

Final report about singlestep BxD for BBLxHOL and for AANxHOL

Trine Andersen and Ulrik Sander Nielsen, February 2025

Folder "Run-2025-02-12"

Introduction

Genotypes and phenotypes

Standardization

Combined indexes

X-indexes

Correlation between my EBV indexes and the official index

Correlation between EBV and SS breeding values

Correlation between breeding value and phenotypic level

Correlation between SS breeding values and X-indexes

Validation of HOL bulls

Indexes for publication to VG

Introduction

The breeding values are estimated separately for BBLxHOL and for AANxHOL, however the genotype imputation is run together.

The model and genetic parameters are the same for BBL and for AAN. The pedigree is different for BBL and AAN but setup is the same.

Model and parameters are shown in separate document.

Genotypes and phenotypes

Number of genotypes in total in AAN and BBL evaluations

AAN eval		BBL eval	
AAN	1845	BBL	890
HOL	6530	HOL	29090
XXX	3241	XXX	9335

Number of phenotypes and genotypes for AANxHOL and BBLxHOL calves

	AANxHOL		BBLxHOL	
	N phenotype	N genotype	N phenotype	N genotype
yss1	57347	2923	332972	8326
yss2	41941	2468	288234	7308
Fspc	3573	346	51489	1733
Mspc	6211	1061	65950	2713
diti	27430	2368	249701	7162
dise	27569	2371	249627	7168
klov	27599	2370	249918	7170
luti	27561	2367	249658	7166
luse	27463	2373	248337	7162
sb1	0	0	0	0
sb2	58282	2667	407519	8646
ce1	0	0	0	0
ce2	54727	2469	367993	8170
cs1	0	0	0	0
cs2	35189	2395	355655	7908
DGM	13553	1465	110807	3884
CSM	16989	1467	110986	3889
FAM	16989	1467	110986	3889
DGF	6568	456	83572	2410
CSF	9274	456	83574	2410
FAF	9274	456	83574	2410
MS	905	695	2144	1298
CH4	1678	1174	5231	3109
DFI	2202	1559	6555	3832
BW	2180	1555	6494	3821

The table below shows how many offspring with phenotype the bulls have. As an example there are 179 AAN bulls with at least one BxD calf, and 155 AAN bulls have at least one BxD offspring with phenotype for early youngstock survival (yss1), and these 155 AAN bulls have in average 553 offspring with phenotype for yss1, and a standard deviation of 1069 of number of offspring with yss1.

Number of BxD calves with phenotype for AAN bulls and for BBL bulls

	AAN bulls			BBL bulls		
	N bulls	mean N offspring	std N offspring	N bulls	mean N offspring	std N offspring
nav_id	179			206		
n1	155	553	1069	194	1716	4125
n2	150	459	877	190	1517	3743
n3	71	50	130	169	305	762
n4	77	81	214	171	386	987
n5	81	339	884	170	1469	3491
n6	81	340	892	170	1468	3491
n7	81	341	892	170	1470	3495
n8	81	340	891	170	1469	3491
n9	81	339	888	170	1461	3472
n10						
n11	157	503	1050	195	2090	4841
n12						
n13	154	438	963	195	1887	4380
n14						
n15	87	405	1032	195	1824	4255
n16	144	107	292	186	596	1521
n17	145	194	379	186	597	1524
n18	145	194	379	186	597	1524
n19	124	96	200	185	452	1155
n20	139	136	250	185	452	1155
n21	139	136	250	185	452	1155
n22	61	15	27	70	31	56
n23	35	48	73	51	103	127
n24	79	28	61	93	70	125
n25	79	28	60	93	70	124
n26	79	26	55	92	67	119
n27	79	28	61	93	70	125
n28	79	28	61	93	70	125

Standardization

Indexes are standardized where base animals have a mean of 100 and genetic standard deviation of 10. Base animals are defined as either BBLxHOL or AANxHOL calves born 2019-2022 and have a phenotype for the trait, and both genotyped and nongenotyped calves are in the base.

