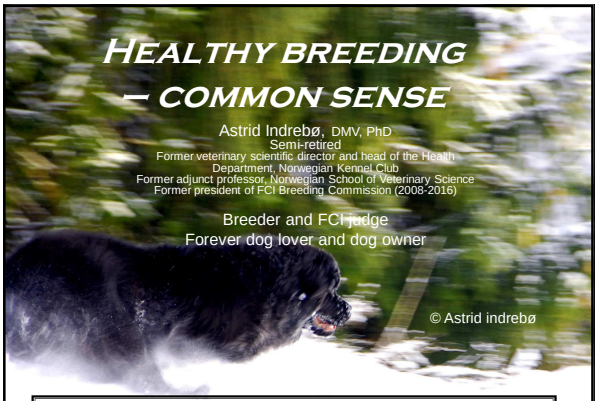
Healthy breeding – common sense

Astrid Indrebø, DMV, PhD
Semi-retired
Former veterinary scientific director and head of the Health Department, Norwegian Kennel Club
Former adjunct professor, Norwegian School of Veterinary Science
Former president of FCI Breeding Commission (2008-2016)

Breeder and FCI judge
Forever dog lover and dog owner



To be beautiful must be healthy!

The goal

..in dog breeding

Functionally healthy dogs....

….with a construction and a mentality typical to the breed….

….which make them able to fulfill the breed specific working tasks….

…dogs that will live a long and healthy life…

…to the benefit and pleasure of the owner, the society – and the dog itself

To be beautiful must be healthy!

The goal….

Healthy young dogs

11 weeks

Healthy old dogs

13 years

..less work for the veterinarians

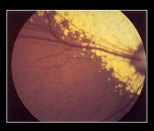
Prevention is better than cure

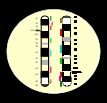
The dog must be looked upon in its entirety

…not only a collection of details

A growing number of kennel clubs and breed clubs....

..increasing number of rules and regulations





DNA-tests

Eradication programs

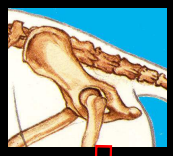
Despite the good intentions for improving health trough strict regulations..

…the result can often be harmful to many breeds and to many dogs!

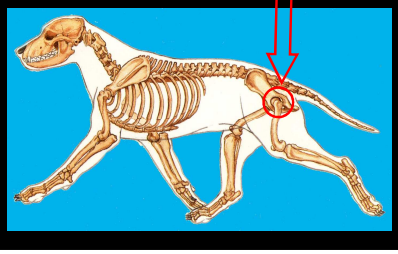
Stringent demands in eradication programs might eradicate the best breeders and the best breed representatives instead of the disease!


"Healthy"


"Diseased"



A scanning diagnosis might influence the health – but most "diseased" animals are functionally healthy!



The history of a dog

- "Bamse" died at the age of 15
- The only time in his life he needed medical treatment, was 14 years ago when he cut his paw
- He was Norwegian and Swedish Champion
- With his calm dignity he was the leader among dogs; there were never any problems when Bamse was present
- He was the children's best friend and companion
- But his excellent health and mentality died with him; he was never used for breeding
- Bamse had mild unilateral hip dysplasia

Is this really rational and sensible breeding policy?

37.8%

Health is much more than hips..

- *Free of hip dysplasia does not necessary mean that the dog is healthy!*
- *Free of HD must never be an excuse to use an unsound dog for breeding!*

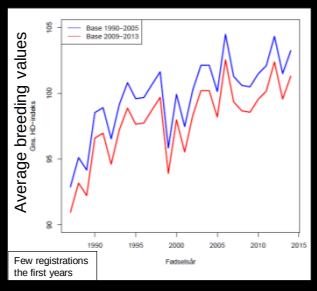
We must focus on the whole dog – and the functional health!

