Expected Progeny Differences:
A Business and Marketing Perspective

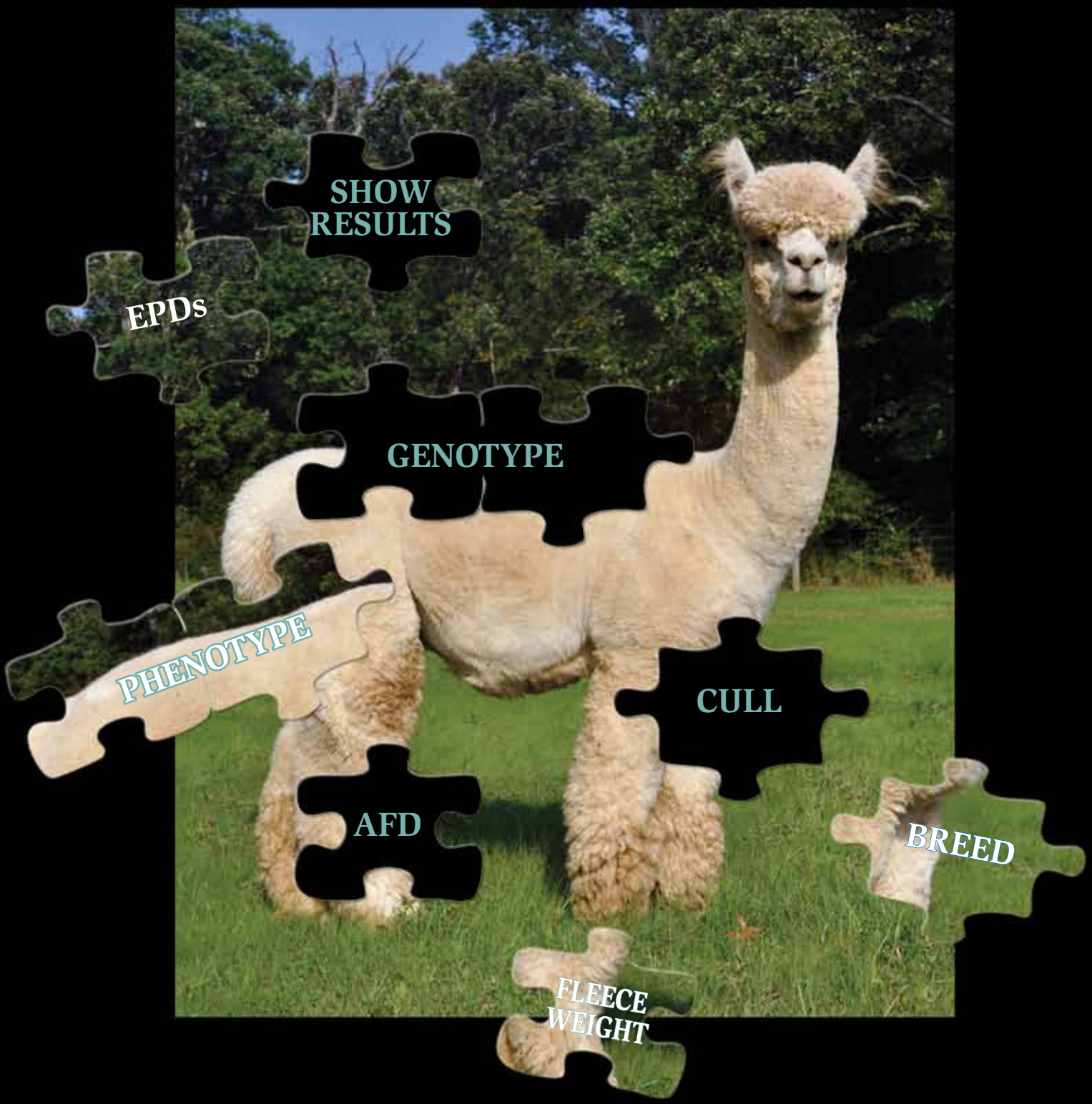


Illustration concept courtesy of the author, photo by Jennifer Clark

BY JOHN HEISE

One day, fifteen years ago, my wife and I made the decision to raise alpacas. As a business owner with no livestock experience, reality quickly set in. Alpacas were (and still are) expensive. Being prone to panic, I remember my concerns—why would anybody would be interested in buying animals and fiber from us or in doing business with our "brand?" Our initial and continual focus has been on how we could develop and establish value in our herd and compete in the marketplace. Right from the start we relied on science.

