Feed Saved – Expected Results

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Data Collected for NIFA project

- Spans **2010 to 2015**
  - Cow data collected mid-lactation for at least 28 days; most at least 42 days
  - More than **537k** daily records compiled – intake, dry matter percentage, milk yield
  - More than **110k** component measurements collected routinely (fat percent, protein percent, lactose percent, SCC, etc.)
  - Body weight, BCS, health events collected
  - Diet composition measured regularly

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Data Collected for FFAR project

- Official start **Spring 2019**
  - Cow data collected mid-lactation for at least 28 days; most at least 42 days
  - More than **118k** daily records compiled – intake, dry matter percentage, milk yield
  - More than **28k** component measurements collected routinely (fat percent, protein percent, lactose percent, SCC, etc.)
  - Body weight, BCS, health events collected
  - Diet composition measured regularly

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Data Processing

- Daily data compiled and edited, checks for outliers and missing data by CDCB and contributing institution
- Residual feed intake (RFI) calculated following methodology developed throughout NIFA project (Tempelman et al., 2015)
- RFI data combined/confirmed with associated data from Cooperator database (pedigree, birthdate, calving dates, parity, etc.)

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Current RFI Phenotypes

Institution	NIFA 2010	CDCB/FFAR	TOTAL
Miner Agric. Res. Inst. (NY)	58		58
Virginia Tech	96		96
Purina Anim. Nutr. Ctr. (MO)	184		184
U.S. Dairy Forage Res. Ctr. (WI)	624		624
Univ. of Wisconsin	1,054	505	1,559
Michigan State Univ.	315	251	566
Iowa State Univ.	1,006	114	1,120
Animal Genomics & Imprv. Lab	834	370	1,204
Univ. of Florida	582	238	810
TOTAL	4,753	1,478	**6,231**

Beltsville, MD
USDA herd

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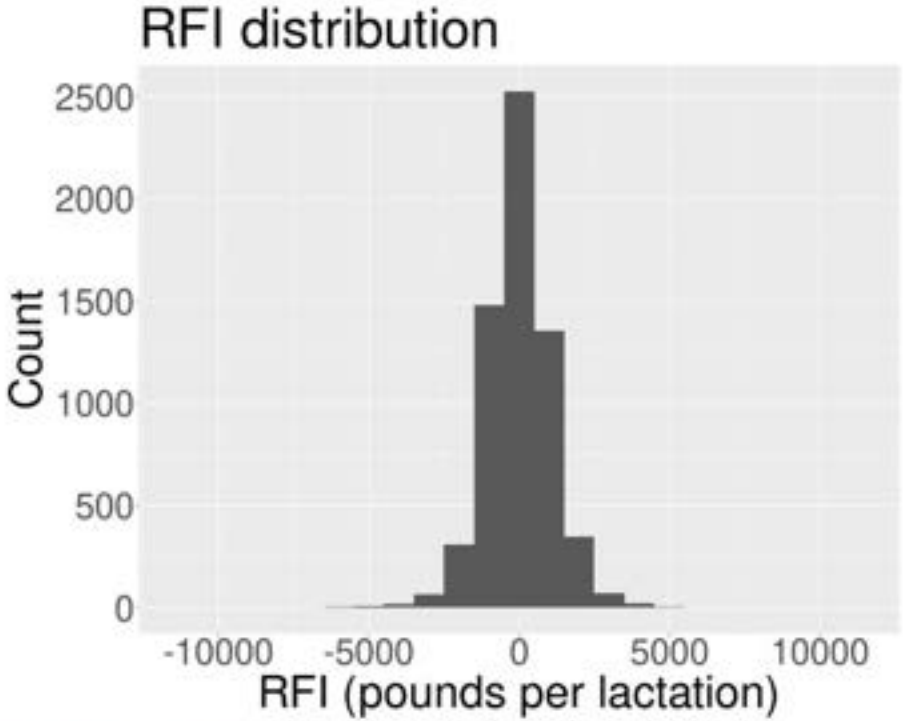
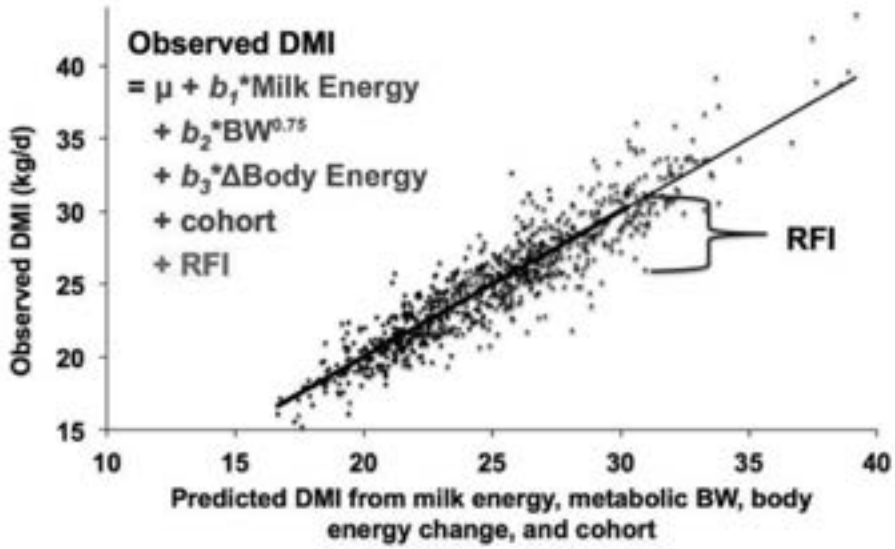
Summary of RFI





