Effect of Different Parameters on the International Ranking of Bulls

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Objectives

Data edits and estimation methods may affect the estimates of the parameters used in the MACE evaluation. The objective of this work was to check the sensitivity of international ranking of sires to changes in the parameters used.

Material and Methods

Beside the official INTERBULL (ITB) and Canadian (CAN) MACE evaluations for production run in August 1995, six different test runs were performed using genetic evaluations from six countries available in July 1995. The countries were Canada, France, Germany, Italy, the Netherlands and the USA. The trait considered was protein yield, and all the comparisons were made on proofs on the Canadian units and base.

The Canadian and INTERBULL MACE official evaluations used different data edits, genetic correlations and sire variances (Table 1).

Of the test runs, Test 1 used the same data and parameters as in the Canadian MACE, but the same genetic correlations as the INTERBULL run. Test 2 had the same data as in the Canadian MACE, but genetic correlations and the sire variances were from the INTERBULL run.

The other four runs had the same data and parameters as the ones used in the Canadian MACE, except that Canadian sire standard deviations were artificially changed: Test 3 (+10%), Test 4 (+20%), Test 5 (-10%) and Test 6 (-20%).

Results and discussions

Genetic correlations were very similar between the INTERBULL and the Canadian run (maximum difference was 4%, with most differences being between 1% and 2%). Thus, using the same correlation as for the INTERBULL run, did barely affect the ranking of the bulls.

Differences between estimated sire standard deviations were for most countries 5% or less, except for Italy, with Canadian estimates 16% lower than those estimated by INTERBULL.

Further research carried out by the INTERBULL Centre (Banos, personal communication) and by Schaeffer has shown that the method previously used in Canada tends to underestimate sire variances, and new programs are now in place. However, other factors such as data edits may affect the estimates of the sire variances.

Between the two official runs, the largest differences were to be found on the ranking of the Italian bulls. The average rank of the first 20 was 604 for INTERBULL and 155 for the Canadian MACE (Table 2).

However, when also the sire variances estimated by INTERBULL were used, the ranking became more similar to INTERBULL, especially for the Italian bulls (Table 2).

Changing the Canadian sire standard deviation did affect the ranking of the Canadian bulls. When the standard deviation was assumed to be higher than the one estimated, the Canadian bulls performed more poorly. At a 10% increase, the average rank of the first 20 slipped from 208 to 297, and at a 20% increase it slipped further to 422. Instead, when the standard deviation was assumed to be lower than the one estimated, the average rank of the top 20 bulls increased to 135 (at -10%) and to 86 (at -20%). The

average rank of the bulls from the other countries was only slightly affected. The number of Canadian bulls in the top 100 (Table 3) went from 4 (in the official Canadian run), to 7 (at -10%), to 12 (at -20%).

Changing the Canadian sire standard deviations did not have almost any effect on the standard deviation of the MACE proofs of the Canadian bulls. However, it did change the standard deviation of the MACE proofs of foreign bulls when expressed on the Canadian scale. When the Canadian standard deviation was assumed to be less than that estimated, the foreign bull proofs were rescaled to a smaller standard deviation and their MACE proofs were more regressed around the mean (Table 4). On the contrary, when the Canadian sire standard deviation was larger than that estimated foreign proofs were over scaled (Table 5).

Conclusions

As already noted by others (Schaeffer et. al., 1995; Banos, personal communication) the international sire ranking seems to be affected more by the sire variances than by other factors. Small changes in the genetic correlations, as those considered in the study, seem to have very little impact.

On the other hand, results indicate that the international ranking may be affected by the relative value of sire variances. Even though the differences may not be very large when considered within country, they may sum up if they are in opposite directions for different countries. Since estimates of sire variances may be affected by the methods used to estimate them as well as by the data edits, it is important that an agreement based on research results be found to define the best procedures for international evaluations.

References

Schaeffer L.R, Reents R. and J. Jamrozik. 1996. Factors influencing International Comparisons of Dairy Sires. Journal of Dairy Science (in print).

Table 1. Parameters and data used in the official MACE INTERBULL evaluations (ITB), Canadian (CAN) and in the test runs

	MACE EVALUATIONS			
	CAN	ITB	Test 1 r(G)	Test 2 r(G)+V
DATA	Bulls from 81, No imports	All bulls, Some imports	Bulls from 81, No imports	Bulls from 81, No imports
r(G)	CAN	ITB	ITB	ITB
var.(sire)	CAN	ITB	CAN	ITB
	MACE EVALUATIONS			
	Test 3 +10%	Test 4 +20%	Test 5 -10%	Test 6 -20%
DATA	Bulls from 81, No imports	Bulls from 81, No imports	Bulls from 81, No imports	Bulls from 81, No imports
r(G)	CAN	CAN	CAN	CAN
Var.(sire)	CAN	CAN	CAN	CAN
Can SD	CAN+10%	CAN+20%	CAN-10%	CAN-20%

Table 2. Average rank of the first 20 bulls by country of first proof and MACE run

Country	ITB	r(G)+V	r(G)	CAN	+10%	+20%	-10%	-20%
CAN	237	242	234	208	297	422	135	86
FRA	57	38	57	55	53	52	59	69
GER	261	166	176	155	149	147	166	189
ITA	604	511	257	261	254	249	277	300
NLD	43	40	47	38	37	36	44	53
USA	32	33	29	34	35	37	33	36

Table 3. Number of bulls in the first 100 for protein, by country of first proof and MACE run

Country	ITB	r(G)+V	r(G)	CAN	+10%	+20%	-10%	-20%
CAN	4	3	3	4	2	2	7	12
FRA	22	22	18	17	18	19	15	15
GER	26	7	7	7	7	7	7	5
ITA	3	3	4	4	4	4	4	4
NLD	23	20	18	23	25	25	20	18
USA	42	45	50	45	44	43	47	46

Table 4. Standard deviation of MACE proofs for protein on Canadian base, by country of proof and bulls birth year, for Test 6 (Can SD -20%)

Country	1984	1985	1986	1987	1988	1989	1990
CAN	7.00	7.07	6.89	5.97	5.48	5.69	5.08
FRA	4.04	4.43	5.03	4.54	4.62	4.44	3.92
GER	4.49	4.81	5.12	4.82	5.16	5.51	4.96
ITA	5.22	4.93	4.25	3.89	4.45	3.89	4.10
NLD	4.47	4.89	5.16	5.14	5.53	5.55	4.67
USA	4.54	4.18	4.19	4.12	4.20	4.22	3.79

Table 5. Standard deviation of MACE proofs for protein on Canadian base, by country of proof and bulls birth year, for Test 4 (Can SD +20%)

Country	1984	1985	1986	1987	1988	1989	1990
CAN	7.13	7.14	7.04	6.01	5.54	5.75	5.10
FRA	5.97	6.46	7.08	6.38	6.55	6.35	5.76
GER	6.35	6.73	7.14	6.75	7.18	7.56	7.14
ITA	7.43	7.07	6.00	5.52	6.18	5.61	5.61
NLD	6.55	7.02	7.29	7.29	7.63	7.70	6.60
USA	6.45	5.94	5.94	5.82	5.84	6.00	5.57