



## **Sexed Semen Dairy Cattle Breeding System Advantage Decision Aids User Guide**

The purpose of these decision aids is to facilitate the organization of reproduction, calf price and breeding system cost data to calculate the economic advantage of using **sexed semen** for dairy cattle production. Information will facilitate the evaluation of breeding system alternatives for dairy cattle producers and semen marketers on the profitability of the sexing semen technology when compared to conventional artificial insemination (conventional AI). For sexed semen to be successful for dairy cattle producers it must be the more cost effective than conventional AI breeding.

The decision aid calculated added revenue and added cost of using sexed semen-based AI breeding system compared to conventional semen. Then the return on investment (ROI) of calculated for using the higher revenue and cost sexed semen breeding system. The income margin above breeding cost is the second indicator of the sexed semen advantage.

**The gender difference in calf value and reproduction success** makes sexed semen a profitable alternative to conventional AI or natural service.

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

- Reproduction rates used in the example for breeding system protocols expected pregnancy and calf losses in the example reflect a consensus level of users. Approximately six million straws have been used in dairy heifers breeding programs. These parameters are variables in the decision aids and should be carefully checked and modified to fit each production situation.
- Based on current information sexed semen pregnancy rate is assumed to be 85% of conventional AI. This is a variable controlled by the software user. Accuracy in gender selection is expected to be in the range of 90% is also controlled by user input.
- 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. Actual producer data on calf prices, reproduction rates and calf loss should be used to fit each situation being evaluated.

**Version ST 12-22-2009**

### **Characteristics of the decision aid are as follows:**

- Prices of live calves are net of marketing cost. This is an input the user can change to fit markets and timing of sale. If the calves are saved net market price is the opportunity cost of not marketing the calves.
- Costs of semen for each AI breeding and associated pregnancy level are variables controlled by the user. Based on the pregnancy level the overall pregnancy rate is calculated.
- Sexed semen can be used in one, two or three of the breeding by typing in “Sexed” for the choice and modifying the cost of the semen.
- Sexed semen pregnancy percent is based off the pregnancy percent of conventional AI per exposed female. This should be around 85% but can be varied to show the economic impact. The accuracy or purity of gender selection will be on the range of 90% for the selected gender. Again this is a variable that can be changed
- Pregnancy and calving losses can be varied by the user varied across breeding systems.
- The insemination/breeding cost is the full cost of hiring this service.

### **Methodology Considerations**

- The advantage of sexed semen is determined by calculating the **income margin over breeding cost generated by each system**, or value of the live calves minus the breeding cost. This margin above breeding cost is a measure of the economic performance of the sexed semen system.
- The income advantage of sexed semen is the result of the difference in the gender value of the live calves and reproduction rate (live calf percentage) and cost differences between breeding systems. **Calf values by gender** are very important in determining sexed semen competitiveness.
- There will be situations where there is a very large difference in gender value between heifer and bull calves. The ROI on the added cost of sexed semen will be very high as the difference in the added revenue is very high relative to the added cost.
- Breeding costs are reported on the basis of females exposed. Semen cost is reported as percent of breeding cost and value of the calves. In economic terms, semen is a small part of the total breeding and dairy production cost.

- The potential for sexed semen speeding improvement in the herd genetic progress is not accounted for in this analysis as measuring this potential requires a great deal of data and is very herd specific.
- Using sex semen is a “component of the breeding system”. Management, nutrition and implementation of the system are critical to successful reproductive performance. Execution of the breeding system reflected in live calf percentage is the critical determinate of production and financial success.

### **Interpretations of Results of the Analysis**

The data entry and report of investment (ROI) provides a summary of the major data that determines the economic advantage of the sexed semen breeding system over conventional AI. The spreadsheet rows shaded in green identify the areas to focus on in the economic analysis. The first three lines focus on calf price, reproduction rates, the costs of the breeding systems and differences in cost. Be sure to check pregnancy and calf loss data. If there is uncertainty in expected losses vary the rates and notice the change in ROI. Users will note the ROI and economic advantage is very sensitive to changes in live calf percentage.

These price, reproduction and cost sections are followed by the live calf market pricing data, premium or (discount) and gender difference. Calf values, number by gender and their gross values are calculated by breeding system. The cost of semen is calculated relative to calf value to help the user keep the semen cost in proper perspective. The final section of this report summarizes the total added revenue above added cost of sexed semen.

The final row is the calculated return to produce’s increase in breeding cost using sexed semen rate of return (ROI) on the added cost. This must be relative high to warrant the use of this new breeding system in the early adoption period.

### **Decision Aid Operation**

This decision aid uses the Excel™ spreadsheet. The **User Guide** sheet has operation instructions. The data is entered in the dairy sexed semen calculation sheet. All variables or data the user can enter are in **blue**: all other calculation cells are protected.

The actual costs of the insemination and breeding protocol can be varied. If experience is lacking it would be good to speak with the insemination technician involved or other dairy farmers.

Once all the decision aid is set up it’s good to print sheet and checks 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 vary are gender prices, reproduction rates and pregnancy and calf losses and semen cost. Sexed semen has advantage where gender value is difference. So it’s very logical when sexed semen will pay.

The decision aid sheets have these variables to easily facilitate the impact of these changes on the final return to producer’s increase in breeding system 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 reproduction rates reflected in calving percentage**. The best way to observe this is to change parameters in the summary sheet and watch the change in ROI.

Users should incorporate their own breeding and semen costs and calf prices as they are highly variable. The cost of sexed semen and conventional semen varies widely as it is related to bull demand and production cost. Semen costs and calf prices become obsolete very quickly and are very dependent on alternatives chosen.

### **Decision Aid Software Disclaimer**

This software package was developed for use by the staff of Inguran LLC and its Affiliates as an estimate and guide of product applicability. The software is in the testing stage, is currently evolving, and is not to be relied solely upon as an accurate indicator of expected results. THIS SOFTWARE IS TO BE USED SOLELY AS A GUIDE AND CONVENIENCE, as actual fertilization results are subject to major fluctuations in individual animal reproductive factors, species characteristics, geographical fluctuations, handler protocols as well as other variables. THE USE OF THIS PROGRAM BY ANY NON-AFFILIATED INDIVIDUAL IS DONE COMPLETELY AND SOLELY AT THE INDIVIDUAL’S OWN RISK. Inguran LLC strongly urges anyone using this software to conduct their own thorough research and investigation to support all software estimates through outside sources. INGURAN LLC MAKES NO WARRANTIES ON THE VALIDITY OF THE INDICATORS PRODUCED BY THIS SOFTWARE. In no event, shall Inguran LLC or any of its Affiliates, agents or representatives be liable to any party for any damages (be they direct, indirect, special, consequential, or other damages) arising from the use of this software or the value indicators so produced.

