

Replacement Heifer Sexed Semen AI Versus Natural Service

Gender value difference, whether bull or heifer, is what makes sexed semen a cost-effective alternative to sexed semen artificial insemination (AI) and natural service.

The economic advantage of the sexed semen breeding system is the result of the revenue difference associated with producing more heifers for replacement, compared to the added cost of using sexed semen versus natural service. 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 potential is quite large when considering the difference in gender value of F1 Brahman, American Breeds or English-sired replacement females. 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.

Using sexed semen allows for a larger portion of the calf crop to come from the most valuable gender.

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 90% of conventional semen. The semen is 90% 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.

Calculating the Value of Sexed Semen in Replacement Production – Decision Aid

Sheet 1 is used to describe the expected reproduction, production results and expected calves market values. The value of sexed semen as a breeding alternative is calculated by determining the impact of steer versus heifer difference in the average weight and net market price for steers versus heifers. However, the calf that can meet special markets can bring a premium in the replacement market.

Selecting sexed semen AI sires with lower weaning weight that reduce calving loss when breeding replacement heifers. This expected difference is recorded in sheet 1. Synchronization can lead to shorter breeding season and more calves born early. This is favorable for life time reproduction.

Prepared by Jim McGrann, Ranch Management Economist, Professor Emeritus, Texas A&M University, 9-14-2019.

Sheet 2 is a description and cost of the breeding protocol. This example protocol must be modified to meet the recommendation of the AI technician and veterinarian involved. There is no question that there is more labor and management involved when using AI. The second page provides a production summary of breeding alternatives.

Sheet 3 is a cost calculator for the natural service cleanup bull. The number of females covered is likely more where AI is being used. The useful life is critical as it determines the annual depreciation.

Breeding costs actually are **not a major cost** of replacement production. Semen costs are a very small portion of the total production costs, as feed, labor and grazing costs overwhelm all costs.

Sexed semen can be a part of anyone's program who is using AI breeding. All breeding programs have information on gender value difference.

Decision Aids Operation

The data convention is items in **blue** are **user input** data. All the cell black numbers are calculated numbers and are protected cells. This is a very comprehensive tool to evaluate the sexed semen breeding alternative.

The spreadsheet also provides the calculation associated with the use of sexed semen for gender selection. These costs are then compared to the revenue from sales differences.

The actual costs of the breeding system can be variable between systems used. If experience is lacking it would be good to speak with the technician involved. Get as many details as possible on the protocol followed and record the information in the description sheet. Then modify the data in sheets.

Once all is set up it's good to print the third sheet and check data. Unusual results are normally a product of data entry so check all input data carefully.

Doing "What If" Analysis

The main reason all is set up in a spreadsheet is to facilitate "what if analysis". Key numbers to "play around" are gender prices and reproduction. Sexed semen has advantage where gender value is different. So, it's very logical when sexed semen will pay. The summary sheets have these variables to easily facilitate the impact of these changes on the final return to producer's increase in Breeding Cost on return in investment (ROI) on added cost. Because semen is a small part of total breeding cost, the ROI is very sensitive to changes in gender difference and all reproduction rates. The best way to observe this is to change parameters in the summary sheet and watch the change in ROI.

As noted, **sex semen is a small component total production** system. All other management, marketing, nutrition and implementation issues must be taken care of before this becomes a cost-effective breeding system. Failure in any aspect of implementation will result in poor reproduction and economic performance.

Summary of Sexed Semen Economics

- The advantage of sexed semen is determined by calculating the **income margin over breeding cost** generated by each system. That is the value of the weaned calves minus the breeding cost. This margin above breeding cost is a measure of the economic performance of the sexed semen system.
- When calculating the advantage of sexed semen is determined by the difference in the gender value of the weaned calves and reproduction rate (weaning percentage) and the breeding cost differences between breeding systems. **Weaned calf values by gender** are very important in determining sexed semen competitiveness.
- Calculating the advantage of the sexed semen when the same genetics is used it's a question of the **added revenue being greater than the added cost** of the sexed semen breeding system compared to conventional AI or natural service.
- Breeding costs are reported on the basis of females exposed. Semen cost is reported as percent of breeding cost. This will help keep breeding cost into proper cost perspective. Semen cost is a minor cost for replacement heifer production. The overall pregnancy rate is always the most important factor in determining bred replacement cost.
- **Synchronization** is a big part of making the use of sexed semen profitable. Fixed time AI with heat detection and followed by clean up bulls is especially cost effective and managerially feasible for most produces producing replacement heifers. Heat detection requires more labor and management then timed AI is normally more cost effective as pregnancies are higher.
- In economic terms, **sexed semen** is a small part of the total breeding and production cost.
- For information on sexed semen see: www.STgen.com

For more on the AI breeding system economic evaluation see “Replacement Heifers Costs and Return Calculation Decision Aids” <http://agecoext.tamu.edu/resources/decisionaids/beef>