



Collecting milking speed data as part of official milk recording

R.H. Fourdraine, H.A. Adams, A.D. Coburn

Speaker: Robert Fourdraine





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R. H. Fourdraine¹, H.A. Adams¹, A.D. Coburn²

¹ CRI International Center for Biotechnology, 2706 County Road E, Mount Horeb, WI

² AgSource Cooperative, 135 Enterprise Drive, Verona, WI



Introduction

- Increased adoption of robotic milking systems in the U.S.
- Maximize milk collected through the robot
 - Amount of milk
 - Time to milk
 - Prep time
 - Time to move cow in and out of the robot
 - Attaching the milking unit
- Similar concept applies to conventional parlors milking 24/7
- Use of in parlor electronic milk meters
 - Maintenance and calibration
 - Cost



Introduction

- AgSource use of Electronic Milk Meters
 - Milk weights
 - Milk samples
 - RFID sample identification
- NEW: Collect milking duration
 - Started in 2015
 - 100 herds with over 100,000 cows
- How can we use milking speed data?
 - Herd management report
 - Breeding Values



Materials and Methods

- AgSource DRPC testday and lactation data
 - Milk yield, components, SCC, pedigree,....
 - Over 900,000 individual milking time records
- Data quality
- Genetic evaluations
 - Data set included >3,200 bulls and >35,000 female records
 - Access to >100,000 genotypes
 - Breeding values estimated using BLUPF90 and variance components calculated using AIREML within BLUPF90 (Misztal et al., 2015).



Results and Discussion

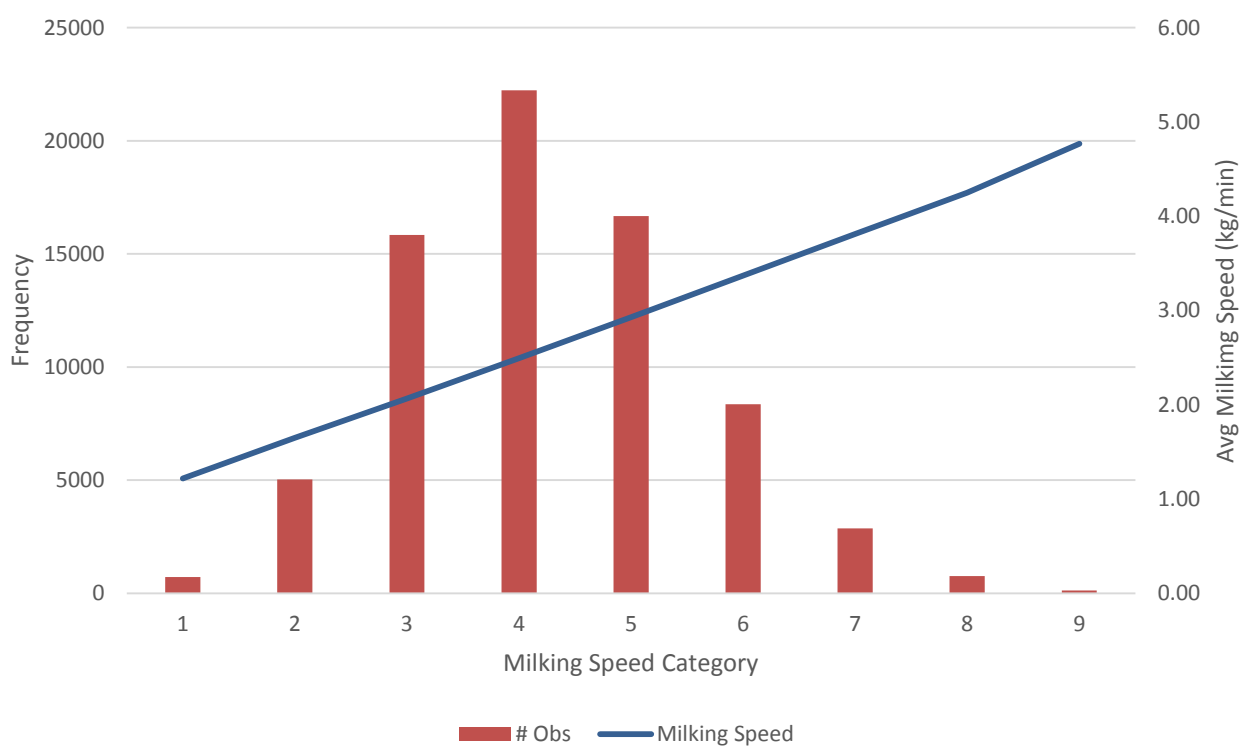
- Data Quality
 - Suspect records only 1.4% of overall dataset:
 - <0.45 kg/min or >6.8 kg/min
 - Milking duration >15 minutes
- Data Variability
 - 2.6 kg/min average

