The Role of Genomics in Heifer-Raising Programs

A successful heifer-raising program is extremely important for a dairy operation’s sustainability and profitability, especially when margins are tight. On many dairies, the primary goal of a replacement program is to raise the most heifers with the lowest cost and to have them freshen between 22-24 months of age. However, this strategy might not be best when economic conditions demand high efficiency, or when new technologies are considered, such as genomics. Incorporating a genomic testing program can help producers raise the right number of the right animals, improving the dairy’s cash flow.

On most dairy operations, the costs associated with heifer programs can represent between 15-20% of overall production costs. According to herd owners, in 2014, heifer-raising costs from day-old calves to freshening on most dairies ranged from $2.10-$3.60 per day. At the end of 24 months (freshening), this represents an investment of $1,533-$2,626 per heifer. Costs vary between dairies and it is highly influenced by feed cost. Producers can expect to recoup their investment as heifers join the lactating herd and start producing milk.

An analysis by AgStar Financial Services in 2011 showed that a cow must produce at least 31,000 lbs. of milk to cover the costs to raise her; for most cows, that milestone would come in their second lactation. However, if a cow leaves the herd before reaching that payoff benchmark, it represents a loss for the operation.

Costs of Raising Heifers

Raising excess heifers also affects cash flow. Higher culling rates in lactating herds require more heifers to be raised, which increases costs associated with feeding, housing and management. Many well-managed dairies often are pushing cows out the door unnecessarily because their heifer supply surpasses their calving needs.

One report, presented at the 2013 Tri-State Dairy Nutrition Conference by Dr. Normand St. Pierre, demonstrated that in a herd of 100 lactating cows, a culling rate of 45% compared with a culling rate of 35% requires an additional 230 tons of silage/year to feed those extra animals. Extrapolating these numbers to a dairy milking 1,000 cows, the amount of additional corn silage needed (2,300 tons) represents $195,500 if corn silage is priced at $85/ton. There are additional benefits of right-sizing the number of replacements raised each year, such as improved animal health from less crowded heifer pens and decreased environmental load. Calculating the financial advantage of those extra benefits is more difficult.

What Genomic Testing Can Offer

Incorporating genomic testing into a heifer-raising program can benefit producers as a continual genetic program, but it’s an even bigger differentiator during adverse economic times. Genomic testing on replacement herds can help minimize profit loss and improve cash flow by enabling more reliable animal selection, to result in a more efficient and profitable group of animals.

Through August 2015, nearly 722,000 Holstein females and more than 95,000 Jersey females have been genomic tested via USDA-DCB (Council on Dairy Cattle Breeding).

When genomic information for the replacement herd is available, producers can make several decisions, including culling and breeding strategies, based on the herd genomic profile.

The first decision is choosing which animals to be replacements. To do so, simply rank animals based on the genomic potential using an index of traits most important to producers. Based on field observation, heifers using Sire Merit as a selection trait have improved animal fertility, milk components and productive life, all of which are part of the SNP calculation. This strategy has enabled producers to decrease involuntary culling rate. Animals that are more profitable are staying in the herd longer, and the proportion of animals with increased lifetime milk production increases. Also, by decreasing the culling rate, the number of replacement heifers decreases.

According to herd reviews, some producers have maintained between 0.72-0.80 heifers per each lactating cow as non-lactating herd inventory without compromising herd size or quality. Of course, the ratio of heifers to cows depends on various factors. When producers analyze their current and future inventory needs, they should put future herd needs first. This Penn State University Extension report offers another resource: http://extension.psu.edu/animals/dairy/nutrition/heifers/economics/heifer-economics.

Genomic Information has lifelong value with the animal and can impact additional management strategies, including breeding decisions. With genomic information and advanced reproductive technologies available, producers can greatly increase the odds of producing more females from superior animals in the herd using sexed semen with good genetics. When choosing the top half of animals, they also can consider choosing donors for embryo programs from their best group of animals or purchase high-quality genetic embryos to be used in the lower genetic females. On the other hand, genetically inferior animals that are needed as herd replacements can be bred with conventional or beef semen, depending on reproduction efficiency.

The most important to create excess dairy females to slightly exceed herd needs and allow for culling those that got the unlucky sort of their parents’ genes and account for variation in female ratios. If making extra pregnancies is successful, then also use beef semen as part of the program. When beef semen is part of the mix, the herd can increase revenue by selling crossbred calves at premium value. When observed on current market circumstances. Dairies with good culling management have an increased return on investment when space and feed is available to raise these crossbred calves up to 500 lbs.

Why Genomic Testing?

The reason for genomic testing is, of course, genetic improvement, beyond sire selection versus other alternatives. When applying the genomic data to the strategies above, herd owners improve their profitability and efficiency. Genetic improvement speeds up because genomic data gives a much more accurate ranking of an animal compared with traditional parent average. Improved accuracy can be measured by the gain in reliability of young animals when comparing genomic results to traditional parent average (Table 1). The increased adoption of genomics on herd selection has drastically changed the dairy industry in recent years, and it will continue to do so. Herds incorporating genomics into heifer programs have been able to capture great benefits. Proactively selecting superior genetic animals as replacements for the herd can help producers improve the finances of their dairies by decreasing animal loss due to early culling and by improving cash flow because of decreased heifer replacement costs. In addition, herds with excellent reproduction can cull heifers as an option for inferior genetic groups, and they have been able to increase cash flow with sales of crossbred calves.

Talk with your Zoetis representative, veterinarian and/or consultant about the benefits of a genomic testing program.

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## The role of genomics in heifer-raising programs continued on page 77

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*ZLD = Low Density Panels consisting of 10,932 SNPs
*Gain = Genomic REL minus Traditional Parent Average REL


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1ZLD = Low Density Panels consisting of 10,932 SNPs
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