

Cryptorchidism in Dogs

Basics and News about the Biological Background
and its Avoidance in Dog Breeding

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Who suffers from cryptorchidism ???

The dog Pain from inguinal cryptorchidism? Cancer-risk? Intestinal strangulation? Changes in behaviour? Fertility? Minor value?

The owner Emotional identification, Costs for health prevention, restrictions in usage (no stud dog!, no show dog!)

The breeder Reduced profit, loss of image in show-lines, risk to keep breeding license for the parents.

The breeding organisation

Loss of breeding potential, cost to organize and run a breeding program

Two main aspects:

What's going on ?

Mechanism of the development and maturation of the male genitalia

What can we do?

Prophylactic and curative medical treatment

Breeding strategies

DEFINITIONS

Anorchism/Monorchism: One or both testicles do not exist

Cryptorchidism: Position of the testicles not within the scrotum

Unilateral: One of the testicles is not within the scrotum

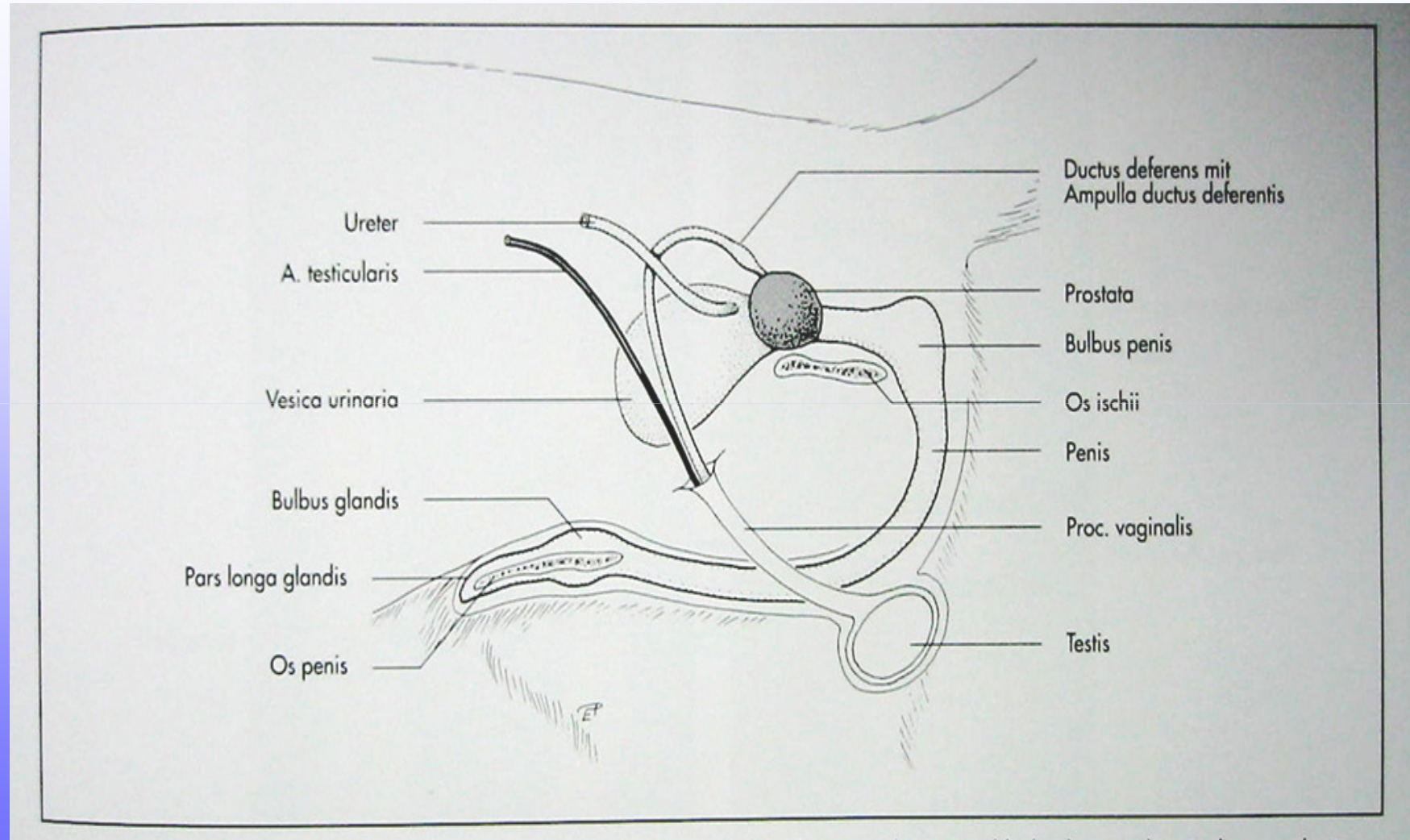
Bilateral: Both testicles are not within the scrotum

**Abdominal or Inguinal
Cryptorchidism** The not visible or palpable testicles are positioned either in the abdomen or in the inguinal canal

Testicular Status Number of hidden testicles at a defined age (0 – 1 – 2)

