

ARI's EPD Program Begins Data Collection

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Alpaca Registry, Inc. announced the official initiation of its industry-wide Estimated Progeny Differences (EPD) program during its 2009 Annual Meeting, June 5, 2009 held at the AOBA National Conference in Cleveland, Ohio.

All of us on the ARI Board and the ARI EPD committee are very excited about the initiation of this program and look forward to seeing our members make use of this important tool in their breeding programs.

In developing the ARI EPD program the ARI Board of Directors and EPD committee has looked to the original scientific literature along with well-established programs in the dairy, beef, swine and sheep industries including their training literature for guidance in establishing our own program. Using software developed at Cornell University where the initial and ground-breaking work on quantitative genetics in dairy cattle was done by CR Henderson beginning in the late 1940s gives the ARI EPD program a firm foundation.

First, I'll discuss some of the principles of the EPD program and then provide information on how to participate in the program for the traits on which the program will initially focus.

EPDs Principles and Practice:

EPDs are calculations based on mathematical models that describe the contribution of genetics and the contribution of environment on the expression of specific performance traits. EPDs are generated from data collected on individual animals and their relatives (progeny, parents, siblings, grandparents). EPDs estimate the genetic value of a specific animal for specific traits compared to others of same breed. The expected difference is that between the **average** trait value of a specific animal's progeny and the **average** trait value in the rest of the population. The performance of two specific animals can be compared by subtracting one animal's EPD from the other – this will give the **average** expected difference between the two animal's progeny for that trait. It is important to understand that EPDs do not give an absolute or individual performance prediction! They give average performance differences of progeny as compared to average performance of others in the population.

Following the principles of gathering data suitable for use in the mathematical equations developed by Henderson and others is important to establishing the ARI EPD program on sound scientific footing. We will not go into the mathematics here which are complex matrix algebra and differential equations used to estimate the portion of trait performance that can be attributed to the genetic contribution of one or the other parent, but will discuss some of the concepts we need to follow to collect good data that will give us useful EPDs.

Those concepts include:

- Connectedness

The first concept to grasp is that of **connectedness** which simply means that in order for the mathematical models to work to discount the impact of environment on the performance trait we must provide data on animals that are genetically related and measured under different environmental conditions.

Alpacas are well set up as an industry in this respect. Our original import animals have been thoroughly spread across the USA (and to other countries) and genetic material has been widely spread through the use of many herdsires across the country as well as the sale of animals across the country and to other countries. In other words, we have very good genetic connections between ARI registered herds so that the mathematical models can effectively separate the impact of genetics from environment.

- Contemporary Groups

The second concept of importance is that of **contemporary groups** which are defined as uniformly managed groups of animals of the same breed, age and gender. Because the models will use genetic relationships among animals to tease out the separate influence of genetics and environment the data provided must be uniformly impacted by the environment under which the trait was expressed. In other words, for meaningful data to be collected all of the animals measured must have developed the trait's performance under the same environmental conditions.

This is a little more difficult to manage and something that all breeders need to think about as they collect and report data. To be a good contemporary group animals' need to have been exposed to the same weather conditions, fed the same feed (hay and grain and any other supplements), subjected to similar levels of stress and measured at the same point in time.

Contemporary groups of 20 or more animals having at least 2 herdsires represented as a parent in the group are preferred. The numbers of animals that smaller farms are able to assign to a contemporary group may well be less than 20. This should not discourage smaller farms from participating! The smaller number of animals in a contemporary group may impact the accuracy/prediction error somewhat (see below) but are not too much of an issue.

For example, fiber samples for analysis should be taken from all animals within a contemporary group within a few days of one another so that the portion tested is all affected by the same growing conditions. This is the reason that the mid-side sample location and 2mm snippet 'butt cut' sampling will be done to address the trait of fiber fineness. There is a greater chance that all the animals within a contemporary group will have grown that portion of fiber under the same environmental conditions and therefore provides a stronger contemporary group of data.

So, if you have an animal that has been off of your farm for the past 2 months and comes back on the day of shearing it should not be included in that year's contemporary group.

