Understanding Interbull Evaluations: MACE and New IGI Values

In addition to national genetic evaluations calculated by Canadian Dairy Network (CDN) using performance data recorded from dairy herds across Canada, CDN has also published genetic evaluations for foreign progeny proven sires for nearly 20 years. These international bull evaluations, named **M**ulti-Trait **A**cross **C**ountry **E**valuations (MACE), are provided to CDN as a service from the Interbull Centre located in Uppsala, Sweden. In 2014, Interbull will introduce a new, important service referred to as Genomic MACE, which focuses on genomic young sires from around the world. The methodologies underlying both MACE for progeny proven sires and GMACE for genomic young sires were both proudly developed by Canadian scientists.

Fundamentals of MACE

Imagine 30 different countries, each with their own Holstein population and national evaluation systems for calculating bull proofs and cow indexes for various important traits. Each country has its own animal identification and herdbook registration system for recording animal details and parentage information; its own type classification system; and its own milk recording system that may, or may not, also collect data related to calving ease, fertility, longevity, milking speed and milking temperament, etc. The genetic evaluation centre within each country has developed and implemented its own methods and genetic evaluations are often expressed on different scales, making bull proofs not comparable across countries.

At the Interbull Centre, they receive the national evaluations from each of these 30 countries and apply the MACE methodology to derive an evaluation for each bull expressed on each of the 30 different country scales. This is done for production, conformation, somatic cell, longevity calving performance, female fertility and milkability traits. For the December 2013 release, Interbull produced MACE evaluations for production traits for nearly 135,000 progeny proven Holstein sires from over 30 different countries. CDN received a MACE evaluation for each of these bulls, loaded all foreign sires from other countries into its database and published the MACE proofs via its web site. Such foreign bulls are labelled by CDN with a MACE LPI and specific lists of Top MACE LPI Sires are produced regularly.

Genomic MACE for Foreign Young Bulls

With the arrival of genomic evaluations in various countries, there has been a growing interest and demand for the international marketing of semen from young genomic bulls. This creates the same problem that originated before the development of MACE. The fact that proofs for progeny proven sires are not comparable across countries also extends to genomic young sires. For this reason, Interbull will launch a new official service in 2014, referred to as Genomic MACE, which allows producers in Canada to assess the merit of genomic young sires from Europe and other countries around the world compared to young bulls already with a genomic evaluation in Canada based on a genotype at CDN. Due to existing genotype exchange agreements, genomic young bulls in Canada, United States, Italy and the United Kingdom will already have a Canadian genomic evaluation based on their genotype so their Genomic MACE evaluation received from Interbull will not be published by CDN. Other countries expected to have young sires with a Genomic MACE evaluation in Canada include Germany, France, Netherlands, Scandinavia, Spain, Poland, Switzerland and Australia.

How are Genomic MACE Evaluations Calculated?

Prior to genomics, the only way that a Canadian bull could receive a reasonably accurate genetic evaluation in another country was following the importation of semen and the recording of production and classification data on resulting daughters. Basically, bulls required some form of progeny proof in each country. MACE services from Interbull provided a prediction of what each bull's proof would be in all other countries not yet having a progeny proof. Today, it is very easy for any young bull to have a genomic evaluation in many countries; simply by having a genotype in each one. For this reason, Genomic MACE evaluations from Interbull are of interest. Genomic MACE evaluations use the national genomic evaluation estimated in each of the countries where a genotype exists and produces a genomic evaluation on the scales of the countries that do not yet have a genotype. It goes without saying that the ideal scenario is having the bull's genotype available to directly compute a genomic evaluation in each country but complete and open sharing of all bull genotypes is not yet a reality in the world of Holsteins.

Identifying Genomic MACE Evaluations at CDN

Effective the April 2014 genetic evaluation release, the "Animal Query" on the CDN web site (www.cdn.ca) will provide access to the Genomic MACE evaluations for nearly 5,000 foreign young sires that have a genomic evaluation in another country but no genotype at CDN for estimating a Canadian genomic evaluation directly. Entering the bull's name or registration number will display its Genetic Evaluation Summary page with a Genomic MACE evaluation for traits where one is available, otherwise a Parent Average. A new label, namely "IGI" for International Genomic Index, will be displayed to represent Genomic MACE evaluations.

Summary

For nearly 20 years now, Interbull has been providing international bull evaluation services, specifically MACE evaluations, to participating countries that submit their national bull proofs for expression on all other country scales. Over the years, Interbull has increased its service portfolio to include more traits and the number of participating countries has continually grown to now surpass 30 in total for Holsteins. In 2014, Interbull is launching a new, important service, referred to as Genomic MACE, which provides international bull evaluations for young bulls that have a genomic evaluation submitted from any of the participating countries. In April 2014, the CDN web site query will provide access to these Genomic MACE evaluations for nearly 4,000 foreign genomic young sires, identified with the "IGI" label.

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