

EFFECT OF PREPARTUM SHEARING ON SERUM THYROID HORMONE CONCENTRATIONS IN AUSTRALIAN MERINO SHEEP UNDER EXTENSIVE GRAZING CONDITIONS

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INTRODUCTION

Homeothermic animals must maintain a stable body temperature in order to perform their vital functions. One of their first responses to cold exposure is reducing heat loss. Cold also triggers shivering and catecholamine release, initiating adaptive thermogenesis. Subsequently, adrenaline secretion increases, promoting hepatic glycogenolysis. In parallel, thyroid hormone secretion rises, enhancing basal metabolic rate and oxygen consumption—mechanisms essential for sustaining productive performance. Shearing represents both an acute and chronic stress factor, with the latter arising from cold stress when wool is removed during winter.

OBJECTIVE

The objective of this study was to evaluate the effects of early (85–90 days of gestation) and late (115–120 days) prepartum shearing on short-term thyroid hormone concentrations in Australian Merino sheep managed under extensive grazing conditions.

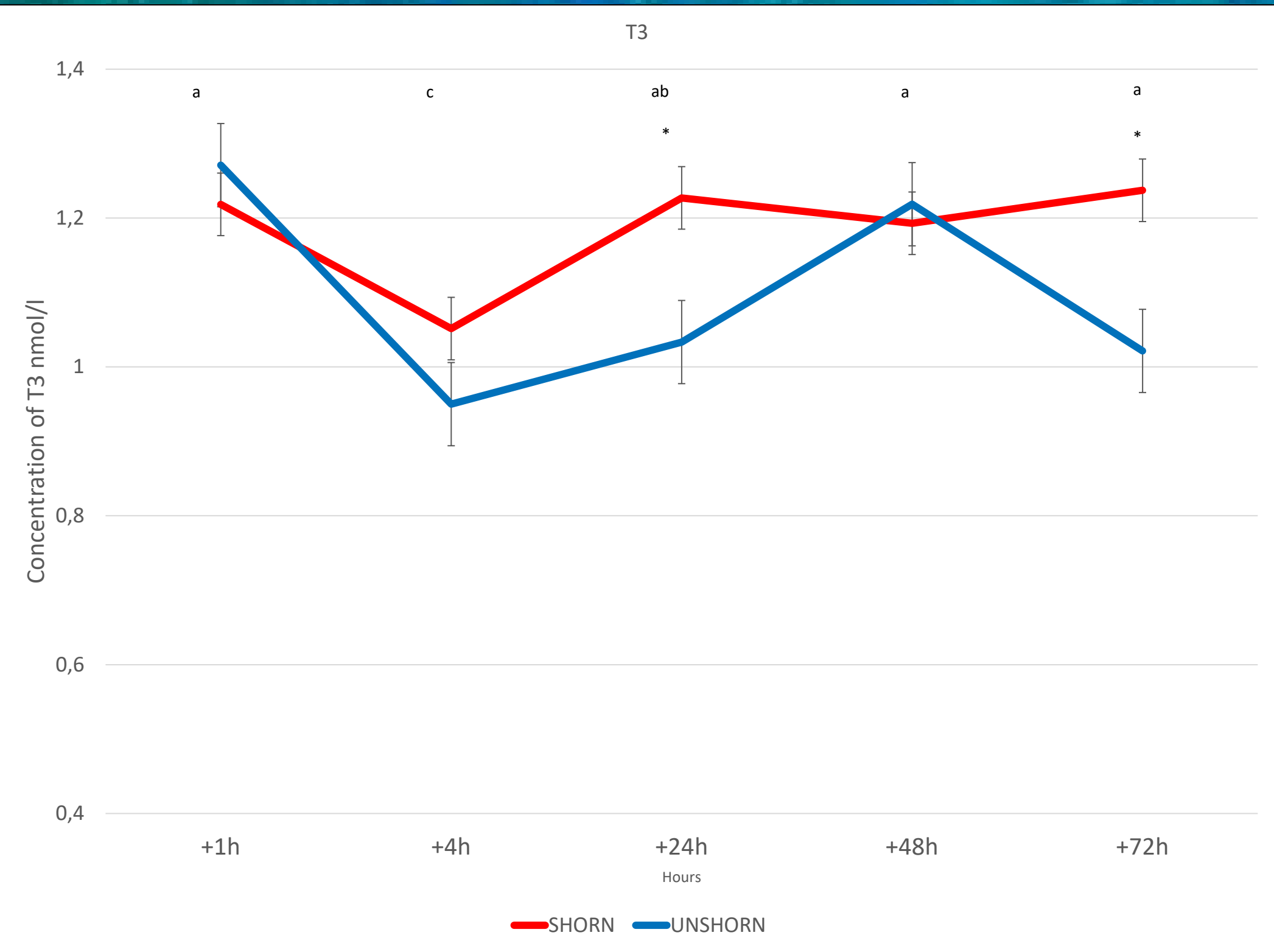
MATERIALS AND METHODS

The study was conducted at Experimental Station N^o. 1 of the Faculty of Veterinary, Universidad de la República, Uruguay, using 230 multiparous ewes. Half of the animals were artificially inseminated with fresh semen over 6 days between March 8 -13, and the other half between April 8-13. Forty-five days after each insemination, pregnancy diagnosis was performed via ultrasound, and 120 ewes carrying single fetuses were selected. They were randomly assigned to four treatments according to gestational stage (early insemination (Te) or late insemination (Ta)) and prepartum shearing (shorn or unshorn). Shearing was performed on July 20 in the designated groups, ensuring that ewes were shorn at two distinct gestational stages. Ambient temperature during the first 72 h post-shearing ranged from 7°C to 19.6°C. Blood samples for free triiodothyronine (T3) and thyroxine (T4) analysis were collected at -72, -48, and -24 h before shearing and at +1, +4, +24, +48, and +72 h after shearing. Hormone concentrations were determined via radioimmunoassay (RIA). The novelty of the experimental design lies in performing shearing simultaneously across both gestational stage groups, standardizing the environmental challenge and ensured that the observed differences could be attributed primarily to the gestational stage rather than to external variability.

