Tackling ET

For the small producer, embryo transplant is no longer out of reach.

by ***Eric Grant***

Like most small seedstock producers, I'd thought about tackling embryo transplant (ET) for years. But it was something that I'd always perceived as a risk rather than a benefit. It was too expensive, too labor-intensive and too hard on your cows.

So every time I got close to doing it, I turned away, deciding instead to let nature — and the old bull in the pasture — do the work instead.

Last summer, I finally took the plunge, and we achieved some pretty good results. I got my best two cows flushed, and their genetics propagated more rapidly than I would have done with just natural breeding.

"With embryo transplant, you're essentially paying for time," a friend once told me. "You're accelerating your progress by getting more calves out of your best cows quicker. And even though the costs can be high, the investment can be well worth it in just time savings alone."

Here's how we did it.

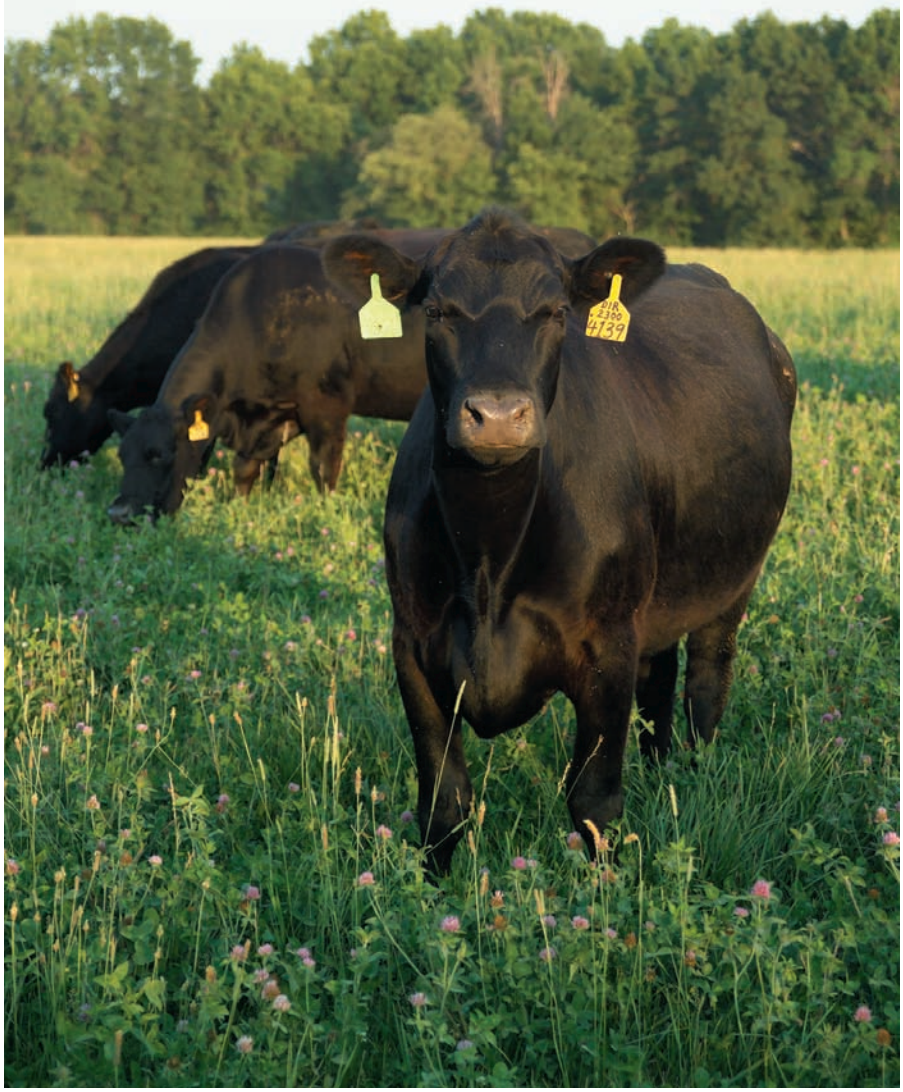
Financial costs

It cost right at $1,500 to flush my two cows. That includes all of the necessary "shots," CIDR®s and services provided by our embryologist, Tom Rea of Berthoud, Colo.

