Development of an enzyme-linked immunosorbent assay for the serodiagnosis of ringworm infections in cattle

B. MIGNON*, L. CAMBIER*, M.P. HEINEN*, V. COZMA , M. MONOD† and E.T. BĂGUŢ†

*Department of Infectious and Parasitic Diseases, Faculty of Veterinary Medicine, University of Liège, Belgium
Department of Parasitology and Parasitic Diseases, Faculty of Veterinary Medicine, University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca, Romania
†Dermatology and Venereology Department, Laboratory of Mycology, Centre Hospitalier Universitaire Vaudois, Lausanne, Switzerland

BACKGROUND
The zoophilic dermatophyte *Trichophyton verrucosum* is the most common agent of dermatophytosis (commonly known as ringworm) in cattle. Several enzyme-linked immunosorbent assays (ELISAs) have been developed for the evaluation of antibody response in animal dermatophytosis, but only few focused on detecting specific antibodies in cattle ringworm.

OBJECTIVES
The goal of this study was to develop an in-house ELISA based on recombinant antigens for the serological diagnosis of cattle dermatophytosis.

MATERIALS AND METHODS
Antigens consisted of available recombinant forms of either *Trichophyton rubrum* dipeptidyl peptidase V (TruDppV) or leucin aminopeptidase 2 (TruLap2) which are 98% identical to *Trichophyton verrucosum* orthologues. Sensitivity (Se), specificity (Sp), positive (PPV) and negative (NPV) predictive values of both ELISAs were determined using field serum samples from 135 cattle with ringworm infection confirmed by microscopy and PCR analyses, and from 55 healthy cattle without history of dermatophytosis (negative controls).

RESULTS
Differences between optical density (OD) mean values obtained in both animal groups were highly significant, showing that our ELISAs can discriminate between infected and healthy animals ($P < 0.0001$, Mann-Whitney U test). Using a cut-off point equal to the mean OD + 2 SD of sera from control group, the ELISA detecting specific antibodies against DppV gave 89.6% Se, 92.7% Sp, 96.8% PPV and 78.4% NPV. The recombinant TruLap2-based ELISA displayed 88.1% Se, 90.9% Sp, 95.9% PPV and 75.7% NPV.

CONCLUSIONS
This are to the best of our knowledge the first ELISAs based on recombinant antigens assessing the immune response in ringworm of cattle, being particularly suitable for epidemiological studies and also for the evaluation of vaccines and/or vaccination procedures.