



Gender Value Difference Determines the Economic Advantage of Sexed Semen for Beef Cattle Producers Using Artificial Insemination

Gender value difference, whether bull or heifer, is what makes sexed semen a profitable alternative to conventional artificial insemination and natural service.

The economic advantage of the sexed semen breeding system is the result of the revenue difference associated with producing more heifers (or bulls), compared to the added cost of using sexed semen versus conventional AI. Specifically, the added revenue captured by taking advantage of the higher valued gender, less the added breeding system cost, results in a significant return on the investment.

The other costs in a synchronized AI breeding system do not change, so the semen cost and reproduction rate are the only differences. Currently, sexed semen is expected to produce a conception rate of about 85% of conventional semen because there are less sperm cells in the sexed semen straw. The semen is about 87% accurate for the selected gender.

Pregnancy, calving and weaning rates are a result of the entire breeding system including nutrition, management, herd health, synchronized breeding, etc. Semen is one component of the breeding costs, and is not significant. In order to put semen cost into perspective, it needs to be compared to the value of the weaned calf produced.

Sexing Technologies™, headquartered in Navasota, TX, near Texas A&M University, has the patented sexed semen technology. They operate a total of eleven labs: six in the U.S., as well as Holland, Italy, Brazil, Canada and France.

In 2008, 3.8 million straws of sexed semen were processed in these labs using the proprietary technology, primarily to the dairy industry breeding replacement heifers. The gender difference for week-old dairy calves can be as much as \$330/head (\$350 heifer calf value versus \$20 bull calf value). This gender difference makes sexed semen very profitable to breed first calf heifers.

With expanded Sexing Technologies™ production capacity, a new effort is under development to provide sexed semen to the beef cattle industry. The beef cattle semen market differs from the homogenous dairy industry, where artificial insemination is widely used. Domestic Holstein semen reported sales totaling 18.8 million straws in 2008. Angus was the nearest beef breed with slightly less than 1 million straws sold (www.naab-css.org).

Detailed below is a further explanation of how to calculate the economic advantage of using sexed semen over conventional AI, the value of sexed semen in beef cattle production, semen pricing and costs.

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Calculating the Value of Sexed Semen in Production

The value of sexed semen as a breeding alternative is calculated by determining the impact of gender difference on the average value of calves weaned.

If a bull calf is valued at \$600, and a heifer calf is valued at \$900, the gender difference is \$300. Using these values, the average value per calf utilizing conventional AI is \$750 ($0.5 * \$600 + 0.5 * \900).

Conversely, utilizing 87% pure sexed semen, the average calf value is \$861 ($.87 * \$900 + 0.13 * \600). Adjustments are made for pregnancy loss and calf loss prior to weaning, and factors in the 85% conception rate sexed semen currently has compared to conventional AI.

However, breeding costs **are not the major cost** of seedstock production. Semen costs are a very small portion of the total seedstock calf production costs, as feed and grazing costs overwhelm all other components. Thus, semen cost relative to calf value is low.

When seedstock owners produce quality replacement females, they aim to achieve the best genetics possible. In most operations, the very best genetics come from heifers. Utilizing female sexed semen enables seedstock producers to produce heifers with an 87% degree of accuracy in gender selection. Combining this 87% level of accuracy with the “new and improved” genetics of heifers within the herd ensures the replacement females are created out of the very best genetics possible. In doing so, the overall performance of the herd improves exponentially for breeding and sales.

The advantage of a heifer’s lower birth weight, decreasing calving difficulty, can also be accounted for in the calculation by adjusting calving rates, as it is an important choice in gender selection.

Cost of Beef Semen Production

The breeding value of semen is quite complex, particularly for a young unproven bull. For proven bulls, it is associated with the performance of progeny and demand in the market place: what the market will bear.

The cost of producing straws for AI is composed of three major fixed costs: the initial bull investment (depreciated annually); the bull’s productive life, or what the market determines is the competitive semen sales life; and the annual cost of maintaining the bull. The only way to reduce the cost per straw is through volume sales. The variable costs (costs that vary with the number of straws produced annually) are semen collection and straw production, semen storage, marketing and registration costs.