Because I didn't have access to a large number of recipient cows, I leased several cows from a neighbor who had several females that had lost calves last spring. The lease rates will cost me $900 per weaned calf next year (this is a figure I received from several seedstock producers who lease recipient cows). I agreed to pay half of the amount — $450 per confirmed pregnancy — at pregnancy check.

I investigated, too, the possibility of purchasing recipient cows, which would have run about $1,500 per confirmed pregnancy. Many of the large ET centers have their customers purchase the recipient cows outright once the pregnancies are confirmed. The advantages of this, of course, are that you own the cow after the calf is weaned and that you have a physical asset to show for your investment.

In either case, it's crucial to find cows that are in good health and middle age — usually 4-7 years old. And, it's critical to make sure these cows don't carry transmittable diseases. If you have questions about the health of potential recipients, you can have your veterinarian test potential candidates before you transplant embryos into them.



PHOTOS BY SHAUNA ROSE HERMEL

►Embryo transfer can accelerate genetic progress by providing more calves from a producer's best cows sooner.

All told, I will invest approximately $6,500, which will be spread over a half dozen ET calves next spring.

The process

Step 1: Identify when donors and recipients are in heat. I had decided to flush two cows — No. 106 and No. 108 — but because it was somewhat a last-minute decision to do so, I had failed to keep a close eye on when they had been in heat. No. 108 had come into heat in mid-July, but I was uncertain about No. 106.

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To induce estrus in both the donors and the recipients, we administered a single shot of Estrumate® on a Friday afternoon. Three days later, virtually all of the females exhibited "standing heat."

The following Friday, we inserted CIDRs in both the donors and the recipients, and gave them a shot of gonadotropin-releasing hormone (GnRH). The CIDRs were left in the cows for about a week.

On Wednesday evening, the superovulation of the donor cows began. We gave them twice-daily injections of follicle-stimulating hormone (FSH) for four consecutive days.

The following Friday, we removed the CIDRs from the recipients and gave them a shot of Estrumate.

On Saturday, we removed the CIDRs from the donors, and gave them their final shot of Estrumate.

We removed the CIDRs from the recipients on Friday and from the donors on Saturday. We staggered the removal because generally the donors exhibit heat more quickly than the recipients do — usually about 24 hours quicker. By doing it this way, we were able to have them in heat at about the same time.

By Monday afternoon, everything was in heat, and we felt good about the results we were seeing.

"One of the keys to ET is understanding the cow's follicular waves," Rea says. "After a cow is in heat, you start a new wave of follicles. Just one of these follicles becomes the dominant follicle, which produces a hormone that inhibits the development of all the other follicles."

The dominant follicle, which produces the egg, eventually becomes the corpus luteum (CL). By using the FSH, we essentially recruited the follicles that were destined to die off to produce eggs.

Step 2: Artificially inseminate. Approximately 12 hours after the donor cows exhibited standing heat, we artificially inseminated (AIed) them. Twelve hours later, we AIed them again. We used a total of three straws in each donor cow to ensure sufficient semen.

Then, we waited until the following Sunday, approximately seven days after insemination, to do the actual flushing.

Step 3: Flush. Tom Rea arrived seven days after we AIed, which gave the embryos plenty of time to develop inside the donor cows. We flushed each donor cow and collected a total of seven embryos — five from one cow, and two from the other.

Before transplanting them into the recipients, Rea evaluated each embryo under a microscope for age and quality. There were a couple of embryos of undesirable quality, which we did not use. Generally speaking, the seven embryos were of excellent quality.

Step 4: Transplant embryos. Perhaps what surprised me more than anything else was the emphasis Rea placed on the recipient cows.

In all cases, he matched up the development of the embryo with the heat of the recipients. So recipients that were observed in heat at an earlier time received the "older," further-developed embryos.

We also rejected two potential recipient candidates because of insufficient CL development on their ovaries. "That is just a subjective evaluation on my part," Rea says, "but the CLs just didn't feel large enough."

►The rules for recipients are the same as the rules for your donors. They need to be in good health, on excellent nutrition and cycling on their own.

What I learned

Going into this process, I recognized fully that I was a rookie in all matters relating to embryo transplant. There are several things that stood out from my experience.

Working facilities. I cannot emphasize enough the importance of having comfortable, quiet working facilities. During the three weeks leading up to the actual "flush" day, we spent considerable energy upgrading our crowding pen and alley leading to the chute. It probably wasn't enough.

