

Enhancing Genetic Predictions of ET Calves

The Association improves interim EPDs for embryo transfers by using maternal data from their registered Angus recipient dams.

by *Stephanie Veldman*

One Angus producer refers to them as “flex cows” — the registered Angus recipient females used in his embryo transfer (ET) program. He likes the fact that he can take a set of registered Angus cows and put embryos in them, yet those that do not conceive may still be bred and produce registerable, marketable calves by a natural-service sire. And, the cows that come into heat at a time not conducive to implanting an embryo may still be bred by artificial insemination (AI).

Ben Eggers of Sydenstricker Genetics, Mexico, Mo., says the reason he started using registered Angus as recipients was because he didn't like having off-colored recipients in the herd. It was also hard trying to manage them separately from the rest of his cows.

“If she is a commercial recipient in a registered Angus herd, she doesn't have much value unless she does raise an embryo calf,” Eggers says. “If she happens not to take an embryo right off the bat, you've pretty much lost her for the year.”

A recent action by the American Angus Association Board of Directors will give registered Angus recipient cows an added value. The Association will be able to use maternal data from the recipient dam to help calculate interim expected progeny differences (EPDs) for the ET calf for producers using registered Angus recipients.

Improving interim EPDs

Previously, interim EPDs of ET calves were based solely on ancestral data. No individual data, such as calf birth weight or weaning weight, were factored in like they would have been for a natural calf in a contemporary group. Instead, all ET calves were given a performance ratio of 100 to indicate they hadn't been compared against other calves.

“We weren't really able to quantify the environment or the recipient cows' influence on ET calves, so we didn't take

into account the weight of those calves,” says Bill Bowman, director of performance programs for the American Angus Association.

Individual performance data is required on records submitted to the National Cattle Evaluation (NCE) to generate published Angus EPDs, which are distributed twice a year online and in the *Angus Sire Evaluation Report*. ET calves are not yet included in the NCE because of the inability to account for the recipient dam's influence.

Comparing genetic values on ET calves has long been a source of frustration, because the recipient dam has a maternal effect on the calf she raises, primarily milk, which can have a significant effect on the calf's weaning weight.

“Anytime you are trying to identify the genetics of an animal, you have to make sure that you account for as much of the environmental noise or nuisance variation, like age-of-dam adjustments — nongenetic factors that you know can cause animals' weights and measures to differ,” says Sally Dolezal, of Dolezal Enterprises, Derby, Kan.

“You have to adjust for that environmental variation so you can separate out the genetic differences,” she adds.

Dolezal conducted a study for the Association that examined the potential of adjusting weights on individual ET calves to account for maternal effects of the recipient dam and to allow the computation of interim EPDs on ET calves.

She used Angus Herd Improvement Records (AHIR) data, which contained records on more than 4,000 embryo calves out of registered Angus recipient females. Bulls and heifers were evaluated separately.

“We know that the embryo transfer calf has genetics from the donor dam, just as it does from the sire. And we know the recipient provides the maternal environment,” Dolezal says. “All that environment that she passes to that calf that influences the weaning weight is the big-ticket trait we are most concerned with.”

Data analysis and results

Birth and weaning weights were analyzed using a model that included known sources of variation, such as herd, management, age of recipient dam, milk EPD and residual error. The management effects included non-creep-fed and creep-fed calves.

Dolezal found that the age of the recipient dam was a significant source of variation for birth weight and 205-day adjusted weaning weight in ET bull and heifer calves. This indicates that adjustments for recipient age are necessary to place ET calf weights on a mature-cow basis.

The study also revealed a significant trend in which recipients' milk EPDs declined as age of dam increased. “These results

illustrate that the recipient dam's maternal genetic ability, for example her milk EPD, cannot be overlooked,” Dolezal says.

Dolezal outlined several implications of the study:

- Birth and weaning weights on ET calves can be adjusted for age of dam effects using the registered Angus recipient female's age and the current Angus age-of-dam adjustment factors.

- Contemporary group ratios can be calculated using the adjusted birth, weaning and yearling weights on individual ET calves out of registered

Angus recipient females.

- Interim EPDs on ET calves can be improved upon by the following.

- Changes to the calculation of interim EPDs on ET calves would apply only to those calves out of registered Angus recipient females.



“These results illustrate that the recipient dam's maternal genetic ability, for example her milk EPD, cannot be overlooked.”

— *Sally Dolezal*

CONTINUED ON PAGE 118

Enhancing Genetic Predictions CONTINUED FROM PAGE 117

- If the recipient dam is a registered Angus female, the ET calf's birth and weaning weights can be adjusted for the age of the recipient dam using her age when the calf is 205 days old.
- Additionally, for the weaning weight EPD, the recipient dam's milk EPD and permanent environmental effect would be used in the calculation of the interim rather than the maternal information of the donor dam. As a

result, the interim yearling weight EPD would be affected through the weaning weight direct EPD.

- ▶ The inability to account for milk EPD of the recipient dam under the current NCE model does not allow the immediate use of ET weaning weights in the existing calculations for EPDs. As a consequence, the adjusted weights on ET calves would continue to be excluded from the EPD analysis until ETs have

their own progeny.

- ▶ In the future, a proposed way to include ET weaning weights in evaluation procedures would be to modify the weaning weight model to include recipient dam effects. This would more appropriately account for the maternal genetic and permanent environmental effects of the known recipient female. Fortunately, the American Angus Association database allows the tracking of these registered recipient dams and their known milk EPDs.

“Even now that we are using the registered Angus recipients and using the individual data on these calves to generate their interim EPDs, that information is still not going to be used in the current National Cattle Evaluation,” Bowman says.

The three-parent model

Bowman says that the step to include ET calves in the NCE becomes complicated, because they have a very traditional way of calculating EPDs for natural calves using the sire and the dam. “You end up having a three-parent model because you have the sire, the donor dam and the recipient dam — you are trying to quantify all of those,” Bowman says. “It is something that we are going to want to look at doing down the road, but it is going to require a substantial change in the current evaluation model to accommodate it.”

“I would like to see it move to a three-parent model where the recipient's genetic merits are taken into account to compute the embryo calf's EPDs,” Eggers says.

Dolezal says that stage two of her study will be the incorporation of weight records for ET calves that are out of registered Angus recipients in the NCE through a three-parent model, so that individual weights on ET calves may be utilized in genetic predictions of the parents.

For now, Eggers says he hopes the modifications to the calculation of interim EPDs will create more demand for the middle-of-the-road and lower-end registered Angus females.

“People will always prefer to have the most accurate EPDs they can,” Eggers says. “If this system will provide a little more accuracy on those embryo calves at an earlier point in life, people will want to use registered Angus as recipients rather than using commercial cows.”