RESULTS

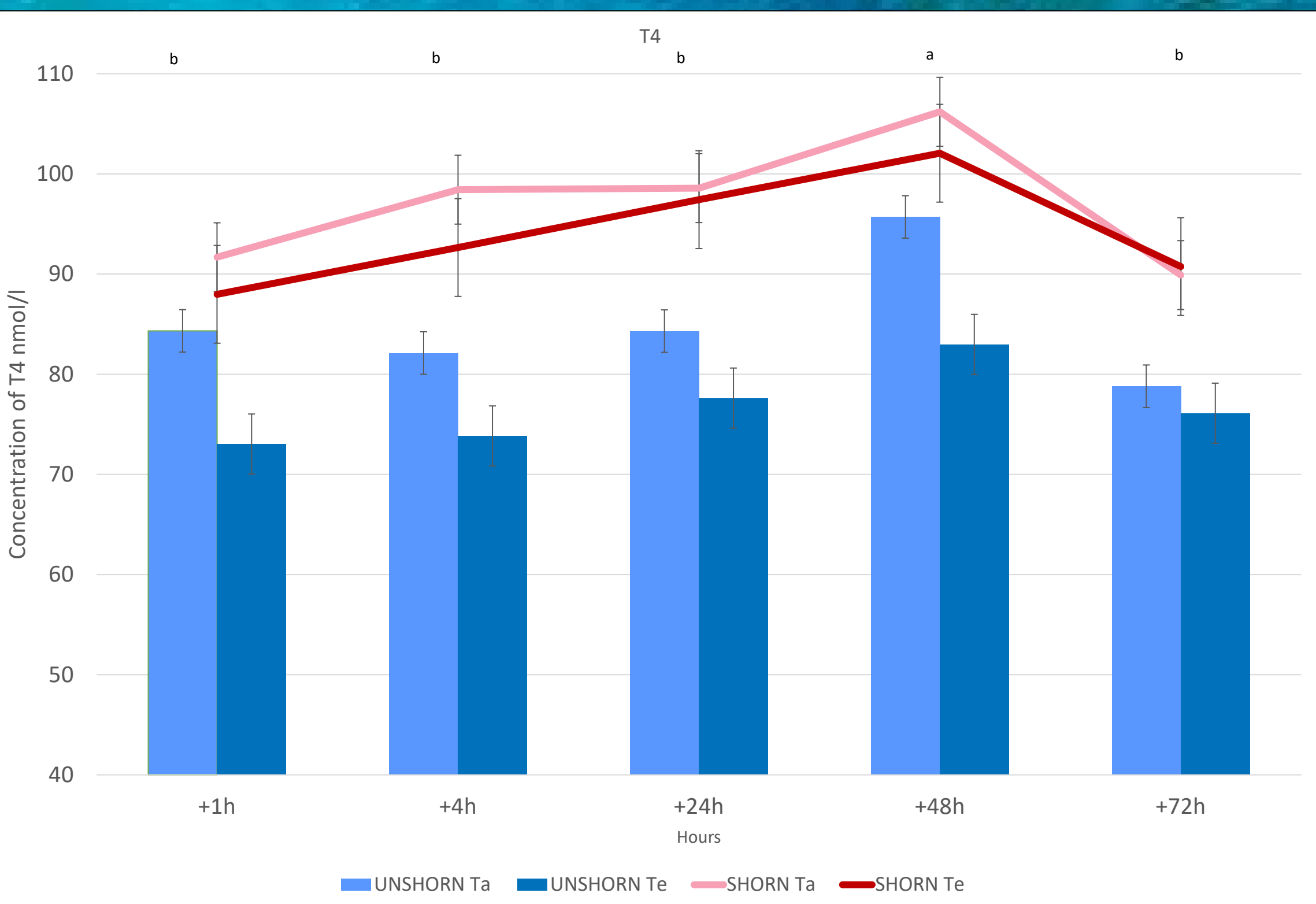
The concentration of T3 was higher in shorn sheep than in unshorn sheep (1.19 nmol/l ± 0.02 vs 1.10 nmol/l ± 0.02; P = 0.0065) and was also higher in sheep in the Ta group than in those in the Te group (1.18 nmol/l ± 0.02 vs 1.10 nmol/L ± 0.02; P = 0.0103). T3 levels also varied with the time of sampling (P < 0.0001), with a significant interaction between shearing and the time of blood sampling (P = 0.0092). Shorn ewes had higher T3 concentrations at 24 hours (1.23 nmol/l ± 0.04 vs. 1.03 nmol/l ± 0.05; P = 0.0042) and at 72 hours (1.24 nmol/l ± 0.04 vs. 1.02 nmol/l ± 0.05; P = 0.0015) compared to unshorn sheep. The T4 concentration was higher in the group of shorn sheep (95.56 nmol/l ± 1.56 vs. 80.88 nmol/l ± 2.14; P<0.0001) and was also higher in the Ta group than in the Te group (91.00 nmol/l ± 1.90 vs. 85.44 nmol/l ± 1.81; P=0.0355). The T4 concentration also varied depending on when the samples were taken (P = 0.013). No interactions between the effects were observed.

INTERACTION OF SHEARING AND TIME ON TRIIODOTHYRONINE (T3) CONCENTRATION



Different letters indicate differences between time points (P<0.0001); asterisks (*) show differences between sheared and unsheared groups at the same sampling time point (*P=0.0042; **P=0.0015).

EFFECT OF SHEARING, GESTATIONAL STAGE AND TIME ON THYROXINE (T4) CONCENTRATION



Bars indicate T4 values for unshorn sheep, lines indicate T4 values for shorn sheep. Different letters indicate differences between time points (P=0.013).

CONCLUSION

Prepartum shearing increased maternal thyroid hormone concentrations, indicating a physiological response to cold thermal stress induced by shearing.

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