



Genetic Evaluation Services



Canadian Centre for Swine Improvement (CCSI)

Estimated Breeding Values (EBVs)

- ! All genetic evaluations in the program are computed using BLUP (Best Linear Unbiased Prediction), the most accurate method known today. The Canadian Swine Improvement Program was the first in the world to make use of this technology for swine genetic evaluation on a large scale (starting in 1985).
- ! The data collected in each herd by an accredited technician is entered on a micro-computer, edited, and used immediately to compute on-farm EBVs. This way, selection can be done as soon as the pigs are probed.
- ! The data is also sent electronically to CCSI, via the regional centres, for the monthly computation of national EBVs. National EBVs are produced through a joint analysis of the records collected in all herds on the program, for many generations.
- ! The computation of on-farm EBVs uses national EBVs for all parents, therefore on-farm and national EBVs are highly correlated ($r > 0.97$). This means that on-farm EBVs can be used to rank animals from different herds, right after probing.
- ! The Canadian system combines three key elements for efficient genetic improvement: speed (you can select pigs immediately after testing), accuracy (you know the program uses the best genetic evaluation methods) and universality (you can tell how good the pigs you select are compared to all other pigs in the program).

Selection of sire lines

- ! The program provides evaluations for various traits that are important for the selection of sire lines:

S	growth rate	-	loin depth
S	lean yield	-	loin eye area
S	backfat depth	-	feed efficiency
- ! Since separate EBVs (and their accuracy) are provided for each trait, selection can be based on those traits that have the greatest value for you, your commercial clients and the packers that receive the market pigs.

- ! If you wish to select for several traits at the same time, the most effective method is to build an economic index which uses EBVs and different economic weights for each trait. To help you develop such an index, we have designed a computer program called "Breeding for Profit". This program can also help you design your own selection strategy and make improvements to your selection methods.
- ! If you prefer, you can use either one of two general purpose indices we publish for sire lines. The first one (the old index) gives slightly more emphasis to lean yield than to growth rate. The other one (the new index) gives more emphasis to growth rate and feed efficiency than to other traits.

Selection of dam lines

- ! For dam lines, EBVs are provided for litter size in addition to the sire line traits (growth rate, lean yield, loin depth, loin eye area, feed efficiency).
- ! Once again, EBVs are provided separately for each trait, so you can tailor the program to your own objectives. You can use "Breeding for Profit" to develop your own economic index for dam lines, or you can use one of two general purpose dam line indices. Both indices give about half the emphasis to selection for litter size.

The future

- ! Research is underway or planned so we can provide genetic evaluations for several new traits over the next one to three years:
 - S feed efficiency (residual component). Currently, EBVs for feed efficiency are based on genetic correlations with production traits (growth rate and backfat thickness). These correlations account for the largest part of the genetic variation in feed efficiency. However, additional genetic progress for feed efficiency can be made by measuring feed intake over a constant period of weight gain. Feed efficiency EBVs which include this information are planned for 2001;
 - S new sow productivity traits (weaning to conception interval, survival rate, number weaned, weight of litter at weaning). Development of EBVs for these traits is planned for 2002;
 - S meat quality traits (pH, color, marbling). Development of EBVs for these traits is planned for 2001;
 - S conformation (feet and legs, underline). Development of a recording program for these traits is underway and the computation of corresponding EBVs is planned for 2002.