

8 Summary

Investigations into the influence of the acid-base-status on the incidence of claw diseases of dairy cows

Within the scope of a longitudinal study, eight different dairy cow herds were observed over the course of twelve months. The relevant dairy farms were visited every four weeks, at which a lameness profile of the entire herd was compiled. Selected test specimens were lame cows (3rd degree and above), non-lactating (dry) cows (up to four weeks a.p.) and recently calved cows (up to four weeks p.p.). The lame cows were diagnostically examined and treated. Ruminal fluid, urine, and blood samples were taken from all test specimens and milk data from the most recent milk control examination was collected. The samples were predominantly examined for acidity status and the related parameters in order to establish an acute or chronic latent ruminal acidosis as the cause for the claw problems. In addition, further metabolic parameters, electrolytes, minerals and vitamin B₁₂ were taken into account. Furthermore, claw trimming and the use of buffer additions to the feed were recorded for each herd. The number of past lactation periods of each test specimen were relevant as well as the number of days ante or post partum at the time of sampling. Finally the loss data of lame animals during the course of the twelve month-long study was followed beyond the period of sampling.

A total of 467 animals were examined, whereby a large portion of the cows were considered as specimens as many as three times (dry, recently calved, lame). In this manner, a total of 802 samples resulted. The lameness incidence was 36.5 %. In terms of ascertained diagnoses, the sole ulcer dominated with 46.9 percent, followed by the foot abscess (26.5%) and laminitis (12.2%). Other diagnoses were disregarded due to their low numbers. The sole ulcer occurred in two peaks during lactation before day 60 p.p. and after the fifth month p.p. Almost half of all diagnosed foot abscesses did not occur until 150 days p.p. or later. Laminitis as the cause for lameness also occurred in two peaks. Approximately one half of the diagnosed cases were diagnosed in the first three months p.p. and one further peak appeared 120-150 p.p. and later. 85% of the lame cows with diagnosed foot lesions were treated within the first three months following the appearance of lameness and recovered fully.

The influencing variable “claw trimming” was notable because cows which received treatment once annually had an only somewhat lower incidence than those which did not receive regular claw trimming.

No correlation could be made in the eight examined dairy farms between the potential influencing variable “buffer additions” and lameness occurring later during lactation, whereby the buffer concentration of the feed remained unconsidered.

A further examined influencing variable on the lameness occurrence in dairy farms was the age of the cows and accordingly, the number of previous lactation periods. Lameness occurred in one fifth of the cows lactating for the first time (37.2%) during this period, while the lameness incidence in cows which had lactated seven or more times reached 50%. The lameness incidence correlated significantly with increased age of the dairy cows. More than 40% of the lame cows left the herd within the first twelve months following the determined lameness; more than 20% left within the first six months. No comparison was made for loss among the portion of the herd with healthy claws.

With regard to the ruminal fluid pH level, no further statistical distinction was made in the dry cows or in the recently calved cows or in the cows which became lame later. Nor could such a statistical distinction be made with regard to cows which developed a sole ulcer. Apparently one can expect claw lesions to occur even without ruminal acidosis present.

Upon analysis of the urine parameter of the dry cows in connection with a later occurring lameness, no significances resulted. One notable result was a decline of the NH_4^+ value ($p=0.007$) of the recently calved cows. After applying a significance test to the urine values of the dry and recently calved cows with consideration of the development of a sole ulcer, a decline was noted for the chloride and magnesium values for the dry cows whereby in the recently calved cows, a decline of the NH_4^+ value was determined with a simple significance.

The milk parameters remained statistically insignificant.

With regard to the chemical parameters of the blood, significant increases appeared in the β -hydroxybutyric acid values for the recently calved cows that developed a lameness later during lactation, as well as for cows that specifically developed a sole ulcer ($p=0.007$ $p=0.000$). The values of the dry animals indicated a significant decrease of creatine ($p=0.043$). In addition, the dry cows that later developed a sole ulcer also revealed a low significance for a decrease of the inorganic serum phosphorus concentration.

The results of this dissertation have proven the importance of the topic “lameness in dairy cow herds”. It must be emphasized that the emergence of claw lesions and the connected lameness is a multifactorial occurrence.

The factors which obviously play an important roll for the farms examined and could possibly be optimized are routine professional claw trimming and an improved adaptation of the

energy needs of each dairy cow to the peripartal phase. In addition, the housing conditions with regard to cow comfort should be reconsidered, in particular for the offspring of the herd.