Dairy Pipeline

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Genomic Testing – 15 years in

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Starting in 2009 dairy producers and breeders have had access to genomic testing. Currently, genomic tests can be run on any dairy animal—including crossbred animals. Testing can be performed using hair, blood, or tissue samples from individual animals. In the United States, these analyses are offered by three main laboratories: Genetic Visions (www.geneticvisions.com); Neogen (www.neogen.com/dairy-genomics); and Zoetis (www.zoetisus.com). Any of these companies can provide genomic data to farmers with similar information.

All genetic and phenotypical data is processed by the CDCB (Council on Dairy Cattle Breeding) providing a central database that is fair and available to all producers. The CDCB analyzes data, formulates genetic evaluations, and researches different traits used by breeders. This data is used to increase productivity on dairy farms.

Even if you have never used a genomic evaluation directly, your farm has been positively affected by genomic data and the data collected by breeders. All milk testing, classification, and farm management data collected on farms is used to verify genomic predictions over time to maintain integrity of the data output.

The chart below from the CDCB shows the incremental increase in net merit for available Holstein bulls from 2000-2020. As you can see, the rate of gain continues to increase. This is a result of the top-end bulls being higher, but also from less of those lower-end bulls being available.

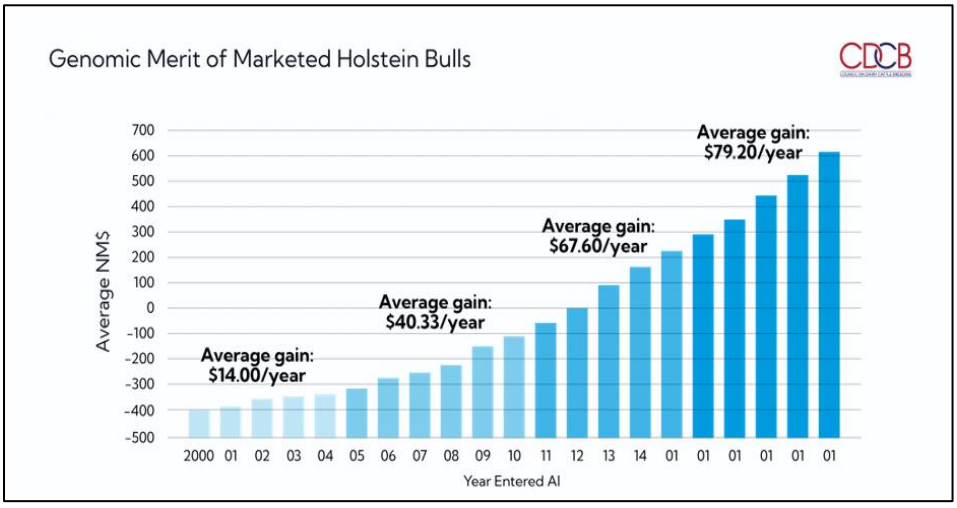

Figure 1. Genomic Merit of Marketed Holstein Bulls.

Traditionally an animal's genetic merit was evaluated using parent averages and then collected data on that animal when available. The accuracy of parent averages is around 40% for most production traits and less for other traits. With

genomic data, the accuracy is nearly 80%--double that of the former method. It is still not a perfect system but eliminates much of the variability in the genetic pool. The snippet from this genomic report shows the change in the genomic reliability verses parent average.

GENOMIC PREDICTIONS	Genomic PTA	April 24GU PA/PTA	Genomic REL %	April 24GU REL %
SELECTION INDEX				
Total Performance Index (TPI)	2042	2023	78	40
Net Merit ($)	-165	-214	72	
YIELD TRAITS				
Milk	-287	-470	79	41
Fat (lbs)	1	-6	79	41
Fat (%)	0.04	0.05	79	
Protein (lbs)	-5	-13	79	41
Protein (%)	0.01	0.01	79	
Feed Efficiency	-48	-71	79	41

Figure 2. Genomic predictions showing the change in genomic reliability verses parent average.

