UF IFAS UNIVERSITY of FLORIDA
Department of Animal Sciences

Dairy Update

Quarterly Newsletter **Vol. 17 No. 4** **Fall 2017**

Dairy Extension Agenda

- November 8-9, 2017. 5th **Southeast Milk Quality Initiative** (SQMI) annual conference, Nashville, TN. Program focuses on dairy producers, milkers, veterinarians and extension agents. Program at http://sequalitymilk.com/5th-annual-meeting-nov-8-9-2017/ The University of Florida is a partner in SQMI. More information: Albert De Vries, devries@ufl.edu
- November 12-14, 2017. **Southern Regional Dairy Challenge**, Live Oak, FL. The Southern Regional Dairy Challenge allows dairy science students to apply theory and learning to a real-world dairy while working as part of a team. Approximately 80 college students from 16 schools in the Southeast hope to learn and compete how to evaluate a Florida dairy farm and make recommendations. More information: Mary Sowerby, meso@ufl.edu, or Albert De Vries, devries@ufl.edu
- February 6-7, 2018. 29th **Florida Ruminant Nutrition Symposium**, Gainesville, FL. More information at http://dairy.ifas.ufl.edu/rns/info.shtml

Dr. Antonio Faciola Joins UF Animal Sciences in the Area of Livestock Nutrition

Dr. Antonio Faciola recently joined the faculty in the Department of Animal Sciences at the University of Florida, after serving on the faculty at the University of Nevada for 4 years. He grew up in a ranch in the Brazilian Amazon, where his family raised water buffaloes, beef and dairy cattle for over 100 years. He received B.S. and M. S. degrees in Animal Sciences from the Federal University of Viçosa, Brazil, a Ph.D. in Dairy Science from the University of Wisconsin-Madison, and was a postdoc at the ARS-USDA U.S. Dairy Forage Research Center. The overall research goal of his laboratory is to further our understanding of ruminant nutrition to improve the efficiency of nutrient utilization in order to enhance animal production and minimize environmental impact of livestock operations. Dr. Faciola has developed several projects in pursuit of this goal including a 5-year research project funded by the Canola Council of Canada to investigate the effects of feeding canola meal to dairy cows. This research has showed that replacing soybean meal with canola meal

can increase production by about 2 lb of milk per cow per day. Other projects include evaluation of alternative feeds, feeding different oilseeds, and determining the nutritional value of different forages for dairy cows. At UF he will be developing a methodology called the dual-flow continuous culture system, which simulates ruminal digestion in the lab, allowing testing feedstuffs faster and more economically. He has been an invited speaker in Brazil, Canada, Italy, Kazakhstan, South Africa, Turkmenistan, U.S.A., and Uzbekistan. He is an Ad Hoc reviewer for over a dozen scientific journals including the Journal of Dairy Science and Journal of Animal Science, and is currently an Associate Editor for Frontiers in Microbiology and Scientia Agricola. At UF he will be teaching Principles of Animal Nutrition and a graduate course on livestock nutrition. Prior to joining UF he was awarded the 2016 Researcher of the Year and the 2017 Early Career Innovator in Nevada. The ultimate goal of his program is to have a positive impact on society by educating future college generations, training prospect scientists, and improving livestock operations locally and globally. For more details on his research projects, lab personnel, teaching, and publications, please visit his website at: www.faciola.com. Contact Antonio Faciola at afaciola@ufl.edu.

Dairy Bull Fertility

Francisco Peñagaricano

Dairy bull fertility receives in general scarce attention. However, the fertility of the bull is critical in determining the reproductive performance of the herd. Indeed, some studies have shown that a significant percentage of reproductive failure is attributable to bull subfertility.

Since August 2008, the US dairy industry has access to a national phenotypic evaluation of service sire fertility called Sire Conception Rate (SCR). This bull fertility evaluation is exclusively based on field data. The current model includes both factors related to the service sire under evaluation (including age of the bull and AI organization) and also factors (nuisance variables) associated with the cow that receives the unit of semen (including herd-year-season, cow age, parity, and milk yield). The trait SCR is defined as the expected difference in conception rate of a given bull compared to the mean of all other evaluated bulls; in other words, a bull with an SCR value of +5.0% is expected to achieve a conception rate of 36% in a herd that normally averages 31% and uses average SCR bulls. Contrary to evaluations for other traits such as production or cow fertility, SCR is designed as a phenotypic rather than a genetic evaluation, because the published estimates include not only genetic but also non-genetic effects.

