A longitudinal cohort study of health and welfare status in extensively and intensively reared goats

Korelidou, V. [1], Kalogianni, A.I. [1], Gelasakis, A.I. [1]

[1] Department of Animal Science, School of Animal Biosciences, Agricultural University of Athens,11855 Athens, Greece

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Introduction

- Goats are present throughout the world holding significant socioeconomic and nutritional importance

- Intensive production practices can satisfy the increasing consumer demands for goat products, but they may also undermine animal health and welfare

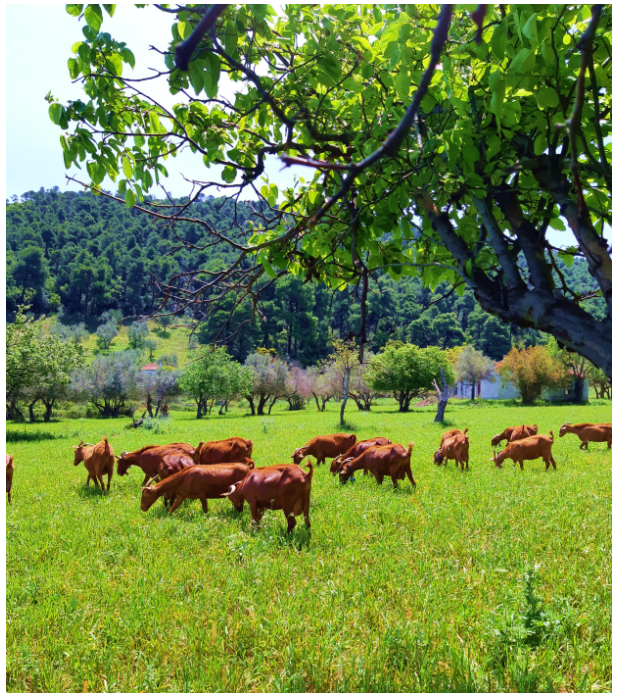
- Extensive farming systems are considered less invasive and more sustainable, but they are challenged by various external factors

Introduction

Animal welfare is a multidimensional concept linked to product quality, animal performance, and profitability, gaining increasing interest over the last decades

The objective of this study was to prospectively evaluate health and welfare status of dairy goats reared under intensive and extensive farming systems

