UF IFAS UNIVERSITY of FLORIDA
Department of Animal Sciences

Dairy Update

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Program 2017 Florida Dairy Production Conference

The 53rd Florida Dairy Production Conference is scheduled for **Thursday April 20, 2017**. Location is the Alto Straughn Center, 2142 Shealy Drive Gainesville, FL. The program starts at 9 AM and adjourns at 5 PM with a reception.

The conference will bring together dairy industry leaders to discuss new strategies to improve feed efficiency of dairy cattle, impacts of biotechnologies on embryo production, and sustainability of the dairy industry. Program overview:

- **Alternative strategies for improving feed efficiency and sustainability** (Michael VandeHaar, Michigan State University)
- **Improving efficiency of microbial growth in order to reduce protein feed costs for cows** (Timothy Hackmann, University of Florida)
- **Lessons from 30 years working with dairy producers** (Art Donovan, University of Florida)
- **Effects of prepartum acidogenic salts on calcium and energy metabolism in transition cows** (Corwin Nelson, University of Florida)
- **Genetic and non-genetic effects on embryo production technologies** (Peter Hansen, University of Florida)
- **Challenges, opportunities, and prospects of US dairy production** (Robert Hagevoort, New Mexico State University)
- **The role of the modern dairy cow in improving the profitability of dairy production** (Greg Andersen, Seagull Bay Dairy, American Falls, Idaho)
- **Thinking outside the box: one panhandle farm's quest for sustainability** (Meghan Austin, Cindale Farms, Marianna, Florida)
- **Producer panel** (Greg Andersen and Meghan Austin; Moderator: Albert De Vries)

Registration and sponsorship info is available at http://dairy.ifas.ufl.edu/dpc/info.shtml. For additional information contact Francisco Peñagaricano (phone: 352-392-1981; email: fpenagaricano@ufl.edu) or Ricardo Chebel (phone: 352-294-4303; email: rcchebel@ufl.edu)

Don't Forget Genetics when Improving Milk Quality

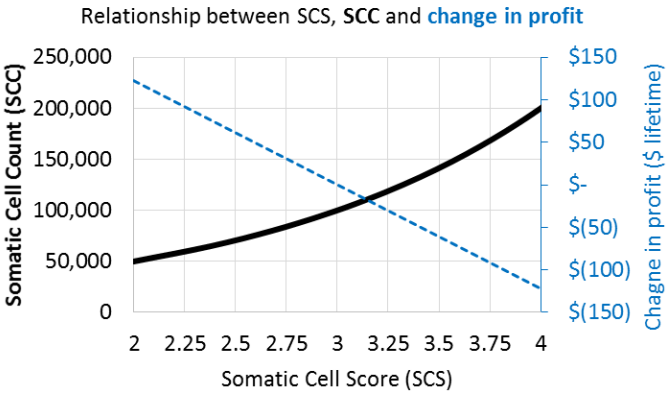
Albert De Vries and Francisco Peñagaricano

Milk quality and mastitis are primarily determined by management such as a clean environment and good milking procedures. Genetics also plays a role. Dairy farmers can buy semen from bulls that lower somatic cell counts (SCC). Since 1984, the source for USDA's genetic evaluations for SCC has been the information collected through the DHI system. USDA found that on average about 12% of the variation in SCC between cows is determined by genetics. Genetic values for males and females in the "official" genetic evaluations are presented as PTA SCS. This stands for predicted transmitting ability (that what is transmitted to the offspring) and somatic cell score (SCS). The SCS is calculated from the SCC as SCS = log2(SCC/100,000) + 3. Equivalently, SCC = $2^{(SCS - 3)}$ x 100,000. The figure shows the relationship between SCS and SCC on the left axis.

The genetic trait SCS is one of 12 traits included in the lifetime profit selection index Net Merit. The list of the top 20% of Holstein sires available in the US, as sorted by Net Merit in the August 2016 genetic evaluation (1,780 sires), shows that the lowest PTA SCS is 2.4 (SCC = 66,000) and the highest PTA SCS is 3.21 (SCC = 116,000). The average PTA SCS of the 1,780 sires is 2.80 (SCC = 87,000). To lower SCC by means of genetics, dairy farmers should look for sires with low PTA SCS. USDA says that "selection for lower SCS reduces the labor, discarded milk, antibiotic, and other health costs associated with clinical mastitis". Lower PTA SCS may also lead to higher milk prices, depending on the quality premiums paid.

