



Heritability of sow longevity and life time production in Finnish Large White and Landrace pigs

Marja-Liisa Sevón-Aimonen¹, Soili Haltia² and Pekka Uimari¹

¹MTT Agrifood Research Finland

²Figen Ltd.

marja-liisa.sevon-aimonen@mtt.fi

Introduction

- Replacement costs in piglet production can be decreased by increasing longevity and especially life time productivity of SOWS
- Particularly culling of primiparous sows decrease both life time productivity and average litter size
 - sows don't achieve the most prolific age
- Genomic evaluation is a new tool for breeding value estimation
 - suitable for traits that can only be measured later in production life
 - increase importance of these traits in breeding programs

Objective

- The objective of the current study was to estimate genetic (co)variances for longevity and other lifetime productivity traits
- Results will be further used in developing genomic evaluation model for these traits

Materials

- Data were obtained from the Finnish pig breeding company Figen Ltd
 - 23078 Large White (LW) sows + 30881 pedigree animals
 - 27103 Landrace (LR) sows + 25011 pedigree animals
- Sows were born between years 2000 and 2006
- Records were available till end of 2010
- Requirements for inclusion of the record in the data set:
 - farm test result exists
 - sow has at least first farrowing
 - culling day is available and the reason for culling is known
 - if the culling reason was poor breeding value for meat production traits or systematic culling the observation was removed