Higher breeding value means more profitable trait, thus for health, methane and feed intake the higher breeding value means lower phenotypic level.

For each trait: $r = (s - m)/k * 10 + 100$ or $r = -1 * (s - m)/k * 10 + 100$

Where r is standardized breeding value, s is raw breeding value, m is mean of base animals (see table below), k is square root of genetic variance (see table below).

N, Mean and std for unstandardized breeding values for base animals and square root of genetic variance

	AANxHOL			BBLxHOL			$\sqrt{(\text{gen_var})}$	
	N	Mean	std	N	Mean	std		
bsol1	33226	0.0004	0.0084	132056	0.0133	0.0167	k1	0.040249
bsol2	29889	-0.0062	0.0278	123569	0.0123	0.0250	k2	0.054772
bsol3	1929	0.0032	0.0080	25473	0.0015	0.0084	k3	0.011741
bsol4	3240	0.0019	0.0081	32126	0.0034	0.0088	k4	0.0126
bsol5	11644	-0.0067	0.0119	119685	0.0014	0.0134	k5	0.037612
bsol6	11629	0.0149	0.0226	119568	0.0018	0.0265	k6	0.055945
bsol7	11650	0.0060	0.0069	119731	0.0081	0.0119	k7	0.009073
bsol8	11642	-0.0084	0.0097	119639	-0.0021	0.0105	k8	0.022773
bsol9	11595	0.1824	0.1569	119000	-0.0008	0.1226	k9	0.12116
bsol10	28097	-0.0067	0.0185	160216	0.0188	0.0280	k10	0.05776
bsol11	28097	-0.0029	0.0073	160216	0.0069	0.0107	k11	0.020886
bsol12	25073	-0.0120	0.0857	144578	0.0801	0.1201	k12	0.21154
bsol13	25073	-0.0053	0.0414	144578	0.0428	0.0621	k13	0.11204
bsol14	12455	0.0352	0.1244	141367	-0.0891	0.1391	k14	0.27845
bsol15	12455	0.0215	0.0969	141367	-0.0564	0.0992	k15	0.17537
bsol16	7499	0.0068	0.0159	51957	0.0088	0.0201	k16	0.025966
bsol17	14107	0.0596	0.2320	52061	0.0490	0.3128	k17	0.46703
bsol18	14109	0.0408	0.1209	52061	0.0503	0.1350	k18	0.20871
bsol19	5631	0.0069	0.0204	40551	0.0049	0.0252	k19	0.030392
bsol20	9799	0.0425	0.2428	40552	-0.0222	0.3369	k20	0.47326
bsol21	9799	0.0311	0.1067	40552	0.0662	0.1347	k21	0.20286
bsol22	789	-3.1710	9.2457	1954	2.4081	7.0032	k22	14.1882
bsol23	886	0.0002	0.0025	3393	-0.0009	0.0030	k23	0.004923
bsol24	1317	0.0416	0.2238	4560	0.1221	0.2943	k24	0.39618
bsol25	1317	1.6386	9.6648	4544	1.3835	9.9137	k25	14.323
bsol26	1252	0.5020	9.0615	4435	5.4897	9.7366	k26	14.527
bsol27	1317	-0.0195	0.1912	4560	-0.0347	0.1940	k27	0.31133
bsol28	1317	-0.0362	0.1875	4560	-0.0488	0.2225	k28	0.34467

