

Pick a straw: Conventional, sexed or beef semen?

Victor E. Cabrera for *Progressive Dairyman*

AT A GLANCE

A herd's reproductive efficiency can be a driving factor when deciding which animals should be inseminated with conventional, sexed or beef semen.

Should dairy producers use conventional semen, sexed semen or beef semen when breeding their heifers and cows? The simple answer is: "It depends."

Contemplate several factors – market conditions (beef, calf, semen and replacement prices) and the herd's reproductive performance (low versus medium versus high; see **Table 1** for descriptions) – as you develop the correct strategy for your dairy operation. In general, high-reproductive performance dairies are more sensitive to calf prices, whereas low-reproductive performance dairies are more sensitive to semen prices.

Generally speaking, dairies with low reproductive performance may increase profits by using inexpensive beef semen and buying replacements. Conversely, dairies with high reproductive performance could increase their profit by using sexed semen to produce and sell replacements.

Does sexed semen get cattle pregnant? The dairy industry has made significant strides in improving the technology of sexed semen. Thus, this technology is more limited by its price than its effectiveness in getting

pregnancies. Sexing accuracy is about 90 percent, and conception rates hover in the 70 to 80 percent range.

Basically, three semen selection strategies can be used.

- Use sexed semen in genetically superior animals to produce better-quality replacements.
- Combine sexed semen use with crossbreeding to maximize income from nonreplacement calves.
- Specialize in replacement production.

With so many variables and fluctuating market prices, decision-support tools such as the Premium Beef on Dairy tool from the University of Wisconsin – Madison Dairy Management website (www.dairymgt.info/tools.php) help producers and consultants determine the best strategy for a particular dairy. The tool calculates semen cost, number of replacements produced and needed, and income from calves for the different semen selection strategies, according to market conditions, reproductive performance and technological efficiency of sexed semen. The model evaluates income from calves over semen cost (ICOSC) when different combinations of conventional, sexed and beef semen are used in a Holstein herd under various market, management and technology conditions.

Study looks at semen selection strategies

In a Wisconsin study, the best semen selection strategy varied among dairies with different

reproductive performance (under 2017 market conditions). For dairies with low and medium reproductive performance (Table 1), the best (most profitable) strategy was to inseminate all cows with beef semen. For dairies with high reproductive performance, the best strategy was to inseminate heifers (first and second services) and primiparous cows (first service) with sexed semen and use beef semen in the remaining adult cows.

Using these optimal strategies, the low and medium dairies bought 20 and 18 replacements, respectively, whereas the high dairies sold six Holstein female calves. Thus, low and medium dairies could only optimize ICOSC if enough Holstein female calves or heifers were available in the market.

If replacements were not available, or concerns existed regarding fluctuating prices (for Holstein females), dairy managers must optimize ICOSC within semen selection strategies that provide enough replacements. For example, under 2017 Wisconsin market conditions for dairies in the medium category, the greatest ICOSC that provided enough Holstein females was to use the sexed semen strategy (first and second services for heifers, and first service for primiparous cows) and inseminate the remaining adult cows with beef semen.

How markets affect breeding strategies

Let's take a bird's-eye view of how a few market variables influence semen use strategies. First, if the price of Holstein female calves increases, the more profitable it becomes to use conventional and sexed semen. When dairies

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TABLE 1 Conception rate scenarios at 60 days post insemination of the different simulated reproductive performance levels (low, medium, and high)

| Parity | A.I. service | Conception rate scenario (%) | | |
|----------------|--------------|------------------------------|--------|------|
| | | Low | Medium | High |
| Heifer | 1 | 50 | 60 | 75 |
| | 2 | 45 | 55 | 70 |
| | 3 | 45 | 55 | 70 |
| | 4 | 40 | 50 | 65 |
| First parity | 1 | 35 | 55 | 70 |
| | 2 | 30 | 45 | 60 |
| | 3 | 30 | 45 | 60 |
| | >3 | 25 | 40 | 55 |
| Second parity | 1 | 30 | 45 | 50 |
| | 2 | 26 | 35 | 40 |
| | 3 | 26 | 35 | 40 |
| | >3 | 22 | 30 | 35 |
| >Second parity | 1 | 30 | 45 | 50 |
| | 2 | 26 | 35 | 40 |
| | 3 | 26 | 35 | 40 |
| | >3 | 22 | 30 | 35 |

