Progress in Pigs

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Phenotypic and genetic applications for total nutritional efficiency in pigs

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Model feed to pork

Feed

BLACK BOX

Pork

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Objective

Model for total feed efficiency

Content

Model

- Building
- Validation

Sensitivity analysis

Application

- Sire lines and finishing
- Consequences of genetic trends in female reproduction

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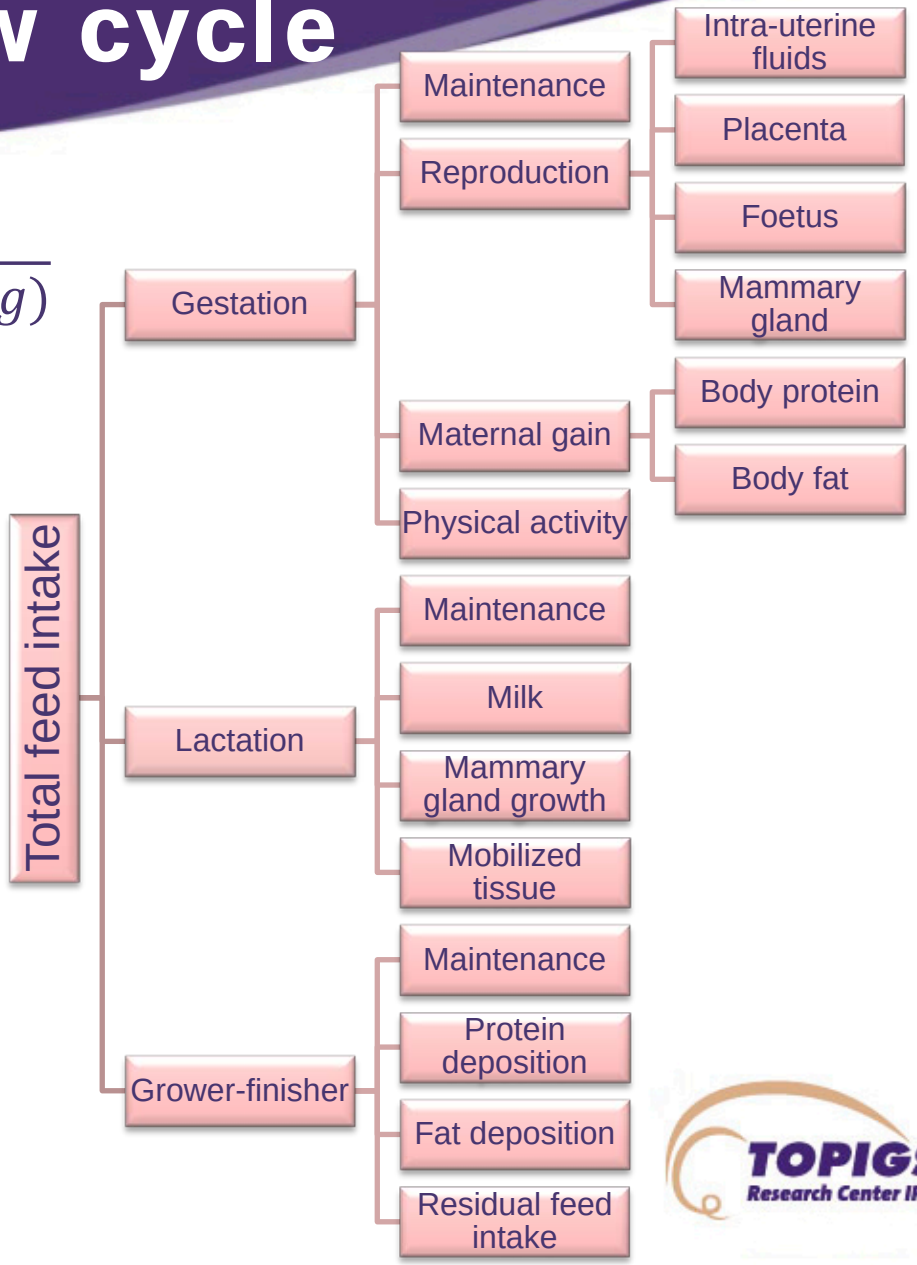
Modelling a sow cycle

