

Factors affecting pregnancy rate after cervical insemination in dairy sheep flocks¹Faculty of Veterinary Medicine, Aristotle University of Thessaloniki, Thessaloniki, Greece²Institute of Molecular Biology and Genetics, Biomedical Sciences Research Center Alexander Fleming, Vari, Greece

The objective of the study was to assess the factors affecting the success of cervical artificial insemination (CAI) with chilled semen in intensively reared dairy ewes in Greece. The study involved 1,242 adult ewes from 14 flocks in northern Greece (Lacaune, n=885 and Chios, n=357). A typical estrous synchronization protocol (intravaginal progestogen sponge×14 d and 400-600 IU of equine chorionic gonadotropin after sponge removal) was applied in ewes during mating period (May to November). All ewes were cervically inseminated 53-56 h after sponge removal. Semen was collected from 10 fertile (mass motility >4) adult purebred Lacaune rams using an artificial vagina. Each ejaculate was approved for CAI after evaluation of viability, sperm membrane integrity and kinematic parameters by a computer assisted sperm analyzer (CASA). Semen was diluted with skimmed milk to 1.6×10⁹ spermatozoa/mL and kept at 15°C until insemination. Pregnancy diagnosis (PD) was performed by trans-dermal ultrasonography at 35-40 d after service. The following data were available for each ewe: breed; parity; previous lambing date; body condition score at onset of synchronization (BCS_s), at the day of CAI (BCS_i) and at the day of PD (BCS_p); presence of rams during synchronization and number of previous synchronizations. Recordings during the CAI procedure included: onset of synchronization to CAI interval; semen collection to CAI interval semen deposition depth; cervical mucus presence; duration of CAI. Housing conditions (bedding space; air volume and ventilation) and dietary management were also recorded in each farm. The association between CAI success and categorical variables was assessed with Chi-square independence test. The difference in the mean values of continuous variables between pregnant and non-pregnant ewes was tested through the application of one-way analysis of variance (SPSS v.25.0). The results showed that breed, parity, semen deposition depth, time from semen collection to CAI and presence of rams during the synchronization period significantly affected CAI success (P<0.05). Pregnancy rate in farms with poor ventilation was significantly lower (P<0.05) compared to farms with adequate ventilation (40.0% vs. 53.4%). Ewes in medium condition at synchronization (BCS_s: 2.50-3.25) showed significantly higher (P<0.01) pregnancy rates compared with underconditioned (BCS_s <2.50) and over-conditioned (BCS_s >3.50) ewes (53.4% vs. 33.0%). Similarly, ewes at good condition at the time of CAI (BCS_i: 2.50-3.25) had a significantly higher (P<0.01) pregnancy rate than the rest (52.2% vs. 31.8%).

Positive energy balance following the onset of synchronization seems to benefit under-conditioned and ewes at medium condition. Instead, weight gain after sponge placement in over-conditioned ewes resulted to significantly lower (P<0.05) pregnancy rates (14.0% vs. 34.8%). In conclusion, selection of appropriate ewes, BCS recording prior to synchronization and evaluation of dietary management and housing conditions are key factors dictating pregnancy rates following CAI.

Keywords: sheep, insemination, factors, fertility

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