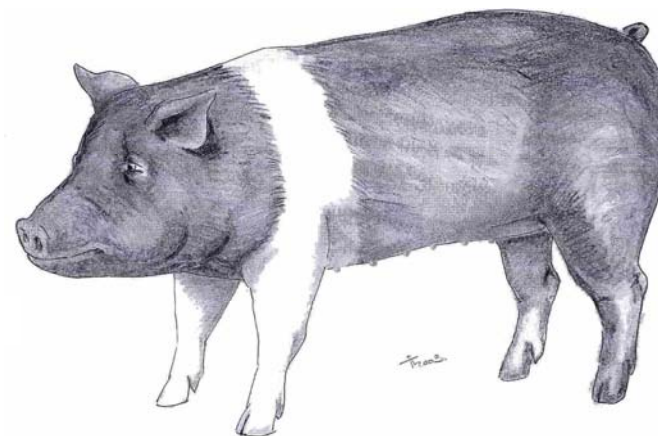
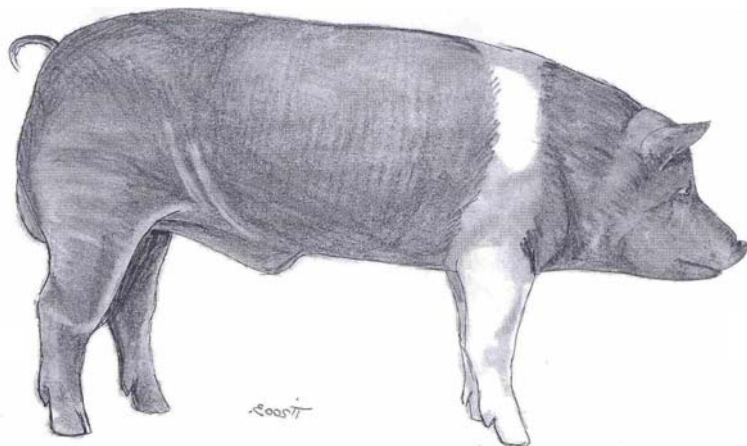
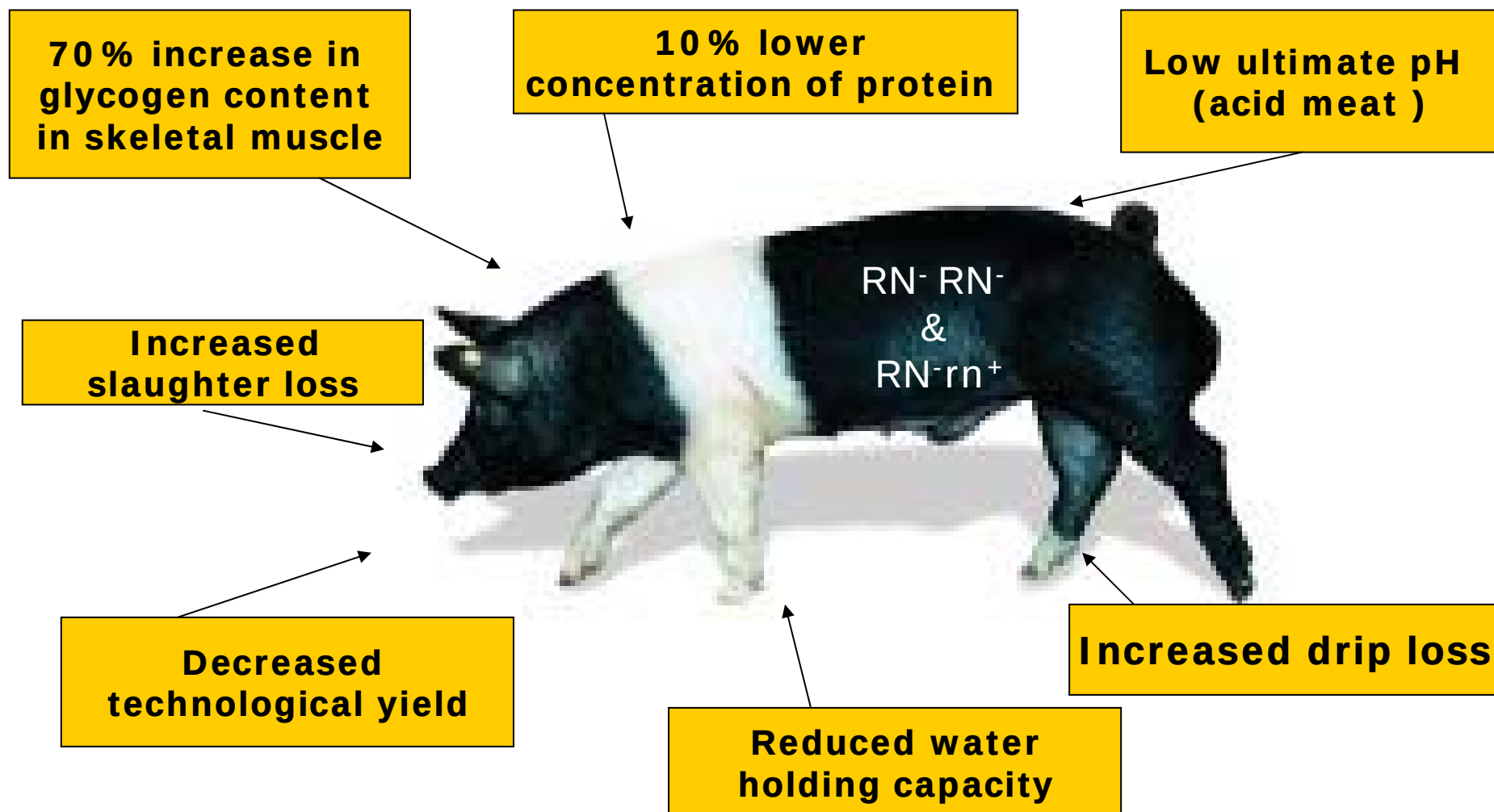


