How we used EBVs in August 2019

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In early August we make breeding decisions for the fall, because any ewes that are going to be AI'd have to be kept as a separate management group starting 30 days before AI breeding.

We breed 150 ewes, and aim to milk 140 through the season. We plan to keep ~ 40-60 replacement ewe lambs every year. Thus:

- 85 total mature ewes and ewe lambs bred to produce replacements via AI & clean-up dairy ram.
- 65 total mature ewes and ewe lambs bred to terminal sires (Dorper & Tunis, respectively).
- Sell ~ 50 excess ewes. We have selected and culled stringently for the last few years, and our per-ewe milk production has reflected that. Also, in 2019 we milked our first F1 daughters from the imported Lacaune semen, and we are now seeing another huge jump in production. As a result, ewes or yearlings that we would have retained a year or two ago have moved into the surplus category.

We have 3 main "buckets" that we need to assign ewes to:

1. Breed AI and clean-up with dairy ram – should be our highest-genetic-value ewes, from whom we want replacement daughters, and some replacement ram lambs
2. Breed to terminal sire – solid ewes that we want to milk, and who may move to the AI bucket next year, but from whom we don't need/want replacement daughters
3. Sell as excess breedable ewes – solid ewes who have been genetically surpassed by others
 (4th bucket) – cull ewes whose production or udder conformation make her unfit for milking

We meter ewes every two weeks until all ewes are through their first 100 days in milk, after which we meter 1x/mo. We take individual milk samples 1x/mo, for five months of the lactation season. Samples are sent to Rocky Mountain DHI for analysis of components.

We have recorded our flock's milk weights in our own Excel sheet since 1999 (we bought Waikato meters in 1998, and have used the same 12 meters ever since).

What a process!

The 140 ewes that we milked through to August 1st 2019 ranged in production from 185 lb produced to 1,466 lb produced.

Below in Table 1, as an example, is a segment from our own Excel spreadsheet for the 2019 milking season to August 1st. It shows the three ewes that produced at the absolute middle of the 140 ewes. We have condensed the table, but for each you can see:

- Lambing date
- Lb/d milked at each metering date
- Mtr sum to 8/1 – total milk collected to August 1st
- Add'l prod'n if suckling – we added 100 lbs to her production if she raised twins for the 1st 30 days (in this case, 1345 suckled twins)
- Mtr sum to 8/1 w age – total production to August 1st, adjusted for the ewe's age. We used U of Wisc's age factor to equalize production of young ewes and mature ewes
- DIM at Aug 1 – how many days they had been producing at August 1
- Avg lb/DIM
- Avg lb/DIM w age factor – average lb milk produced per day, adjusted by ewe's age

Table 1.

Ewe#	Lamb'g Dt	2/18	3/5	3/18	4/1	4/16	5/2	5/16	5/30	6/21	7/9	7/30	Mtr sum to 8/1	Add'l prod'n if suckling	Mtr sum w suckling	Mtr sum to 8/1w age	DIM at Aug 1	Avg lb/DIM	Avg lb/DIM w age fact
1205	3-Feb	5.6	5.5	4.2	3.7	3.7	3.4	3.1	4.4	3.1	3.1	2.9	695	0	695	695	178	3.9	3.9
1345	8-Apr					3.1	4.2	8.8	8.4	6.6	6.6	5.1	700	100	800	800	114	6.2	6.2
1883	3-Apr					6.4	6.6	6.4	6.6	5.5	5.3	4.6	702	0	702	1,011	119	5.9	8.6

Selection decisions clearly have to be taken into account:

- Total production
- Lambing date (Days in Milk -- DIM) – fewer DIM means less total milk
- Suckling lambs – some ewes suckled twins from D1 – D30 on the 12-hr suckling system
- Age – ranged from yearlings who are not at their mature potential, to 7-yr-olds who are past their mature potential
- Persistency – some power on into the fall, some slow way down

What we have used in the past to help compare apples to apples is the summary number:

- Average lb/DIM, adjusted for age ("*Avg lb/DIM w age factor*" on the table)

But we also have to take into account:

- Production history of their dams, their sisters, their daughters – each over multiple years
- Udder conformation (and udder conformation of their dams, daughters, sisters)

It's a dizzying process, requiring two people to keep everything straight as we make the final decisions – *"now who was her mother? And was her grand-dam the one that had the metritis two years ago so her production was low? Didn't she have pretty low production in her first year, but then come on like gangbusters as a two-year-old? And was it her half-sib 1851 who hated being milked and would lay down in the parlor, or was that 1861? …"*

Using EBVs in 2019

This year we had EBVs to help us. They are the results of submitting production data (from metering) and component analysis data (from individual milk samples analyzed by RMDHI) to Genovis in Canada.