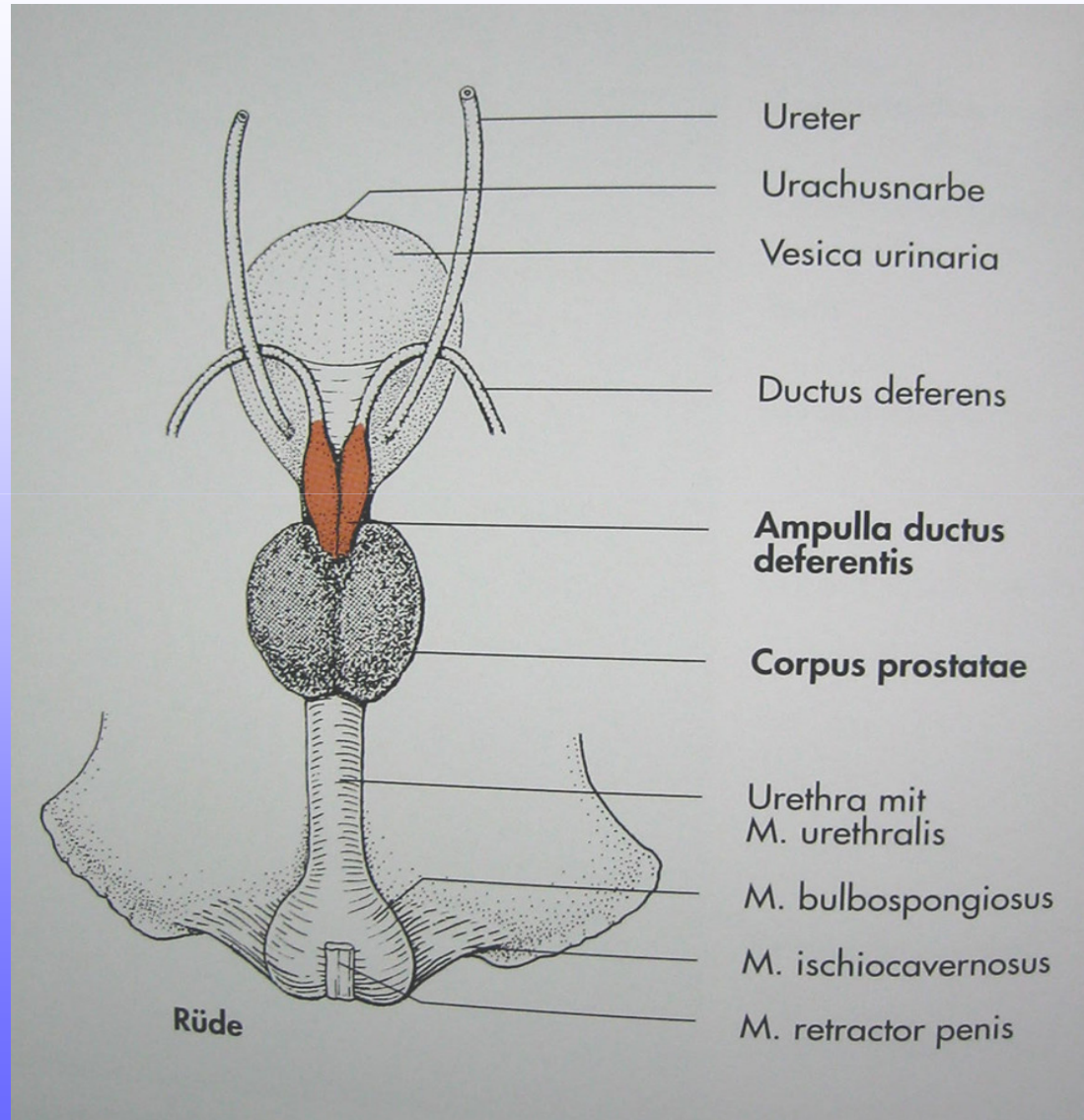
Tractus urogenitalis of the male dog

(Dyce, Sack and Wensing 1991)



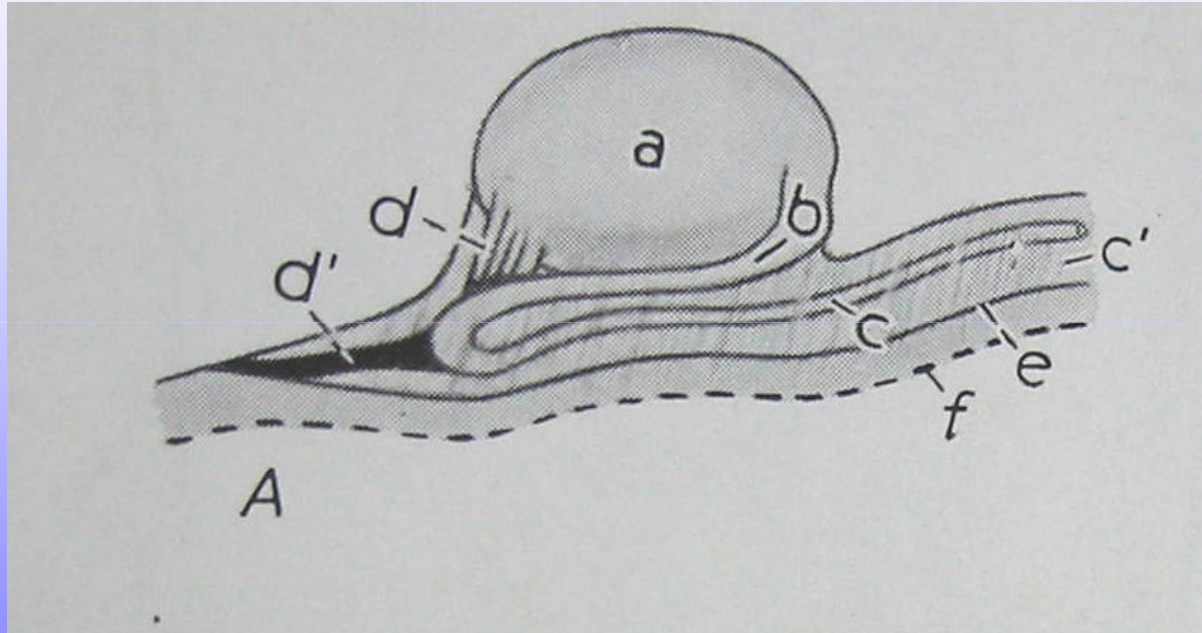
Accessory Glands of the male dog

(König and Liebrich 1999)



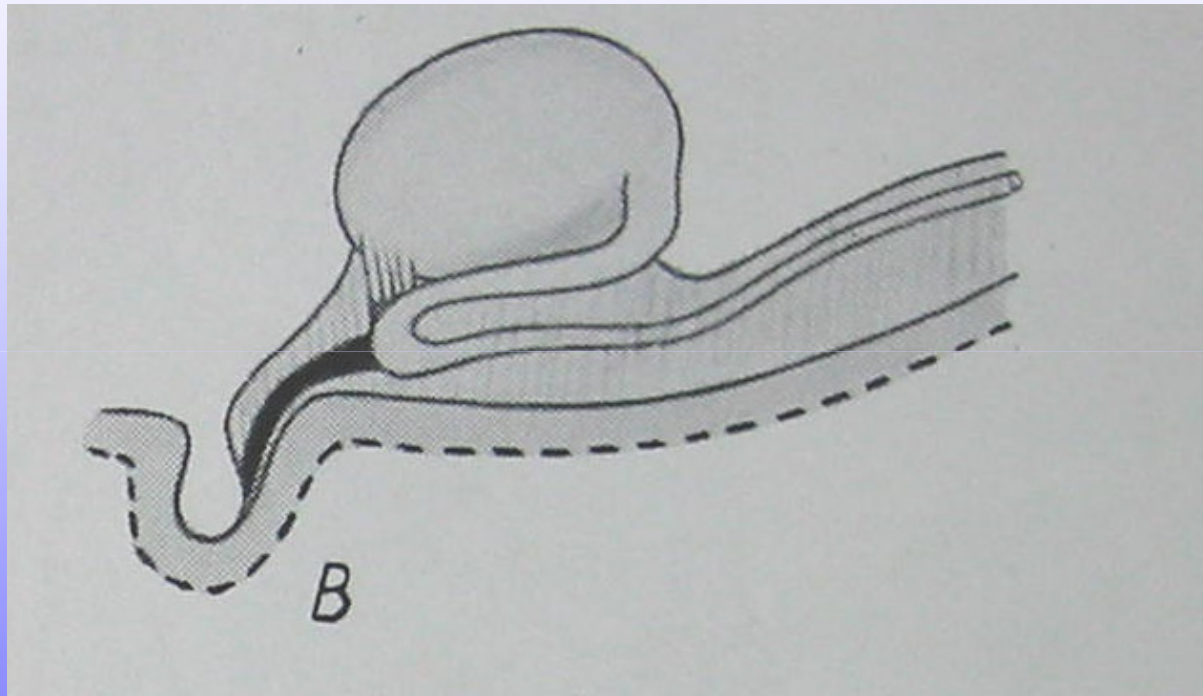
Descensus Testis

(by Zietschmann)