	Milking Speed (kg/min)	Standard Deviation (kg/min)
1 st Quartile	1.9	0.4
2 nd Quartile	2.4	0.5
3 rd Quartile	3.1	0.6
4 th Quartile	3.4	0.6

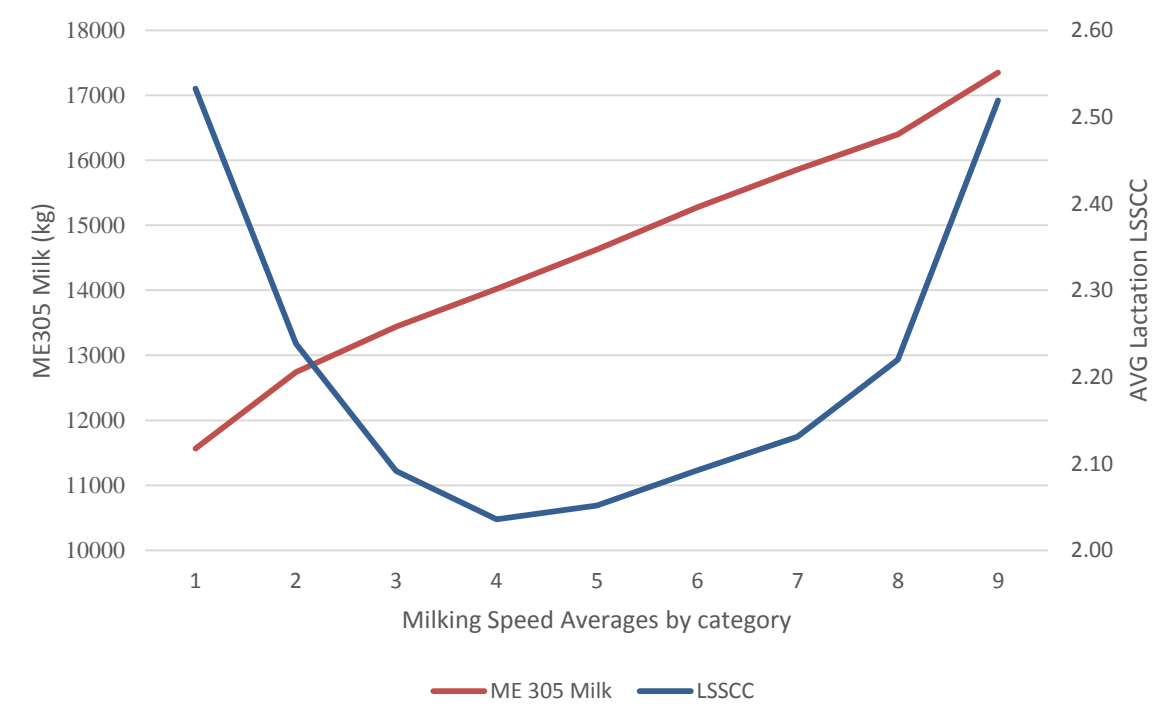


Results and Discussion – Milking Speed Analysis