Materials and Methods

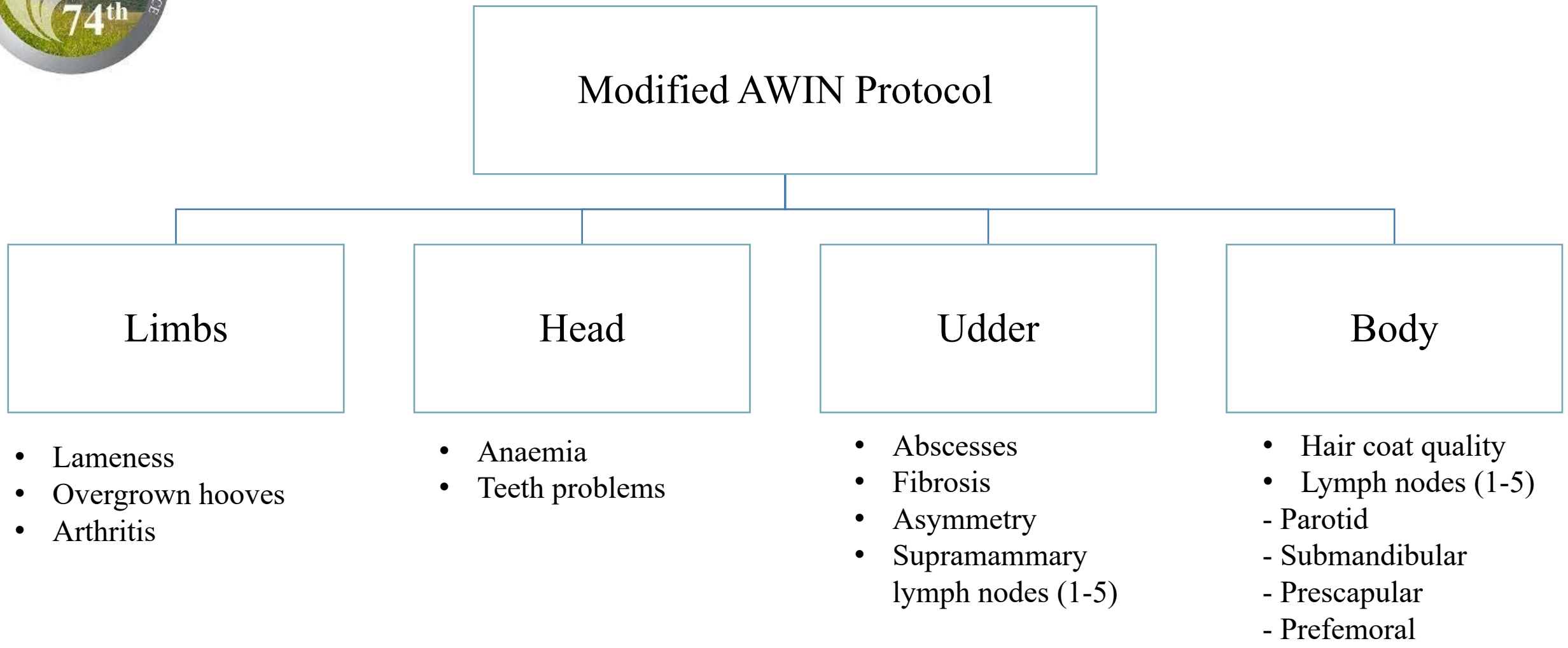


Extensive farm

Intensive farm

- Purebred adult Skopelos goats
  - 133 extensively reared (Skopelos island)
    - (12 goats were lost, 1 new entry in 3rd sampling)
  - 105 intensively reared (Attica region)
    - (2 goats were lost, 5 new entries in 2nd sampling)
- The animals had the same genetic merit
- The study initiated post-weaning and the animals were observed for one milking period (February – late July)
- Animals were clinically examined every 50 days by an experienced vet

Materials and Methods



Materials and Methods

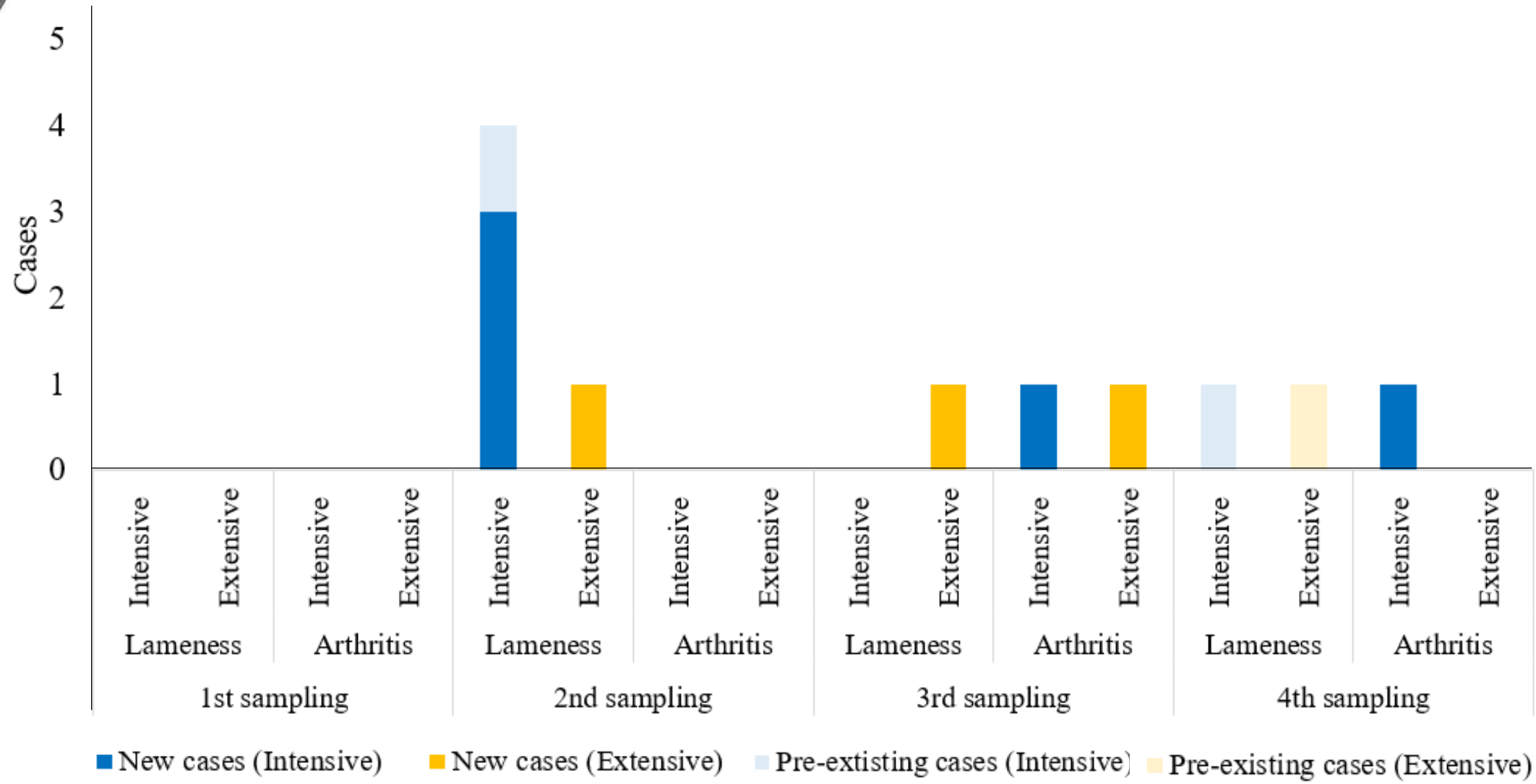
$$\textbf{Period prevalence} = \frac{\text{Number of new and preexisting cases over a specified period of time}}{\text{Total population in the specified period}}$$ → Disease overview