Standardized indexes for base animals

	AANxHOL			BBLxHOL		
	N	Mean	std	N	Mean	std
bv1	33226	100	2.1	132056	100	4.2
bv2	29889	100	5.1	123569	100	4.6
bv3	1929	100	6.8	25473	100	7.2
bv4	3240	100	6.4	32126	100	7.0
bv5	11644	100	3.2	119685	100	3.6
bv6	11629	100	4.1	119568	100	4.7
bv7	11650	100	7.6	119731	100	13.1
bv8	11642	100	4.2	119639	100	4.6
bv9	11595	100	13.0	119000	100	10.1
bv10	28097	100	3.2	160216	100	4.9
bv11	28097	100	3.5	160216	100	5.1
bv12	25073	100	4.1	144578	100	5.7
bv13	25073	100	3.7	144578	100	5.5
bv14	12455	100	4.5	141367	100	5.0
bv15	12455	100	5.5	141367	100	5.7
bv16	7499	100	6.1	51957	100	7.7
bv17	14107	100	5.0	52061	100	6.7
bv18	14109	100	5.8	52061	100	6.5
bv19	5631	100	6.7	40551	100	8.3
bv20	9799	100	5.1	40552	100	7.1
bv21	9799	100	5.3	40552	100	6.6
bv22	789	100	6.5	1954	100	4.9
bv23	886	100	5.0	3393	100	6.0
bv24	1317	100	5.7	4560	100	7.4
bv25	1317	100	6.7	4544	100	6.9
bv26	1252	100	6.3	4435	100	6.7
bv27	1317	100	6.1	4560	100	6.2
bv28	1317	100	5.4	4560	100	6.5

Standardized indexes for AAN bulls and BBL bulls with minimum 10 offspring with phenotype

	AAN bulls			BBL bulls		
	N	Mean	std	N	Mean	std
bv1	154	100	3.2	194	98	6.5
bv2	145	102	4.9	188	98	7.3
bv3	37	97	8.1	146	102	9.2
bv4	46	96	7.6	154	101	9.0
bv5	74	102	4.8	159	99	5.2
bv6	74	101	6.6	159	97	11.8
bv7	74	94	11.3	159	99	27.8
bv8	74	103	5.6	159	99	5.1
bv9	74	95	21.3	159	90	25.0
bv10						
bv11	152	102	5.2	195	96	7.6
bv12						
bv13	152	102	5.7	194	96	9.3
bv14						
bv15	81	98	7.7	194	102	9.3
bv16	109	97	9.7	176	95	10.5
bv17	121	103	6.4	176	107	11.5
bv18	121	102	8.5	176	98	8.9
bv19	87	97	9.9	170	97	11.1
bv20	102	103	6.7	170	108	12.2
bv21	102	102	7.5	170	99	9.3
bv22	18	100	10.5	29	99	7.1
bv23	33	99	7.1	50	100	8.1
bv24	38	100	7.5	56	104	7.8
bv25	38	99	8.4	56	96	7.0
bv26	37	98	7.9	55	99	8.2
bv27	38	99	7.9	56	103	8.5
bv28	38	100	6.9	56	104	8.1

Combined indexes

name	description	weights
FEFF	Feed efficiency	= EFF1
MEAT	Eating quality	= MS
METH	Methane production	= CH4
NETI	Net growth	= DGM *0.50 + DGF*0.50
SLFO	Conformation score	= CSM *0.50 + CSF *0.50
SLGP	Slaughter percentage	= Fspc * 0.50 + Mspc *0.50
FASC	Fat score	= FaM*0.50 + FaF*0.50
BRTH	Birth	= SB2
CALV	Calving	= CE2
OVTI	Early survival	= YSS1
OVSE	Late survival	= YSS2
HLTI	Early health	= (diti * 0.0063*2 + luti * 0.0056*2)/(0.0063*2 + 0.0056*2)
HLSE	Late health	= (dise * 0.0796 + klov *0.0042 + luse * 0.0264)/(0.0796 + 0.0042 + 0.0264)