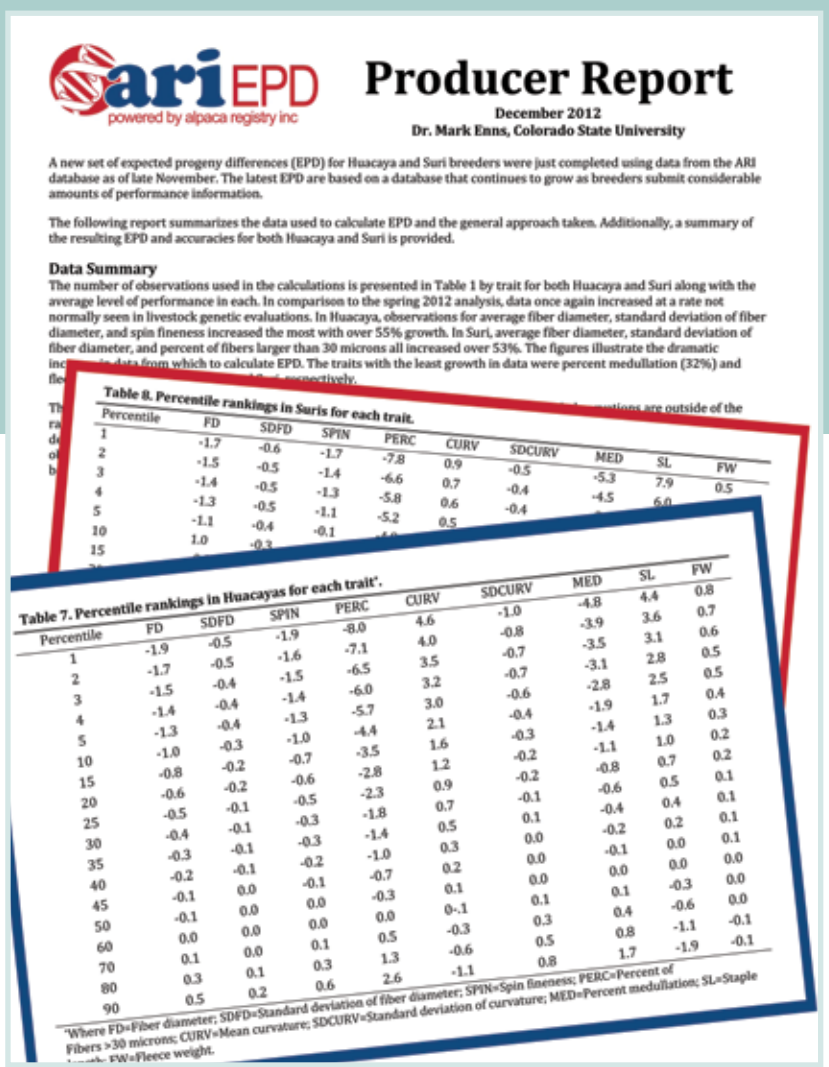
At the time we started raising alpacas, the "new" science in the industry was histograms. Back then, few breeders would acknowledge they did histograms, and even fewer provided the results if they did. Many breeders claimed histograms were a waste of time and money, and dismissed them as being unreliable and too complicated. We saw histograms as a key component to successfully competing in this market. Histograms gave us credibility. They provided a clear, unbiased way that we could demonstrate how our animals compared to others on the market, and they helped established value for our "brand."

