

Miniature Bull Terriers: Breeding Strategies for Health

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Animal Health Trust
The science behind animal welfare



Ljud till föreläsningen finner du här:

Part 1: http://www.youtube.com/watch?v=avG0_hr15BI

Part 2: <http://www.youtube.com/watch?v=dWUkhkuSIhg>

Part 3: <http://www.youtube.com/watch?v=cRP-HxxLo0M>

Part 4: http://www.youtube.com/watch?v=9ZBeYuSZ_dc

Overview

- **Gene pool and genetic diversity**
- **Inbreeding**
- **Approaches to minimising diversity loss**
- **Current situation in the MBT**
- **Future breeding strategies**





TOOLS
to aid breeding decisions

Single gene diseases

DNA tests

Complex diseases

Estimated Breeding Values (EBVs)
Genomic BVs (based on DNA)

Mate selection program

BREEDING PROGRAMMES
for long-term health

General health

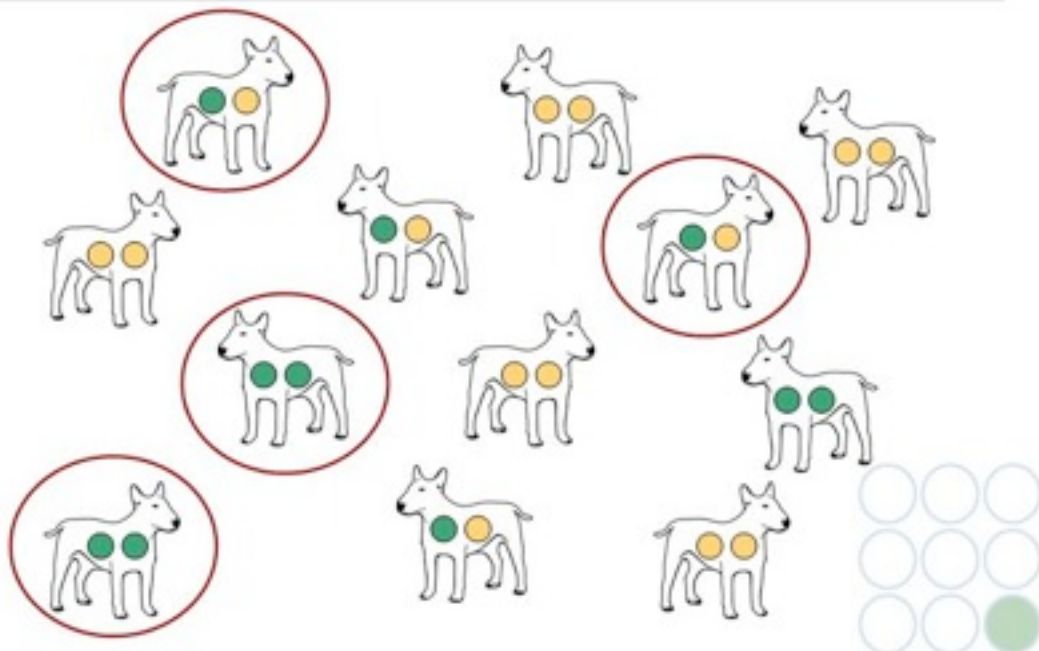
Management of genetic diversity

Optimised breeding programmes

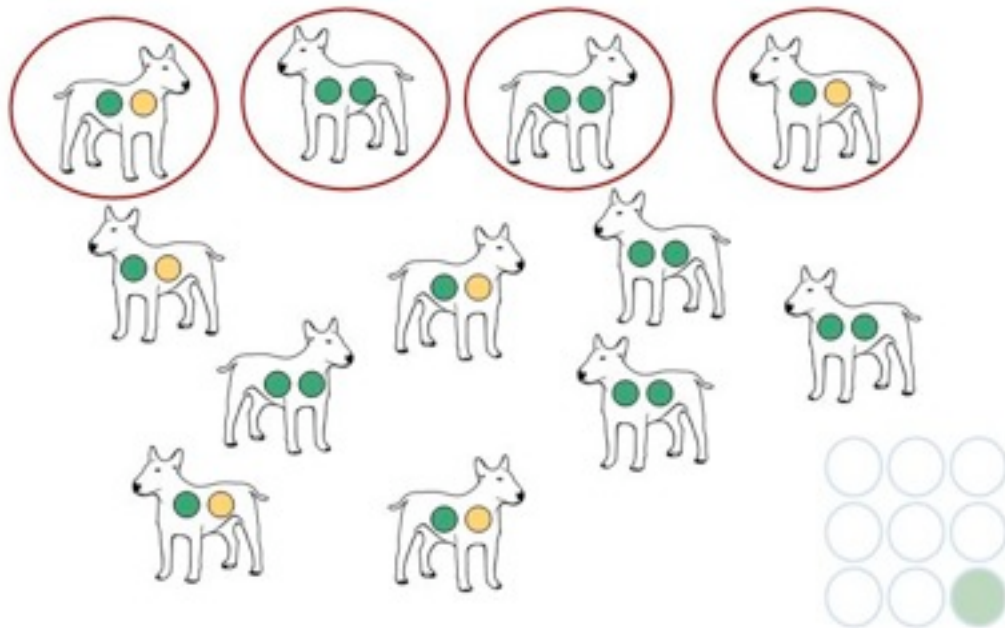
Reduce or eradicate known disease and maintain long-term health