X-indexes in Euro and DKK

	XMAF		XSLF		XMAN		XSLN		NLN		NLF	
	Euro	kroner	Euro	kroner	Euro	kroner	Euro	kroner	Euro	kroner	Euro	kroner
NETI	0.3770	2.8275	0.3770	2.8275	0.3770	2.8275	0.3770	2.8275	0.4375	3.2813	0.4375	3.2813
SLFO	0.1005	0.7538	0.1005	0.7538	0.1005	0.7538	0.1005	0.7538	0.3261	2.4458	0.3261	2.4458
FASC	0.0352	0.2640	0.0352	0.2640	0.0352	0.2640	0.0352	0.2640	-0.0744	-0.5580	-0.0744	-0.5580
BRTH	0.2050	1.5375	0	0	0.2050	1.5375	0	0	0.2050	1.5375	0.2050	1.5375
CALV	0.1862	1.3965	0	0	0.1862	1.3965	0	0	0.1862	1.3965	0.1862	1.3965
OVTI	0.1869	1.4018	0	0	0.1869	1.4018	0	0	0.1869	1.4018	0.1869	1.4018
OVSE	0.4315	3.2363	0.4315	3.2363	0.4315	3.2363	0.4315	3.2363	0.4315	3.2363	0.4315	3.2363
HLSE	0.1102	0.8265	0.1102	0.8265	0.1102	0.8265	0.1102	0.8265	0	0	0	0
SLGP	0.5330	3.9975	0.5330	3.9975	0.5330	3.9975	0.5330	3.9975	0	0	0	0
FEED	0.7737	5.8028	0.7737	5.8028	0	0	0	0	0	0	0.7737	5.8028
METH	0.1386	1.0395	0.1386	1.0395	0	0	0	0	0	0	0.1386	1.0395
EAQU	0	0	0	0	0	0	0	0	0	0	0	0
SUM	3.0778	23.0835	2.4997	18.7478	2.1655	16.2413	1.5874	11.9055	1.6988	12.7410	2.6111	19.5833

Correlation between my EBV indexes and the official index

My EBV indexes are correlated to the official index, which I do not make. The official model is a sire model with different data, different pedigree and different setup. For BBL the correlation is high, but lower for AAN, however the official index for AAN also includes RDC dams, which I do not include.

The correlation is lower for indexes with low heritability.

Correlation between EBV and official index for AAN bulls and BBL bulls with a minimum of 50 offspring with phenotype in my BxD evaluation.

		AAN		BBL	
		No	corr	No	corr
1	yss1	73	0.63	141	0.92
2	yss2	68	0.85	135	0.96
3	Fspc	12	0.97	79	0.98
4	Mspc	18	0.95	84	0.98
5	diti	37	0.76	119	0.74
6	dise	37	0.59	119	0.88
7	klov	37	0.51	119	0.86
8	luti	37	0.75	119	0.70
9	luse	36	0.63	119	0.70
10	sb1	67	0.53	142	0.94
11	sb2	67	0.66	142	0.96
12	ce1	66	0.79	142	0.98
13	ce2	66	0.75	142	0.98
14	cs1	37	0.93	141	0.97
15	cs2	37	0.97	141	0.99
16	DGM	39	0.93	117	0.99
17	CSM	49	0.89	117	0.99
18	FAM	49	0.94	117	0.98
19	DGF	42	0.96	104	0.99
20	CSF	47	0.89	104	0.99
21	FAF	47	0.86	104	0.98

Correlation between EBV and SS breeding values

Correlation between EBV and SS breeding values for bulls with minimum of 50 offspring with phenotype.

For calving traits are counted for later parity offspring, and for EFF and FEFF are counted for DFI.

t	name	AAN no	corr	BBL no	corr
1	yss1	119	0.99	187	0.99
2	yss2	110	0.98	178	0.98
3	Fspc	12	1.00	91	1.00
4	Mspc	19	1.00	97	1.00
5	diti	47	0.94	145	0.98
6	dise	47	0.99	145	1.00
7	klov	47	0.95	145	0.92
8	luti	47	0.93	145	0.98
9	luse	46	0.97	145	0.99
10	sb1	113	0.89	189	0.99
11	sb2	113	0.87	189	0.99
12	ce1	107	0.98	188	1.00
13	ce2	107	0.97	188	1.00
14	cs1	49	0.99	186	1.00
15	cs2	49	1.00	186	1.00
16	DGM	47	0.99	145	1.00
17	CSM	68	0.99	145	1.00
18	FAM	68	1.00	145	1.00
19	DGF	49	0.99	126	1.00
20	CSF	60	1.00	126	1.00
21	FAF	60	1.00	126	1.00
22	MS	3	1.00	11	1.00
23	CH4	7	0.99	22	1.00
24	DFI	9	1.00	24	1.00
25	BW	9	1.00	24	1.00
26	dBW	9	1.00	24	1.00

Correlation between breeding value and phenotypic level

Correlation between breeding value and phenotype for BxD calves with phenotype (born >= 2018).