Results from NKK last 10 years
(Rhodesian ridgeback - N=1240)

	HD % (n)	ED % (n)
X-rayed - % of total dogs registered	56.4%	52.3%
Free (HD=A+B, ED=0)	93.7% (655)	93.8% (608)
Mild (HD=C, ED=1)	3.7% (26)	4.5% (29)
Moderate (HD=D, ED=2)	2.1% (15)	1.1% (7)
Severe (HD=E, ED=3)	0.4% (3)	0.6% (4)

Norwegians are World champions to x-ray their dogs.....

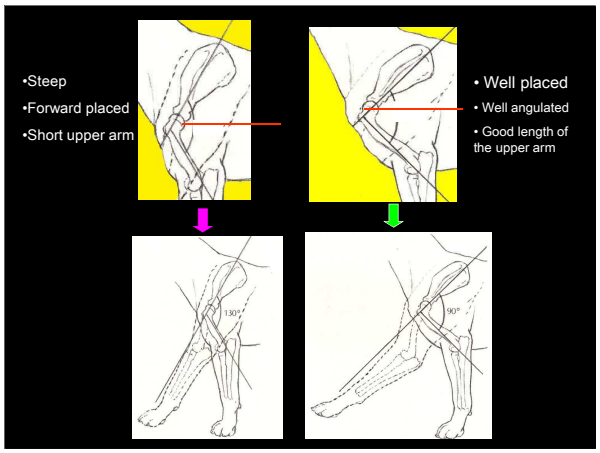
Born 2014: 96.7% free (64.5% of registered dogs are x-rayed)
Born 2013: 92.7% free
Born 2012: 97.2% free



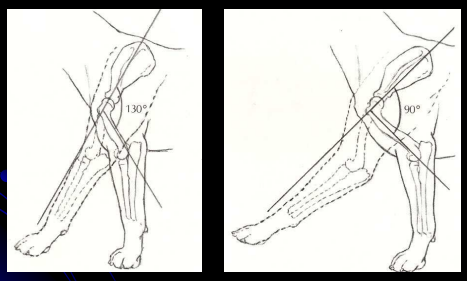
Few registrations the first years

Genetic trend – rhodesian ridgeback

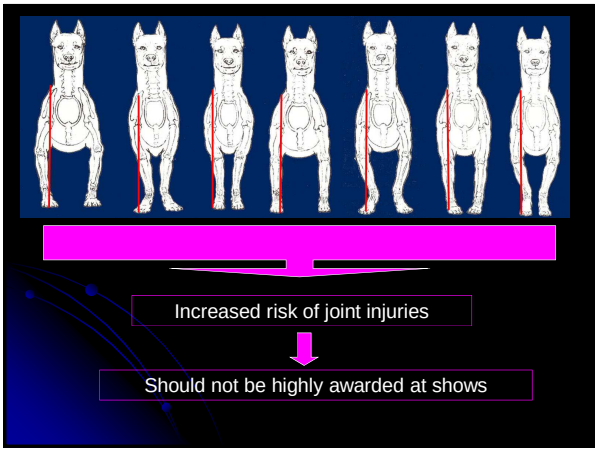
Heritability HD: 0,31



Sound conformation is the key to sound function!