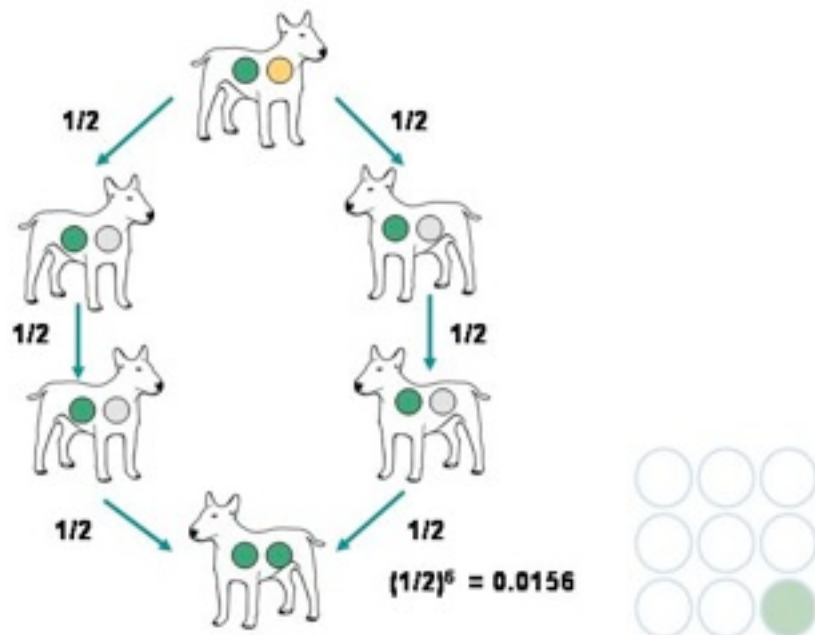
Gene pool and genetic diversity



Gene pool and genetic diversity

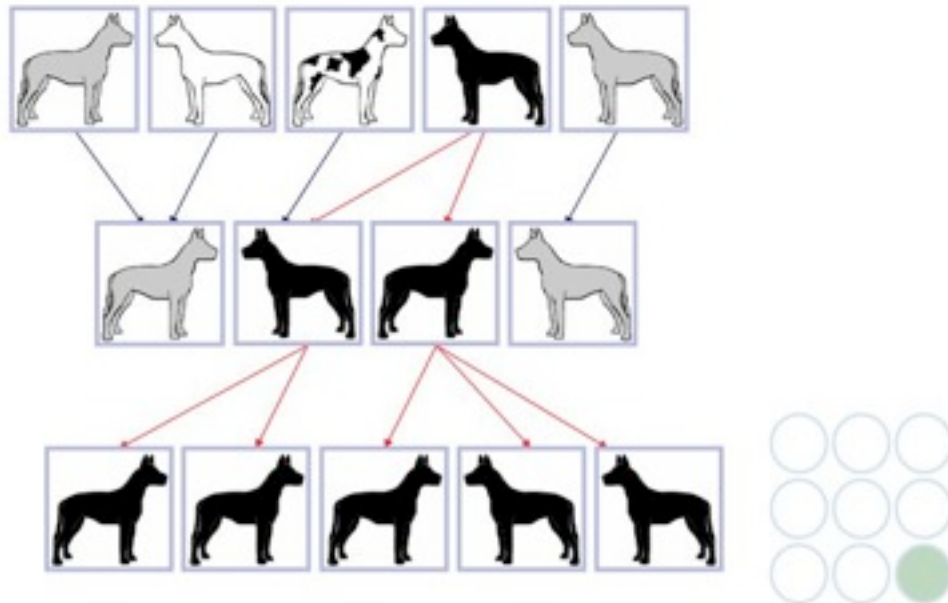


Inbreeding coefficient



anteckningar: Efter DNA-testet, samarbete med KC, hälsoprogram, långsiktigt arbete annars kommer andra sjukdomar, inte förlora genetisk variation

Genetic bottlenecks



Diversity loss

- High risk factor for emergence of new inherited disease
- Long-term health means managing the loss of diversity
- Controlling the rate of increase of inbreeding



Control of inbreeding

- What is the end goal?
- Constrain rate of inbreeding (ΔF) to no more than 0.5% per generation
- Effective population size (N_e)= 100 At least!
- If below this, fitness of the population will steadily decrease and population will become unviable in the long-term