*dBW is correlated to phenotype for BW.

t	name	AANxHOL			BBLxHOL		
		no	Corr EBV	Corr SS	no	Corr EBV	Corr SS
1	yss1	69219	0.28	0.28	255485	0.21	0.20
2	yss2	53907	0.20	0.20	214463	0.23	0.23
3	Fspc	3464	0.64	0.64	38785	0.74	0.74
4	Mspc	6041	0.70	0.70	51861	0.79	0.79
5	diti	27135	-0.17	-0.15	218054	-0.16	-0.17
6	dise	27274	-0.26	-0.26	218046	-0.28	-0.27
7	klov	27304	-0.22	-0.19	218245	-0.16	-0.16
8	luti	27266	-0.20	-0.17	218011	-0.17	-0.16
9	luse	27168	-0.32	-0.32	216908	-0.30	-0.31
10	sb1	65811	.	.	320104	.	.
11	sb2	65811	0.25	0.24	320104	0.23	0.22
12	ce1	58872	.	.	287303	.	.
13	ce2	58872	0.36	0.36	287303	0.38	0.37
14	cs1	34513	.	.	278727	.	.
15	cs2	34513	0.42	0.41	278727	0.36	0.35
16	DGM	13519	0.53	0.53	85854	0.55	0.55
17	CSM	21811	0.57	0.56	86001	0.74	0.73
18	FAM	21813	0.52	0.52	86001	0.64	0.63
19	DGF	9257	0.54	0.56	63527	0.61	0.61
20	CSF	14305	0.58	0.58	63529	0.73	0.72
21	FAF	14305	0.41	0.41	63529	0.65	0.65
22	MS	905	0.59	0.57	2144	0.63	0.60
23	CH4	1679	-0.62	-0.61	5231	-0.54	-0.52
24	DFI	2203	-0.47	-0.44	6555	-0.39	-0.38
25	BW	2181	0.40	0.39	6494	0.36	0.35
26	*dBW	2038	0.55	0.52	6209	0.52	0.49

Correlation between SS breeding values and X-indexes

Below is shown correlations between singlestep indexes and the two X-indexes for 119 AAN bulls and 187 BBL bulls with minimum of 50 offspring with yss1 phenotype

Slaughter percentage is correlated much higher to the two X indexes for BBL than for AAN bulls. The same for daily gain, conformation score and methane, whereas the FBC index BW is correlated more positive for AAN than for BBL to the two X indexes.

