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Contact: Wyatt Bechtel, Filament
wbechtel@filamentag.com, 608-720-1792

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Sexed semen: An opportunity to capture more value for cattle

Breeding with sexed semen can help your bottom line by creating cattle the market demands.

SPRING VALLEY, Wis., USA [August 1, 2023] — Sexed semen breeding programs for the beef industry have primarily focused on developing genetically superior replacement heifers.

“Male sexed semen is an opportunity to capture value. The opportunity’s greater when the price spread between steers and heifers is significant,” says Ken Odde, DVM and Ph.D., professor and department head emeritus of the Department of Animal Sciences and Industry at Kansas State University.

Since retiring from academia, Odde has focused on creating more profitability for his family’s commercial cow-calf ranch in South Dakota, USA.

“About six years ago, I was sitting at the sale barn in Mobridge, South Dakota, and the price spread between steers and heifers just struck me that day,” Odde says.

From that “aha moment,” Odde started to pursue what a sexed semen breeding program could look like for his ranch. He shares strategies and protocols to consider for success, including fertility differences between cows and heifers, the use of split-time or fixed-time artificial insemination (AI) and the value of using breeding indicator patches to measure estrus intensity.

Value of breeding for males

Before breeding with sexed semen, Odde looked back at industry trends to see the economic impact of breeding for more males.

“We’ve got years of history when most sexed semen was targeted at producing females,” Odde says. “Breeding for males is a shift in thinking, and ultimately it’s driven by how high the price difference is between steers and heifers.”

Data from Superior Livestock (see Figure 1) shows the price per hundredweight (cwt) difference between steers and heifers has been on an upward trend for nearly three decades. Odde says the price difference between steers and heifers has been primarily driven by increasing carcass weights and the rising cost of gain.

Figure 1: Value of Heifer Calves Relative to Steer Calves, Superior Livestock Data, 1995-2021

YEAR	MEAN BASE WEIGHT (LBS.)	MEAN PRICE PER 100 LBS. (US\$)	PRICE SPREAD BETWEEN STEER AND HEIFER LOTS (US\$/100LBS.)
1995	527	67.55	6.83
2000	540	100.06	8.00
2005	575	121.43	9.04
2010	567	118.77	10.68
2015	578	248.39	20.94
2020	580	154.22	15.81
2021	572	172.50	18.47

Feedlot closeout performance data in Kansas (see Figure 2) from August 2017 showed the average cost of gain was \$5.66 per cwt higher for heifers versus steers. That year corn was relatively cheap to feed at \$3.91 per bushel. In August 2022, the average cost of gain was \$12.77 per cwt higher for heifers than for steers when the corn price was \$8.69 per bushel.

Figure 2: Gender Performance Differences in Feeder Cattle, Focus on Feedlots, Kansas State University

CLOSEOUT DATE	NO. OF HEAD	IN WEIGHT (LBS.)	FINAL WEIGHT (LBS.)	AVERAGE DAYS ON FEED	AVERAGE DAILY GAIN (LBS./DAY)	FEED TO GAIN (DRY BASIS)	DEATH LOSS (%)	AVERAGE COST OF GAIN/CWT (US\$)
August 2022 (steers)	38,069	766	1,439	180	3.61	6.02	2.06	129.41
August 2022 (heifers)	25,912	736	1,296	169	3.14	6.52	2.72	142.18
August 2017 (steers)	34,951	793	1,379	169	3.62	6.05	1.27	73.88
August 2017 (heifers)	22,764	711	1,231	165	3.11	6.61	1.69	79.54

August 2022 corn price=US\$8.69/bushel and August 2017 corn price=US\$3.91/bushel

“Steers can be fed to higher weights more efficiently,” Odde adds. “The trend of increasing carcass weights could be a driver of producing more male calves with sexed semen, particularly when feed prices are higher.”

On-ranch experience

The first set of females to be bred with sexed semen on Odde’s ranch used maternal female sexed semen on heifers (see Table 1) and predominantly utilized terminal male sexed semen on cows (see Table 2).

Following an estrus synchronization protocol, heifers were bred by visual heat detection using ESTROTECT Breeding Indicator patches to aid in estrus detection during five days of monitoring. The heifers’ AI pregnancy rate was 63.4%.

