1. INTRODUCTION

A field study during the month of February-March, 2007 was conducted in Jordan under a collaborative project between IAH and Jovac. The primary aim of this study was to evaluate the performance of non-structural serological tests (Cedi, Bommeli and UBI) in field for the detection of O and A serotype of foot-and-mouth disease (FMD) virus infection, particularly in vaccinated and infected sheep and goats and specifically in unnoticed FMDV infected sheep and goat farms. Secondary aims were to examine NSP seroconversion rates in sheep, goat and cattle that had been exposed to infection and to find out NSP tests specificity in field situations.

2. MATERIALS AND METHODS

Clinical specimens were collected from 409 sheep and lambs, 91 goats and 258 cattle in 15 herds in different provinces of Jordan, in which the history of FMD vaccination was known. Four vaccinated sheep and goat herds, three vaccinated cattle herds and one vaccinated mixed herd for sheep, goat and cattle had reported outbreaks of disease two to three months previously. A 5th vaccinated herd containing sheep and goats (n=107) where lesions were not found were also sampled. 122 sheep and goats were also randomly sampled from a sixth farm where vaccination was not applied for several years. Out of total 258 cattle, 160 cattle were sampled from 4 vaccinated farms where clinical lesions were observed. Further, 98 cattle from five vaccinated herds from no out break area were also sampled to find out the tests specificity. A monovalent vaccine (O1 Manisa) had been applied in above mentioned 14 farms.

3. RESULTS AND CONCLUSION

NSP antibody tests provided evidence of FMDV infection in all eight known infected herds as well as in one herd where FMDV infection was unnoticed. The overall sero-prevalence for sheep and goats varied with different NSP tests from 13% to 30% and 73% to 94% in vaccinated and unvaccinated animals, respectively. Similarly, the overall sero-prevalence for vaccinated cattle varied with different NSP tests from 30% to 82% with a tests specificity of 92% to 97%.

4. INTRODUCTION

Though available NSP antibody tests were validated in Brescia, Italy under the scope of an EU funded International research group, a consortium of European reference laboratories (Brochi et al., 2006), it was mainly based on serum samples obtained from vaccinated and infected cattle. Very few serum samples from sheep, goats and pigs were used in this validation process. It has been advocated that another NSP antibody test validation is necessary for sheep as well as for Pigs. Recently we have reported the efficiency of NSP tests in vaccinated challenged sheep and pigs in experimental condition (Parida et al., 2007 and 2008). Therefore the primary aim of this study was to evaluate the performance of non-structural serological tests (Cedi, Bommeli and UBI) in field for the detection of O and A serotype of foot-and-mouth disease (FMD) virus infection, particularly in vaccinated and infected sheep and goats and specifically in unnoticed FMDV infected sheep and goat farms. Secondary aims were to examine NSP seroconversion rates in sheep, goat and cattle that had been exposed to infection and to find out NSP tests specificity in field situations.
5. MATERIALS AND METHODS

During February and March 2007, a serosurveillance was conducted in different provinces (Fig. 1) with the help of a Jordanian vaccine company, Jovac, based in Amman, Jordan. Clinical specimens were collected from 409 sheep and lambs, 91 goats and 258 cattle in 15 herds in different provinces of Jordan, in which the history of FMD vaccination was known. Four vaccinated sheep and goat herds, three vaccinated cattle herds and one vaccinated mixed herd for sheep, goat and cattle had reported outbreaks of disease two to three months previously. A 5th vaccinated herd containing sheep and goats (n=107) where lesions were not found were also sampled. 122 sheep and goats were also randomly sampled from a sixth farm where vaccination was not applied for several years. Out of total 258 cattle, 160 cattle were sampled from 4 vaccinated farms where clinical lesions were observed whereas 98 cattle from five vaccinated herds were sampled from no out break area to find out the tests specificity. A monovalent vaccine (O1 Manisa) had been applied in above mentioned 14 farms.

Blood, saliva and probang samples were collected from each of the animals. Due to a delay at the airport, probang samples received were unsuitable for virus isolation, but are being examined by RT-PCR. Serum and saliva samples were analysed for NSP antibodies by Cedi NSP test (Ceditest® FMDV-NS originally from Cedi Diagnostics, now Prionics B.V. Lelystad, The Netherlands) and IgA test respectively and this work was described in the 2007 report. During 2008, further analyses of serum samples were conducted for detection of NSP antibodies by Bommeli (CHEKIT(FMD(3ABC, Bommeli Diagnostics, Bern, Switzerlandand) and UBI (UBI® FMDV NS ELISA, United Biomedical Inc., New York, USA) tests and the results were compared to the original findings from use of the Cedi test.

6. RESULTS AND DISCUSSION:

The main objectives of this work were to evaluate the performance of available commercial NSP tests to detect infection with O and A serotypes of FMD in cattle, sheep and goats in the field and to establish seroconversion rates in vaccinated sheep and goats. Manifestations of FMD in sheep and goats are often mild and there is considerable danger that infection will be missed, even where serology is carried out, if only few animals are infected with limited virus replication.

Detection of NSP antibodies in 160 cattle serum samples from 4 vaccinated infected farms revealed that 82%, 31% and 54% of the samples were scored positive by Cedi, Bommeli and UBI tests respectively. The proportion of seropositive animals found in apparently infected flocks was lower in vaccinated sheep and goats than in vaccinated cattle herds. Analysing 271 sheep and goat serum samples from 5 vaccinated and presumed infected farms, the proportion of seropositive animals was 30%, 20% and 13% by Cedi, Bommeli and UBI tests. As seen earlier in unvaccinated cattle, the proportion of NSP antibody seropositive animals in unvaccinated sheep and goat flocks was higher than amongst vaccinated animals. Out of 122 random serum samples from sheep and goats from an unvaccinated infected herd 95%, 73% and 75% animals were seropositive for NSP antibodies and were detected by Cedi, Bommeli and UBI tests. Detection of NSP antibodies in 107 sheep and goat serum samples from one vaccinated farm where FMD infection was not noticed revealed 49%, 6% and 4% NSP seropositive animals in Cedi, Bommeli and UBI tests respectively.

During this study in Jordan, NSP test specificity was also estimated from analysis of sera collected from 98 vaccinated cattle from 5 vaccinated and apparently uninfected farms in areas where disease had not been reported. This revealed 92%, 97% and 96% specificity in Cedi, Bommeli and UBI tests respectively. For specificity estimation of these NSP tests in sheep and goats, 100 vaccinated sheep and goats were sampled from unaffected areas of Jordan during October 2008, and analysis of these samples is ongoing.
Figure 1: Arrows showed the place of sample collection in Jordan after 2006 FMD outbreak

7. CONCLUSION

- NSP antibody tests provided evidence of FMDV infection in all eight known vaccinated infected herds, one unvaccinated herd and in one herd where FMDV infection has not been noticed.
- The overall sero-prevalence for sheep and goats varied with different NSP tests from 13% to 30% and 73% to 95% in vaccinated and unvaccinated animals, respectively.
- Similarly, the overall sero-prevalence for vaccinated cattle varied with different NSP tests from 31% to 82% with specificity ranging from 92% to 97%.

8. RECOMMENDATION

- NSP antibody tests are useful to detect infection in vaccinated sheep.

9. ACKNOWLEDGEMENT

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10. REFERENCES


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