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Short Communication

# LH response of seasonally anovular Corriedale ewes acutely exposed to rams and estrous ewes

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**Abstract**

Serial blood sampling before and after exposing four anovular Corriedale ewes to a group of rams and estrous ewes during the non-breeding season revealed a pattern of LH secretion similar to that previously observed in Merinos. Mean LH values doubled ($P < 0.001$) from $0.24 \pm 0.06$ μg $L^{-1}$ (mean ± s.e.m.) before to $0.55 \pm 0.05$ μg $L^{-1}$ after 2 h of visual, auditory, and odor exposure to rams and estrous ewes in an indoor facility. A non-significant ($P < 0.17$) increase of LH pulses per hour was also observed ($0.7 \pm 0.3$ pulses per hour before compared with $1.3 \pm 0.3$ during stimulation). All four ewes had recently formed corpora lutea by five days after stimulation. Results are consistent with the pattern of sudden increase and sustained release of LH observed in other sheep breeds, particularly the Merino.


*Keywords:* Sheep – ram effect; Ovulation; Anestrus; Seasonal breeding; LH

## 1. Introduction

The reproductive stimulation triggered in anestrous ewes by a sudden exposure to rams after a period of isolation has been recognized at least since early in the nineteenth century (Girard, 1813). Similar phenomena have been reported for a number of ungulates (goat: Amoah and Bryant, 1984; cattle: Alberio et al., 1987; red deer: Moore and Cowie, 1986; moose: Whittle et al., 2000;

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springbok: Skinner et al., 2002). Most research on this phenomenon, termed the 'male effect', has been done in Merino sheep, a breed that is not highly seasonal in breeding pattern. A rapid increase of LH secretion is the first endocrine response detectable in ewes acutely exposed to rams (Martin et al., 1980; Poindron et al., 1980). An attenuation of the negative feedback of estradiol-17β on the hypothalamus and the pituitary may contribute to the sustained LH response (Martin et al., 1986). The effectiveness of the 'male effect' varies depending on a number of factors. Although establishing valid comparisons is difficult, response to the male depends on extent of breed seasonality (Knight, 1983; Martin et al., 1986; Ungerfeld, 2006). While Merino ewes readily respond to a sudden introduction of rams during most of the anestrous period, breeds with more distinct seasonal breeding patterns usually do not, except shortly prior to the start of the breeding season. Merino-derived moderately seasonal breeds such as the Corriedale have an intermediate response to introduction of rams. In this latter breed, rams alone do not evoke a full response (Rodríguez Iglesias et al., 1992), but the presence of estrous ewes at ram introduction seems to provide the additional variety and intensity of stimulus required for a reliable response throughout the anestrous period (Rodríguez Iglesias et al., 1991). The immediate ovarian response observed in Corriedales (ovulations without expression of behavioral estrus within 48 to 60 h of exposure to rams and estrous ewes) is consistent with what has been observed in ram-exposed Merinos (Martin et al., 1986). The timing of the ovarian response suggests that the pattern of increased LH release after ram-stimulation is similar to that observed in Merinos, and most likely underlies the ovarian response. The limited evidence available on the timing of LH surges after ram exposure in Corriedale ewes (Ungerfeld et al., 2002; samples collected every 4 h for a period of 60 h) also indicates that a similar LH pattern is likely to exist with this breed. Such a pattern, however, remains hypothetical. To the best of our knowledge, a single LH profile from samples collected at 15 min intervals after ram exposure (Ungerfeld, 2003) is the only available information on the immediate LH response of Corriedale ewes. This single profile, however, does not fit well with the assumption that there is a sudden increase in the frequency of LH pulses; it rather suggests a progressive and sustained increase over a period of several hours. Establishing the nature of the immediate LH response of Corriedale ewes would contribute to the characterization of between-breed variation for a trait of considerable importance for non-pharmacological out-of-season breeding in sheep. The pattern of LH release in response to a ram-induced stimulus, however, is also a needed benchmark for evaluating immediate hormonal responses to other possible surrogate triggers such as sound recordings, images, or videos. This type of research, already underway (Hawken et al., 2006; Ferrería et al., unpublished results), is required to elucidate the relative importance of and possible interactions between different sensory inputs in triggering hormonal and ovarian responses in anovular ewes.

We report results from an observational study in which mature anovular Corriedale ewes were longitudinally sampled for LH before and after being exposed to the presence of rams and estrous ewes during anestrus.

## 2. Materials and methods

### 2.1. Location and animals

The present study was conducted at the Argerich Experiment Station (latitude: 38° 44′S) during late December and early January 2006. Four 4.5 to 6.5-year-old multiparous anovular Corriedale ewes with body weights (66 ± 4 kg; mean ± s.d.) and body condition scores (2.8 ± 0.5; mean ± s.d.; scale 1 [emaciated] to 5 [obese]; Jefferies, 1961) representative of an experimental