BY THE NUMBERS

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Reproductive Technology Adoption

The use of reproductive technologies has significantly influenced genetic improvement in Angus cattle.

Genetic improvement is often linked to programs and advancements Angus breeders are familiar with. Such advancements would include things like expected progeny differences (EPDs), genomics and the development of new traits.

Another family of technologies that work alongside these advancements are of the reproductive variety — things like artificial insemination (AI) and embryo transfer (ET). In fact, these two families of technologies are complementary. On the one hand, genomics can help improve the accuracy of selection, where AI can increase the intensity of selection; both of which together are multiplicative in their impact on genetic progress.

The use of AI in commercial beef production is 7% with 12-15% common in heifers, according to representatives in the beef semen business (personal communication) and these levels of adoption have not changed dramatically in recent years. Given this relatively low level of adoption in the commercial beef industry, it could be concluded that the effect of AI and other reproductive technologies has been minor in beef cattle.

This article brings a counter argument to this view. The use of reproductive technologies on genetic improvement in Angus cattle has been significant.

Ahead of the curve

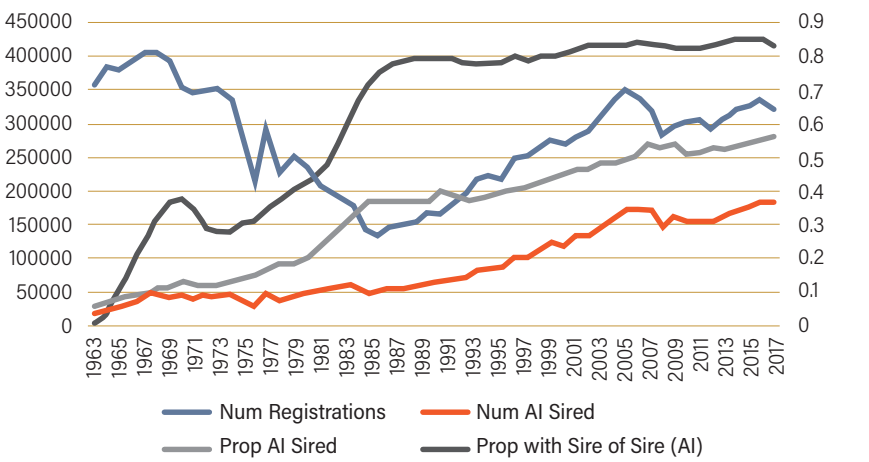
Policy allowing the use of open AI in registered Angus cattle was put in place in 1972 and is heralded as a major advancement for the breed. Since that time the use of AI in Angus has steadily increased.

Figure 1 shows AI use over time, along with registrations by year. In 2018 there were 321,197 registered calves born, with 57% of those coming from AI. Although this level of AI adoption is high, the full effect of AI is higher than this 57% metric would indicate.

Many of the calves born from natural service were actually sired by a bull who was AI sired himself. This means that for those breeders not using AI, they are buying their walking bulls from breeders who are using AI. This is an excellent example of genetic multiplication where AI extends the reach of elite sires through their direct use as well as the use of their sons as natural-service sires.

Besides AI, embryo transfer is another technology that continues to increase in influence. Figure 2 (shown on the following page) illustrates the number and proportion of registered ET calves born each year. In 2018, there were 42,149 ET calves, representing 13% of

Figure 1: ***Artificial Insemination (AI) use in registered Angus***



calves born. The number of ET calves that were generated through *in vitro* fertilization (IVF), which has been recorded since 2015, has risen sharply to 7,560 or 18% of ET calves. Similar to AI, the full effect of ET is larger than these metrics would indicate. Of all calves born in 2018, 43% had at least one ET parent. The fact that a lot of the most widely used AI bulls are also ET, plays a large role in this.

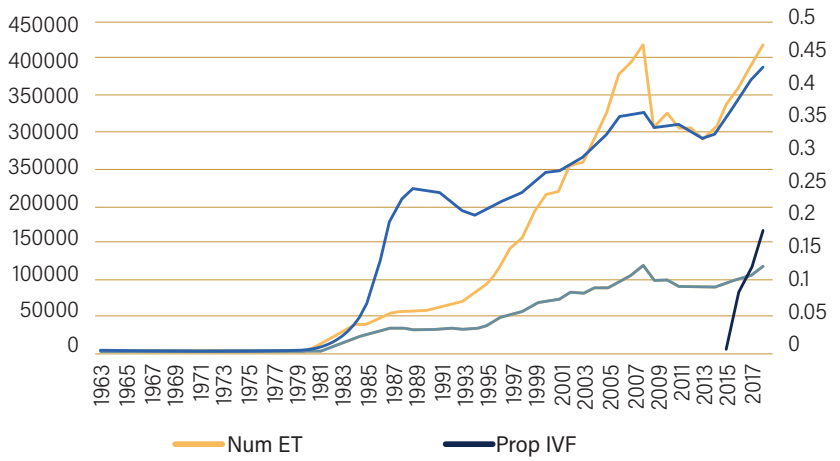
Like genomics and EPD technologies, reproductive technologies will continue to evolve and be embraced by breeders as a way to compete. Sexed semen is now playing a major role in the dairy industry, allowing female replacements to be generated from fewer cows and allowing beef bulls to be used on the remainder of the herd. Angus bulls are featured prominently in this dairy market.

Embryo genotyping is now a reality for Angus breeders with more than 200 embryos genotyped since the service was first offered just a little over a year ago, allowing genetic and marketing decisions to be made before the calf is born. Although not new, there are a handful of animals that are registered as clones each year with 163 recorded since 2000.

With low and unchanging adoption of well-proven reproductive technologies such as AI in the commercial beef sector, it is easy to jump to the conclusion that the overall effect of these technologies is small. This is not true. More than 55% of registered Angus calves are AI and more than 80% of calves have a sire that was born through AI. Embryo transfer also plays a significant role, with 13% of calves being ET and 43% having an ET parent. Sexed semen and embryo genotyping are just two new technologies starting to have a significant effect.

The embracement of these new technologies as a way to fully exploit the best genetics, which can more accurately be identified now with genomics, is a path to more rapid improvement for the Angus breed moving into the future. AJ

Figure 2: ***Embryo Transfer (ET) use in registered Angus***



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Editor's note: If you have questions, please contact the Performance Programs department at 816-383-5100.