3

Managing inbreeding and relationship in a breed

Inbreeding (F) can cause genetic defects and affect health. When breeding related animals the offspring will be inbred. Inbreeding itself is not heritable *(see infographic 1)*.

When breeding an animal, it is important that breeders can choose from a sufficient numbers of weakly related animals with low relationship to choose from for breeding *(see infographic 2)*.

Population
Rate of inbreeding (ΔF): difference (in %) between the average inbreeding in a population and the average inbreeding at an earlier stage.

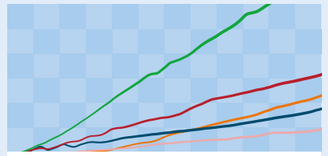
Rate of inbreeding per generation
Rate of inbreeding adjusted for generation interval, used for risk assessment between breeds and species.

For a healthy population

More animals for breeding

Higher genetic diversity

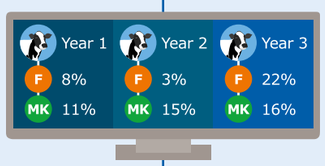
Lower rate of inbreeding



Evaluate the effect of measures.
Start again at 1 and 2.

Inform and advise breeders.

Monitor relationship and inbreeding in the population.



Inbreeding in the breeding programme
Breeders select breeding animals. Breeding organisations are responsible for the breeding policy supporting the breeding goal.

1 2 3 4 5 6

Implement measures in breeding policy if necessary.

ΔF

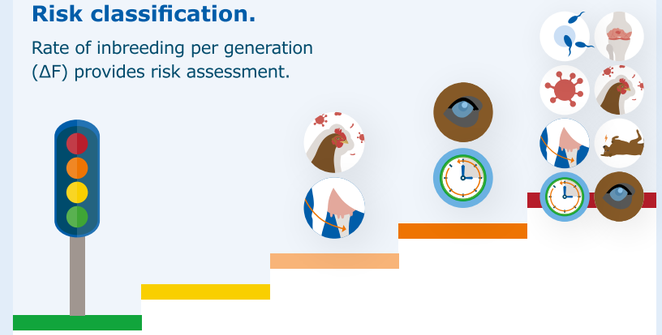
Determine rate of inbreeding per generation per breed.

Evaluate risk factors.

Risk factors
Few or uneven use of breeding animals.

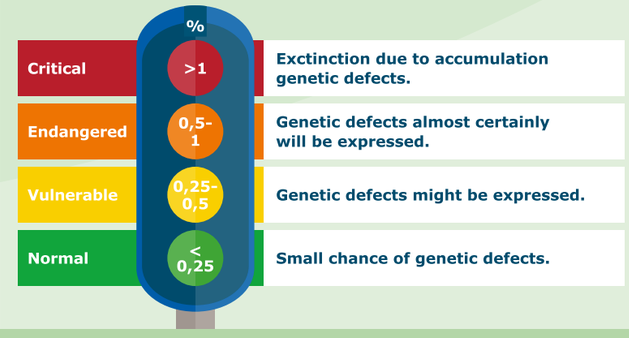
Risk classification.

Rate of inbreeding per generation (ΔF) provides risk assessment.



Risk status and traffic light system

Risk status determines the need to take measures. Criteria follow international guidelines.



Mean Kinships (MK)

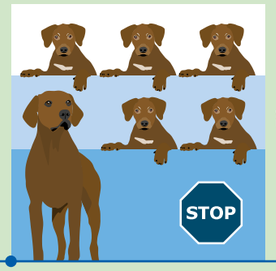
Average kinship of an animal to all other breeding animals (♂+♀) in the population.

- Publish MK to assist selection of breeding animals.
- Offspring increases the MK of their relatives.
- Use animals with a low MK for breeding.
- MK adjusts every generation for animal use.

Measures to limit rate of inbreeding

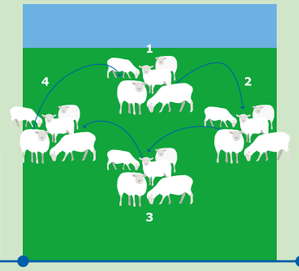
Inform and advise
Animal owners and breeders make the choice. Advice and information are needed.

- Be aware of current situation and possible scenarios.
- Give breeding advice and use breeders acumen.



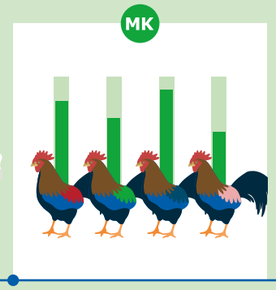
Breeding restriction
Maximal number of matings per breeding animal.

- Prevents excessive use of certain animals.
- Promotes use of other breeding animals.



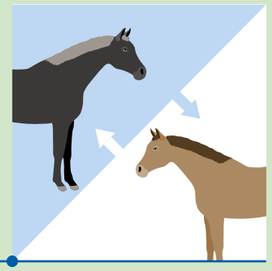
Breeding circle
Males always move to another group.

- No pedigree needed.
- More groups are more effective.



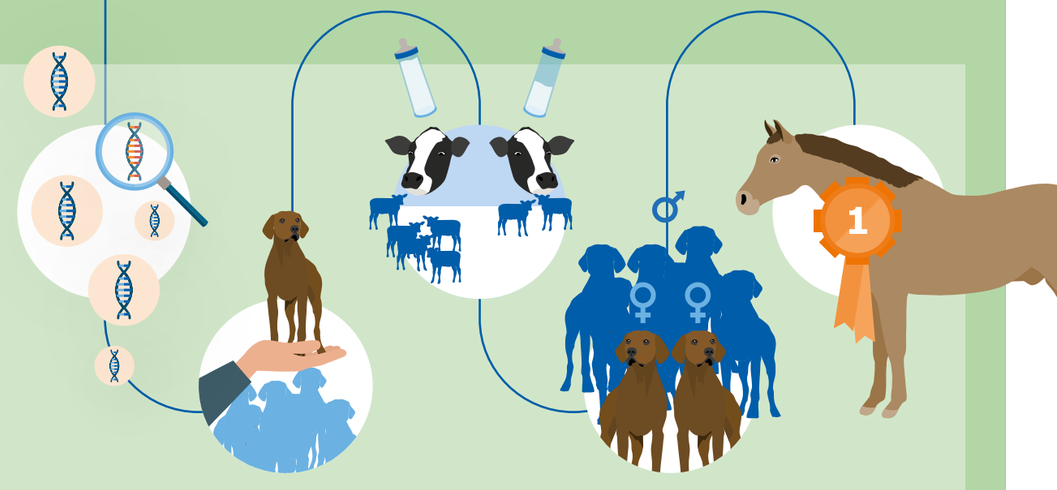
Publish Mean Kinships

- Selection criterion for breeders.
- Increases visibility of less known family lines.
- Most effective measure in the long term.



Use animals from a different breed (outcross)

- Always less or not related.
- Backcrossing with purebred animals reduces effect of outcross.
- Effect is temporary.
- Risk of loss of breed characteristics.



Small, closed populations quickly run out of unrelated animals.

Not all potential breeding animals are used for breeding.

Few and related animals are used due to high selection pressure on heritable traits.

Male biased sex ratio in breeding animals.

Champions are more popular and produce dispro-portionate numbers of offspring.