

Increasing The Effectiveness of ASA's Genetic-Evaluation System

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Part III: Development and Use of Economic Selection Indices.

Editor's Note: Part I of this three-part series appeared in the June/July issue of the Register, and outlined modifications being implemented in ASA's cattle evaluation process. Part II, which appeared in the September Register served to introduce the economic selection index.

Last month I introduced the concept of economic selection indices (ESIs) — the weighting of multiple traits to come up with animals' overall economic value as parents. As I mentioned, we are currently working with USDA Research Scientist Dr. Mike McNeil on developing ESIs. Though our ESIs will be created through complex and rigorous mathematical computation, using them will be relatively easy — a single number (\$ EPD) will assess the overall value of animals. For example, if sire A's index is \$110 and sire B's index is \$125, we would expect Sire B to average \$15 more net return per calf (\$125 - \$110). While easy to use, deciding how to use them won't be a slam-dunk. Many important issues must be sorted out before using ESIs.

One of the major issues in ESI utilization, from a breed association's perspective, is how best to develop and present them to our members. At the ASA, we have decided to take a two-phased approach. Our near-term plans are to develop three, breed-wide ESIs that will provide general direction to our members and their customers. The indices are listed below:

Terminal-Sire Index. Designed for evaluating sires' economic merit in situations where they are bred to mature cows and all offspring go to the feedlot. Consequently, maternal traits such as maternal calving ease, maternal weaning weight and female fertility are not considered in the index.

Heifer-Sire Index. Appropriate for selecting sires to use on first-calf heifers in situations where a portion of their daughters will be used as replacements, while the rest of their offspring are fed for slaughter. Obviously, this index will put heavier emphasis on direct calving ease than the other indices.

Multi-Purpose Index. Evaluates sires being bred to both first-calf heifers and mature cows with a portion of their daughters being retained for breeding and the remaining heifers and steers being put on feed, i.e., the typical small herd situation.

Within each category, the index is essentially "one-size-fits-all". These one-size-fits-all, breed-wide indices will be a better fit for some situations than others as they are built for average, rather than specific, situations. For example, all three breed-wide ESIs are being created for a scenario in which Simmental sires are used on the typical Angus cowherd, i.e., Angus cows with breed-average EPDs — a logical approach, given that Angus genes predominate this country's commercial cowherds.

We will also be using economic parameters that are based on historical averages. For instance, a spread of \$6.20/cwt between Choice and Select and a discount of \$16.80 and \$19.90/cwt for overweight (950 + lbs) and underweight (< 550 lbs) carcasses, respectively, are assumed in our breed-wide ESIs. Though our ESIs need to reflect future econom-

ics, we settled on using historical data, as the past is a reasonably good predictor of the future when estimating long-term economic parameters.

You may be thinking, "my customers have Brahman-based cows or I feel strongly that there won't be a discount for overweight carcasses in the near future; therefore, these ESIs are of no use to me". Though it may be true that our breed-wide indices won't fit your situation perfectly, it doesn't mean they are of no value. Well-conceived indices tend to be quite effective even if they aren't right on the money. In fact, research (Pease et al. 1967; Vandepitte, W.M. and L.N. Hazel 1977) showed that errors in economic weights of $\pm 50\%$ only decreased an index's effectiveness by 1%.

At first blush, this may sound surprising. How could we change the economic weights by 50% and have so little impact on the overall calculation? The key is that ESIs truly employ multi-trait selection — all traits of economic relevance are considered simultaneously. Because there are so many traits being considered, a change in the weighting on any one of them doesn't upset the apple cart. This is definitely not the case when we select for only a few traits. For instance, let's say we limit our selection pressure to carcass traits (which is currently the case in some breeds' ESIs). Now, assume the USDA throws marbling out the window, making it economically irrelevant. Unfortunately, many

of the bulls that ranked toward the top because they had lots of marbling suddenly become low-value sires. Alternatively, if all traits affecting the bottom line had been considered, a dramatic change such as marbling becoming irrelevant probably wouldn't have re-ranked sires much at all.

Having said all that, in a perfect world, ESIs would be constructed for each individual situation rather than one-size-fits-all. For example, there would certainly be less emphasis on calving ease if you were selecting sires to use on Brahman-based cows or marbling would receive heavy emphasis in a situation where there was a large premium for prime beef. This acknowledgement leads us to our second phase — giving users the capability to provide input to tailor ESIs to specific situations.

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We are beginning work with Dr. Dorian Garrick of Colorado State University and the National Beef Cattle Evaluation Consortium on a system that will allow users to customize their ESIs. With this system, you will be able to input parameters that are different than the average scenarios assumed in our breed-wide ESIs. Furthermore, our EPD database will be linked to the website, which will allow for the evaluation of all animals in the breed based on your customized index. This system is in the developmental stage and is probably a year or more away from being ready to use. Breed-wide ESIs, however, will be available along with our Spring '05 EPDs. In addition, the Show Committee has proposed to our Board of Trustees that we use ESIs in PTP shows in the near future.

That sums up ASA's plans for the development of ESIs. Once our system is in place the ball is in your

court; you must decide which ESIs to use. One thing to keep in mind if you are a seedstock breeder is that your function is to produce genetic material for your customers — not yourself. Therefore, it is imperative that you use ESIs appropriate to your customer's situation — not your own. For example, though you may have an affinity for breeding maternal-type cattle, if your customers use your bulls strictly as terminal sires, you should use an index that puts no emphasis on maternal traits. Of course, it is likely your customers have a wide range of needs. If so, it may be that you utilize different ESIs to produce bulls for various purposes — essentially producing lines engineered for specific targets.

Besides being a tool to improve seed stock, commercial producers can use ESIs to determine how much a bull is worth. Or, put another way,

how much they can pay for one bull compared to another. For example, when buying a heifer bull, a producer can quickly figure a bull scoring +\$30 on the Heifer-Sire Index is worth an extra \$3000 over a \$0 bull if both sire 100 calves (\$30 x 100hd). If other species are any indication, commercial producers will use ESIs heavily in making buying decisions. It only makes sense that they do — ESIs are easy to use and, when well constructed and appropriately applied, they allow for maximum economic progress.

There you have it, ASA's plan for increasing the effectiveness of our genetic evaluation program. It isn't earth shattering — just a progressive, solid system that will provide you with tools to build the best product possible for your customers. If you have any questions or comments, feel free to contact me at wshafer@simmgene.com or just give a call. ♦