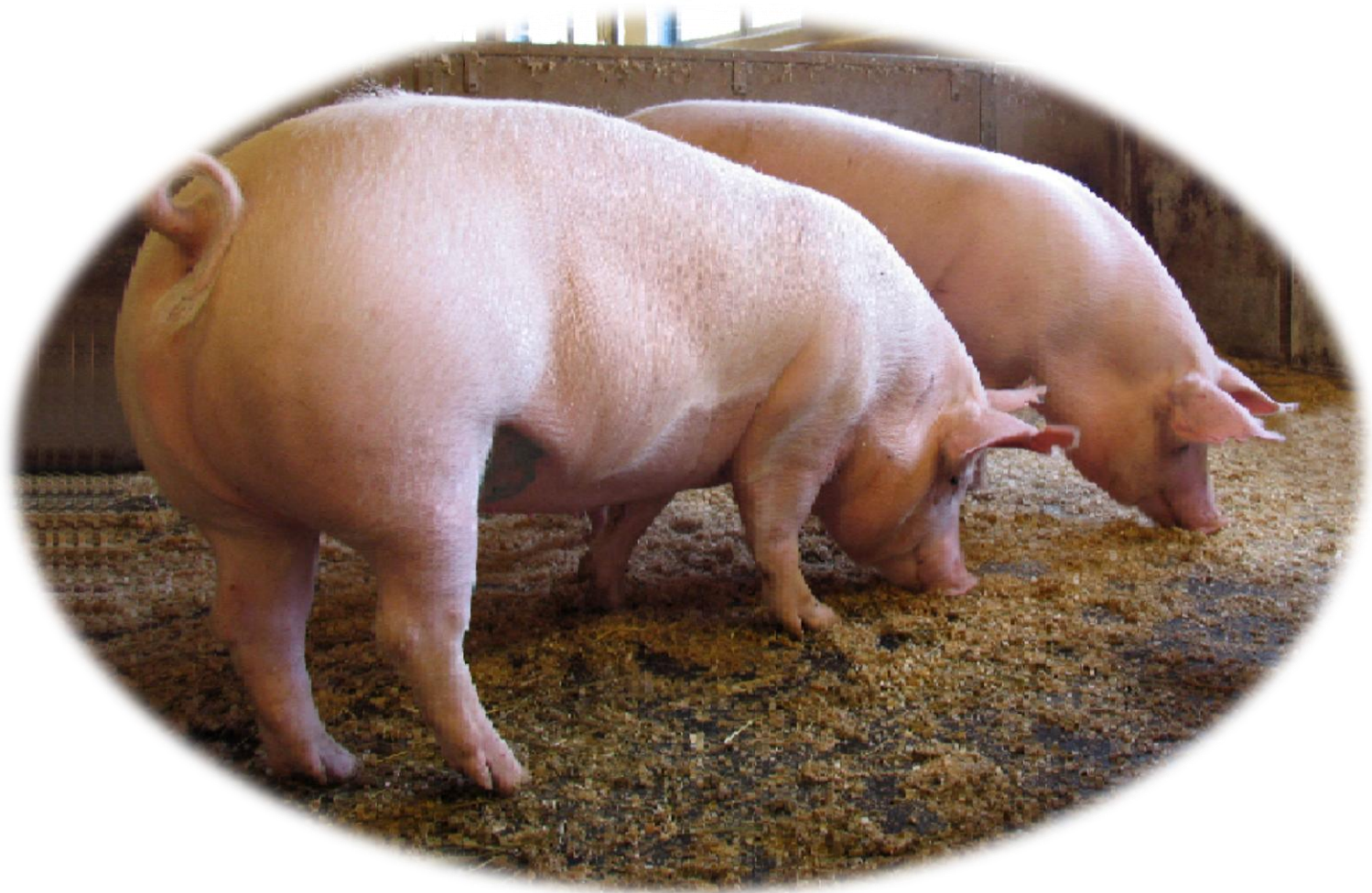
Traits

- Age at culling (AC)
- Total number of parities (TNP)
- Life time production measured as a total number of
 - piglets born (LTNB)
 - piglets born alive (LTBA)
 - still born (LTSB)
 - weaned (LTW)
 - died before weaning (LTPM)
- Proportion of non-productive days to total herd days calculated from the first mating (HTNP)

Methods

- (Co)variances were estimated using a multitrait animal model REML and DMU program package
- The linear model contained herd and birth month as fixed effects and dam, animal (additive polygenic effect) and error as random effects

Results



Heritabilities and phenotypic variances

	Large White		Landrace	
	h^2	V_p	h^2	V_p
AC	0.11	129534	0.08	139592
TNP	0.11	4.65	0.08	5.08
LTNB	0.12	788	0.09	842
LTBA	0.12	647	0.09	697
LTSB	0.12	18.4	0.07	18.1
LTW	0.10	422	0.08	452
LTPM	0.16	99.2	0.08	94.9
HTNB	0.06	0.023	0.06	0.026

Genetic (upper triangular) and phenotypic correlations, Large White

	AC	TNP	LTNB	LTSB	TNPM	HTNP
AC		0.89	0.88	0.48	0.58	0.09
TNP	0.94		0.97	0.61	0.68	-0.26
LTNB	0.91	0.96		0.67	0.70	-0.23
LTSB	0.52	0.57	0.63		0.48	-0.28
TNPM	0.52	0.57	0.60	0.36		-0.08
HTNP	0.00	-0.24	-0.22	-0.16	-0.04	

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Genetic (upper triangular) and phenotypic correlations, Landrace

	AC	TNP	LTNB	LTSB	TNPM	HTNP
AC		0.96	0.92	0.38	0.70	-0.13
TNP	0.95		0.95	0.41	0.77	-0.36
LTNB	0.93	0.97		0.53	0.83	-0.38
LTSB	0.58	0.61	0.66		0.46	-0.17
TNPM	0.59	0.63	0.66	0.40		-0.33
HTNP	-0.15	-0.37	-0.34	-0.24	-0.14	

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Conclusions

- Estimated heritabilities were higher in Large White (h^2 from 0.06 to 0.16) than in Landrace (h^2 from 0.06 to 0.09)
- Values were at a reasonable level in both breeds to be used in selection program
- Correlations between age at culling, total number of parities and life time production were highly positive (r_g from 0.88 to 0.96)
- Life time production measured as a total number of piglets born was also highly correlated with a total number of still born piglets and piglets died before weaning (r_g from 0.53 to 0.83)
- Proportion of non productive days was negatively correlated with almost all other studied traits, but correlations were either low or moderate (r_g from 0.9 to -0.38)

Acknowledgement

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Thank you for your attention!