	RFI (lb/lactation)
Mean	-4
SD	1,125
Minimum	-11,402
Maximum	11,236

TRADITIONAL EVALUATIONS

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Traditional evaluations - bulls

	Mean	SD	Minimum	Maximum
FSAV PTA	-116.1	165.7	-822	633
FSAV PA	-121.4	153.3	-681	421
FSAV reliability	16.9	11.4	0	89
FSAV PA reliability	12.0	7.7	0	35

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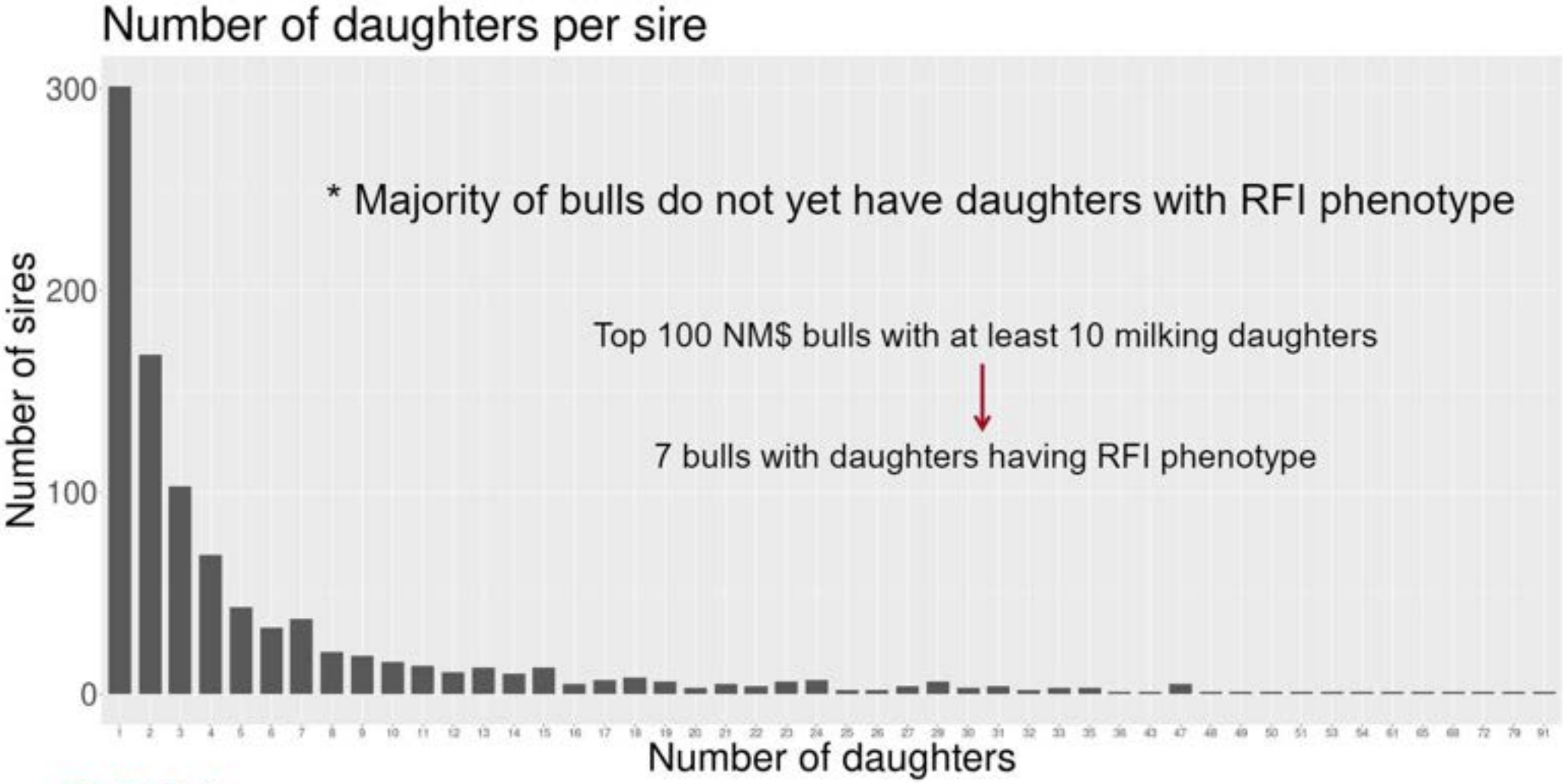

