Implementation of a Stayability EPD: American Simmental Association perspective

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Through the development of an extensive data collection network and database as well as high-tech methods to analyze and utilize our data, we now have the capability of making genetic progress at many times the rate possible in the early days of performance testing. That said, we have by no means reached the Promised Land. In fact, in some areas we can't even see it. One of those areas is cow longevity.

We have long known that cow longevity is a major piece of the profitability puzzle. By most accounts, it dwarfs all other traits in relative importance. Nevertheless, while we've made a fair bit of progress in calving ease, growth and carcass traits we probably haven't improved longevity much. Sure, most breeders cull cows for traits related to longevity (e.g. being open). Unfortunately, we won't make much headway by simply culling open cows.

This may seem counterintuitive. Why wouldn't getting rid of the offenders improve your genetics for longevity? The main reason lies in the fact that longevity tends to be lowly heritable (estimates typically run between 5-20%). With lowly heritable traits, an animal's own performance is not a good indicator of its genetic level for the trait. Therefore, many open culls may be genetically above average or even superior for fertility. By the same token, several cows kept because they are bred will be genetically inferior for fertility.

Besides being lowly heritable, longevity is a trait expressed later in life. (Technically, we don't have a record for longevity on a cow until she is gone.) Because of this, a cow that doesn't make it to the herd's average age (typically around 6 years old) could already have four daughters in the herd (born when their dam was 2, 3, 4 and 5).

Does this mean if we want to make progress we should cull her daughters? Well, if longevity were highly heritable that might make sense. Given its meager heritability, however, it is quite possible we would be culling females with superior longevity genes; i.e., though their dam was culled at a younger than average age she could easily have been genetically superior for the trait.

So, what do we do? Because a cow's longevity is expressed later in life, and even then it only provides a very cloudy picture of her genetic merit for longevity, are we relegated to making little to no genetic progress for the trait? Heck no! We can start clearing the clouds by calculating longevity EPDs.

Though EPDs always provide the best estimate of what an animal is genetically, they are especially valuable when applied to low-heritability traits. This is because, when an animal's own record is a poor indicator of its genetic makeup, gathering information on its relatives is the only means we currently have of getting a clear picture.

You may be wondering, "If an animal's own performance doesn't tell us much, what's to be gained by records on its relatives?" It's not that a single relative record brings much to the mix (obviously it adds even less than the animal's own record); it's that there is strength in numbers—an animal can have many relatives with records but only one record on itself. Through the use of EPDs we utilize information on all of an animal's relatives and, in doing so, chip away at the cloud with each record that flows in.

With a low-heritability trait expressed later in life like longevity, the cloud clears slowly—but it will clear. In fact, if an animal has enough progeny records, we can see its genetic merit for longevity as clear as a bell. Unfortunately, this is only possible for highly used AI sires.

As many of you are aware, we now have an EPD that measures longevity: Stayability (STAY). Former Colorado State University researcher, Dr. Warren Snelling, developed the prototype for STAY (Snelling et al., 1995) and the Colorado Center for Genetic Evaluation implemented it for the Red Angus Association of American a few years later. The American Simmental Association (ASA) has recently integrated STAY into our genetic evaluation.

STAY is defined as the probability daughters entering the herd will stay in production through 6 years of age. An animal receives a record for STAY when her contemporary group reaches 6 years of age. To be contemporaries, cows must have calved in the same herd and season as two year olds. A cow is scored a success if she has a calving record at six and a failure if she doesn't. Keep in mind that we don't differentiate why cows fail; we only note that they calved at two and not six. (ASA does the same thing at three years of age; we just don't print the results, opting instead to only use them in the prediction of 6-year STAY.)

From the way it's calculated, it's easy to see that STAY is a compound trait—a trait composed of the many factors causing a cow to be culled prior to six years of age. From Simmental seedstock producers' prospective, traits such as fertility, soundness, productivity, temperament and, yes, even polledness, color and color pattern are clear candidates for influencing STAY. To the degree these traits influence commercial producers' culling decisions, STAY provides the producer with an indicator of how long a sire's daughters will stay in the herd.

The previous paragraph alludes to a possible shortcoming in ASA's current STAY EPD; if a commercial producer's culling methods are very different from the way breeders cull their cattle, STAY may not provide them with a good prediction of longevity. For example, a sire with a poor STAY EPD due to disposition will probably fare better than predicted in a producer's herd who only culls on pregnancy status.

How can we zero in on what an animal's STAY EPD is due to? At this point in time we can't. We need large amounts of data with concise culling codes to do so. That's where ASA's recent efforts to increase our inventory-based reporting system come in. We now have almost 95,000 cows on inventory. By requiring that the reason for disposal be submitted for every animal removed from inventory, we will amass a large, informative database—a database that will allow us to break a sire's STAY EPD into its component parts—a database that will allow us to make more informed decisions in the area of longevity.

Does our current inability to zero in on the components behind an animal's STAY mean Simmental breeders should ignore the EPD? At their peril if commercial customers keep replacement females out of their bulls! My best guess is that a good share of the differences we see in STAY is due to fertility. My rationale is that once a seedstock breeder goes through the expense of getting a heifer into production, the primary reason for her being culled prior to six years of age is for being open. (Keep in mind that culling for things like disposition, color and polledness primarily occurs before a female is put into production.)

Some may disagree with my assessment of seedstock breeders, but no one should disagree that commercial producers' primary culling criteria is fertility and that fertility has a major impact on profitability. So if my judgment is accurate, by selecting for increased STAY breeders are likely to increase the longevity of their commercial customers' cowherds. There is probably nothing that would have a greater impact on their customer's bottom line.

Literature Cited

Snelling, W. M, Golden, B. L., and R. M. Bourdon. 1995. Within-herd genetic analyses of stayability of beef females. J. Anim. Sci. 73:993.