The economic value of one point greater PTA SCS per lactation in the Net Merit index was set at −$44 by USDA, which includes a lost quality premium of $24 plus $20 for labor, drugs, discarded milk, and milk shipments lost because of antibiotic residue. The loss of $44 per lactation is equal to a loss of $122 lifetime, which is

assumed to be 2.8 lactations. As an example, suppose Sire A has a PTA SCS of 2.5 and Sire B has a PTA SCS of 3.0. Their daughters are expected to be 3.0 – 2.5 = 0.5 SCS different, which is valued at a difference of 0.5 x $44 = $22 per lactation and $61 lifetime in favor of the daughters of Sire A. The right axis in the figure shows what the expected change in profit per lifetime is for various SCS compared to an SCS of 3.



Emerging genomic testing technologies combined with new phenotypic data collection are also shaking up the way milk quality can be improved with genetics. Recently, Zoetis launched CLARIFIDE Plus, a commercial genomic test that gives dairy farmers the ability to genomically select animals based on different wellness traits. CLARIFIDE Plus allows farmers to identify and select animals with reduced genetic risk for six of the most common and costly health traits, including mastitis. Zoetis has reported that CLARIFIDE Plus can achieve genomic predictions at an early age with reliability values between 49% and 51% for the six health traits. Additionally, CRV also provides a commercial genomic test called HerdOptimizer that allows dairy farmers to genomically test young animals for multiple health traits, including clinical and subclinical mastitis. These genomic tests are based on farm recorded disease cases. Traditional and new genetic information should be part of any dairy farmer's tool box to improve milk quality and reduce mastitis.

This article first appeared in the fall 2016 issue of the newsletter of the Southeast Quality Milk Initiative.
http://sequalitymilk.com/the-sqmi-quarterly-fall-2016/

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Effective Use of Genomics in Commercial Farms: II. Replacement Heifer Selection

Francisco Peñagaricano

The selection of replacement heifers in commercial dairy farms has been traditionally characterized by very low intensity of selection, because in general farmers retain nearly every heifer calf as a future herd replacement. However, recent improvements in herd management have reduced involuntary culling rates and improved reproductive efficiency, which has led to the ability to produce excess heifers. Additionally, the use of sexed semen can also generate a considerable surplus of heifer calves. In this context, the selection of replacement heifers is feasible. The key question here is: how do we select the necessary replacements? In other words, how can we identify superior or inferior heifer calves accurately? The use of genomic testing, namely the use of genetic markers across the genome to predict breeding values, allows us to identify and select heifers at an early age.

What are the advantages of using genomics for selecting heifer calves? The key point is try to estimate as precisely as possible the genetic merit of a heifer at a young age. In the absence of genomic information, the selection or culling of a given heifer calf is based on the average genetic merit of her parents. The reliability of this information typically ranges from 0 when we do not know the parents to 0.40 if we have access to complete pedigree information. Now, if we use genomic testing, then the reliability of the genomic-predicted genetic merit of the heifer calf ranges from 0.55 to 0.75 depending on the trait of interest and the amount of pedigree data available. Interestingly, this genomic prediction early in life is generally more reliable than the traditional predicted transmitting ability (PTA) estimated using several lactation records on both the cow and her daughters. Therefore, genomic testing allows us to make accurate selection (culling) decisions at an early age; and these decisions are more reliable than those than can be achieved using pedigree information alone.