We really are only starting to understand the numbers we are getting, but this is what we think we know:

Parity 2 – the ewe's predicted mature performance. These numbers are based on her own performance data, the performance data of all of her female relatives and her flockmates, Genovis' understanding of typical milk production curves in dairy ewes, and the genetic links between different performance traits.

EBV – the estimate of a ewe's direct genetic effect on a trait such as milk yield or fat %.
Acc. – the accuracy or reliability of the EBV. Higher is better. Accuracy improves with more data from the ewe, from her relatives, and from other similarly managed animals.
% -- where this ewe places on a 0-100 scale, as her ranking amongst all dairy ewes in the US and Canada putting production data into the Genovis system.

We are paying most attention to 220-day milk yield, but also starting to watch component % as well.

Below in Table 2 are examples from the 140 ewes we milked this year. In this case we sorted the ewes by % ranking within the North American dairy flock (so look at the column for 220-day Milk Yield, %)
- Our two highest-ranking ewes
- Two of our average ewes
- Our two bottom-ranking ewes

Table 2.

Ewe #	Parity 2														
	220j Milk Yield (kg)			Ave. Daily Fat %			Ave. Daily Protein %			Ave. Daily Lactose %			Persistency		
	EBV	Acc.	%	EBV	Acc.	%	EBV	Acc.	%	EBV	Acc.	%	EBV	Acc.	%
1529	142	76	99	0.19	70	89	0.16	70	92	0.10	70	96	0.37	76	53
1638	135	76	99	-0.65	69	0	-0.31	69	0	-0.36	69	0	0.27	76	3
1427	10	76	51	0.10	71	78	-0.02	71	37	-0.07	71	5	0.29	76	7
1820	7	3	49	0.00	3	57	0.04	3	61	0.03	3	73	0.38	3	68
1533	-54	70	5	-0.21	63	18	-0.08	63	19	0.07	63	91	0.39	70	81
1232	-65	72	3	0.48	64	97	0.21	64	95	0.01	64	59	0.45	72	98

It's easy to see that the bottom two (whose progeny will actually decrease the average production of the flock!) should not be bred to a dairy ram to produce replacement ewe lambs!

But what's interesting is to find a ewe like 1529, who not only increases the flock's average production by a lot, but who also increases the average component %! We should be using her not only for producing daughters, but also for producing ram lambs!

Another way we used the EBVs was to make final ram lamb selection decisions. For example, we had to decide which ram lamb would be used to be the clean-up ram on our group of AI ewes. Below in Table 3 were our top two choices. In the end, we chose the son of 1707, because of her better EBV and the relatively-high accuracy.

Table 3.

	Parity 2													
	220j Milk Yield (kg)			Ave. Daily Fat %			Ave. Daily Protein %			Ave. Daily Lactose %			Persistency		
Ewe #	EBV	Acc.	%	EBV	Acc.	%	EBV	Acc.	%	EBV	Acc.	%	EBV	Acc.	%
1434	80	74	91	-0.02	64	53	0.12	64	89	0.02	64	67	0.29	74	5
1707	102	75	96	-0.03	65	50	0.04	65	58	0.10	65	96	0.40	75	83

Sorting out the middle

Where we really used the EBVs the most was in all the middle ewes – ewes that could reasonably be in either the AI/replacement group, the terminal sire group, or the excess ewe group.

Below in Table 4 and Table 5 are 11 ewes, most of whom ranged between 700 – 850 lb of milk at August 1st, and so were above the median of 700lb for the total flock.

Points that can be noted:
- 5-yr-olds. Pretty similar performance in the season (same lambing dates, similar total production). But their EBVs take their past milking records into account, and those of daughters etc, and you can see that their EBVs are vastly different EBVs. 1400 and 1427 were sold; 1436 was bred to a terminal sire.
- 4-yr-olds. Clearly a difference between the two, but notice that although 1521 produced much more milk than 1436 *this season*, her EBV was actually below 1436.
- 3-yr-olds. Two of them had lower early metering numbers, due to suckling twins. But 1623's EBVs showed that she clearly should be in AI group.
- 2-yr-olds. Thankfully, we don't have to milk these many more years to see how their genetics will impact the flock! 1737 went in the AI group. 1733 & 1734, twin sisters (and daughters of one of our top ewes a few years ago), went into the excess ewe group.

Table 4 is our own Excel spreadsheet. The usual dizzying array of numbers.

Table 4.