$$\textbf{Cumulative incidence} = \frac{\text{Number of new cases of disease during specified time interval}}{\text{Total population at risk at beggining of the specified period}}$$ → Risk of developing a disease

$$\textbf{Incidence rate} = \frac{\text{Number of new cases of disease during specified time interval}}{\text{Total person−time at risk during the specified period}}$$ → Disease occurrence frequency

* New case = the first time an animal was diagnosed with a health issue
* Person-time = the actual time-at-risk in months that all animals contributed to the study

Results - Limbs



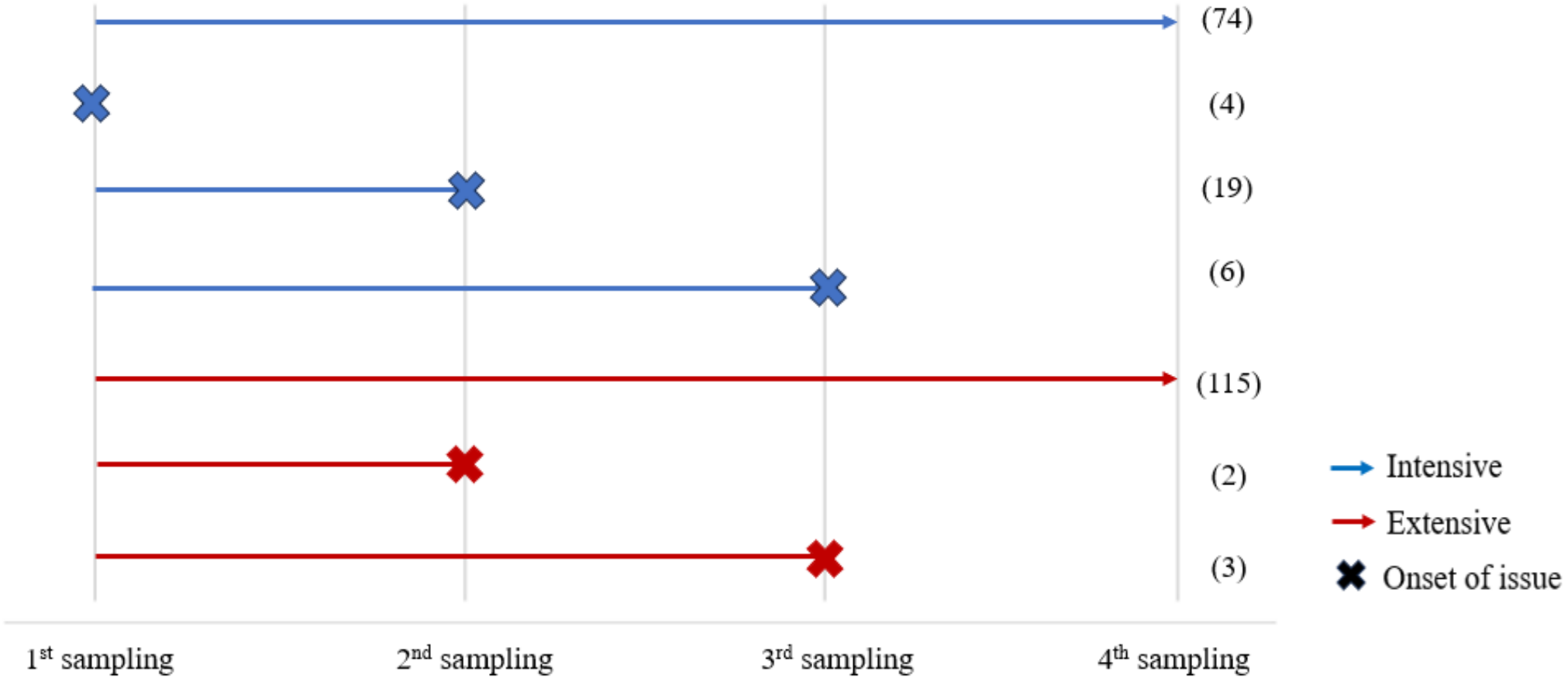
Results - Limbs

Health problem	Farm	Period Prevalence (%)	CI 95% (%)	Cumulative Incidence (%)	Incidence Rate (New cases per 1,000 goat-months)
Lameness	Intensive	3.8	0.2 – 7.5	2.9	6.0
	Extensive	1.5	0.0 – 3.6	1.5	3.2
Arthritis	Intensive	1.9	0.0 – 4.5	1.9	3.9
	Extensive	0.8	0.0 – 2.2	0.8	1.6

