DIAGNOSIS OF PREGNANCY IN THE EWE AT MID-GESTATION

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ABSTRACT


Detection of the pregnancy-specific antigen, chorionic somatomammotrophin in serum was applied to the diagnosis of pregnancy in a commercial-type flock of 286 sheep 70 days after joining with rams. At the time of testing the ewes were between Days 47 and 70 of pregnancy. Based upon lambing results, the positive diagnoses were 97% correct. However, the accuracy in diagnosing non-pregnancy, which rose from 85% when all the ewes (Day 47—70) were considered to 99% after Day 55, suggest that some pregnant ewes whose stage of pregnancy was earlier than Day 55 were not being detected and were wrongly designated non-pregnant. This pregnancy test can be successfully used from Day 55, although a correct prediction of pregnancy was made in 40 ewes between Days 47 and 54.

INTRODUCTION

Kelly et al. (1974) demonstrated the presence and measured the concentration of ovine chorionic somatomammotrophin (oCS) in the plasma of the pregnant ewe. Thimonier et al. (1977) and Robertson et al. (1980) have described a pregnancy test for sheep based on the detection of this pregnancy-specific antigen in blood after Day 80 or Day 57 respectively. The present report confirms and extends these observations to the application of the test in a commercial-type flock of ewes.

MATERIALS AND METHODS

Rams were joined with 286 crossbred ewes and removed 23 days later. Blood samples were obtained from all the ewes 70 days after the introduction of the rams. The samples were immediately chilled in ice-water, centrifuged cold, and the serum collected and stored at −20°C until assayed. The number of days from the introduction of the ram to the day of lambing was recorded. The ac-
tual day of gestation on which the blood samples were taken was calculated as 70 less the difference between the number of days to lambing and 145, the average length of gestation.

oCS was measured in the serum by radioimmunoassay according to the procedure described by Chan et al. (1978). The sensitivity of the assay was 0.25 ng oCS when a 50 µl serum sample was assayed giving 5 ng/ml as the minimum detectable level. Single samples were assayed but all serum samples having a concentration of < 20 ng/ml were reassayed. The intraassay and inter-assay coefficients of variation were 10.5% and 8.2% respectively. All ewes having serum oCS values greater than the minimum detectable level, viz. 5 ng/ml, were diagnosed pregnant.

RESULTS

Lambing extended from Day 137 to 168 after the introduction of the ram, hence the serum samples had been obtained over the period Day 47–70 of gestation. The accuracy of the diagnoses of pregnancy and of non-pregnancy is summarized in Table I.

TABLE I

Accuracy of diagnosing pregnancy and non-pregnancy in the ewe during the first half of gestation based upon the detection of oCS in serum

<table>
<thead>
<tr>
<th>Prediction</th>
<th>No. lambing</th>
<th>No. not lambing</th>
<th>Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pregnant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days 47–70</td>
<td>139</td>
<td>4</td>
<td>97</td>
</tr>
<tr>
<td>Non-pregnant</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Days 47–70</td>
<td>22</td>
<td>121</td>
<td>95</td>
</tr>
<tr>
<td>Days 50–70</td>
<td>19</td>
<td>121</td>
<td>96</td>
</tr>
<tr>
<td>Days 55–70</td>
<td>1</td>
<td>121</td>
<td>99</td>
</tr>
<tr>
<td>Days 60–70</td>
<td>1</td>
<td>121</td>
<td>99</td>
</tr>
</tbody>
</table>

When the results are grouped according to the calculated stage of gestation at the time of test, it may be seen that considerable error was made in diagnosing as not pregnant, ewes from which samples were taken earlier than Day 55 of pregnancy. For maximal accuracy in diagnosis it is obvious that the blood samples should be collected later than Day 55.

Four (2.8%) of the 143 ewes diagnosed pregnant from blood samples taken between Days 47 and 70 failed to lamb and must have aborted since the serum oCS concentrations in these ewes were 15.8, 65.0 and two with > 100 ng/ml. It is estimated that in these ewes the diagnoses were made between Days 55 and 70 of pregnancy. It is of interest that pregnancy was correctly diagnosed in nine ewes as early as Day 47–49 and in 31 ewes at Day 50–54.
DISCUSSION

These data confirm the findings of Robertson et al. (1980) who showed that high accuracy in diagnosing non-pregnant animals can be attained when the blood samples are taken later than Day 57 of pregnancy. The estimated fetal loss of 2.8% after Day 55 is in agreement with the 2% reported by the above authors.

It is recommended that to use this test accurately on an experimental or commercial flock, the blood samples should be taken 55 days after the removal of the breeding ram at which time a very high accuracy of prediction will be obtained.

REFERENCES


