

# EFFECT OF SEASON AND NUTRITION ON PLASMA GROWTH HORMONE (GH) AND INSULIN-LIKE GROWTH FACTOR-1 (IGF-1) CONCENTRATIONS IN GOAT BUCKS.

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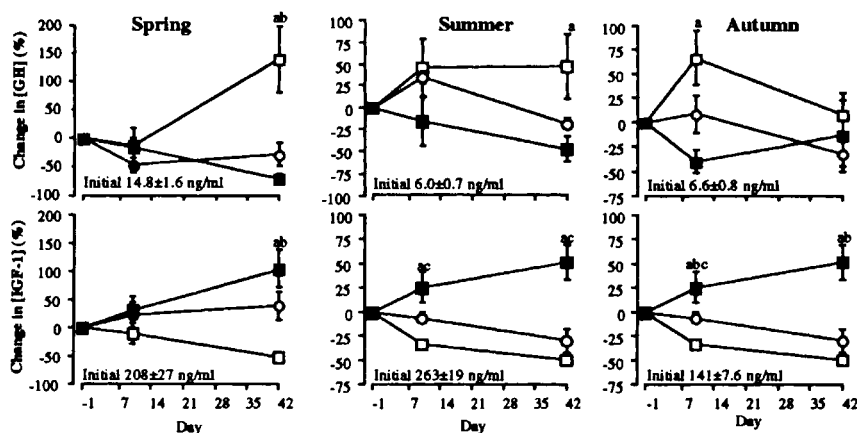
Australian feral goat bucks show seasonal cycles in testicular size and body weight that are closely associated, and testicular size is very responsive to nutritionally-induced changes in body weight (Walkden-Brown *et al.* 1994). The hormones of the somatotrophic axis might be involved in these effects so, as part of a study into the effects of season and nutrition on growth and reproductive function in feral goat bucks, we examined plasma concentrations of GH and IGF-1.

Between September 1994 and April 1995, two experiments were conducted using mature feral bucks. In Experiment 1 five bucks were placed on a unchanging maintenance diet for the duration of this period. In Experiment 2, bucks were placed on half maintenance (0.5M), maintenance (M) or twice maintenance (2M) diets ( $n=6/\text{diet}$ ) for periods of 42 days commencing on 2 September 1994 (Spring, non-breeding season), 7 December 1994 (Summer, transitional period) and 14 March 1995 (Autumn, breeding season). Bucks in both Experiments were fed a basal diet of 200 g oaten chaff with the balance of the ration made up of a high quality pelleted ration. On Days -1, 11 and 42 of each experimental feeding period blood samples were collected at 20 minute intervals over 24 hours. Pooled plasma samples for each buck were assayed for GH and IGF-1 by RIA. Data were analysed by ANOVA. Results are shown in Table 1 and Figure 1.

**Table 1. Mean ( $\pm$  s.e.) growth hormone and IGF-1 concentrations in Experiment 1.**

Date (season)	Reproductive season	Plasma GH (ng/ml)	Plasma IGF-1 (ng/ml)
Sept. 1 (Win/Spring)	Non-breeding	$23.4 \pm 6.7^a$	$141 \pm 18^a$
Dec. 6 (Summer)	Transitional	$7.5 \pm 1.1^b$	$231 \pm 35^b$
Mar. 13 (Autumn)	Breeding	$4.4 \pm 1.8^b$	$140 \pm 21^a$

<sup>ab</sup>Means not sharing the same superscript are significantly different  $P < 0.05$



**Figure 1. Experiment 2. Mean ( $\pm$  s.e.) change in growth hormone and IGF-1 concentrations in response to 0.5M ( $\square$ ), M ( $\circ$ ) and 2M ( $\bullet$ ) diets at different times of the year ( $n=6/\text{diet}$ ). Significant differences within a time period ( $P < 0.05$ ): a: 0.5M vs 2M; b: 0.5M vs M; c: M vs 2M.**

These results are the first demonstration that both GH and IGF-1 concentrations show distinct seasonal variation in the goat, and that, as with other ruminants, GH concentrations are depressed and IGF-1 concentrations increased, with improving nutrition.

WALKDEN-BROWN, S.W., RESTALL, B.J., NORTON, B.W., SCARAMUZZI, R.J. and MARTIN, G.B. (1994). *J. Reprod. Fert.* **102**, 351-360.