Selection strategies in an endangered Norwegian horse breed

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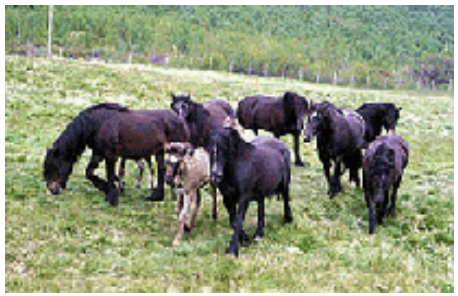
The Norwegian Døle horse

- 3000 registered horses
  - 200 foals/year
- Working, driving and riding
- Cultural heritage
- Considered endangered (FAO)
- Responsibility for conservation

Breeding history

Small population
Selection
Matador stallions



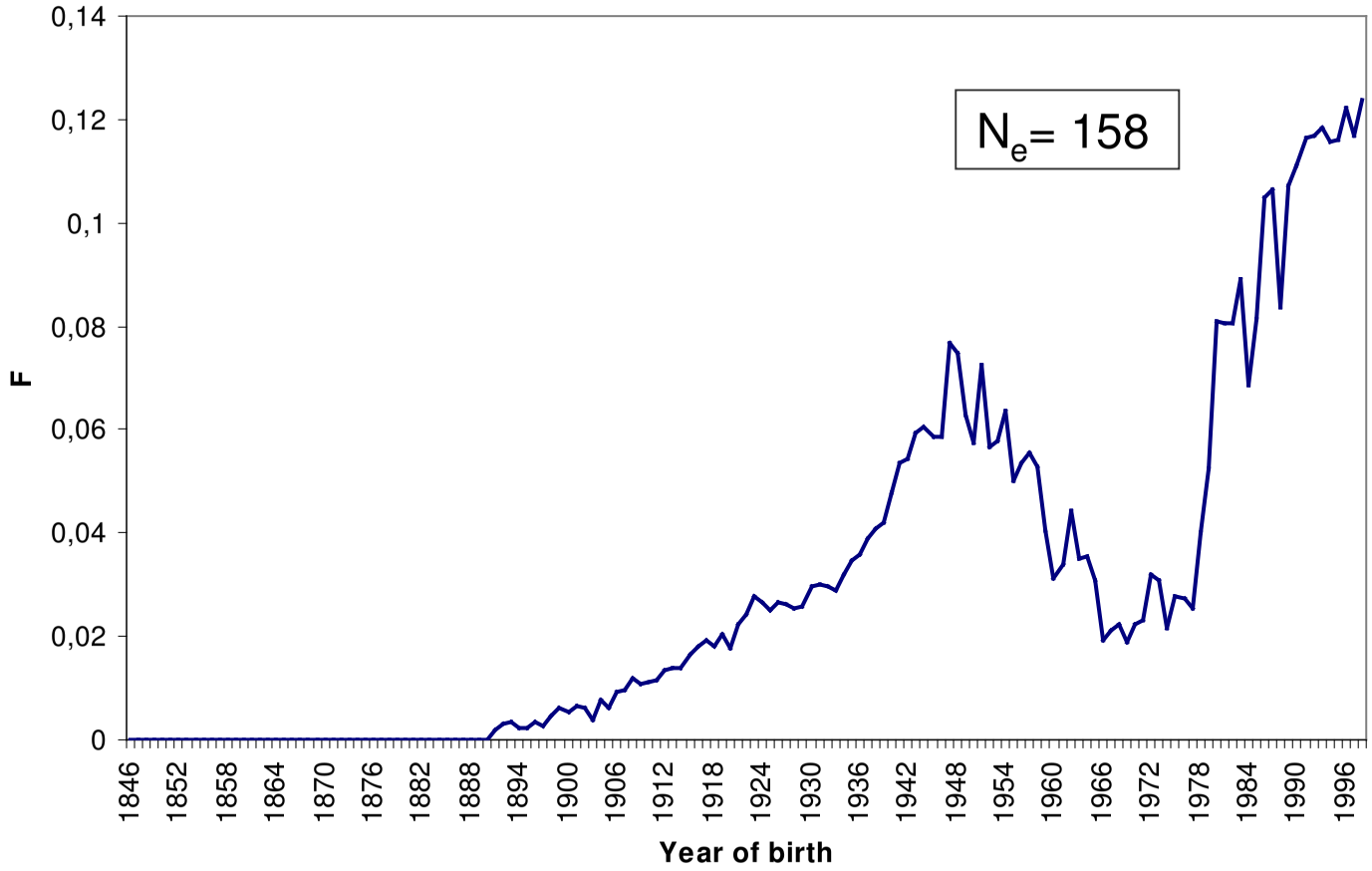
Norwegian Coldblooded Trotters

North-Swedish Horses

Status: High level of inbreeding, indications of low genetic variation (Olsen et al., 2005)