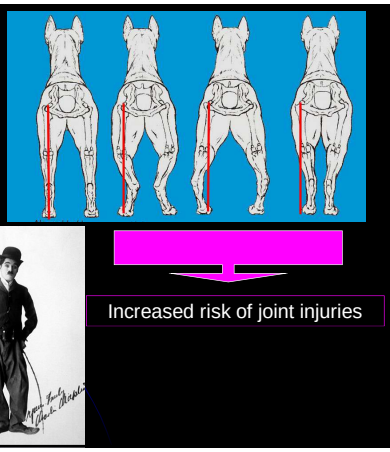


From H Spira. Canine Terminology



Increased risk of joint injuries

Should not be highly awarded at shows



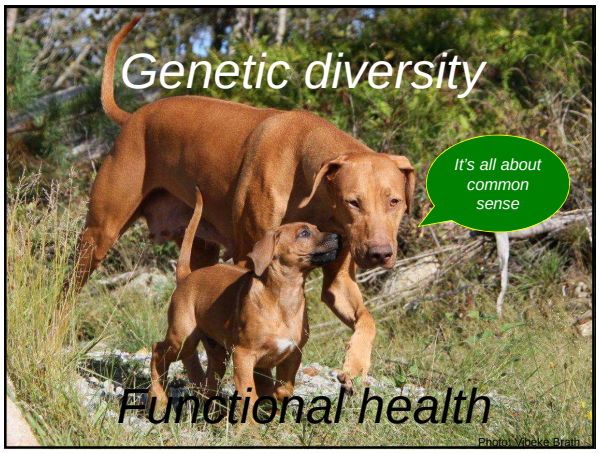
Increased risk of joint injuries

In breeding and judging

The dog must be looked upon in its entirety

…..not just focus on more or less unimportant details!

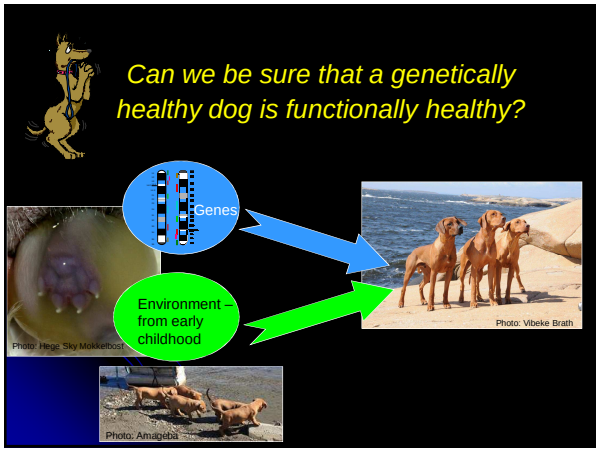
Is eye colour - or tail carriage - more important than a correct front?


Genetic diversity
It's all about common sense
Functional health


Healthy young dogs
Healthy old dogs
FCI Breeding Commission
Functional health


Genetic health??
No dog is free of genes that might give disease….
…if we look close enough


Ideally the goal should be genetically healthy dogs….
But the goal should be realistic


Can we be sure that a genetically healthy dog is functionally healthy?
Genes
Environment – from early childhood


Stringent demands in eradication programs might eradicate the best breeders and the best breed representatives instead of the disease!

Matador breeding – ”Popular Sire Syndrome”

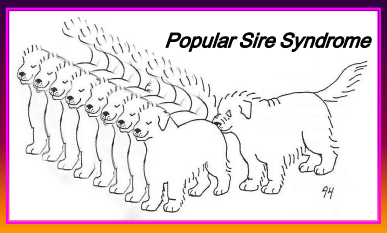
One dog is allowed to have too many offspring relative to the breed population

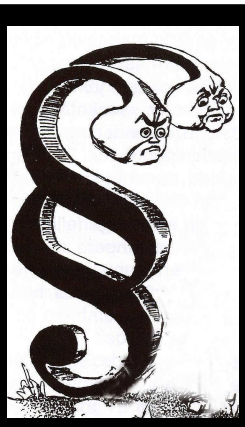
The most serious ”disease” in modern dog breeding

If a large portion of dams are mated to a single stud dog, the gene pool will drift in that dogs direction

↓

Loss of genetic diversity in a breed





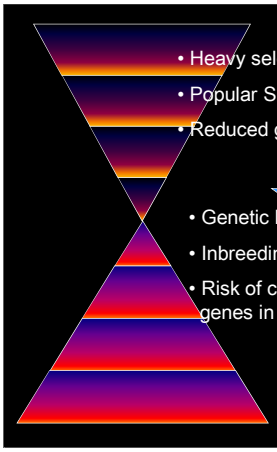
Too stringent demands - too many rules

↓

Too strong selection

↓

Encourage matador breeding



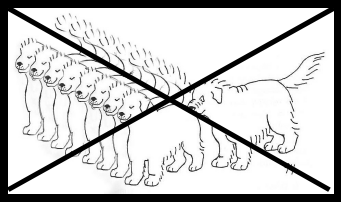
- Heavy selection – few dogs used for breeding
- Popular Sire Syndrome
- Reduced genetic variance

