

Where is all that beef semen going?

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There has been a remarkable increase in beef semen sales over the last few years. According to the semen sale reports from the National Association of Animal Breeders (NAAB), the overall number beef semen units sold United States was approximately 22.9 million in 2021 (Figure 1). This value includes custom frozen, exports, and the domestic market. Interestingly, this represents an increase greater than 600% over the last 20 years, as the total number of beef semen units reported in 2001 was 3.7 million. While artificial insemination (AI) is a powerful tool that has really helped the beef industry make genetic progress, this increase in beef semen sales not necessarily reflects an increase in the adoption of AI by beef cattle producers. As an Extension specialist working with producers to increase to use of reproductive technologies, it would great to tell you that this increase in semen sales is associated increased adoption of the artificial insemination. However, a recent survey from the USDA indicates that only 11% of the cow-calf operations in the United States are currently utilizing AI. If that's the case, where is all that semen going?

Taking a closer look to the changes in semen sales between 1995 and 2021, the number of semen units remains relatively constant between 1995 and 2004, but there is a clear gradual increase between 2005 and 2017 (Figure 1). This represented a 237% increase between 2001 and 2017. A reasonable explanation for this increase was the improvements in estrus synchronization protocols for fixed-time AI. Estrus synchronization protocols eliminate the need for estrus detection when performing AI, which facilitates the adoption of AI in beef operation that are extensive by nature. Nevertheless, a significant change in the number of units sold happened between 2017 and 2021, which represented a 262% increase.

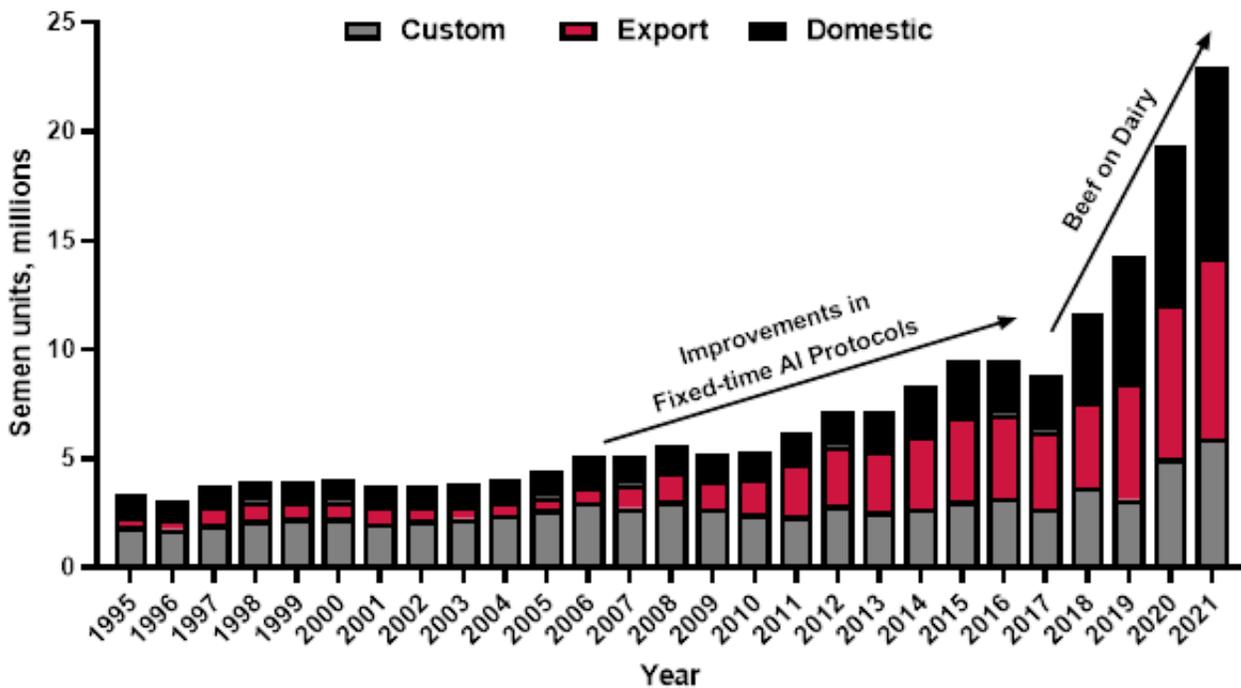


Figure 1. Number of domestic, international, and custom frozen semen units sold. Adapted from the National Association of Animal Breeders.