The elimination of the allele Rendement Napole (RN) in the Hampshire Pig has reduced genetic gain and increased inbreeding

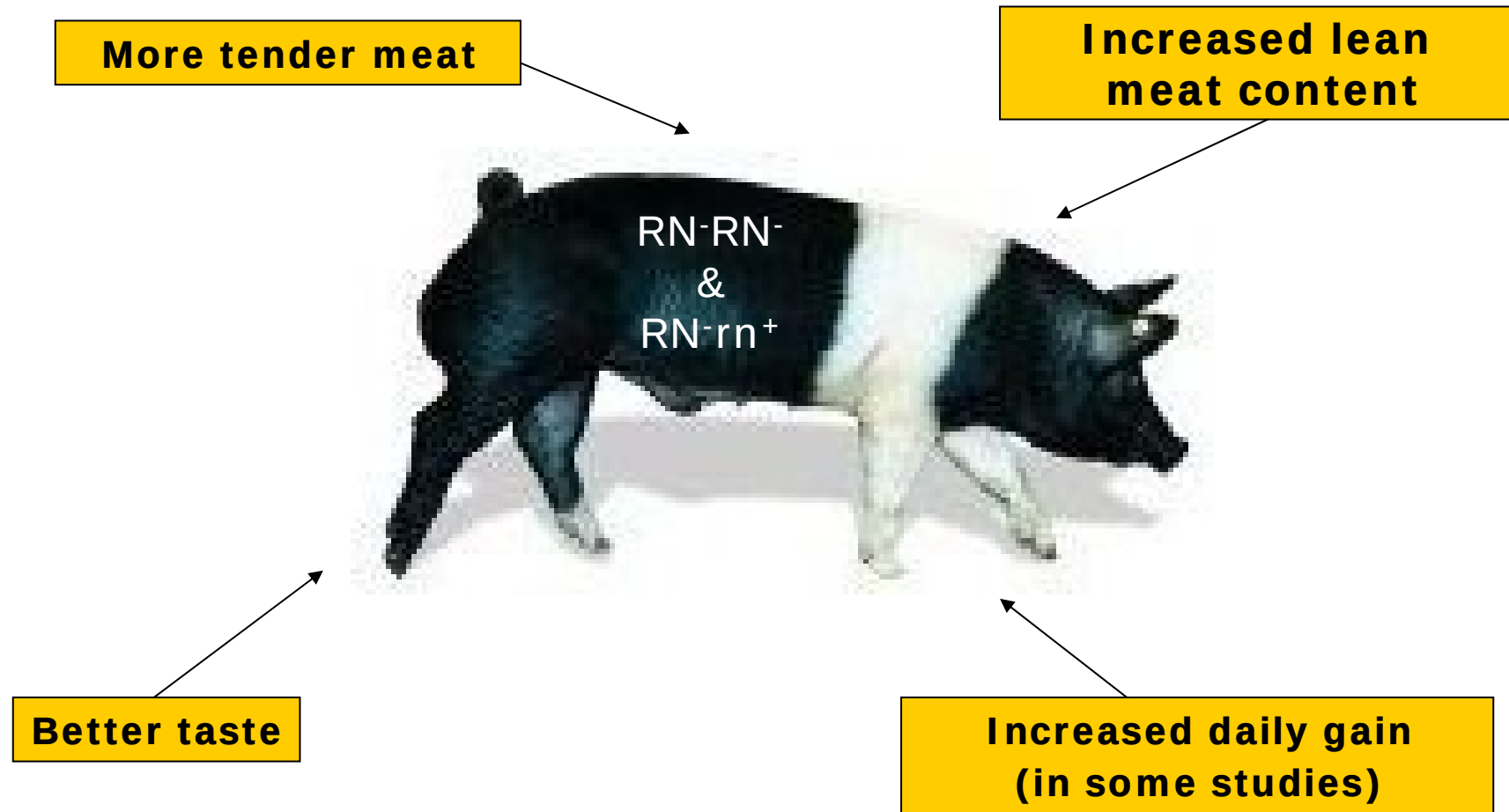
Ane Marie Closter



Negative influences of RN⁻



Positive influences of RN⁻





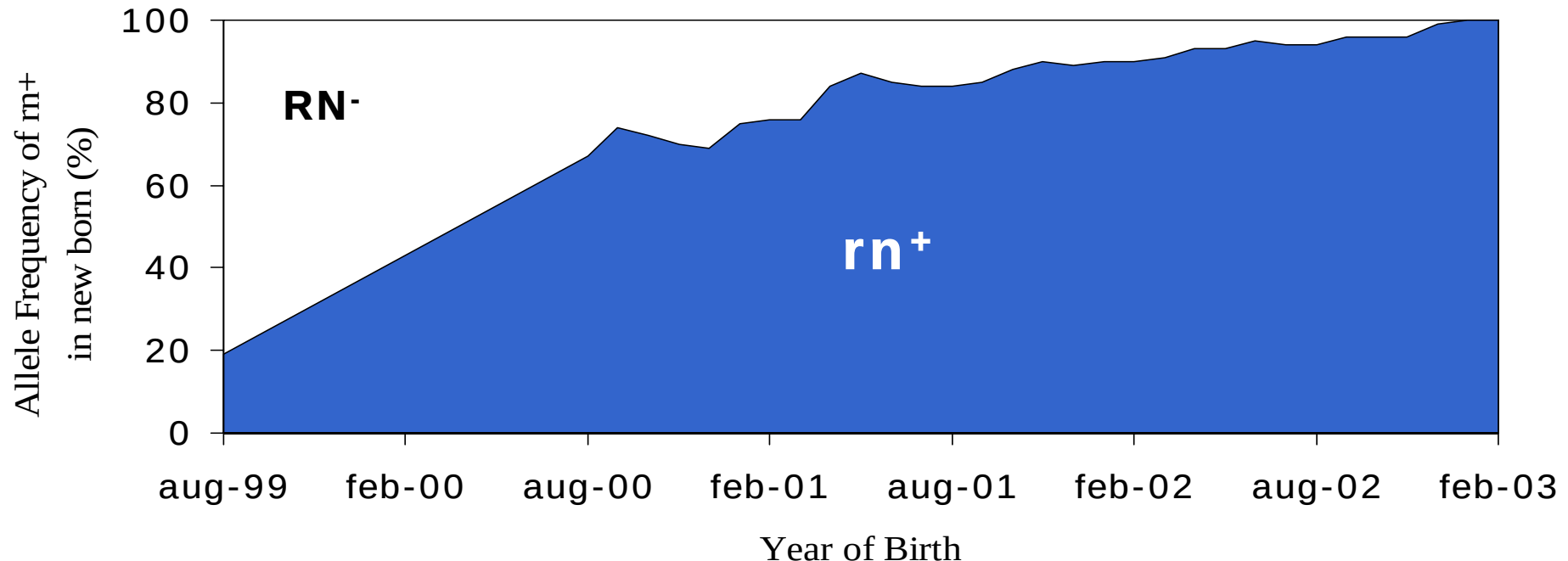
Selection strategy in 3 steps

- Pre-selection and index selection
 1. 1999 Boars: Heterozygote or homozygote rn^+
 2. 2001 Boars: Homozygote rn^+
 3. 2002 Sows: Homozygote rn^+
- The total number of animals in population increases
 - 2001: From 4900 to 6400 animals
 - 2002: To 7300 animals

Successful elimination of unwanted genotype

- The frequency of genotypes in the Danish Hampshire Pig in 1999

■	Homozygote RN^- :	74%
■	Heterozygote:	24%
■	Homozygote rn^+ :	2%





Theory

- Reduced genetic improvement
 - Increased population size
 - Reduction of gene pool
 - Potential breeding animals have been left out with pre-selection for rn^+ animals
- Possibility of using animals with same ancestors when pre-selection for a single allele



