

Preparing for Single-Step

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The hot topic in many breed improvement discussions over the past several years has been genomics and genomic-enhanced expected progeny differences (GE-EPDs). More recently, these discussions have frequently centered around “single-step”, “one-step”, or “BOLT”, all of which are terms that describe a new, more streamlined method for incorporating genomic results into EPDs. In the very near future, the American Gelbvieh Association (AGA) will be joining other International Genetic Solutions (IGS) partners in deploying weekly National Cattle Evaluations using BOLT software technology.

Over the last few months, AGA staff and genetic consultants have had the chance to review BOLT results and to compare them to results from the current Cornell software. As we prepare to deploy the BOLT-derived EPDS, I'd like to give you a preview of what to expect.

1. **Some re-ranking:** In general, the correlations between the current EPDs and the new BOLT EPDs are high – but they are not 1.0 -- which means there will be some re-ranking. This happens anytime you add data or change methodologies in an evaluation, and migration to BOLT will not be an exception. This certainly doesn't minimize the sting for those impacted, but the goal is to continually strive for more precise genetic evaluations that allow members and their customers to make better selection and mating decisions and moving to the BOLT software is certainly a major step in that direction. The re-ranking will be especially prevalent in carcass EPDS, where major model improvements will be deployed simultaneously to the BOLT software change.
2. **Limited-to-moderate change in EPDs:** The average change in EPD for mid-to-high accuracy animals is low, but there are some individuals who will move substantially, especially those in the tails of the bell curve. Like in any case where information is added that gives us a picture of an animal's genetic worth as

a parent (performance data, progeny information, or a genomic test, for example), low accuracy animals stand the chance to move the most.

3. **Accuracy:** In general, for growth and calving ease, accuracy values will drop (especially on younger animals). Computationally, calculating accuracy is more difficult than EPD computation, so historically, software used in evaluations had to approximate accuracy. However, modern computing power has increased to the point that programs such as BOLT calculate accuracy directly, and thus more precisely. The good news is that direct calculation of accuracy will better reflect possible change, so there should be fewer instances of animals' EPDs moving more than their possible change indicated they should.
4. **More value for your genomic investment:** BOLT uses a method called the Marker Effects Model, which is a fancy way to say that it gets more information out of the genomic markers for animals who have been tested. This is better than other software programs available and is a significant improvement over the “blending” method currently being used in AGA GE-EPDs. Our current “blending” methodology uses an approximation of the marker effects, but BOLT uses all of the data available on animals (pedigree, performance, genomics) simultaneously to look directly at marker effects.
5. **Model improvement for carcass EPDS:** In addition to migration to the BOLT software, several important improvements and upgrades to the carcass EPDS will be deployed. Currently, carcass EPDS are simply an index of the carcass trait and its corresponding ultrasound trait. Going forward, a true multi-trait evaluation with all carcass and ultrasound traits plus weaning weight and post-weaning gain will be used. Plus, correlations between carcass and ultrasound have been updated, and trend lower than previous estimates. In contrast to the accuracy for growth and calving ease EPDS, these model improvements will lead to a slight increase in accuracy for carcass EPDS.

Change can be difficult and often leads to many questions – I hope this preview has helped answer some questions you may have and to prepare you for what to expect when the new NCE system is deployed later this spring. The goal with this change is to provide you and your commercial customers with the best available selection tools to allow you make the best possible decisions to move your operations forward. ❀