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Uterine morphology and reproductive phenomena in relation to number of embryos at different stages of gestation in prolific sheep

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Abstract

Forty prolific ewes of which half were superovulated with 800 IU PMSG were slaughtered on either d 30, d 70 of gestation or d 3–5 post-partum. At each slaughter date, the ewes were balanced for number of ovulations (1 to >3 at d 30) or embryos (1 to 4 at d 70 and d 3–5 post-partum). Uterine length, width, surface and dry matter (DM); embryonic weight and DM; plasma progesterone at d 15 and 30 of gestation; and protein concentration in allantoic fluids were measured. Superovulated ewes averaged 5.8 CL vs. 3.1 CL for the control. On d 15 of gestation, plasma progesterone concentration increased from 4.87 ng/ml in ewes with 2 CL to 8.02 ng/ml for those with >7 CL. The corresponding figures at d 30 were 4.19 and 9.44 ng/ml, respectively. Embryonic losses increased from 16.5% in ewes with 2 CL to 67.9% in those with >7 CL. Length of uterine horns increased by 9.2, 7.7 and 4.1 cm for each increase in number of embryos present at the three slaughter dates, respectively. On d 30, only embryo DM showed a significant ($P < 0.05$) increase with increased number of embryos present. On d 70, length, width and uterine surface increased linearly with increase in number of embryos, however, little difference was observed between ewes carrying three and four embryos. Ewes slaughtered after they had lambed one, two or three lambs had significantly smaller and narrower uteri than those with four lambs. It is concluded that, in prolific as in non-prolific sheep the space available seems to be adequate for development of all embryos surviving the critical first 30 days of pregnancy.

Key words: Uterus; Superovulation; Embryo; Mortality; Prolific sheep

1. Introduction

The number of lambs born is a function of ovulation rate and embryonic survival which is determined to a great extent by the physical and physiological capacity of the uterus. In non-prolific breeds of sheep, where the number of lambs born is often one or two and rarely three, the uterine capacity is seldom a determining factor for the number or size of young born. This situation

may be different in prolific breeds with high ovulation rate, for which ovulation rate (even after early embryonic loss) could be higher than the ability of the uterus to accommodate the surviving embryos. The limiting effect of the uterine space may have a greater impact when prolificacy is introduced abruptly in originally non-prolific breeds such as in the case of introducing a major gene for prolificacy, for example, the Booroola gene. Despite the apparent importance of the subject (Leymaster and Bennett, 1990), few reports were pub-

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