Goat with severe lameness

Results - Limbs

Overgrown hooves



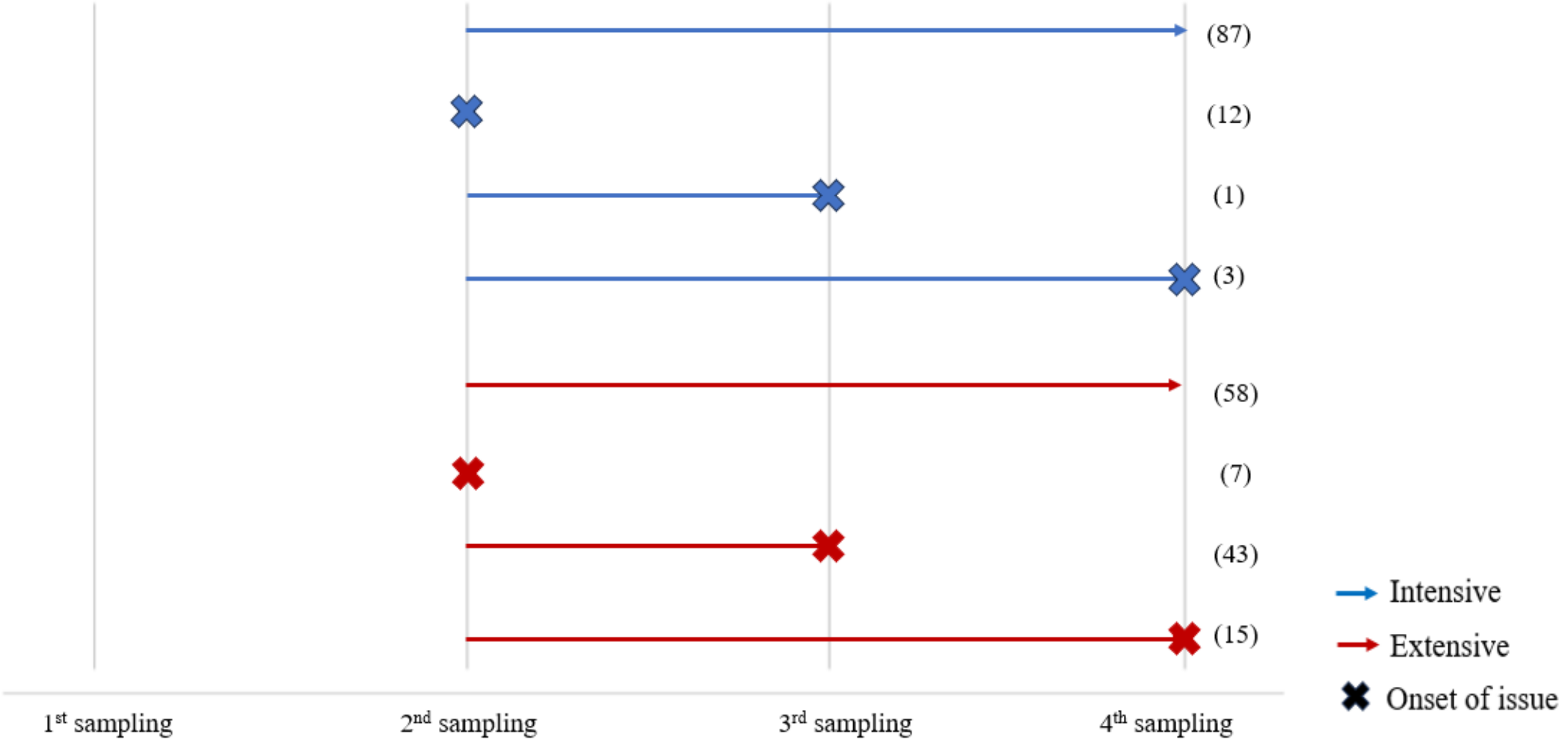
Results - Limbs

Health problem	Farm	Period Prevalence (%)	CI 95%	Cumulative Incidence (%)	Incidence Rate (New cases per 1,000 goat-months)
Overgrown hooves	Intensive	29.5	20.8 – 38.3	26.7	68.5
	Extensive	3.8	0.5 – 7.0	3.8	8.1

