Using EBVs to Select Replacements
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Now that you have a better idea of what EBVs are (see Spring 2013 Hairald), how can you use them in your flock? One of the primary uses of EBVs is in selection. Remember, selection *is the act of carefully choosing something as being the best or most suitable*. Whether you're selecting replacement ewe lambs or a new flock sire, the principles are the same. You'll want to choose the highest quality animal that suits your management system. We'll outline the basic procedure here, then talk about individual traits, and give an example.

Start by reviewing the goals you have for your flock, as well as your market, resources and management style, so you will be better prepared to make sound selections. Then it's time to sit down at the kitchen table and review your records. We're focusing on EBVs here, but don't forget about other important records that will help you to decide which animals best fit your criteria. As you review your most recent LambPlan analysis, consider your flock's strengths and weaknesses. Realize that no flock (or animal) is perfect. By objectively identifying areas in need of improvement, you can make better decisions on how to move your flock forward. Focus on areas of weakness you want to improve without going backwards on areas of strength. We're looking at relative differences between animals and/or compared to the average numbers for the breed in each trait, rather than focusing on specific values for each trait. While still at the table, identify the animals that best meet your criteria, selecting 20-25% more animals than the number of replacements you need.

Now, it's time to go to the barn for visual appraisal and final selection. Only consider the animals you've identified on paper. If you've done your initial selection well, you'll be looking at animals that have the highest potential to move your system forward, and won't be distracted by animals that may be equally attractive, but not necessarily suitable for reaching your goals. From the group you've identified as "potential replacements", you can now narrow the selection down to the number you need based on physical criteria – structural correctness, phenotype, better coat, preferred color, etc.

EBVs are simply tools to help you identify an animal's genetic potential for different traits. It shouldn't be a contest to see who has the highest numbers, but rather a process for choosing animals that will complement your management and available resources. Remember, management refers to the time, labor, and resources you will have available throughout the year for the maintenance and care of your sheep. Selecting for certain traits may require more resources than you have available.

Let's review which traits have EBVs available and what they mean.

The Birth Weight EBV (BWT) is predictive of birth weight. The bigger the number, the larger the lambs will be at birth. Extreme birth weights haven't been much of an issue in Katahdins thus far.

Maternal Weaning Weight EBV (MWWT) reflects genetic differences in ewe milk production, but other aspects of mothering are also involved. A higher number generally indicates more milk production and/or higher quality of milk. A higher number may be required in low input systems for ewes raising multiples. Over-selecting for this trait could lead to mastitis problems in high input systems.

Growth EBVs are used to select lambs that will reach your target market weight based on the resources you have available and your management system. **The Weaning Weight EBV (WWT)** provides an estimate of pre-weaning growth potential, whereas the **Post-weaning Weight EBV (PWWT)** predicts growth potential after weaning.

The Number of Lambs Born (NLB) evaluates the genetic potential for prolificacy (number born per litter), while **Number of Lambs Weaned (NLW)** evaluates the ewe's effects on prolificacy and lamb survival to weaning. Selecting for higher prolificacy has the advantage of increasing the number of lambs marketed; however in some systems more triplets will also require more labor and resources. It's generally better to have the NLW EBV higher than the NLB EBV since it reflects a ewe's ability to raise multiple lambs to weaning.

Parasite resistance is measured by the **Weaning and Post-weaning Fecal Egg Count EBVs (WFEC & PFEC).** These EBVs evaluate the genetic merit for parasite resistance based on worm egg counts recorded at weaning and/or post weaning age. Lower numbers reflect fewer parasite eggs, thus less vulnerability to parasitism. *With these two EBVs a negative number is actually desirable.*

Finally, the USA HAIR Index EBV – also called the Katahdin Index or **Ewe Productivity Trait (EPT)** – combines EBVs for both growth and maternal production traits into one composite index. It gives substantial

positive weight to Number of Lambs Weaned (NLW), Maternal Wean Weight (MWWT) and Weaning Weight (WWT) EBVs. While single trait selection should be avoided, this is the one exception, since it's an index and not a specific trait. Selecting on this EBV alone, over time will improve the productivity of your flock.

If all this sounds confusing, think of EBVs as radio dials. Each trait can be tuned up or tuned down depending on your management and available resources. For instance, if you have a parasite problem, you may want to select animals with a negative number in WFEC. Or, if your system doesn't support triplets, you might only consider animals with an average or lower NLB EBV. Be aware though, selecting hard for any single trait (or single trait selection) often comes at the expense of other important traits. Your best bet is nearly always to select balanced animals, or animals with EBVs at least average in all the measured traits. Then look for animals that are above average or superior in one or two traits you need. This is especially important when selecting a herd sire since his genetics can affect the entire lamb crop. An unbalanced sire with extreme EBVs in either direction can have lasting negative effects.

Here are a few examples of how to apply these principles of selection:

Flock XYZ is in a low-input, grass-based system that currently has too many triplets, too many orphan lambs, and lower than average weaning weights; the MWWT average in this flock is -0.4. Flock QRS on the other hand, prefers to lamb in winter and has the ability to finish lambs in the barn on grain, so triplets are a bonus in this system. When selecting a herd sire, the following rams are being considered:

	BWT	MWWT	WWT	PWWT	WFEC	PFEC	NLB	NLW	US HAIR
Ram A	.2	.5	1.9	2.3	22	47	23	24	107.2
Ram B	.5	1.1	2.1	3.2	-2	-12	4	8	105.9
Ram C	-.2	-.4	2.6	4.1	-70	-58	12	6	103.8

Let's look at each ram. Ram A has too much prolificacy for Flock XYZ since one of their goals is to reduce the number of triplets born. Also, since this flock is grass based, the higher numbers for WFEC and PFEC (indicating less parasite resistance) could be a problem. However, Ram A could be the perfect fit for Flock QRS where higher prolificacy is desired and lambs will be finished in the barn, thus parasite resistance is of less importance.

Ram B would be a good fit for Flock XYZ. He is balanced in all traits and has the potential to improve survivability because of the higher milk EBV's and weaning percentage. This ram will also improve weaning and post weaning weights, while minimizing the number of triplets and quadruplets born to his daughters.

Ram C may not be the best fit for either of these two flocks, but because of his good growth and parasite resistance, might be a good fit for another flock. Keep in mind that all of these rams may have the potential to be good herd sires, with different strengths and weaknesses, depending on the needs of a particular flock. That's the beauty of EBVs, you can use them to fine tune your flock by turning up or turning down certain traits to fit your needs.

So, whether selecting replacements from this year's lamb crop or purchasing new animals, it's important to keep in mind your flock goals and the traits that will help you reach those goals depending on your management system and resources. Next, use EBVs to help identify those animals that are the best fit for your system before making your final decision based on visual appraisal. The most suitable animals are usually the ones that are balanced: good EBVs, good temperaments, and good looks!