Ewe#	Lamb'g Dt	12-hr	2/18	3/5	3/18	4/1	4/16	5/2	5/16	5/30	6/21	7/9	8/30	Mtr sum to 8/1	Add'l prod'n if suckling	Mtr sum w suckling	Mtr sum to 8/1 w age	DIM at Aug 1	Avg lb/DIM	Avg lb/DIM w age fact
1400	21-Mar					7.3	6.2	6.2	6.8	5.7	5.1	3.7	3.7	734	0	734	734	132	5.60	5.60
1427	20-Mar					5.7	7.0	6.6	5.7	5.9	5.9	4.4	3.5	746	0	746	746	133	5.65	5.65
1436	23-Mar					7.3	7.3	6.9	7.3	7.0	6.6	4.8	4.6	838	0	838	838	130	6.49	6.49
1521	20-Mar					7.5	7.9	8.6	8.4	7.7	8.6	7.5	4.4	1,015	0	1,015	1,015	133	7.69	7.69
1531	24-Feb			6.4	5.5	4.2	4.8	4.6	5.0	5.3	4.4	4.0	3.3	741	0	741	741	157	4.75	4.75
1609	5-Apr	2				4.4	4.8	8.1	9.9	6.8	7.0	4.0		761	100	861	973	117	6.56	7.41
1623	12-Apr	2				4.6	3.5	10.1	8.4	7.3	7.7	5.3		752	100	852	962	110	6.90	7.79
1644	23-Mar					5.7	5.5	5.5	4.8	5.5	4.8	5.1	4.4	670	0	670	757	130	5.19	5.87
1733	2-Mar			3.7	3.5	3.4	3.7	3.7	2.9	3.1	3.1	2.0	1.8	459	0	459	570	151	3.06	3.80
1734	22-Feb			4.8	4.4	4.4	4.4	5.3	4.4	5.7	4.4	3.7	3.3	714	0	714	885	159	4.52	5.60
1737	5-Feb		8.1	7.9	6.8	6.3	7.0	5.9	5.7	5.5	6.6	6.2	6.2	1,154	0	1,154	1,431	176	6.59	8.18

Table 5 is the EBVs for each of those 11 ewes.

Table 5.

	Parity 2															
	220j Milk Yield (kg)			Ave. Daily Fat %			Ave. Daily Protein %			Ave. Daily Lactose %			Persistency		
Ewe #	EBV	Acc.	%	EBV	Acc.	%	EBV	Acc.	%	EBV	Acc.	%	EBV	Acc.	%
1400	-19	76	20	0.01	71	59	-0.03	71	33	0.03	71	71	0.35	76	36
1427	10	76	51	0.10	71	78	-0.02	71	37	-0.07	71	5	0.29	76	7
1436	55	72	83	-0.03	64	51	0.07	64	79	-0.08	64	4	0.29	72	5
1521	49	76	81	-0.07	70	42	0.08	70	82	0.03	70	72	0.28	76	4
1531	4	74	47	0.40	65	96	0.15	65	91	0.14	65	99	0.34	74	26
1609	25	72	64	0.26	65	92	0.14	65	90	0.02	65	68	0.23	72	0
1623	80	70	92	-0.13	64	29	0.16	64	92	0.03	64	70	0.31	70	10
1644	43	75	78	-0.25	68	14	-0.01	68	39	0.08	68	93	0.37	75	66
1733	-38	73	10	-0.07	64	43	-0.10	64	15	0.13	64	98	0.32	73	16
1734	2	73	45	0.12	64	82	-0.04	64	29	0.09	64	95	0.34	73	33
1737	110	76	97	-0.17	68	23	0.11	68	87	0.03	68	71	0.40	76	84

p.s. udders don't tell you much

1733 as a yearling in May 2018
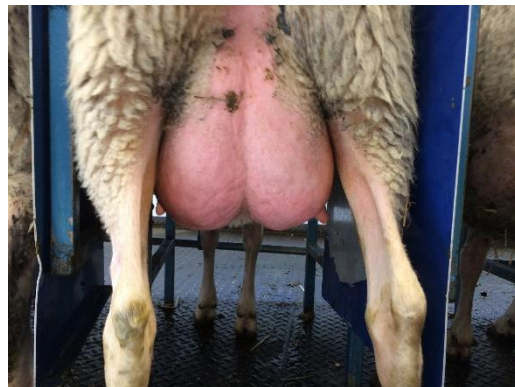
1737 as a yearling in May 2018

Using 2019 EBVs for 2020 ram lamb decisions

We select our ram lambs, both to keep and to sell, in mid-winter, before lambing starts. We do this because any non-selected rams will be castrated at Day 1, and go off to a baby lamb buyer. (We keep more than we anticipate needing, so that if any physical weaknesses emerge as the ram lambs grow, we can still cull them.)

But we need to identify the ewes from whom we want to keep ram lambs. We will use EBV's to make these decisions. We will send in our metering and component data for the last three months of the season, and in January we'll use the EBV's to select the dams to keep ram lambs from.

Addendum: our process for milk recording and sampling for component analysis

1. Metering/sampling steps:
2. Take a bulk tank sample before milking
3. Milk ewes as normal with Waikato meters
4. Record ear tag #s
5. Record milk weights from meters
6. Collect sample from each meter
7. Write ewe # on top of sample vial
8. Take bulk tank sample after milking
9. Refrigerate samples until mailing
10. Include a copy of parlor recording sheet in box of vials
11. Mail to RMDHIA