








Understanding Opportunities
with NSIP
Part 1: NSIP Update
January 9, 2016
David Notter



NSIP to Increase Profits




- National Sheep Improvement Program
 - “A profit driven genetic selection tool”
- Our Mission:
 - To provide predictable, **economically important genetic evaluation** information to the American sheep industry by converting performance records into relevant decision-making tools.



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NSIP to Increase Profits

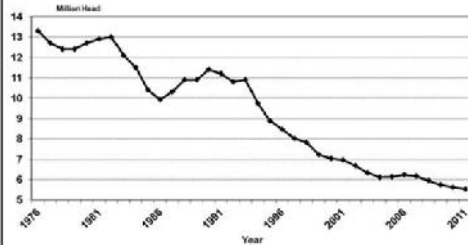
- Why do we need a profit driven genetic selection tool for U.S. sheep?



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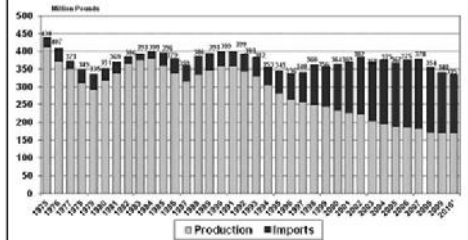
Why do we need a profit driven genetic selection tool for U.S. sheep?

Figure 1: U.S. All Sheep/Lamb Inventory 1976-2011 January 1 Inventory



Source: USDA-NASS, Sheep and Goats Report, January 28, 2011

Figure 3: U.S. Lamb and Mutton Supply 1975-2010'



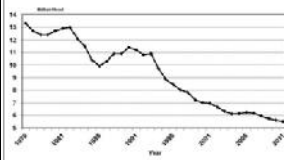
Source: Livestock, Dairy, & Poultry Outlook Report, June 27, 2010

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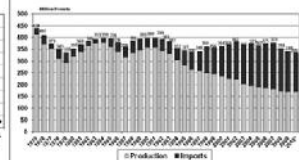
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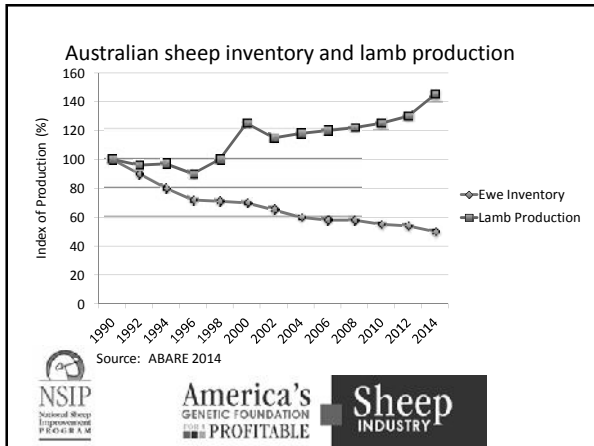


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Importance of Genetic Selection

- U.S. Sheep Industry Roadmap
- Productivity Improvement
 - Wider adoption of Quantitative Genetic Selection
- Genetics are the foundation to build upon

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Importance of Genetic Selection

Phenotype = Genetics + Environment

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How do we Get EBVs?

- Step 1: Measure phenotypic traits of animal
 - Body weights
 - Carcass measurements
 - Reproduction
 - Wool Traits



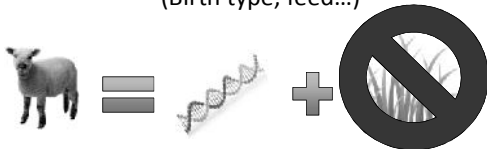
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Adjust for Variation

- Step 2: Account for environmental differences (Birth type, feed...)



Phenotype = Genetics + Environment



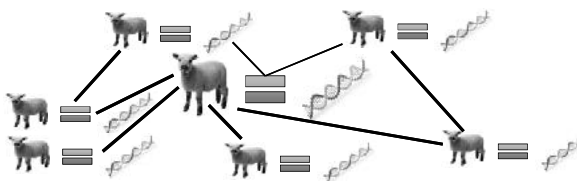
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Analyze pedigrees

- Step 3: Compare animal to all of its relatives



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Analyze Pedigrees

- An individual's performance is compared to every known relative
 - Including relatives in other flocks
- Adjust for genetic relationship (shared genes) and heritability of each trait



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How do we Get EBVs?