Some farms may need to report separate contemporary groups for the fiber analysis. If males, pregnant females, weanling males and females, fiber animals or other groups are treated differently they should be labeled as such when the samples are submitted for analysis. Contact ARI or Dr. Shauna Brummet if you have questions regarding contemporary group assignment.

- Prediction Error/Accuracy

EPDs are accompanied by an accuracy or prediction error figure. This number (listed as a decimal number between 0 and 1) shows the reliability with which the estimate is made. It shows us the level of confidence that predicted values are near the true genetic value of the animal for the specific trait. Accuracy/Prediction Error is dependent on the heritability of the trait and the number of records from the individual, relatives and progeny used in the evaluation. Accuracy is dependent on an animal having relatives in different herds, on the contemporary group and its size and on the number of sires represented in each contemporary group. It is important to note that animals with high accuracy EPDs will produce as much variation in offspring as animals with low accuracy EPDs, but the high accuracy EPD is closer to the true breeding value of the animal for the trait.

- Data Collection

Accurate performance records are critical to the success of genetic evaluation & selection programs. Remember the old computer saying GIGO – garbage in, garbage out – a truism for the EPD program as well. Consistent and accurate collection of data is important for generating EPDs with good accuracy in the nearer term.

Submitting all data is important as well. Because different environments will impact the traits differently animals might well have better genetic value than appears under some conditions. In order for the industry to quickly produce useable data it is important for you to submit data on all animals that you maintain whether they are herdsires, prize females, young unproven stock or fiber animals. So, collect samples from all your animals and let the calculations sort out the differences!

ARI EPD Program Participation

Fiber analysis may be ordered from three laboratories for submission to the ARI EPD program. Those labs are Yocom-McColl, Inc., Olds College Natural Fiber Center, and Australian Alpaca Fibre Testing. The required order form is available on each laboratory's website.

Other laboratories may apply to be a vendor by submitting the Vendor Application form available from the ARI website.

Fiber analyses that were performed on previous years fleece samples by Yocom-McColl, Inc. (or from a laboratory

that can show compliance with the testing criteria for the previous analyses) may be submitted to the ARI EPD program as well. Please contact Yocom-McColl to request that your historical data be submitted to the ARI EPD program. **ONLY** data that was **originally** labeled with the animal's ARI registration number and sampling date will be accepted in the ARI EPD program.

Initially ARI is collecting data on the traits listed below. It is unlikely that EPDs will be calculated from all of these. To begin with we anticipate being able to get meaningful data for our members on several traits. Most of the data will be submitted directly by the testing laboratories. Birth weight, weaning weight and birthing ease are traits that may be submitted directly to the program through your ARI account page.

Trait	EDP Calculation Planned
Mean Fiber Diameter	Yes
Standard Deviation	Yes
Coefficient of Variation	Yes
Spin Fineness	No
Fibers >30 microns	Yes
Comfort Factor	No
Mean Staple Length	Yes
Length Standard Deviation	Not yet determined
Length Coefficient of Variation	Not yet determined
Mean Curvature	Not yet determined
Standard Deviation of Curvature	Not yet determined
Medullated Fibers (%) (for white and light fleeces)	Yes
Fleece weight	No, not as yet
Birth weight	Yes
Weaning weight	Not yet determined
Birthing ease	Probably

The breeder supplied data may be uploaded individually or in batch via Excel spreadsheets from your ARI account. To accurately record birth weight we suggest weighing the cria after it is dry and before it is 12 hours old. Weaning weight should be determined at about 6 months of age. Report both birth and weaning weight in units of pounds and tenths of pounds. The date of birth and weaning will also be reported.

Sheared fleece weight should be reported on the Fiber Analysis form when submitted to the fiber testing laboratory and should be done by weighting the animal immediately before and after shearing for a total shear weight. This method has been selected as an initial trial with the realization that a sheared fleece weight measurement is more difficult to insure across herd consistency in taken the measurement.

Please visit www.alpacaregistry.com or www.AlpacaAcademy.com for further information regarding EPDs, data collection and submission.