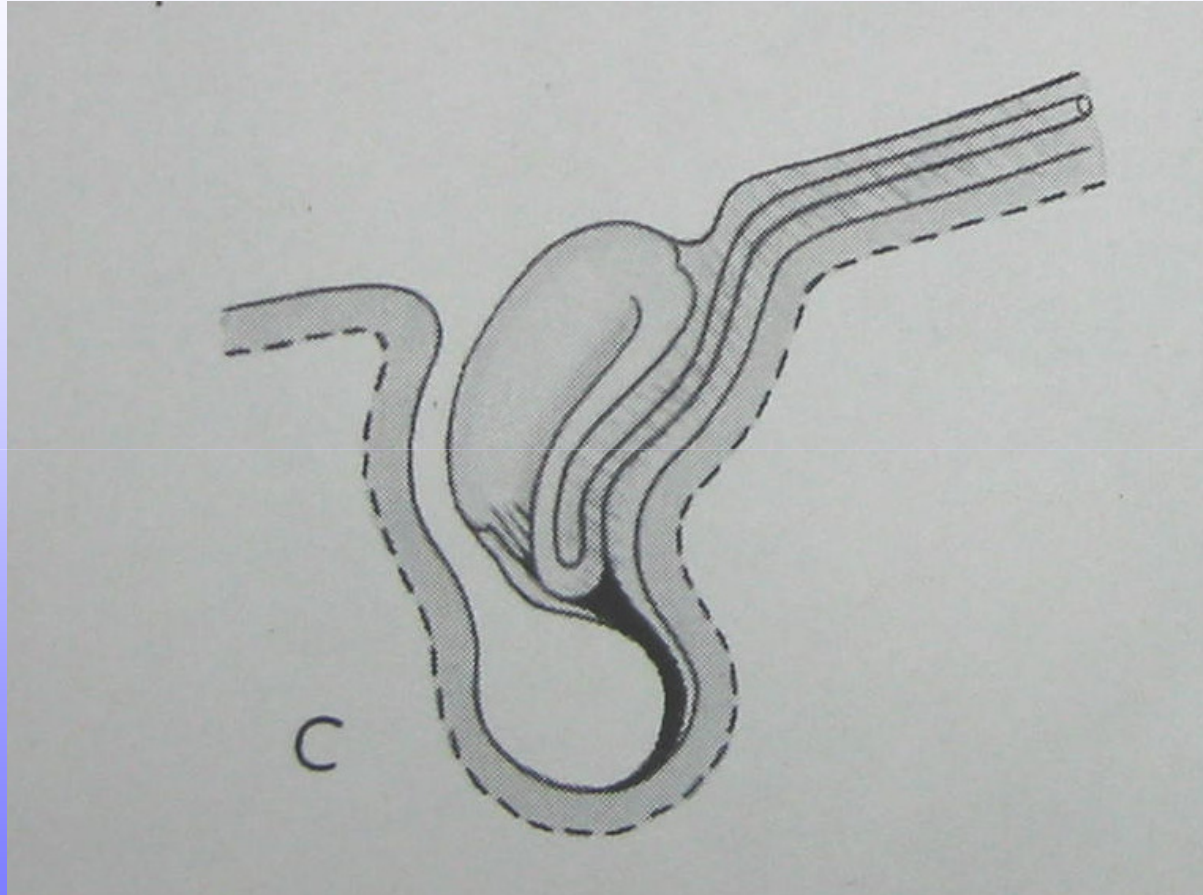
Descensus Testis

(Zietchmann)