Average coefficient of inbreeding

(Olsen et al., 2005)

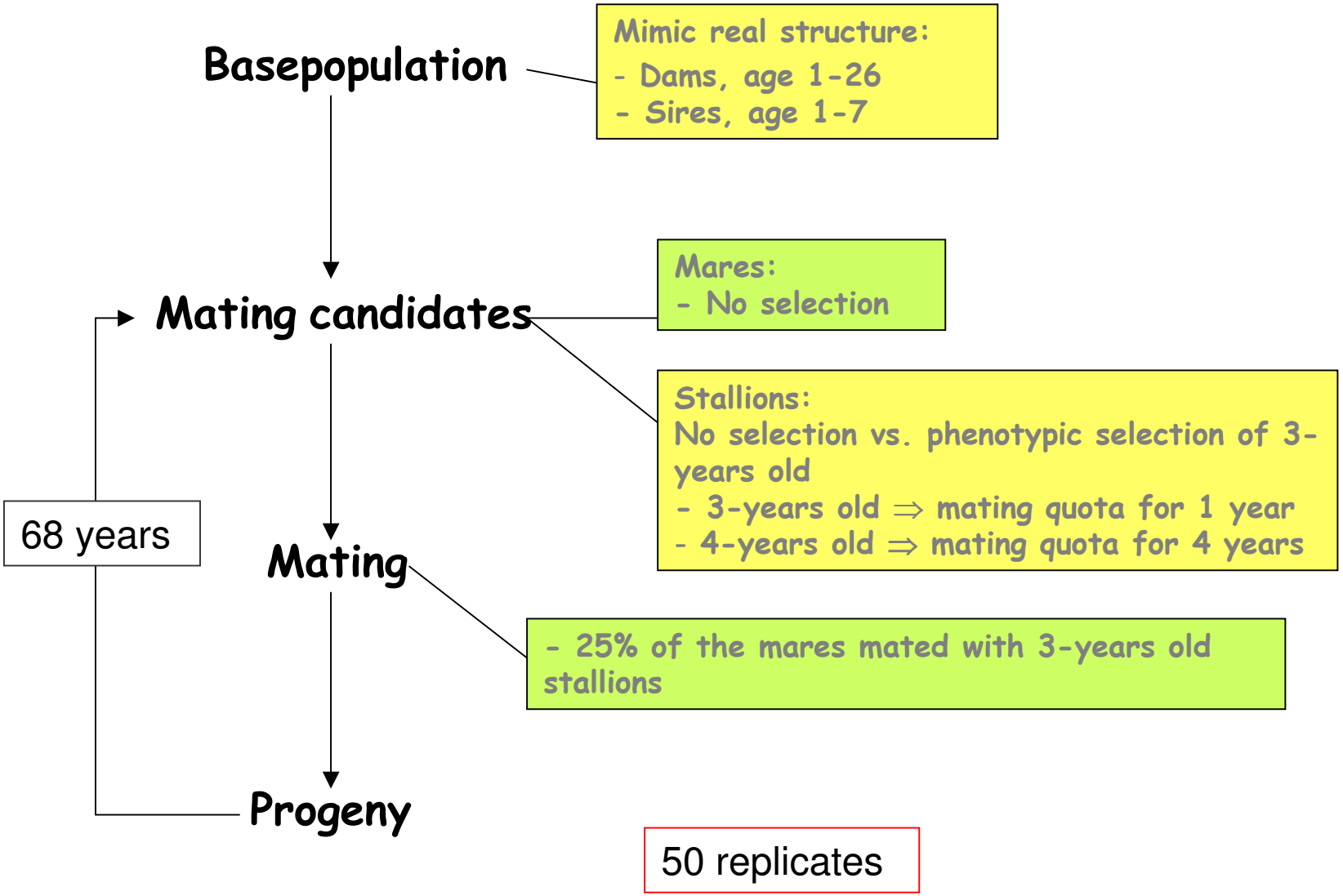


Aims

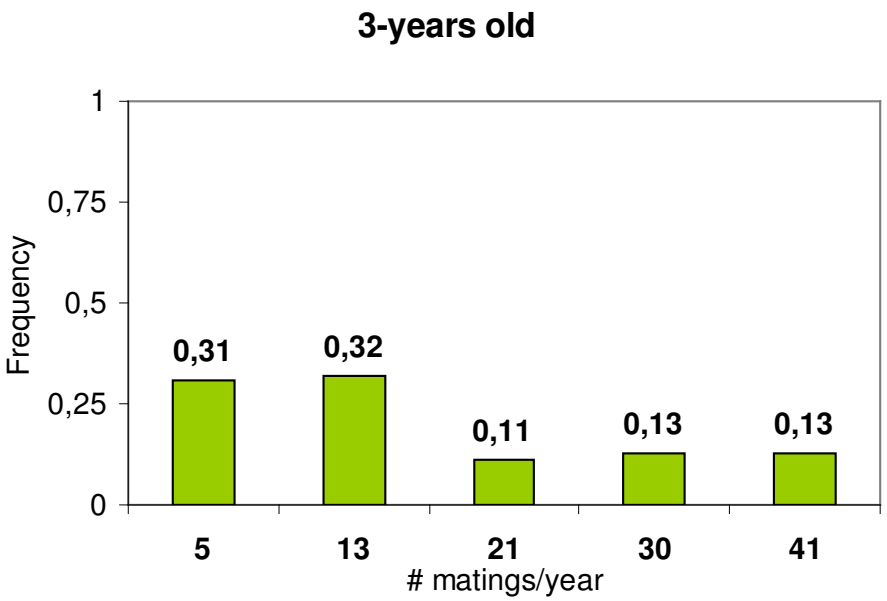
- Compare ΔF and ΔG for different selection strategies, given existing population structure:

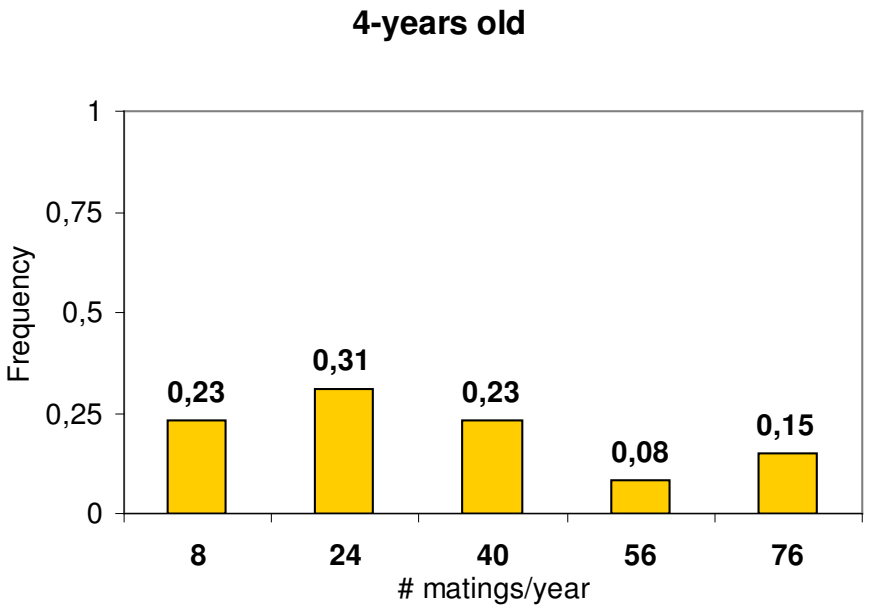
  1. No selection
  2. Selection for one trait, $h^2=0.24$
  3. Optimal contribution selection (next)

- Stochastic simulation (infinitesimal model)

