

## **Sexed Semen Versus Conventional AI for Replacement Production**

The purpose of these decision aids is to facilitate the organization of reproduction, calf price and breeding system cost data. The economic advantage of using **sexed semen** can be compared sexed to conventional artificial insemination (AI).

It's the **gender difference of calves' value and reproduction success** that makes sexed semen a profitable alternative to conventional AI.

The potential advantage of sexed semen is quite large when considering the difference in gender value of F1 Brahman, American Breeds or English-sired replacement females.

These are the things to keep in mind when using these decision aids to evaluate the alternative breeding systems:

- Reproduction rates for pregnancy and calf losses in the are only examples. The capability to easily do “what if” analysis with these decision aids facilitates changing the reproduction values to check their impact on the alternative breeding systems economics.
- Sexed semen pregnancy rate is expected to be 90 to 95% of conventional AI. Accuracy is about 90% in gender selection. These are variables in the decision aids to facilitate “what if” analysis.
- The synchronization breeding system is used for conventional AI and sexed semen. The protocols are described and costs reflected in the cost sheet. A separate sheet is provided to calculate the cleanup bull cost.
- Pregnancy loss and calving to weaning losses can be varied across breeding systems. Lower calving losses are expected for selecting use of lower birth weight AI sires.
- Prices of weaned calves should be adjusted for weights and sex using market data and price slides. Premiums for the higher valued female is an input variable.

### **Methodology and Considerations**

- 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.

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

- 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 is 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 producers producing replacement heifers. Heat detection requires more labor and management is normally cost effective as pregnancies are higher.
- In economic terms, **sexed semen** and it is a small part of the total production cost or the value heifer produced.

### **Calculating the Value of Sexed Semen in 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 heifer versus steers or bulls difference in the average weight and net market price for steers versus heifers.

Sexed semen AI calves are expected to have different weaning weights than from natural service which can be reflected in added revenue. Selecting sires with lower weaning weight can help reduce calving weight thus reducing calving loss. This expected difference is recorded in sheet 1. Synchronization can lead to shorter breeding season and more calves born early that can be reflected in ADG and days before weaning.

**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 the major cost** of cow-calf production. Semen costs are a very small portion of the total calf production costs, as feed, labor and grazing costs overwhelm all other components. Thus, semen cost relative to calf value is low.

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. This decision aid has 10 sheets that are linked together.

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.

This data will be used to calculate the following for the sexed semen and conventional group of females

- Pregnancy rate
- Calving rate
- Weaning rate and weight and production per exposed female and gender value
- Losses at each stage of production

All this production data can be used to identify reproductive performance and use in economic evaluation of the breeding systems.

For information on sexed semen see: [www.STgen.com](http://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>