In addition to a more accurate prediction of the animal's ability to produce and reproduce, genomic predictions can be available at a very young age. Hair can be collected the day the calf is born and sent to the laboratory for testing. By the time the calf is a month old, the genomic predictions will be available with greater accuracy than we used to have on an animal that we would wait five years to obtain.

Genomic testing can benefit any dairy farm, regardless of what your farm goals are. Because the test combines production traits, type traits, health traits, and recessive traits anyone can find value in them. An additional benefit of genomic testing for any farm is a more accurate identification of animals.

How can you start using genomic testing on your dairy? You already are by using genomic-tested bulls. The next step is to establish goals for your herd. Once you know what goals you are looking for genetically, you can then determine a testing protocol and mating strategy for your farm. This will be different for each farm and can be done regardless of which lab you use for testing or where you purchase your genetics.

Genomic testing can also assist in making decisions on which cows to cull or breed to beef in herds that are managing heifer inventory. Culling the lower-end animals or breeding to beef sires to eliminate their genetics from the future herd are both options for managing a herd.

In addition to managing inventory and rate of genetic progress in your herd, you also have the opportunity to fine-tune the genetic profile of your herd. Great progress can be made in a few years on components, productive life, type, and overall profitability on a farm. Cows with the genetic capability to produce large volumes of high-component milk with fewer health problems can be had by strategically using genomics. You may not want to test every animal born on your farm, but initiating genomic profiles to fine-tune your operation is a management tool that can pay big dividends over time.

Weaning calves successfully!

Authored by Robert James, Professor Emeritus of Dairy Science, Virginia Tech; and consultant at Förster Technik. Reprinted from CalfBlog.com.

Feeding and managing preweaned calves is expensive on a per-day basis. Fortunately, it's a relatively short time in the life of the calf and a minor percentage of total rearing expenses. Traditionally, the goal for preweaned calf management has been to encourage rumen development and early weaning to reduce these expenses on a cost/day basis. **Shouldn't the goal be to manage the calf to achieve her genetic potential for growth, lactation potential, and health?** There is no other time in the calf's life when growth will be more efficient! This period also has a large impact on health and future performance.

Consider beef cattle where calves consume multiple meals each day and aren't weaned until six months of age or later. The early-life dry diet for the beef calf is usually pasture with high sugar and digestible fiber content. Compare this to how we manage the dairy calf with twice-a-day milk

feeding, individual housing, and calf starter grain. Over the past few years, the trend to feed more milk has become more common and has made successful weaning of dairy calves much more challenging, especially if we try to wean them at a young age!

How can we manage calves to attempt to replicate the situation with the beef calf, but within the practical limitations of the modern dairy farm?

Liquid diet

- Individually housed calves are typically fed twice daily by bucket or bottle. Calves have been weaned by feeding once daily which constitutes a significant stress to the calf, particularly when daily milk intake may exceed 6L/day. To ease the transition, reduce feeding by 1L/feeding for at least four days and then go to 1X feeding. Extending the weaning process to two weeks is likely even less stressful (one week of reduced milk/feeding and one week of 1x/day feeding).
- The autofeeder is well suited to a more "normal" weaning. Ad libitum milk intake is recommended (limited to 2L every two hours) for 28 to 40 days. Reduce milk intake over four days from 12L to 8L or less/day. Hold milk intake to 8L for ten days and then reduce milk over 14 days to 2L. This provides sufficient nutrients from milk for better early growth and the stepwise reduction in milk encourages starter intake and an easier transition to life without milk.
- When to wean? Most published research involved weaning at less than six weeks of age. It should not be surprising then that these calves experience decreased body weight gains due to the lower digestibility of nutrients from calf starter grains as compared to milk. Research indicates that calves weaned at over 12 weeks of age, compared to those weaned early, are better metabolically prepared to transition to a diet without milk. Prolonging milk feeding by two to four weeks encourages superior growth, improved intestinal development and higher feed efficiency compared to calves weaned at less than seven weeks of age. Is the additional expense in feeding milk for a longer period offset by improved health during the post-weaning period or ultimately more milk during the first and later lactation? Unfortunately, there are few studies comparing the economic implications of six-week weaning to eight- to ten-week (or more) weaning. It is logical to assume that the ability to better manage intake through autofeeder systems simplifies weaning in a less stressful manner.