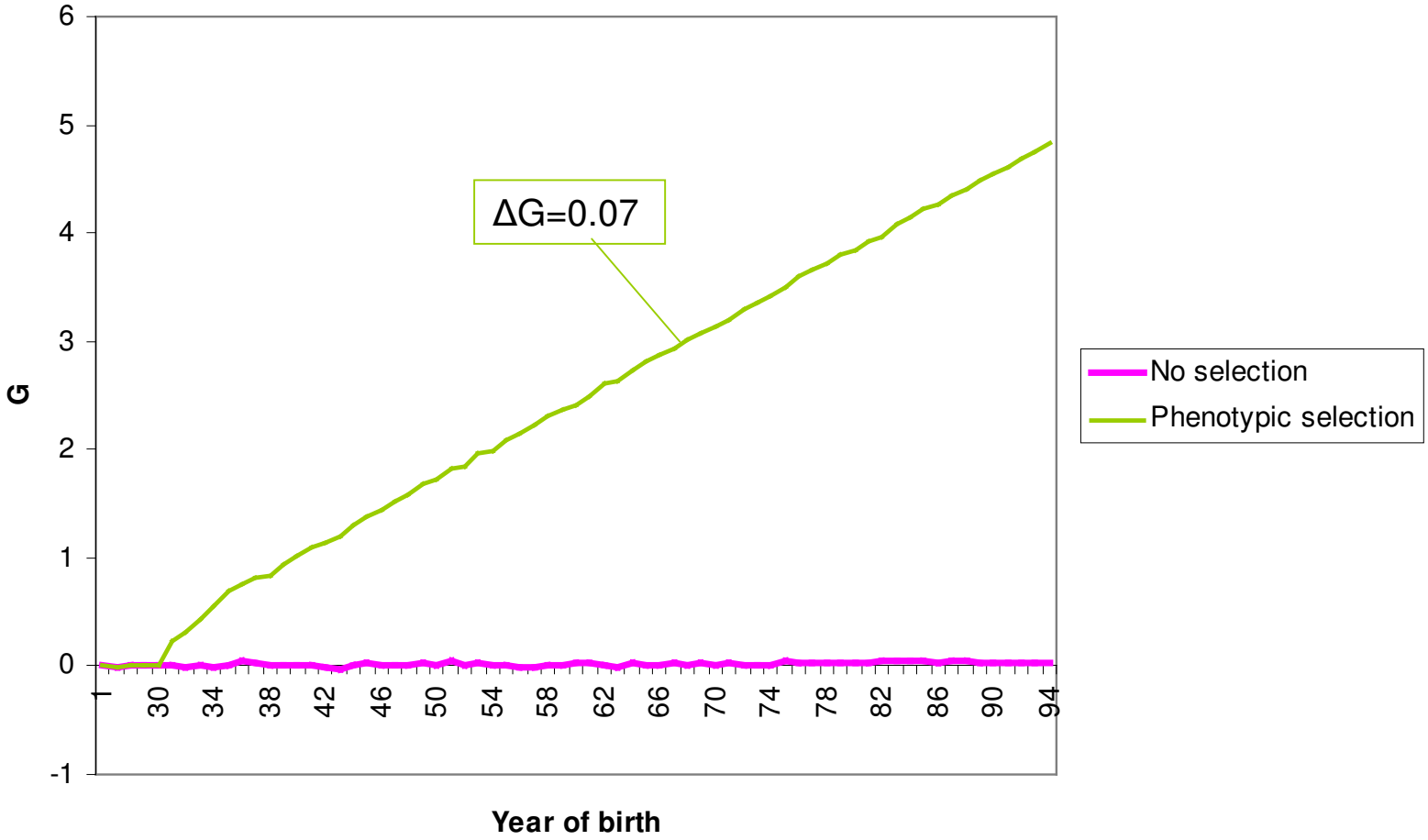

Basepopulation
Mimic real structure:
- Dams, age 1-26
- Sires, age 1-7
Mating candidates
Mares:
- No selection
Stallions:
No selection vs. phenotypic selection of 3-years old
- 3-years old ⇒ mating quota for 1 year
- 4-years old ⇒ mating quota for 4 years
68 years
Mating
- 25% of the mares mated with 3-years old stallions
Progeny
50 replicates

