

Sexed Semen: “Best Practice” for Breeding Dairy Replacement Heifers

Irrespective of economic conditions, dairy producers need to find cost effective alternatives to current technologies referred to as “best practices” in production and management. Sexed semen should be adopted as a new “best practice,” as it is a more cost effective technology than conventional AI.

There is currently a gender difference of \$300 or greater for producing a heifer calf compared to a bull calf in the dairy industry. With this value difference, the additional revenue generated from a higher percentage of heifer calves offsets the higher cost of sexed semen compared to conventional semen, making it a more profitable breeding alternative.

Economic and Cash Flow Advantage


The economic advantage of the sexed semen breeding system is measured by calculating added revenue and added cost. The additional revenue generated by producing a larger percentage of higher-valued heifers is compared to the added cost of sexed semen to calculate return on investment.

The breeding system itself does not change. Therefore, the only cost difference lies in semen. Sexed semen has an approximate conception rate of 85% of the conventional semen rate, since there are fewer sperm cells in the sexed semen straw. With multiple breedings, sexed semen will approach conventional semen pregnancy levels. Sexed semen is also roughly 90% accurate for the gender selected.

Table 1 below illustrates likely return on the added investment in sexed semen.

Table 1. Calculation of the Economic Advantage of Sexed Semen

| | | | |
|-------------------|--|--------------|--|
| Live Calves | | Value \$/Hd. | |
| Heifer Calf | | \$320 | |
| Bull Calf | | \$20 | |
| Gender Difference | | \$300 | |



| | | | |
|--|----------|-----------|----------|
| Number of Females Exposed First | 100 | | |
| Conventional AI Breeding | First AI | Second AI | Third AI |
| Conventional AI Semen Cost | \$15 | \$10 | \$2 |
| Pregnancy % Based on Exposed Females* | 60 | 60 | 60 |
| Number to breed | 100 | 40 | 16 |
| Number Pregnant | 60 | 24 | 10 |
| | % | Pregnant | Open |
| Total Pregnant Percent & Total Bred and Open | 94% | 94 | 6 |
| Pregnancy and Calving Loss | 5% | | Head |
| Total Live Calves %, Head and Straws Used | 89% | | 89 |

| | | | |
|---|----------|-----------|----------|
| Sexed Semen or Conventional Semen Used | Sexed | Sexed | Convent. |
| Sexed Semen Cost | \$35 | \$35 | \$2 |
| Sexed Semen Breeding | First AI | Second AI | Third AI |
| Conception Sexed Semen Versus Conventional AI | 85 | 85 | 100 |
| Pregnancy % Based on Exposed Females* | 51 | 51 | 60 |
| Number to breed | 100 | 49 | 24 |
| Number Pregnant | 51 | 25 | 14 |
| | % | Pregnant | Open |
| Total Pregnant Percent & Total Bred and Open | 90% | 90 | 10 |
| Pregnancy and Calving Loss | 5% | | Head |
| Total Live Calves %, Head and Straws Used | 86% | | 86 |

| | | | | |
|--|----------|--------------|--------------|--------------------|
| Value of Calves - Conventional AI | Gender % | Head | Value \$/Hd. | |
| Live Heifer Calves | 50% | 44 | \$320 | \$14,227 |
| Live Bull Calves | 50% | 44 | \$20 | \$889 |
| Total Head, Average and Total Value of Calves | | 89 | \$170 | \$15,116 |
| Total Semen Straws and Cost | | \$12 | 156 | \$1,932 |
| Insemination/Breeding Cost | | \$7 | 100 | \$700 |
| Total Semen and Breeding Cost & % of Calf Value | | Total | | \$2,632 17% |
| Margin Above Straw and breeding Cost | | | \$125 | \$12,484 |

| | | | |
|--|----------|--------------|--------------------|
| Sexed Semen Accuracy or Purity | 90% | | |
| | Gender % | Head | Value \$/Hd. |
| Live Heifer Calves | 84% | 72 | \$320 |
| Live Bull Calves | 16% | 14 | \$20 |
| Total Head, Average and Total Value of Calves | | 86 | \$271 |
| Total Semen Straws and Cost | | \$30 | 173 |
| Insemination/Breeding Cost | | \$7 | 100 |
| Total Semen and Breeding Cost & % of Calf Value | | Total | \$5,963 26% |
| Sexed Semen Margin Above Straw Cost and Breeding Cost | | | \$173 |

| | | | |
|--|----------------|------------------|------------------|
| Sexed Semen Compared to Conventional AI | Change in Cost | Change in Margin | Advantage Change |
| Total Economic Advantage of Sexed Semen | \$3,331 | \$8,145 | \$4,814 |
| Advantage Per Female Exposed | 100 | \$33.31 | \$81.45 |
| Return to Producer's Increase in Breeding Cost- ROI on Added Cost | | | 145% |

*Users should use their own breeding protocol and semen costs and calf prices as they are highly variable and become obsolete very quickly and are very dependent on alternatives chosen. See Disclaimer Sheet.

In this example, sexed semen is valued at \$35 per straw, and heifers are bred twice. (The cost of sexed semen and conventional semen alike is highly variable, as it is related to bull demand and production costs.)

Conventional semen is valued at \$15, \$10 and \$2 per straw, respectively, for three breedings. A 60% conception rate is used for each breeding, with a loss of five percent between pregnancy and live calves. The sexed semen system is shown with a conception rate of 90% of the conventional semen rate.

USDA market prices for bull and heifer dairy calves are not reported as with beef cattle. Often, bull calves are valued near \$20/head, which is used in Table 1. Heifer calves are shown valued at \$320 per head.