Your ET technician will need plenty of comfortable, safe space behind the chute to work. What we'd built was a little too crowded, so we're taking a second look at our facilities.

Plus, we didn't plan on him being left-handed, and the door behind the chute was designed for efficient use by a right-handed person. It caused a few problems during the course of the "flush" day, but we were able to make some last-minute adjustments to make his work more comfortable.

Our chute is also outmoded and archaic, so as we continue to upgrade our facilities, the purchase of a new chute will be at the top of our list.

"Your cows need to be comfortably restrained while they're in the chute," Rea says. "And the embryologist needs to be able

to work quietly and efficiently behind them."

Nutrition. Even though the donor cows were flushed in mid-summer, when the grass was tall and lush, I probably could have secured better results had I provided the cows with a more consistent trace mineral supplement during the months leading up to the ET work.

The region where I manage my cows is notorious for copper (Cu) and selenium (Se) deficiency. Had I placed the cows on a longer-term nutritional program starting last spring — and not just waited for the grass to grow — Rea says the cows would have produced more embryos.

"I tell a lot of my clients to use chelated minerals with probiotics and high levels of vitamins A, D and E," Rea says. "If your cattle haven't been on a good mineral program, you can see some awesome results."

Needles. Many of the shots you give your donor cows must be given intramuscularly.

Dr. Rea provided me with long needles for administration of the FSH; there were times when I used shorter needles that I had stored at the house.

This may have resulted in the FSH being injected into fat, instead of muscle, and therefore could have diminished our results.

I also learned that the gauge and length of the needle can come into play in ET results as well. "When you use a shorter needle or one that's bigger in diameter, you can have leakage when you administer a shot," Rea says.

Handling. We moved the donor cows a couple of times prior to beginning the flushing regimen, and I think we underestimated the necessity of cow comfort when it comes to achieving good ET results.

When I do this again, I will keep them in the pasture next to the house and not move them. I will have a round bale of high-quality hay in the nearby corral, where they can loaf and fill up, and where I can catch them easily while they're there.

"Managing stress on your cattle is very important," Rea says. "A lot of people like to move their recipients right after we've put embryos in them. That can be a mistake. I advise them to find a way to do the embryo work at the pasture where the cows will be staying, even if you've got portable corrals to work them in. That way, when they walk out of the chute, they're already in the pasture where they're going to be."

Heat detection. I didn't spend a lot of time observing the donor cows for signs of heat, something I will work at harder next time.

"The three most important factors to a successful AI program — heat detection, heat detection and heat detection — can also be applied to ET," Rea says. "Visual observation of your donors and recipients is critical.

"It's been my experience that you're often better off if you're working off a natural heat," Rea continues. "If you observe them in heat, you can put together a timetable built on the animal's own cycles. If not, you can use the CIDR method."

Recipient cows. At the beginning of this effort, I had no idea of the importance of the recipient cows. I'd lined up 11 of them, and figured it would be similar to synchronizing a bunch of cows or heifers for AI and that we would simply be dumping embryos into them after they came into heat.

I was wrong.

In fact, Rea tells me that one of the single most important factors to achieving good results in ET is ensuring the recipients are in good shape, have received good nutrition, and have had a couple of good heat cycles postcalving prior to the time you transplant the embryos into them.

"There are so many factors in ET that we cannot control, so it's essential that we look at the factors that we can control," Rea says. "When it comes to recips, I want the most reproductively sound cows that you have. They need to be cycling. I want problem-free cows that conceived early, calved early and with little assistance. You want a cow that will do a tremendous job of taking care of that calf."

In sum, the rules for recipients are the same as the rules for your donors. You need to provide them with excellent nutrition. They need to be in good health. They need to be cycling on their own, and it's a good idea to observe them for signs of estrus as well.

Suckling calves. Both of our donor cows and one of the recipients had calves at their sides. We ended up not using the recipient cow because her CL wasn't fully developed. The later-calving donor cow produced just two viable embryos.

When we flush our cows again, they will not have calves at side.

"The cow that has weaned her calf off often has better results than a cow with a calf at side," Rea says. "When a cow is lactating, she is producing a hormone called prolactin. Prolactin can have a negative impact on reproduction."

Weather. Weather can have a significant effect on your ET results. And Rea recommends that you look at doing the bulk of your ET work when weather conditions are not too hot or too cold. "If you can stay away from extreme weather conditions, you'll enjoy better results," he says. AJ