Today, Expected Progeny Difference(s), EPDs, are the "new" science in the alpaca industry. The same process of acceptance and transparency is repeating itself, just as it did with histograms. New and existing breeders are catching on. EPDs provide credibility and help establish value.

We have participated in an EPD program with all of our breeding stock for over six years. We discovered the EPD program provided much more information and guidance than we ever anticipated. Not only has it helped us make better decisions and improve our herd, but it also opened the door for marketing opportunities to new and existing breeders who are interested in establishing themselves in today's alpaca industry. EPDs also give the alpaca community credibility and generate interest among other livestock breeders.

Photo courtesy of the author

Expected Progeny Differences (EPDs) provide enhanced scientific information on which to base breeding decisions for herd improvement.



ari EPD
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Producer Report

December 2012
Dr. Mark Enns, Colorado State University

A new set of expected progeny differences (EPD) for Huacaya and Suri breeders were just completed using data from the ARI database as of late November. The latest EPD are based on a database that continues to grow as breeders submit considerable amounts of performance information.

The following report summarizes the data used to calculate EPD and the general approach taken. Additionally, a summary of the resulting EPD and accuracies for both Huacaya and Suri is provided.

Data Summary

The number of observations used in the calculations is presented in Table 1 by trait for both Huacaya and Suri along with the average level of performance in each. In comparison to the spring 2012 analysis, data once again increased at a rate not normally seen in livestock genetic evaluations. In Huacaya, observations for average fiber diameter, standard deviation of fiber diameter, and spin fineness increased the most with over 55% growth. In Suri, average fiber diameter, standard deviation of fiber diameter, and percent of fibers larger than 30 microns all increased over 53%. The figures illustrate the dramatic inc... data from which to calculate EPD. The traits with the least growth in data were percent medullation (32%) and fle... respectively.

Th... ...ations are outside of the ra... d... o... b...

Table 8. Percentile rankings in Suris for each trait.

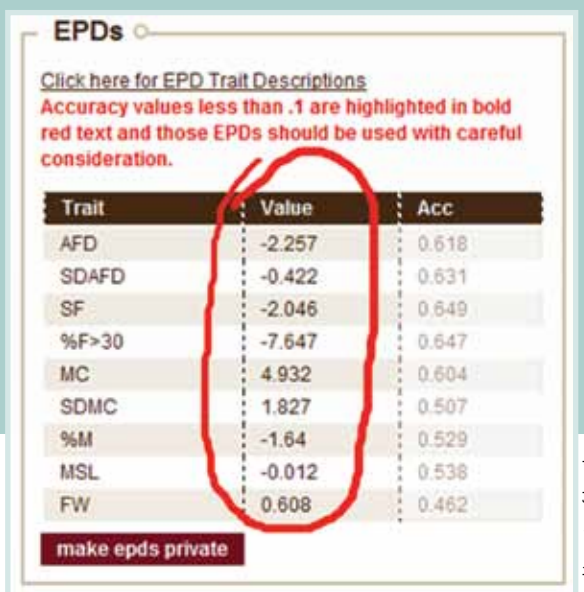
Percentile	FD	SDFD	SPIN	PERC	CURV	SDCURV	MED	SL	FW
1	-1.7	-0.6	-1.7	-7.8	0.9	-0.5	-5.3	7.9	0.5
2	-1.5	-0.5	-1.4	-6.6	0.7	-0.4	-4.5	6.0	
3	-1.4	-0.5	-1.3	-5.8	0.6	-0.4			
4	-1.3	-0.5	-1.1	-5.2	0.5				
5	-1.1	-0.4	-0.1						
10	1.0	-0.3							
15									

Table 7. Percentile rankings in Huacayas for each trait'.