Distributions – progeny groups

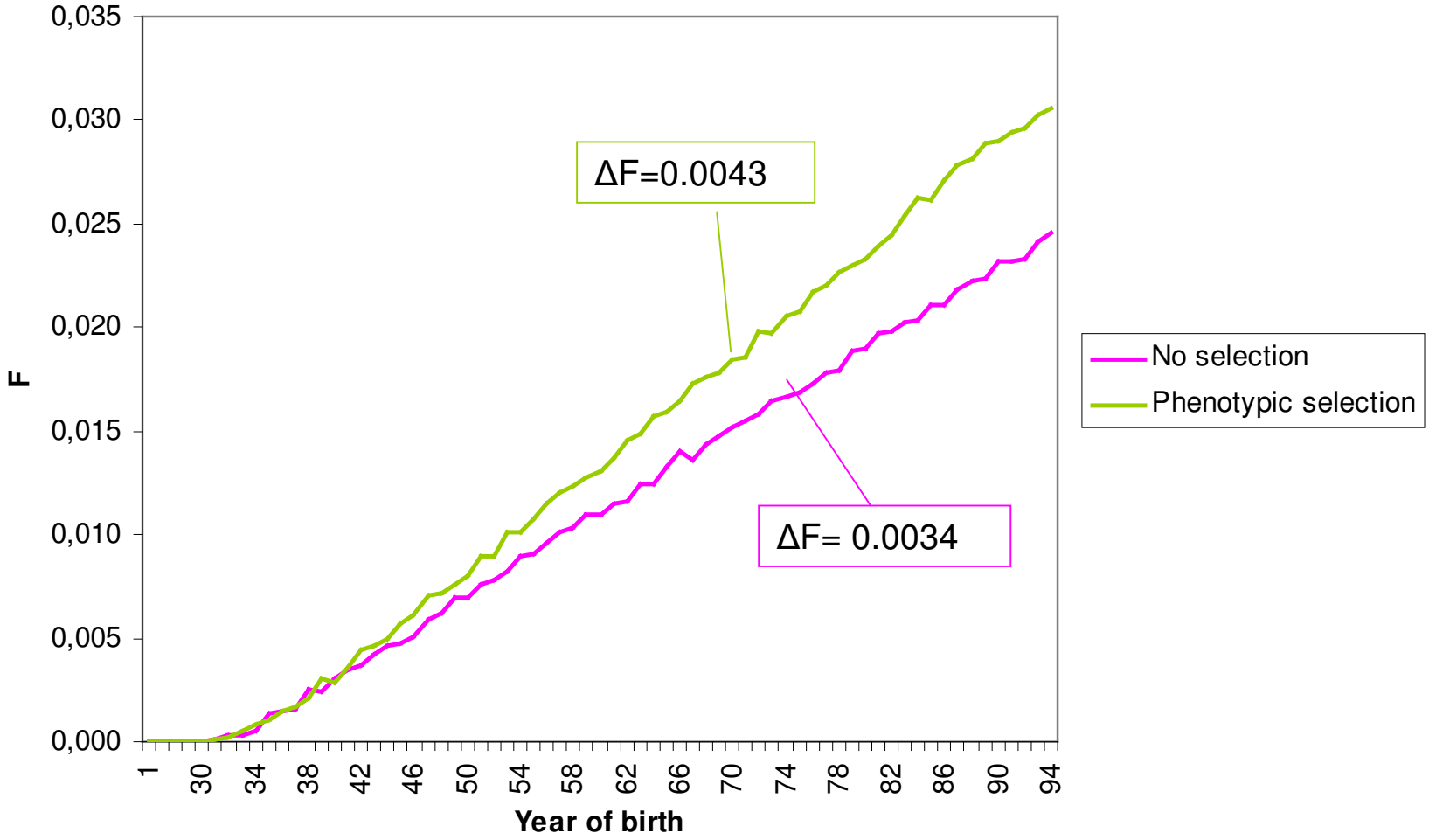




Selection response



Coefficient of inbreeding



Population parameters

		No selection	Phenotypic selection
ΔF		0.0034	0.0043
Generation intervals	L_{SS}	5.66	5.48
	L_{SD}	5.68	5.68
	L_{DS}	11.15	10.28
	L_{DD}	11.10	11.11
Effective population size, N_e		147	116

Preliminary conclusions

Although small population:

Phenotypic selection as assumed
is <u>not</u> in conflict with $\Delta F=0.005$

Challenge:

Explore optimal contribution selection