

FRANCE TO CANADA CONVERSION FACTORS USING FULL-SIB METHODOLOGY

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MATERIALS AND METHODS

Data of Holstein bulls were obtained from Agriculture Canada (Canadian proofs file of July 1994) and from INRA (French proofs file of July 1994). The genetic base was the same for both country: rolling base 1993. Editing criteria for the computation of the coefficients "b" and "a" are shown in Table 1.

TABLE 1. Editing criteria for the computation of the coefficients "b" and "a".

	b	a
North American [‡] sire and dam	✓	✓
Full sib bulls [‡]		✓
≥ 35 daughters	✓	✓
≥ 20 herds	✓	✓
Repeatability ≥ 70%		
1979 ≤ birth year ≤ 1988		✓
1982 ≤ birth year ≤ 1988	✓	

[‡] American or Canadian

[‡] at least one full sib in each country

Coefficient "b" (Banos, 1992)

After the editing, 2003 Canadian and 2380 French bulls remained. Theoretical "b" coefficients were estimated for milk, fat and protein yield, and fat and protein content. The theoretical "b" were computed as the ratios of the standard deviation of proofs multiplied by a genetic correlation equal to 0.9. Standard deviations were calculated within year of birth and then pooled across year, weighted by the frequency of bulls. French proofs were halved prior to computation of the standard deviations, because French evaluations were expressed as EBV.

A sensitivity analysis was carried out assuming different genetic correlations ranging from .7 to 1 by step of .05.

Coefficient "a" (Mattalia and Bonaiti, 1993)

After the editing there were 118 full sib families with 138 bulls tested in Canada and 174 bulls tested in France. Full sib methodology was used for the computation of the "a" coefficients.

RESULTS

Estimated sire standard deviations for Canadian and French bulls are shown in Table 2.

TABLE 2. Estimated sire standard deviations.

	Canada		France	
Number of bulls	2003		2380	
Milk yield	6.916	ETA pts BCA	300.142	ETA kg
Fat yield	6.884	ETA pts BCA	11.598	ETA kg
Protein yield	6.159	ETA pts BCA	8.223	ETA kg
Fat percent	.155	ETA %	1.567	ETA ‰
Protein percent	.078	ETA %	.670	ETA ‰

Coefficients "a" and "b" for the conversion formulae France to Canada and Canada to France are given in Table 3. France to Canada conversion factors are official, while Canada to France coefficients are unofficial.

TABLE 3. "a" and "b" coefficients between Canada and France for all production traits.

	France to Canada		Canada to France [†]	
	b	a	b	a
Milk yield	.0104	3.2838	78.11	-352.62
Fat yield	.2671	5.7244	3.033	-24.787
Protein yield	.3370	4.0240	2.403	-14.169
Fat content	.0445	.0765	18.213	-1.545
Protein content	.0523	.0232	15.480	-0.424

[†] Unofficial conversions

The above conversion factors are based on the theoretical "b" multiplied by the genetic correlation that it has been assumed equal to .9, following the French work. Tables 4 and 5 show the changes in conversion formulae when the genetic correlation was varied from 1 to .7 by steps of .05. Changes in "b" values are quite evident, while the "a" values vary little.

TABLE 4. Changes in conversion formulae (France to Canada) by changes in genetic correlations (r).

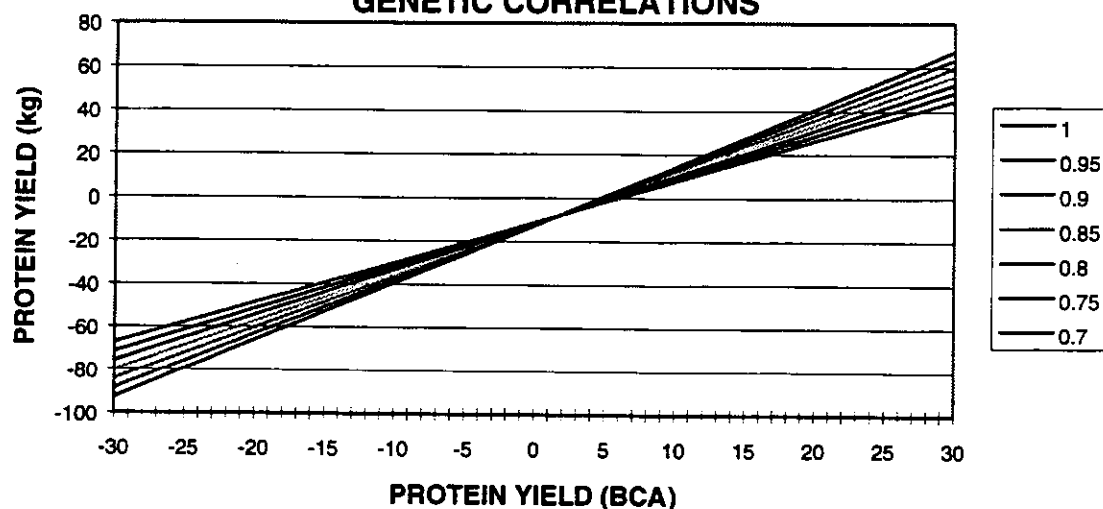
	Milk yield		Fat yield		Protein yield		Fat content		Protein content	
r	b	a	b	a	b	a	b	a	b	a
1	0.01152	3.76666	0.29677	5.910	0.37449	4.166	.0494	.0804	.0581	.0252
.95	0.01095	3.33029	0.28193	5.817	0.35577	4.095	.0469	.0784	.0552	.0242
.90	0.01037	3.28377	0.26709	5.724	0.33704	4.024	.0445	.0765	.0523	.0232
.85	0.00979	3.23692	0.25225	5.632	0.31832	3.953	.0420	.0745	.0494	.0222
.80	0.00922	3.19088	0.23741	5.539	0.29959	3.883	.0395	.0725	.0465	.0212
.75	0.00864	3.14403	0.22257	5.446	0.28087	3.812	.0371	.0705	.0436	.0202
.70	0.00806	3.09718	0.20774	5.354	0.26214	3.741	.0346	.0685	.0407	.0192

