Genomic testing in dairy cattle: What can we do with this information and what strategies can we develop?

David Erf, MS, Geneticist, Dairy Technical Services, Zoetis
Saint Paul, MN 55128

Abstract

Genomic testing is closing in on 10 years of existence in the dairy cattle genetics industry. In 2008 this technology was introduced, 2009 brought genomic evaluations to the marketplace, and 2010 saw the first commercial genomic testing in the dairy industry. Fast forward to 2018 and we will see well over one-half million dairy animals tested this year. To put into perspective, we have progressed from less than 1 out of every 200 dairy heifers being tested 7 years ago to more than 1 out of every 10 being tested today.

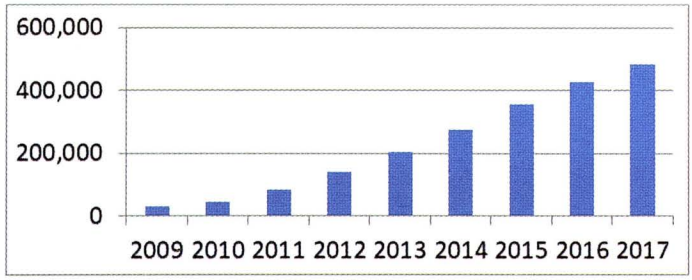
Key words: dairy, genomics

Résumé

Le testage génomique existe depuis près de 10 ans dans le secteur de la génétique des bovins laitiers. Cette technologie a fait ses premiers pas en 2008. L'évaluation génomique est apparue en 2009 et les premiers succès commerciaux du testage génomique dans l'industrie laitière datent de 2010. Avançons en 2018 et nous verrons plus d'un demi-million de bovins laitiers testés cette année. Pour remettre le tout en perspective, il n'y avait qu'une génisse laitière testée sur 200 animaux il y a de cela 7 ans tandis qu'aujourd'hui une génisse laitière sur 10 est testée.

Introduction

The chart below shows the progress in the use of genomics:



While many factors can explain the rapid growth of genomic testing, the bottom line is that this information has to help herds be more profitable or testing will not continue.

As new herds contemplate adding genomic testing to their overall approach to managing the dairy, they should not approach this technology blindly.

Using Genomics and Developing Strategies

As I encounter new genomic testing candidates, we have to ask and answer some very pertinent questions to whether the herd should start testing;

1. Am I ready for this technology? Is my management up to par?

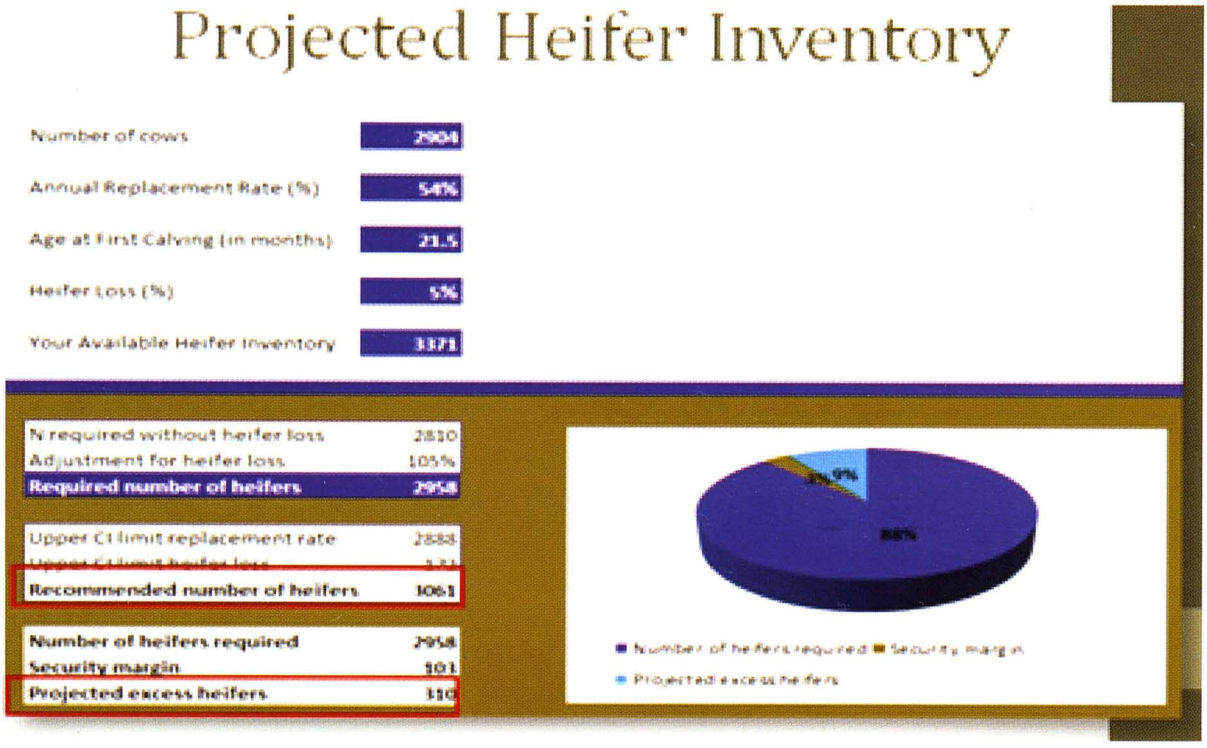
While all herds do not like having their shortcomings pointed out, when looking at whether or not to add genomic testing, it is crucial to be honest about your management level. All genetic estimates are fit to an average management level. If a herd has deficiencies in areas, these may dilute the effect of genomic selection as the environment comes into play. I have seen herds that have top-notch managers that rate themselves low, and vice versa. One way to get a rough measure is to evaluate response to genetic selection in the current herd. If favorable, then genomic testing may be an option. If not, we have to ask what is happening in our herd to slow down this response?

