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EMBRYO TRANSFER CAN MAXIMIZE BEST GENETICS

by: Heather Smith Thomas

A growing number of breeders now use advanced reproductive techniques such as embryo transfer (ET) to maximize the genetics of their best cows. This is a way to produce many more calves from an outstanding cow than she could ever raise in her lifetime. As pointed out by Russ Princ at Genex (a company that does custom semen collection, much of which is used for ET), this is also a way to get more calves from a pair of animals that nick well. "A good cow may have only 10 to 14 calves during her life, but with ET you can raise dozens of calves from her. People are selling rights to flushes, selling embryos, and confirmed sexed pregnancies (in recip cows) from a flush," says Princ.

Lyndal Hurst, a breeder in Slaton, Texas, has been using ET for 6 years. "What it does for me is keep from tying up my best cows for a year raising just one calf. It gives me the chance to have 5 to 15 calves a year from those top cows. This allows me to get rid of my lower end cows and just keep my best," he says.

Dr. Charles Looney (Ovagenix) says more than 500,000 embryos are collected and transferred annually, worldwide, and more producers in this country are now using the advanced technology.

THE PROCESS -- Mark Steele (Steele Embryo Service, Graham, Texas) says the procedure can be done on the donor cow any time after about 60 days past calving. Best results are usually obtained using cows that have already calved once. A common practice is to use FSH (follicle stimulating hormone) to super-ovulate the cow and get multiple eggs/embryos instead of just one.

"The cow must have come into heat at least once after calving and be cycling normally. We start using FSH about 10 days after one of her heats," says Steele. "We give her two shots of FSH per day for four days. Then we give her Lutalyse and get another heat cycle, at which time we go ahead and breed her by AI with semen from whatever bull the client selects. With this protocol we can average about seven to eight good embryos per flush, collecting them about seven days after the breeding," he says.

"Seven days after breeding, the embryo is approximately 54 to 128 cells -- about the optimum number for collecting it. The embryo doesn't really change in size until it bursts out of the zona (the membrane surrounding the egg). A seven day embryo is still about the same size at 128 cells as it was when the egg was a single cell. Then about day nine it bursts out of the zona and starts growing larger," explains Steele. You have to collect it before that time.

At six to eight days it can be retrieved. "If the cow is in heat and bred on Thursday, you'd want to flush her the next Thursday, for instance. After collection, the embryos can be immediately put into recipient cows, or frozen for future use. If everything works right, you generally have a success rate of 60 to 65 percent, using fresh embryos. This drops to about 50 to 55 percent when using frozen embryos," says Steele.

"I usually tell people they can expect 60 percent success on fresh ones and 50 percent on frozen; it's usually 10 to 15 percent less. This is an average. It sometimes works better than that, but you can't always expect it to. I've had times I've put in 10 embryos and got 9 pregnancies, but you can also put in 10 and get pregnancies. It averages around 60 percent," he says.

"You may hear about large flushes where you might be able to freeze 20 to 30 embryos, and people may think every cow should do that. But the national average is about 7.6," says Steele.

"The other day I got 13 embryos out of one cow, which is very good; most times I get 4, 5, or 6. It depends on the individual cow, the doses of drugs used, etc. Every cow is different. You have to experiment to figure out what works best for that cow."

RECIP COWS -- If you transfer embryos fresh (rather than freezing and saving them for future use), the recip cows must also be about 60 days out from calving, and the cycles of the recip and the donor cow must be timed the same; the reproductive tract of the recip cow must be at the same stage as the donor cow, to receive the embryo. If the donor cow is in heat this Thursday, the recip cow must also be in heat this Thursday, so we can collect the embryos next Thursday and put them in, explains Steele.

"The embryo is placed in a .25 cc straw (after flushing it from the donor cow), a straw that is specifically designed for transferring embryos. We must place the embryo clear up into the horn of the recip cow's uterus, on the side she ovulated 7 days earlier. We palpate her ovaries, to know which one ovulated. This is a little different from doing AI, in which you simply put semen into the uterus through the cervix. The embryo must go clear into the uterine horn," says Steele. Many people use CIDRs and various drugs to get everything to work right in timing the donor and the recip cows for best results, to synchronize their heat cycles.

If a recip cow does not "take" and comes up open, she can often be used again fairly quickly if the producer uses ultrasound or a blood test to check for early pregnancy. A blood test can determine pregnancy 30 days after conception, and ultrasound can also be accurate quite early, compared with palpation -- which is generally not very accurate until 90 days after conception. If you can check the recip cows earlier than that, you have a chance to use the open ones again much more quickly.

