



# LEAD the Way

## LLAMA EVALUATION FOR ADVANCEMENT

### The CLAA Genetic Evaluation Program

*“The major decision in any breeding program is to select which animals should be retained within a herd for breeding and to which sire or dam they should be mated. Historically such selection has been based on the visual assessment of the animal or by its performance in a show ring. In the mid 20<sup>th</sup> century breeding programs based on objectively selecting of animals based on measured traits was developed which have evolved into breeding programs based on genetic evaluation of these measured traits”.*

CLAA members now have available to them an exciting new tool to fast-track their breeding programs – the **Genetic Evaluation Program**. Like all livestock breeders, llama breeders are constantly striving to improve their breed. This improvement may be seen in an array of measurable traits that include: increased fleece weights, greater fleece uniformity, increased staple length or increased fineness. Wherever such improvement is sought, genetic factors are likely to play an important part in determining that improvement, and different llamas differ in their ability to deliver that genetic improvement to their offspring. This program will assist individual breeders in selecting the most appropriate mating combinations to increase progress towards breeders’ specific breeding goals.

An animal’s appearance and performance depends both on the genes it inherits and the environment in which it grows and produces. The importance of these environmental factors means an animal’s appearance and performance is not an accurate guide to its breeding value. The key to genetic improvement of livestock is to first distinguish between genetic and environmental factors influencing performance and then select only those animals that are genetically superior to form the basis of a breeding herd. In making breeding decisions, llama breeders not only want to take into consideration the genetic traits of the dam and sire, but also to consider the degree to which these two animals tend to pass on these (certain) traits to their offspring. The Genetic Evaluation Program, as with most breed improvement programs, gathers performance and pedigree data, collates these records and applies (genetic) statistical analysis to produce a best estimate of an animal’s true genetic value. With this knowledge, a breeder can make better-informed choices about which animals in their herd have the better genetics for specific and desirable traits. If breeders wish to continue to improve specific traits they should choose animals with the highest breeding (genetic) values for that trait.

### Do other Associations use genetic evaluation programs?

Most certainly. Genetic evaluation programs are widely used throughout the world and in particular with great success in Canada in the dairy, swine and beef cattle industries. Elsewhere they are leading to substantial progress in the wool and meat sheep industries. Livestock breeders will always wish to select replacement stock or stock to upgrade their herds from that group of animals that have shown an ability to produce the most desirable (profitable) offspring. Estimated breeding values derived from genetic evaluation programs have become the “currency” in which livestock breeders discuss genetic merit and make their purchasing decisions.

### How Does it Work?

The Genetic Evaluation Program requires little more than what most breeders are doing already. Breeders will be asked to measure and record specific traits related to their production goals on an annual basis. This will include things such as fleece weight, staple length and complete fibre analysis results. The breeder then forwards this information to the CLAA office which will input the data into the Genetic Evaluation Database. Using the submitted information reports are then generated for each individual farm on the performance of animals within their herd and will compare each animal’s performance to other animals in that herd.

## **What Information will I Get?**

The reports generated by the Genetic Evaluation Program will provide an analysis of how each of your breeding animals compares to the rest of your herd in specific measurable traits and their ability to pass on these traits. The reports provide Indexes. The indexes compare the value of a specific trait against the average for your herd. For example the llama with a mean fibre diameter closest to the average of the herd is given a score of 100, all other llamas are scored as they relate to this mean figure. Ten % finer would have a score of 90, 10% stronger (coarser), a score of 110. Each llama is scored in this fashion for each of the listed attributes.

## **What if I Don't Have All the Information to Submit?**

The more information breeders can submit, the more useful a tool LEAD will be. The only mandatory information needed to enrol an animal is gross fleece weight, average fibre diameter (AFD), Standard Deviation (SD) and comfort factor (or % > 30 microns) along with the animals CLAA registration number and parentage.

It is recommended that breeders also submit additional fleece data (CV, fibre curvature, % medullated fibres and staple length) as well as the weight of animals at birth, the age of 6 months and at shearing. If breeders do not have this information, animals can still be enrolled with the minimum of the required data. Breeders are encouraged to begin to measure and track all of the characteristics in the Program.

## **Can I use the information to compare llamas from different herds?**

No, not initially at least. Animals from one herd are not compared with animals from another herd - the comparisons are only valid within a herd. In Canada this type of herd testing is the backbone of performance recording systems and has been used widely for decades in many countries. The comparison within a herd not only provides a frame of reference for comparison; it, most importantly, removes many of the environmental influences. Following adjustment for age sex and other "non-environmental" factors that considerably complicate comparisons, differences between herd mates raised in the same environment are largely genetic. The evaluation contained in the report will be expressed relative to the average performance of all llamas in that herd only. The report will give breeders an instant and extremely useful learning tool for their own herd by providing them with a means of identifying and selecting genetically superior breeding stock (in the traits the breeder is most interested in).

## **Will it be possible in the future for across herd comparisons?**

Yes. As the number of enrolled llama increases over the years of the program genetic links between herds will become apparent in the database. Genetic links are created through the sale of breeding stock from one herd to another. Through this, animals of related genetic background are observed and measured raised in different herds, thus herds become linked. Because EBV's account separately for the effects of environment and genetics, the management effect can be removed allowing valid comparisons of breeding stock in different herds. The more information that is available on related animals, the greater the accuracy of the EBV's. A statistical procedure known as best linear unbiased prediction (BLUP) can then be used. BLUP estimates genetic and environmental differences simultaneously to provide accurate across herd estimated breeding values.

