

Jersey Mace for Conformation

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Genetic improvement of many of our breeds of dairy cattle is a global effort. Interbull plays a valuable role in this endeavor by coordinating the exchange of genetic evaluations among countries, encouraging scientific discussion and offering a service to obtain Mace for a variety of breeds and traits.

Recently, the World Jersey Cattle Bureau (WJCB) decided to investigate the feasibility of Mace for Conformation for the Jersey breed. In January 2000, WJCB in cooperation with Holstein USA initiated a pilot study. Conformation information from Australia, Canada, Denmark, New Zealand and the United States was included in the initial study. Data analyzed included 14 linear and 3 composite traits (Table 1). These are the same 17 traits as those used for Mace for Conformation for Holsteins.

Data were analyzed using the same methodology that was developed for Holstein Mace for Conformation. Standard steps for Mace were used, these included:

1. De-regression
2. Correlation estimation
3. Solving

A detailed description of the methodology can be found on the Interbull web page. Data edits were similar to those used for Mace for Production for Jersey. This meant that in the solving step, 2nd country evaluations were excluded if they were not based on information on at least 40 daughters in 25 herds.

Standard procedures require that correlation estimates be based on a well-connected subset of bulls. These are determined as those that have evaluations in more than one country and those that are members of a $\frac{3}{4}$ sib family that have

members with evaluations in more than one country. Currently, only a limited number of bulls are used in common by all five countries.

Table 1. Traits included in Mace for Conformation for Jersey

Stature	Fore Udder Attachment
Chest Width	Rear Udder Height
Body Depth	Udder Support
Dairy Form	Udder Depth
Rump Angle	Teat Placement
Rump Width	Teat Length
Rear Legs Side	Overall Conformation
Foot Angle	Overall Udder
	Overall Feet and Legs

Results from the correlation estimation procedure were presented at the meeting in Bled. It was concluded that: Mace for Conformation for Jerseys is quite feasible. However, correlations for some of the trait and country combinations were lower than desired. Not all countries submitted information for each trait, nor did each country submit a trait with the exact same definition for each trait. Therefore, it was deemed advisable that some data be excluded for some of the traits. In particular those traits in which the trait definition is not in close agreement.

In September 2000 a second pilot study was initiated. In addition to the previously mentioned five countries, data were also submitted by Great Britain. The same 17 traits as well as the same procedures from the first pilot study were used. The data submitted was somewhat different than the first study. Each country took a closer look at their traits and only submitted those traits determined to be similarly defined. Additionally more recent data was used in identifying additional bulls for the well-connected subset.

Table 2. Simple and Mace correlations between Denmark and the United States when using different data sets

Method	Simple Correlation			Mace	
	Jan 2000	Sep 2000		Jan 2000	Sep 2000
Number of Bulls	25	25 ¹	28		
Chest Width	.71	.72	.60	.82	.75
Udder Depth	.87	.86	.81	.91	.88

¹) Same bulls as in the Jan 2000 estimate.

Table 2 shows an example of the correlation estimates from the two studies. The simple correlations are based on bulls that have evaluations in both countries. The difference in simple correlation columns 1 and 2 (based on the same 25 bulls) reflects the impact of new, more recent, data from Denmark and the US. The results in column 3 show the impact of adding three new bulls. Although three additional bulls is a small amount of new data, it represents a 10% increase in the number of common bulls. Adding a couple of additional bulls can have a dramatic effect on the correlation estimates when initially there are a limited number of ties among countries. The final two columns show the correlations when estimated by the Mace procedure. Both differences in data structure and methodology can lead to important differences in our estimates of genetic correlations.

The importance of Mace

Acceptance of Mace is greatly aided when there are logical explanations for the changes that breeders will see in the difference between domestic evaluations and international proofs. Oftentimes, the reason for a change in a bull's evaluation between domestic and international evaluations is straightforward.

Before looking at results for stature on the US scale it might be good to describe what to expect from MACE. Four basic situations can be identified:

1. A bull's evaluation is based on domestic information only. In this case his MACE will be close to his national evaluation.
2. A bull's evaluation is based on foreign information only. His MACE is based solely on this foreign information.
3. A bull has a national evaluation based on few daughters and foreign evaluations on many daughters. This will usually result in a modification of his national evaluation based on the foreign information.
4. A bull has a national evaluation based on many daughters and there are also foreign evaluations available for him. These could be based on many daughters as well. In general, MACE for bulls in this category will closely resemble the national genetic evaluation.

