

## Impact of mineral supplementation on parturition behaviour of ewes

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Fetal growth and colostrum production in late gestation induce high energy and mineral requirements in pregnant ewes which consequently affect parturition associated factors such as the length of labour, contraction frequency and contraction amplitude (Dwyer et al., 2003). It has been shown that Adenosine triphosphate (ATP), is used as an energy source to power the movement of contraction in working muscles (Baker et al., 2010). Contribution of minerals like calcium (Ca) and magnesium (Mg) in myometrial contraction and ATP production in hepatocytes have made these elements essential for the birth process (Wray and Arrowsmith, 2012). Prolonged deliveries can impair suckling and locomotor activities in lambs due to central nervous system injury (Kilgour and Haughey, 1993). Therefore, this study aims to evaluate the effect of supplementation of pregnant ewes with Ca and Mg on duration of parturition, contraction frequency and amplitude in ewes.

Forty-four twin bearing ewes (Merino-4 years old) were randomly allocated to one of four dietary treatments ( $n=11$ ) from one month prior to lambing to one-month post-lambing. The experimental groups were provided with customised pellets consisting of High Ca group (0.72% DM Ca concentration); High Mg group (0.43% DM Mg concentration); High Ca+Mg group (0.66% DM Ca and 0.47% DM Mg concentration); and Control group (0.33% DM Ca and 0.28% DM Mg concentration). Video cameras (CCTV-infrared) were used to record the behaviour of ewes from the first visible contraction (before rupture of the foetal membranes) until 2 hours after delivery of the first lamb. The data were analysed by the general linear model (GLM) (univariate analysis) in which treatment was the fixed factor.

The contraction frequency, contraction duration and parturition duration of ewes for both lambs are presented in Table 1. These measured parameters were greater for the first lamb compared to the second lamb. The duration of parturition for the first lamb did not differ between groups ( $P = 0.172$ ). However, the effect of treatment on contraction duration ( $P=0.075$ ) and parturition duration ( $P=0.058$ ) for the second lamb had a trend toward being shorter in the supplemented groups.

The trend difference between supplemented groups and the control group for the parturition duration could be associated to mineral supplementation due to the role of these minerals in energy regulation (Ataollahi et al., 2018). However, it needs to be confirmed as not many variables measured in this study supported these findings. However, no significant difference between treatment groups was observed for the parturition duration of the first lamb, probably because Ca and Mg concentration in the base pellet were sufficient to regulate energy for the delivery of the first lamb. For the ethical reasons we were not able to create Ca and Mg deficiency in the control group, but further studies could be conducted to know how mineral supplementation influences parturition compared to deficient ewes.

**Table 1. Effect of supplementation with Ca and Mg on parturition behaviours of ewes**

Variables	Control	Ca	Mg	Ca+Mg	SE	P value
<b>Parturient behaviours-Lamb 1</b>						
Contraction frequency ( $n$ )	28	15	22	27	1.2	0.117
Contraction Length (seconds)	411	307	272	423	1.1	0.215
Parturition Length (minutes)	148	71.0	111	134	1.3	0.172
<b>Parturient behaviours-Lamb 2</b>						
Contraction frequency ( $n$ )	5	2	3	2	1.3	0.193
Contraction Length (seconds)	105	56	45	31	1.4	0.075
Parturition Length (minutes)	49	17	16	22	1.3	0.058

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