Currently, there are about 12,500 Holstein bulls and 1,500 Jersey bulls with official SCR evaluations. Figure 1 shows the distribution of SCR values in these two breeds. Interestingly, there is a remarkable variation in SCR both in Holsteins and in Jerseys; indeed, there are more than 10 points (10% conception rate difference) between the two extremes, i.e., between high-fertility and low-fertility bulls. Our group is investigating potential genetic factors underlying this variation. Recently, we evaluated the feasibility of predicting SCR using genomic data. Notably, our findings suggest that genomic prediction of service sire fertility is feasible. This could be the foundation for the development of genomic tools that help the dairy industry to make accurate genome-guided decisions, such as early culling of predicted subfertile bull calves.

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.

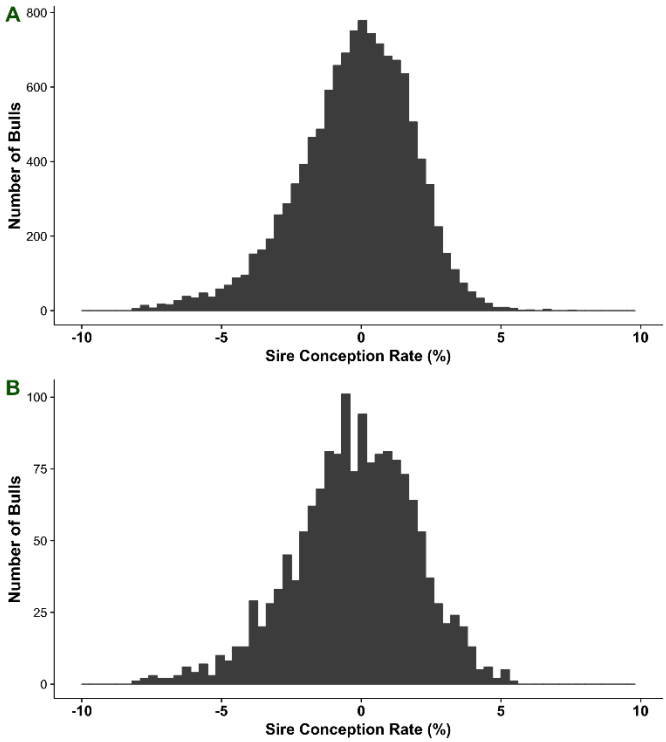


Figure 1. Distribution of Sire Conception Rate (SCR) values in Holstein (A) and Jersey (B) bull population.

Expected Profit Differences of Dairy Heifer Calves Ranked on Net Merit Dollars

Michael Schmitt and Albert De Vries

More and more dairy farmers have a surplus of dairy heifer calves. These calves are not needed to replace culled cows or for herd expansion. One option is to sell the surplus calves at a young age. Let's assume that the dairy farm wants to keep those calves that are expected to become the most profitable cows. The calves that are expected to become the least profitable cows are sold. What the farm needs is a ranking of all dairy calves for future profitability.

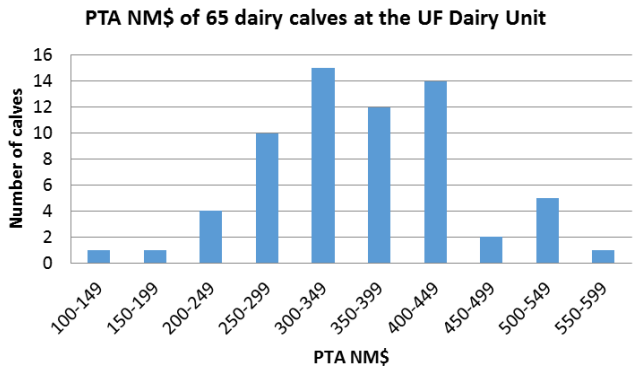
Many factors affect a calf's expected future profitability, such as birth weight, disease events (pneumonia), and heat stress during gestation. Another important factor is the calf's genetic merit, such as for traits like milk yield, daughter pregnancy rate, or productive life. The trait Lifetime Net Merit (NM$) combines 13 economically important traits into a profit index. The NM$ index is defined as expected lifetime

profit as compared with the breed base cows born in 2010. For Holsteins, the average number of record equivalents is 2.78, which means that lifetime is about 3 year after first calving. All NM$ values in the US are expressed as predicted transmitting abilities (PTA) and are available based on parent (sire and dam) average or from genomic testing.

