Genomic postcard from pig breeding

Maximise long-term genetic gain

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Dan Avl

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

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LANDBRUG FØDEVARER

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Funding

Ministry of
Food , Agriculture and Fisheries in Denmark

Ministeriet for Fødevarer,
Landbrug og Fiskeri
NaturErhvervstyrelsen
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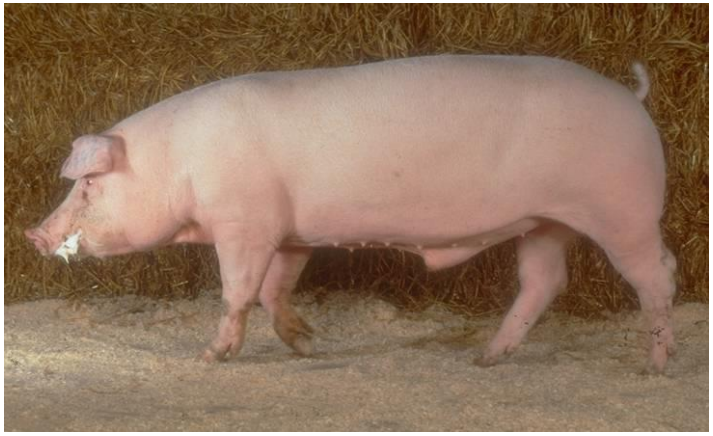
Breeds

Duroc



Landrace

Yorkshire

Crossbreeding

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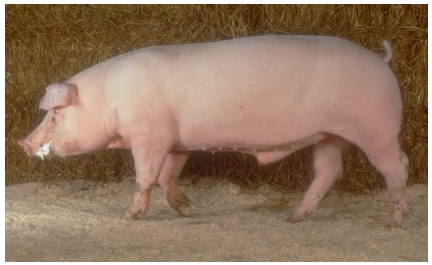


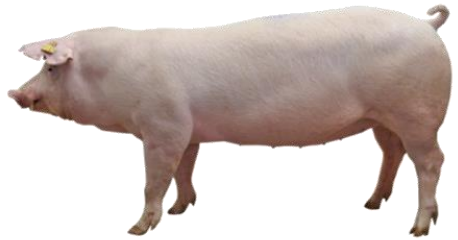
Landrace

X

Yorkshire

Duroc

X



Structure

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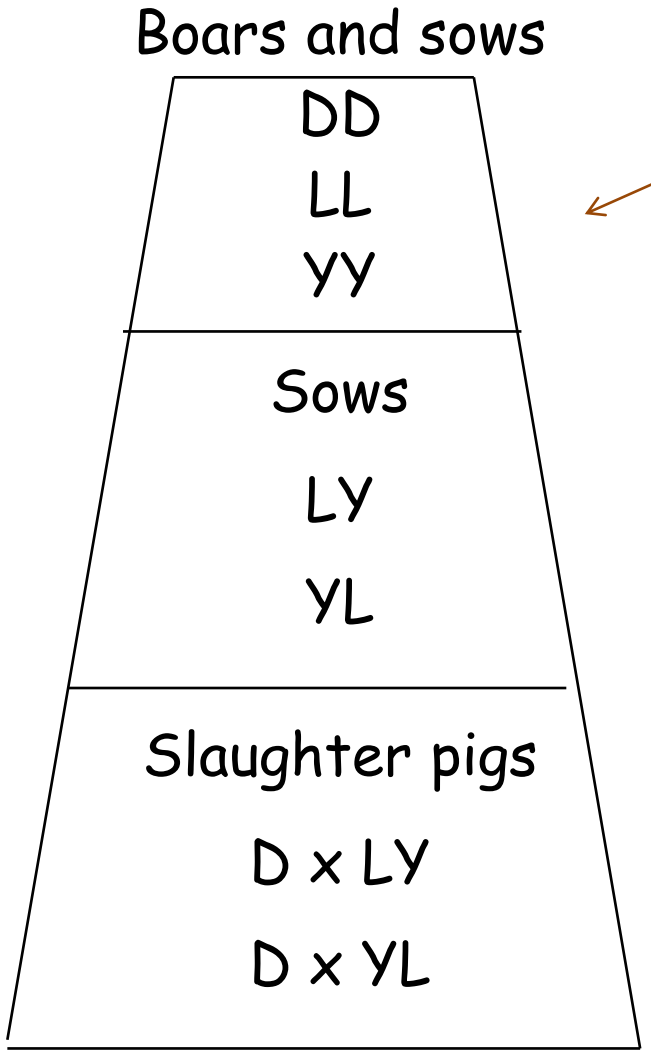