Distribution of Cows by Average Milking Speed category



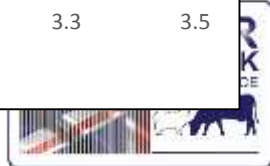
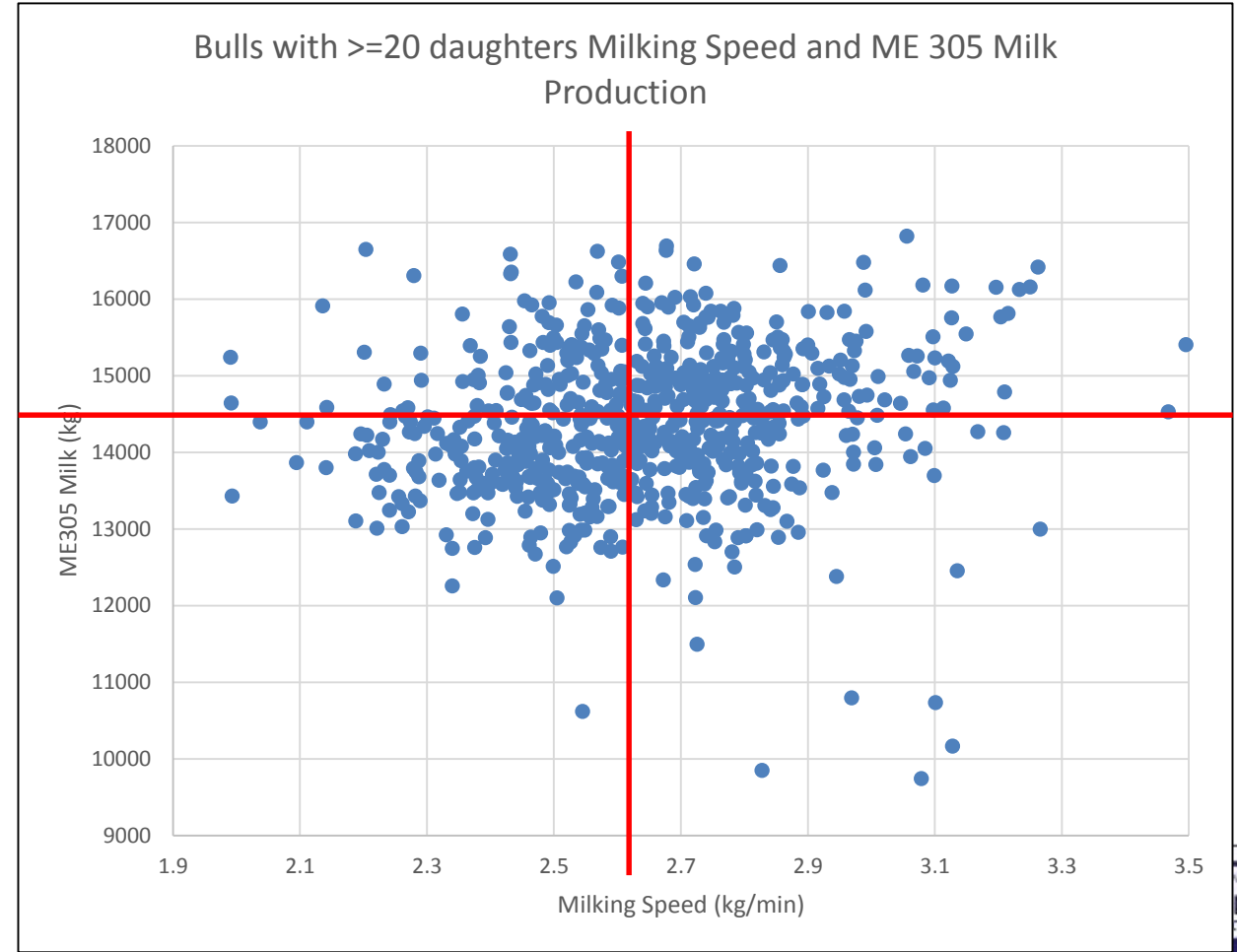
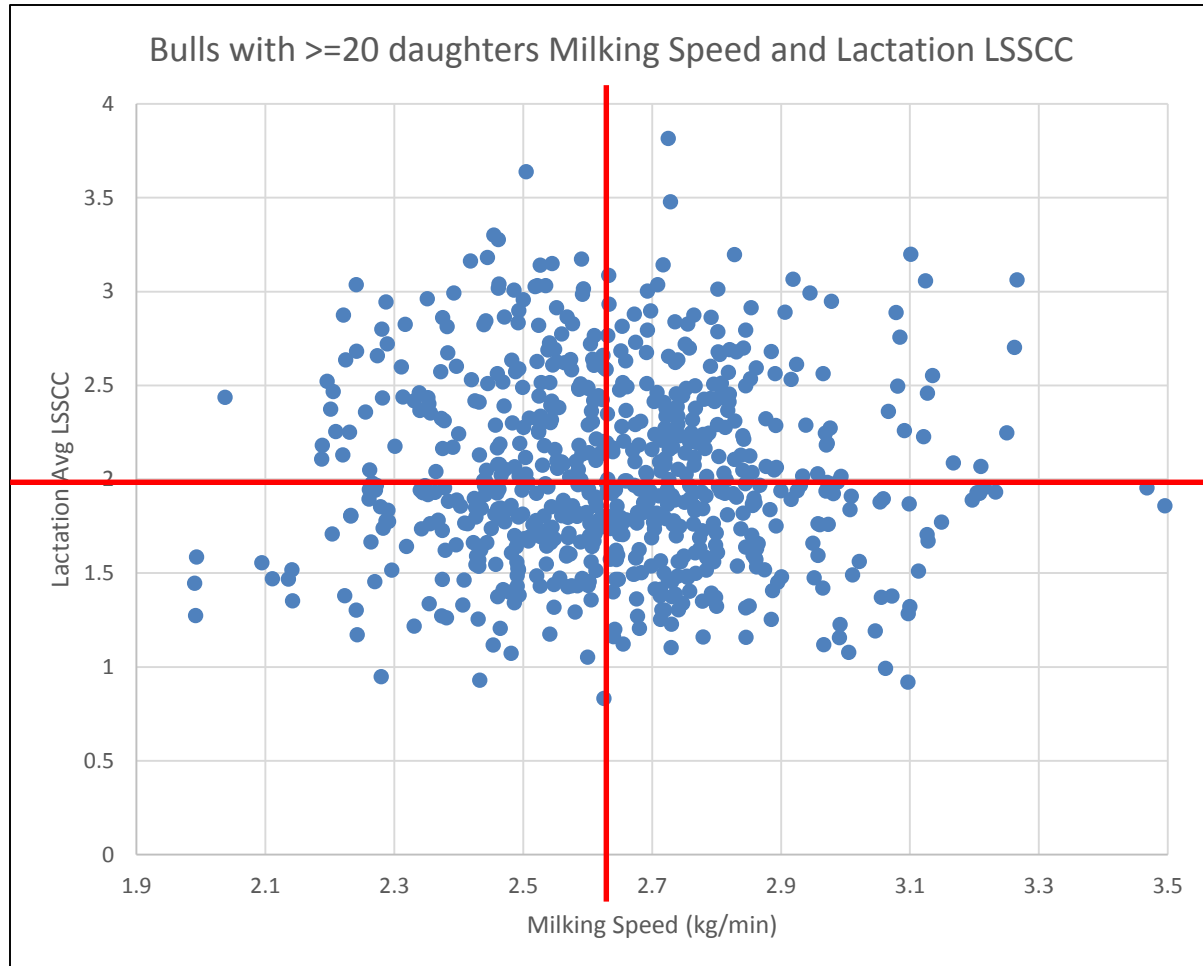
Relationship between milking speed and ME305 milk production and LSSCC



