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Beef on Dairy

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Beef from dairy herds accounts for 16 to 20 percent of the beef supply in the United States. Traditionally, the beef from these dairy herds was from straight-bred dairy cattle, but in recent years, the use of conventional beef breed semen in dairy cows has increased. For clarity, conventional beef breed type will be referred to as “beef” for brevity. Factors that influenced the transition from dairy to beef semen have been attributed to improvements in sexed semen technology and market changes.

In 2014, dairy heifer prices dropped due to volatility in the U.S. milk market, and in 2016 the Holstein bull calf had almost no value. The issue was exacerbated by major U.S. beef packers' rejection of Holstein-fed calves, leading to an estimated $610 million revenue loss to Holstein feeding operations in 2017. As a result, dairy farmers were left with a limited market for straight-bred dairy calves. Many dairies began breeding their females using beef semen to add value to their surplus calves. The use of sexed semen in many U.S. dairies has led to a more strategic breeding strategy to only create replacement dairy heifers from the best females and to use beef semen on the remainder of the dairy herd. From 2017 to 2021, there was a 260% increase in domestic beef semen sales and a 24% reduction in dairy semen sales attributed to beef semen sales to dairy herds (NAAB, 2021).

Utilization of beef semen in dairy herds

The management decisions for the implementation of beef semen in dairy herds in the U.S. has been quantified in two surveys. Halfman and Sterry (2019) surveyed 69 dairies in the Midwest (Iowa, Michigan, and Wisconsin), and a survey of 141 California dairies was reported by Pereira et al. (2022). Both surveys reported the criteria for selecting dairy cows to be bred to beef semen (Figure 1). Reproductive performance, lactation number, and milk production were the most commonly reported reason for breeding cows to beef semen.

Halfman and Sterry (2019) reported the selection strategies for the beef bull semen used (Figure 2). The top criteria for selecting beef semen were cost, conception rate, and calving ease, indicating selection based on the immediate needs of the dairy and not on the production performance of the calf.

Figure 3 represents the distribution of beef breeds used in dairy herds (Pereira et al., 2022). Angus bulls contribute to the majority of beef semen used on dairy cows. The U.S. beef production set premiums for black coat-colored calves, contributing to the high use of Angus and other black-hided breeds.

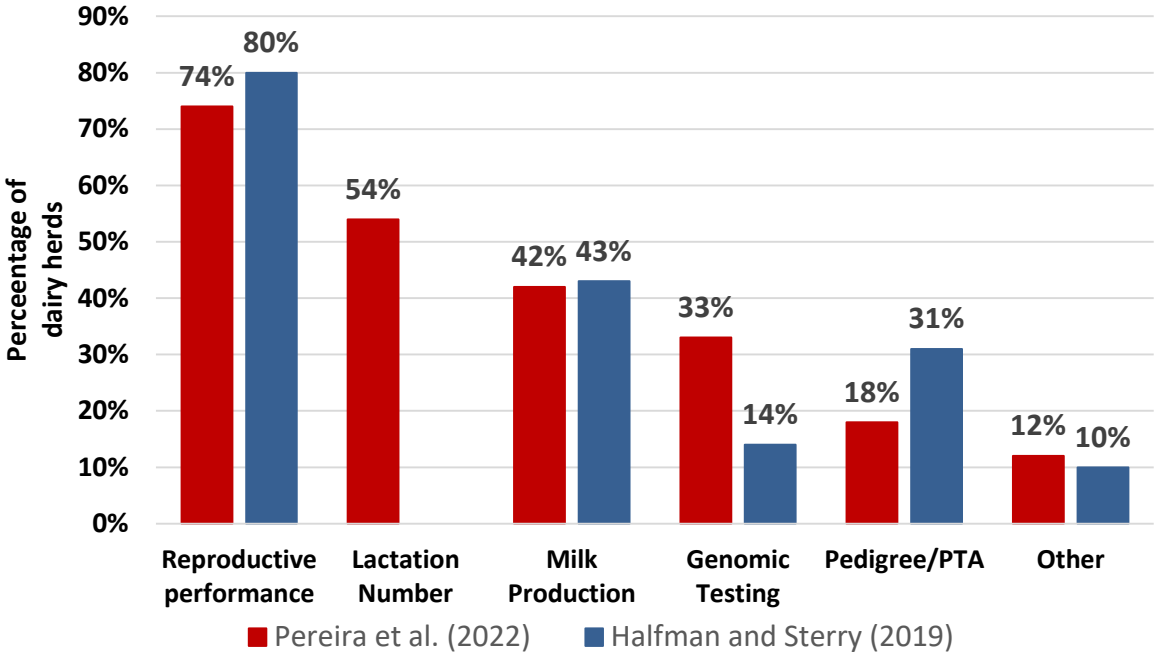

Figure 1. Percentage of dairy farms according to selection criteria for considering which cow to be bred to beef semen (adapted from Pereria et al., 2022 and Halfman and Sterry, 2019). Survey respondents had the option to select more than one option.