Purebred herds

Multipliers

Producers

Selection

Pig breeding with GS

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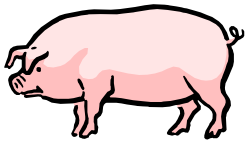

7-8 months

Phenotyping, 'production traits'

↓

Prediction ⟷ Genotyping

↓

Selection

↓

Mating

↓

Phenotyping, 'maternal traits'

Breeding plans

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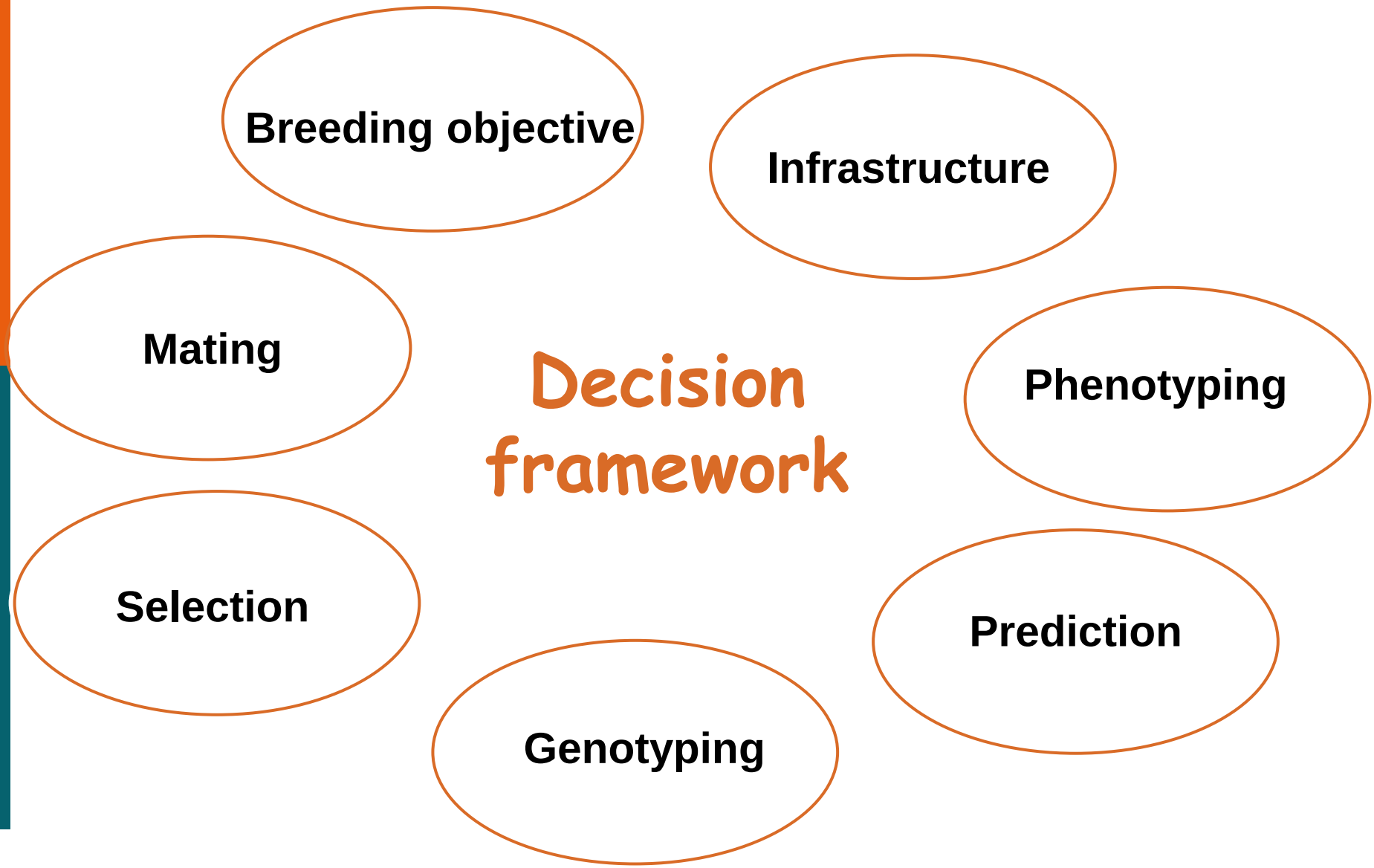