Ranking and finding the lowest NM$ calves on a dairy farm is straightforward, but what about the differences in expected lifetime profit? Example: Two young calves are in an overcrowded pen, and a decision needs to be made about their future on your dairy. The two calves have NM$ PTA of $400 and $300. There is a $100 difference in NM$ PTA among them, so it is expected that the difference in their lifetime profit is $100, right? No. The PTA represents the expected genetic values they are expected to transmit to their offspring, but for this case we want to know the lifetime profit that these two calves will generate for themselves, in addition to their offspring. Because of this, the PTA value is multiplied by 2 in order to calculate the estimated breeding value (EBV) for each calf and the result is a $200 NM$ EBV difference. However, not all calves will reach maturity and be allowed to fully express their genetics on the farm. For this farm, say 10% of calves will not make it to maturity either from death, culling, etc. Consequentially, 90% of calves will reach maturity to express their genetic merit. Thus, multiply the $200 EBV difference by 90% of calves reaching maturity, resulting in a $180 expected difference between the two calves. But that is not all. If they reach maturity, these two calves will also pass along their genetic merit to future generations of offspring, which is not accounted for in the NM$ PTA. Half of the genic merit is expected to be passed to the second generation, half of that genetic merit is passed to the third generation and so forth. The genetic merit difference will continue to be half of the previous generation. This concept is called gene flow. The sum of these effects is a gene flow multiplier of 2 (= 1 + 1/2 + 1/4 + 1/8 etc.) when a calf is expected to replace itself once.

However, the expressions of genetic merit differences in the future need to be discounted to recognize the time value of money because a dollar made in the future is worth less than a dollar made today. A reasonable multiplier to account for the time value of money when all future generations are included is 0.65. So the difference of $100 NM$ PTA between both calves is actually $100 x 2 x 0.90 x 2 x 0.65 = $100 x 2.34 = $234 in today's dollars. The difference in PTA NM$ between calves is only 43% (100/234) of their differences in the present value of their lifetime profit when the value of their offspring are included. Differences in PTA are worth more than we typically assume.

The figure shows the NM$ for 65 dairy calves born at the University of Florida Dairy Unit between January and May 2016. The lowest NM$ PTA was $133 and the highest was $571. The difference between the lowest and highest PTA NM$ calf was $438, but in terms of the present value of lifetime profit, the differences was 2.34 x $438 = $1025!



The difference in EBV of the lowest and highest calf is 2 x $438 = $876. Assuming the calves are on average 3.5 years old when these genetic differences are displayed, a multiplier of 0.84 is used to account for the time value of money when we ignore the value of the offspring. So the highest PTA calf has a $876 x 0.90 x 0.84 = $662 greater expected lifetime profit than the lowest PTA calf, expressed in today's dollars. Per lactation, this is a $221 difference. The value is even greater when the expected lifetime is greater than 3 years (when the herd cull rate is lower). Notice that these economic calculations do not change the ranking of the dairy calves based on their PTA of NM$. The same surplus dairy calves will be identified.

There are many assumptions in the math above. The NM$ is based on many educated guesses about future feed, milk, beef, and other prices. The time value of money depends on the opportunity cost of money, such as the interest rate. The gene flow multiplier is much greater than 2 if a calf is later used as a donor in an embryo transfer program, but less if she is likely not to reproduce.

The math shows that differences in lifetime profit of the calves are quite a bit bigger than it appears at first when looking at the PTA differences in NM$. It is encouraging that dairy farmers want to have a clearer understanding of how genetic merit impacts the profitability of replacement decisions.

Michael Schmitt is a graduate student in the Animal Sciences graduate program. Contact Albert De Vries, devries@ufl.edu

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Market Watch: Variations in Prices for Top Average Heifers, Heifer Calves, and Dairy Bull Calves

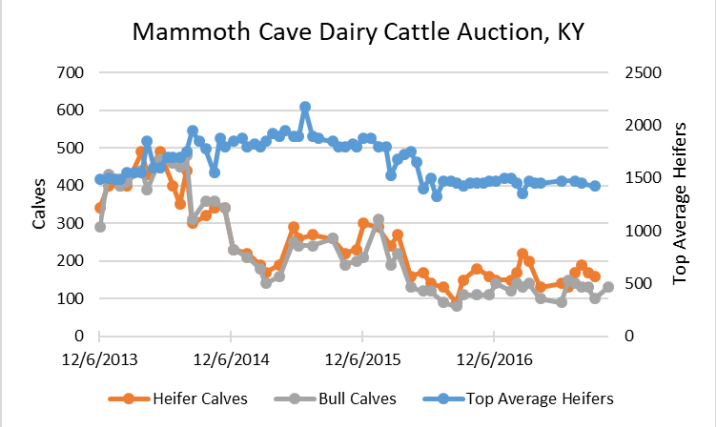
Albert De Vries, Pornpamol Pattamanont and Fernanda Ferreira