The driver of this significant increase has been the dairy industry. Dairy herds have been observing an increase in fertility over the recent years. This increase in dairy cow fertility is likely explained by the adoption of improved management strategies, the use reproductive technologies, and to a lesser extent a partial progress on genetic traits associated with fertility. Together with improvements in fertility, the use of female sex-sorted semen has helped dairy producers to meet their female replacement requirements. Therefore, a growing practice in the dairy industry is the use of beef semen to generate crossbred (beef x dairy) calves that have an added value compared with dairy bull calves. These crossbred calves are generated using heavy terminal sires to overcome some of the carcass limitations of Holstein and Jersey genetics. Usually, cows with decreased genetic value or repeat breeders are exposed to beef semen. Interestingly, these crossbred calves grade well and have a consistent performance in the feedlot because of the small genetic variation between animals.

Based on the data reported by the NAAB in 2021 for semen sales on the 2020 fiscal year, there is more beef semen going into dairy cows than beef cows in the United States. In other words, dairy producers today use more beef semen in the United States than beef producers. In fact, the number of semen straws in the domestic market going into dairy cows was more than two times the number of straws going into beef cows (Figure 2). This difference is expected to further increase in the 2021 fiscal year reports.

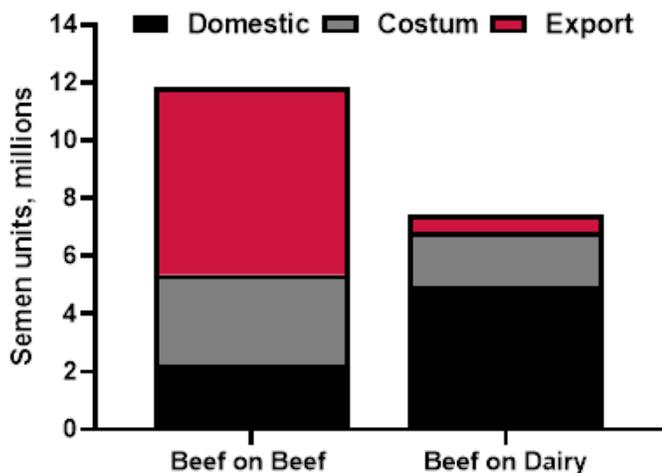


Figure 2. Summary of semen units based on market in 2020.
Adapted from the National Association of Animal Breeders.

Another interesting aspect of these reports is the increase in the amount of beef semen being exported (Figure 1). The dairy on beef phenomenon is not restricted to the United States. Yet, a good proportion of the exported semen is going to beef herds in other countries (See Figure 2). An interesting example is the Brazilian beef market that uses United States beef semen to breed a predominantly Nelore (indicus breed) base herd and generate crossbred terminal calves. The Brazilian Association of Artificial Insemination (ASBIA) reported that Brazil imported approximately 7 million beef semen straws in 2020 and the number of beef straws marketed reached

over 19 million in 2021. Estimates from São Paulo State University indicate that more than 20% of the Brazilian cows are artificially inseminated yearly, predominantly through fixed-time AI and all projection indicate that this market will continue to increase.

In summary, while improvements in reproductive technologies resulted in an increase in the use of AI in the United States, it appears that semen export markets and the use of beef semen in the dairy industry have been the major drivers of the recent increase in semen sales. More importantly, AI is still underutilized in the beef industry and future increases in the use of AI can positively impact production efficiency.

This article was originally printed in the Georgia Cattlemen magazine.



UNIVERSITY OF GEORGIA
EXTENSION

August 2022