



Education on Use of Genomic Enhanced Single Step EPDs for Selection

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Extension Education on Genetics and Genomics

- State Extension educates producers on technology to improve production and returns.
- Education of producers on genetics and genomics is better in some states than others.
- Some states more involved in those areas work more to educate their producers.
- Breed associations aid greatly in these efforts.



Educational History



- 1940s selection index (SI) was introduced, widely adopted by dairy (but not beef)
- 1950s adjusted weaning and yearling weights introduced, slowly adopted by the beef industry especially by purebred breed associations
- 1960s estimated breeding values (EBV) introduced, slowly adopted by most purebred beef associations
- 1972 ASA produces first Sire Summary.
- Late 1970s expected progeny differences (EPD) introduced, slowly adopted by purebred beef breed associations

Educational History cont.



- 1980s ultrasound reintroduced to beef
- 1990s genomic technology era begins with two, later three, traits and stars
- 2000s Several EPD traits are created, genomic tests for a number of traits are offered
- 2003 Human genome mapped
- 2009 Bovine (Hereford) genome mapped (1X)
- 2010s Index EPDs created by several breeds
- 2015 Genomic Enhanced EPD introduced
- 2018 Holstein genome mapped

Technology

- Not all technology is adopted
 - Lack of understanding
 - Lack of expertise or knowledge
 - Lack of equipment or facilities
 - Lack of time
 - Cost
 - Laziness
 - Scientific
 - Over kill of terminology and change



Educating Producers

- Most producers (except for certain areas and breeds) barely understand what an EPD is or how to use them
- Most producers don't use EPD in bull selection much less female selection
 - They know how to select a bull!
- EPD are EPD
 - Drop terminology of “Single Step” and “Two Step” and “Genomic Enhanced”
 - Confusing jargon “imputation”



Difficulty in Educating Producers



- Cattle breeders and bull buyers are leery of changes
 - Changes in EPD and ACC with additional information or changes in analysis
 - Across Breed EPD
 - Now GE-EPD
- Not all genomic markers are equal
- Not all genomic panels are equal
 - Don't all measure the same thing completely
 - Gene frequencies are different in different breeds and sometimes in the same breed

Explaining the Value of GE-EPD

- Including genomics in an EPD allows for improved selection accuracy of bulls and females (especially young ones) for traits that might only be measured:
 - later in life (mature size)
 - when they are older (feed efficiency)
 - when they are dead (carcass merit)
 - in one gender (milk)



An Example of Value of GE- EPD



- Flush mates that are full brothers will have the same EPDs - the estimates are computed from the parental EPDs.
- Those EPDs are not very accurate until their own performance records are collected.
- Genomic information yields more accurate genetic relationship of sibs and distant relatives.
- Adding genomic information enhances their EPDs by making them more accurate.

Added Value of GE- EPD

- An additional value of having genomic information is to be able to identify genes (especially genetic abnormalities) quickly and cheaply
 - Reduces the widespread use of the affected animal in a herd or breed
 - Recessive genes often at low frequencies in heterozygous form
 - Unless identified and well known can be expensive to progeny test



Up-to-Date GE- EPD

- Using as much genetic information as possible, i.e., including the effects of all the gene products affecting the trait, provides a more accurate picture of the overall genetic transmitting potential of the animal for that environment.



What Do Breeders Need to Do?



- Continue to collect and report weights and measures on all animals, especially in females and carcass traits, and all other traits that are important to them in a timely and accurate manner.
- Continue to submit DNA on all animals to add to the genomic data base to increase the knowledge and accuracy of EPD prediction.
- Educate buyers on the use of EPD.

What Do Commercial Buyers Need to Do?

- Ask for the most recent EPD or Index on the animals they are selecting for purchase – both bulls and females.
- Make sure the EPD or Index matches their selection and marketing goals.

