STØTTET AF
Mælkeafgiftsfonden

Snell score calving sire and parent

I have run a full model and a reduced model (same as used for interbull validation test3).
I have counted how many offspring each bull have in full and reduced.

A: Bull index full and parent index full
Bulls. AI. Nordic. Bull has >50 offspring in full model and zero offspring in reduced model.
Father has >50 offspring in full and MGS has >50 offspring in full.
Model1: own_index_full = mother_index_full + father_index_full
Model2: own_index_full = mgs_index_full + father_index_full

HOL current

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	206	0.62	0.47	0.59	206	0.24	0.41	0.33
dCE1	206	0.58	0.48	0.54	206	0.24	0.40	0.31
dCS1	173	0.69	0.40	0.49	173	0.22	0.33	0.15
dSB2	221	0.56	0.45	0.43	221	0.18	0.39	0.19
dCE2	215	0.52	0.38	0.38	215	0.25	0.33	0.19
dCS2	198	0.65	0.51	0.54	198	0.28	0.48	0.28

HOL current direct

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	206	0.57	0.46	0.57	206	0.21	0.43	0.32
dCE1	206	0.54	0.48	0.53	206	0.22	0.41	0.28
dCS1	173	0.65	0.40	0.48	173	0.22	0.32	0.15
dSB2	221	0.50	0.44	0.39	221	0.16	0.39	0.19
dCE2	215	0.46	0.37	0.35	215	0.27	0.35	0.20
dCS2	198	0.59	0.49	0.49	198	0.26	0.45	0.25

HOL snell score

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	196	0.68	0.48	0.63	196	0.21	0.43	0.33
dCE1	195	0.61	0.46	0.53	195	0.24	0.38	0.26
dCS1	160	0.78	0.41	0.52	160	0.21	0.30	0.12
dSB2	209	0.77	0.48	0.59	209	0.27	0.43	0.28
dCE2	205	0.65	0.39	0.44	205	0.29	0.32	0.18
dCS2	189	0.71	0.52	0.56	189	0.28	0.48	0.26

RDC snell score

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	123	0.82	0.33	0.55	123	0.15	0.25	0.07
dCE1	112	0.78	0.41	0.58	112	0.15	0.31	0.16
dCS1	42	0.65	0.55	0.50	42	0.13	0.53	0.25
dSB2	137	0.83	0.47	0.62	137	0.16	0.40	0.18
dCE2	138	0.75	0.47	0.59	138	0.12	0.38	0.15
dCS2	68	0.71	0.50	0.47	68	0.19	0.53	0.21

JER snell score

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	69	1.07	0.51	0.75	69	0.35	0.56	0.28
dCE1	65	0.98	0.51	0.67	65	0.33	0.46	0.21
dCS1	65	0.62	0.50	0.54	65	0.19	0.50	0.34
dSB2	89	1.14	0.54	0.73	89	0.35	0.55	0.22
dCE2	87	1.30	0.59	0.76	87	0.56	0.46	0.13
dCS2	86	0.62	0.56	0.48	86	0.20	0.47	0.28

B: Bull index full and parent index reduced

Bulls. AI. Nordic. Bull has >50 offspring in full model and zero offspring in reduced model.
Father has >50 offspring in reduced and MGS has >50 offspring in reduced.
Model1: own_index_full = mother_index_reduc + father_index_reduc
Model2: own_index_full = mgs_index_reduc + father_index_reduc

HOL current

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	90	0.29	0.42	0.27	97	0.18	0.41	0.27
dCE1	91	0.35	0.29	0.19	98	0.26	0.32	0.23
dCS1	80	0.32	0.19	0.09	84	0.21	0.24	0.08
dSB2	100	0.04	0.32	0.12	107	0.10	0.32	0.15
dCE2	98	0.22	0.05	0.05	105	0.29	0.15	0.12
dCS2	86	0.32	0.32	0.13	92	0.29	0.40	0.19

HOL current direct

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	90	0.25	0.39	0.24	97	0.17	0.40	0.25
dCE1	91	0.33	0.26	0.17	98	0.22	0.29	0.16
dCS1	80	0.32	0.15	0.09	84	0.23	0.20	0.08
dSB2	100	0.01	0.31	0.12	107	0.05	0.31	0.14
dCE2	98	0.20	0.02	0.04	105	0.29	0.13	0.11
dCS2	86	0.28	0.29	0.11	92	0.29	0.38	0.17

HOL snell score

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	90	0.35	0.45	0.31	97	0.20	0.44	0.30
dCE1	91	0.32	0.25	0.15	98	0.25	0.29	0.20
dCS1	78	0.28	0.15	0.06	82	0.19	0.20	0.06
dSB2	100	-0.01	0.35	0.14	107	0.10	0.36	0.16
dCE2	98	0.23	-0.05	0.05	105	0.33	0.07	0.14
dCS2	85	0.29	0.30	0.11	91	0.29	0.39	0.18

RDC snell score

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	69	0.22	0.22	0.07	71	-0.03	0.23	0.05
dCE1	64	0.13	0.35	0.16	65	0.03	0.34	0.15
dCS1	25	-0.17	0.46	0.21	26	-0.08	0.48	0.21
dSB2	84	0.33	0.26	0.12	87	0.08	0.23	0.08
dCE2	83	0.40	0.34	0.16	86	0.06	0.27	0.08
dCS2	38	0.09	0.49	0.17	39	0.05	0.49	0.16