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Correlations - RFI

	Correlation
Milk yield	0.002
Protein yield	0.02
Fat yield	-0.02
SCS	-0.02
Productive Life	0.04
Livability	0.15
Daughter Pregnancy Rate	0.10
Health traits	~0.10

Among bulls born since 2000 with NM$ reliability ≥ 90%

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GENOMIC EVALUATIONS

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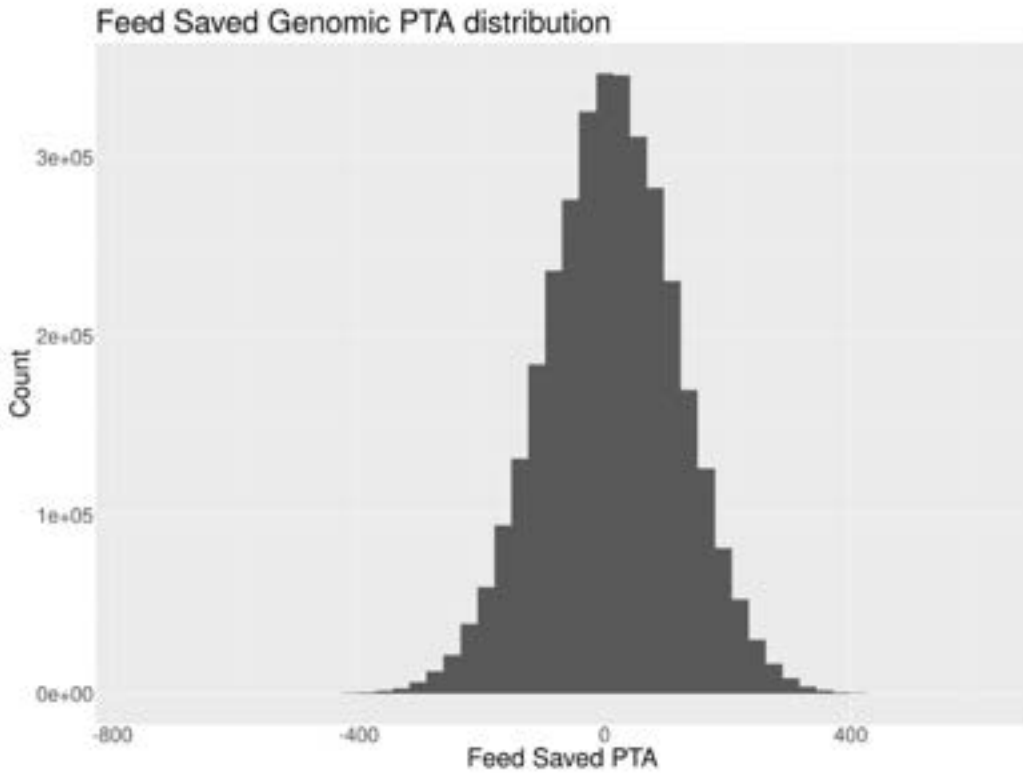
Genomic Evaluations

