Registration on farm level. Can I trust the results from national and international listings and breeding values?

Lars-Inge Gunnarsson, Ränneslöv, Laholm, Sweden

I have a deep engagement in the Swedish and Nordic dairy cattle breeding industry. I have been the chairman of the AI-company Svensk Avel for the last 12 years. I'm the chairman of the joint Nordic company for estimation of breeding values, Nordic Cattle Genetic Evaluation. In January 2008 Dansire and Svensk Avel will form a new AI company and I'm the chairman in the present board. Furthermore, I belong to the Holstein breeding committee at Svensk Avel.
The Ränneslöv farm is situated in the south of province Halland in the south west of Sweden. At the moment we milk 450 cows, mainly Holstein. In May 2007 we milked 372 cows with a mean annual production of 12346 kg. All bull calves are fattened at the farm and additional to the dairy operation the farm also runs 60 beef cattle and 200 sheep. 1150 ha are under our care and the main crops are grass, pasture, grain, corn and potatoes. At the moment we are building a new cow shed that will increase the number of cows with about 250 animals.

Registration on farm level

Good management tools are of great importance to operate large herds. Recording of relevant traits is therefore fundamental. Furthermore, the information can be used for estimation of breeding values. The value of the records is depending of the quality of the registrations. It is important that the recording is done in a reliable and accurate way. We also need cheap and labour saving procedure for recording and delivering data to the national data centre. It is also necessary that the information is updated frequently. If the registration has to low quality the value of the management tools and the accuracy of the breeding values are poor and we are at risk to fool ourselves.

Can we trust national evaluations?

The long-term value of national listings and breeding evaluations is to a large extent depending on the accuracy of the proofs. This is depending on the way the records are done and the number of times the trait is recorded. The accuracy is also depending on the traits genetic parameters such as heritability and repeatability. Traits with a low heritability must have a larger number of records to achieve the same accuracy as trait with higher heritability.

When we compare a bull's proof from different years, it can be several factors that have an influence on the change. Firstly, the numbers of daughters for second crop bulls have increased considerable. Secondly, the genetic trends for some traits (e.g. milk production) are evident. This will be obviously in countries with changes of the genetic bases. Other reasons to changes of a bull's proof might be that the trait definition has been altered or that the trait is recorded in another way.

In August 2001 Svensk Avel had six Holstein bulls on the list of recommended bulls. In table 1 the proofs of these bulls from August 2001 and June 2007 are compared. One trait with a relatively high (Milk index) and one trait with a low (mastitis resistance) heritability are presented. In table 1 are the top two bulls for each trait printed in green and the two bottom bulls printed in red.

Table 1. Comparison of bulls proofs for Milk index and mastitis resistance from August 2001 and June 2007

Bull	MILK Index 01	MILK Index 07	MAST 01	MAST 07
Gubbilt	**120**	**123**	**102**	**98**
Spånstad	**112**	**120**	**105**	**107**
G Best	**124**	**116**	**98**	**96**
Gul	**102**	**92**	**107**	**110**
Atong	**108**	**99**	**103**	**106**
Ladva	**106**	**93**	**103**	**100**

The ranking of the six bulls is consistent between 2001 and 2007 for both traits. During this period the organisation who is conducting the estimation has change from Svensk Mjölk to Nordic Cattle Genetic Evaluation. Furthermore, both traits have now a new definition. The milk index of today value protein production more than earlier and utilizes information from lactation 1 to 3. Earlier it was just the records from the first lactation that was used. A major change of the mastitis resistance index has been done. Today udder depth and fore udder attachment are use as complementary predictors for udder health.

Total Merit Index

Total Merit Index is the aggregated breeding objective of the breeding program. In Sweden the aim of the TMI is to put a value on traits that have an impact on the profitability in the milk production. The traits included in TMI are changed over time as well as their relative weights. In table 2 the TMI ranking of the bulls from 2001 is compared with their present ranking. Sweden made a change of the national TMI in 2005. We have today higher economical weights on functional traits and lower on milk production than before. Two of the bulls from 2001 list have been winners, Spånstad and Gul.

Table 2. Comparison of TMI from 2001 and 2007

Bull	TMI 01	TMI 07	Rank 01	Rank 07
Gubbilt	**+22**	**+12**	**1**	**4**
Spånstad	**+18**	**+22**	**2**	**1**
G Best	**+18**	**+13**	**2**	**3**
Gul	**+18**	**+19**	**2**	**2**
Atong	**+16**	**+10**	**5**	**5**
Ladva	**+15**	**+3**	**6**	**6**

Can we trust international evaluations?

The Nordic Cattle Genetic Evaluation (NCGE) is a jointly owned company between Denmark, Finland and Sweden. Today NCGE estimates breeding values for milk production, fertility, udder health, conformation, milkability and temperament. More traits will be included in the routine evaluations later this and next year. NCGE is using raw data from the three countries and the genetic correlation is assumed to be 1. In all international cooperation it is important to have as harmonized traits as possible and a pedigree file that identifies the individual right. The NCGE proofs are today official proofs in Denmark, Finland and Sweden. Interbull is using deregressed proofs from the participating countries in the estimation of “international” breeding values. The genetic correlation between countries is assumed not to be one. The “Interbull proofs” are official proofs in Sweden for bulls without Scandinavian daughters.

Do we have any alternative than trust national and international breeding values?