Percentile	FD	SDFD	SPIN	PERC	CURV	SDCURV	MED	SL	FW
1	-1.9	-0.5	-1.9	-8.0	4.6	-1.0	-4.8	4.4	0.8
2	-1.7	-0.5	-1.6	-7.1	4.0	-0.8	-3.9	3.6	0.7
3	-1.5	-0.4	-1.5	-6.5	3.5	-0.7	-3.5	3.1	0.6
4	-1.4	-0.4	-1.4	-6.0	3.2	-0.7	-3.1	2.8	0.5
5	-1.3	-0.4	-1.3	-5.7	3.0	-0.6	-2.8	2.5	0.5
10	-1.0	-0.3	-1.0	-4.4	2.1	-0.4	-1.9	1.7	0.4
15	-0.8	-0.2	-0.7	-3.5	1.6	-0.3	-1.4	1.3	0.3
20	-0.6	-0.2	-0.6	-2.8	1.2	-0.2	-1.1	1.0	0.2
25	-0.5	-0.1	-0.5	-2.3	0.9	-0.2	-0.8	0.7	0.2
30	-0.4	-0.1	-0.3	-1.8	0.7	-0.1	-0.6	0.5	0.1
35	-0.3	-0.1	-0.3	-1.4	0.5	0.1	-0.4	0.4	0.1
40	-0.2	-0.1	-0.2	-1.0	0.3	0.0	-0.2	0.2	0.1
45	-0.1	0.0	-0.1	-0.7	0.2	0.0	-0.1	0.0	0.1
50	-0.1	0.0	0.0	-0.3	0.1	0.0	0.0	0.0	0.0
60	0.0	0.0	0.0	0.0	0-.1	0.1	0.1	-0.3	0.0
70	0.1	0.0	0.1	0.5	-0.3	0.3	0.4	-0.6	0.0
80	0.3	0.1	0.3	1.3	-0.6	0.5	0.8	-1.1	-0.1
90	0.5	0.2	0.6	2.6	-1.1	0.8	1.7	-1.9	-0.1

'Where FD=Fiber diameter; SDFD=Standard deviation of fiber diameter; SPIN=Spin fineness; PERC=Percent of Fibers >30 microns; CURV=Mean curvature; SDCURV=Standard deviation of curvature; MED=Percent medullation; SL=Staple ... FW=Fleece weight.

EPDs provide a snapshot of the genetic profile (genotype) of an animal, and describe how the resulting offspring will perform against the rest of the animals in the breeding program.



EPDs

Click here for EPD Trait Descriptions

Accuracy values less than .1 are highlighted in bold red text and those EPDs should be used with careful consideration.

Trait	Value	Acc
AFD	-2.257	0.618
SDAFD	-0.422	0.631
SF	-2.046	0.649
%F>30	-7.647	0.647
MC	4.932	0.604
SDMC	1.827	0.507
%M	-1.64	0.529
MSL	-0.012	0.538
FW	0.608	0.462

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Graphics courtesy of the author

At first glance, EPD data can appear complex. But we quickly realized that EPDs are profoundly simple to use; they are only complicated to develop. Probably the most confusing aspect of EPD data is grasping what it actually depicts. Because EPDs describe traits frequently measured on a histogram, many view EPDs as another kind of histogram. They are not.

Since histograms are used to develop EPDs, it's natural to assume the results of an EPD calculation will refer to the phenotype of the animal they are attached to. They do not. Histograms measure the visible fiber characteristics (phenotype) of an animal on that day. EPDs reveal the genetic profile (genotype) of an animal for its life. EPDs describe how the resulting offspring in a breeding will perform against the rest of the animals in the program.

You may find it easier to think of EPDs as road maps or GPS. While histograms tell you where you've been, EPDs will reveal where you are going. EPDs describe the genotype of an animal by predicting the pheno-