$$\text{TFE} = \frac{Feed\ intake\ (kg)}{live\ weight\ at\ slaughter (kg)}$$



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Data

Literature relations as far as possible

Data set for other relations and for validation

- One farm
- 505 crossbred sows with 1833 Litters
- 27913 piglets/finishers
  - 27905 Records in the piglets phase
  - 18743 In the farrow-to-finish phase

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Validation

Gestation			**3556**
Maintenance			2502
Reproduction			194
Maternal gain			642
Physical activity			218
Lactation			**1951**
Maintenance			557
Milk			1926
Mammery gland growth			89
Mobilized tissue			-621
Grower-finisher			**42110**
Per sow			42110
Per pig	Maintenance	1345	
	Protein deposition	955	
	Lipid deposition	1040	
	Total	3340	
Total feed intake (kg)			3602
TFE in kg feed			**2,4616**
Feed intake according to database (kg)			3586
TFE in kg feed according to database			**2,4503**

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Sensitivity analysis

Trait	% Change	σ_p
HGP-BF	4,93	2,92
Average daily gain	-3,32	76,76
Litter size	-2,27	3,08
Litter mortality during lactation	1,45	11,60
Body weight at start lactation	1,43	34,22
Slaughter weight	1,33	7,43
Backfat start lactation	0,89	3,70
Still born	0,80	7,43
Backfat start gestation	-0,65	2,69
HGP-LD	-0,55	6,83

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Service sire line comparison

	Sire line 1	Sire line 2
Litter size (#)	14,0	14,1
Birth weight (kg)	1,4	1,4
Gestation length (d)	115,6	115,7
Lactation length (d)	25,0	25,0
Still born (%)	7,1	5,7
Litter mortality lactation (%)	14,6	13,1
HGP-BF (mm)	14,9	16,3
HGP-LD (mm)	60,6	58,2
Average daily gain (g)	820,0	879,0

	Sire line 1	Sire line 2
Total feed (kg)	2995	3117
Total live weight (kg)	1257	1308
TFE	2,38	2,38

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5 yr Genetic trends

Trait	Genetic trend
Litter size (#)	0.380
Still born (#)	-0.190
Mortality (%)	-1.340
Gestation length (d)	-0.090
Number of teats (#)	0.920
Birth weight (kg)	-0.060
Loin depth (mm)	0.750
Backfat (mm)	-0.975
Average daily gain (gram)	55.000