With these figures, the additional cost for sexed semen breeding is estimated at \$33 per exposed replacement heifer.

When the gender difference is calculated, sexed semen produces additional revenue of \$81 per heifer; a net added margin of \$48 per head. Therefore, the return on investment (ROI) for utilizing sexed semen is 145%.

Even when Table 1 is recalculated with a more conservative gender difference of only \$150 (heifer at \$170, bulls at \$20 per head), the sexed semen advantage ROI is 21%.

This example confirms that utilizing sexed semen is a “best production practice” for breeding in the dairy industry. However, it is important to remember pregnancy and calving rates are a result of the entire breeding system, including nutrition management and health.

Breeding Costs a Small Part of Total Dairy Production Costs

Breeding costs are insignificant in the overall cost of dairy production. Benchmark data reported for the first three months of 2009 from Texas dairies showed only 1.8% of total per cow expenses are spent on veterinary and breeding costs, amounting to \$17 of \$919 per cow (Genske, Muller & CO., LLP, March 31, 2009). The same report showed \$15 of \$864 per cow of expenses for three months or 1.7% of California total three months expenses were veterinary and breeding costs. Another large dairy accounting firm, Moore, Stephens, Wurth and Torbet, LLP, reported veterinary, breeding, testing, etc., costs for dairies in the Texas Panhandle were 2.1 percent, in the three California summaries (Southern California, San Joaquin Valley and Kern County), the average was 1.9% of the total cost of operation in the six month period ending June 30, 2009. Although not reported as an itemized expense in benchmark data, semen cost is a very small portion of total dairy cow production costs.

Sexed semen cost relative to calf values is low as well. Sexed semen price varies by bull, but when estimated at \$35 per straw, is 10% of the value of a \$350 heifer calf. Additional heifers can be marketed, offsetting replacement heifer costs with the more important overall dairy production.

Communicating with Accountants and Lenders

Financial stress has pressured dairy farmers to find any outlet to reduce cash outlay. It is important to find ways to reduce costs, yet ensure the reduction in revenue is not greater than that achieved by reducing expenses. Sexed semen does increase cash outflow, but substantially increases cash inflow as more high-valued heifers are produced. Replacement quotas can be met, and surplus heifers can be sold at 15 times the value of bull calves. This reality can be easily explained to accountants and lenders when cash flow and budgeting are reviewed.

The cash flow consequences of some inputs are discussed in financial data summaries. Yet, veterinary and breeding expenses are often lumped together, and the cost of semen is never reported as it is such an insignificant cost in dairy production. The positive impact sexed semen has on production and cash flow is much greater than the slight cost increase.

It should be clear to producers engaging in “cost cutting” efforts the focus of attention cannot be on veterinary and breeding costs which account for two percent of total expenses yet have a significant impact on herd production.

Production Benefits which Make Sexed Semen Profitable

When dairymen produce quality replacement females, their aim is to achieve that goal with the best genetics possible. In most operations, the very best genetics come from heifers. Utilizing female sexed semen enables dairymen to produce heifers with a 90% degree of accuracy, or purity, in gender selection. Combining this 90% level of accuracy with the “new and improved” genetics of the dairy heifers within the herd ensures the replacement females are created from the best genetics possible. In doing so, the overall performance of the herd improves. Additionally, as the market for dairy heifers improves, the gender difference will continue to favor female sexed semen.

With an increased number of heifers, dairymen will have a better selection from which to choose their “keeping” heifers. They would not have to keep heifers produced from average or below average cows.

The additional advantage of lower birth weight in heifers reduces calving difficulty, labor costs associated with it, and potential death loss. The survival rate is important due to missed sales opportunities for calves not needed as replacements. In a “big picture” point of view, fewer costly replacement heifers are required to maintain the herd when there is a low calf loss.

Some farms will experience facilities limitations on handling “extra” heifers. When sexed semen produces more heifers than facilities can accommodate, a market remains for these heifer calves. These heifers have a higher value than the bull calves conventional semen would have produced. Therefore, cash flow can be improved by utilizing sexed semen, even when an abundance of heifers are produced.

Implementation of a Sexed Semen Based Breeding Program

The major breeding services in the North American dairy market offering sexed semen include:

- ABS Global
- Accelerated Genetics
- Alta Genetics
- Cooperative Resources International
- CRV

- Select Sires
- Semex
- Trans World Genetics

Sexing Technologies™, headquartered in Navasota, TX, near Texas A&M University, owns XY, Inc., which has the patented sexed semen technology. They operate a total of twelve labs: six in the U.S., as well as Holland, Italy, Brazil, Canada, France and New Zealand. Sexed semen has been commercially available in the US since 2005 with proven results in thousands of dairy farms. Sexed semen has been used primarily for the production of replacement dairy heifers.

To implement the use of sexed semen, sires may be selected from Sexing Technologies™ or any distributors listed above.

Summary

As long as a large gender difference between heifer and bull calves exists, sexed semen will be a highly profitable alternative to conventional AI for breeding replacement heifers. With an increased percentage of heifers, dairymen will have a better selection for choosing replacement females from high-performing cows, thereby increasing their pace of genetic improvement.

Implementation is simple and inexpensive, as replacing conventional semen with sexed semen does not require changes in the dairy production system. As shown, it is a cost effective alternative, irrespective of the overall economic performance in the dairy sector.

Sexed semen is a **“Best Production Practice”** in the dairy industry.

References for Accounting Firms

Genske, Muller & CO., LLP, Costa Mesa, CA, www.genskemuler.com

Moore Stephens Wurth and Torbet, LLP, www.mswft.com