

Genetic Evaluation in Quebec If I Should Choose a Single System?

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In Quebec, two genetic evaluation programs are offered to the beef breeders: programs managed by beef breed associations and PATBQ whose evaluations are performed by Beef Improvement Ontario (BIO), hereafter referred to as PATBQ/BIO. These programs have a lot in common but they also have some differences. If you have to make a choice, which program would be the most beneficial for genetic improvement? This is the question submitted to Dr. Roger Cue, geneticist at McGill University, and whose reflection is summarized here.

Alike or not?

The common point between these two programs is that they used multi-trait animal models and they are predominantly oriented towards traits measured on young growing animals (e.g. birth weight, weaning weight, yearling weight, etc.). Table 1 presents other similarities between them.

Table 1. Similarities between Breeds Association Programs and PATBQ/BIO

Parameters	Breed Association Programs / PATBQ/BIO
Inclusion of Pedigree Information	Integrate male and female pedigree. Neither integrates data about imported animals
Genetic Evaluation Models	Use multi-trait models which integrate genetic and environmental correlations between traits
Traits Included and Published	Measures approximately the same traits and calculate corresponding EPD. PATBQ/BIO calculates an EPD for test-station gain – interesting because of its high correlation with other measures taken at the farm level
Accuracy	Provide accuracy
Minimum and Maximum Ages at Weaning	Both programs recommend roughly similar age and condition

Table 2 presents points which differ between both programs. Principal differences are summarized in the following points:

- 1) PATBQ/BIO genetic evaluation uses data from all types of beef cattle, purebred animals as well as crossbred animals, and this is what

- represents its strength. This allows comparison of “all breeds” and the possibility to increase the number of animals within contemporary groups – a benefit to commercial producers. Beef breed programs use only purebred cattle, although certain breeds tend to include data from non-registered dams;
- 2) Beef breed programs are restricted to purebred breeders. PATBQ/BIO is offered to all breeders and producers;
 - 3) In PATBQ/BIO, there is an official supervised version. Breed association programs use data provided by breeders. The only supervised data are ultrasound scanning estimation for back fat thickness and rib eye area.

Table 2. Differences between Breed Association Programs and PATBQ/BIO

Parameters	Breed Association Programs	PATBQ/BIO
Frequency of Evaluation (high frequency = rapid genetic progress)	Twice a year Data calculated every six months Difficult to find errors	Each month Data calculated monthly Easy to find errors
Inclusion of Bull Test-Station Data	Do not use those data except certain ultrasound estimations	Uses those data
Hybrid Vigor	No consideration for hybrid vigor and no comparison between breeds is possible	Allows comparison between breeds and has the potential to be able to distinguish hybrid vigor
Reference base value	The majority uses a fixed base. It varies among breeds	Mobile base = 0 (easy result interpretation : > 0 = improve ; except for birth weight)
Percentiles Rankings (allow for animal ranking without knowing its genetic variability)	Some breeds provide it	Yes (across breeds and within breeds)
Contemporary Groups (accuracy and repeatability)	The number of animals within a group is, in some cases, as low as 1 – this excludes this animal's contribution	Groups must have a minimum of 5 animals
Exclusion of Data	Not clear. Errors are sent back to the breeder who must correct them	Exclusion of data if animal does not meet certain criteria (age, different pedigree)

		information, etc.)
Partial or Complete Herd Inventory	Recommended that the whole herd be recorded to avoid the possibility of a selection of selective recording and bias	As public funds are being used, it is therefore normal that the whole herd be registered

Capability to give ourselves the means...

None of these programs generates EPD on final product which is the marketed meat. This data is very difficult to measure. This is almost impossible since without an individual animal identification and tracking system, and without some way of feed back the information that abattoirs collect on carcass weight and grade per individually identified animal. Therefore, Quebec has the possibility of doing this, via the ATQ identification system, and the information that abattoirs return to the FPBQ. This information could be used advantageously by commercial breeders as well as selector breeders for management and genetic evaluations.

Making the right choice... for genetic improvement

The beef genetic evaluation programs available in Quebec are quite similar in using multi-trait animal models. However, PATBQ/BIO offers several additional benefits:

- ✓ Provides across-breed and within-breed evaluations and percentile rankings;
- ✓ Utilizes bull test-station information;
- ✓ Provides an average on easy to use mobile base;
- ✓ Allows faster genetic progress due to the more frequent genetic evaluations;
- ✓ Allows the realization of analysis and reports for the whole beef sector in order to make administrative decisions for the Quebec industry.

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PULL OUT

Who is evaluating what?

In Canada, beef breed associations do not run their own separate genetic evaluation programs. They have chosen to pair up with their respective American breed associations. This makes substantial sense given the large overlap of genetic pedigrees and also the similar breeding systems and environments. It is also interesting to note that these respective North American evaluations are not

carried out by the respective breed associations themselves, but rather carried out by the Universities of Georgia, Colorado and Cornell.

More important to know: as an animal ages, the recording diminishes! Of all the animals born and weighed, only about 2/3rds will have a recorded weaning weight, and of these, only a further 2/3rds will have a recorded yearling weight. This is fairly consistent across the various recording and genetic evaluation programs. As an example, if we look at the PATBQ extraction from July 2008, we can see that there are 421,685 animals with a recorded birth weight, 308,287 animals with a recorded weaning weight, only 59,246 animals with post-weaning information, and only 2,161 animals with any back fat measurement.

From the standpoint of the accuracy of an animal's genetic evaluation whether the databank contains 1 M animals or 300,000, it will make very little difference to any animal's evaluation. A more important factor is the recording on close relatives, having whole-herd recording and making effective selection and use of the breeding population.