

# Making Good Progress on your Genetic Goals: Part 1: Accuracy & Genetic Component

By James Morgan, Arkansas Katahdin breeder

To assess progress in a seedstock program, you need to develop an effective genetic goals statement, and then regularly evaluate and improve it. Picture yourself, early in your career, writing a statement like the following one:

My goals are to breed a Katahdin Flock that has excellent growth, is structurally correct, never gets out of the fence, is scrapie resistant, weans bigger twins, has no dystocia (lambling difficulties) and no vaginal prolapse, excels in loin eye area, never needs foot trimming, never has bottle lambs, excels in shedding, shows good mothering, makes efficient weight gain, provides superior genetics for a profitable commercial meat industry, is parasite resistant, never has triplets and never singles, never has pneumonia and is in the top 10% of the breed for each of these traits.

A friend would say: "And you want them to solve quadratic equations too?"

One goal slipped in that is not a specific genetic goal and does not belong. The phrase, "provide superior genetics for a highly profitable commercial sheep meat industry" is not a specific goal. It needs to be removed. But, keeping that broad mission in mind, each individual part of the goal statement can be evaluated for its impact on "genetics that affect profitable sheep meat production".

A goals statement listing that many traits would not hold up with experience, but examining it closely provides a teaching opportunity. Each of the above selection traits needs to be evaluated based on the following questions:

- does the trait have sufficient heritability and variability within the breed or my flock?
- where does this individual trait rank in my goals (rate of improvement decreases with increasing numbers of traits)?
- can this trait be realistically selected for?
- is the trait best improved by chang-

es in management or changes in genetics?

- is the goal written so that that progress can be quantified? and
- can the trait be accurately measured?

First, do all of the traits in the ideal flock have a genetic component? If there is no genetic component to the trait or behavior, then selecting for or against it won't improve your flock's genetics. There is a genetic component to each phrase in the goals statement. That does not mean that a shepherd can make significant progress on every one of the component goals, but they do have a genetic component. Summary: No parts of the goals statement need to be removed because they do not have a genetic component.

Second, goals need to be realistic. The word "never" is a red flag and that part of the goal is probably not realistic. Bottle lambs are caused by many factors including disease, mothering and management. We suggest that improving the genetics for mothering or increasing resistance to mastitis may be more appropriate parts of the goal. "Never have pneumonia" could be replaced by "selecting for genetics with increased resistance to respiratory diseases". And, "never have dystocia" could be changed to "a flock with a frequency of dystocia of less than 2%". Summary: All the "never" statements should be replaced or reworded to be realistic goals.

Third, several of the goals are most effectively improved by changes in management. Pneumonia and vaginal prolapse are strongly affected by management. Feeding hay with too little nutrient value to small pregnant ewe lambs (less than 80 lbs) late in gestation can result in 30% or more incidence of vaginal prolapse. Improving nutrition and avoiding breeding really small ewe lambs are effective controls. If management results in having 30-50% of ewe lambs with vaginal prolapse, it creates a situation where effective genetic selection can occur but also creates a nightmare and shepherds cannot tolerate that much agony. Improvement in management rather than genetics is a better choice for that trait. When an event occurs in

less than 15-20% of the population, it is hard to make progress. Decreasing dust and ammonia and increasing air flow would be much more effective than making significant progress in genetics for pneumonia resistance. A more effective genetic goals statement would remove resistance to pneumonia and vaginal prolapse.

Fourth, evaluate goals for the ability to accurately measure differences in the trait. The less accurate the measurement, the harder it is to separate superior performance from mediocre and mediocre from inferior performance. This is more than just having a scale that repeatedly weighs an animal the same. If a shepherd weighs 20 lambs, some will have just drunk a quart of water (2 lbs) and others will have excreted urine or feces recently, all of which affects accuracy of the weight of the animal. If a shepherd is weighing every week to two weeks, 2-3 lb error is very significant. Efficient weight gain is an example of a goal that is hard to measure. Efficiency of feed conversion is usually measured by putting each lamb in its own stall and weighing feed consumed, excretion and weight gained. Efficient weight gain, while very important to meat production and profit, required research stations. "Efficient weight gain" should probably be removed from the genetic goals statement.

Fifth, most goals need to be quantifiable so that progress can be measured. Goals in the draft statement that need reworking include: excellent growth, bigger twins, excels in loin eye area, excellent shedding and so on. Excellent growth could be changed to 80% of lamb crop reaches 110 pounds in 150 days. Or if your market is 80 pounds the phrase might read, "read 80% of the lamb crop reaches 80 lbs in 125 days". These weight goals can be measured and progress can be evaluated, however there is an important "But!" Growth is very impacted by the quality of nutrition, heat stress and other environmental factors. In fact, only 10% of 60 day weight, 20% of 120 day weight and 40% of 240 day

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weight is genetic. The rewritten goals for weight gain should reflect that this factor is more affected by changes in management than by genetics. The goal writer can come up with a combination statement of management and genetics or just set a genetic goal for weight gain such as "top 10% of the breed for weight gain".

Let's rework the goal statement to fix the identified wording problems and make the components more re-

alistic and achievable, before further evaluation.

My genetic goals are to breed a Katahdin Flock that a) is in the top 10% of the breed for weight gain to 120 days, loin eye area, parasite resistance and b) is structurally correct, resistant to scrapie, averages 200% lamb crop that is 90% twins, averages less than 3% bottle lambs/year, require hoof trimming no more than once every two years, shed completely, has a fre-

quency of dystocia of less than 2.5% per year.

*Note: This article to be continued in the next issue of the Katahdin Hairald. The new goals statement is better, but still needs substantial editing and evaluation to make it an effective working goal. There are still too many traits to make progress on all of them. In the next issue, I will discuss heritability and environment, rate of improvement and making progress on lowly heritable traits. We'll also finish a better genetic goals statement.*

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