Goats with overgrown front hooves

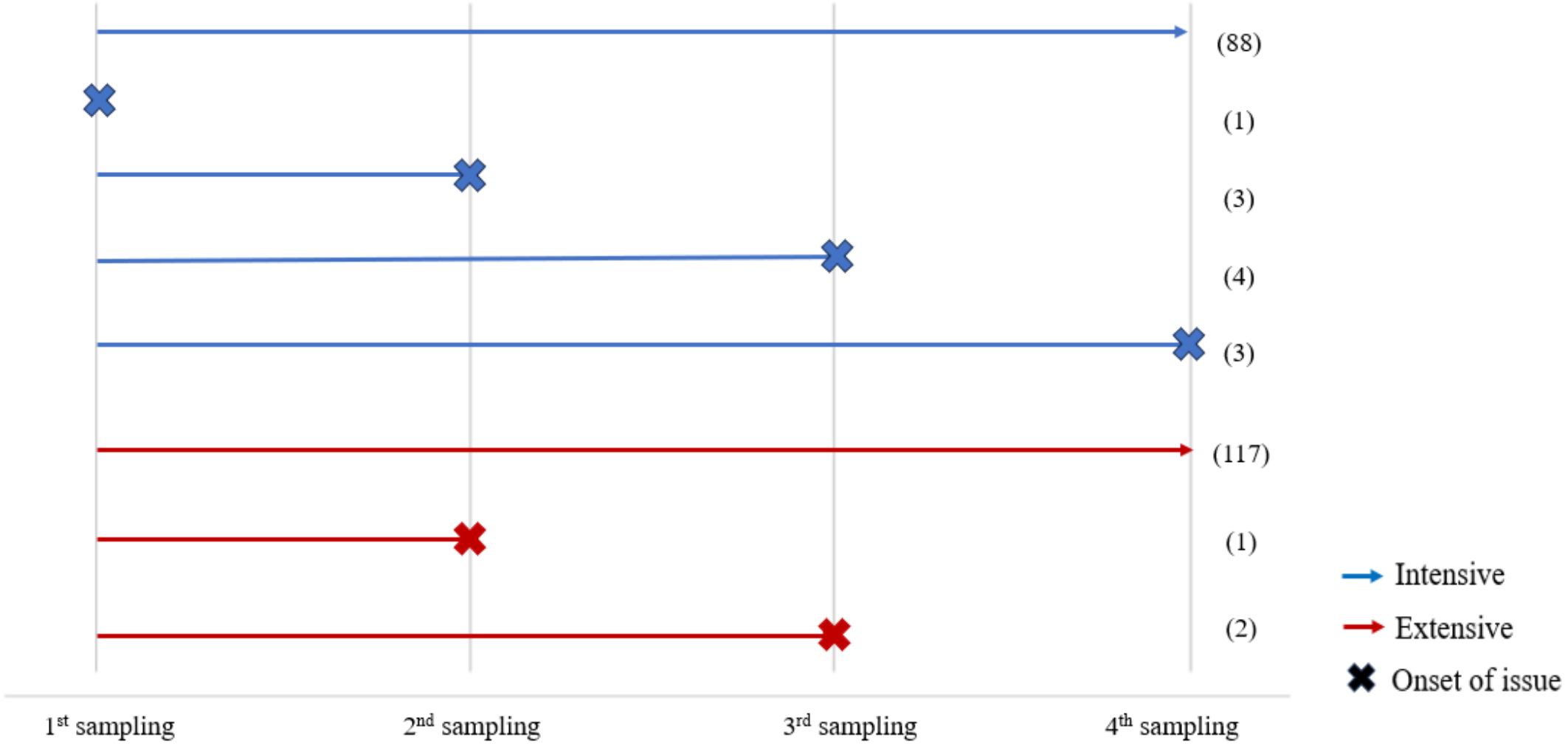
Results - Head

Anaemia



Results - Head

Teeth problems



Results - Head

Health problem	Farm	Period Prevalence (%)	CI 95% (%)	Cumulative Incidence (%)	Incidence Rate (New cases per 1,000 goat-months)
Anaemia	Intensive	15.2	8.4 – 22.1	4.3	13.3
	Extensive	48.9	40.4 – 57.4	46.0	210.9
Teeth problems	Intensive	10.5	4.6 – 16.3	9.6	20.6
	Extensive	2.3	0.0 – 4.8	2.3	4.8