However if there are no known genetic links between groups or sample sizes are too small, then we must estimate breeding values on a within group basis and cannot compare the breeding values of animals in different groups. RAK Consulting has estimated, given our current herd size and given strong membership support for this program that across herd comparisons may be possible after 5 years.

## **What Information will I be asked to Submit?**

At present, the traits that will be tracked in the Genetic Evaluation Program are:

- fibre quality (micron, SD, CV, comfort factor / %.30 microns, fibre curvature, degree of medullation)
- gross fleece weights and staple length
- birth, (growth) and weaning weights and animal weight at shearing

Breeders will be asked to submit results for all of these traits annually but gross fleece weight and micron, SD and % > 30 are the only required measurements for enrolment. All other measurements are recommended but are optional.

## **What is the cost of Participating?**

Enrolment in the Genetic Evaluation Program is open to all members of the Association. Participation in this program is strongly encouraged but is done strictly on a voluntary basis. Thanks to a generous donation from the Canadian National Alpaca Sale and Futurity (CNASF) group, submitting animal data for entry into the database will be free for the first year. Thereafter there will be a small cost per animal for data entry. There will be a \$30 charge for the annual reports on your animals.

## **How will the Information be used?**

The data collected and the information provided in reports belongs to you. The performance information of individual animals or individual farms is not made available to any one but the owner of the animal at the time the data was submitted. It is up to each individual breeder to decide whether they wish to make the information available to others for marketing or advertising purposes.

It is also possible that as the database grows in size, the opportunity could emerge for the information in the database to be used to generate statistics of the national herd in general. From the outset of the program breeders are encouraged to give permission for submitted data from their animals to be compiled and used in completely non-identifying ways in a national database. This breeder co-operative approach will facilitate industry reporting, benchmarking and development of genetic evaluation of the Canadian registered llama.

## **What Animals are Eligible to be Included?**

All animals that are CLAA registered (purebred and percentage purebred) are eligible to be included in the Genetic Evaluation Program. You are encouraged to enroll all of your eligible animals although this is not mandatory in order to participate. Submitting all of your registered animals will give you more complete and accurate results enabling you to make better-informed breeding decisions.

## **What Does it Take to Enroll my Animals?**

Very little. Complete the data collection forms (Page 1 & 2) included in this package or those available online at [www.claacanada.com](http://www.claacanada.com). Submit the required information and any additional requested data available for each of the animals to be registered and submit it to the CLAA office. You will be notified when the report is available.

## How will the information impact the value of my animals?

Since the information contained in the report is not made public or can be used to validly compare herds, the value of the received information is in making breeding decisions. Over several years of data collection and analyses certain animals in your herd will outperform others in traits that are important to your breeding program. These animals will have greater value to you and your program. Animals that under perform the average will have a decreased value to you.

Again, while the information on individual herds will not be made public by the Association, breeders are strongly encouraged to personally share the information with prospective purchasers – since this information will also help them in their decision making. As a consequence animals that under perform in certain traits will likely be undervalued by others in comparison to those that do well in your herd. Remember though, although an animal may show to be below average compared with the rest of your herd for a certain trait, that same animal may well have other traits that are above average or be quite valuable to someone who has different breeding goals. Also, a consumer can be motivated to pay more for breeding stock if given assurances that profit will increase as a consequence of those increased costs.

## Where Can I Get More Information about LEAD?

There is a great deal more information and details about LEAD on the CLAA website. Follow the links to **LEAD** or click on [www.claacanada.com](http://www.claacanada.com). Various fact sheets as well as presentations (such as **LEAD** overview, instructions for collecting data and measuring traits and instructions for completing data collection forms) related to the program are also available on the website or can be requested through the CLAA office. If you have a question about **LEAD** that you do not see answered in any of the information or that you wish clarification on, contact the CLAA office at 800.717.5262 or [claacanada@nucleus.com](mailto:claacanada@nucleus.com)

## Why is CLAA Launching this Program?

As part of a proactive effort to enhance the position of the Canadian llama and llama industry in Canada, the CLAA contracted the services of RAK Genetic Consulting in 2006, to conduct a breed improvement assessment and development project. One of the recommendations coming out of this was the development of a Breed Improvement Program. The adoption of genetic evaluation programs in other livestock breeds have been shown to be up to nine times more effective in driving genetic improvement than an individual's own singular efforts. Ultimately it is hoped that this program will also give the Association the ability to produce, for each member, Canadian Llama and Llama Breeding Values for an increased range of different, but still economically important, traits.

Until now, the size of the Canadian llama industry has not been sufficiently large to support such a program and take full advantage of the measurable genetic progress that can be made in our industry. However, as our llama population increases, the implementation of this structured genetic evaluation program will enhance the competitive position of Canada in the world llama market, to the benefit of all Canadian breeders.

The Genetic evaluation committee and the CLAA Board strongly encourage all Canadian breeders to participate in this program. The primary aim of this program is to assist members to maximise their herd's genetic improvement. The greater the participation the faster we will see improvements in our national herd. Consider also please the following quote from the Secretary's Manual to the Animal Pedigree Act – "Breed associations, for all practical purposes are simply a group of breeders working collectively to make improvements in their breed."