Genetics of carcass condemnations and relationships with growth, backfat and uniformity in pigs

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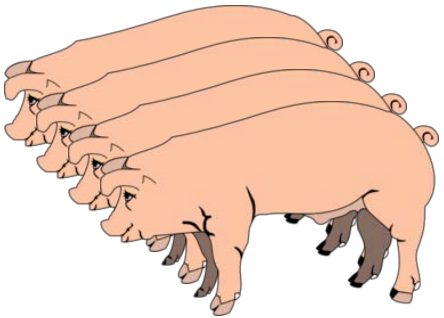

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Topigs Norsvin
PROGRESS IN PIGS

Selection to increase uniformity of finisher pigs

- Uniform pigs are advantageous
  - No price penalties by slaughterhouse
  - Less/no sorting by farmer
  - More efficient growth, better welfare

- Indications for genetic variation in uniformity

Are there trade-offs when selecting on increased uniformity?

- Are uniform animals enough responsive to diseases or other environmental perturbations?

- A favourable relationship could be expected as well:
  - Uniform pigs are more resilient/robust
  - Families with higher uniformity have fewer runts

Objectives

- Estimate genetic variation in uniformity for finisher traits
- Estimate genetic relationships between uniformity and carcass condemnations
- Estimate improvement in profit when sorting boars on uniformity

Data

Pietrain terminal crosses

- 56319 records
- 3 farms
- 701 sires
- 28 and 220 offspring/ sire

Traits

- Growth: birth weight to carcass weight
- Backfat
- Carcass weight

- Bursitis: inflammation of bursae in joints
- Pneumonia: inflammation of lungs
- Pleuritis: inflammation of pleura around lungs
- Pericarditis: inflammation of pericardium around heart

Method

- Double hierarchical generalized linear model (Asreml4)
  - Model on trait level and on residual variance
  - Sire-dam model

- Random effects:
  sire-dam additive genetic effects and litter
- Fixed effects
  finisher traits: farm, sex, farm.sex.line, hysbirth
  carcass condemnation: slaughter date (extra)

Genetic variation in residual variance

trait	Genetic variance uniformity		Genetic correlation mean-var	
growth	0.049	(0.013)	0.182	(0.094)
backfat	0.199	(0.011)	0.779	(0.035)
carcass weight	0.044	(0.010)	0.405	(0.085)

- High genetic variance in uniformity
- Positive genetic correlations: scaling
  - Higher mean, higher variance

Heritabilities carcass condemnations

	h^2	se h^2
bursitis	0.073	0.006
pneumonia	0.025	0.004
pleuritis	0.014	0.003
pericarditis	0.022	0.004

Genetic correlations between carcass condemnations and uniformity of growth

	Uniformity of growth	
bursitis	-0.133	(0.107)
pneumonia	-0.035	(0.152)
pleuritis	-0.155	(0.184)
pericarditis	-0.143	(0.157)

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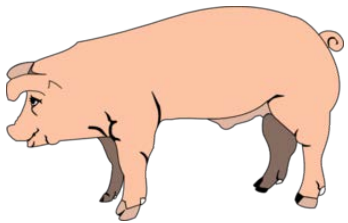
Genetic correlation between carcass condemnations and uniformity of backfat

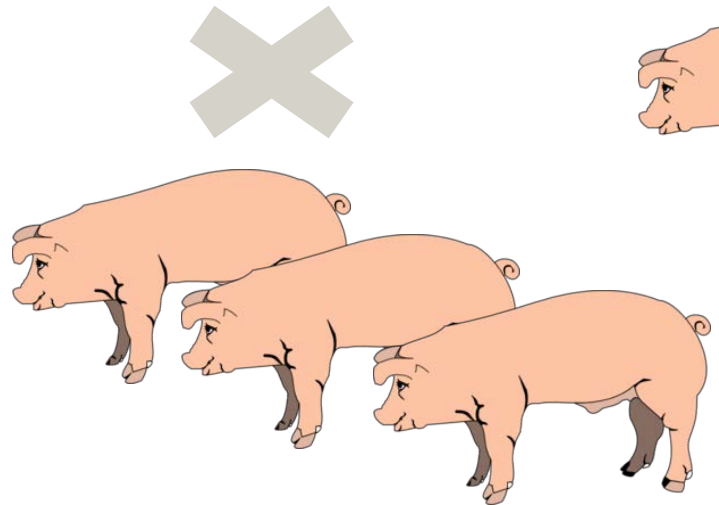
	Uniformity of backfat	
bursitis	-0.12	(0.07)
pneumonia	0.10	(0.10)
pleuritis	-0.10	(0.11)
pericarditis	0.03	(0.10)