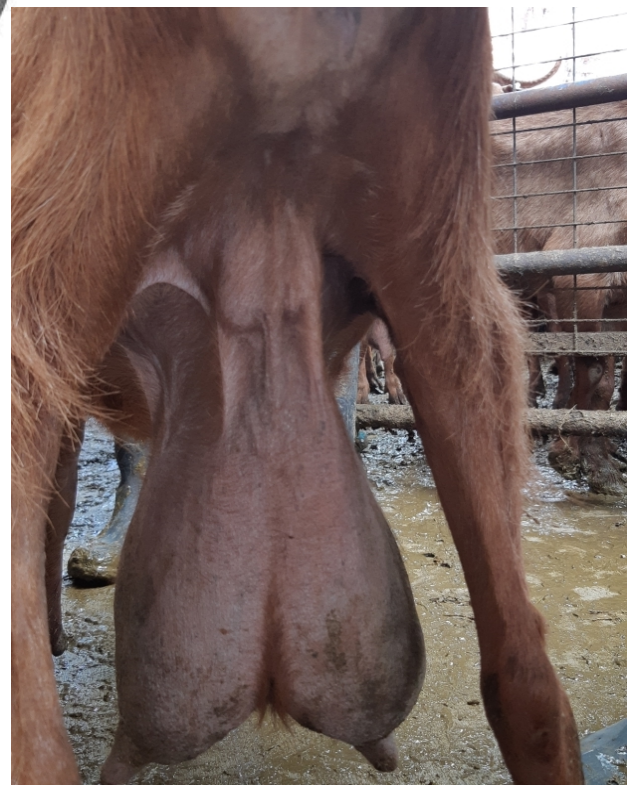
Swelling of gingiva

Anaemia

Results - Udder

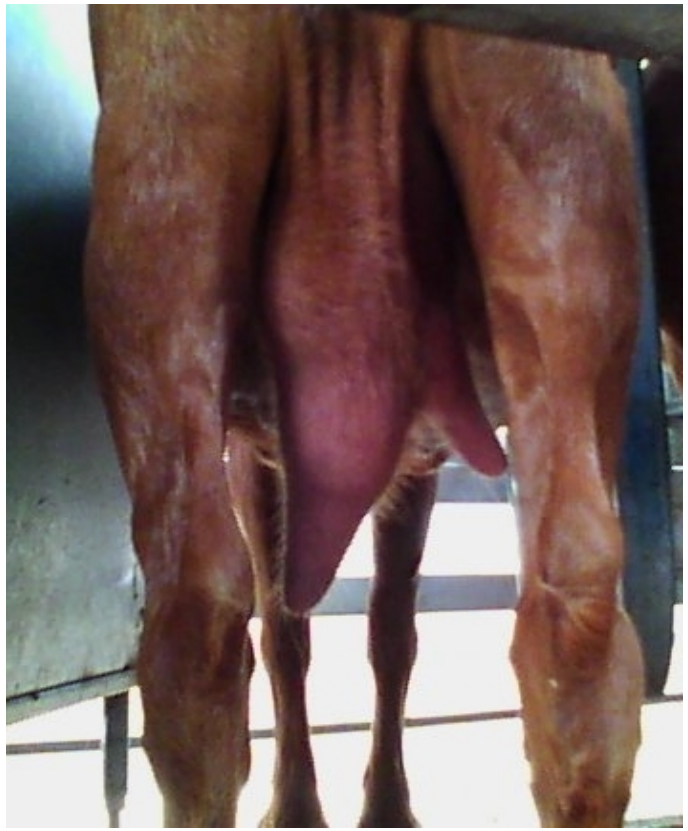
Health problem	Farm	Period Prevalence (%)	CI 95% (%)	Cumulative Incidence (%)	Incidence Rate (New cases per 1,000 goat-months)
Udder abscess	Intensive	4.8	0.7 –8.8	2.0	4.1
	Extensive	10.5	5.3 – 15.7	4.8	10.4
Udder fibrosis	Intensive	43.8	34.3 – 53.3	35.8	91.0
	Extensive	56.4	48.0 – 64.8	55.4	171.4
Udder asymmetry	Intensive	76.2	68.0 – 84.3	71.6	279.0
	Extensive	75.9	68.7 – 83.2	73.1	278.4
Swollen mammary lymph nodes	Intensive	14.3	7.6 – 21.0	6.3	13.2
	Extensive	24.1	16.8 – 31.3	12.2	26.9