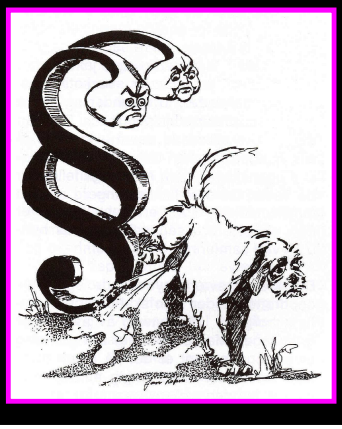
↓

- Genetic bottleneck
- Inbreeding depression
- Risk of concentrating undesirable genes in the population

There is no way to ensure that any dog is free of every undesirable genes

Regulations against
Popular Sire Syndrome





"Gray zone breeders" –

Outside the organized dog world

Basic for success in breeding programmes

- Education – knowledge
- Cooperation
- Honesty, trust and respect
- Reliable statistics based on screening
  - only for diseases that are important for the dogs health
- DNA-tests
  - only for diseases that are important for the dogs health
- Central register - open to the breeders and the public

FCI International Breeding Strategies

proposal from FCI Breeding Commission
Approved by General Committee February 2010

Strategies to improve canine health – NOT specific rules

FCI Breeding strategies - § 1, including

- *The breeder should keep the breed standard as the guideline for the breed specific features; any exaggerations should be avoided*

The goal

FCI International Breeding Strategies §1

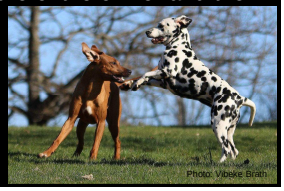
Functionally healthy dogs….

….with a construction and a mentality typical to the breed,

…dogs that will live a long and happy life…

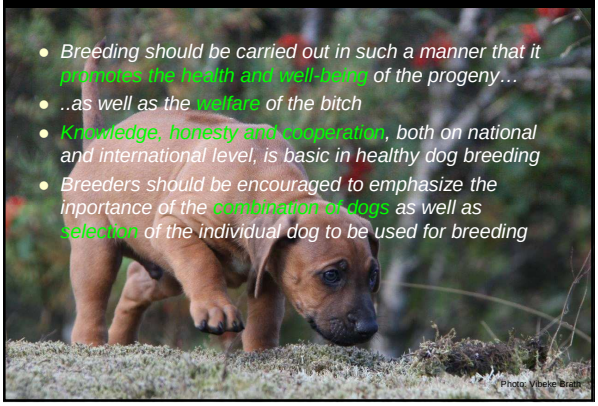
…for the benefit and pleasure of the owner and the society

…as well as the dog itself



FCI International Breeding Strategies §1….

- *Breeding should be carried out in such a manner that it promotes the health and well-being of the progeny…*
- *..as well as the welfare of the bitch*
- *Knowledge, honesty and cooperation, both on national and international level, is basic in healthy dog breeding*
- *Breeders should be encouraged to emphasize the importance of the combination of dogs as well as selection of the individual dog to be used for breeding*



FCI International Breeding Strategies §1….

- *Education of breeders is to be recommended rather than strict breeding regulations and stringent demands in breeding programmes…*
  - *…which can easily result in reduced genetic diversity in the breed…*
  - *…as well as exclusion of excellent breed representatives and reduced cooperation with conscientious breeders*
- *Breeders and breed clubs should be encouraged to cooperate with scientists in genetic health issues, to prevent combination of dogs from lines that will result in unhealthy offspring*

FCI Breeding strategies - § 2

Only functionally and clinically healthy dogs, with breed typical conformation, should be used for breeding;

- *i.e. to only use dogs that do not suffer from any serious disease or functional disability*

It is not enough for a breeding dog to be functionally healthy – but it is basic for even thinking to use a dog for breeding

FCI Breeding strategies - § 2.1

If close relatives of a dog that suffers from an inherited disease or functional disability are used for breeding, they should only be mated to dogs from bloodlines with low or no occurrence of the same disease or disabilities.

