



Zoo breeding program of White Rhinoceros: *Ceratotherium simum*



Ceratotherium simum simum
(Southern)



Ceratotherium simum cottoni
(Northern)

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Background and problem

- 1900 → Bottleneck
- **Problem:** Reproduction and social composition
- Lifespan: 35 years (wild) 50 years (captivity)
- Reproduction: able to mate and reproduce the whole year

Total population (wild) ≈ 20500

Total population (captivity) ≈ 298

Aim

- Maintain 97,4% of Genetic Diversity over the course of a 100 years

Demographic analysis

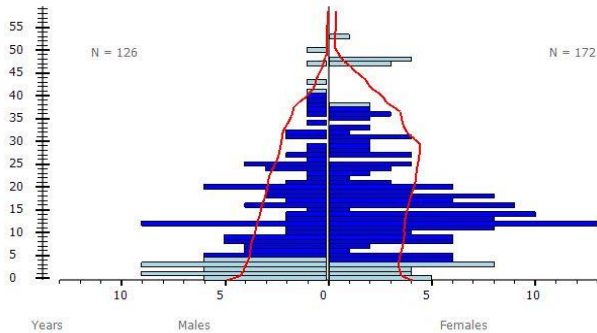


Figure 1. Age distribution

- Lambda variation 0.998 – 1.009
- Higher mortality females
- Significant chance for increase
- Projected population growth → 22 rhinos in 20 years
- ↑ 110 rhinos in 100 years

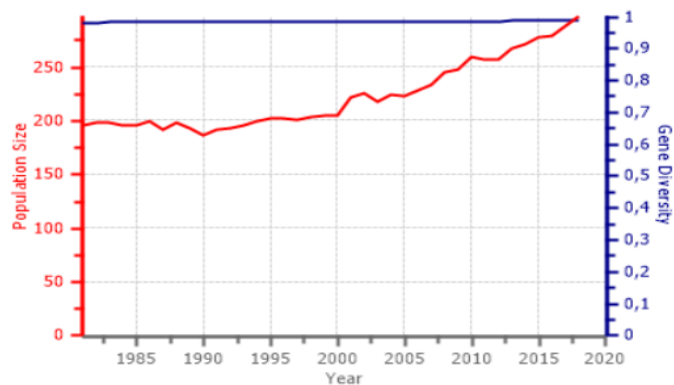


Figure 2. Projected growth



Genetic analysis

GD	0.9863		
FGE	36.63	Potential	140.36
F	0.0112 (1.12%)		
MK	0.0138		
Ne/N	0.2987		
Ne	80.37		

Founders = 113

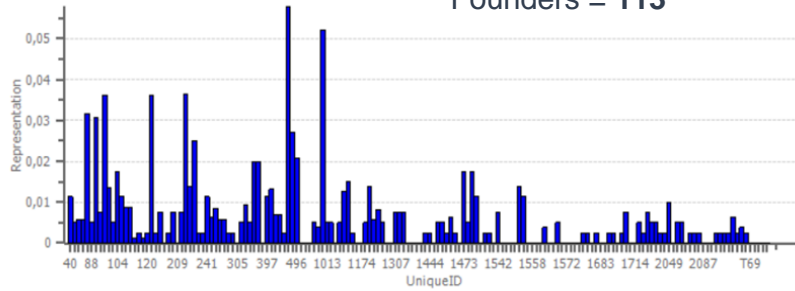


Figure 3. Founder representation

- Founders might be related
- Unequal founder representation and contribution
- For the aim:

$$\circ \frac{Ne}{N} = 0.6$$

- Possible mating
 - Male 1393 – Female 1203 (Beekse Bergen)
 - MSI: 2.145
 - F: 0.000

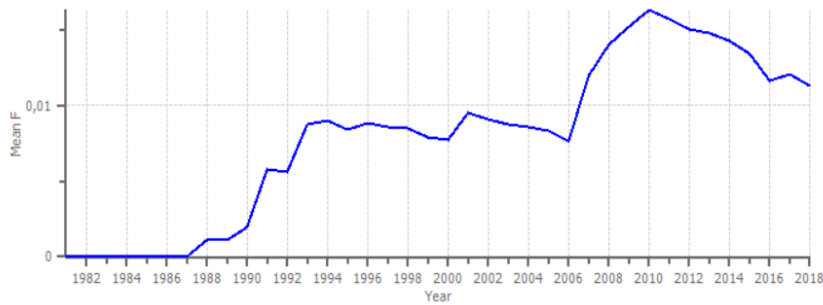


Figure 4. Mean inbreeding

- Studbook → No attention for genetics

Conclusions and management solutions

- We need 10,3 births/year to reach our aim
- Equal founder representation and low mean kinship
- DNA analysis for founder relationships
- Group structure influences reproduction → Transfer
- PMx data doesn't always reflect reality