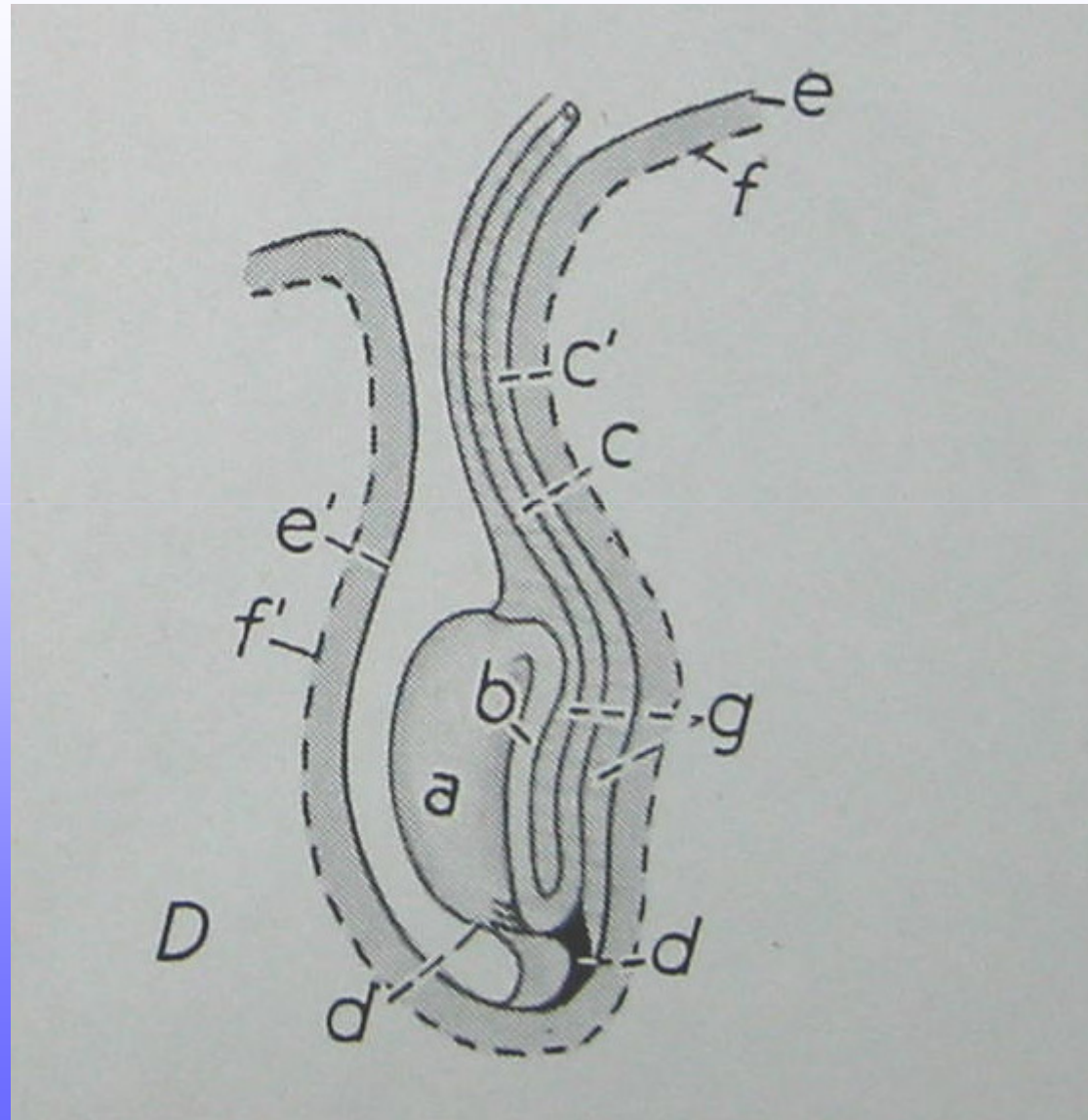
Descensus Testis

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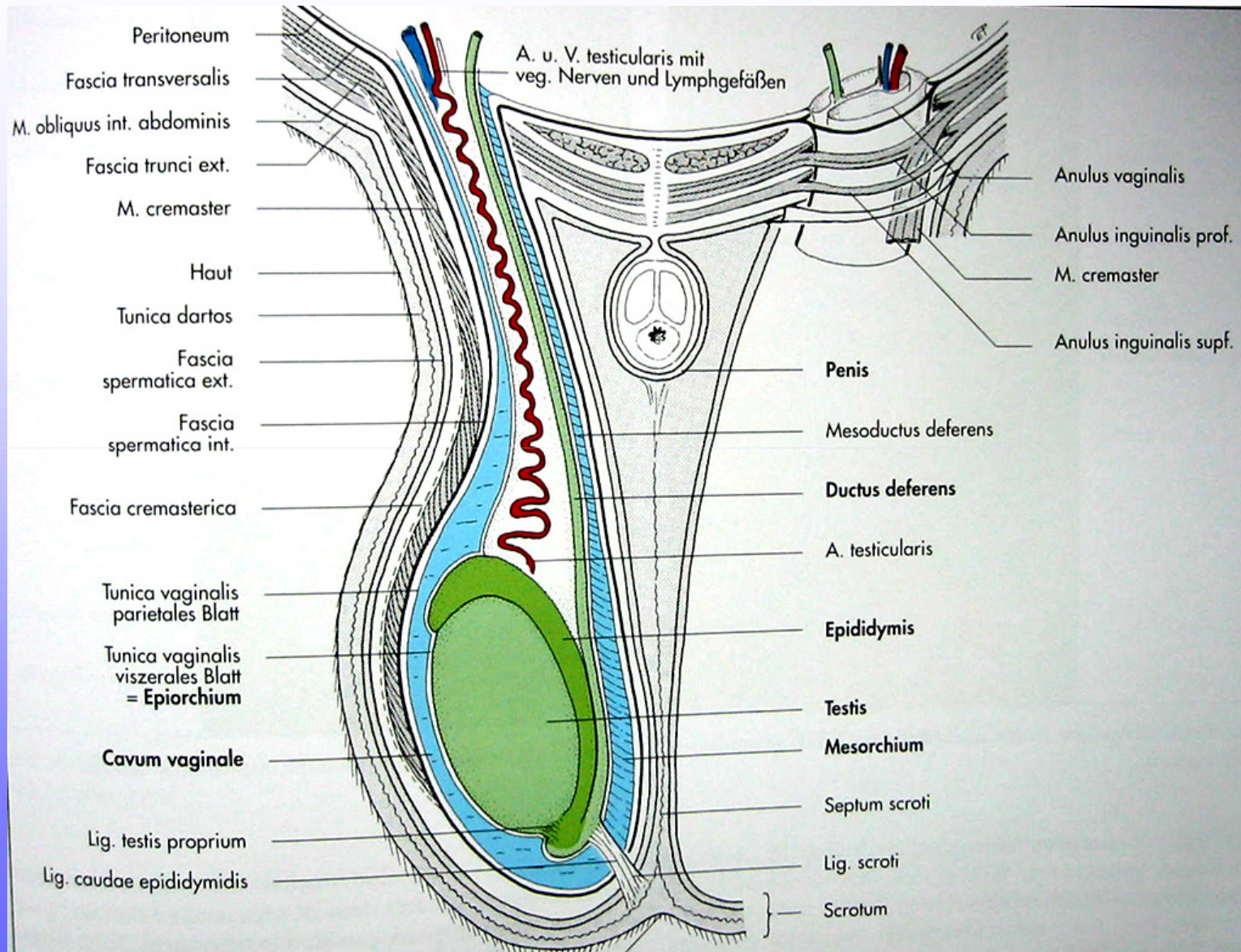


Descensus Testis

(Zienschmann)



Scheme of bovine Testis



Cryptorchidism – possible reasons

No or missformed structure of the processus vaginalis

No or missformed ligamentum scroti

**Insufficient traction of the shrinking ligamentum scroti (gubernaculum)
Insufficient abdominal pressure**

Too narrow inguinal canal, by itself or by secondary barriers

Too big testicles

Retention by abdominal structures

**Insufficient synchronisation in the course of time by hormonal
imbalance or insufficiency**

and ...

good luck or bad luck

Cryptorchidism in Dogs

Consequences:

Sperm production is a temperature-sensitive process. Scrotal temperature should be 3-5 degrees lower than abdominal temperature.

At too high temperature the sperms are first mostly deformed, finally the spermatogenesis is ending

After cooling the regeneration comes up very slowly after 2-3 month, after long heat it may never restart

The hormone production in the testicles (testosterone) is usually not influenced

Cryptorchidism in dogs

Consequences:

In case of inguinal cryptorchidism the testicle turns degenerating or is getting necrotic because of reduced blood circulation

Tumor risk is multiply higher in inguinal or abdominal testicles

Abdominal testicles can strangulate intestines (Ileus)

Cryptorchidism in dogs

Preventive support in young puppies

Massage towards scrotum, restricted feeding, physical exercise

Medical treatment

**Hormonal treatment with Gonadotropine or Gonadotropine-Releasing-Hormone (GnRH). Dosage (Niemand-Sauter):
Gonadotropine 300 iU/10kg once a week. In humans: GnRH 2-6 times in 2-6 days intervals. Treatment seems to be of low effect, after age of 10 weeks without chance.**

Surgically correction

Not easy to move hidden testicles down into the scrotum! Like imlantates from silicone morally doubtfull!

**Final solution
Kastration**

Cryptorchidism in dogs

Prevention by Breeding

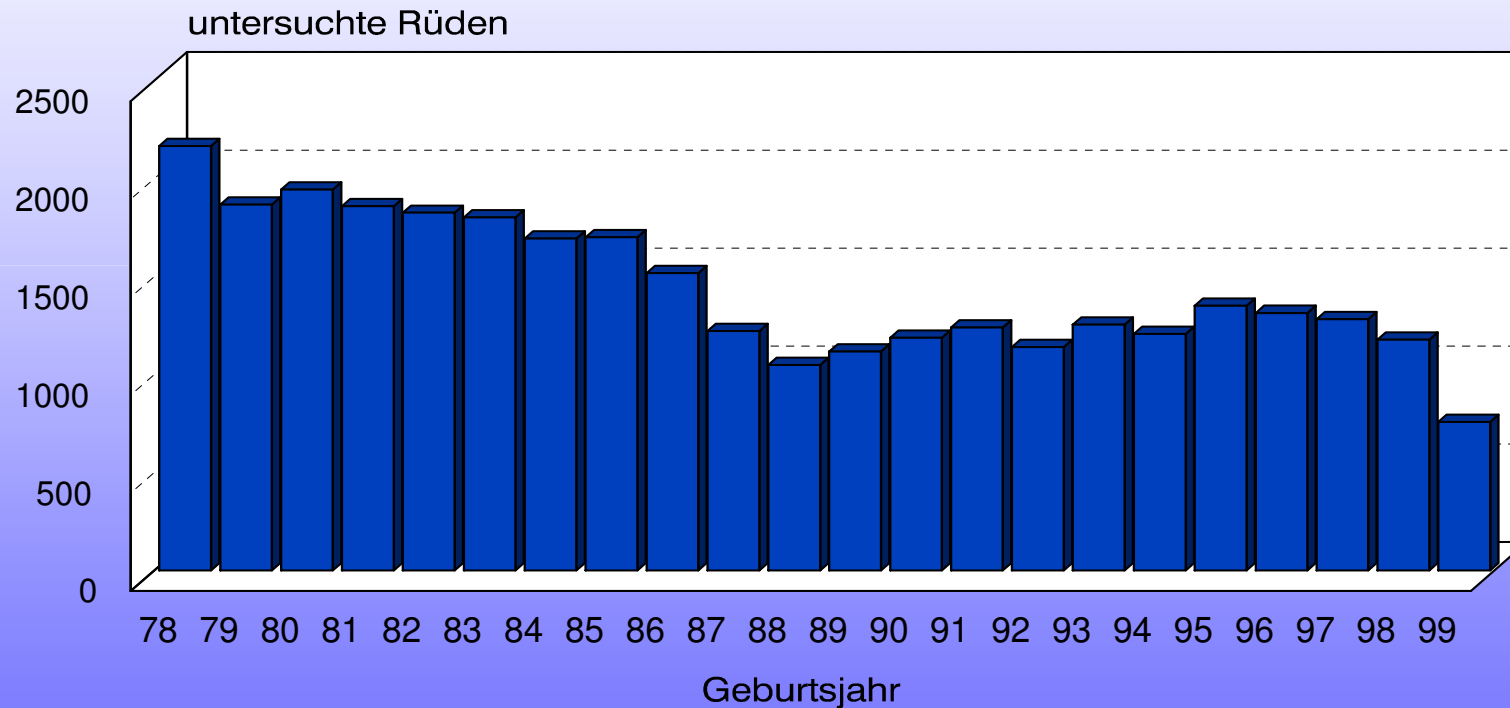
The Inheritance of Canine Cryptorchidism Studies and Application in the German Boxer Population