	Mean	SD	Min	Max
Feed Saved PTA (lb/lactation)	9.87	108.59	-738	613
Feed Saved Reliability (%)	31.06	3.79	7	93



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Top 100 NM$ bulls

	Avg FSAV PTA (lb/lact)	Min FSAV PTA (lb/lact)	Max FSAV PTA (lb/lact)	Avg FSAV REL (%)	Min FSAV REL (%)	Max FSAV REL (%)
With ≥ 10 daughters	+94	-183	+395	38	32	52
With < 10 daughters	+150	-17	+364	28	26	30

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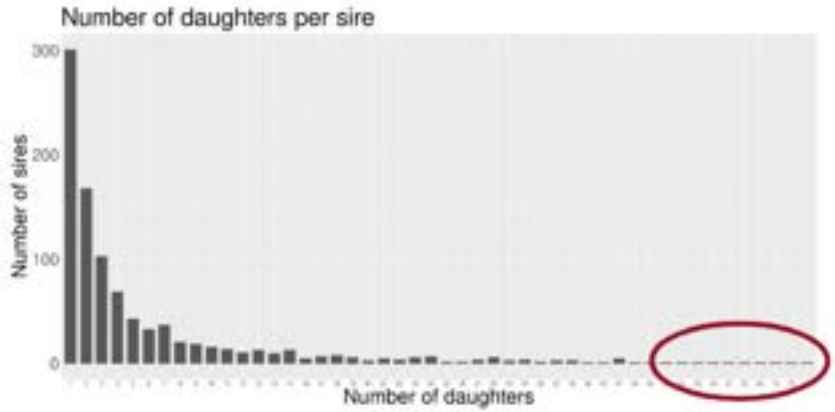
10 Sires with Most RFI daughters

- Number of daughters ranges from 50 to 91
- Average traditional FSAV reliability = 81%
- Average genomic FSAV reliability = 87%



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EXAMPLE

An example

6 healthy cows in the same herd

All have the same production

Cow B eats 2 pounds more per day

Cow C and Cow F eat 2 pounds less per day

Cow F is the most efficient, saving 886 pounds of feed per lactation

	Cow A	Cow B	Cow C	Cow D	Cow E	Cow F
Weight (lb)	1500	1500	1500	1570	1430	1430
Body weight composite	0	0	0	+2.0	-2.0	-2.0
Milk yield, fat corrected (lb/lact)	25,000	25,000	25,000	25,000	25,000	25,000
Expected dry matter intake (lb/lact)	18,000	18,000	18,000	18,276	17,724	17,724
Actual dry matter intake (lb/lact)	18,000	18,610	17,390	18,276	17,724	17,114
Residual feed intake (lb/lact)	0	-610	+610	0	0	+610
Feed saved (lb/lact)	0	-610	+610	-276	+276	+886

2 BWC x 138 lb. less feed per lactation
276 + 610 RFI = +886 feed saved

Trait means of top 100 NM$ proven bulls

Trait	NM2018	NM2021	Difference
Feed Saved	+53	+116	+63
Body weight composite	-0.38	-0.73	-0.35
Residual feed intake	0	-15	-15
Milk	+1299	+1555	+256
Fat	+80	+73	-7
Protein	+48	+52	+4
NM2018	+633	+616	
NM2021	+651	+669	+18

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Looking ahead

Continued collection of phenotypes through FFAR/CDCB project → Identification of proxy variables

Participation in international collaborations and research projects

Identification of additional new sources of data related to feed efficiency

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What's to come

- Feed Saved evaluations included in December 2020 CDCB triannual evaluation
- Inclusion of Feed Saved in Net Merit when revised in April 2021
- Be on the lookout for materials and articles discussing Feed Saved (as well as other updates!)

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