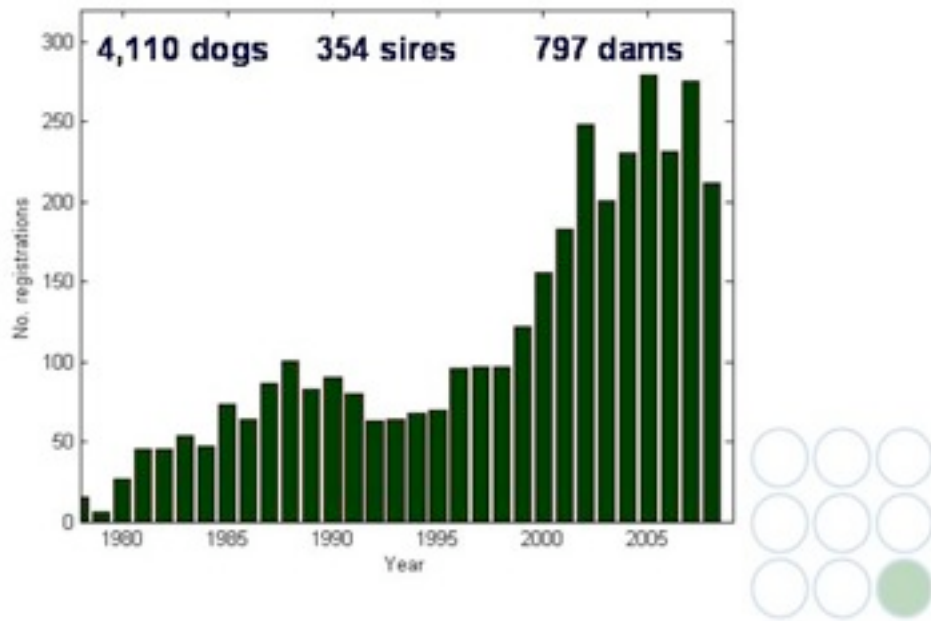


Possible approaches

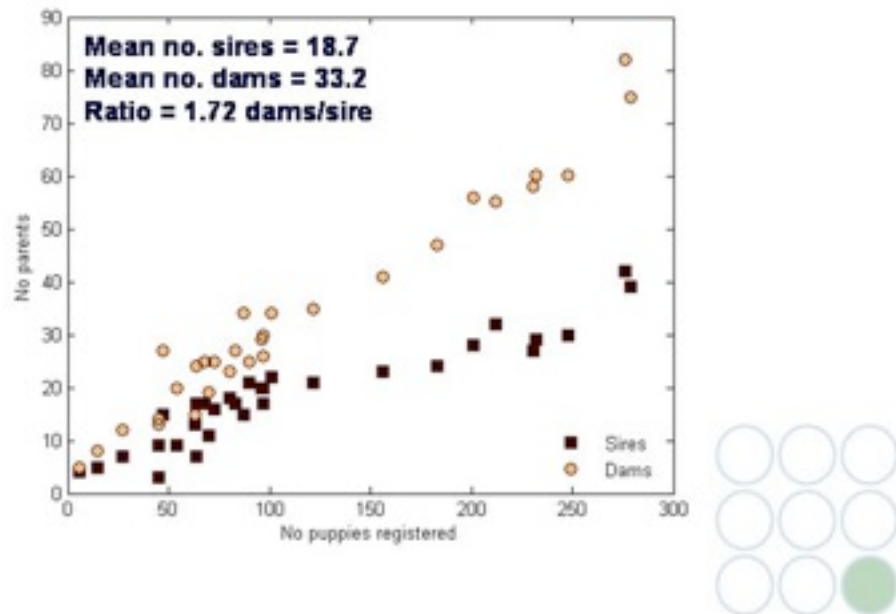
- Minimising coancestry (kinship) of matings
- Increasing numbers of animals used for breeding
- Equalising the use of males and females
- Optimising genetic contributions
- Inter-breeding



