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## Fertility in the Bernese mountain dog

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## Content

1. Importance of fertility
2. Studies on semen quality in BMD
3. The Pregurine project

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### Breeding – selection




Specific tasks  
Mentality  
Personality  
Breed standard  
Genetic diseases  
etc






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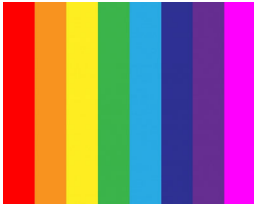
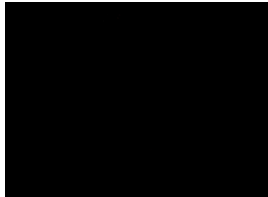
### Several traits to take into account



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### The possibility to choose and select

1. Genetic variation
2. Fertility

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### SLU contacted by the breeding council of the Swedish Sennenhund Club

- Breed specific strategy (RAS) – fertility important
  - Low pregnancy rates
  - Small litter sizes
  - Dystocia
  - Pyometra
- Collaboration Breed Club and SLU

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RESEARCH Open Access

### Factors affecting reproductive performance in the Swedish Bernese mountain dog

Eva Améli<sup>1\*</sup>, Linda Sofia Rasmus<sup>1,2</sup> and Toril Melangen<sup>3</sup>

**62 % whelping rate** – negative effect of age  
**Median litter size: 6** - negative effect of age  
**Puppy mortality: 19%** - effect of litter size  
**Caesarian section: 33%** - effect of litter size

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### Steps of fertility

Male Ability to mate  
Semen quality

Mating Timing  
Preferences

Female Ability to mate  
Ovulation

Pregnancy Whelping

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### Ongoing projects

Semen quality  
Pregurine – female fertility

Male Ability to mate  
Semen quality

Mating Timing  
Preferences

Female Ability to mate  
Ovulation


Pregnancy Whelping

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### Evaluation of the male dog

