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Doppler ultrasound in the diagnosis of early pregnancy in sheep

G.M. Bragança[1], M.F.A. Balaro[1], J.F. Fonseca[2], P.H.N. Pinto[1], R.M. Rosa[1], L.S. Ribeiro[1], M.S. Almeida[1], J.M.G. Souza Fabjan[1], A.R. Garcia[3], F.Z. Brandao[1]

[1]Universidade Federal Fluminense, Rio de Janeiro; [2]EMBRAPA Caprinos e Ovinos, Sobral; [3]EMBRAPA Pecuária Sudeste, São Carlos.

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The diagnosis of early pregnancy increases reproductive efficiency because non-pregnant females can be subjected for a promptly mating, concentrating births and improving the farm management. The aim of this study was to determine the effectiveness in the diagnosis of early pregnancy on the 12nd and 17th day after sheep mating. The study was carried out in a meat sheep flock located at Cachoeiras de Macacu city, Rio de Janeiro, Brazil. A total of 58 crossbred (Dorper x Santa Inês) ewes had their estrus synchronized by two doses of 0.12 mg cloprostenol (Estron®, Agener Union Animal Health, São Paulo, Brazil) seven days apart. Estrus behavior was detected after 36 hours of the second dose and ewes were mated by healthy rams. At the 12th (pre-luteolysis), 17th (post-luteolysis) and 30th day after mating, ultrasound exams were performed aided by Color Doppler ultrasound system (Sonoscape S6®, Sonoscape, Yizhe Building, Yuquan Road, Shenzhen, China), using a 7.5 MHz linear transducer (transrectal) to assess the quantity and quality of corpora lutea (CL). The quality of CL was evaluated subjectively by the vascularization degree: 1 (0-25%), 2 (25-50%), 3 (50-75) and 4 (75-100%) in accordance with previous study (Figueira, L. Reproduction in Domestic Animals, v.50, p. 643-50, 2015). At the 30th day, pregnancy was confirmed by the uterine fluid and embryo. To calculate the sensitivity, specificity and accuracy of the pregnancy diagnosis at the 12th and 17th day (predictive diagnosis) compared to the 30th day (confirmatory diagnosis), it was considered as "not pregnant" female, ewes with a vascularization degree 1. At 17th day, in addition with the luteal vascularization, the presence or absence of uterine fluid was also observed on the categorization of pregnancy. The degree of luteal vascularization on pregnancy (positive x negative) was evaluated by Wilcoxon test (signed-rank test) at 5% significance level. An effect of the vascularization luteal degree was found on the diagnosis of gestation ($P < 0.05$). At the 12th day and 17 th day, respectively: 84.1% and 70.5% of sensitivity, 42.7% and 85.7% of specificity and 74.1% and 74.2% of accuracy were obtained in the adoption of the degree of luteal vascularity for pregnancy prediction. When associating these data of vascularization degree with the presence or absence of uterine fluid for pregnancy prediction, 100% of sensitivity, specificity and accuracy were achieved. In conclusion, the pregnancy diagnosis performed on the 12th day post-mating may correctly predict approximately 85% of the pregnant ewes. However, on the 17th day, the association of the degree of luteal vascularization and the presence of intrauterine fluid contributed to reach 100% of accuracy in the pregnancy diagnosis. Therefore, the Doppler ultrasound evaluation at the 17th day post-mating in crossbred sheep is effective in the detection of the early pregnancy.

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