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Single-step prediction

- Reliable breeding values
- Genotyped and non-genotyped animals
- ”Reference value” of all animals
- Easy to implement

Restrictions

Weekly predictions
Limited time, 12 hours
Automated

Genotyping strategy

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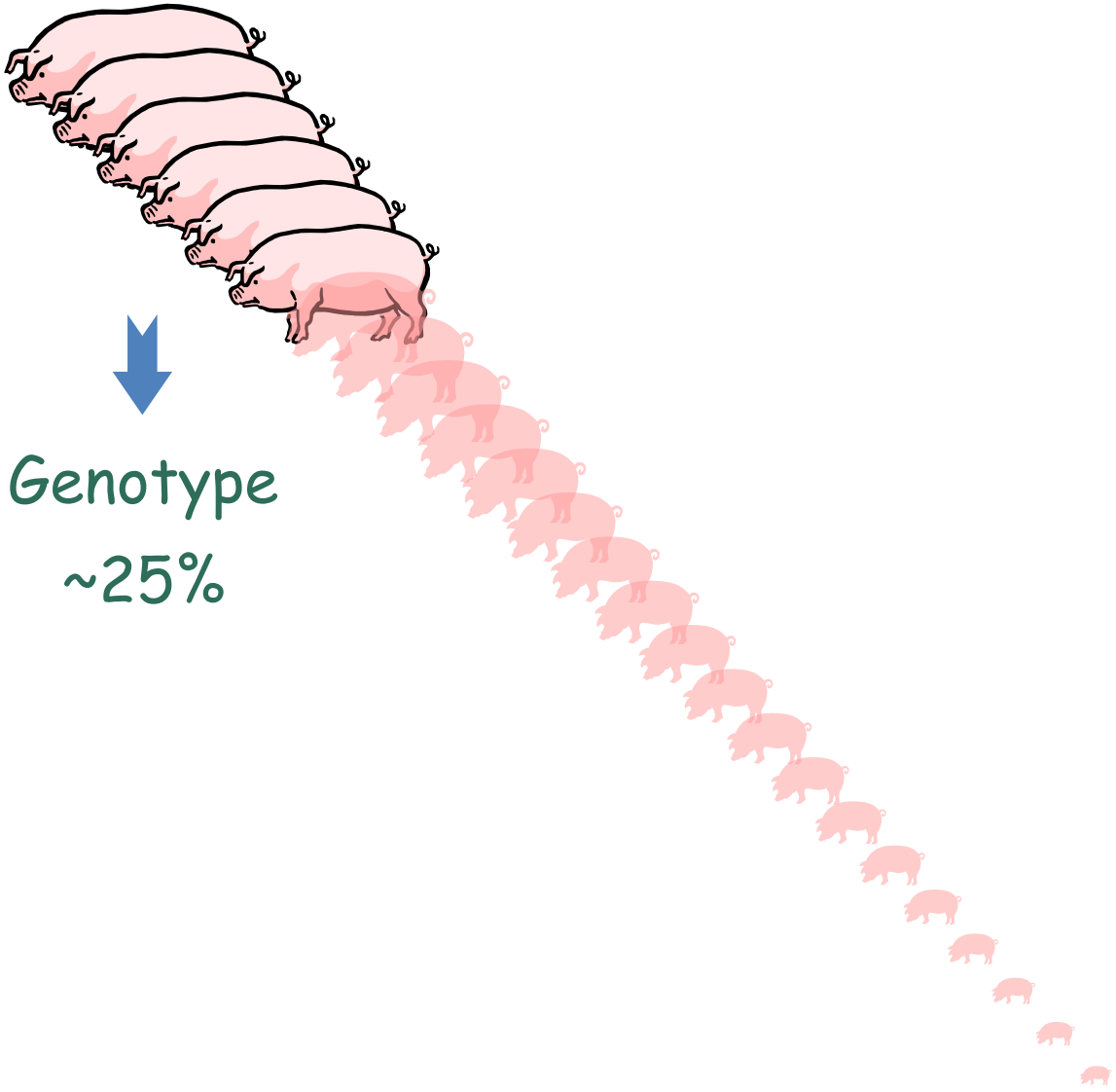