If a DNA-test for the disease/functional disablility is available, the breeding stock should be tested in order to avoid mating of two carriers (see point 5)

It all about honesty and respect. The breeders must talk with each other - not only about each other!

FCI Breeding strategies - § 2.2

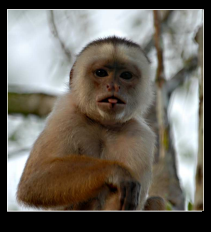
Mating combinations which from available information increase the risk of serious diseases or functional disabilities or impairment in the progeny, should be avoided

Does the mating of two ridgebacks increase the risk of serious disease?

FCI Breeding strategies - § 2.2

Only dogs having a sound temperament, typical for the breed, should be use for breeding

- *That is to only use dogs that do not show signs of behavioural disturbance in the form of*
  - *excessive fear reactions*
  - *or aggressive behaviour in unprovoked situations*
  - *or situations that can be considered as everyday situations for the dog*



FCI Breeding strategies - § 3

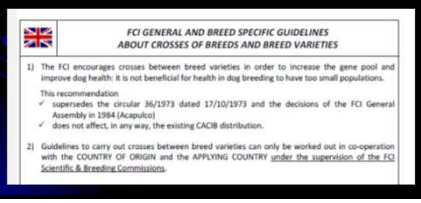
- *To preserve, or preferably extend, the genetic diversity of the breed, matador breeding and heavy inbreeding should be avoided*
  - *Mating between siblings, mother to son or father to daughter should never be performed*

Genetic diversity
Crossing of breed varieties

- Proposal from FCI Breeding Commission 2010, approved by joint meeting FCI Standard, Scientific and Breeding Commission 2011:
  - *FCI should encourage breed varieties to be crossed in order to improve genetic health;*
  - It is not beneficial for health to have too small breed populations
- This recommendation supersedes circular 36/1973 and the decision of General Assembly 1984..
  - ..and *does not affect the allocation of CACIB as it stands today*
- The joint meeting made a list of breed varieties (size/coat/colours) that can be crossed
- *FCI general and breed specific guidelines about crosses of breeds and breed varieties approved by the General Committee to be at General Assembly 2012, but with some changes…*

Approved by FCI General Assembly 2012:

- Guidelines to carry out crosses between breed varieties can only be worked out in co-operation with the country of origin and the applying country under the supervision of the FCI Scientific & Breeding Commissions



FCI GENERAL AND BREED SPECIFIC GUIDELINES
ABOUT CROSSES OF BREEDS AND BREED VARIETIES

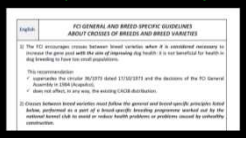
1) The FCI encourages crosses between breed varieties in order to increase the gene pool and improve dog health: it is not beneficial for health in dog breeding to have too small populations.

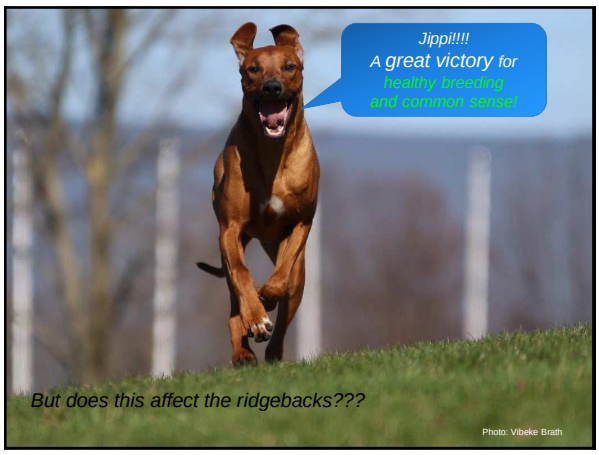
This recommendation
- ✓ supersedes the circular 36/1973 dated 17/10/1973 and the decisions of the FCI General Assembly in 1984 (Acapulco)
- ✓ does not affect, in any way, the existing CACIB distribution.