by Reiner Beuing, Gabriele Beuing, Peter Pracht, Nina Janssen

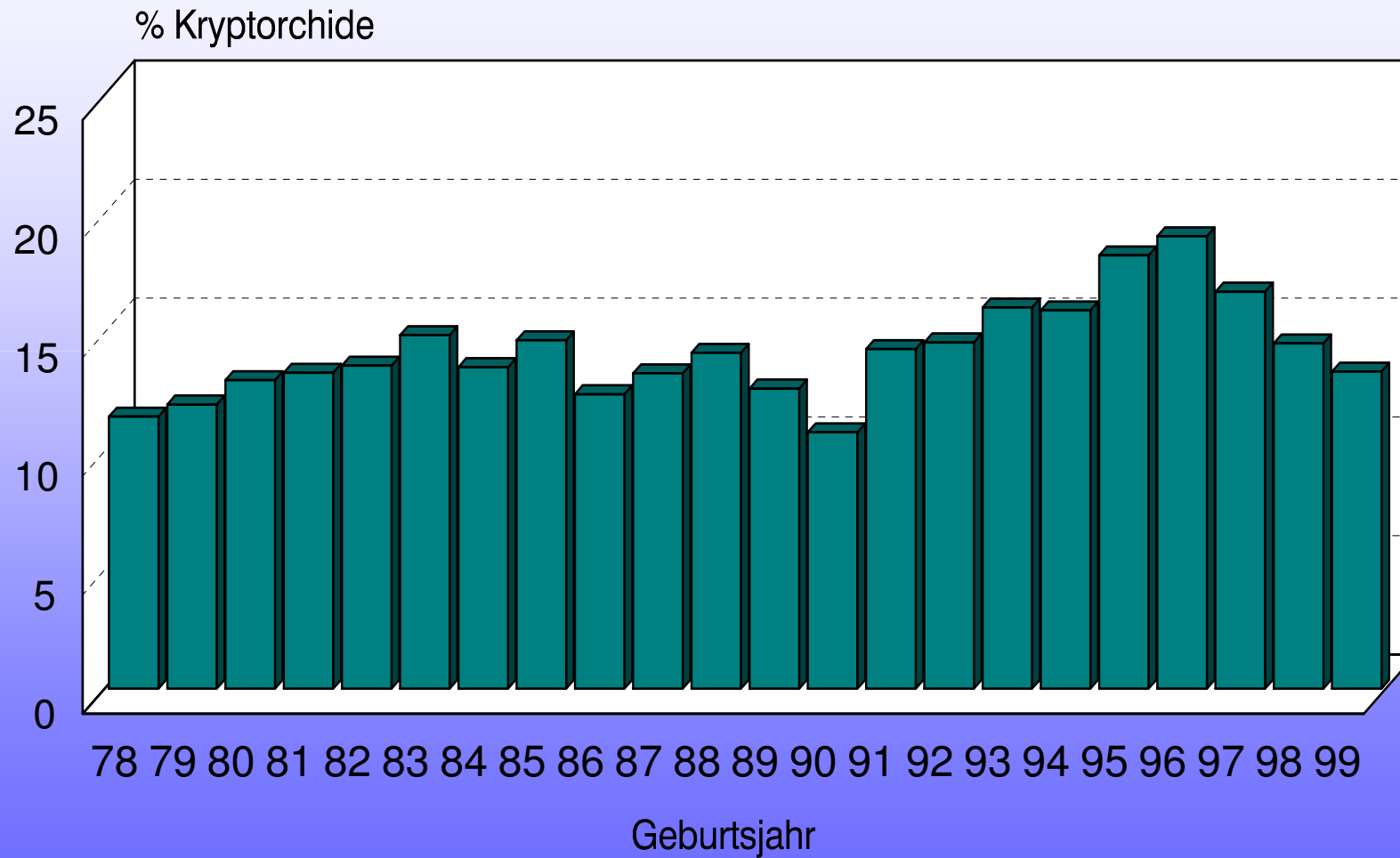
Data 1999 submitted from the breeding Organisation

95 986 dogs with data about sire, dam, date of birth, sex, etc.

32 187 male dogs with tested testicular status



Incidence of Cryptorchidism in the Boxer Population



Heritability of Cryptorchidism

Similarity (Correlation) of related animals gives information about the genetic background of the genetic predisposition

Example:

Take hundreds of different halfsib-pairs, each from same sire and different dams, and calculate the correlation. Halfsibs have 25% common genes.

If you find a halfsib-correlation of 0,10 then it is only 40% of what you could expect under 100% heritability! So heritability seems to be 0,40

Heritability Estimation in Boxers

Variance component for Genotype: **0,397**

Variance component for other factors: **0,603**

Heritability is the rate of response to selection

Heritability is the accuracy to identify the genotype by looking on the phenotype

