WHY GENETIC SERVICE-SIRE EFFECT ON LITTER SIZE IN SIRE AND DAM LINES SHOULD NOT BE IGNORED

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ISO 9001 Management System Certification
BUREAU VERITAS Certification Denmark A/S

Dan Avl

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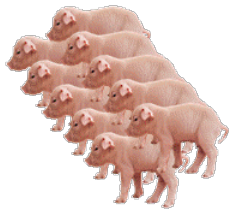
THE SERVICE-SIRE EFFECT IS ECONOMICALLY IMPORTANT IN SIRE LINES, BUT NOT IN DAM LINES

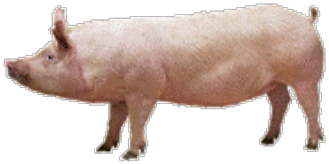
Sire line
– Terminal service-sire

Breeding goal: Paternal effect

Fertility - Litter size



Dam line - Yorkshire



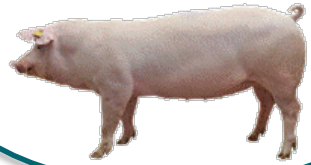
X

Crossbred sow

Breeding goal: Maternal effect

X

Dam line - Landrace



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THE SERVICE-SIRE EFFECT IMPROVES ACCURACY OF EBV'S FOR TOP SIRES IN DAM LINES

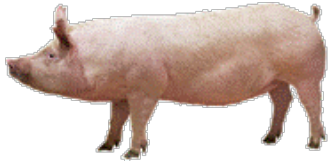
Selection candidates:

Selection criteria:

Matings:

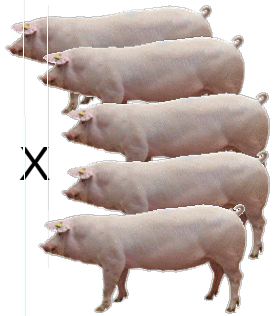
N phenotypes:

♂ Landrace boar

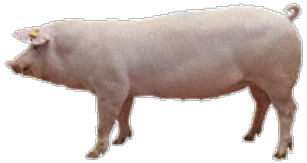


Parent average

X

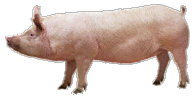


♀ Landrace sow



Parent average

X



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THEREFORE WE HYPOTHESIZE THAT:

1) There is a significant genetic service-sire effect in sire lines

2) The genetic service-sire effect improves prediction of female fertility in dam lines

METHODS:

1. Models:
   a) Excluding a genetic service-sire effect
   b) Including a genetic service-sire effect

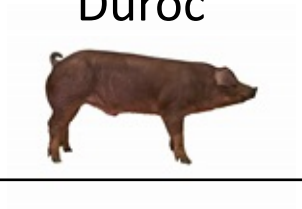
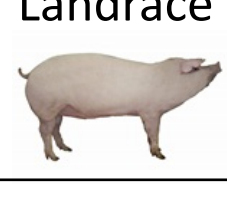
2. Predictive ability and bias for the dam lines:
   a) Accuracy $= r_{\hat{g}_{sow}, Y_c}$

      Y_c: corrected phenotypes

   b) Bias $= \beta_{\hat{g}_{sow}, g_{sow}}$

      $\hat{g}_{sow}$ and g_{sow}: ebv's before and after own performance

DATA

	Duroc	Yorkshire	Landrace
			
Trait:	Total no. born (TNB)	Live piglets at 5 days (LP5)	
N service-sires:	606	3,384	3,567
N sows:	7,520	46,377	51,670
Parities:	1st (70%) – 4th	1st (46%) – 5th	1st (47%) – 5th
N Litters; Purebred:	10,093	66,732	88,120
Crossbred:	0	34,013	22,897

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THE GENETIC SERVICE-SIRE EFFECT IN DUROC SIRE LINE IS SIGNIFICANT

	Model	
Parameters*	Excl. genetic service-sire	Incl. genetic service-sire
h^2_{sow}	0.09	0.09
$h^2_{service-sire}$		0.06
c^2_{sow}	0.08	0.08
$c^2_{service-sire}$	0.08	0.00
$r_{g;sow,service-sire}$		0.37

* All parameters were significant

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THE GENETIC SERVICE-SIRE EFFECT IMPROVES PREDICTION OF FEMALE FERTILITY

		Model	
	Breed	Excl. genetic service-sire	Incl. genetic service-sire
Accuracy, $r_{\hat{g}_{sow},Y_c}$	Landrace	0.05	0.07
	Yorkshire	0.06	0.06
Bias, $\beta_{\hat{g}_{sow},g_{sow}}$	Landrace	1.12	1.18
	Yorkshire	1.01	1.00

* GSS: Genetic service-sire effect

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COMBINATION OF LARGE GENETIC SERVICE-SIRE EFFECT AND CORRELATION TO GENETIC SOW EFFECT

	Landrace	Yorkshire
h^2_{sow}	0.06	0.05
$h^2_{service-sire}$	0.04	0.03
$r_{g;sow,service-sire}$	0.76 ± *0.09*	0.17 ± *0.12*

* All heritabilities were significant

GENETIC SERVICE-SIRE EFFECT FOR LITTER SIZE IN SIRE AND DAM LINES SHOULD NOT BE IGNORED!

- The genetic service-sire effect is important for male fertility in sire lines
- The genetic service-sire effect improves prediction of female fertility in dam lines

Genetic service-sire effects should be included in breeding programs both for sire and dam lines!