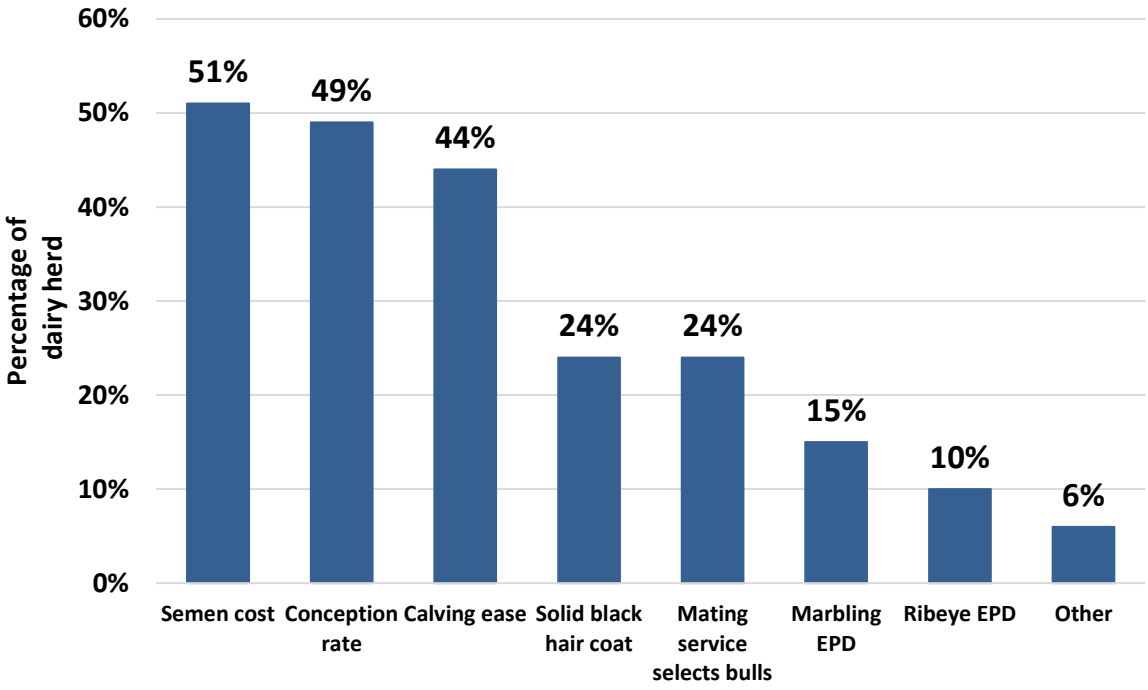

Figure 2. Percentage of dairy farms according to the criteria of beef bull semen selection reported by Helfman and Sterry (2019). Survey respondents had the option to select more than one response.

