DETECTION OF PREGNANCY AND EMBRYOS IN EWES BEFORE DAY 30 USING ULTRASOUND IMAGING

J.F. WILKINS*

Real-time ultrasound imaging provides an easy and reliable means of pregnancy and litter size diagnosis in many species. Ewes are usually examined with external probes between 40 and 100 days gestation but earlier diagnoses are often desirable. The position and size of the tract in early pregnancy makes it difficult to image with external probes. However, a probe inserted per rectum provides closer apposition to the uterus which improves imaging (Buckrell et al. 1986). The following experiments were aimed at determining the earliest possible time of detecting pregnancy and imaging the embryo(s) present.

Merino ewes with known dates of mating were examined with a Toshiba SAL 32A scanner fitted with a trans-rectal linear array probe (IVB-505S, 5 MHz), which was inserted per rectum. Ewes could be examined while upright or on their back, but the latter presentation was preferred. In Experiment 1, 10 ewes were examined every one or two days during the cycle preceding mating and thereafter until day 30 of pregnancy. A further 24 ewes were examined daily during days 15-30 after mating. These observations provided video and photographic records of the changes in appearance of the tract in the non-pregnant state and during progression into early pregnancy. There was considerable variation between ewes in the appearance of the non-pregnant and early pregnant tract. The first images diagnostic of pregnancy were "pockets" of developing placental fluid, which appear as dark (non-echogenic) areas, and which expanded rapidly. Diagnostic images were found in 50% of pregnant ewes at 18 days, but rarely before, and increased to >90% after 20 days. Those not evident were due to failure to locate the tract. The embryo first appeared between days 20 and 25 as a small echogenic mass, closely attached to the wall of the uterus and was often difficult to find. The amniotic membrane was usually seen surrounding the embryo. The embryo(s) was more easily found when floating free in the fluid between 25 and 30 days. Heartbeats were found in embryos in more than half the ewes after 24 days and in all ewes by 28 days.

In Experiment 2, 200 ewes were mated and were examined at days 19, 20, 25, 26 and 27, prior to abattoir recovery of the tracts on day 28. At day 19 there were 11% of diagnoses uncertain and 30% of pregnancies were not detected. On day 20, there were 4% undetected and 9% uncertain. The accuracy of detection of twins rose from 48 to 71 to 95% on days 25, 26 and 27 respectively. By day 27 all predictions of multiples were correct but litter sizes of three or more were underestimated. Positive predictions of pregnancy at any stage were confirmed in 98-100% of cases.

In Experiment 3, 104 ewes were scanned at days 19, 20, 28 and 29. They were scanned twice again during mid pregnancy and observed closely at lambing to validate scan predictions. Prediction of ewes not pregnant was 95% accurate at day 20 and 100% thereafter. All predictions of pregnancy from 20 days onwards were confirmed. There were 8 and 12% errors in multiple diagnosis at days 28 and 29 respectively due to tracts not being found or being partly obscured.

These results have shown that predictions of pregnancy or non-pregnancy using the transrectal probe were 95-100% accurate after day 20, provided the tract was identified. Predicting single and twin embryos present was 95% accurate by day 27. Non-pregnancy should not be concluded if the tract was not seen.


Supported by A.M.L.R.D.C.

* School of Agriculture (Animal Science), University of W.A., Nedlands, WA, 6009.