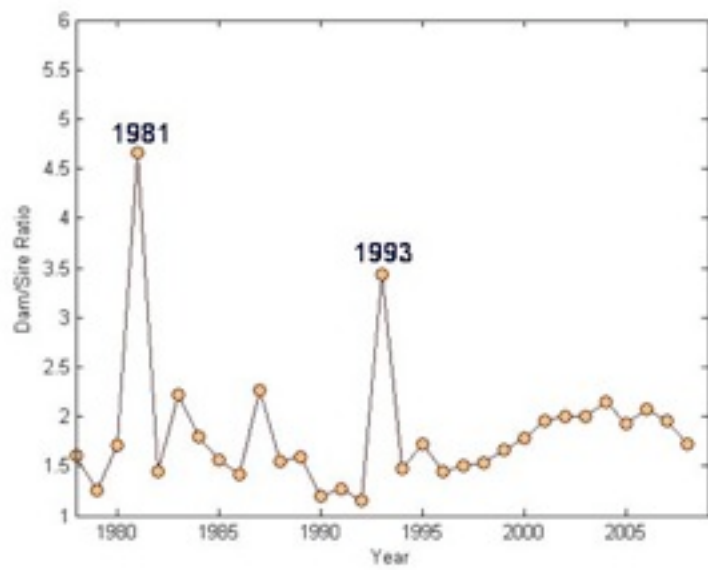
Number of KC registrations



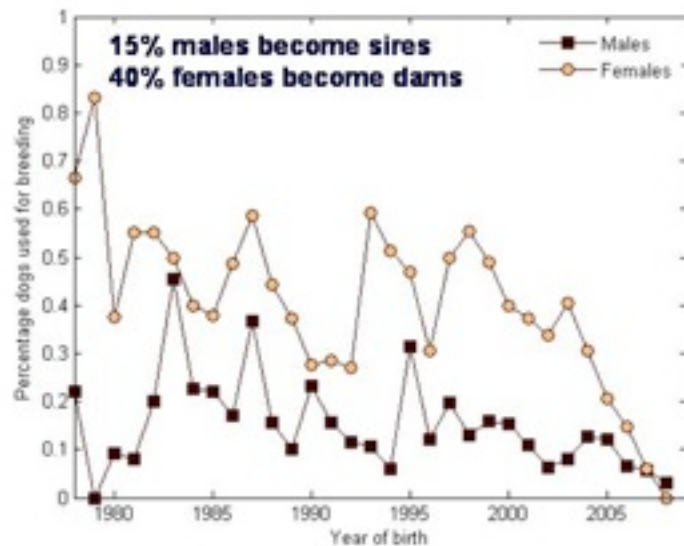
Number of sires and dams used



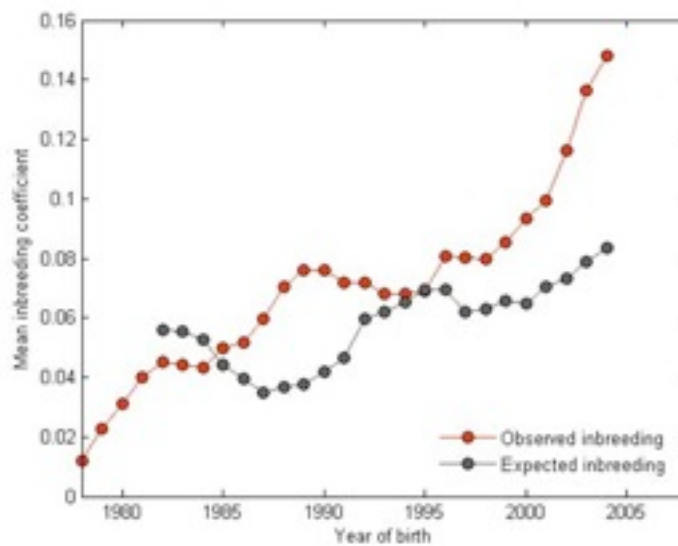
Ratio of dams/sires



Percentage dogs used for breeding



Observed and expected inbreeding

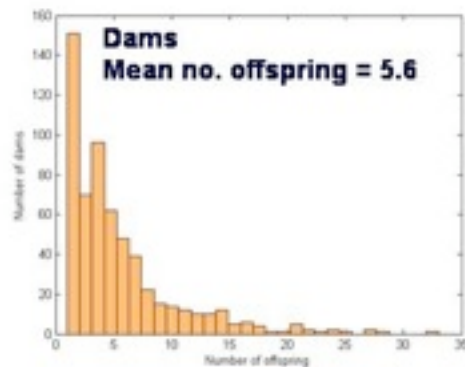
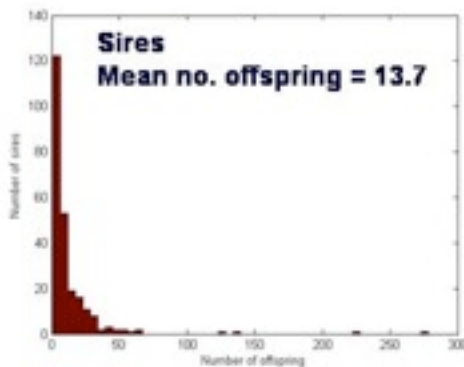


Effective population size (N_e)

	% per generation	N_e	Registered/year
MBT	1.1	48	203
IRWS	1.8	28	133
CKCS	0.4	123	11,903
Labrador	0.5	103	26,757



Number of offspring per sire/dam



4 sires > 100 offspring
15 dams > 20 offspring



anteckningar: 15% hanar i avel 40% tikar i avel.

PLL

- **approx. 1200 dogs of breeding age in UK**
- **genotype all possible dogs and re-select breeding individuals?**
- **breed with carriers for one further generation and select unaffected homozygote (normal) replacements**
- **further analysis based on pedigree and genotyping results**



Acknowledgements

13,7

- Dr Tom Lewis (KCGC at the AHT)
- Dr Jeff Sampson (The Kennel Club)



<http://www.the-kennel-club.org.uk/services/public/health/search/Default.aspx>

Inbreeding coefficient		Kinship coefficients		Recommended
Rosedawn Delilah	0.04	Ballymore Delight	0.02	●
		Ballymore Samson	0.01	●
		Legend of Kilkenny	0.02	●
		Rosedawn Diamond	0.12	
		Lordswood Romancer	0.08	



genomsnitt avkommor /per hanar

5,6 genomsnitt avkommor /per tikar.

Anteckningar: Miniaturbullterrier är den mest inavlade rasen de sett med så hög inavelsstegring. Ovanligt jämfört med andra raser. Inavels procent på MBT i UK idag ca 15%
(203 registreringar per år i England)