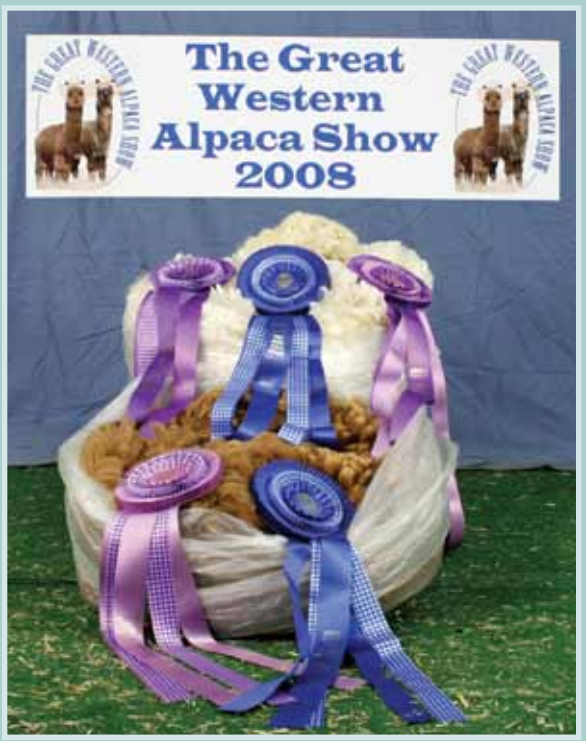

Photo courtesy of the author

Fleece and halter shows provide valuable feedback about the animal's phenotype, or visible characteristics, while EPDs offer insight into their potential to pass those traits on to the offspring.

type of their offspring. EPDs are the most advanced breeding technology in use within all livestock industries today. They have changed how other livestock industries do business. In fact, EPD data is being used to not only justify the genetic value of seedstock, but to improve the bottom line of commercial production herds. EPDs will change the future of alpaca industry.

Arthur C. Clark, the author of "*2001, A Space Odyssey,*" wrote that "Any sufficiently advanced technology is indistinguishable from magic." EPDs fit that description. We've experienced what they have done to transform our herd for the better.

Success in a livestock breeding program is principally the result of only two basic decisions. The first decision is selecting a breeding animal and the second ongoing decision is how that animal will be bred. These decisions entail evaluations and comparisons. Until now, alpaca selection strategies have mainly relied upon phenotype, or how an animal looks. Progress is slow and unpredictable when selection is based upon phenotype (breeding like to like or like to unlike). Inbreeding can speed up the process; however, it is generally not advised to do on a large scale. Selection based upon phenotype makes it difficult to select and improve on more than just a few traits. EPDs provide the quickest, clearest path to achieve desired goals for as many traits as can be measured.

Today's alpaca buyer is much more informed than in the past. Also, buyers today are more focused on what they want to do in the industry: some want to be involved with the show system, others are more focused on fiber production and many are buying alpacas for a hobby or "backyard" family project. Each of these buyer perspectives can benefit from the EPD program. Breeding programs that utilize EPDs are able to identify the best marketplace for that particular animal. EPDs may be the saving grace for many males that just didn't have that "wow" fleece to impress the judges, but their superior genetics can now be used to improve someone's herd.

In the past, buyers found a level of comfort in purchasing registered alpacas based upon ARI's DNA-based registry. Today, a breeder who provides a buyer with EPD data is providing additional transparency and value based upon objective data. The seller is also providing his customer with tools they can continue to use to reach their goals. Even without any previous livestock experience, EPD's provide new breeders with the means to understand what they are selecting. EPDs provide a level playing field for existing breeders and support sound decisions for novice buyers.

Photos courtesy of the author

To be successful in the alpaca breeding market, it is imperative to develop the genetics capable of meeting the demands of the mature fiber market. We are just starting to see glimpses of what that market will require. Greater attention needs to be placed on improving multiple traits. Breeding programs that can predictably meet those expectations will be successful, but the key to that process is starting with realistic expectations.

Having a clear and accurate understanding of what an animal is capable of producing is absolutely paramount. I am reminded of a novice breeder who insisted upon purchasing a very expensive breeding with a well proven and documented herdsire for his relatively unimproved female with a mostly unknown pedigree. Despite recommendations that his money could be put to better use, the breeding occurred as requested. While the resulting offspring was a great improvement over the dam, it did not meet the high expectations that had developed in that breeder's mind.

