

SOLID FOUNDATION

*Donor cows can serve as the base for a quality cattle herd
and promote rapid growth when properly identified.*

by Megan Silveira, assistant editor

Today's world is built on data and how fast people can get their hands on it — especially when it comes to the cattle industry. Expected progeny differences (EPDs) are updated weekly. Economic assumptions keep current with the times. Markets are evolving. Environments change.

“The pace that we move at today is faster than we've ever moved before,” says Charlie Boyd II, of Boyd Beef Cattle in Mays Lick, Ky. Finding the balance between all these revolving concepts is a struggle, but with technology like embryo transfer (ET), Boyd says producers can rapidly replicate elite genetics in their herd to build their herd on a solid foundation.

EARLY TALKS

In the late '70s, cattlemen first started whispering about ET technology around the dinner table. The subject was quickly gaining traction in the industry.

Kentucky veterinarian Herb Brown was one of the first to regularly practice the process. When he started Green River Embryo Transfer in Bowling Green, Ky., cows were being flushed conventionally and embryos were being placed in recipient cows through a surgical process soon after they were collected.

It was Brown who helped veterinarian Angus breeder Levi Holt discover his passion for embryology. Holt started doing embryo work in



2019 and purchased Green River Embryo Transfer from Brown.

ET work has improved over the years, and producers can now choose between conventional ET and *in vitro* fertilization (IVF), but Holt said the thoughts behind the science have stayed the same.

“Both of those styles and methods of collecting embryos have advantages and disadvantages,” Holt says, “but they’ve definitely helped to facilitate the genetic growth of the cattle industry. And not just the Angus breed, but all breeds — beef and dairy cattle.”

Simply put, Holt says ET allows producers to create more of their top genetics each year.

“We all have those cows that are the best producers or possess elite genetics,” he explains. “By utilizing ET, we can get more calves out of that cow in a year’s time versus the one she can produce naturally.”

With the production of multiple calves from a single dam in one year, Holt says cattlemen have more opportunities to quickly improve their cattle herd. With this technology, producers can breed the same cow to multiple bulls. From an emphasis on maternal traits to a focus on carcass and hanging ability, ET helps producers get the best of both worlds with each year’s calf crop.

“There’s flexibility from a mating standpoint,” Holt says. “Through ET, we don’t have to breed a cow one specific way each year. We can choose different bulls to breed the same female to play both sides.”

STAYING AHEAD OF THE CURVE

Iowa cattleman Darin Meyer of De-Su Angus is anticipating 1,000 ET calves on the ground in the next year. Between his commercial recipients and his registered females, Meyer manages 1,500 head. Everything the operation is doing in their breeding program is either the result of artificial insemination (AI) or ET.

“I want to push that genetic envelope,” Meyer says. “I kind of think if you want to find outliers, you have to have a lot of numbers. The more I have, the more I can go out there and find the ones that have the genetic package and the phenotypic package.”

Meyer uses conventional ET methods, as he says they are more cost-efficient and reliable for his herd compared to IVF.

Meyer has a background in the dairy industry and his first ET calf

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“THERE’S NO REPLACEMENT FOR THOSE TRUE FOUNDATION FEMALES. WE’VE GOT COW FAMILIES HERE THAT WE’VE HAD SINCE THE VERY BEGINNING, AND THEY’RE THE ONES THAT KEEP US IN BUSINESS.” – CHARLIE BOYD II

was born in 1983. He’s applied his experience in ET technology to his Angus herd and is doing what he can to consistently outproduce previous generations of the cow herd.

When it comes to selecting those donor females, Meyer says it starts with genetics. He wants his herd to be in at least the top 15% of the breed standard for expected progeny differences (EPDs) and dollar value indexes (\$Values), but says he breeds for calves that reach the top 3%.

“I’m looking for acceptable birth weight, calving ease direct, really good growth. I try to make sure that they have a pretty good carcass package to them,” he explains.

Only after Meyer identifies the top females on paper does he ensure they’re a phenotypically pleasing animal before flushing them.

“I start with numbers first,” he says. “I don’t flush a cow because she looks nice. I flush a cow because she has good numbers *and* looks nice.”

At De-Su, “looking nice” means having an acceptable set of feet and legs, a clean front end and a natural fleshing ability. Meyer avoids extremes in appearance when it comes to donor females, but says an animal does need enough width and capacity to make it in an ET program.

Nearly all of Meyer’s donors are virgin heifers. His team completes the entire ET process in-house, with females being flushed two to three times before carrying their own calf. While he does consider flushing a few top producers again after they calve, Meyer doesn’t typically keep cows as donors if they were successful as a heifer.

In his mind, ET technology is all about producing the next great donor.

“If I did my job, I should have made something better out of that cow by the end of the calving season,” he says.

Successful females can still be labeled as foundational donors, but Meyer says he wants his program to center around marketing those elite animals and then to continue to build the herd from their progeny. It’s a cycle to help his program stay at the forefront of the industry.

Meyer knows there’s more to a good ET program than just quality cattle, however. He reminds producers it takes proper management and adaptability to truly reap the benefits of ET technology.

“It comes with some handicaps,” he admits, listing days on feed and calving intervals as necessary evils. “You’ve

got to adjust your management a little bit to it. If you’re not managing different, costs can add up in a hurry.”

For this cattleman and his herd, he says the benefits far outweigh the costs at the end of the day. ET is helping Meyer achieve the lofty goals he has set for his herd’s genetic performance and allowing him to meet the demands of his customer base.