Dry feeds

- The first consideration for a calf starter is that it tastes good to the calf! Always make sure to have fresh starter and discard any that has become moist from rain or calf water. When milk allocations exceed 8L/day, research indicates better performance post-weaning with crude protein levels of ~22%.
- Starch levels range between 20-40%. Higher starch levels appear to increase the likelihood of acidosis in the calf which is not desirable. To replicate the beef calf's diet, a sugar content of up to 14% is suggested. Lower starch and higher sugar content diets appear more favorable to rumen development. More rapidly digested starch sources from wheat or barley grains should be avoided in calf starter grains.
- **Forage -** The availability of forage to the preweaned calf has been debatable. The low energy content relative to feed grains suggests limiting it in the diet. Research has shown that providing limited amounts of chopped small grain or grass hay promotes starter intake. It is not uncommon to observe calves consuming straw bedding during the preweaning period. Alfalfa hay or silages are not recommended during the weaning period.
- **Water** - Clean water should always be available. During the winter offer water immediately after feeding milk. Clean buckets to prevent algae growth during the summer.
- **Housing -** The calf hutch or other individual housing systems have been the "gold" standard for calves. However, research and the experience of many dairies show that calves housed in pairs or group housing consume starter earlier, adapt to post-weaning systems better and exhibit other behavioral benefits extending throughout their lives. They adjust to new situations (cow grouping) or new feeds better. An added benefit is that calf rearing on dairies is better perceived by the consumer.

How the dairy can facilitate successful weaning from both the perspective of the dairy owner and the calf:

- Provide a high-quality, liquid diet based on either milk or milk replacer. Feed sufficient solids from this diet to support gains, which enables the calf to double its birth weight by 56 days. This means more than 6L of milk or a high-quality milk replacer (~24% CP) per day.
- Wean calves by a step-down reduction in milk rather than an abrupt transition to once-daily feeding.
- Calf starter palatability is the primary concern. It should contain ~22% protein with moderate starch levels of 20-25% and sugar content of 10-15%.
- Offer high-quality chopped grass, small grain hays, or straw before and just after weaning.
- Plan for housing calves in pairs or group housing systems before weaning.
- Manage your calves, which means having sufficient information to evaluate the economic consequences of changes to your calf feeding program.

Upcoming Events

November 7, 2024
Grain Bin Entrapment Awareness
Open to all involved in Agriculture & Emergency Services
Rocky Mount, VA

November 8-9, 2024
Grain Bin Entrapment Training
Open to Rescue Team personnel - See details
Rocky Mount, VA

December 13-14, 2024
VA WISE Cattle & Equipment Women Increasing Skills & Education
Chatham, VA

If you are a person with a disability and require any auxiliary aids, services, or other accommodations for any Extension event, please discuss your accommodation needs with the Extension staff at your local Extension office at least 1 week prior to the event.

Additional Notes:

- Virginia Cooperative Extension has compiled a list of resources on their Hurricane Helene Resource Page for those who need assistance.

- **Southwest Virginia Agriculture Relief Program** Virginia Cooperative Extension, Virginia Cattlemen's Association, Virginia Farm Bureau, and others are here to help farmers impacted by Hurricane Helene. If you are interested in donating agricultural materials to farmers in need, please fill out this form → Donations for Farmers Affected by Helene in Virginia (https://shorturl.at/tsQ2U).

- The dairy extension group is working with VDH to assist in distributing PPE to dairy farms. Request a kit online at https://shorturl.at/ethov or contact your local extension agent. Requests will be filled as supplies allow.

- Have a question, suggestion, topic, or idea for the dairy extension group? Your input could guide future programming! Please complete the short survey at tinyurl.com/mrxfctan and let us know your thoughts.

For more information on Dairy Extension or to learn more about our current programs, visit us at VTDairy—Home of the Dairy Extension Program online at www.sas.vt.edu/extension/vtdairy.html

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