Genotype

~25%

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Genotyping strategy

Cost and logistics

Diminishing marginal returns

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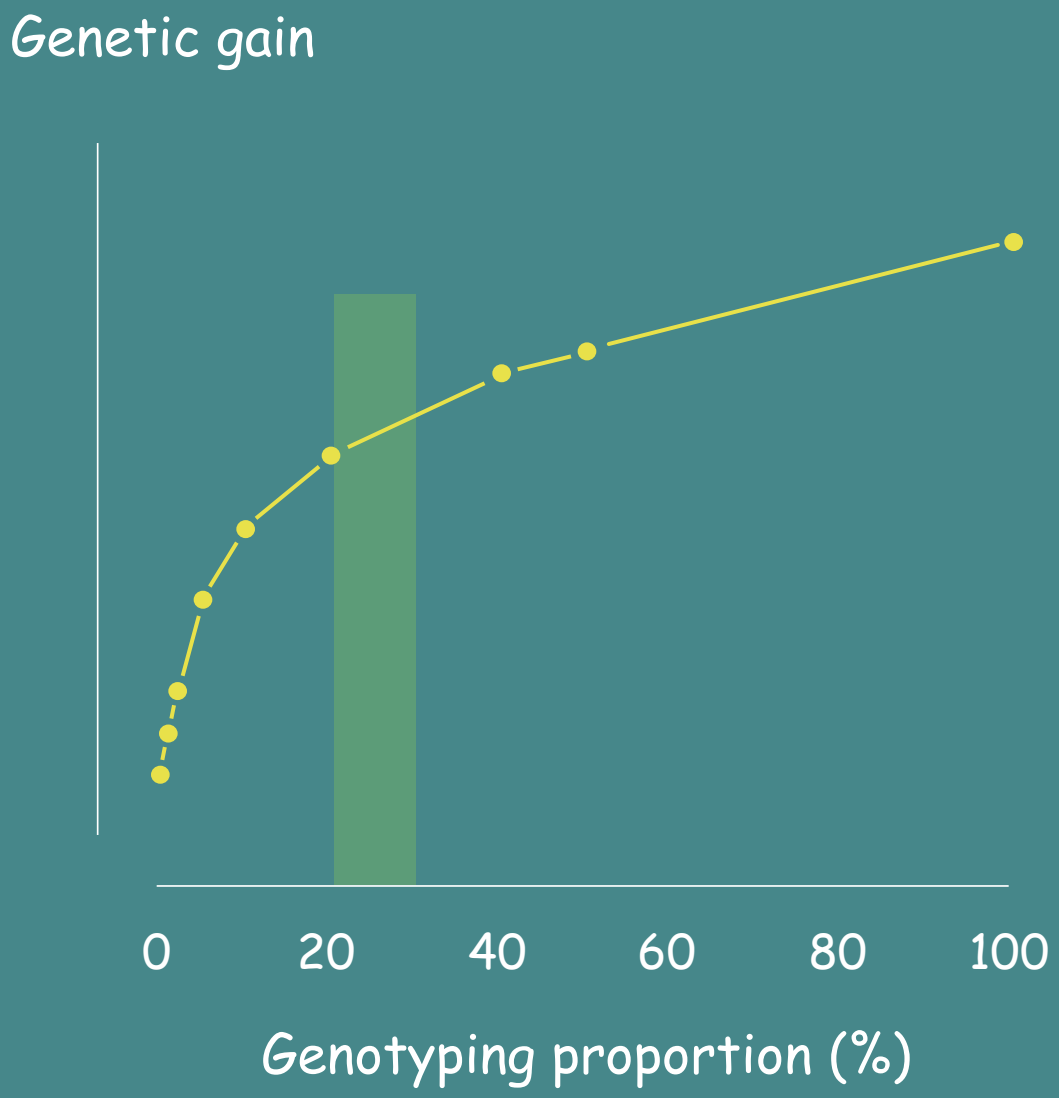
Diminishing marginal returns



