested). The economic decision of early harvest should consider the cost savings from avoiding an insecticide treatment as well as the added costs of supplementing starch in the total mixed ration of the animals. These considerations are important since early harvest or non-treatment of an infested field is highly likely to result in undeveloped grain.

SCA should be expected as a repeat offender in summer-autumn of 2017 in CA. Until then, good weed control of Johnsongrass, Barnyardgrass, and crabgrass are pertinent. With the control tools currently available, early scouting and proper identification will be key in effective management of this pest. Still, more research is needed to evaluate effectiveness of insecticide control methods, economic thresholds, and timing of insecticide applications to develop CA forage sorghum specific information particularly useful to local production.

There's an App for that! Respiratory Disease in Dairy Calves

Betsy Karle- UCCE Glenn County & Sharif Aly, Veterinary Medicine Teaching & Research Center

The UC Davis School of Veterinary Medicine, Animal Science Department and UCCE are pleased to announce that the "UC Davis BRD" app is now available in English and Spanish for



both Apple and Android devices. The free app allows convenient access to the UC BRD scoring system and the user can easily calculate the prevalence of BRD in the pre-weaned calf group as an option in the tool. Users can also send their prevalence reports to any email address with an option to send a copy to the UC Davis School of Veterinary Medicine.

The app is based on the California BRD Scoring System that was developed by UC scientists and veterinarians as a convenient tool to diagnose BRD in pre-weaned dairy calves. The scoring system was created and validated in California, making it useful for the different climatic conditions that we face in our state. See the November 2014 California Dairy Newsletter (http://ucanr.edu/u.cfm?id=159) for a complete description of the scoring system. A scoring system chart is available from your local Cooperative Extension Dairy Advisor or at http://www.vmtrc.ucdavis.edu/laboratories/epilab.cfm

Preparing for the Next Storm

Deanne Meyer, UCCE Livestock Waste Management Specialist

Now is the perfect time to reflect on how your dairy did during the storms since Thanksgiving. Take just 10 minutes to think about how the cows, employees, and facility weathered winter thus far. I'd suggest a piece of paper, or your phone, for jotting down a few notes. Check all areas where your facility did well.

□ Roads maintained for milk truck and employees
□ Cows able to get out of water
□ Feed management area manageable
□ No increase in mastitis
□ Normal heat detection
□ Generators met electrical needs during outage
□ Gutters functional and diverted fresh water

□ Nutrient management plan working well
 □ Corrals drained sufficiently after storm events
 □ Run-off collected and transferred to lagoon
□ Lagoon capacity for 25 yr, 24-hr storm
□ Property berms firm
□ Run-on prevented from entering animal housing and feed storage areas

Make note of things you identify to do, either over the next few weeks or when everything dries out. As you work through your list, you will take comfort in knowing you're preparing for the next wave Mother Nature sends our way. There is comfort in being prepared!

Western Dairy Management Conference, February 28-March 1

Happy New Year! It's 2017, which means that the Western Dairy Management Conference is just around the corner. The conference begins Tuesday February 28 at 1pm and goes through Thursday afternoon. Pre-conference presentations are also available. We anticipate a great set of presentations, with research and information highlights that you can take home and implement. The conference will be held at the Peppermill in Reno, so it's a quick ride up the hill for many in California. To register, go to the conference website at http://wdmc.org

Sorghum Silage Meetings
Tuesday, March 7, 2017 – Madera
Thursday, March 9, 2017 – Tulare
10am – 1pm

Presentation topics:
Variety selection
Water & nutrient use
Invasive pests – how to manage for sugar cane aphid
2016 sorghum silage quality/nutrition reports

Look for the meeting flyer in February; for more information, contact Jennifer Heguy @ 209.525.6800 or jmheguy@ucdavis.edu

University of California Cooperative Extension

California Dairy Newsletter

Merced, Stanislaus & San Joaquin Counties
October 2016

Jennifer

Jennifer Heguy, Dairy Advisor
Merced, Stanislaus & San Joaquin Counties