

Why Are There So Many New High Genetic Merit Bulls?

Genex provides the answers for this question as well as many others relating to genomics.

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This January, it is as if we fast forwarded through nine USDA sire summaries all in one release without a base change. With genomic selection now available, 34 new Holstein sires graduated that would not have been available for another two or three years if we had continued to use the old sire evaluation system. The advantage we gain from genomics is that we can now predict the genetic merit of our young animals at a much higher reliability earlier than we could with simply the use of traditional parent averages. This gives dairy producers the potential to make significant genetic progress in their herds.

What is genomic selection?

Genomic selection is predicting the performance of an animal's offspring based on the DNA of that animal. Recent breakthroughs from industry-supported research have resulted in new tests that look at thousands of DNA markers of an individual bull or cow. The DNA markers of the individual animal are compared to the marker profiles of thousands of bulls and cows with millions of offspring with known performance for the various traits of interest. This allows an estimation of breeding values of an animal based on associations between DNA marker profiles and milk yield, Somatic Cell Score, Productive Life and other important traits.

What is a genomic genetic evaluation?

A genomic genetic evaluation includes the information from the DNA marker testing of that individual. The evaluation also considers parent or pedigree information and may also include progeny information or, for females,

performance information. The USDA-AIPL began calculating a genomic Predicted Transmitting Ability (genomic PTA) for Holstein and Jersey animals with the January sire summaries.

How can I tell if a bull is genomically proven?

If a bull is genomically proven and has no daughter information in his proof, the letter "G" has been placed in the daughters and herds column in the Investment Guide, Sire Directory and the individual bull pages on the Genex Web site.

Can I determine what portion of a bull's proof is based on genomics?

No. You will see only one PTA or Standardized Transmitting Abilities (STA) for each trait. These PTAs and STAs will consist of a combination of parent, genomic and daughter information depending on which type(s) of information the bull has available. USDA-AIPL weights each of these appropriately.

What is the expected reliability of a genomic proof?

We can expect most bulls with genomic proofs to range between 62 and 72 percent reliability for all traits.

Is it safe to use bulls at these reliability levels?

Yes, it is safe to use bulls at reliability levels between 62 and 72 percent. Reliability level should determine the amount of use each bull receives. Also, it is important to use a **group** of genomically-proven bulls.

How does genomic reliability compare with number of milking daughters?

The genomic breeding value for a bull without any milking progeny has an average reliability for LNM of 68 percent. This is comparable to a normal progeny tested bull with 50 milking daughters. It is anticipated that the reliability levels will increase for bulls with no milking progeny as more animals are genotyped in the future.

For bulls with milking progeny, the genomic contribution to the PTA increases overall reliability of the PTA. The amount of increase in reliability varies by bull and is mostly dependent on how many milking daughters the bull has. Typically for a bull with 100 milking daughters, the increase in reliability is equivalent to approximately 10 more daughters.

Are all breeds utilizing genomics?

Currently only the Jersey and Holstein breeds have published genomic proofs. Other breeds such as Brown Swiss and Guernsey have genomic research projects underway.

Why do reliability differences exist between breeds?

The population size drives reliability. The Holstein population is larger compared to any other breed which allows for the quickest gain in reliabilities. With time the Jersey breed should be able to see considerable gains for all traits too. For other breeds, it is more difficult and will take more time to be able to observe significant reliabilities.

Have all bulls available from Genex been genomically tested?

Currently sires offered through international alliances do not have proofs which include genomic information. As of now, the capability for genomic testing is variable from country to country. Many, if not most, European countries are in the process of testing or are

developing plans to have bulls tested through the same basic technology as Genex. However, the marker effects can vary from country to country, and at this point, genomic proofs can not be incorporated through the Interbull process. Also, the database size per country is variable which impacts the resulting proofs.

Can genomically proven bulls be used in MAP?

Of course they can! MAP is flexible. Producers can choose any group of bulls to fit their needs. For example, if wanting to incorporate the use of genomic bulls into a genetic game plan, genomic bulls could be used in one column and progeny tested bulls in the remaining two columns.

Why should I use genomic bulls?

The answer to this question is the same as the question, why use A.I.? Quite simply, a producer should use genomic bulls to use the best genetics available. Many of the best bulls for a particular trait now have evaluations based on the genomic tests and not on progeny test information. As stated previously, many genomically-proven bulls will have lower reliabilities. That should be considered and usage spread over more bulls. After that, use the best bulls to make the fastest genetic progress.

How does genomics affect Genex programs?

Many genomics changes have already taken affect. Since June 2008, all new sires have been genomically tested prior to purchase, and this practice will continue. Besides purchasing sires, Genex will rely more heavily on GENESIS to produce profitable, genomically-tested sires. In addition, in 2009 the new Quantum™ sampling program will replace QUEST™.