The cleftabet - evaluation of interdigital cleft conformation

By: Victor Daniel and Nynne Capion

**Objectives**

Dynamics of bovine digital dermatitis (BDD) and variation in susceptibility (Döpfer et al., 2012; Capion et al., 2012) has been associated with multiple factors. Genetic variation (Scholey et al., 2013) and hind leg conformation (Laven et al., 2007) has been described as possible factors related to the individual cow. Also this observation model may explain some of the variation that we see in dairy herds as well as deviation of BDD infection rates between front and back legs.

The objective of this study was to evaluate a method of scoring interdigital cleft conformation.

**Materials and methods**

Fourteen Danish trimmers and eight Canadian trimmers participated in the study. In each country, 16 cadaver feet were lined up, numbered and each trimmer scored the interdigital cleft conformation on elevated legs twice with a few hours interval. Before the first scoring the participants was given a short introduction to the cleftabet. The conformation of the interdigital cleft was scored as:

D – diamond shaped narrow at the top and narrow at the coronary band with and sharp-edged opening in the middle.

I - the cleft is narrow from the top to the coronary band, shaping an I.

n – The cleft has the shape of an arch, with an opening from the top and open between the coronary band of each claw.

O – the cleft forms a ring with little/no space between the coronary band of the two claws.

S – the cleft is narrow and shape like the letter S.

On weightbearing legs cleft conformation scores D, O and n becomes n, with a wide or open interdigital cleft. Interdigital clefts scoring I and S on lifted legs becomes I or A upon weightbearing, with either a narrow cleft from the top to the coronary band or a cleft that is narrow at the top and widens out in the coronary band.

Before the second session more background on the hypothesis of an association between interdigital cleft conformation and susceptibility to DD were presented to the participants.

The golden standard was defined as the scores by Victor Daniel and Nynne Capion. From the golden standard, inter-observer and intra-observer variation was calculated by weighted kappa.

**Results**

The agreement was acceptable with weighted κ= 0.43. However, the results showed that it was difficult to distinguish between D and O. When both D and O categories are regarded as O the weighted κ= 0.54 and κ= 0.86 in Canada and Denmark, respectively.

The intra-observer agreement was substantial with a mean weighted κ= 0.84 (SE 0.02) for all trimmers.

**Conclusion**

This study shows that the interdigital cleft conformation can be scored with a low variation following a limited amount of training. The individual variance in cleft conformation may play a key role in susceptibility towards infectious claw lesions and effectiveness of treatment and preventive strategies. This factor will have to be included in future studies to understand the association between DD, cleft conformation, and variation between cows and leg structure.

**References**

Capion N., Boye M., Ekstrøm C.T., Jensen T. K. 2012. Infection dynamics of digital dermatitis in first-lactation Holstein cows in an infected herd. J. Dairy Sci. 95 :6457–6464

Döpfer D., Holzhauer M., van Boven M. 2012 The dynamics of digital dermatitis in populations of dairy cattle: Model-based estimates of transition rates and implications for control. The Veterinary Journal 193 (2012) 648–653

Laven R.A. 2007. The relationship between hoof conformation and digital dermatitis in dairy cattle. Cattle Practice, 15(1), 93-95.

Scholey R.A., Evans NJ, lowey RW, Massey JP, Murray RD Smith RF, Ollier WE, Carter SD. 2013. Identifying host pathogenic pathways in bovine digital dermatitis by RNA-Seq analysis. 2013 The Veterinary Journal 197 (2013) 699–706