67 male dogs  
Semen  
Prostate

Graph: Anna Snell

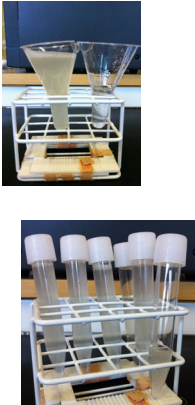


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### Semen sample

- Total number of sperm
- Sperm motility
- Sperm morphology

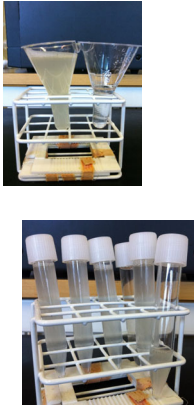
→ fertility

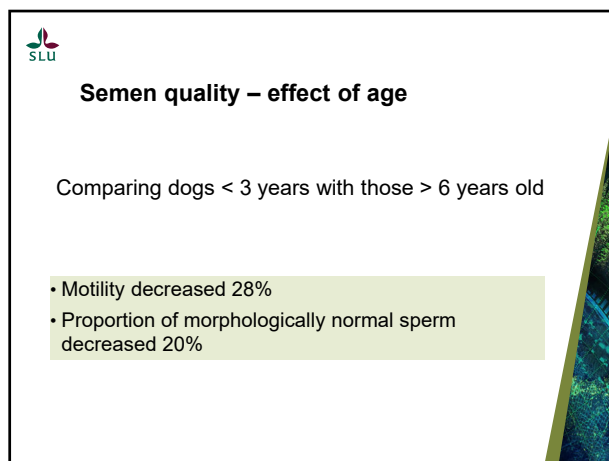
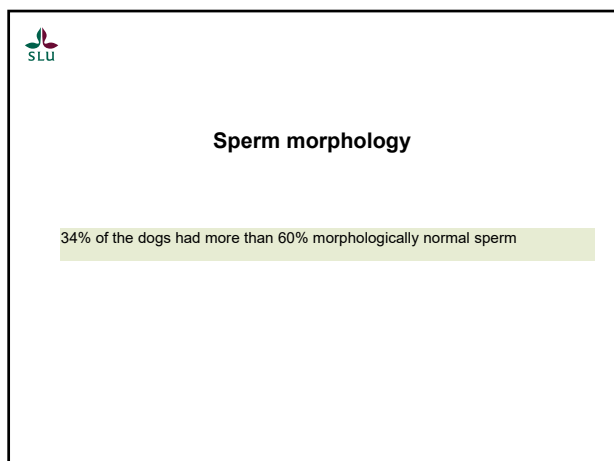
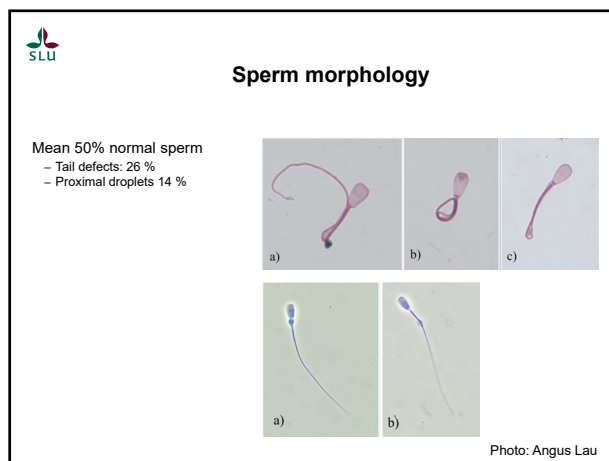
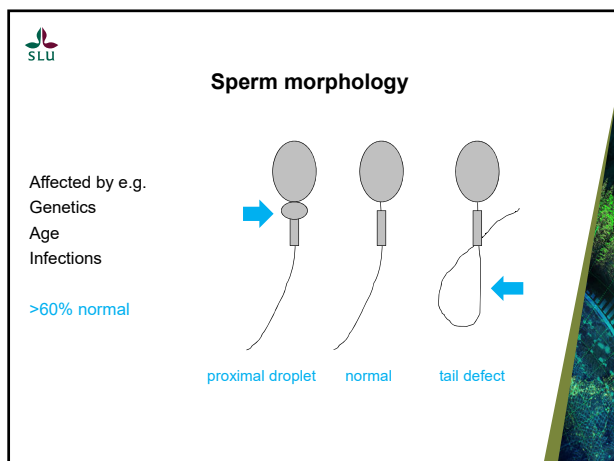
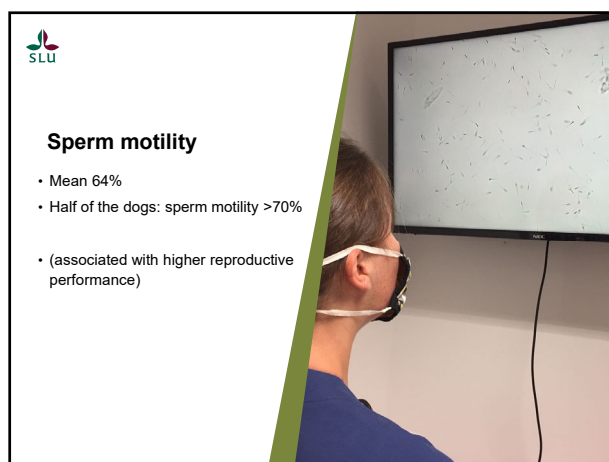
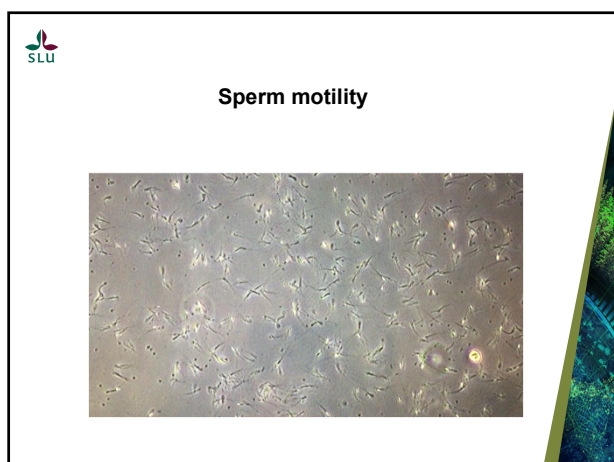