Hypotheses

- The genetic improvement is reduced as a consequence of the elimination of the RN^- allele through the pre-selection
- The average coancestry increased faster during the elimination of RN^-



Data materiel

- Phenotypic observation from Hampshire pigs
- Three traits
 - Daily Gain_{30-100kg}
 - Lean Meat Percentage
 - Feed Conversion Rate
- RN genotype on animals (not all animals have been genotyped)
- Full pedigree from 1974 to 2005



Production data analysis

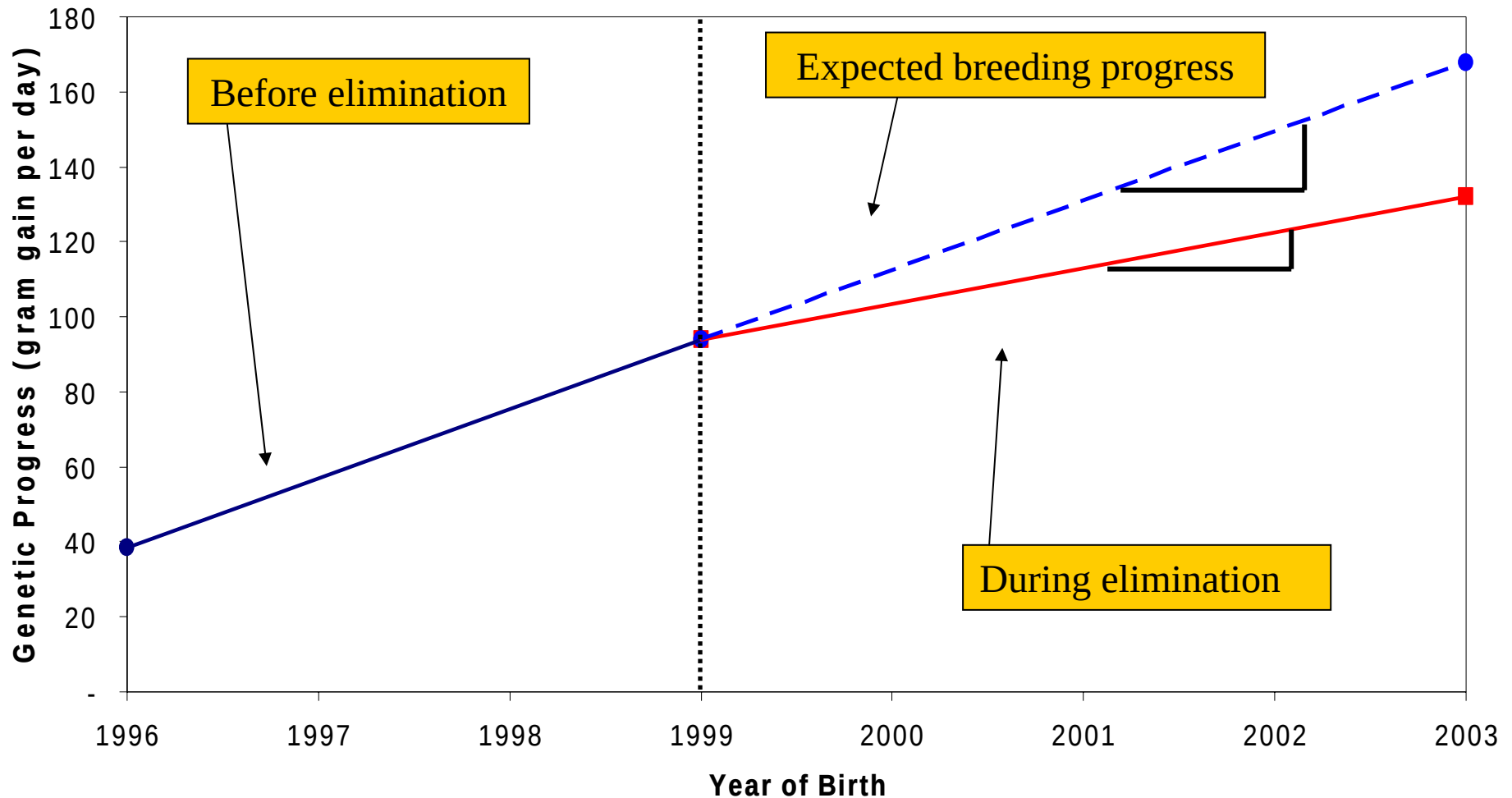
□ Three single trait models (DMU-software)