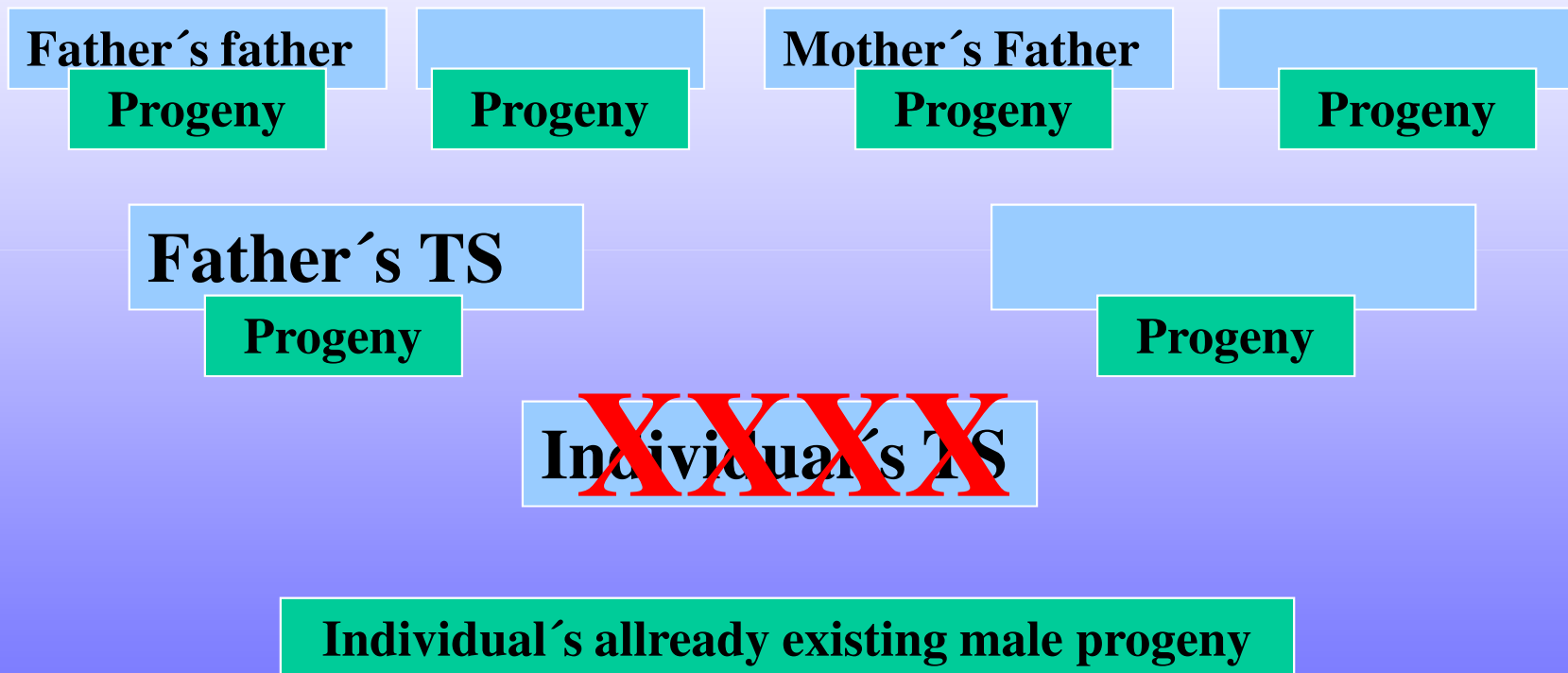
Breeding Values for Cryptorchidism

The breeding value is a numerical figure to describe the effect of each individual's genotype on the phenotype of its progeny

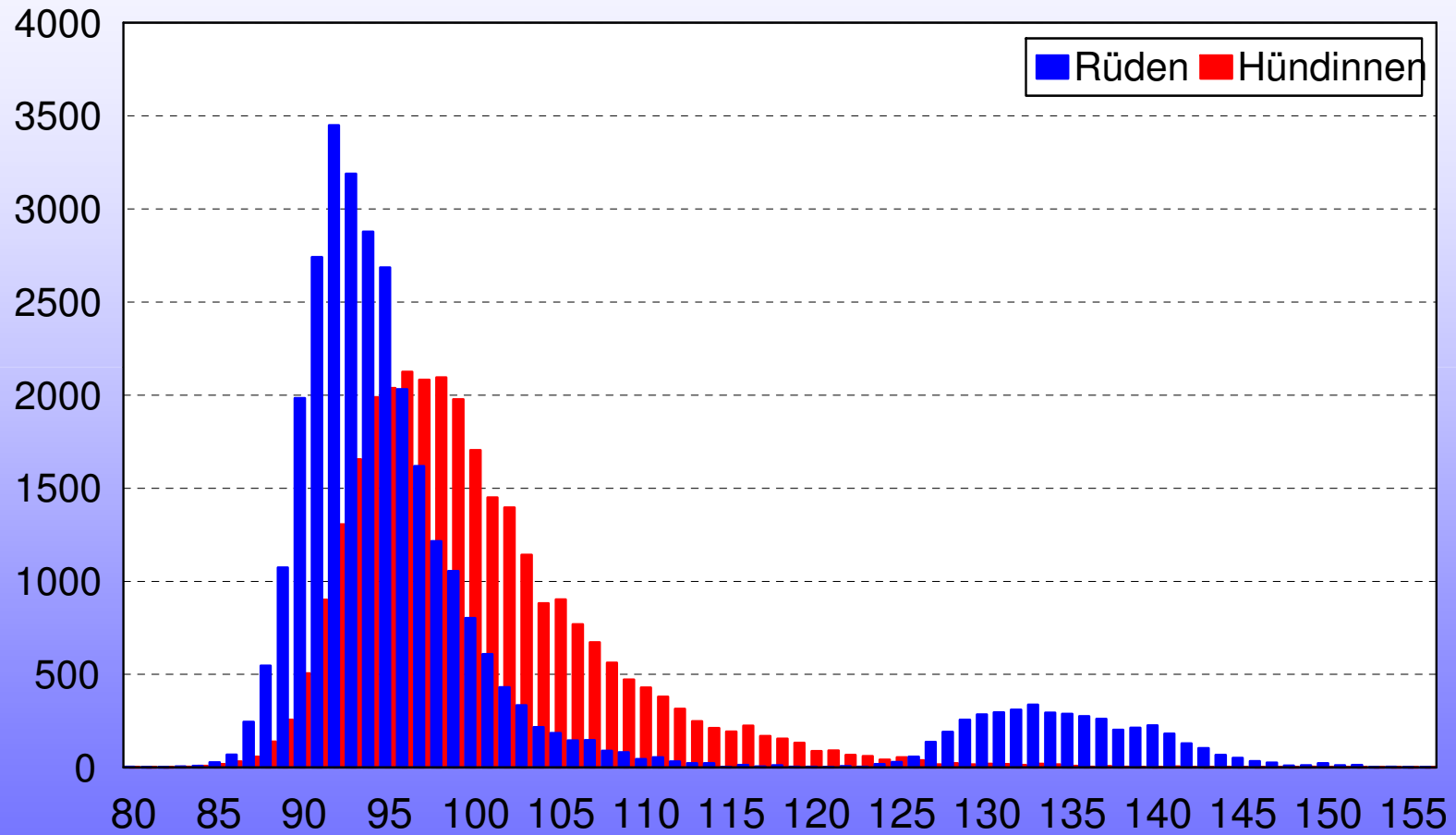
Relative breeding values:

- <100** lowers the rate of cryptorchidism in the progeny
- 100** holds the breed average
- >100** increases the rate of cryptorchidism in the progeny