2) Guidelines to carry out crosses between breed varieties can only be worked out in co-operation with the COUNTRY OF ORIGIN and the APPLYING COUNTRY under the supervision of the FCI Scientific & Breeding Commissions.

FCI general and breed specific guidelines about crosses between breeds and breed varieties – approved by General Assembly 2015

1. FCI encourage crosses between breed varieties *when it is considered necessary to increase the gene pool with the aim of improving dog health;* it is not beneficial for health in dog breeding to have too small gene populations
   - This recommendation does not affect, in any way, the existing CACIB distribution
2. Crosses between breed varieties must follow the general and breed specific principles listed below, performed as a part of a *breed-specific breeding program worked our by the national kennel club to avoid or reduce health problems or problems caused by unhealthy construction*





FCI Breeding strategies - § 3 cont.

- *As a general recommendation no dog should have more offspring than equivalent to 5% of the number of puppies registered in the breed population during a five year period*
  - *The size of the breed population should be looked upon not only on national but also on international level, especially in breeds with few individuals*

Example: 200 registered dogs/year – no dog should have more than 50 offspring in his life

FCI Breeding strategies - § 4

- *Screening results (positive or negative) for phenotypic appearance of polygenetic diseases should be available in open registries*
  - *The results should be used to aid the selection and combination of breeding dogs*

FCI Breeding strategies - § 4.1

§ 4.1: Breeding values based on screening results should when possible be computerized to facilitate selection of breeding stock, not only on the phenotypic appearance but also by indicated genotype

As a general rule the estimated breeding value for a combination should be better than the average of the breed

Is it beneficial to calculate breeding values for HD in Rhodesian ridgeback – when 94% are free?

FCI Breeding strategy - § 4.2

- *Screening should only be recommended for diseases and breeds where the disease has major impact on the dogs' functional health*

Is it necessary to x-ray any family dog for HD – if 94% are free, and only 3 dogs in 10 years have severe hip dysplasia?

FCI Breeding strategies - § 5

- *Results from DNA tests for inherited diseases should be use to avoid breeding diseased dogs, not necessarily to eradicate the disease*
  - *Dogs shown to be carriers (heterozygote) for a recessive inherited disease should only be bred to a dog that is proven not to carry the allele for the same disease*

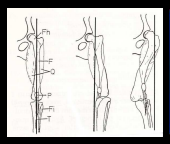
FCI Breeding strategies - § 6

- *Any dog should be able to mate naturally*
  - *Artificial insemination should not be used to overcome physical inabilities of the dog*
- *A bitch should be excluded from further breeding if she is unable to give birth, due to anatomy or inherited inertia (week/no uterine contractions), or if she is unable to take care of the newborn puppies, due to mentality or inherited agalactia (no milk production)*

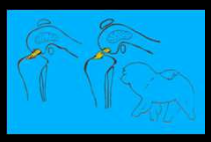
FCI Breeding strategies - § 7

- *Health issues that cannot be diagnosed by DNA-tests or screening programmes should have equal impact in the breed specific programmes*

Hypothyrosis
RR: NRRK study 1.5%
Agria: 3 x as common as in «all breeds»



Patella luxation
NRRK study: 0



Rupture of cruziata ligament
NRRK study: 1 dog

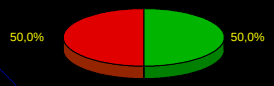
Agria: 50% less common than «all breeds»

Of major importance in all dog breeding…

1. Mentality!
2. Skin problems
   - Norwegian health survey (owners reports to Norwegian School of Veterinary Science)
   - RR: 26% (91/344) reported frequent dermatitis, otitis externa, scratching and/or irritated skin
   - Agria: Twice as common as in «all breeds»
- Joint problems
  - Knee problems (cruziata rupture, patella luxation)
  - Other joint problems
- Breed specific problems (dermoid sinus)
- Digestive problems (NRRK 8.5%, Agria 30% more common)
- Heart (NRRK 4%, 15% more common)
- Cancer/neoplasia (Agria: 30% more common as cause of death)
- Eyes, hormones etc