- Isolate the genetic differences between animals
 - Account for known sources of variation
 - Compare to all related animals
- Assign numeric value to genetic merit



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The Power of NSIP

- Because environmental differences are eliminated and pedigrees are analyzed, EBVs are more powerful than:
 - Raw data
 - Adjusted weights
 - Ram tests




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The End Result


Sires	Animal ID	Breeding	Prog Fks	Birth Wt				Weaning Wt				PFat	Pemd	Yfd	Ugfr	HLB	KLM	Fec	USA
				kg	kg	kg	kg	kg	kg	mm	mm								
	630074-2006-WR1157	0.9%	323.5	0.3	1.5	2.7	2.7	9.9							4.0	37	28	1.0	122.7
	WOODHILL		Ass: 95	96	94	93	93							80	91	88	40		
	630075-2013-EJ061X	0.9%	25.1	0.4	1.3	2.1	2.1	4.9							46	41			122.7
	ELM CREEK		Ass: 78	81	74	85	89							15	47				
	630062-2013-L1090Z	0.9%	1014	0.4	1.4	2.8	2.9	7.0							44	40			122.6
	LAMBSHIRE		Ass: 80	80	89	77	89							22	57				
	630062-2013-L3123W	0.3%	88.2	0.3	1.2	2.1	2.2	5.3							90	33			119.1
	LAMBSHIRE		Ass: 81	80	77	87	79							32	89				
	630098-2013-RP1388	4.1%	22.2	0.4	1.3	1.3	2.1	2.1							31	27			117.9
	HENKE FARMS		Ass: 77	86	73	88	73							43	85				
	630098-2013-RP1303	1.2%	28.1	0.1	1.9	1.1	2.9	2.4							33	28			112.2
	HENKE FARMS		Ass: 79	80	78	82	73							69	64				
	630075-2012-EJ0498	4.9%	87.4	0.6	1.4	1.7	2.3	2.4							26	26			116.9

The Good News?

- You don't have to worry about doing any genetic calculations!
 - NSIP takes care of all the work
- Enrolled flocks just submit measures and EBVs are returned



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What Traits are available?

- Weight:**
 - Birth
 - Weaning
 - Post Weaning
 - Yearling/hogget
- Carcass:**
 - Eye muscle
 - Fat depth
- Fecal Egg Count
- Fleece:**
 - Fleece Wt
 - Fiber Diameter
 - Staple length
 - OFDA histogram traits
- Reproduction:**
 - No. lambs born
 - No. lambs weaned
 - Scrotal circumference



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What Traits are available?

- Production Indexes Combines multiple traits into 1 EBV:
 - Carcass Plus
 - USA Maternal
 - USA Hair
 - USA Range






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Importance of Ram Selection

- Rams represent half of the genetics of the next lamb crop
 - Market lambs
 - Replacement ewes
- Does NSIP really improve genetics?





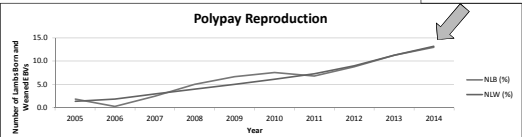
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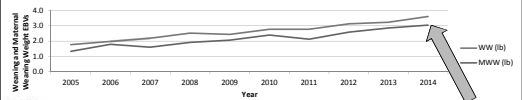
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Genetic Progress


Polypay Reproduction




Polypay Growth



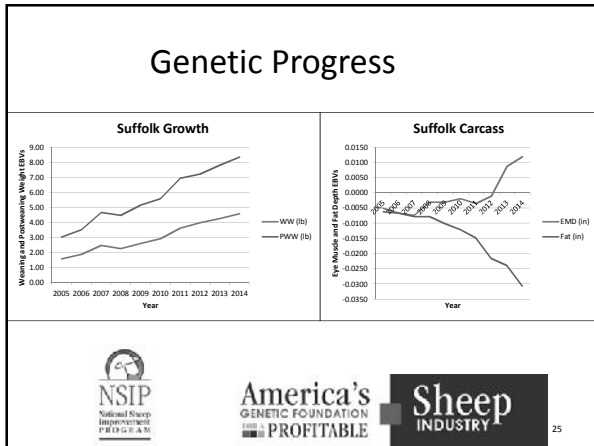




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1.75 pounds heavier @ 60 days=201 more lbs of lamb/24



How to Get Started

- Using EBVs from NSIP in your ram selection
 - Demand EBVs from your suppliers
- If you are a seedstock producer, join NSIP!

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Not a Silver Bullet

- Visual appraisal of ram for:
 - Sound feet and legs, free of foot rot
 - Correct mouth structure
 - Breeding soundness exam
 - Health status and susceptibility
 - Scrapie
 - OPP
 - Spider

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Not a Silver Bullet

- Does not replace good management
 - Breeding Program
 - Including cross breeding!
 - Nutrition
 - Marketing



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Conclusion



Visit www.nsip.org for more information including percentile and elite sire reports

Paid for in part by the American Sheep Industry



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“Should You Join NSIP?”

