



NSIP Fact Sheet NSIP-001-01

Accuracy (ACC) – What Is It?

What is Accuracy?

In the NSIP world, an Accuracy value tells you how much confidence you can put in an EPD. You will see the abbreviation ACC on all NSIP genetic evaluation reports. ACC is short for Accuracy and is usually at the top of one or more columns in these reports. Every EPD will have an Accuracy value located just to the right of it.

Accuracy values range from 0 to 1. Higher accuracy values are better. A zero Accuracy means just what you think it means – the EPD is not very reliable. Accuracy values that approach 1.0 mean two things: (1) that the associated EPD is very reliable because that EPD closely predicts the actual genetic value of the animal, and (2) that the EPD value will be very stable (i.e. not change much) when more data is included in future calculations.

Accuracy value is a very practical tool: it allows you, as a producer, to evaluate the reliability of an EPD for a particular animal and also to manage the risk associated with the genetic estimate. Accuracy values simply give us a useful gauge on how much faith we can put into the associated EPD.

Rule of Thumb:

In general, Accuracy values can be considered as follows:

less than 0.20low

0.21 to 0.40.....medium

greater than 0.40.....high

Some Practical Tips Regarding Accuracy:

1. ACC values are not EPDs! An EPD is an estimate of an animal's genetic merit. An ACC value simply tags that number with a measure of reliability.
2. Young rams who have few progeny will generally have lower ACC values than older rams who have more progeny or records.
3. An EPD with a low ACC value will more likely show a greater fluctuation (it may increase or decrease over time) than an EPD with a higher ACC.
4. For any single trait, an animal's ACC values can *never* decrease. If you see ACC values decrease, contact your breed data coordinator or NSIP personnel.
5. Primary selection should be based on superior EPDs. If EPDs are equal, then use the individual with the higher ACC.
6. Be careful about widespread use of rams with low ACC values. Use Accuracy values to manage your risk. Hedge your selection choices by using these rams on only a few ewes to obtain progeny information.
7. Don't be discouraged about low ACC values. Even with low Accuracy values, EPDs are still our best tool to identify and select good breeding stock. EPDs are far more accurate than any ratios or performance-based indexes.

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An Example:

Let's say that we want to know the genetic merit of a ram for its weaning weight. What information could be used to calculate this EPD?

First, we can measure that ram's own weaning weight. This will give us one important piece of information. However, although this individual weight is obviously valuable, *it is still only one piece of information*. Weight is affected by many things that are not genetic. Consider this: what would have happened if our ram had suffered a mild case of coccidiosis during its first few weeks of life? Would that health problem have affected its growth rate? Coccidiosis, of course, would not have altered its genetics **C** which we are trying to estimate **C** but it surely could have affected its weaning weight, which is the only thing that we measure. Therefore, using *only* this one piece of information to estimate our ram's genetic merit may not be very reliable, even though it is our only piece of information. The NSIP computer would still conscientiously use this single weight to calculate an EPD, but the associated ACC (Accuracy) value would only be around 0.08.

Where could we get additional information about this ram's genetic value? If we kept this ram in our flock, after a year, it would have hopefully sired some progeny, all genetically linked to him. Wouldn't weight records from these progeny provide some genetic information about our ram? Of course, a weaning weight from a single individual progeny wouldn't be as good as the weaning weight of the actual ram itself, but what if we had 10 such progeny weights? Wouldn't those weaning weights indicate an underlying genetic pattern?

Yes **C** this is what happens in NSIP. The NSIP computer can incorporate these progeny weaning weights into its EPD calculations for that ram. This sophisticated method provides a more complete picture about our ram's genetic merit. We could be more confident in the value of the genetic estimate. This new information may or may not change the actual numerical value of the EPD, depending on many things. However, the Accuracy values would definitely increase, to say, 0.20, because we had more information about the ram than we had before.

Let's expand this strategy: What if we took weaning weights on all its progeny *over five years*? Wouldn't we have even more information? Let's assume that our ram had 20 progeny in his flock for each of five years. (Of course, no lambs die in our hypothetical flock.) *Thus, after five years, we would have a total of 100 progeny values for weaning weight*. When the NSIP computer now calculates the EPD for our ram, the Accuracy would be considerably higher ... at least 0.50.

We shouldn't forget our ram's own sire and dam! These animals are obviously closely related to our ram, so why couldn't their weaning weights also be used in the EPD calculations? Then, while we're at it, we could also incorporate weaning weights from all *their* progeny, over as many years as we have data. (In fact, it is precisely these records of our ram's relatives that are used to calculate our ram's EPD before it has any performance records of its own, or if for any reason its own records cannot be used). And then we do the same for *all* the NSIP flocks that are linked to this ram's flock. The weaning weights of animals in these flocks provide *some* genetic information about our ram.

You get the picture. Each time we link more data into the EPD equation, the Accuracy value improves.

How Do Accuracy Values Improve?

Simple: by giving NSIP more information with which to calculate the EPD. The more performance information used for an EPD calculation, the more confidence we can have in the value of that EPD. We accomplish this by including records from related sheep, linked flocks (flocks containing related sheep), accumulating records over multiple years, using the same sire for more ewes, etc.

Basic Concepts:

NSIP Accuracy values reflect the possible changes in an EPD that you can expect as additional information becomes available. Low accuracy values indicate that you can expect a relatively large possible change in the EPD as additional information becomes available. High accuracy values indicate that you can expect little change in the EPD as additional information becomes available.

Here is a practical example: Let's say that you are considering buying a ram with an EPD of +2.0 lbs for weaning weight. Remember that an EPD is an *estimate* of an animal's genetic value. How reliable is this estimate? That is, how closely does this number estimate the true EPD? You should look at the Accuracy value for an answer. If the Accuracy (ACC) associated with this EPD were only 0.10, we could expect a relatively large fluctuation in the EPD as more information is collected (i.e. the EPD could potentially range from approximately -0.1 to +4.1. Note that it is still nearly always greater than zero). If, on the other hand, the Accuracy (ACC) were 0.50, we could expect that the EPD would change relatively little as more information is collected (i.e. it could potentially range from approximately +0.8 to +3.2). This explains why, when you must select from animals with equal EPDs, you should try to choose the individual with the higher ACC.

For Further Information:

SID Sheep Production Handbook, Breeding Chapter.



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