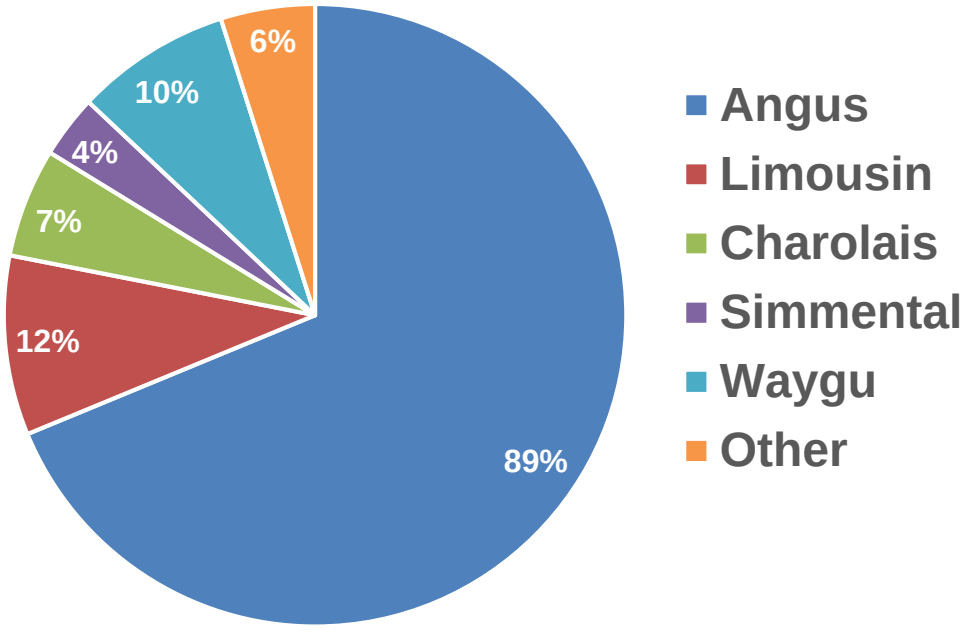

Figure 3. Most common beef breeds used on dairy females adapted from Pereira et al. (2022).

Beef x dairy performance

Breeding dairy cows to beef semen has minimal impact on cow performance for milk yield and days on milk. Gestation length has been reported to be longer for beef-sired calves, but greater gestation has not been reported to attribute to calving difficulty.

Traditionally, straight-bred dairy cattle have contributed to Prime Quality Grades in the U.S. but have received discounts for lower dressing percentages and less desirable USDA yield grades due to lighter muscling and smaller ribeye areas. In addition, feedlot performance has lagged for dairy breed animals compared to their beef counterparts due to a higher energy requirement for gain and lower average daily gain. A comparison of beef and beef x dairy cattle found that beef x dairy cattle were less efficient than beef cattle but have demonstrated advantages in average daily gain compared to straight-bred dairy. A comparison of carcasses for beef, dairy, and beef x dairy cattle demonstrated that beef x dairy cattle were intermediate in performance compared to straight-bred beef and dairy, but beef x dairy crossbreds were not significantly different for quality grade compared to Holsteins. However, it is worth noting that the sample size for this study was limited. More studies on early beef x dairy calf development, health concerns, and feedlot performance are needed.

The selection of beef bulls for the development of beef x dairy calves

The decision as to the genetic merit of beef semen to generate terminal beef x dairy calves is made by dairy producers, but as reported by Halfman and Sterry (2019), these decisions are driven by on-dairy performance and needs.

Breeding objectives for beef x dairy cattle should focus more on improved feedlot performance, carcass merit, and avoiding discounts of straight-breed dairy cattle, but the vast majority of dairy breeding objectives do not consider the performance of beef x dairy calves post-calving. Several semen companies and breed associations in the U.S. have developed indexes for selecting beef bulls for use in dairies. However, the expected progeny differences (EPD) used to derive the indexes have been developed using genetic parameters from native beef breeds. Limousin and Charolais breeds are cited as the second and third most used breeds on dairy females (Figure 3), but to date, neither breed association has an index for bull use on dairy females.

Of the beef x dairy crosses reported by the Council on Dairy Cattle Breeding in the U.S. from 2016 to 2019, 95% used Angus semen. Given the significant use of Angus bull semen, the American Angus Association has developed two indexes to identify Angus bulls for use on dairy females. The American Angus terminal index, $B, was modified to account for supply chain, production, and economic parameters specific to slaughtered dairy cattle. The $Angus-on-Holstein ($AxH) and $Angus-on-Jersey ($AXJ) indexes are specific for Holstein or Jersey females, respectively. These indexes incorporate feed intake and economically relevant carcass traits while penalizing excessive yearling height EPD in the $AxH to reduce long carcasses.

A joint venture between Holstein Association USA and American Simmental Association has developed the HOLSim index for selecting Simmental and Angus crossed bulls for use on Holstein females, emphasizing calving ease, marbling, muscle conformation, and carcass length.

How this index manages carcass length is not clear. International Genetic Solutions genetic evaluation generates bull expected progeny differences (EPD). International Genetic Solutions is an international collaboration between multiple beef breed associations to generate a multi-breed genetic evaluation of beef cattle. Bulls included in the HOLSim index are homozygous black and polled.

Conclusion

The use of beef semen in the U.S. dairy herd to generate terminal beef x dairy calves is increasing in popularity. To maintain the economic advantage of crossbred calves in the beef supply chain, breeding objectives of dairy herds need to consider the beef x dairy calf performance once it leaves the dairy. The use of indexes is well documented, but the availability of indexes is limited for some beef breeds.

Sources:

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