Probably one of the key points regarding the use of genomics for selecting herd replacements is to demonstrate that the results of the genomic testing are highly correlated with future phenotypic performance. Recently, colleagues at the University of Wisconsin-Madison compared early genomic predictions with subsequent production and reproduction performance in the first lactation of Holstein cows (Figure 1). Cows were ranked based on their own genomic PTA values (predicted at 12 months of age), and then these alternative quartile rankings (from top 25% to bottom 25%) were compared with the actual phenotypic

performance in first lactation. If there is an association between genomic testing and future performance, then we expect than the best heifers in terms of genomic values show greater phenotypic records. Indeed, for milk yield, the observed difference between the top and the bottom quartiles was equal to 4,800 lbs. (Top Figure 1). For female fertility, the actual difference in days open between those heifers classified as top 25% and those classified as bottom 25% was equal to 21 days (Bottom Figure 1). Therefore, these findings show that early genomic predictions (performed on calves or yearling heifers) can be effectively used as predictors of future performance. In other words, genomic testing can be used to make accurate selection decision at a young age.

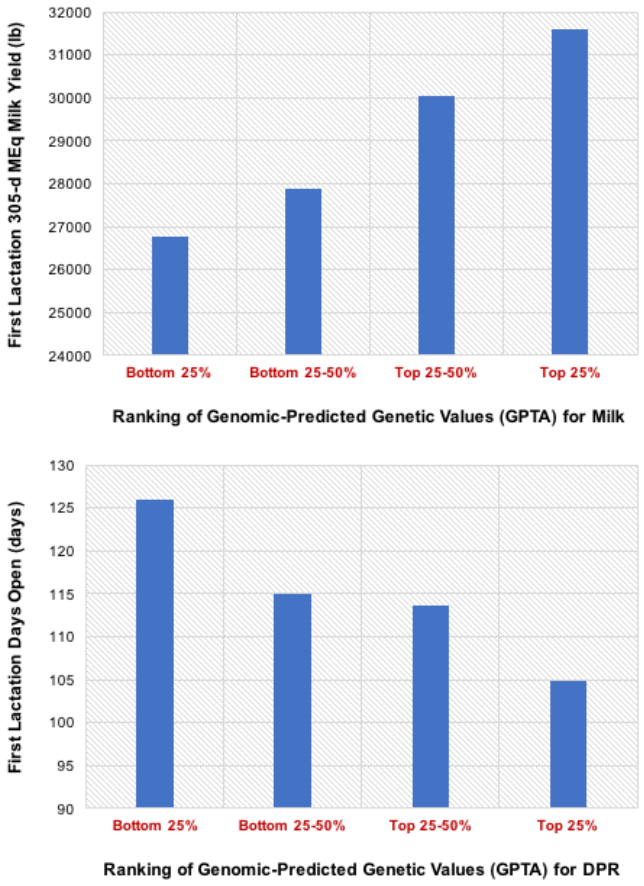

Figure 1. Production [305-d mature-equivalent (MEq) milk yield] and reproductive performance (days open) in first lactation according to the ranking of genomic values. The rankings were calculated based on genomic predicted transmitting ability (PTA) values estimated at 12 months of age. [Adapted from Weigel and collaborators (2015) Western Dairy Management Conference].

Genomic information on individual animals can be used to reduce feed costs and improve the genetic level of herd replacements. Indeed, the identification of genetically inferior heifer calves allows early culling of these animals, significantly reducing the cost of rearing replacements. Alternatively, these genetically inferior heifers can be inseminated with beef semen to produce high-value crossbred beef calves. Note that these cows inseminated with beef semen are in fact removed as parents of the next generation. On the other hand, the identification of superior heifers through genomics can be combined with the use of advanced reproductive technologies to rapidly propagate these animals and generate superior replacements. For instance, high-genetic-merit heifers can be used as donors in either an in-vitro fertilization program or an embryo transfer program. Instead, these superior heifers can be inseminated using sexed semen from top sires.

It is worth noting that genotyping replacement heifers has extra benefits other than making proper selection and mating decisions, including parentage verification, controlling inbreeding, and avoiding the spread of genetic disorders through genomic-enhanced matings. Arguably, these benefits add value to genomic testing.

Overall, genomics has revolutionized dairy cattle breeding. Nowadays, dairy farmers can use this technology to support more accurate selection or culling replacement decisions. Those producers that combine genomic testing with other management decisions, such as early culling to reduce feed cost or the use of advanced reproductive technologies to rapidly propagate the best females in the herd, will capture the greatest benefits of this technology.