Producing sexed semen requires a gender selection cost, added to conventional AI semen production costs. Sexing semen has high fixed costs, as the sorting machines required in the process cost approximately \$300,000. Therefore, high volumes are required in order to reduce the processing cost per straw. In the end, fixed costs are a significant portion of the total semen processing cost. Sales or order volume is the primary factor in determining the price charged to the customer.

The demand curve below helps explain the pricing approach which can be used. The choice is to have a very high price (P1) and very low quantity of sales (Q1), or have high volume sales (Q2) and low prices per unit (P2). Logically, the larger the sales quantity, the lower the sales price, since sexed semen production has high fixed costs.

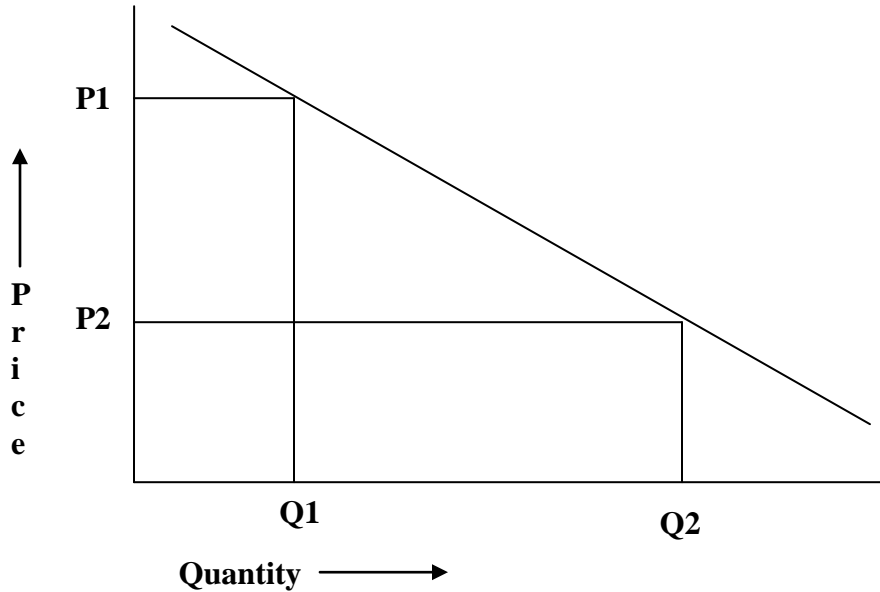


Figure 1. Demand Function for Beef Semen

Semen pricing strategy is an important determinant from the perspective of the bull owner, semen producer and end users of the semen. If overpriced, the semen will not sell. Potential buyers examine the price and say it will not work.

Seldom are the semen value as a component of the breeding system, genetic improvement, and traits such as calving ease, fully considered. The cost of the semen relative to the calf's value is very low, but seldom expressed in this way.

Sexed semen provides the opportunity to completely change the way semen is evaluated, priced, marketed and communicated to users. Sexed semen makes AI a more profitable breeding system for all AI users.

The USDA study reported only 7.2% of beef cattle operations in the U.S. use artificial insemination (USAD-APHIS- Beef 2007-2008). Talk about a growth potential if sexed semen is properly priced and breeding systems appropriately implemented. Sexed semen can make AI profitable where conventional AI is not competitive with natural service.

The goal of Sexing Technologies™ is to work with the beef semen industry to provide sexed semen to beef producers using AI at prices so competitive beef producers will have the incentive to always consider using sexed semen when there is a gender difference. The aim is to change the beef producer's perception that sexed semen is a high cost technology that is not competitive with conventional AI or natural service.

The potential is quite large when considering the difference in gender value of F1 Brahman, American Breeds or English-sired replacement females for the anticipated growth in the beef female market as the cow herd recovers; the value of steers in terminal crosses relative to heifers; further development of composite breeds; and high value niche markets for club calves, rodeo bulls and unique sires.

Sexed semen can be a part of anyone's program who is using AI breeding, as all breeding programs do have the most valued gender in mind. The first semen providers adopting this technology as part of semen sales will benefit from the capture of market share for the higher-valued gender. Likewise, producers utilizing sexed semen will gain an economic competitive advantage.