

# Multiplying Effect

Advanced reproductive technologies open breeding and marketing doors for Angus breeders.

**M**any registered Angus breeders have elite females from which they can market valuable genetics and offspring. With the use of advanced reproductive technologies, more offspring can be propagated to help multiply the success of breeding and marketing programs. While many breeders are familiar with embryo transfer (ET) and in vitro fertilization (IVF), they may not be aware of new technologies that advance the opportunities available with IVF.

ET has been used to propagate elite genetics for the last 25 years. The process involves specific hormonal treatment to the donor cow causing superovulation, inseminating her as usual, and “flushing” the embryos out of her uterus. The embryos can then be transferred fresh to synchronized recipients (surrogate dams) or frozen for later use.

Jim Sundberg and his family have been farming in north-central Illinois for more than 125 years. Eight years ago, they invested in purebred Angus for the breed’s eye appeal, performance and carcass traits. A year later, Sundberg and his family began to use ET to increase the influence of their best genetics.

“Getting 10 to 20 calves from our best cow each year ... justifies the extra cost of the ET program,” Sundberg says. Now, his family has a dozen or more donors in their ET program. In selecting females to become donors, they choose those with top performance traits and those whose progeny ultrasound and perform well.

“We’re ultimately breeding for bulls that make feeder cattle that produce pounds and grade and yield well. And we breed for females that excel in fertility and durability,” Sundberg says.

## In vitro fertilization

Later this year, Sundberg plans to try IVF on one of his special cows that presents a variety of marketing opportunities. “I’d like to get more embryos out of her, and I plan to use sexed semen with the IVF treatments to get female offspring,” he says.

IVF technology involves removing immature oocytes (eggs) from the donor female, placing them in a petri dish of specific media to mature, and then introducing sperm cells. After fertilization occurs, the embryos are incubated for about seven days and then transferred into synchronized

recipients. Traditionally, IVF has been used to create viable embryos out of subfertile donors, pregnant donors and even recently dead donors.

Now, IVF technology allows clients to use rare or sorted semen on multiple donors at one time. Trans Ova Genetics, based in Sioux Center, Iowa, can even sex-sort semen that has been previously frozen, so breeders can use sexed semen from any bull of their choice in combination with IVF. Or, more than one sire may be used on one donor’s oocytes to produce calves from multiple matings.

Mark Squires at Express Ranches sees this technology as an appealing option. Express Ranches and Express Genetics Partners collectively register nearly 3,000 Angus each year. For the past four years, they have used IVF technology on some of their best females.

One of their top females sent to Trans Ova in February 2003 for IVF production has since produced more than 100 pregnancies, Squires says. More recently, elite females from Express Ranches have also produced gender-specific embryos through the use of IVF and sexed-semen technology.

“This combination has the chance to revolutionize the industry’s current method of advanced reproductive technologies,” Squires says. “We plan on incorporating IVF, sexed semen and frozen IVF technologies to mass produce gender-specific matings for transfer into purebred recipients as well as commercial recipients at off-site production units.”

Express Ranches markets more than 4,500 bulls, purebred females and commercial females each year. Bulls are as much in demand as females, so Squires explains that they will probably still purposely have a 50/50 split of heifers and bulls born. “But, we can effectively select gender-specific matings that will advance the top-end production of both bulls and females.”

Southern Cattle Co. of Marianna, Fla., has also used IVF as a tool in its breeding program. Owner John Downs explains that the technologies help support their mission “to breed and raise some of the best Angus genetics for the Angus industry” by allowing them to offer more offspring from elite females.

“Most recently, a real plus for us has been to use sexed semen together with IVF,”

Downs says. “We prefer to make only heifer calves from our donors.”

Southern Cattle Co. generally works with about 65 donors, selecting them based on stringent criteria: weaning more than 650 pounds (lb.), good disposition, and individual health and conformation traits. Oocytes from some of Southern’s elite donors are paired with previously-frozen sexed semen from elite sires. Being able to freeze IVF embryos is another plus for Southern Cattle Co., allowing targeted calving dates with bull calves born in the fall and heifers born by the first of March to avoid the worst of Florida’s heat and humidity.

Because all their cattle are born and raised in Florida, Downs emphasizes that they know how to perform in similar conditions.

## Larger calves with IVF?

Seventeen years ago, when IVF was first being used, some breeders noticed larger-than-normal birth weights for IVF-produced calves. Hong Wei, director of research and development at Trans Ova Genetics, explains that changes made in the embryo culture system have significantly improved the situation.

“The new culture system has since been the standard for Trans Ova Genetics’ IVF process for more than five years. We have accumulated data for 13 years, leading to substantial changes, which have allowed us to reduce large calf birth sizes,” Wei says. “Statistics from calves resulting from IVF-produced embryos at Trans Ova Genetics in the last five years show that only 2% of calves born are larger than normal.”

## Freezing IVF embryos

Changes to IVF culture media also have led to advances in freezing technologies. Wei says improving IVF embryo freezing is an ongoing research project for the company. In early 2006, his team developed a minimum-volume vitrification method. In field trials, they achieved a 63.5% conception rate with frozen embryos, nearly identical to the conception rate (63%) achieved with fresh embryos. Freezing IVF-produced embryos gives breeders additional marketing opportunities, and allows them to choose the date to transfer embryos to recipients.

Angus breeders using advanced reproductive technologies on their elite cattle have even more options today than with conventional embryo transfer. In vitro fertilization is not a new technique, but its combination with other reproductive tools gives breeders new possibilities.



**Editor’s Note:** This article was provided by Filament Marketing LLC for its client Trans Ova Genetics.