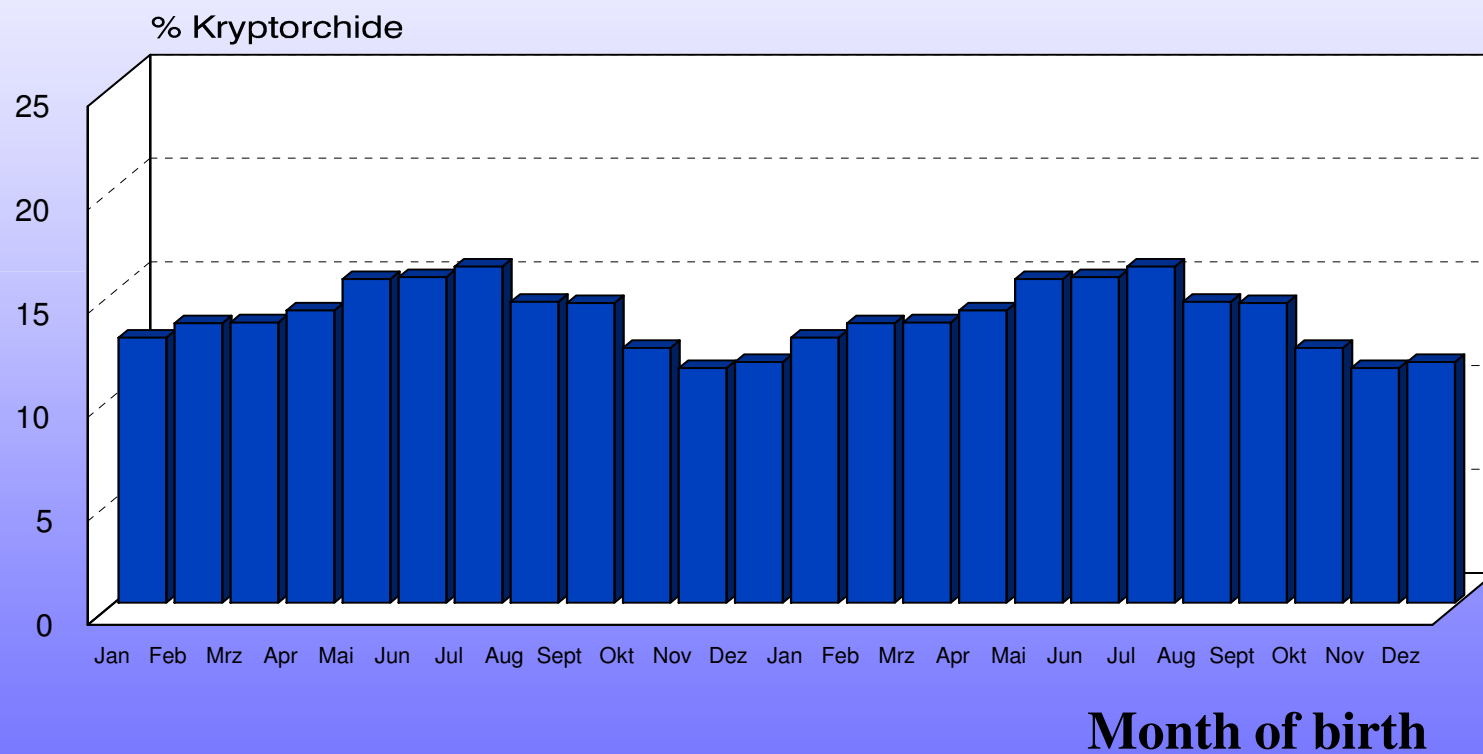
Information used in breeding value estimation for Testicular Status (TS)