David Notter

Department of Animal and Poultry Sciences, Virginia Tech

The National Sheep Improvement Program (NSIP) provides tools to manage genetic improvement. One way to utilize NSIP is as an active participant, recording performance data on your sheep, receiving EBVs for each animal, and using those EBVs to drive genetic change in your flock and in the flocks of other producers who buy breeding stock from you. That sounds pretty good in the abstract, but active participation requires enrolling in NSIP, paying annual enrollment and data processing fees, individually identifying all your sheep and lambs, recording accurate lambing information and, at a minimum, weaning weights, entering that information into a computerized data system, and sending those records to NSIP for processing. If you want to achieve a more comprehensive evaluation of your animals, and depending on what sort of sheep you have, you can also consider obtaining ultrasound scans to estimate carcass fat and muscle, detailed measurements of wool quality, or fecal egg counts to monitor parasite resistance. However, all of these measurements come with extra costs and, to be useful, must be taken each year and on at least most (and preferably all) your lambs.

In exchange for this extra work and cost, you should expect a reasonable return on your investment. This return on investment can be realized in one of two ways: 1) through better prices and greater demand for breeding animals from your flock, and/or 2) by increasing the amount and value of lamb and wool that you send to market.

To capture value from genetic improvement by selling breeding animals, you first have to actually sell some, and everyone doesn't do that. In fact, most sheep producers don't do that. They sell lambs and wool. If you want to market a significant proportion of your animals as breeding stock, then you need to achieve, document, and maintain a reputation for genetic superiority for your animals. They need to add value to your customers' flocks. One way to document genetic excellence has been the show ring, but in increasingly sophisticated markets, blue ribbons based only on visual appraisal are no longer enough. A comprehensive set of EBVs, coupled with good customer service and unquestioned integrity, are a better alternative.

Many seed stock breeders say that their commercial customers don't ask to see EBVs. That is true, but misses the point. Your customers want rams and replacement ewe lambs that work for them, in terms of increasing production and profit. EBVs let you, as a supplier of breeding stock, do a better job of producing the right kind of rams and replacement ewes, and, if you do that, your customers will keep coming back. Over time, there will be opportunities to share your breeding program and use of EBVs with them, to make them more informed and engaged in the selection process, but, first and foremost, your sheep have to work for your customers. EBVs will help you produce that kind of sheep.

If you are a commercial producer and, especially, if your flock is small (10 to 40 ewes) and you normally buy rams from other flocks, then your involvement with NSIP may better be as an informed user of EBVs. You can then become an exceptional ram buyer, actively

supporting and engaging with breeders who provide EBVs. This approach allows you to make decisions about the sort of breeding stock you want to own, search out animals that meet your needs, and reward breeders who provide the necessary information.

Of course, NSIP welcomes commercial and small purebred flocks as members, but before enrolling, there are a few questions to consider. For example:

- 1) How many breeding rams to you normally use? If it's only one, there is no opportunity to use records to comparatively evaluate different sires based on direct progeny comparisons. The idea of direct progeny comparison of different rams is central to NSIP.
- 2) Do you frequently keep your own rams? If not, then having detailed lamb performance records will not improve the quality of your sires. Your breeding rams will be reflecting someone else's records and breeding program.
- 3) Can EBVs pay for themselves by helping you select better replacement ewe lambs? Maybe, but it's easier to make a big mistake in ram selection, so EBVs are most valuable in choosing sires. If you have 100 ewe lambs and need to keep 15 or 20, most of those will be pretty easy to spot based on simple phenotypic measurements. Split out the heavy half of the twin ewe lambs and use simple records on past dam performance to cull out those with underperforming dams. If you have used sires with EBVs, and if they differ in EBVs related to ewe performance (no. of lambs born, no. of lambs weaned, maternal weaning weights), then you can get a little more sophisticated, but a simple set of ewe records and lamb weaning weights will provide most of what you need. However, when buying rams, you could consider buying at least one ram with really good maternal EBVs and preferably keeping replacement ewe lambs out of him. Or, if your flock is big enough, you could buy several rams like that and attempt to sell replacement ewe lambs to your neighbors.

Finally, if you see needs and opportunities to produce a type of animal that is not readily available in the market, can EBVs help you do that? Yes, they can, but the most effective way to take advantage of such an opportunity is to collaborate with other, like-minded breeders to create a critical mass of animals bred for a similar production goal. If you have 40 ewes and commonly use two rams, you can compare two rams from different sources each year, but information and genetic improvement will accumulate slowly. But if five flocks of 40 ewes each work together, sharing rams and sons of rams with the objective of using EBVs to move in a similar direction, then the resulting "superflock" of 200 ewes evaluating 10 rams each year from various sources and sharing the resulting information can move more quickly and more easily merchandize breeding stock. An example comes from Katahdin breeders who have begun to collaborate to generate rams with high levels of worm resistance.

EBVs are thus a tool to meet needs and take advantage of opportunities. They work best in a collaborative environment, but there is plenty of room for different breeding objectives and selection goals within each breed. Whether you choose to be an active participant or an informed user, NSIP EBVs can make a positive contribution to your breeding program.