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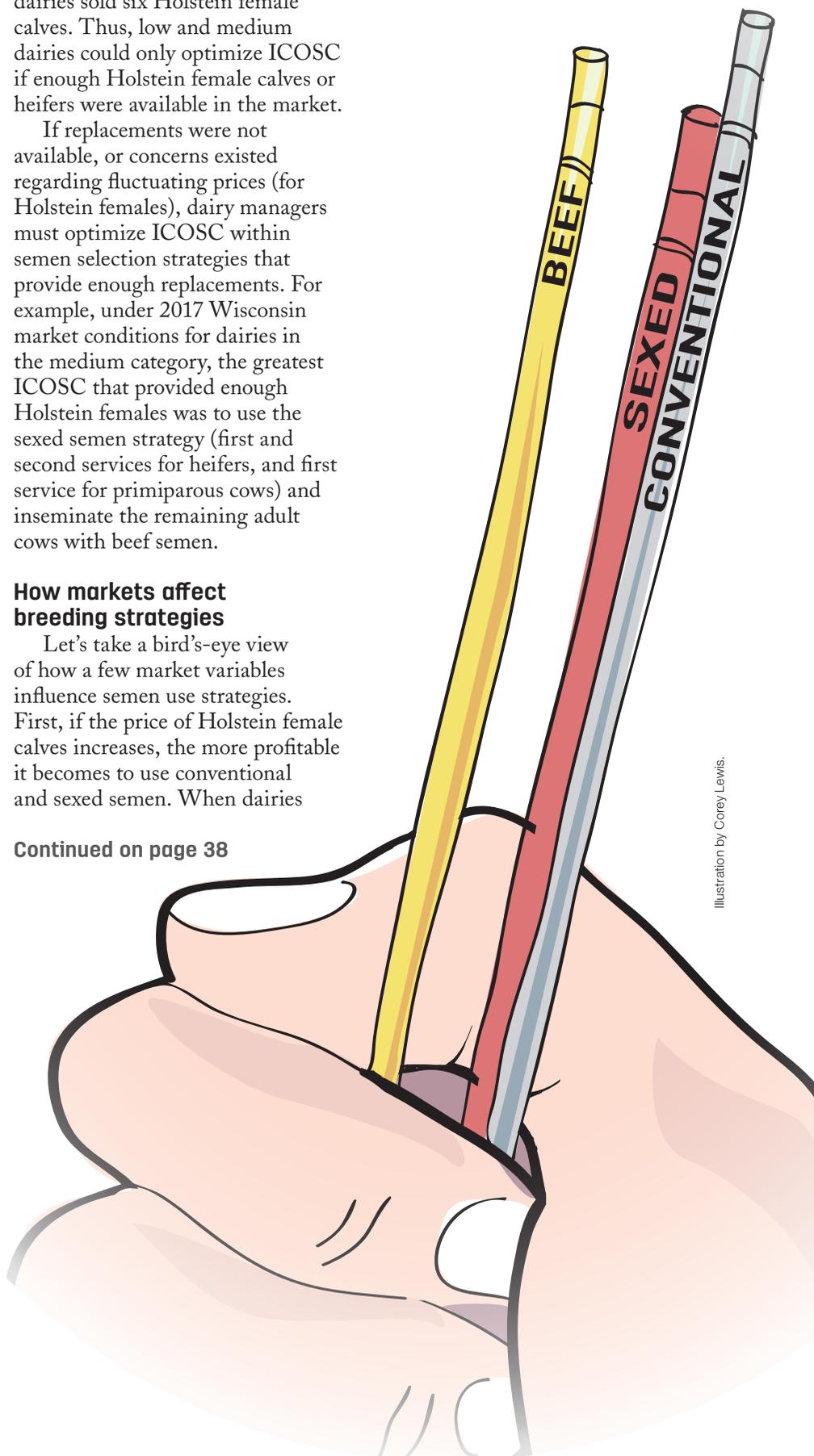


Illustration by Corey Lewis.

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| | Miscellaneous Illness ¹ | \$14,390 | \$15,860 | \$1,470 |
| | Mortality ¹ | \$105,600 | \$132,000 | \$26,400 |
| | Heifer Pneumonia ² | \$13,240 | \$13,520 | \$280 |
| | Heifer Diarrhea ³ | \$5,720 | \$6,040 | \$320 |
| | Heifer Mortality ¹ | \$118,580 | \$141,680 | \$23,100 |
| | TOTAL SAVINGS/LACTATION | | | \$72,330 |

(30,000 Cows & 75,000 Heifers)
¹Guard, C. The costs of common diseases of dairy cattle - CVC in San Diego Proceedings
²Pneumonia in heifer calves costs more than \$100/head - Vet Times
³Mohd, N et al. Estimating the costs of rearing young dairy cattle... - Preventative Vet Med

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ICOSC=

Income from Calves Over Semen Cost

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are striving to improve the herd's genetics, using sexed semen could be increased. This allows dairies with high reproductive performance to sell high-genetic animals to dairies with low reproductive performance.

Second, if the price of Holstein beef crossbred calves increases, the value of using sexed semen falls. Under this scenario, dairies should use semen selection strategies that optimize ICOSC and provide enough replacements. Without enough replacements in the market, available replacements would be extremely expensive or nonexistent.

Third, when the price and fertility of sexed semen varies, the "best" breeding strategy changes. If the sexed semen price falls from \$35 to \$15 per unit, all dairies (in the model) should use sexed semen to optimize ICOSC. Conversely, if the fertility of sexed semen equals the fertility of conventional semen, high and medium dairies should breed heifers (first and second services) and primiparous cows (first service) to sexed semen, with low herds using sexed semen only in heifers.

Fourth, when the price of beef semen drops, the low- and medium-repro dairies should inseminate all adult cows with beef semen to increase ICOSC. The high-repro dairies should reduce the use of sexed semen until it lacks adequate replacements.

And fifth, consider the turnover ratio. Increasing the turnover ratio from 30 to 50 percent did not modify the semen selection strategies but reduced ICOSC on all dairies. In addition, it reduced the number of semen selection strategies in which self-supply of replacements could be achieved. ↗

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