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### Total number of sperm

Mean total sperm count:  $1.1 \times 10^9$   
 80% of the dogs had > 300 million sperm







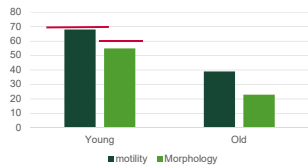
### Semen quality – effect of age

**Less than 7 years (n=53)**

- Sperm motility 68%
- Morphologically normal sperm 55%

**7 years and older (n=10)**

- Sperm motility 39%
- Morphologically normal sperm 23%



### Semen quality – effect of age

53% of dogs younger than 7 years have at least 150 million morphologically normal sperm and 70% motility



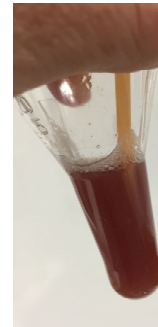
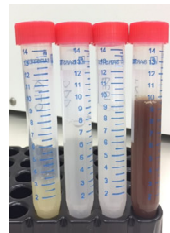
### Prostate

- Evaluation of the colour of the semen sample
- Measure of a biomarker related to the size of the prostate (CPSE)



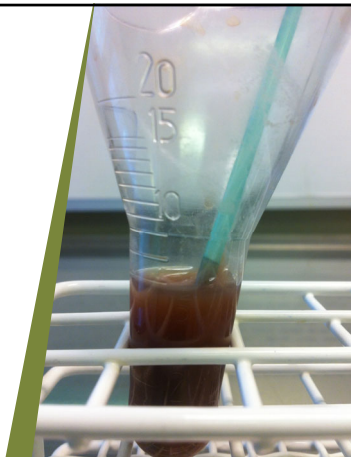
### Prostate

- 43% abnormal colour of ejaculate
- 85% of the dogs had biomarker concentrations suggesting an enlarged prostate



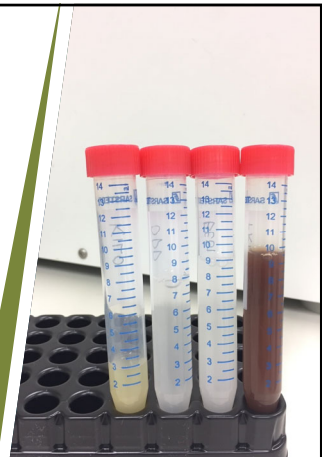
### Prostatic disease

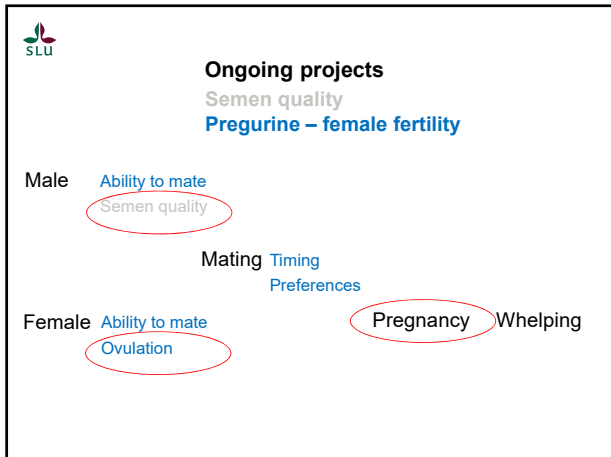
- Effect on semen quality
- Effect on ability to mate



### Prostatic disease

Increase with age





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### Pregurine – studies of canine pregnancy

- 47 bitches (16 BMD) – inclusion ongoing
- Estimate ovulation (progesterone analysis) – timing of mating
- Pregnancy evaluation (ultrasound)
- Whelping records

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### Estimation of ovulation

- Vaginal cytology
- Progesterone analysis

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### Estimation of ovulation

- Vaginal cytology
- Progesterone analysis

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### Preliminary results:

#### Ovulation

- 80 % (12/15) BMD bitches
- 100 % (31/31) bitches of other breeds

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### Preliminary results:

#### Mating

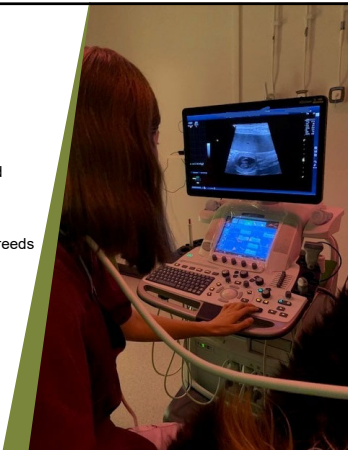
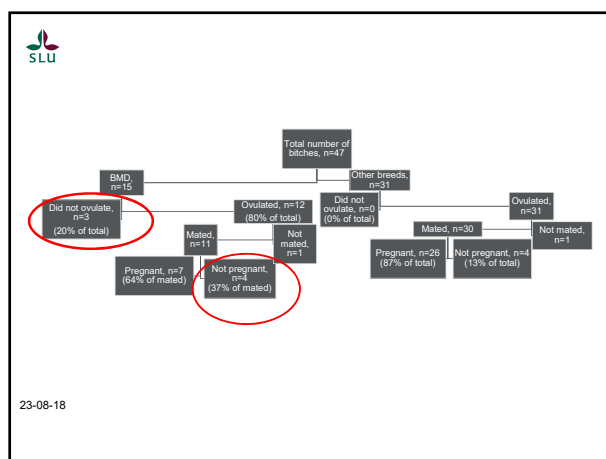
- 10/11 BMD bitches
- 30/31 bitches of other breeds



**Preliminary results:**

### Pregnancy

- 7/11 BMD bitches that ovulated (64%)
- 26/30 (87%) bitches of other breeds

**Summary**

- Decreased semen quality
  - High number of morphologically abnormal sperm
  - Decreased sperm motility
- Anovulation
- Low pregnancy rates

**Ongoing projects**


- Semen quality
- "Pregurine" – female fertility

**Male**

- Ability to mate
- Semen quality
- Mating Timing
- Preferences

**Female**

- Ability to mate
- Ovulation
- Pregnancy
- Whelping



**How do we continue?**


**Further studies on semen quality**

- Studies on sperm production and biomarkers of semen quality
- Genetic analyses of semen quality in the BMD, focus on tail defects
- Studies of environmental factors (PFAS)



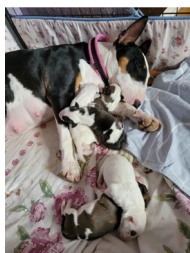
**Continuing studies Pregurine**

- Inclusion of more bitches
- Further analyses of changes and biomarkers related to ovulation and pregnancy





### Starting a project "Puppy health"



- Investigations of causes of puppy death
- Not specific for BMD
- PhD-student (Anna Bonnevie)



### Project on whelping

Master thesis (student) work on whelping, supervisor professor Eva Axné.



### What can breeders do?



#### Male dogs

- Check the semen quality
- Check prostate
- Consider the age
- Consider fertility



#### Female dogs

- Timing of optimal time for mating, progesterone until ovulation
- Consider the effect of age
- Consider fertility



### Thank you!

#### Genetics:

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Gabriella Hallbrink Agren  
SciLife Lab

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Veterinary Clinicians

#### Semen quality and biomarkers:


Angus Lau  
Hannah Olsson  
Stina Wallander  
August Rooth  
Alexandre Dubois

#### Pregurine:

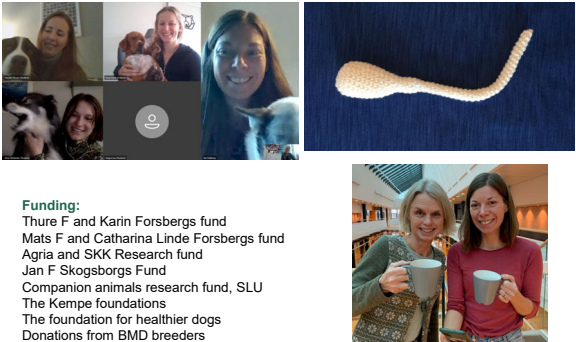
Malin Linder Nording  
Margareta Ramström Jonsson

Eva Axné's group

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Working together – for healthy dogs!



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