FCI Breeding strategies - § 8

As a general rule, a breeding programme should not exclude more than 50% of the breed; the breeding stock should be selected from the best half of the population



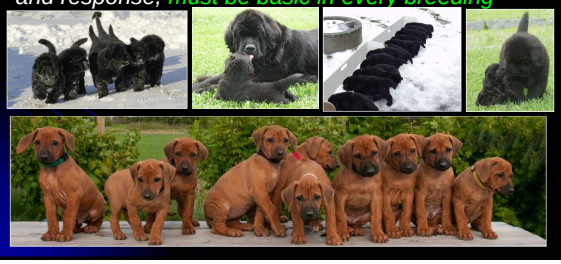
How many % of registered dogs are used breeding?

For all breeds (NKK): 13.8%

Rhodesian ridgeback (dogs born 2002-2011, NKK): 9,1%

FCI Breeding strategies - § 9

The raising of puppies, with correct feeding, environmental exposure, stimulation by their mother, breeder and others to develop social sense and response, must be basic in every breeding



Health and functionality in the breed standards

- European Convention for Protection of Pet Animals (1988 – 1995)
- Pedigree Dogs Exposed
- FCI Standard Commission
  - Major improvements in many breed standards the last decades..
  - ..to improve health
  - …and avoid exaggerations that can cause health problems

FCI Rhodesian ridgeback standard (1996)

- *"The RR should represent a well balanced, strong, muscular, agile and active dog, symmetrical in outline, and capable of great endurance with a fair amount of speed…*
- *The peculiarity of the breed is the ridge on the back, which is formed by the hair growing in the opposite direction to the rest of the coat"*

Proposals from FCI Breeding Commission

- Proposal (2012, 2013): Approval in breed standards of coat, colours and anatomical features that it genetically impossible to avoid in order to breed what is accepted in the breed standard
- These dogs should be equally recognized in the breed standard
  - Coated type in breeds where only naked dogs are accepted
  - Merle in breeds where harlequin is accepted
  - Ridgeless dogs in breeds where only dogs with ridge are accepted in the standard
    - Rhodesian ridgeback
    - Thai ridgeback

- It is possible to breed ridgebacks without breeding ridgeless dogs..
  - …if at least one of the parents is homozygot for the ridge allele
- But the result will be a higher risk of dermoid sinus…
  - …which might be fatal
  - Hilbertz et al (2007): 10 out of 12 dogs with dermoid sinus was homozygote for the ridge allel (83%)
  - Hillbertz (2005): No reports of dermoid sinus in ridgeless dogs of this breed
  - Waldo & Diaz (2015): Development and validation of a diagnostic test for Ridge allele copy number in Rhodesian Ridgeback dogs

Varieties of the same breed can be mated

- A dog homozygote for the ridge gene can be mated with a ridgeless dog….
- …which to a great extend will reduce the risk of dermoid sinus
- Two heterozygote dogs will produce 25% ridgeless dogs – and 25% homozygote dogs
- A heterozygote dog mated to a ridgeless dog will produce about 50% ridgeless dogs
- They will be registered eigher as ridgebacks or ridgeless dogs – depending on the ridge
- They do not have to compete with each other in the show ring; they can be judged as varieties of the same breed

Why are we dog breeders??

- *Why do we use all our spare time – and most of our money – on our dogs?*
- *Why does my husband and I very seldom go on holiday together?*
- *Why is our floors always covered with black hair?*
- *Why do we have a car with plenty of space for dogs and no spare seat for humans?*

- It is about passion
  - The excitement of creation
  - The joy of life – the love for our dogs
  - It's about being together – with our dogs and our friends
- It's about making a difference
- *We can all make a difference - for the joy and pleasure of our dogs*