UPHOLDING HIGH STANDARDS

Though Boyd is the first in his family to breed Angus cattle, he comes from a line of four generations dedicated to promoting quality beef animals. He’s seen the benefit of ET firsthand — it was this technology he says helped get his family’s first bull into an AI stud.

Today, Boyd Beef Cattle has embraced a few foundational females and kept them as the base for their own ET program.

“There’s no replacement for those true foundation females,” Boyd explains. “We’ve got cow families here that we’ve had since the very beginning, and they’re the ones that keep us in business.”

The top 80% of the calf crop is the result of 20% of the gene pool, Boyd adds. These numbers aren’t blind luck. While Boyd recognizes the benefits of building a herd on a few key cow families, he says it takes caution and thought to truly reap the benefits of ET technology.

Boyd uses both conventional ET and IVF, though the operation leans more heavily on conventional methods. For both processes, however, the action of identifying a donor female stays the same.

At Boyd Beef Cattle, selection starts in the pasture.

“We start with phenotype first and build around that with genotype,” Boyd explains. “We want females that are attractive, big-bodied, square-hipped, sound, with beautiful udders. We want it all. If we can make females like that with big numbers, that’s just a little extra icing on the cake.”

A good yardstick for potential in these females is their dams. Boyd refuses to consider a female for his ET program if she’s not from a proven cow family. If her pedigree doesn’t showcase past generations of eye-appealing, fertile females, Boyd says she doesn’t make the cut.

Holt agrees, “There is a lot of variability in the science of selecting females. If you know any kind of history on that cow’s dam, that’s somewhat heritable. Those females

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BACK TO THE BASICS

Since it first entered the industry in the '70s, Levi Holt, embryologist at Green River Embryo Transfer in Rickman, Tenn., says embryo transfer (ET) technology has become more popular and more precise among cattlemen across the country.

"ET really allows us to capitalize on the genetics of the top end females in our herd," Holt says.

Advances in technology give breeders the option to pursue ET through conventional methods or *in vitro* fertilization (IVF).

For conventional ET, Holt says donors are first stimulated to ovulate multiple eggs or oocytes.

"We are breeding those cows similar to what we do in artificial insemination AI," he explains. "All of the fertilization and embryo development occurs in the uterus of that cow — that donor female."

Seven days after breeding a donor, an embryologist will flush the cow to collect those embryos from her uterus. The embryos can then either be frozen or immediately placed into a recipient cow.

Females can be flushed conventionally every four to six weeks, and the national average is six good embryos per conventional flush. Although Holt says there's variability in those numbers depending on the donor female.

On the other end of the spectrum, Holt says IVF requires the fertilization of eggs in a laboratory setting.

An ultrasound-guided aspiration technique pulls eggs directly from a donor's ovaries, and those oocytes are shipped to an IVF lab where they are fertilized in a petri dish with semen from a bull of the breeder's choice. Embryos are cultured in the lab for seven days, before being frozen or transferred to a recip.

With this method of ET, cows can be flushed whether they are open or less than 120 days pregnant. Aspiration can occur every two to three weeks, and Holt says producers should expect close to but slightly lower numbers of quality embryos from IVF compared to a conventional flush.

Similar to straws of semen, as long as they are stored properly in liquid nitrogen, Holt says embryos collected through either method do not have a shelf life or expiration date.

Knowing the basics of each ET option allows breeders to make decisions to help advance their herd.

"There's different things we can do within each of those scenarios that may or may not help with that female being a good donor," Holt says. "It gives our cows more of a chance to make eggs one way or the other."

He says the choice between conventional ET or IVF is one that should be based on what works best with a producer's goals and a cow's ability to perform.



out of dams that were successful in an ET program are more likely to be successful themselves.”

Boyd’s biggest caution for all cattlemen? Flushing females that shouldn’t be.

He says it’s easy for producers to get caught up in industry trends, single-trait selection or pressure from other breeders. It’s Boyd’s devotion to having heifers prove themselves through their progeny before flushing them that results in his donor females being at least 3 to 4 years old. He’ll flush those young females two to three times, allow the calf crop to hit the ground and then reevaluate her performance. From that initial period of trial and error, he says things become much simpler.

“Phenomenal producers get to be a donor for a long time. If you start with a good base and foundation, cow family and phenotype, your law of averages are significantly better for success,” Boyd says. “Study the cow families. Study their history. Go look at the cattle. ET can either be a very economical way to mass produce elite genetics, or it can be a very, very expensive learning curve.”

BUILDING ON A STRONG BASE

There’s more than just production of quality calves for a good donor, Holt warns. Despite the improvements

in technology and the many options for a breeder’s ET program, sometimes things don’t fall into place.

“At the end of the day, sometimes cows just don’t really want to be donors,” he admits. “It’s unfortunate, but it does happen.”

Age can be a tricky discussion point for donors, as well. Holt says breeders need to find the fine line between longevity and relevance. Depending on the program, he says some donors become obsolete after a year while others can serve as the foundation for a herd for years.

“I personally like to see females that are 5 to 7 years of age and still producing,” he says. “That donor is doing a lot of things right if she’s still relevant at that age.”

Beyond relevance, Holt says some cows’ reproductive tracts become more difficult to manipulate with conventional ET methods as the years add on. IVF can be an option for these older cows, but Holt says the choice requires consideration of a donor’s genetic and physical potential to continue pushing a herd towards progress.

There’s a lot to balance in this discussion of identifying the individuals out in the pasture who should become a family’s legendary donor females. It takes thought, dedication and a continued effort to not be overwhelmed by a current world built around rapid change. **AJ**

