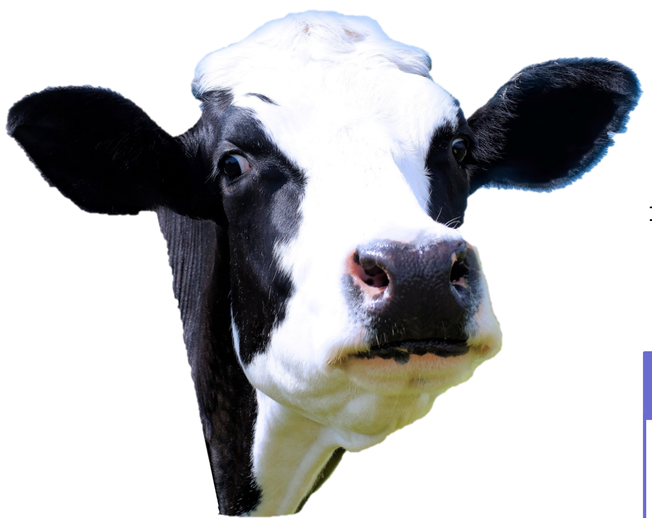
Farm-level risk factors for digital dermatitis in dairy cows in mountainous regions



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STUDY AIM AND CONCLUSION

The objective of this study was to identify farm-level risk factors for bovine digital dermatitis (BDD) in Swiss dairy herds as an example of small-scale farms located in mountainous regions.

Although some aspects were already known for animals in conventional housing and management conditions, this study reveals novel findings; namely, that mountain pasturing, time between diagnosis and treatment, tiestall housing, and the amount of concentrate fed are associated with the occurrence of BDD. More research is needed, because we cannot exclude the possibility that additional risk factors exist for BDD.

MATERIALS AND METHODS

This trial was designed as multicenter, observational, unmatched case-control study. To obtain information on potential risk factors, 100 dairy cattle farms were visited and a questionnaire was completed by the first author together with the farmer or herd manager. Herds revealing a BDD within-herd prevalence of ≥ 26% during each of the most recent 3 routine claw trimmings were considered case farms (n = 50). Farms without a BDD problem (defined as no BDD cases within the previous 18 mo) served as control farms (n = 50).

External biosecurity

- Mountain pasturing
- Commingling during mountain pasturing
- RAUS†
- Participation in dairy shows
- Rearing on other farms
- Animal purchase
- Control of new animals

Internal biosecurity

- Herd size
- 305-d milk yield
- Breed
- Housing/flooring type
- Claw trimming frequency
- Age at 1st claw trimming
- Disinfection of trimming knives
- Preventive measures against BDD
- Floor hygiene‡
- Animal selection for therapy
- Time between diagnosis and therapy
- Bandage application
- Medical treatment of acute lesions
- Concentrate supplementation

Figure 1: Explanatory variables included in the study to identify risk factors for the occurrence of bovine digital dermatitis (BDD) in 100 dairy herds kept in mountainous regions, collected via a questionnaire which was filled out together with the farmer or herd manager

†regular access to outdoor facilities: regular access to pastures (> 26 d/mo) from May 1 to Oct 31; regular access to pastures or regular exercise in an outdoor pen (> 13 d/mo) from Nov 1 to Apr 30

‡assessed using a standardized protocol (available online at https://www.dairyresearch.ca/animal-comfort-tool.php)

RESULTS

1)

Item	OR (95% CI)	*P*-value
Mountain pasturing		
No	1	Reference
Yes	0.12 (0.04 – 0.35)	< 0.001
Participation in dairy shows		
No	1	Reference
Yes	0.32 (0.11 – 0.94)	0.039
No. of purchased cattle during the previous 2 yr	1.28 (1.12 – 1.52)	0.001

2)

Item	OR (95% CI)	*P*-value
Housing type		
Tiestall	1	Reference
Freestall	20.65 (1.59 – 649.37)	0.039
Both	2.34 (0.04 – 192.75)	0.681
Time (diagnosis – treatment) (d)	10.31 (3.55 – 81.21)	0.002
Concentrate feeding (kg per cow and d)	7.72 (2.46 – 6.47)	0.010

Tables 1/2: Results of final binomial generalized linear regression models on the bovine digital dermatitis (BDD) herd status (case vs. control)§ dependent on risk factors for either introduction (1) or establishment (2) of the disease, based on data collected on 100 small-scale dairy farms located in mountainous regions

§Case farms (classed as "1") revealed BDD within-herd prevalences ≥ 26% and control farms (classed as "0") revealed no BDD cases during the previous 18 mo
CI – confidence interval; OR – odds ratio

DISCUSSION

Even though ample research in the area of etiopathogenesis has been conducted over the last decades, BDD is still a problem in nearly all countries with intensive dairy production. The main reason for this might be that some aspects such as immunological mechanisms or pathogen-host interactions in BDD-affected animals are still not fully understood (Evans et al. 2016, Orsel & Plummer 2018). Thus, identification and consequent reduction of risk factors remain mainstays in current disease control. We could identify 6 of 23 potential predictors at farm-level that were significantly associated with the occurrence of BDD. To our knowledge, this is the first study describing potential risk factors for BDD in small-scale dairy farms located in mountainous regions.

It is relevant that such cross-sectional studies are able to identify associations between exposure factors and the occurrence of the disease, but it is not possible to assign direct causality to the associations found without following-up on disease occurrence and without exposure to the respective factor.

Further studies are necessary to investigate aspects of treatment such as bandage application, pharmaceuticals used for treatment, or animal selection for treatment.

Literature: Weber et al. 2023, J Dairy Sci 106: 1341–50; Orsel & Plummer 2018, Transbound Emerg Dis 65 (Suppl. 1): 186–98; Evans et al. 2016, Vet J 211: 3–13