

# Goat welfare and infectious diseases



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Background:

**The welfare of a sentient animal is determined by its capacity to avoid suffering and sustain fitness (Webster, 2005).**

- The Norwegian dairy goat population: approx. 40.700 animals in 490 herds (SSB, 2007) - average herd: 83 dairy goats .
- Problems in the health status of the goats results in **reduced animal welfare** and reduced income for the farmers.
- High prevalence of chronic infectious diseases: paratuberculosis, caseous lymphadenitis (CLA) and caprine arthritis encephalitis (CAE).
- Disease sanitation program run by The Goat Health Service: TINE BA, NSG, Norsk Kjøtt, Kjøttbransjens Landsforbund, The Norwegian Veterinary Association (DNV), The Norwegian School of Veterinary Science (NVH), The National Veterinary Institute of Norway (VI) and The Norwegian Food Safety Authority (Mattilsynet).



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Background:

## Smittesaneringsprosjektet FRISKERE GEITER



- “Healthier Goats”: started in 2001. Aim: to have 200 herds free from paratuberculosis, CLA and CAE by 2010. Promising results!
- 2005: funding from the Norwegian Research Council: “Optimal helse, velferd og mattrygghet for kvalitetsprodukter fra norske geiter” (Collaboration between The Goat Health Service and The Norwegian Agricultural Economics Research Institute - NILF).
- Goal: a modern and robust goat industry with products of a high quality, satisfying consumer demands.



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Background:

### Paratuberculosis:

- Primarily affects the digestive tract. Non-specific signs; weight loss leading to gradual debilitation and death.
- *Mycobacterium avium subspecies paratuberculosis*: resistant to environmental degradation, spread by faeco-oral transmission
- Susceptible young stock, particularly in overcrowded conditions.
- Triggered by stress or other factors: infected animals start shedding the organism in the faeces.



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Background: Paratuberculosis



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Background:

**Caseous lymphadenitis (CLA):**

- *Corynebacterium pseudotuberculosis*. Enters via small breaks in skin or mucous membranes or inhalation
- Becomes localised in peripheral lymph nodes, or cause internal abscesses; typically in the lungs.
- Abscesses frequently burst, resulting in discharging sinus: environment becomes contaminated.
- Most commonly on the head and neck in goats due to behaviour (fighting) (Smith and Sherman, 1994).



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Background: Caseous lymphadenitis (CLA)



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Background:

**Caprine Arthritis Encephalitis (CAE):**

- Lentivirus in the Retroviridae family: life-long infections with recurrent bouts of acute disease.
- Five different clinical forms: neurological, respiratory, arthritic, udder form and a form characterised by progressive weight loss.
- Arthritic form most common; occurs in sexually mature goats.
- Transmitted orally to kids as they consume infected colostrum or milk.



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Background: Caprine Arthritis Encephalitis (CAE)



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Objective 1: Social stress and immune response

**Aims:**

- a) To see how different space allowances affect the behaviour, stress levels and immune response.
- b) To find out whether subordinate goats are more adversely affected in terms of stress levels and immune response than dominant goats.

**Hypothesis:**

Optimising the social environment improves subordinate dairy goats' immune response to a Paratuberculosis vaccination.

- Stress: can alter the host resistance to pathogens - coping is a key factor in the effects of stressors on immunity



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## Objective 1: Social stress and immune response

### Experimental design:

- 32 goats in groups of 4, two different space allowances: 2.2 m<sup>2</sup> or 0.6 m<sup>2</sup>/goat.
- Vaccination against paratuberculosis (Gudair™, Pfizer) 1st day of trial.
- Immune response: Interferon-gamma (IFN- $\gamma$ ) test once weekly for 6 weeks.
- Video recording one 24 hour period every week: behavioural sampling and recording of agonistic interactions (The Observer, Noldus corp.):
- Ranking according to percentage of successful agonistic interactions (1 – 4).
- Salivary cortisol is a useful indicator of stress in goats (Greenwood and Shutt, 1992).



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## Objective 2: Developing a pain ethogram for goats

**Pain:** Unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage (IASP, 1979).

**Aim:** To evaluate different behavioural indicators of pain in animals suffering from chronic infectious diseases in order to identify when pain relief is needed.

- Animals of prey have an evolutionary reason for disguising signs of weakness or ill-health (Dobromylskij et al. 2000).
- Naturally occurring pain in relation to infectious diseases: CLA or arthritic form of CAE?
- At least six animals at same stage of disease - compare with healthy animals, describing behaviour with and without pain relief.



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Objective 3: Farmers' empathy and attitudes towards pain/disease.

**Hypothesis:** The welfare of dairy goats is influenced by the stockpersons' ability to recognise and empathise with pain and discomfort in animals.

- The attitudes of stockpersons' towards pain might influence the management of animals with painful conditions – welfare consequences.

**Materials and methods:**

- A questionnaire with photos of ~ 20 painful conditions: to goat farmers. Photos are known to elicit empathic responses in humans.
- Visual analogue scale (VAS): How painful do they consider each condition to be?
- Epidemiological data from farms will be collected, either from Geitekontrollen or in collaboration with PhD student Gunvor Elise Nagel-Alne.



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Objective 4: The relationship between empathy towards animals in pain and the social environments on farms.

**Hypothesis:** Farmers that are less empathic towards animals experiencing pain also have higher levels of social stress and aggression in their herds and this has an adverse effect on the disease outcome.

**Aim:** Study the link between the understanding of pain, social organisation and health outcome on farms.

**Materials and methods:**

- Same questionnaire – select 15 farms with the highest and lowest scores.
- Collect information about the social environment and behaviour.
- Compare with epidemiological data and indicators of immune competence.



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Thank you for listening!



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