For more information, contact Francisco Peñagaricano at fpenagaricano@ufl.edu or call (352) 392-1981 ext. 231. Francisco Peñagaricano is Assistant Professor of Dairy Cattle Genetics and Genomics in the Department of Animal Sciences at the University of Florida.

Seven UF Dairy Challengers Attend Southern Event

Mary Sowerby

Each fall collegiate students from West Virginia to Louisiana - Kentucky to Florida, meet together to compete and learn at the Southern Regional Dairy Challenge.

In 2016 the 11th Annual Southern Regional Dairy Challenge was held at Lake Blackshear Resort, Cordele, GA, on November 13-15. Fifty students from ten universities participated in the event including seven from the University of Florida: Gloria Rodriguez, Makenzie Spies, Staci Breske, Tatiana Recicar, Ruth Ann Galatowitsch, Catalina Mejia, and Shaylynn Kolwyck, accompanied by Mary Sowerby. None of these students have a dairy farm background, but all had been practicing dairy farm evaluation in class, on farms

and in other competitions and have developed a real passion for the dairy industry.

These seven ladies were each put on different teams of four or five students, given information about the host dairy farm, allowed to visit and ask questions at the host dairy farm, then given an afternoon to assemble a PowerPoint presentation about the strengths, challenges and opportunities they found on the farm.

The challenge of working with other students they had just met and evaluating the host dairy, then giving an oral presentation to a panel of judges is daunting, but all the teams prevailed. Ruth Ann Galatowitsch was honored to be on a first place team and Tatiana Recicar on a second place team.

Without Florida dairy producers willing to open their farms to students for practices and sharing information about the dairy industry, the Florida Dairy Challenge program would not exist. We currently have 6 students trying out for the 4-person UF Dairy Challenge team which will compete in the national event in Visalia, California, at the end of March, 2017.

Thank you to all of you producers who have and will share your time and experience with UF students and industry representatives who are willing to share their expertise to help these students evaluate dairy farms. This coming fall Florida will once again host the Southern Regional Dairy Challenge.

NORTH AMERICAN INTERCOLLEGIATE Dairy Challenge™
Tomorrow's Dairy Leaders

Prediction of the Future Florida Mailbox Price and Future All Milk and Feed Prices: February 2017 – January 2018

Table 1. Forecast of the future Florida Mailbox Price and Future All Milk and Feed Prices: February 2017 – January 2018

Month	Forecast FL mailbox price ($/cwt milk)	2014 Farm bill formulas	
		Forecast All-Milk price ($/cwt milk)	Forecast feed cost ($/cwt milk)
Feb-17	20.67	18.12	8.03
Mar-17	20.45	17.95	8.10
Apr-17	19.52	17.38	8.15
May-17	19.57	17.45	8.21
Jun-17	19.82	17.69	8.27
Jul-17	21.29	17.93	8.32
Aug-17	21.47	18.10	8.34
Sep-17	21.53	18.15	8.36
Oct-17	21.91	18.79	8.35
Nov-17	21.92	18.79	8.38
Dec-17	21.70	18.56	8.42
Jan-18	20.85	18.29	8.45

Based on futures prices of February 17, 2017.

The forecast All-Milk price and the forecast feed cost have been added to the table since the Fall 2014 issue of Dairy Update (see http//dairy.ifas.ufl.edu/dairyupdate). These forecast are based on the formulas in the 2014 Farm Bill. Daily updated Florida mailbox price forecasts are found at http://future.aae.wisc.edu/predicted_mailbox/?state=Florida Feed costs are found at http://future.aae.wisc.edu/tab/costs.html#94.

For more information, contact Albert de Vries at devries@ufl.edu or (352) 392 5594 ext. 227.

Dairy Extension Agenda

- April 1, 2017. **Family Day at the Dairy Farm.** This is the Open House at the University of Florid Dairy Unit in Hague, FL. More info at https://www.facebook.com/FamilyDayattheDairyFarm/
- April 20, 2017. **53rd Florida Dairy Production Conference**, Straughn Center, 2142 Shealy Drive, Gainesville, FL. More info at: http://dairy.ifas.ufl.edu/dpc/info.shtml

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