Wes Larkin (Genetics Unlimited, College Station, Texas) says the most important thing when doing ET is having good recip cows.

"This is the key. No one will remember how many embryos you got out of a cow, but they'll remember how many pregnancies you got," says Larkin. For this to work, the recip cows have to be at the right stage of their cycles to receive those eggs, and you also want them to be good mothers. The best recipes are the best mama cows you can get, says Larkin.

"You might get 20 grade one embryos out of a donor cow but if you put them into recipes that aren't synchronized right or aren't good mothers, it still won't work. You might only get a couple pregnancies instead of 10 or more. Good

management, especially on the recipients, is 75 percent of this game. The work that I do on that certain day with the embryo transfer is nothing, compared to the importance of preliminary things like the shots and management of those cows. All those things have to be done right or it's not going to work," explains Larkin.

A good recipient cow is a healthy, docile animal that is fertile and milks well enough to raise a good calf. "The ideal recipient is a cow that's already had a calf or two and has a calf at her side, or that we know for a fact has carried an embryo before," says Vernon Guidry (Guidry Land and Cattle, Madisonville, Texas). This increases the odds that the cow has a normal, healthy reproductive tract and that she'll carry a successful pregnancy.

He just bought 190 Brahman-Holstein cross cows to use as recipients in his ET program. "This cross makes excellent recipient cows. The ones we bought are 5 years old and last year the average weaning weight on their calves was 762 pounds. When we sell an embryo in a recipient cow, not only do we offer prolific pregnancy, but we also offer a prolific recipient cow," says Guidry. The resulting calves will have good health and good growth.

OTHER FACTORS THAT AFFECT SUCCESS RATES -- "The handling of cattle, and the mineral program, are key factors in fertility," says Princ. "I don't think these things have been stressed enough, for many producers," he says.

"We need to maintain good focus on the basics," says Linsey. "When handling these animals we need to use caution and eliminate or reduce stress at every possible opportunity, and not forget the simple things we can do to improve our chances -- through proper nutrition, herd health, etc.

There are many things to consider, including management of the cattle, condition of the animals, weather, etc. "You don't want a donor cow too fat or too thin, and the same applies to recipients," says Steele. "If they look good but are actually losing weight (you come back 30 days later and they've lost 100 pounds) your success rate will be much less. If they look average but are gaining, and you come back in 30 days and they've gained 100 pounds, your success will be better."

Larkin says it's often a challenge having enough hay and facility to take care of all the donor cows that are brought to him. The drought last year had a large impact on the success rates of ET, in a lot of regions. Some people had recipients that lost their pregnancies due to the drought and poor pasture conditions. "I've never watched the weather so much in my life!" says Larkin.

USE EXPERIENCED PEOPLE -- Usually the best success is obtained when you use the services of someone who has been doing ET for awhile, since there are a lot of people who try it for a short time and are in and out of this business. Steele has been doing ET work in cattle since 1982. "Some of us are certified in ET work, while others may not be. Any time you have something new come along there are always people who jump in and try to do it. The American Embryo Transfer Association has yearly meetings where we all get together and discuss techniques and try to figure ways to tweak everything so we can do a better job," says Steele.

"This doesn't mean people can't learn how to do this on their own; some may be doing a really good job. This always happens in any industry, and that's how we progress. Someone comes along with some good ideas and innovations they came up with on their own," he says. But to ensure success, check and make sure the person you ask to do your ET work has had experience and good success rate. Get some references. Check with someone you know is good at it, even if he's not in your part of the country; he can recommend someone he knows who is closer.

"Embryos are shipped all over the country, and I feel more comfortable putting in embryos that come from a certified company or from someone I know. I hesitate to get a batch of embryos from someone I don't know," says Steele. "If I put in someone else's embryos and we don't do well with them, it reflects on me, even if it was a poor embryo." It pays to have quality all the way.

"You want to use someone who's had enough experience to figure things out, make adjustments if necessary, and knows what to do next if you have problems. There are 10 or more processes involved in this and if you break down on any one of them, your success rate goes down. So you have to be able to work on all of it, for optimum conditions and success," explains Steele.

Wes Larkin says, "Anyone who wants to do ET needs to know the percentages and success rates, before they invest a lot of time and money. They need to check out who is doing it and what kind of results (pregnancy rate) they're getting. Anyone considering use of ET needs to learn as much about it as possible. They can ask people who are doing this kind of work. Ask every question you can think of. If you are familiar with every aspect of it before you get into it, then there are no surprises. You need to know all you can about it -- everything from the cattle, to the procedure, how the cattle are worked, what's done to them, the cost involved, etc. I encourage people to find out every little thing about this, before they jump into it," says Larkin.

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