Considerations for Breeding Dairy Cattle to Beef Breeds for Meat Production

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Producing dairy x beef cross calves has the potential to increase market value of these calves compared to straight bred dairy bull calves. However, as supply of these calves increases, it's reasonable to assume buyers will become more discerning. Dairy producers can stack the odds in their favor with thoughtful beef sire selection.

Contrary to some old assumptions, modern, well managed Holstein steers are a high quality and very consistent carcass product. It is far from the truth to say they are only good for hamburger.

Today's Holstein Steer

Strengths:

- Comparable quality grades with less external fat than common beef breeds
- Similar taste & tenderness compared to common beef breeds
- Similar taste panel evaluations (Holstein vs. Angus)
- Consistency in performance as a breed

Weaknesses:

- Lower dressing percentage than common beef breeds
- Smaller ribeye size, and elongated ribeye shape compared to common beef breeds
- Risk of exceeding packer height or weight restrictions if not properly managed
- Limited number of harvest facilities procuring Holsteins, resulting in fewer competing bidders

By choosing beef sires that improve upon the weaknesses of dairy steers, listed above, using beef on dairy can improve feed efficiency, rate of gain and reduce days on feed. Wisely incorporating beef genetics can also improve carcass characteristics over straight bred dairy by increasing ribeye size and changing the ribeye shape, increasing muscling, and moderating frame size while maintaining the marbling ability of dairy animals.

Research is needed to establish beef sire selection criteria for use on dairy breeds. Informal observations have found some dairy x beef crosses lack sufficient improvement in frame size and muscling, and are ultimately priced as Holsteins. Breed selection, and within breed sire selection, is important to address the weaknesses in dairy breed feedlot performance and carcasses.

Based on data from a multi-state Extension survey, semen cost, conception rate, and calving ease are the common starting points many farmers use for beef on dairy sire selection.

EPDs: the genetic language for beef

Expected Progeny Differences (EPDs) represent the genetic potential of an animal as a parent. Differences in EPDs of two sires gives an estimate of the difference in the average progeny performance of those two sires when mated to females of similar genetic merit.

Beef on Dairy sire selection

Considerations important to the dairy:

- Semen cost
- Sire conception rate
- Calving ease
- Hair coat color

Considerations important to the feedlot:

- Carcass value, carcass weight, and feed efficiency traits, selected for by using a terminal index (e.g. TI, $B, MTI, etc.) depending on the breed
- Select for greater Ribeye area (REA) amongst high Terminal Index sires
- Improved muscling, by using REA as the indicator trait
- Moderate frame score (Holstein matings)
- Increase carcass weight (Jersey matings)
- Use homozygous polled bulls

Emphasis on calving ease may vary, depending on the use for heifers vs. cows, and breed of dairy cattle. While these traits are of importance to the dairy, they do not add value in the feedlot or to the carcass. Selecting sires that simultaneously improve traits that are economically relevant to the dairy (e.g. calving ease) and feedlot (e.g. yield, feed efficiency) and those traits that enable carcasses to be acceptable as beef carcasses (e.g. ribeye area, frame score) are equally important to semen cost, calving ease, and hair coat color for producing quality beef.

When dairy steers are fed and managed properly they often grade well (80%+ Choice) with comparable quality grades to their beef breed counter parts and less external fat at the 12 to 13th rib. Thus, beef sire selection for ribeye, carcass weight, and frame size may need to be prioritized higher than marbling. Muscle shape of the ribeye and round is extremely important for many grid based marketing programs, and a trait that dairy genetics typically lack. Since there is no EPD for muscle shape, Ribeye EPD is often used instead as an indicator trait.

Hair coat color is a factor in many markets, with discounts for non black haircoat, or black hair coat but with excessive white markings. Some direct market and specialty markets do not place the same emphasis on black hair coat color. Bottom line, investigate your local markets and buyers to determine how much of an emphasis hair coat color should be to your breeding program.

Waygu genetics may be a fit with specialty markets. Waygu beef has superior marbling and tenderness characteristics. However, Waygu and Waygu x dairy crosses are slower to finish. Phenotypically they may display less muscling. Ideally Waygu dairy crosses are marketed as such, as they may be discounted if co-mingled with other breed crosses.

Dairy genetics for milk production and body conformation have changed over the past 30 years, and similar genetic changes have occurred in North American beef breeds. Many beef breeds have brought in outside genetics to incorporate black hair coats into their breeds. Many have also opened their herdbooks to accepting hybrid breeding. Examples include Sim-Angus, combining Simmental and Angus, and Lim-Flex, combining Limousin and Angus.

All major beef breeds have sires with traits that can moderate the frame size and improve the muscle-to-bone ratio of dairy steers, without adversely affecting their marbling traits. Conversely, there are also sires that can have little or even a negative effect on frame score and muscle shape. A 2015 research study from the USDA Meat Animal Research Center[1] found less than a 34 pound difference in hanging carcass weights between Angus, Limousin, and Simmentals in their study. In this study, Angus had the greatest average carcass weight, followed by Simmental, and Limousin. If your frame of reference is the beef genetics of the 1980's and '90's, this is a significant shift. Limousin, Angus, and Simmental all have homozygous black, polled bulls that can provide the needed muscle shape and moderate frame size to add value to these crossbred calves. Bottom line, within breed selection is highly important regardless of the breed you choose.

Heterozygous or Homozygous?
Heterozygous is the term used when an animal has two unlike copies of the same gene, and homozygous animals have two identical copies. Each of these copies is called an allele. When used on horned dams a Heterozygous Polled bull will sire 50% polled and 50% horned calves (sire has one horned and one polled allele, polled is the dominant trait). Homozygous Polled bulls will sire 100% polled calves (sire has two polled alleles). Same applies to coat color, Homozygous Black has two black hair coat genes (i.e. "BB"). , Heterozygous Black has one black and one red allele, with red being recessive (i.e. "bB").

Lack of group uniformity has been identified as a drawback to dairy x beef crosses, primarily due to random sire usage with no consideration to carcass traits, and improper health management. Forward thinking dairy producers can add value to their crossbred calves by providing sire identity and health management protocols to their marketing partners and potential buyers.

Some feedlot operations are offering contracts or purchase programs for dairy x beef cross calves, if you use the genetics they select or provide, and follow specific health protocols. They typically require use of a limited number of bulls or closely related bulls. These bulls are genotypically selected with traits to improve feedlot performance and carcass traits of their offspring while maintaining the traits important to the dairy (i.e. calving ease). This is their way of minimizing variability, improving beef traits, and ensuring predictable calf group health.

On a related note, holding back dairy x beef females to start a beef cow herd is discouraged, as some dairy traits can persist for generations and negatively effect feeder calf quality. If beef cow/calf is your future plan, your best option is to start with all beef breed genetics.

Reference: [1]Kuehn & Thallman, 2017 Across-Breed EPD Table & Improvements. https://articles.extension.org/sites/default/files/2018-2_Across-Breed_EPD_Table_and_Improvements.pdf