proportion of seropositive animals increased significantly ($p < 0.01$) from December (11%) through February (17%) and to August (38%), and then decrease occurred in November (15%).

Conclusion and implications
This small, preliminary study suggests that CCPP is a common disease in a typical small-scale village farming scenario in Punjab. Existing knowledge of CCPP would suggest that this kind of disease incidence will likely have significant local impact for farmers and their animals, and significantly reduce the potential productivity and income of small ruminant farming for village farmers. Further studies of the distribution, transmission and impact of CCPP are needed to identify where and how to more effectively address this disease and its effects in Pakistan.

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O-115
A new approach to the diagnostics of small ruminant lentivirus infection?

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Keywords: SRLV; Diagnostics; Saliva; Feces

Introduction
ELISA tests are the mainstay of diagnostics of small ruminant lentivirus (SRLV) infection. However, there is still a need for quick and simple field diagnosis. The development of a rapid diagnostic test for milk and blood samples is a aim of ICRAD CAE-RAPID project run by our team. However, collection of faecal and saliva samples is easiest and can be performed by a non-qualified persons and regardless of the physiological state of animals. The aim of this study was to determine whether these specimens can replace traditionally used milk and blood samples. We were aware that especially investigating the feasibility of using faecal samples is quite ambiguous. However, we decided to confirm this experimentally.

Material and methods
An indirect commercial ELISA test based on the mixture of synthetic viral peptides (ID Screen MVV-CAEV Indirect Screening test, ID.vet Innovative Diagnostics) was used.
The study was carried out in herds whose health status had been monitored for many years. Positive and negative animals were serologically tested at least three times at one year intervals and the results were consistent.
Fecal samples were collected from 7 seropositive and 5 seronegative animals and treated with protease inhibitors. Saliva samples came from 20 seropositive and 20 seronegative animals.
The optical density (OD) of the tested samples was determined and used for statistical analysis. The median and the interquartile range (IQR) were calculated and compared using Mann-Whitney U test ($\alpha = 0.05$).

Results and discussion
OD values of fecal samples coming from seropositive animals (median 0.047, IQR 0.046 – 0.056) were generally very low and similar to that coming from seronegative animals (median 0.051, IQR 0.046 – 0.052). The same was found in terms of OD values of saliva samples (median 0.106, IQR 0.079 – 0.144 and median 0.100, IQR 0.080 – 0.136, respectively).
The idea of using faecal samples for diagnosing SRLV infections was strange from the very beginning. Therefore, the results did not surprise us and confirmed our expectations. It does not seem possible to use this material in the future in diagnosing SRLV infection.
The situation is different in the case of saliva. Saliva is gaining in popularity as a sample in the diagnostics of viral diseases in humans. However, the results of our study did not confirm this assumptions. Perhaps the higher concentration of viral antigen for coating ELISA plates is needed.

Conclusion and implications
Unfortunately, we must state that we were not able to confirm the usefulness of fecal and saliva samples for diagnosing SRLV infections in goats.

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O-116
Development of a multiplex immunoassay to detect antibodies against maedi-visna virus in sheep

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Keywords: Ovine; Lentivirus; Diagnostic test; Multiplex

Introduction
Maedi-visna virus (MVV) is a small ruminant lentivirus, infecting sheep and goat. There is no treatment nor vaccine, therefore culling of infected animals is the primary means of control. In Norway, maedi-visna is a notifiable disease, and eradication is a national goal. Through the national surveillance program, MVV was detected in sheep in 2019, 14 years after the last detection. Genetic analysis indicates persistence of the virus in the sheep population, despite continuous surveillance. Two ELISA tests in serial interpretation are currently used in the surveillance program. However, false positive and false negative results occur. Crossreactive substances in serum and high antigenic heterogeneity of local strains may be sources for the false test results. Bead-based multiplex immunoassays are relatively new methods that can detect and differentiate a large number of different analytes in one sample. When developing a multiplex assay for antibody detection, one can evaluate the relevance of each antigen and exclude those most likely causing false positive results. Furthermore, many different antigens can be included, making it possible to include antigens based on the circulating viral strain. Our study aims to develop a multiplex immunoassay that can be used to improve the Norwegian national surveillance program.

Material and methods
Microspheres (MagPlex®-C) were coupled to three different viral antigens (obtained from In3diagnostic) using a coupling kit (Bio-Plex Amine Coupling Kit) according to the manufacturer's instructions. Furthermore, we plan to include antigens based on sequencing of the Norwegian viral strain. For assay optimisation and validation, we are using serum samples from the 2019 outbreak with known commercial ELISA test results (ID Screen® MVV/CAEV Indirect kit and IDEXX MVV/CAEV p28 kit Ab Verification Test) and samples from a sheep immunized with recombinant antigen from an Italian viral strain. We will use Bayesian latent class modelling to determine the optimal cut-off value for each antigen and estimate test characteristics.

Results and discussion
The three viral antigens (matrix/capsid, transmembrane and capsid) coupled to beads are referred to as antigen A, B and C respectively. When antigens A and C were tested against serum from immunized sheep, high signal compared to the ELISA negative control pool was seen. Interestingly, pooled and individual ELISA positive outbreak samples have a high signal only towards A and B compared to negative control pool. Preliminary results indicate that there are strain differences, which is important to consider when developing the assay.

Conclusion and implications
In order to improve the surveillance program better diagnostic tests are needed. Developing a multiplex assay enables us to investigate the antibody response to several antigens simultaneously, making the testing regime more efficient. In addition, the assay will be customised using a panel of immunodominant regions derived from the Norwegian viral strain.

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O-117
Follow-up scenario's, including retrospective bulk milk testing, after loss of caprine arthritis encephalitis virus (CAEV) herd accreditation in commercial dairy goat farms

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