Daily gain_{30-100kg} =
Intercept(f) + gender(f) + HYS(f) + genotype(f) +
litter(r) + pen(r) + animal(r) + start weight(fr) +
residual(r)

Lean Meat Percentage =
Intercept(f) + gender(f) + HYS(f) + genotype(f) +
litter(r) + pen(r) + animal(r) + residual(r)

Feed Conversion Rate =
Intercept(f) + HYS(f) + genotype(f) + litter(r) +
animal(r) + start weight(fr) + residual(r)

Expected genetic progress





Annual polygenetic progress

Traits	Before elimination	During elimination	
Daily gain _{30-100kg} (gram per day)	18.4	9.5	* *
Lean Meat percentage (%)	0.091	0.166	N.S.
Feed Conversion rate (Feed unit/kg gain)	-0.014	-0.005	*



Calculation of average coancestry

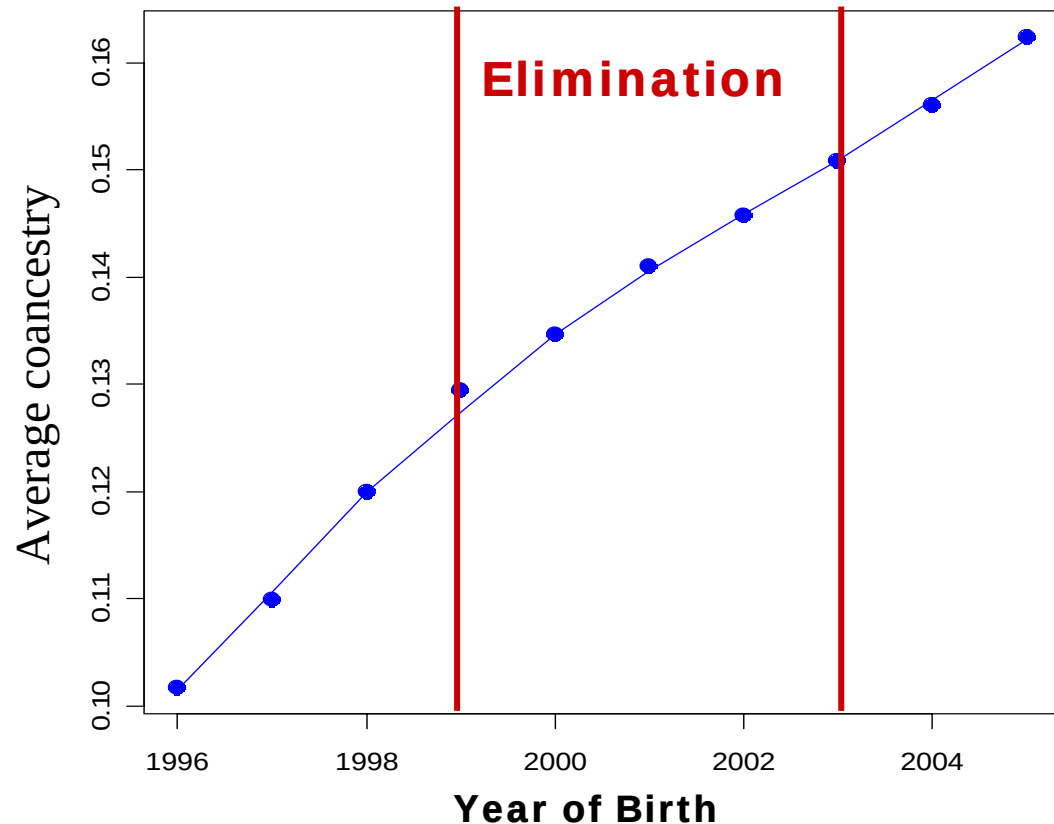
- Use of full pedigree

- Degree of average coancestry
 - 15 generations
 - Calculated with EVA_inbred-software

Average coancestry increases less than feared during elimination

□ Annual change in coancestry 1996–2005:

- 1997: 0.82%
- 1998: 1.01%
- 1999: 0.94%
- 2000: 0.53%
- 2001: 0.63%
- 2002: 0.47%
- 2003: 0.51%
- 2004: 0.52%
- 2005: 0.64%





Summary

- Gradually change in elimination program
 - Sufficient genetic variance
- Increased population size
 - Use of less good animals for breeding
 - Decreased risk of using related animals
- Less relationship between rn^+ pigs
 - The mutant RN^- might come of one or few ancestors



Perceptive

- The elimination of RN⁻ is complete
- Elimination of RN⁻ had a harmful effect on the breeding progress
 - Loss of genetic improvement was less than expected
- Average coancestry increased more slowly during the elimination period than prior to elimination