2. Does the herd have opportunities to use the data?

Just having a favorable response to genetic selection does not mean to start genomic testing. The question of where this data will be used to make decisions MUST come into play. The key areas to consider are dealing with the inventory numbers (heifers to raise) and which animals to obtain replacements from. In today's dairy economy, any efficiencies we can implement are very impactful. Currently, a good majority of dairies are raising excess heifers simply because they can make them. This can hurt their profitability in 2 ways – added costs of raising more heifers and lost milk production from milking more young cows. Here is a herd that I visited in the past year that has great opportunities in this area.

This herd has worked themselves through sexed semen and improved reproduction to a 54% turnover rate. If they dropped to a 40% turnover rate, they could raise 1,000 less heifers. The cash flow and cost savings are quite substantial. Having a culling strategy is crucial in making genomic testing work.

Also, having a sound breeding strategy is another area to utilize genomic testing. Knowing and executing that plan that creates the desired number of heifers you need to maintain current milking herd size will help the herd focus on the best animals for creating the next generation.

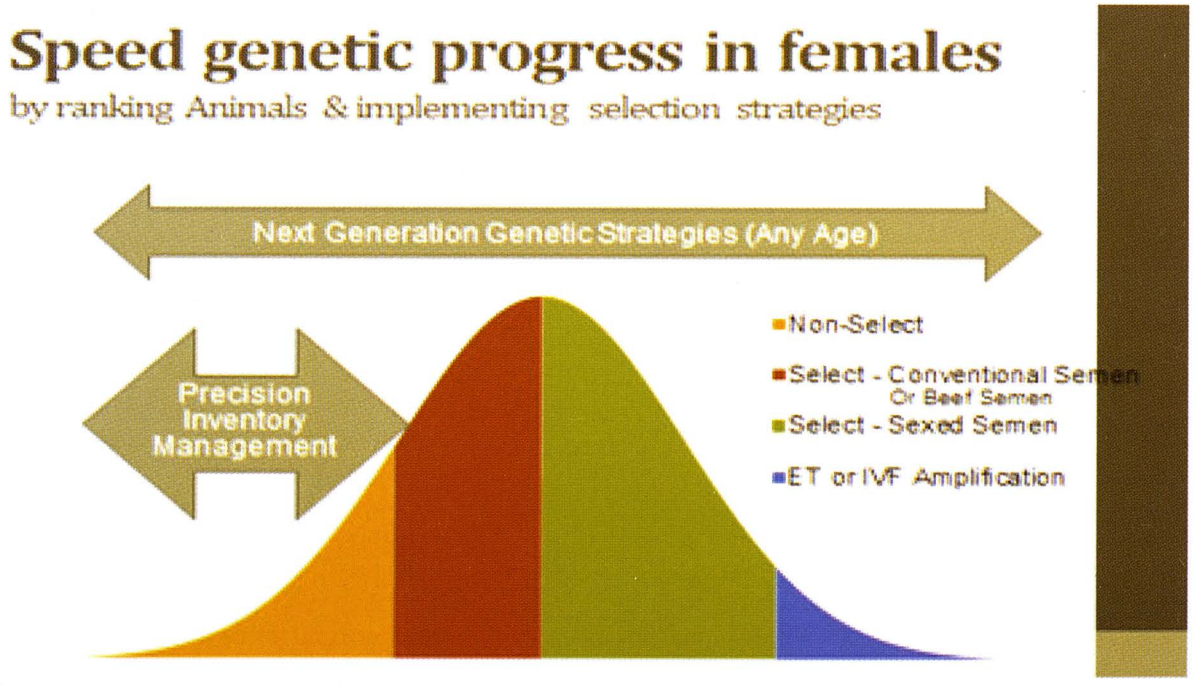


3. What is the most valuable calf this animal can give me?

I have asked this question to farmers across the country. The simple facts are that dairy bulls have limited value on most dairies. Beef cross calves can provide premium prices over dairy bulls. While the levels of these premiums may differ, there is a potential income source to create these calves. But, producers do need to be aware to create a product that is desired. Using inferior genetics on the beef bulls or raising those calves poorly will ultimately result in smaller or no premiums.

4. Can I stick to my plan and am I willing to make changes that are necessary to make it work?

I have seen some herds that pass all the standards I set, but are still poor candidates because of the unwillingness to make the changes to make the plan work.



Partial execution of the plan is a sure chance of failing. We all can think of herds we had good suggestions for but did not see them incorporated. I cannot overemphasize the importance of following the plan.

Conclusions

Overall, while genomic testing provides very valuable information that can help us create a more profitable herd, getting that information is just the first step on our journey. Using that information for decision making is where we get the value. Having a plan that utilizes the genomic data all along the animal's life cycle is where we get the most out of our investment.