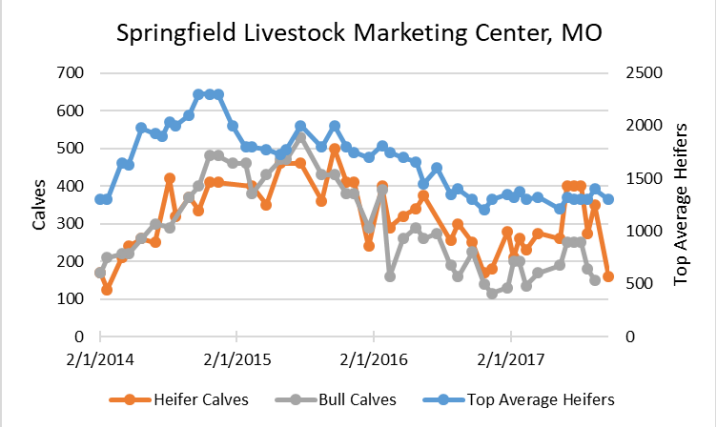
A Florida dairy producer asked us about historical price data for heifer calves and dairy bull calves for the past 10 years. After searching on-line and asking around, we concluded that these historical data are not available in one easily accessible format. Fortunately, www.progressivedairy.com/marketwatch/ provides frequent reports of auction prices from approximately 20 auctions across the US. The prices in the Market Watch are edited to be for Holstein dairy cattle as much as possible. Reporting of these prices by the auctions to Progressive Dairyman is not standardized, however.

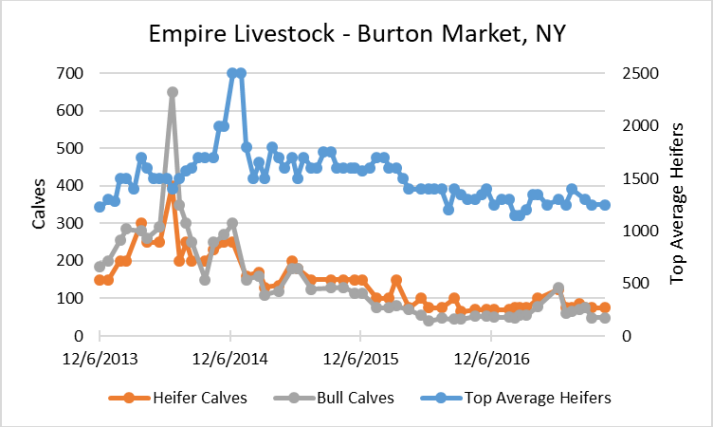
Progressive Dairyman was so kind to send us their historical market watch data in a format few could work with. The four figures show the reported prices from four auctions (KY, MO, NY, CA) for Top Average heifers (springers), Heifer Calves and Bull Calves. The data are from approximately January 2014 to October 2017.

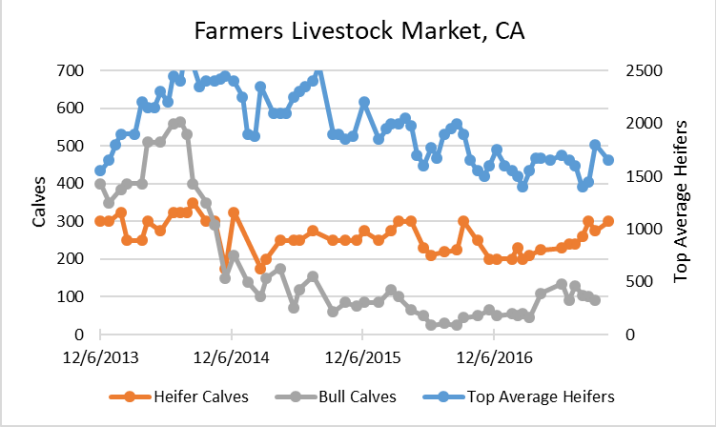
Within each auction, prices often show quite a bit of variation from month to month. Heifer calf and bull calf prices were quite similar at the KY and NY auctions. Heifer calves have been worth quite a bit more than bull calves at the CA auction lately. Across these four auctions, the average prices were $1695 for Top Average heifers, $240 for heifer calves, and $222 for bull calves. The average correlation between heifer calf prices and bull calf prices was 0.80. The average correlation between heifer calf prices and Top Average heifer prices was 0.58. The KY auction had slightly higher correlations.

For more information, contact Albert De Vries, devries@ufl.edu









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

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

Month	Forecast FL mailbox price ($/cwt milk)	2014 Farm bill formulas	
		Forecast All-Milk price ($/cwt milk)	Forecast feed cost ($/cwt milk)
Oct-17	20.95	17.91	7.70
Nov-17	20.68	17.61	7.72
Dec-17	20.54	17.45	7.74
Jan-18	19.57	17.08	7.80
Feb-18	19.56	17.06	7.86
Mar-18	19.55	17.03	7.93
Apr-18	18.72	16.57	7.98
May-18	18.85	16.69	8.04
Jun-18	19.03	16.88	8.09
Jul-18	20.59	17.12	8.14
Aug-18	20.76	17.28	8.18
Sep-18	20.87	17.37	8.22

Based on futures prices of October 18, 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.

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