Today, with the use of EPDs, breeding outcomes are very predictable. Not only would the novice breeder have been able to project the results for several traits, he also would have been able to compare additional, less expensive options which would still have allowed him to reach his goal. Most importantly EPDs would have provided realistic expectations. Through the use of EPDs, future generations and herd production can be planned and projected with a pencil and paper using simple math. EPDs not only "get rid of the guess," they save time and money.

All animals participating in the EPD program receive predictions in the form of numeric values for each trait being tracked in the program. Currently there are nine traits being tracked in the ARI-EPD program. These numeric trait values are useful in making breeding or purchase decisions. When making a purchase or breeding decision based on EPDs, it is helpful to use the information from different perspectives. EPD trait values can be expressed in two ways: a Numerical Trait Value and secondly as a Percentile Ranking of that trait value.

Because EPDs capture all of the data from a histogram, they are useful in maximizing multiple positive fleece characteristics in offspring.

The Numerical Trait Value is the number most commonly seen when trait characteristics are being described in terms of EPDs. It is the calculated prediction of how a trait will occur in the alpaca's offspring as it differs from the group average. The Numerical Trait Value is used to make specific judgments that will be of best use when comparing mates and selecting your breeding pairs.

Percentile Ranking of a trait value provides a simple comparison of how that particular trait ranks among the tested population. This is similar in concept to how someone is ranked academically in their class. Each Numerical Trait Value will have a corresponding Ranking Percentile that it falls within. Currently the ranking percentile is only available in the "Producers Report." I understand ARI is planning to add the Ranking Percentile, along with the Trait Numerical Value, in the next EPD computation later this year. Once the ranking has been established, it becomes clear whether that trait should be improved or maintained when planning the next breeding. Ranking provides a quick, clear picture of where an animal fits within the tested population.

Gone are the days when a simple histogram and pedigree are able to provide all the information needed to make sound breeding or purchase decisions. Top breeding stock is easily identified as that which has the capability to improve or maintain multiple traits for most of the alpaca population. However, above average breeding stock (the top fifty percentile) can be utilized to improve below average traits. EPDs identify

It is imperative to develop the genetics capable of meeting the demands of the mature fiber market.

Photo courtesy of the author

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those animals available to get the most improvement and provide the breeder an accurate assessment of value based upon the likely end result.

Currently, EPD data only provides a picture of what fiber qualities can be passed on to the next generation. Additional heritable traits related to reproduction are planned to be added to the ARI EPD program in the future. EPDs won't necessarily disqualify an animal from breeding; they do help identify how an animal can be put to best use. However, EPD's are unable to help with all the decisions a breeder needs to make for each breeding. Breeder assessment and awareness is still needed to address conformation issues and genetic disorders. The "Art of Breeding" is still very much in play for those looking to be rewarded in show ring, where selection is based upon visual assessment of character and uniformity as well as other qualities.

The science behind EPDs is not new. It is the same science used in a sound studio to remove unwanted noise in a recording. When this science is used with genetics, it is able to distinguish what is relevant data and what is not. It is able to identify cheating and credit where credit is due. EPDs enable valid comparisons of animals of the same breed regardless of age, sex or location. In the future, as our alpaca industry matures, EPDs can incorporate DNA markers of specific traits, providing quicker and higher accuracies. Eventually the show system may even incorporate EPDs, in addition to the qualities now being judged.

The North American alpaca industry is at yet another crossroads as it grows and matures into a production livestock model. Demand for natural fiber is growing and sustainable farming practices are favored. Are we working hard enough to help meet those demands and expectations? How does our industry measure up? Are breeders and producers making enough headway towards meeting that demand?

As with most things in life, the hard part isn't in the knowing… it's in the doing. However, it sure helps to know what you're doing before you do it.

John Heise and his wife, Cynthia Fronk, own and operate Stargazer Ranch Alpacas in Loveland, Colorado. They have been raising alpacas for fifteen years and are very active with education and new breeder mentoring. More information about EPDs can be found on their website, www.alpaca.net.