		AAN						BBL			
		XMAF	XSLF	XMAN	XSLN	NLN	NLF	XMAF	XSLF	XMAN	XSLN
	N	119	119	119	119	119	119	187	187	187	187
yss1	bv1	0.28	0.16	0.35	0.22	0.36	0.30	0.17	-0.05	0.28	0.03
yss2	bv2	0.23	0.20	0.32	0.30	0.49	0.39	0.22	0.09	0.39	0.24
Fspc	bv3	0.28	0.32	0.40	0.48	-0.02	-0.07	0.64	0.70	0.63	0.75
Mspc	bv4	0.30	0.32	0.41	0.46	-0.04	-0.09	0.67	0.70	0.70	0.77
diti	bv5	-0.22	-0.10	-0.14	0.01	0.18	0.06	0.06	0.05	0.04	0.03
dise	bv6	0.02	-0.12	0.00	-0.17	-0.23	-0.19	0.15	0.13	0.09	0.08
klov	bv7	0.16	0.03	0.15	0.00	-0.24	-0.18	-0.02	0.03	0.03	0.10
luti	bv8	-0.21	-0.08	-0.13	0.04	0.20	0.08	0.00	-0.09	0.10	0.00
luse	bv9	0.16	0.01	0.10	-0.08	-0.25	-0.16	0.17	0.15	0.29	0.28
sb1	bv10	0.24	-0.11	0.33	-0.08	0.11	0.06	0.10	-0.27	0.25	-0.19
sb2	bv11	0.26	-0.07	0.31	-0.08	0.07	0.06	0.11	-0.25	0.25	-0.17
ce1	bv12	0.09	-0.23	0.24	-0.15	0.17	0.05	0.04	-0.32	0.19	-0.22
ce2	bv13	0.12	-0.22	0.26	-0.14	0.16	0.05	0.03	-0.32	0.18	-0.24
cs1	bv14	-0.09	0.23	-0.24	0.14	-0.18	-0.06	-0.04	0.31	-0.21	0.20
cs2	bv15	-0.03	0.25	-0.19	0.14	-0.18	-0.04	-0.02	0.30	-0.19	0.18
DGM	bv16	0.44	0.55	0.52	0.68	0.67	0.59	0.58	0.67	0.56	0.71
CSM	bv17	0.23	0.28	0.37	0.46	0.55	0.40	0.53	0.66	0.51	0.70
FAM	bv18	0.06	-0.01	0.09	0.02	0.02	0.00	-0.21	-0.32	-0.19	-0.33
DGF	bv19	0.45	0.54	0.54	0.68	0.73	0.63	0.54	0.68	0.48	0.68
CSF	bv20	0.27	0.28	0.42	0.46	0.52	0.38	0.46	0.62	0.42	0.64
FAF	bv21	0.05	-0.05	0.06	-0.05	-0.11	-0.10	-0.09	-0.25	-0.07	-0.25
MS	bv22	-0.01	-0.08	-0.16	-0.26	-0.15	-0.02	-0.02	-0.08	0.14	0.07
CH4	bv23	0.12	0.13	0.16	0.18	0.03	0.01	0.23	0.25	0.10	0.14
DFI	bv24	0.07	0.12	-0.36	-0.33	-0.32	0.06	0.07	0.17	-0.30	-0.17
BW	bv25	0.43	0.45	0.29	0.32	0.25	0.40	0.14	0.16	0.17	0.20
dBW	bv26	0.37	0.34	0.24	0.21	0.26	0.38	0.48	0.41	0.40	0.35
EFF1	bv27	0.51	0.57	-0.15	-0.12	-0.12	0.48	0.44	0.53	-0.03	0.09
EFF2	bv28	0.31	0.36	-0.29	-0.27	-0.25	0.30	0.33	0.41	-0.11	-0.01
MEAT	bv29	-0.01	-0.08	-0.16	-0.26	-0.15	-0.02	-0.02	-0.08	0.14	0.07
METH	bv30	0.12	0.13	0.16	0.18	0.03	0.01	0.23	0.25	0.10	0.14
NETI	bv31	0.45	0.55	0.53	0.68	0.71	0.62	0.57	0.69	0.53	0.71
SLFO	bv32	0.25	0.29	0.40	0.47	0.54	0.40	0.50	0.65	0.47	0.68
SLGP	bv33	0.30	0.33	0.42	0.49	-0.02	-0.07	0.66	0.71	0.67	0.76
FASC	bv34	0.06	-0.02	0.09	-0.01	-0.04	-0.05	-0.15	-0.29	-0.13	-0.30
BRTH	bv35	0.26	-0.07	0.31	-0.08	0.07	0.06	0.11	-0.25	0.25	-0.17
CALV	bv36	0.12	-0.22	0.26	-0.14	0.16	0.05	0.03	-0.32	0.18	-0.24
OVTI	bv37	0.28	0.16	0.35	0.22	0.36	0.30	0.17	-0.05	0.28	0.03
OVSE	bv38	0.23	0.20	0.32	0.30	0.49	0.39	0.22	0.09	0.39	0.24
HLTI	bv39	-0.22	-0.09	-0.14	0.02	0.18	0.07	0.03	-0.01	0.07	0.02
HLSE	bv40	0.11	-0.04	0.07	-0.12	-0.26	-0.18	0.17	0.16	0.20	0.19