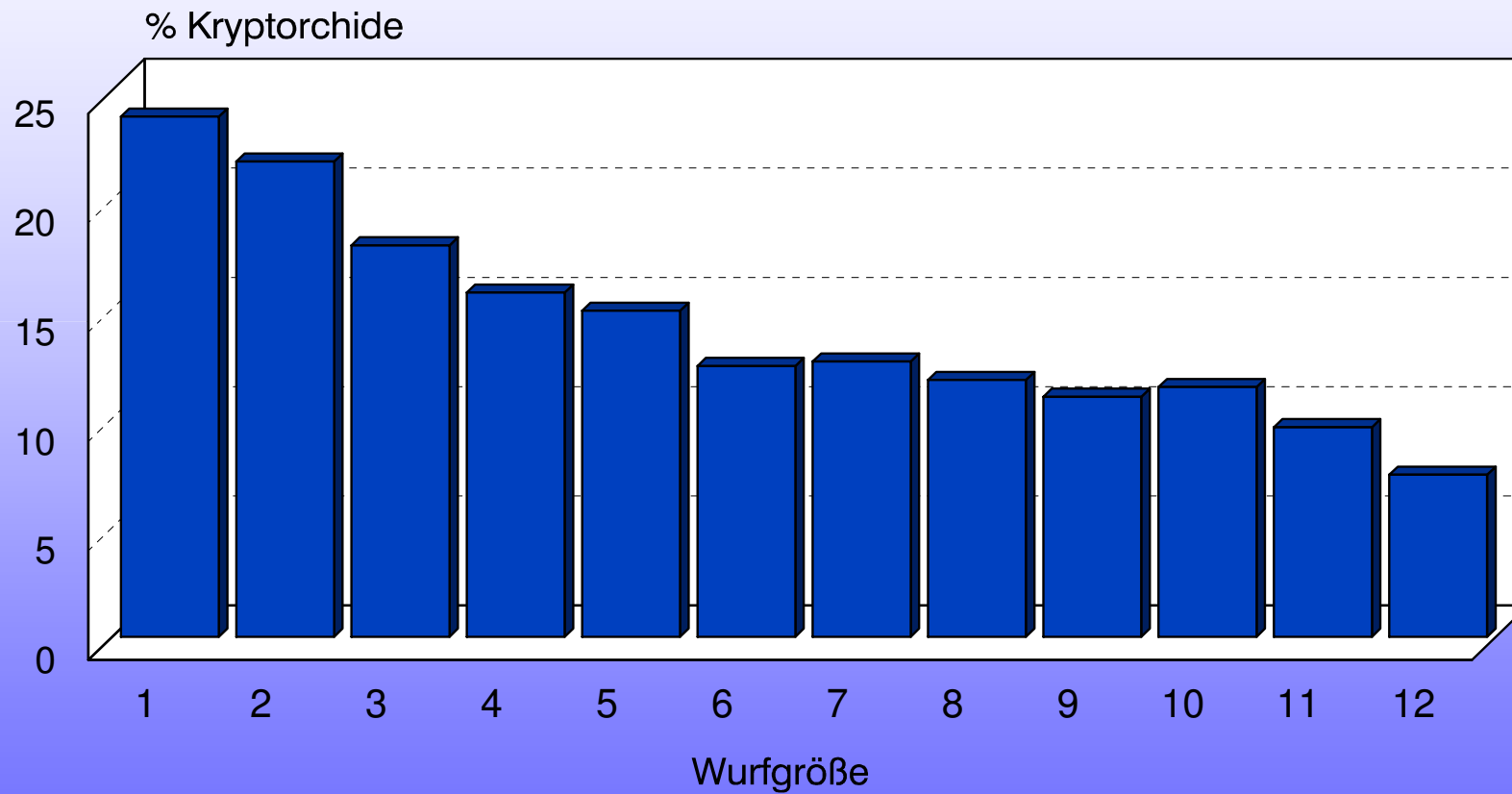
Breeding Values



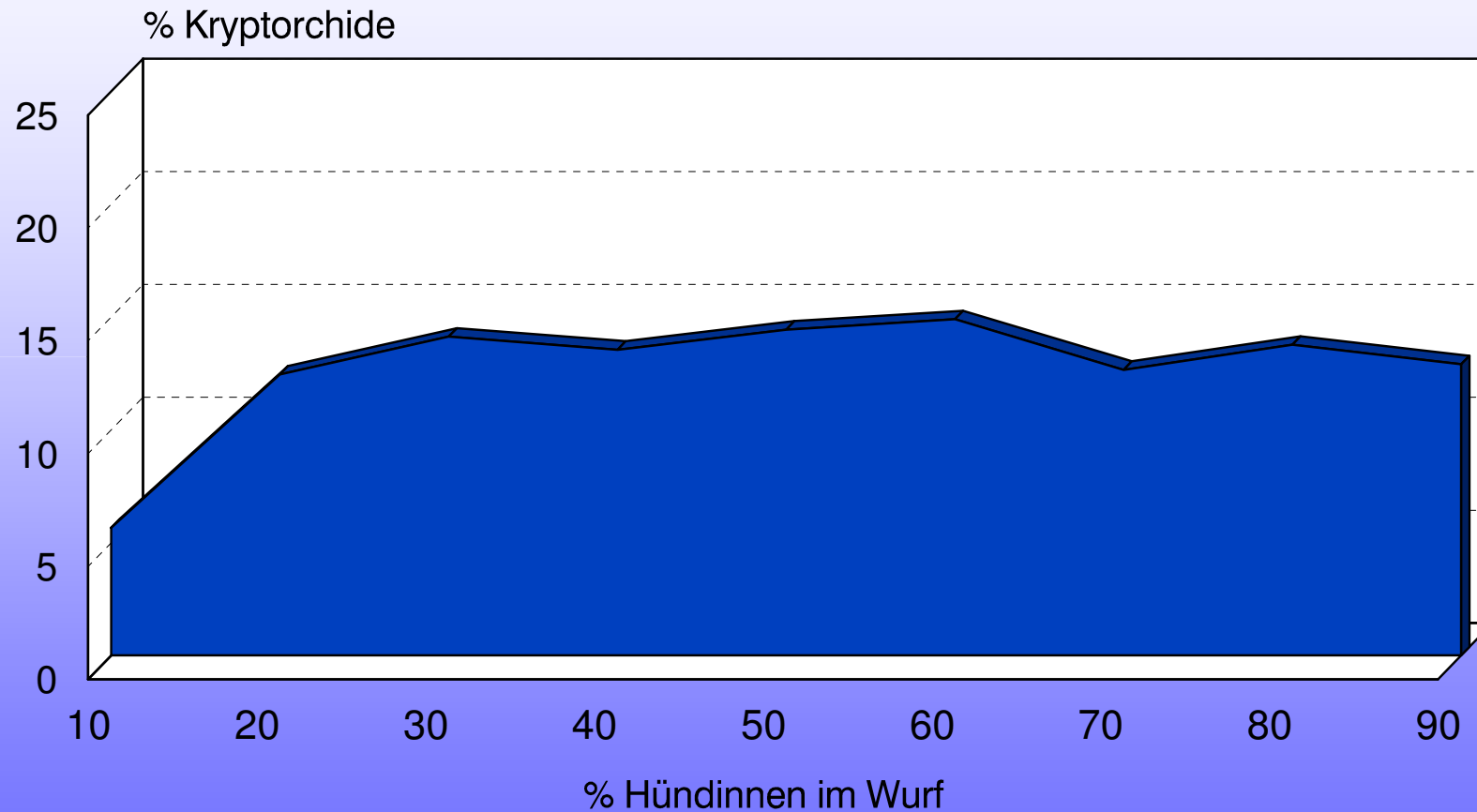
Information about Environmental Effects



Effect of Litter Size on TS



Influence of the Sex Ratio on TS of the male



Breeding Strategie

Don't touch the bitches

Look on the risk from the bitch

Choose the right sire for that bitch

The average breeding value from sire and dam should be lower than 100, to keep the risk for the puppies below breed average.

Try to breed as low as possible!

Simulation of breeding on the Data of 1999

How many cryptorchide under the running breeding Program?

105 out of 696 with TS>0 = 15,1%

What was the realised selection intensity?

Breeding value sires: 96,3

Breeding values dams: 98,7

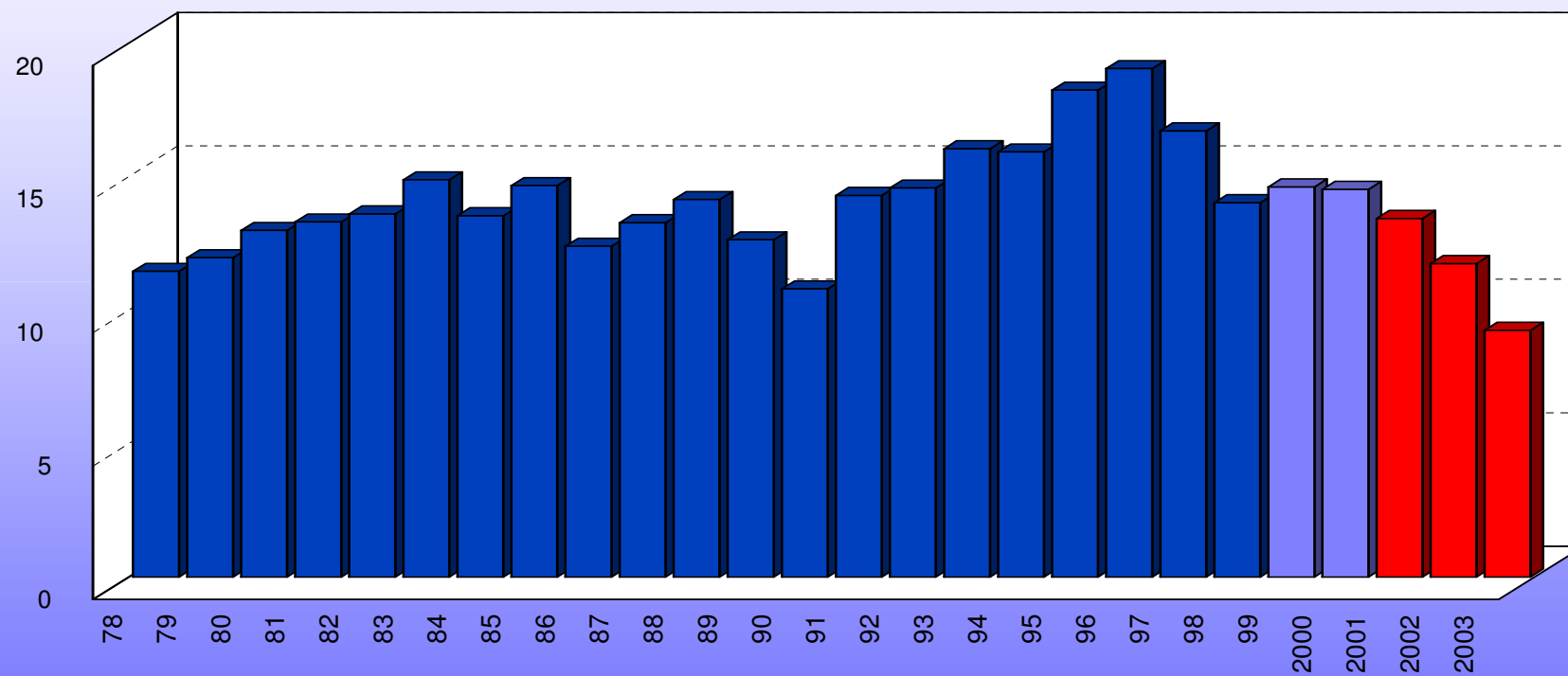
What could be, if breeding values would have been

<100 : 10,28% (25,17% if parents >100)

<105 : 11,67%

<110 : 12,07%

Introduction of the Breeding Program November 2000



**Sometimes we don't start things because they
seem to be difficult,**

**but often they are difficult and stay
difficult because we don't start!**