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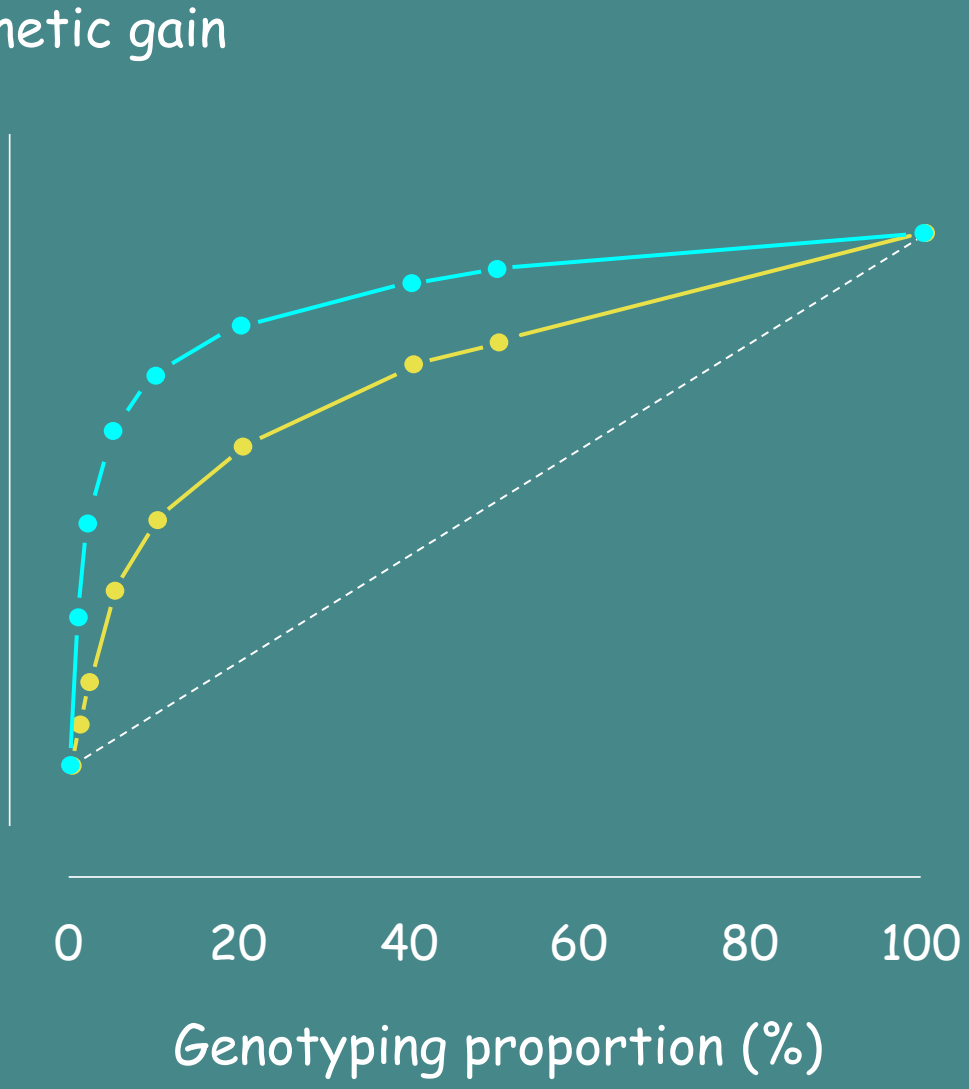
Better genotyping strategies



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Genotyping challenges

- Multiple reference populations
- Amount of *a priori* information
  - Males *vs* females
  - Chip size
  - Early *vs* later in life

Genotyping strategies require further analyses to find the allocation of genotyping that maximises long-term genetic gain !

Selection

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- **Optimum contribution selection**
  - -We use OCS
  - -Balance between genetic gain and inbreeding

- **Genomic OCS**
  - -Even better balance between genetic gain and rate of inbreeding

Future work

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- Phenotyping strategies
- Predicition models for crossbreds
- Genotyping strategies
- Interactions between genotyping, phenotyping and selection

Conclusion

Breeding plans of "good practice"

A strong decision framework is needed in breeding plans for pigs to maximise the long-term genetic gain