Results and Discussion – Producer Benefit

Control #	Lact #	# of Milking Times Collected	Group/Pen		Lactation	Test Day				
			Avg Milk (kg/min)	Avg Milk Duration (min)	Avg Milk (kg/min)	Days In Milk	Milk (kg)	LSCC	Avg Milk/Min	Milking Duration (Min)
5	2	3	2.58	5.07	2.37	454	54.9	2.7	2.55	7.3
8	2	2	2.58	5.07	4.11	239	37.2	2.9	4.23	3
10	3	1	2.58	5.07	3.96	40	54.9	4.6	3.96	4.7
77	4	2	2.58	5.07	1.90	278	20.0	2.2	2.06	3.3
84	2	3	2.58	5.07	2.89	199	41.3	2.9	2.70	5.2
102	4	4	2.58	5.07	1.58	163	38.6	2.8	1.60	8.2
118	2	1	2.58	5.07	2.65	29	56.2	0	2.65	7.2
127	2	1	2.58	5.07	2.32	325	30.8	6.7	2.32	4.5
130	3	4	2.58	5.07	1.76	395	37.2	5.9	1.76	7.2
131	1	3	2.58	5.07	2.29	172	28.1	0	2.38	4
132	1	3	2.58	5.07	1.96	103	33.6	0	2.10	5.4

Results and Discussion – Bull Distribution



Results and Discussion – Genetic Evaluations

Fixed Effects:

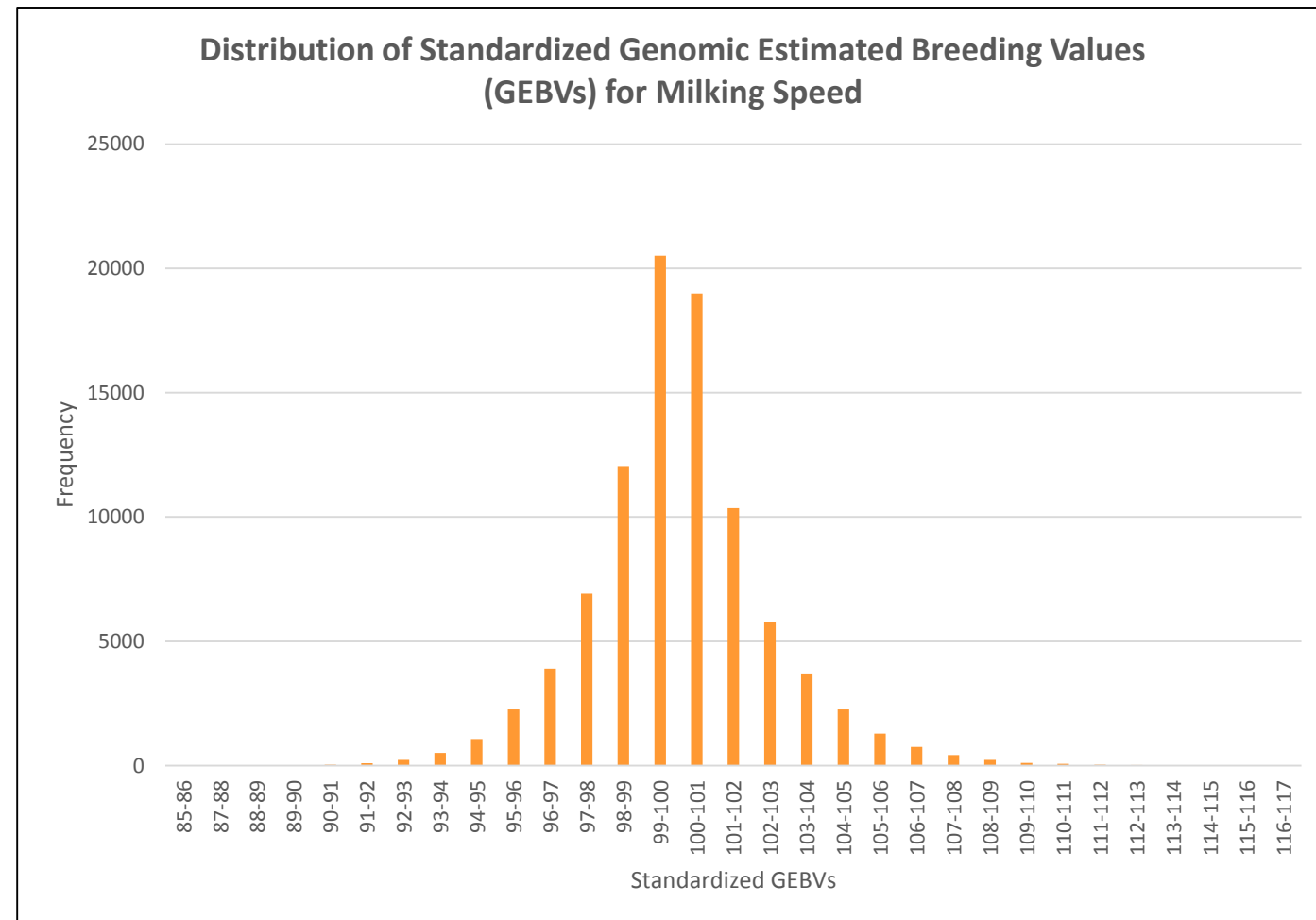
- Meter milk (kgs of milk produced at the current milking)
- Linear somatic cell score
- Herd - Year of calving - Month of calving (HYM)
- Lactation (1 to 4)
- Days in milk (DIM)

Random Effects:

- Cow
- Permanent environment (PE): non-genetic effect assumed to be common to all observations on the same cow