Results - Udder



Swollen mammary lymph nodes

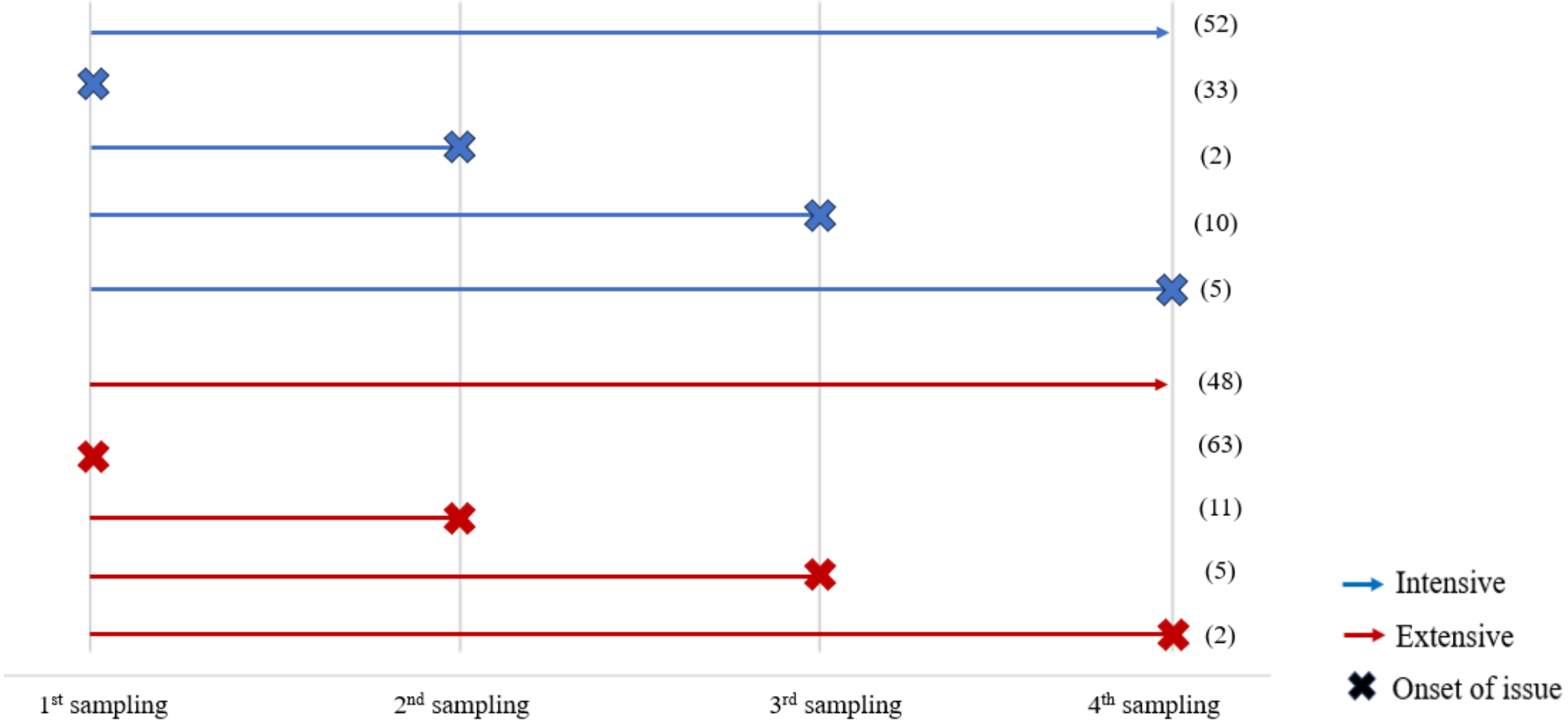
Udder abscess



Udder asymmetry

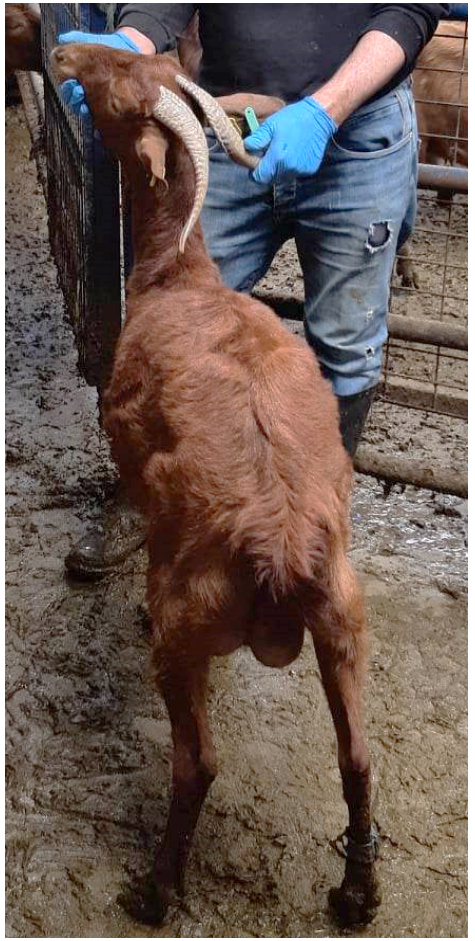
Results - Body

Hair coat quality



Results - Body

Health problem	Farm	Period Prevalence (%)	CI 95% (%)	Cumulative Incidence (%)	Incidence Rate (New cases per 1,000 goat-months)
Hair coat quality	Intensive	49.5	40.0 – 59.1	26.4	60.5
	Extensive	60.9	52.6 – 69.2	25.7	64.3