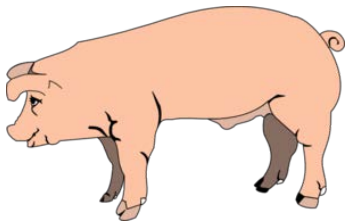
Sorting boars on uniformity and effect on profit

Boars selected 1 genetic sd
- Selection intensity = 2
- Accuracy = 0.5
- No correlated effect on mean

Dams are unselected

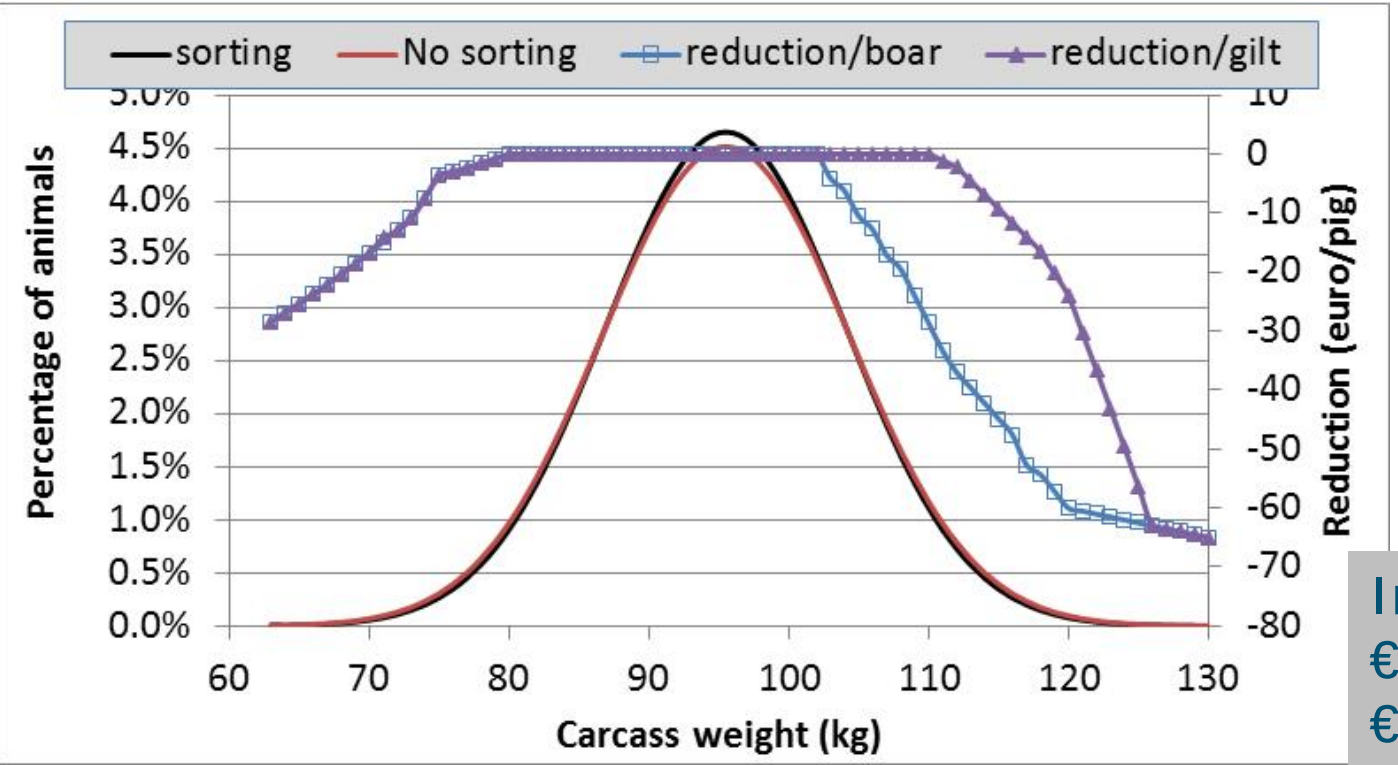






Sorting boars on uniformity and effect on profit

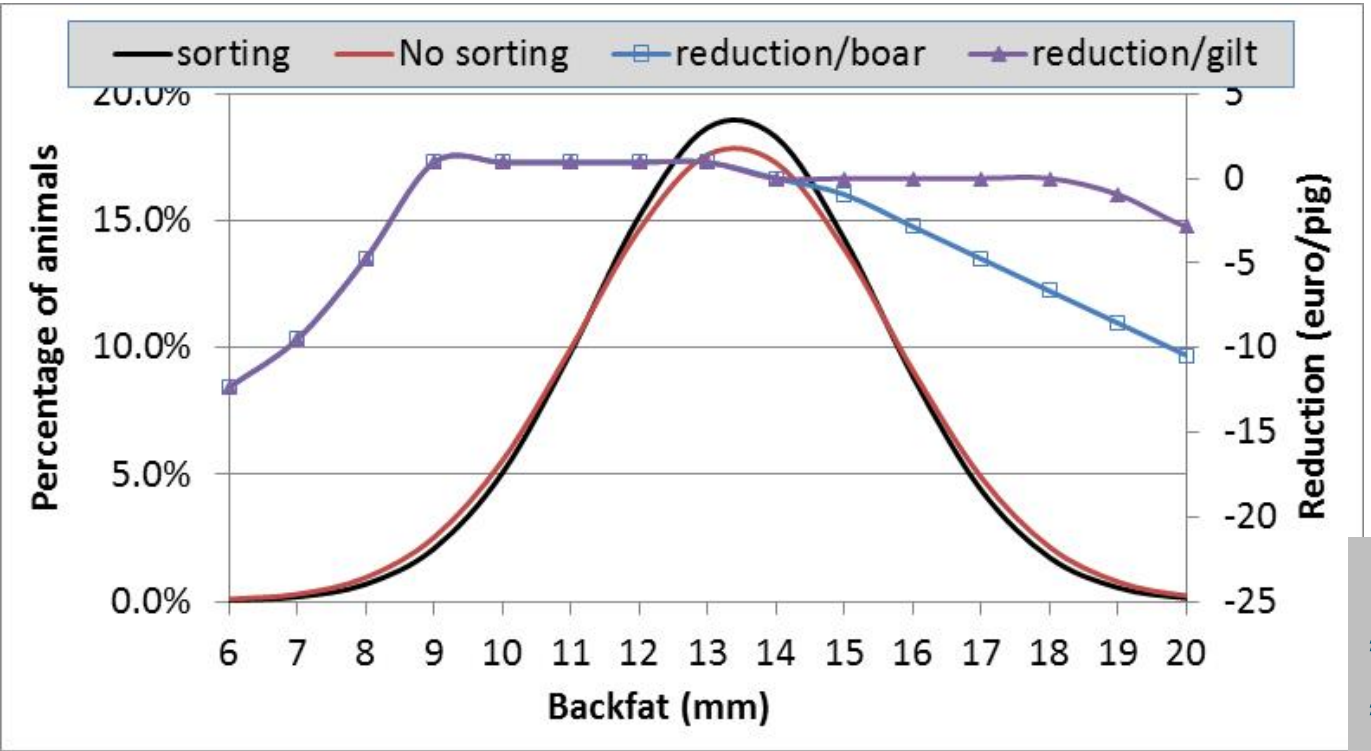
Uniformity of growth rate



Increase in profit
€ 0.30/boar
€ 0.09/gilt

Sorting boars on uniformity and effect on profit

Uniformity of backfat



Increase in profit
€ 0.12/boar
€ 0.04/gilt

Conclusion

- Substantial genetic variation in uniformity for growth, carcass weight and backfat
- No significant genetic correlations between uniformity and carcass condemnations
- Sorting boars on uniformity of growth rate and backfat improves profit by € 0.05 – 0.20 per pig