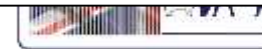
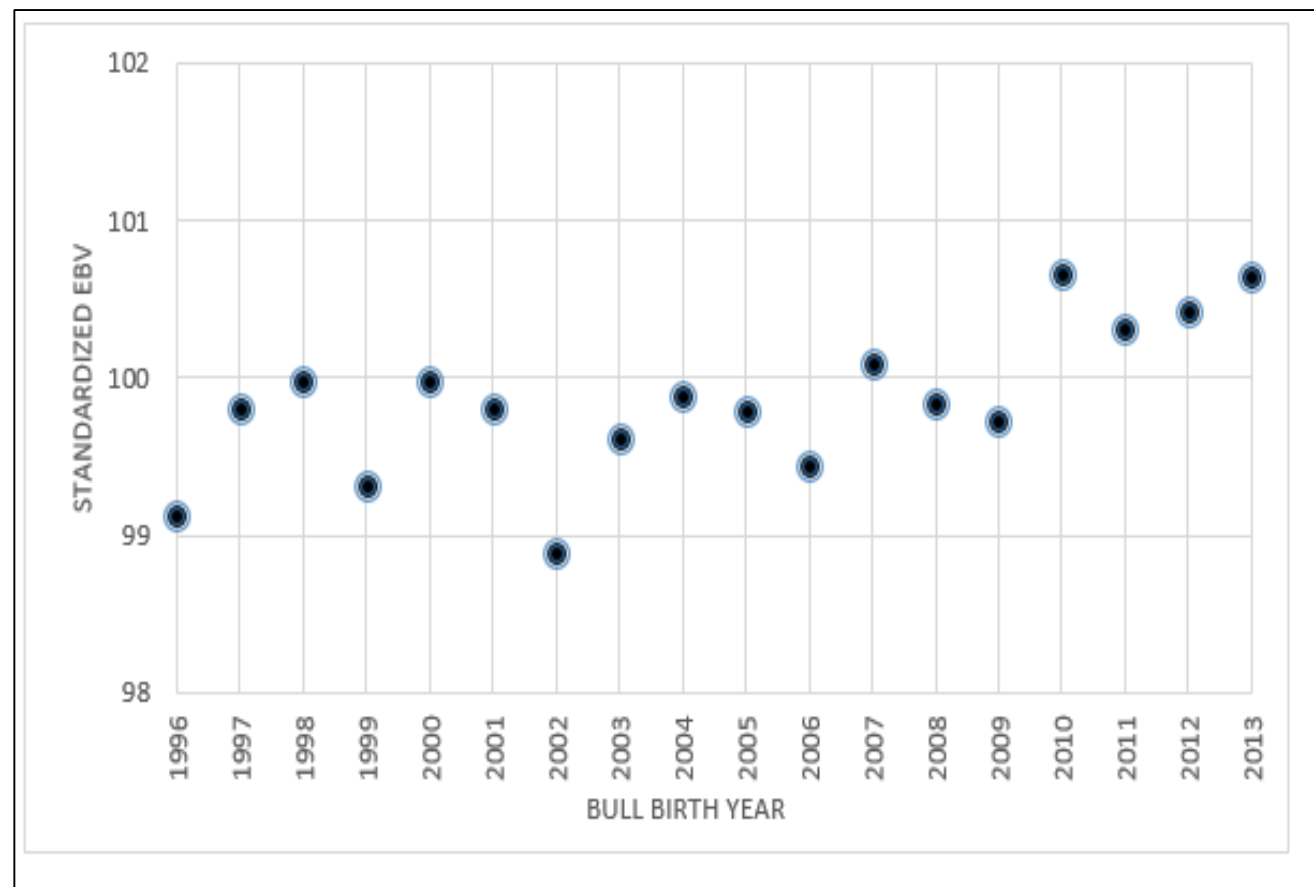
Results and Discussion – Genetic Evaluations

	Variance Est	Var SE
Additive (animal)	0.3630	0.0199
PE	0.4349	0.0161
Residual	1.2204	0.0031
Total	2.0183	
Heritability	17.99%	
Repeatability	39.53%	



Results and Discussion – Genetic Evaluations

RegNo	# Obs	# Daughters	StGEBV	REL
HOUSA000137191143	3896	369	100	0.98
HOUSA000062072898	3446	326	99	0.97
HOUSA000060845420	3240	285	101	0.97
HOUSA000136278496	3237	284	97	0.97
HOUSA000061898423	2735	241	98	0.96
HOUSA000066591071	2124	226	99	0.96
HOUSA000062297934	2230	224	94	0.96
HOUSA000052774524	2575	217	112	0.96
HOUSA000064541656	2341	212	98	0.96
HOUSA000060597003	2518	207	100	0.96



Conclusions

- EMM Milking speed data provides a valuable tool for milk recording organizations
 - Value – added
 - Consistent and high quality
 - Management use
 - Genetic Evaluations