TABLE 5. Changes in conversion formulae (Canada to France) by changes in genetic correlations (r).

r	Milk yield		Fat yield		Protein yield		Fat content		Protein content	
	b	a	b	a	b	a	b	a	b	a
1	86.79	-373.851	3.370	-26.155	2.67	-12.672	20.237	-1.628	17.201	-.433
.95	82.45	-363.236	3.201	-25.471	2.537	-12.472	19.225	-1.587	16.341	-.429
.90	78.11	-352.621	3.033	-24.787	2.403	-12.221	18.213	-1.545	15.480	-.424
.85	73.77	-342.006	2.864	-24.104	2.27	-11.97	17.201	-1.504	14.620	-.420
.80	69.43	-331.39	2.696	-23.420	2.136	-11.719	16.189	-1.463	13.760	-.415
.75	65.09	-320.775	2.527	-22.737	2.003	-11.468	15.177	-1.422	12.900	-.411
.70	60.75	-310.16	2.359	-22.053	1.869	-11.218	14.166	-1.381	12.040	-.406

Figure 1 shows an example of differences among slopes computed using different genetic correlations (Canada to France, protein yield).

Figure 1. CHANGES IN CONVERSION FORMULAE BY GENETIC CORRELATIONS



The theoretical "b" was computed as a weighted average of ratio of standard deviations between the two countries pooled across birth years. Large variation was found when the "b" was computed by year of birth (Tables 5 and 6, Figures 2 and 3).

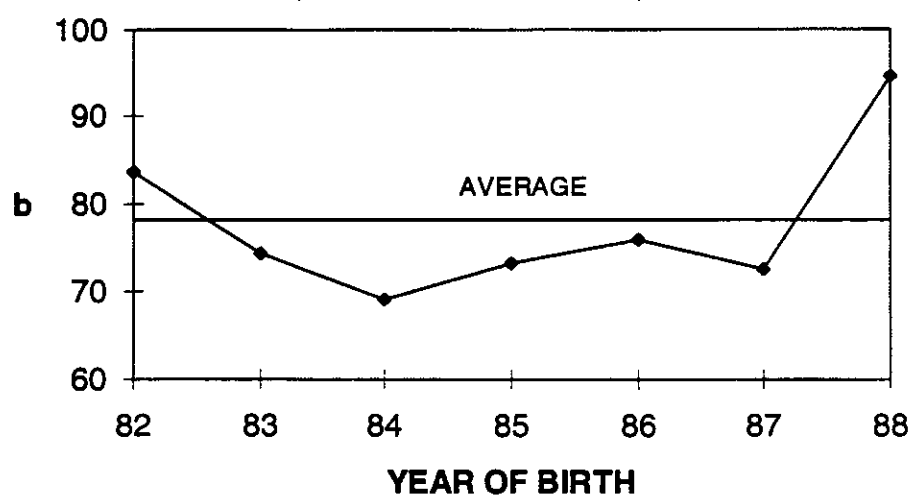
TABLE 5. Theoretical "b" by year of birth (France to Canada)

Year of birth	Milk yield	Fat yield	Protein yield	Fat content	Protein content
82	0.0097	0.2719	0.3052	0.0448	0.0538
83	0.0109	0.2497	0.3377	0.0432	0.0544
84	0.0117	0.3028	0.4137	0.0443	0.0555
85	0.0111	0.2670	0.3697	0.0459	0.0546
86	0.0107	0.2654	0.3559	0.0395	0.0494
87	0.0112	0.2896	0.3785	0.0482	0.0497
88	0.0086	0.2648	0.2750	0.0500	0.0531

TABLE 6. Theoretical "b" by year of birth (Canada to France)

Year of birth	Milk yield	Fat yield	Protein yield	Fat content	Protein content
82	83.583	2.979	2.654	18.089	15.048
83	74.423	3.244	2.399	18.756	14.884
84	69.038	2.675	1.958	18.300	14.586
85	73.278	3.033	2.191	17.652	14.826
86	75.865	3.052	2.276	20.506	16.406
87	72.515	2.797	2.140	16.816	16.303
88	94.528	3.059	2.946	16.213	15.248

Figure 3. ESTIMATION OF "b" BY YEAR OF BIRTH (CANADA TO FRANCE)



CONCLUSIONS

- "a" coefficients calculated with the full sib methodology are little influenced by varying genetic correlations.
- Theoretical "b" are very dependent on the choice of the genetic correlation.
- More work need to be done on the computation of the theoretical "b".
- Further research is planned with the use of Canada-USA data

REFERENCES

- Banos, G. 1992. Report on COPA/INTERBULL joint project. Paper presented at the Interbull meeting, Neustift, June 7-8, 1992.
- Mattalia, S., and B. Bonaiti. 1993. Use of full sibs families to estimate the "a" coefficients of conversion formulas between countries. Paper presented at the Interbull meeting, Aarhus, Denmark, August 19-20, 1993.