Goat with poor hair coat quality

Results - Body

Health problem (Swollen lymph nodes)	Farm	Period Prevalence (%)	CI 95% (%)	Cumulative Incidence (%)	Incidence Rate (New cases per 1,000 goat-months)
Parotid	Intensive	5.7	1.3 – 10.2	2.9	9.1
	Extensive	5.3	1.5 – 9.0	3.1	10.1
Prefemoral	Intensive	1.9	0.0 – 4.5	1.9	5.8
	Extensive	28.6	20.9 – 36.3	15.2	53.5
Prescapular	Intensive	15.3	8.4 – 22.1	9.2	29.6
	Extensive	25.6	18.2 – 33.0	13.2	47.2
Submandibular	Intensive	21.9	14.0 – 29.8	17.2	56.5
	Extensive	5.3	1.5 – 9.1	3.1	10.1

Results - Body

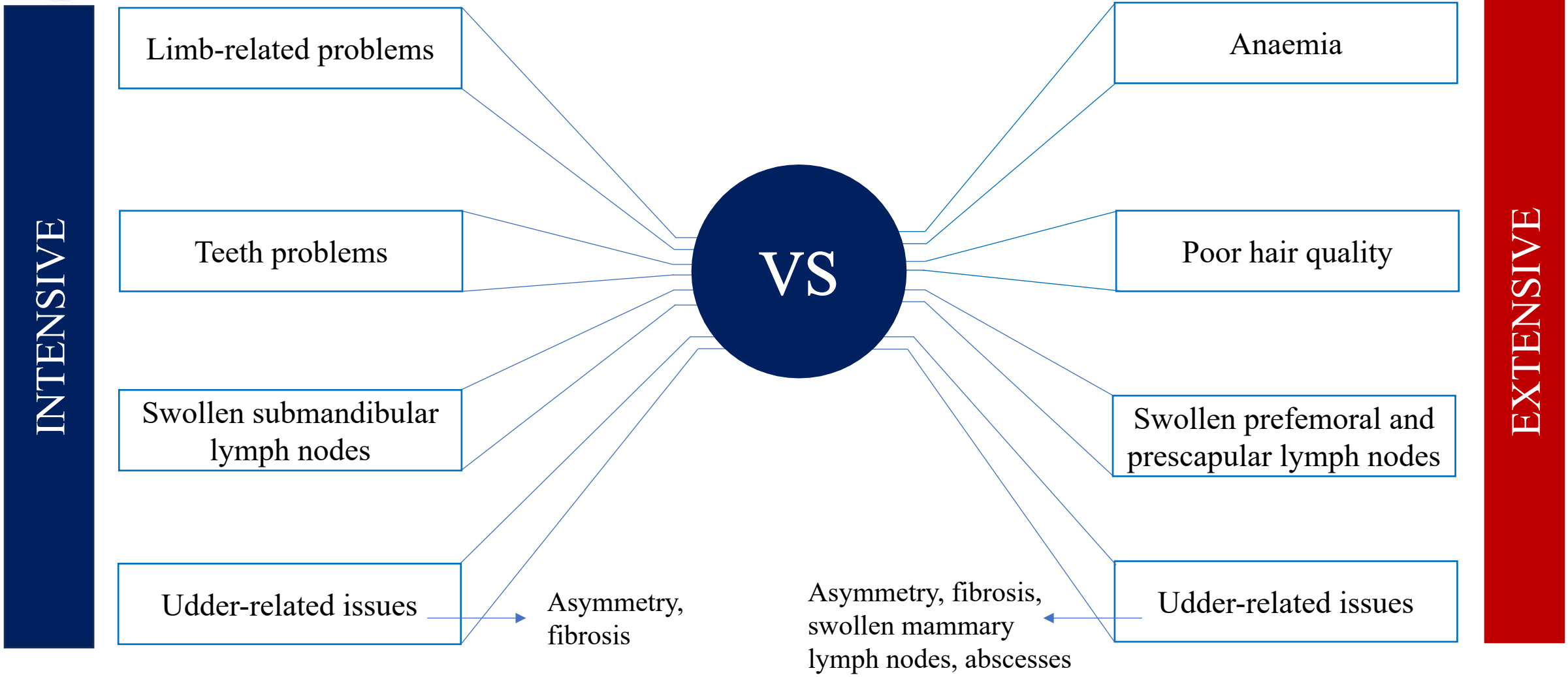
Swollen L prefemoral lymph node

Swollen L prescapular lymph node

Swollen L submandibular lymph node

Swollen R parotid lymph node

Conclusion


INTENSIVE
Limb-related problems
Teeth problems
Swollen submandibular lymph nodes
Udder-related issues
Asymmetry, fibrosis
VS
Asymmetry, fibrosis, swollen mammary lymph nodes, abscesses
Anaemia
Poor hair quality
Swollen prefemoral and prescapular lymph nodes
Udder-related issues
EXTENSIVE

Conclusion

- Health and welfare issues occur with different frequencies in the different farming systems.

- Further studies on the underlying causative agents and relevant risk factors on a case-specific basis are required

- Targeted interventions and effective management practices should be implemented

Acknowledgments

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code: re-farm

Thank you for your attention!