Table 1: AI Pregnancy Rates for Gender Sorted Semen in Yearling Heifers—2019, 2021 and 2022

YEAR	SEMEN GENDER	BREED OF SIRE	NO. OF HEIFERS	ESTRUS SYNCHRONIZATION PROTOCOL	BREEDING PROTOCOL	NO. PREGNANT A.I.	A.I. PREGNANCY RATE (%)
2019	Female	Angus	101	MGA-PGF2α	Breed by Estrus	64	63.4
2021	Female	Simmental	69	MGA-PGF2α	Breed by Estrus	40	58.0
2021	Female	Angus	73	MGA-PGF2α	Breed by Estrus	41	56.2
2022	Male	Angus	148	MGA-PGF2α	Breed by Estrus	77	52.0

In the first year, cows were bred using multiple protocols. With fixed-time AI, cow reproduction rates were 40.9%. Two cow groups were bred using split-time AI at 70 hours post prostaglandin injection for cows with activated ESTROTECT patches. If patches weren't activated, insemination happened at 90 hours with an injection of GnRH. The split-time groups had pregnancy rates of 45% and 47%.

Table 2: A.I. Pregnancy Rates for Gender Sorted Semen in Cows—2019, 2021 and 2022, Summer of 2021

YEAR	SEMEN GENDER	BREED OF SIRE	NO. OF COWS	ESTRUS SYNCHRONIZATION PROTOCOL	BREEDING PROTOCOL	NO. PREGNANT A.I.	A.I. PREGNANCY RATE (%)
2019	Male	Charolais	88	CO-Synch-CDIR	FTAI	36	40.9
2019	Male	Charolais	80	CO-Synch-CDIR	STAI	36	45.0
2019	Female	Angus	51	CO-Synch-CDIR	STAI	24	47.0
2021	Male	Charolais	204	CO-Synch-CDIR or 7&7 Synch	FTAI	96	47.0
2022	Male	Charolais	46	CO-Synch-CDIR	FTAI	24	52.2
2022	Male	Charolais	78	CO-Synch-CDIR	FTAI	35	44.9

“We think with split-time AI, we were able to pick up a few more cows running them through a second time,” Odde relates. “However, it is pretty labor intensive, so we’ve moved towards more fixed-time AI with the cows.”

In the third year of research, male sexed semen was used across all the heifers and cows.

“We have learned we get better fertility on our yearling heifers than on mature cows,” Odde says. “We can easily produce more bull calves from our heifers, so that’s something we want to evaluate further.”

Words of advice

If you are considering breeding with sexed semen, Odde has a few tips.

Odde suggests using a protocol that helps make chute-side breeding decisions based on estrus intensity via a breeding indicator patch.

If half of the patch or more is rubbed off, females are good candidates to be bred with sexed semen. Should less than half of the patch surface ink be rubbed off, it’s best to use less expensive conventional semen to help manage costs of your genetics investment.

Keeping an eye on market trends is another management practice to consider.

“You need an understanding of the economic dynamics,” Odde says.

For some herds, it may work better to develop more replacement heifers via sexed semen and marketing those replacements to terminal-focused operations, particularly when replacement females are in demand.

“It could be that male sexed semen works well in some situations, and a few years later, it may not have the same incentive,” Odde adds. “When there is a good price difference between steers and heifers, it can really work well.”

Odde presented his on-ranch research findings during the [Beef Improvement Federation Annual Symposium](#) in Calgary, Alberta, Canada, on July 3. For more information on breeding indicator patches, visit [ESTROTECT.com](#).

The ESTROTECT Breeding Indicator is the industry standard for optimizing cattle breeding efficiency and economics. With millions and millions of units sold around the world, ESTROTECT is the only breeding management tool tested in a multitude of university studies by researchers.

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ET_Herd of cows with breeding indicators: *The breeding indicator’s surface ink is rubbed off by friction during mounting and reveals an indicator color. When enough color is exposed, the animal is considered ready to breed.*

ET_Artificial insemination: *Some breeding indicators have easy-to-read bullseyes (black surface ink) on them. Once the bullseye, or the equivalent surface area, is rubbed off the animal – that animal is ready to breed and is up to three times more likely to result in a confirmed pregnancy.*

ET_Ken Odde: *Dr. Ken Odde served as Department Head for the Animal Sciences and Industry Department at Kansas State University from 2007 to 2018. Dr. Odde now works full-time on the family ranch in South Dakota and serves as a regional representative for the American Simmental Association.*

ET_Table 1: *AI Pregnancy Rates for Gender Sorted Semen in Yearling Heifers – 2019, 2021 and 2022*

ET_Table 2: *AI Pregnancy Rates for Gender Sorted Semen in Cows – 2019, 2021 and 2022*

ET_Figure 1: *Value of Heifer Calves Relative to Steer Calves, Superior Livestock Data, 1995-2021*

ET_Figure 2: *Gender Performance Differences in Feeder Cattle, Focus on Feedlots, Kansas State University*