*For full correlation structure between all 46 traits, see separate document

Validation of HOL bulls

Due to the low number of BBL bulls and AAN bulls we have tried to validate the BxD indexes for HOLbulls. The current setup for singlestep BxD evaluation is built in a way where genotypes for HOLcows, BBL animals, AAN animals and BxD animals are included in the evaluation. HOLbulls (grandsires for BxD calves) is only included in pedigree but do not have a genotype included in the singlestep BxD evaluation. The genotype map for BxD singlestep evaluation is a HOLmap and the Singlestep setup creates a file for SNPsolutions. The SNPsolutions can be used to estimate breeding values for genotypes animals (here HOLbulls) in the same procedure as we do Monthly and Weekly runs for Singlestep purebred dairy evaluations. This means that there is polygenic effect in the monthly breeding values. We have also made a test where the SNPsolutions are all set to zero and then the monthly breeding values are only based on the polygenic information. We have tested this for the traitgroup "CARC" which is 16= SDGM, 17= CSM, 18= FATM, 19= SDGF, 20= CSF and 21=FATF.

We compare breeding values for each trait.

bv = singlestep BxD eval with genotypes for singlestep, but no genotypes for HOLbulls

ebv = traditional BxD eval (similar to singlestep but without any genotypes)

mbv = monthly BxD eval (SNPsolutions on genotypes for HOLBulls)

pbv = monthly BxD eval (SNPsolutions all set to zero and thus only polygenic information on HOLbulls)

ssbv = official singlestep purebred HOL eval february2025 for growth

The official singlestep growth indexes for purebred HOL are 1=SDG, 3=CS and 4=FAT.

In the official singlestep growth evaluation the fatscore breeding value has higher breeding value for lower fat score in phenotype. In BxD evaluation higher breeding for fatscore means higher fatscore in phenotype.

Distribution of number of BxD grandchildren for HOL bulls with genotype in official evaluation for purebred growth.

N grandchildren	AANxHOL calves		BBLxHOL calves	
	number of HOLbulls	perc	number of HOLbulls	perc
<=10	1392	78	1183	49
11-20	147	8	366	15
21-30	65	4	242	10
31-40	45	3	136	6
41-50	35	2	73	3
51-60	26	1	27	1
>60	82	5	364	15
Sum	1792	100	2391	100

Correlation between breeding values for 240 HOLbulls with at least 20 AANxHOL and 20 BBLxHOL grand-children with phenotype for "CARC" which is 16= SDGM, 17= CSM, 18= FATM

16		AAN				BBL				HOL
		bv	ebv	mbv	pbv	bv	ebv	mbv	pbv	ssbv
AAN	bv	1								
	ebv	0.97	1							
	mbv	0.98	0.94	1						
	pbv	0.98	0.95	0.98	1					
BBL	bv	0.69	0.68	0.70	0.70	1				
	ebv	0.66	0.66	0.67	0.67	0.99	1			
	mbv	0.71	0.70	0.72	0.71	0.99	0.98	1		
	pbv	0.70	0.70	0.72	0.71	1.00	0.98	0.99	1	
HOL	ssbv	0.58	0.58	0.58	0.58	0.75	0.74	0.76	0.75	1

17		AAN				BBL				HOL
		bv	ebv	mbv	pbv	bv	ebv	mbv	pbv	ssbv
AAN	bv	1								
	ebv	0.98	1							
	mbv	0.97	0.93	1						
	pbv	0.98	0.96	0.98	1					
BBL	bv	0.76	0.72	0.78	0.77	1				
	ebv	0.74	0.71	0.76	0.75	0.99	1			
	mbv	0.76	0.73	0.79	0.78	0.99	0.98	1		
	pbv	0.77	0.73	0.79	0.79	0.99	0.98	0.99	1	
HOL	ssbv	0.68	0.62	0.70	0.68	0.81	0.78	0.82	0.82	1