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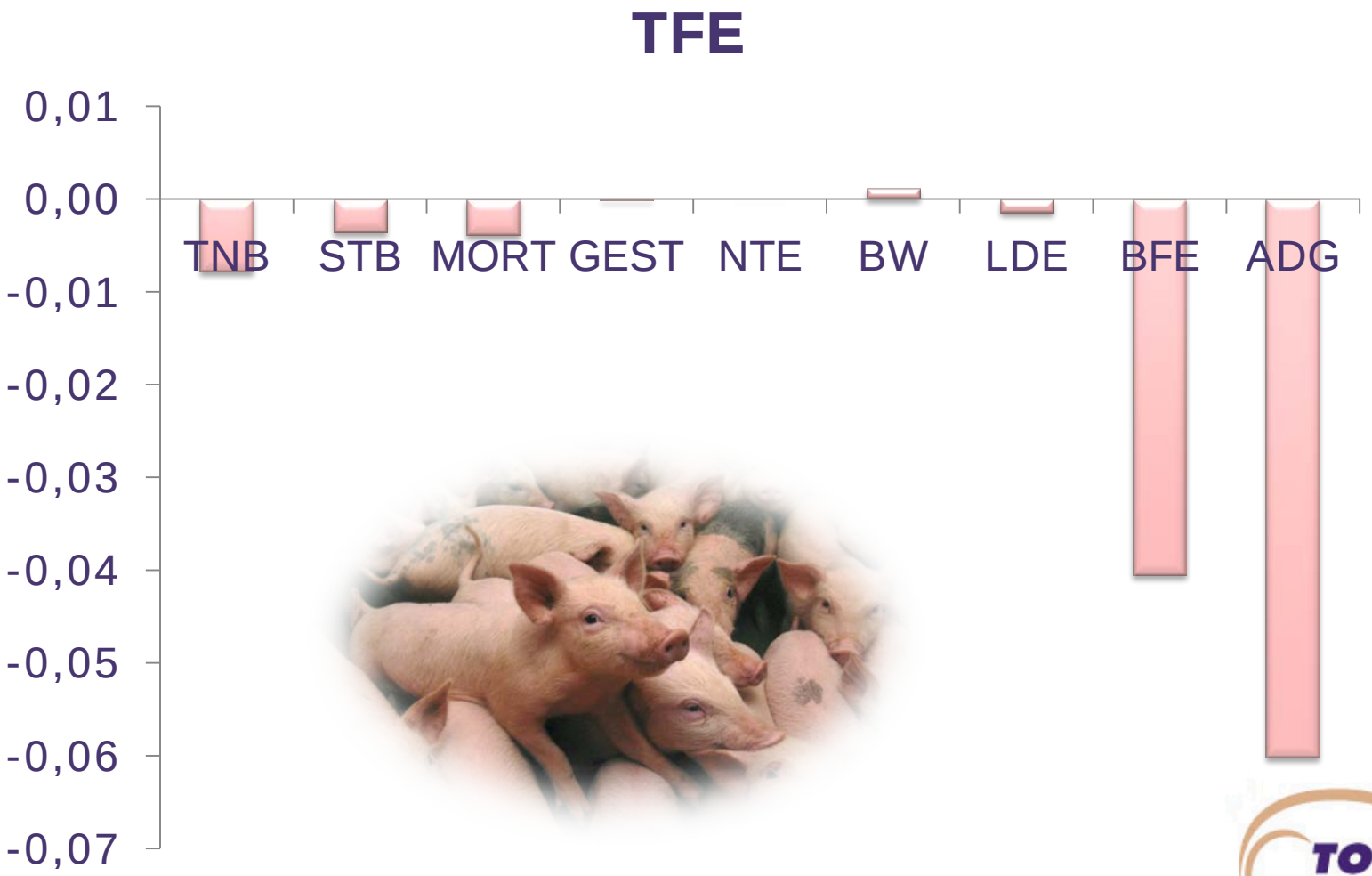
Genetic trends

		2013	2018
Gestation		**3556**	**3553**
Maintenance		2502	2500
Reproduction		194	191
Maternal gain		642	642
Physical activity		218	219
Lactation		**1951**	**2007**
Maintenance		557	557
Milk		1926	1978
Mammery gland growth		89	93
Mobilized tissue		-621	-621
Grower-finisher		**42110**	**42307**
Per sow		42110	42307
Per pig	Maintenance	1345	1251
	Protein deposition	955	974
	Lipid deposition	1040	958
	Total	3340	3183
Total feed intake (kg)		3602	3620,98
Total live weight (kg)		1463	1543
TFE in kg feed		**2,4616**	**2,3468**

