Conversion of Estimated Breeding Values from Different Countries to Slovenia

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Abstract

The latest estimated breeding values fron Austria, Bavaria, the Netherlands, the USA and Slovenia were avaliable to estimate the conversion parameters. The method used was linear regression. Between Slovenia and Austria no matches were found because all imported bulls from that country are born before 1985 and are not included in the austrian evaluation any more. Between Slovenia and Bavaria 32 for the Simmental, respectively 9 matches for the Brown breed were found. Seven matches between Slovenia and the USA for the Brown breed were found. The correlations between estimated breeding values estimated in different countries and Slovenia were low to moderate. The estimated parameters are not suitable for conversion of breeding values.

Introduction

The cheapest way to improve the own population is to import genetic gain from other populations. Slovenia is buying bull semen in many countries. This sperm is used to fertilize the best cows in the population and so produce a new generation of young elite bulls. The problem is to test the imported bulls and to estimate their breeding values in the population applied. First of all, the bulls are at least four years old when they get the test in their home country. It takes another four years to get breeding values in the importing country. In that time the genetic gain in the first country is raising. Many methods were developed and improved with the goal to estimate parameters for the conversion of breeding values from one country to another *(Gravert et al., 1982; Zhang et al., 1989; Banos et al., 1992)*. This wounld help to sale the semen and to reduce the generation interval. The aim of this work was to find out if there is a possibility to convert breeding values from different countries to Slovenia.

Material and methods

1. Simmental breed: The data were breeding values from the latest estimation in Austria and Bavaria. Unfortunately we couldn't found any corresponding pairs between Austria and Slovenia, All Simmental bulls inported from that country are born before 1985, while the

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austrian data contains only breeding values of bulls born after 1985. Also, breeding values of slovenian bulls (home and imported) estimated with the bavarian animal model were avaliable. This means the same method, only different correction factors for the environmental effects were used for the estimation of slovenian data.

2. Brown breed: Data from Austria , Bavaria and the USA were avaliable. The same problem between Austria and Slovenia occured here. No matches were found.

3. Black and white: The latest breedig values from the Netherlands and Austria were avaliable. As mentioned before here also no matches with the austrian data could be found. Between the Netherlands and Slovenia we found only one pair. All other bulls imported from this country to Slovenia haven't any offspring and tests yet.

Generally, a lot of errors were detected in the slovenian pedigree file of imported bulls.

The method used was linear regression with the following model:

$$y = a + bx + e$$

where

- y represents the breeding values estimated in Slovenia
- a is a estimated constant and represents the difference between population base
- x represents the estimated breeding values in the exporting land
- b is the regression coefficient which represents the change in the slovenian breeding value if x changes for one unit

Results with discussion

1. Simmental breed

Table 1: Number of pairs between Slovenia (sire model) and Bavaria (multitrait animal model) and the estimated regression parameters and the correlation coefficients

Trait	N	a	b	r
BV milk kg	32	193.4	0.337	0.51
BV fat kg	32	8.43	0.343	0.50
BV fat %	32	-0.0009	0.001	0.13

Between this two populations the highest number of matches was found, but the correlation between slovenian and bavarian breeding values is small. That means, that if there is a connection it is widely random.

In Slovenia the standard model for breeding value estimation is the BLUP sire model. The standard model in Bavaria is a multitrait animal model. Within the scope of a joint project with BLT Grub, breeding values for slovenian simmental population were estimated with their model. Only the correction factors for the environmental effects were calculated separately for the slovenian data. This means the same method but different populations. Subsequently the matches were searched and the conversion coefficients calculated. The results are summarized in table 2.

Table 2: Number of pairs betwen Slovenia and Bavaria (both bavarian multitrait animal model) and the estimated regression factors and the correlation coefficients

Trait	N	a	b	r
BV milk kg	30	31.11	0.09	0.46
BV fat kg	30	2.10	0.11	0.50
BV fat %	no results			

The results are similar. It is logical, because the correlation between breeding values estimated on the same population with the sire and the animal model is very high, hence, similar results were expected. The correlation are moderate. These results leads to the assumption that there is a possible genotype*environment interaction *(Philipsson, 1983)*.

2. Brown breed

We found 9, respectively 7 matches in the material with Bavaria, respectively the USA. The results are in tables 3 and 4.

Table 3: Number of pairs between Slovenia and Bavarian and the estimated regression parameters and the correlation coefficients

Trait	N	a	b	r
BV milk kg	9	241.09	0.47	0.55
BV fat kg	9	10.5	0.28	0.50
BV fat %	9	0.39	0.122	0.78

With the model in spite of the small number of pairs we have a relatively high correlation between the breeding values.

Between Slovenia and the USA only 7 pairs couls be found. The regression coefficient for fat kg is negative and the population difference for fat content is negative, too. The results are summarized in table 4.

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Table 4: Number of pairs between Slovenia and the USA and the estimated regression parameters and the correlation coefficients

Trait	N	a	b	r
BV milk kg	7	333.78	0.15	0.37
BV fat kg	7	9.32	-0.0024	0.40
BV fat %	7	-0.012	0.37	0.00

Conclusions

1. Generally there was small number of matches between the different populations and Slovenia found.
2. Many errors were detected in the slovenian pedigrees for imported bulls.
3. The correlations between the estimated breeding values were low to moderate. The estimated conversion parameters cannot be used.
4. There might be a possible genotype*environment interaction between the estimated breeding values for the Simmental breed.

Literature:

Banos, G.; Wiggans, G.R.; Robinson, J.A.B. (1992): Comparison of methods to rank bulls accross countries. J. Dairy Sci. 75:2560-2568.

Fewson, D. (1982): Grundsätze zur Umrechnung ausländischer Zuchtwerte von Bullen. Züchtungskunde 54(1) s.2-4.

Gravert, H.O. and Pabst, K. (1982): Umrechnung ausländischer Zuchtwerte bei Bullen. Züchtungskunde 54(1) s. 5-10.

Philipsson, J. (1983): Zur internationalen Vergleichbarkeit von Bullen Prüfergebnissen. Der Tierzüchter, 35(1983)4, s. 129-131.

Zhang, Q. and Haussmann, H. (1989): Conversion of estimated breeding values form one population to another. 40th Annual Meeting EAAP, August 27-31, 1989, Dublin, Ireland.