18		AAN				BBL				HOL
		bv	ebv	mbv	pbv	bv	ebv	mbv	pbv	ssbv
AAN	bv	1								
	ebv	0.97	1							
	mbv	0.96	0.92	1						
	pbv	0.97	0.94	0.98	1					
BBL	bv	0.53	0.49	0.55	0.54	1				
	ebv	0.50	0.47	0.51	0.51	0.98	1			
	mbv	0.54	0.49	0.56	0.55	0.99	0.96	1		
	pbv	0.55	0.51	0.56	0.56	0.99	0.97	0.99	1	
HOL	ssbv	-0.60	-0.56	-0.63	-0.61	-0.74	-0.72	-0.74	-0.74	1

Correlation between breeding values for 109 HOLbulls with at least 50 offspring with phenotype in purebred HOL evaluation for growth and 0 grandchildren for AANxHOL and 0 grandchildren for BBLxHOL evaluation for "CARC" which is 16= SDGM,17= CSM,18= FATM

16		AAN				BBL				HOL
		bv	ebv	mbv	pbv	bv	ebv	mbv	pbv	ssbv
AAN	bv	1								
	ebv	0.88	1							
	mbv	0.62	0.46	1						
	pbv	0.90	0.70	0.57	1					
BBL	bv	0.40	0.29	0.38	0.51	1				
	ebv	0.47	0.44	0.31	0.57	0.78	1			
	mbv	0.37	0.19	0.65	0.36	0.55	0.42	1		
	pbv	0.42	0.30	0.41	0.53	0.99	0.77	0.58	1	
HOL	ssbv	0.26	0.15	0.46	0.28	0.41	0.33	0.60	0.42	1

17		AAN				BBL				HOL
		bv	ebv	mbv	pbv	bv	ebv	mbv	pbv	ssbv
AAN	bv	1								
	ebv	0.74	1							
	mbv	0.49	0.36	1						
	pbv	0.96	0.65	0.49	1					
BBL	bv	0.48	0.38	0.44	0.46	1				
	ebv	0.46	0.53	0.23	0.45	0.68	1			
	mbv	0.41	0.30	0.62	0.40	0.74	0.50	1		
	pbv	0.50	0.34	0.38	0.52	0.94	0.64	0.64	1	
HOL	ssbv	0.36	0.13	0.46	0.33	0.47	0.31	0.71	0.40	1

18		AAN				BBL				HOL
		bv	ebv	mbv	pbv	bv	ebv	mbv	pbv	ssbv
AAN	bv	1								
	ebv	0.84	1							
	mbv	0.62	0.49	1						
	pbv	0.88	0.68	0.66	1					
BBL	bv	0.20	0.10	0.20	0.11	1				
	ebv	0.24	0.20	0.26	0.21	0.73	1			
	mbv	0.22	0.15	0.43	0.16	0.74	0.55	1		
	pbv	0.25	0.16	0.25	0.18	0.97	0.69	0.74	1	
HOL	ssbv	-0.22	-0.19	-0.26	-0.15	-0.23	-0.14	-0.38	-0.22	1

Indexes for publication to VG

3000 AAN animals and 535 BBL animals have indexes, which is allowed for publication for this run.
The standard deviation of indexes is much lower for AAN than for BBL.

	AAN Mean	std	BBL Mean	std
N	3000	3000	535	535
FEFF	100.6	1.8	101.0	4.8
MEAT	100.6	1.8	99.4	3.3
METH	99.0	1.3	99.6	3.8
NETI	97.8	2.8	95.9	7.6
SLFO	103.4	1.7	105.2	7.2
SLGP	96.4	2.0	102.0	5.6
FASC	102.0	1.8	100.2	5.6
BRTH	100.4	1.9	99.5	4.8
CALV	99.9	2.0	98.9	6.3
OVTI	99.5	0.9	100.4	5.0
OVSE	102.5	1.6	100.5	5.3
HLTI	.	.	.	.
HLSE	101.2	4.6	93.1	6.0
XMF	-8.4	15.0	-2.4	49.7
XSF	-8.1	15.1	-0.6	51.5
XMN	-11.0	11.5	-7.6	44.3
XSN	-10.6	11.1	-5.8	41.2
NLN	6.2	12.0	.	.
NLF	8.7	15.7	.	.