Genetic trends



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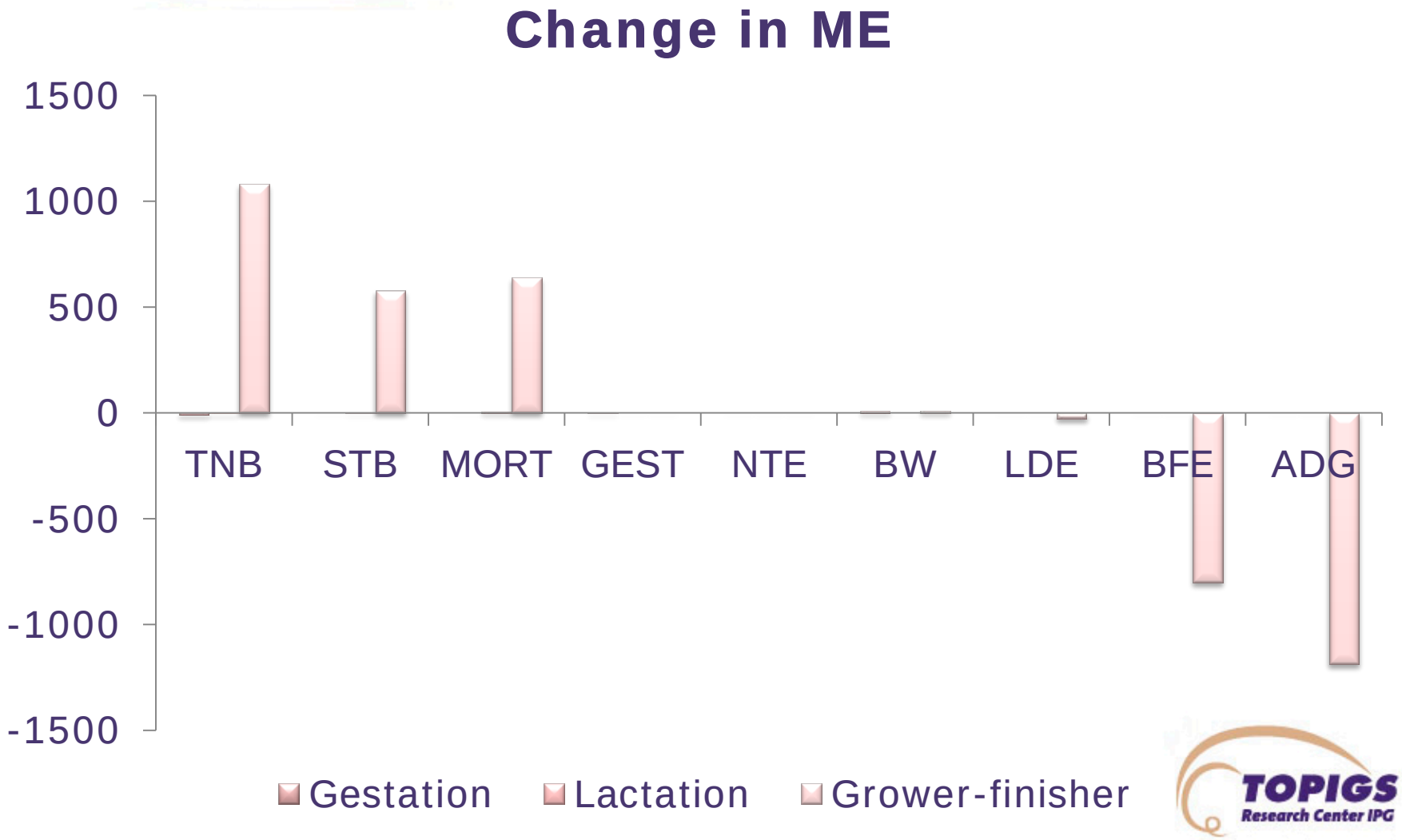
Genetic trends



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Discussion & Conclusion

Model

- Overestimation model less than 0.5%
- Grower finisher traits, backfat thickness and average daily gain most, important traits
- Litter size, litter mortality during lactation and body weight of the sow at start of lactation most important sow traits

Application

- No ENERGY consequences of increased reproduction
- Genetic fertility trend reduces TFE 0.014 points per 5 years
- Total genetic trend reduces TFE 0.115 points per 5 years
- Increase in slaughter weight *increases* TFE, zeroing out other efficiency measures

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Thank you for
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