Histological structure of the hooves in ruminants
Author: S. Abgottspon.

Histological alterations in overgrown hooves and hooves with footrot in sheep.
Authors: A. Passeraub, H. Geyer

The digital cushions of the ruminant hooves

Summary / Zusammenfassung
One of the most frequent hoof horn changes in cattle is slurry heel during winter time. In addition to the macroscopic and clinic observations further knowledge is necessary which kind of histological changes occur and in which area they begin.

The group of Dr. M. Räber investigates the cushioning fat bodies of the heel in cattle and sheep. These structures may be important for preventing alterations as "sole"-ulcer. The axial and abaxial fat-bodies in the bulb of sheep is similar but the medium fat body is smaller than in cattle. In a trial with fattening bulls it was controlled, wether the composition of the digital cushions could be influenced by different nutritional diets. The different diets showed as well differences in the fat composition of the digital cushions.

In further research in hoof histology it was confirmed that with a relative high level of Selen 0.5 mg/kg food in fattening bulls no histological damages in the hooves could be seen. In pigs with chronic Selenium-intoxication severe damages in the claw histolgy could be demonstrated, beginning in the deep-layers of the stratum corneum.

The axial and interdigital areas of the ruminant hooves showed frequently changes with microfissures between the horn-cells already in the deep layers of the stratum corneum. Bacteria and fungi were only found in the superficial areas of the stratum corneum. Therefore it is concluded that the first step of slurry-heel is a degradation of the epithelium. For the prevention of slurry heel an improvment of hoof horn quality could be tried and nutritional factors like biotin or zinc can be recommended.

Histological changes in overgrown hooves of sheep showed many signs of decayed horn; in cases of foot-rot, the damages of epidermis were more severe and the sensitive corium was opened and reached the surface. The areas with lesions in foot rot were mainly in the interdigital epidermis and corium.

A new part of scientific work tries to get some basic knowledge of the macroscopic and microscopic structure of normal hooves in some species of antelopes, as a base for trimming and hoof care. In many zoos problems with hoof care in antelopes exist, and the knowledge about normal conditions is very poor. The study is just finished and gives a macroscopic and microscopi documentation of normal and pathological structures in hooves of different antelopes.

Weitere Informationen unter http://www.vetanat.uzh.ch/research/geyer.html

Publications / Publikationen
Thesis of S. Abgottspon, University of Zürich, 2001; reprints are available.
H. Geyer, S. Abgottspon:
Histological alterations in heel erosions in cattle.
A. Passeraub: Histologische Untersuchungne zur Moderhinke und zum Tragrand überwachsener
Grundlagen zur funktionellen Klauenpflege. Thesis Universiity Zürich 2006
M. Räber, M.R.L. Scheeder, P. Ossent, Ch.J. Lischer, H. Geyer
Content and composition of lipids in the digital cushion of the bovine claw with respect to age and
V. Letter: Einfluss der Fütterung auf die Fettkörper im Ballen der Rinderklause. Thesis University
Zürich 2007, M. Räber supervisor.
Räber, M, H. Geyer J. Kessler und A. Gutzwiller (2008): Einfluss eine hohen Selenzufuhr auf den
Selenstatus, die Leberfunktion und auf die Klauenqualität von Maststieren. Schweiz. Arch
Tierheilk. 150, 57-67.
Weitere Informationen unter http://
/publications/publications1.html

Keywords / Suchbegriffe
cattle, hoof, heel horn changes, histology, scanning-electromicroscopie., sheep, hoof, histological
changes, footrot., antelopes, hoof, macroscopical and histological anatomy

Project Leadership and Contacts / Projektleitung und Kontakte
Prof. H. Geyer (Project Leader) hgeyer@vetanat.uzh.ch
Dr. M. Räber (Project Leader) mraeA., Chassober@vetanat.uzh.ch
Dr. P. Ossent (Project Leader) ossent@vetpath.uzh.ch
Dr. A. Chassot

Funding Source(s) / Unterstützt durch
Private Sector (e.g. Industry), Others

In Collaboration with / In Zusammenarbeit mit
ETH Zürich, Inst. für Nutztierwissenschaften, Dr. M. Scheeder
Dr. A. Chassot Agroscope Liebefeld Posieux, CH 1725 Posieux
Dr. S. Hammer Al Wabra Wildlife Preservation, Qatar

Duration of Project / Projektdauer
Feb 1999 to Dec 2007