JER snell score

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	41	0.44	0.55	0.23	41	0.18	0.58	0.20
dCE1	37	0.12	0.38	0.14	37	0.04	0.38	0.14
dCS1	37	0.08	0.50	0.35	37	0.15	0.54	0.38
dSB2	47	0.54	0.56	0.17	47	0.29	0.54	0.14
dCE2	47	-0.12	0.23	0.03	48	-0.15	0.17	0.03
dCS2	47	0.07	0.61	0.31	47	0.26	0.63	0.43

C: Bull index full and parent index full

Bulls born between 2010 and 2015 both years included. AI. Nordic. Bull has >50 offspring for full. Father has >50 offspring in full and MGS has >50 offspring in full.

Model1: own_index_full = mother_index_full + father_index_full

Model2: own_index_full = mgs_index_full + father_index_full

HOL current

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	624	0.76	0.42	0.59	624	0.27	0.43	0.23
dCE1	607	0.68	0.45	0.58	607	0.20	0.43	0.24
dCS1	495	0.63	0.45	0.54	495	0.20	0.37	0.21
dSB2	670	0.76	0.37	0.51	670	0.26	0.33	0.12
dCE2	668	0.68	0.37	0.51	668	0.28	0.31	0.17
dCS2	581	0.60	0.41	0.52	581	0.20	0.34	0.20

HOL snell score

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	629	0.76	0.44	0.64	629	0.26	0.45	0.28
dCE1	610	0.71	0.46	0.58	610	0.21	0.45	0.22
dCS1	485	0.66	0.46	0.56	485	0.20	0.38	0.21
dSB2	672	0.80	0.43	0.61	672	0.26	0.41	0.21
dCE2	668	0.75	0.39	0.55	668	0.29	0.35	0.17
dCS2	580	0.62	0.42	0.55	580	0.19	0.35	0.21

RDC snell score

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	401	1.03	0.46	0.62	401	0.26	0.34	0.14
dCE1	389	0.89	0.50	0.66	389	0.27	0.44	0.24
dCS1	59	0.92	0.42	0.53	59	0.07	0.23	0.05
dSB2	496	0.86	0.45	0.63	496	0.24	0.39	0.24
dCE2	489	0.84	0.47	0.64	489	0.27	0.43	0.25
dCS2	171	0.88	0.49	0.61	171	0.21	0.43	0.21

JER snell score

trait	model1 N	model1 b1mother	model1 b1father	model1 Rsq	Model2 N	model2 b1mgs	model2 b1father	model2 Rsq
dSB1	190	1.02	0.51	0.71	190	0.13	0.40	0.20
dCE1	175	0.93	0.55	0.71	175	0.23	0.49	0.32
dCS1	138	0.74	0.61	0.69	138	0.15	0.61	0.36
dSB2	262	1.08	0.51	0.67	262	0.20	0.38	0.12
dCE2	262	1.08	0.53	0.67	262	0.30	0.49	0.20
dCS2	261	0.72	0.50	0.60	261	0.20	0.45	0.26

Phenotypic means

I have looked further into the data used for HOL current for dCE2.
It is for the same bulls as used in A and in B.

- bull_dCE2_mean is the mean of the offspring of the bull in the full data
- father_dCE2_mean is the mean of the offspring of the sire in the full data
- mgs_dCE2_mean is the mean of the offspring of the maternal grand sire in the full data
- father_dCE2_mean_reduc is the mean of the offspring of the sire in the reduced data
- mgs_dCE2_mean_reduc is the mean of the offspring of the maternal grand sire in the reduced data

for the 215 bulls in A:

Mean and STD:				Correlations		
Bull_dCE2_mean	215	3.932	0.029			Bull_dCE2_mean
father_dCE2_mean	215	3.909	0.043	father_dCE2_mean	215	0.223
mgs_dCE2_mean	215	3.876	0.050	mgs_dCE2_mean	215	0.220

For the 105 bulls in B:

Mean and STD:				Correlations		
Bull_dCE2_mean	105	3.924	0.029			Bull_dCE2_mean
father_dCE2_mean_reduc	105	3.913	0.034	father_dCE2_mean_reduc	105	0.118
mgs_dCE2_mean_reduc	105	3.860	0.044	mgs_dCE2_mean_reduc	105	0.089

The correlation between bull and father for B is lower than expected based on the heritability and the number of offspring, but it is in line with results shown on BV in section B. We expect a heritability of 7-8% for dCE2.

Number of offspring pr bull, pr father and pr mgs

	bull_full	father_re-duc	mgs_reduc
50-70	0	5	0
71-100	1	4	3
101-200	1	11	3
201-500	21	16	13
501-1000	25	13	9
1001-2000	10	9	14
2001-	47	47	63
Min	100	56	73
Max	11992	8743	39099

r^2_{AI} for sire index

	h^2		
Number of offspring	0.02	0.08	0.32
1	0.01	0.02	0.08
10	0.05	0.17	0.47
50	0.20	0.51	0.81
100	0.33	0.67	0.90
200	0.50	0.80	0.95
1000	0.83	0.95	0.99
10000	0.98	1.00	1.00