Tables 3 and 4 illustrate the practical implications of evaluating potential sires with different methodology. Table 3 shows the top 10 US bulls for Stature based on the US data only (i.e., domestic genetic evaluations). The limitation of only looking at domestic evaluations is that often time's additional information exists in other countries. For example, of these 12 bulls, Van Holme Imperials Saturn and Rock Ella Perimiter also have an evaluation in Canada, Curtsey Duncan Jude has another evaluation in Australia, Cottonwood MBSB Highmark is also evaluated in New Zealand and Rock Ella Remake is evaluated in both Australia and Canada. Significant changes in evaluations and rankings can occur when all of the data is included in MACE (Table 4).

Table 3. Top 10 bulls for Stature based on US national genetic evaluations

Rank	Name	STA	Reliability
1	AL-Top All American	4.2	92
2	Dutch Hollow Berretta Choice	3.7	95
3	Van Holme Imperials Saturn	3.6	88
4	Rock Ella Remake	3.5	88
5	Graber FMT & FLF Ingamar	3.4	85
6	Altheas Les Pitino Al-Top	3.3	95
7	Rock Ella Perimiter	3.2	79
8	Sonic Boom	3.1	93
9	Curtsey Duncan Jude	3.0	96
	Curtseys King James	3.0	89
	Queen-Acres Sooner Era Plus	3.0	84
	Cottonwood MBSB Highmark	3.0	90

Table 4. Top 10 bulls for Stature based on MACE on the US scale

Rank	Name	MACE STA	National (N) or Converted (C) STA	US Daughters	Total Daughters
1	AL-Top All American	4.2	4.2 N	72	72
	Cloverholm C Top's Jester	4.2	4.2 C	0	65
3	Belles Expert	3.8	4.2 C	0	334
	Sko Ivan	3.8	3.8 C	0	56
5	Dutch Hollow Berretta Choice	3.7	3.7 N	137	137
	Valleystream Gemini General	3.7	3.9 C	0	268
7	Glenamore Top Prize	3.6	3.6 C	0	55
8	Van Holme Imperial's Saturn	3.5	3.6 N	54	256
	Diarwood Junction	3.5	2.9 N	0	120
10	Graber FMT & FLF Ingamar	3.4	3.4 N	29	29
204	Rock Ella Remake	1.6	3.5 N	0	79

As mentioned previously, changes between domestic and international evaluations are easily accepted as long as there is a good explanation. Let's look at some examples; there are three bulls in table 4 who only have daughters in the U.S. Since there are no foreign daughters contributing to their proof, we'd expect little change. In this case, the domestic and Mace Proofs are identical.

Cloverholm C Top's Jester and Belles Expert form an interesting pair. Neither bull has any daughters in the US. If we apply a straight conversion formula to the data, we'd obtain

identical genetic evaluations. However, MACE leads us to a different conclusion. Here, we see Jester's proof stays the same while Expert's decreases. The reason for this change is that Jester's sire, Master C Tops, was evaluated at 4.2 while Expert's sire, AU Sooner Brass Cocktail, had a MACE of 1.9. Since, MACE directly uses the pedigree information, we'd expect Jester to be evaluated higher than Expert.

Valleystream Gemini General has information in both Great Britain and Canada. MACE uses information from both countries

simultaneously to determine an evaluation. Therefore we expect that General's Mace will be somewhere between his evaluations from these two countries. Which is exactly what we see, his converted evaluation from Great Britain is 3.2, the converted Canadian evaluation is 3.9 and his Mace is 3.7.

Diarwood Junction and Rock Ella Remake are two interesting bulls in that even though they had US national evaluations this information was not used in MACE. Interbull edits require that a bull is AI tested (this excluded Rock Ella Remake) and that for bulls that are not progeny tested in a country they have at least 40 daughters in 25 herds (this excluded Diarwood Junction who had 21 daughters). Diarwood Junction's MACE is based on information from Canada (his converted evaluation was 3.2) while Rock Ella Remake had information in Australia and Canada. Conversions from these two countries were 1.2, in line with his MACE of 1.6.

Conclusions and Recommendations

This study shows the feasibility of calculating Mace for Conformation for Jersey for the six

countries involved in this trial. In addition to being scientifically sound, the Mace proofs can be explained in a manner that will lead to their wide acceptance by Jersey breeders. This study has also helped to identify two areas that can lead to more valuable international comparisons:

1. A need for increased harmonization of traits among the different countries. The World Jersey Cattle Bureau is addressing this concern through the appointment of David Hambrook to the ICAR Conformation Working Group. They are also planning on organizing worldwide classifier workshops as well as seeking closer cooperation with Holstein classifiers.
2. A need for stronger genetic ties among some of the countries. Widespread usage of Mace will help identification of global bulls that have the potential of improving the worldwide Jersey breed.

The World Jersey Cattle Bureau and it's members are excited about the prospect of this service being available through Interbull and are looking forward to the first official Mace for Conformation for Jersey. They would like to see the first implementation in February 2001.