

A Five Year Response to Selenium Supplementation in Sheep Grazing Selenium Deficient Pasture

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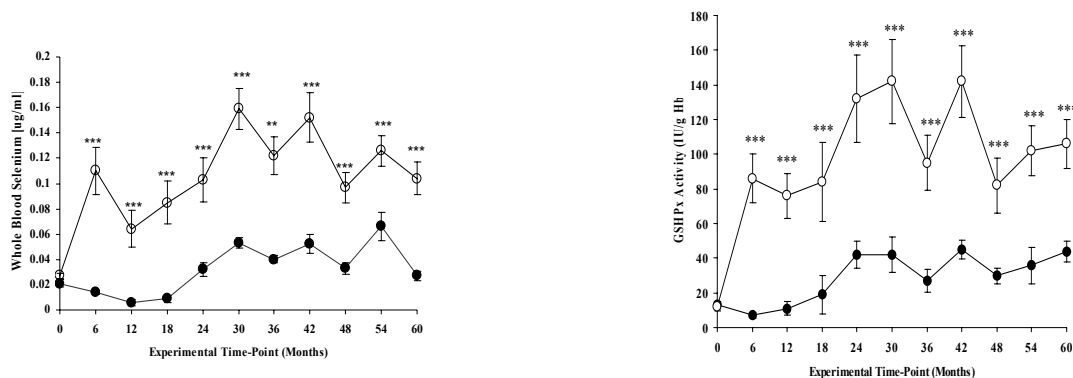
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The importance of elemental selenium (Se) to animal health and productivity is well-documented. Clinical and subclinical Se insufficiencies are often observed in livestock grazing pastures of low levels of Se in many regions of Australia (Standing Committee on Agriculture, 1990).

The aim of this study was to investigate the physiological response of sheep grazed on Se deficient pasture to Se supplementation in the form of an intra-ruminal device (*Rumetrace™ Ezymin Sheep Selenium Pills*). As the major physiological function of Se is in its incorporation into the important enzyme, glutathione peroxidase (GSHPx), both Se and GSHPx activity levels were measured as indicators of the response to supplementation.

Thirty fine-wool Merino wethers were randomly allocated to 2 groups. The treatment group was dosed with 1 intra-ruminal Se pill (*Rumetrace™ Ezymin Sheep Selenium Pill*, Ridley AgriProducts Pty Ltd) and one steel grinder, as per the manufacturer's instructions. In contrast, the control group was not given any form of Se supplementation. All sheep were grazed as one flock on known Se deficient pastures. Blood samples were collected from all sheep by venipuncture at the time of dosing and at 6 monthly intervals until the conclusion of the experiment (5 years later). Se concentration and GSHPx activity levels were analysed by CSIRO laboratories. General animal health was monitored during the course of the study.

The whole-blood Se concentration and GSHPx activity levels, <0.05µg/ml and <50IU/g Hb respectively, measured at the commencement of the trial, were consistent with Se deficiency. Control animals remained Se deficient for the majority of the study. In contrast, animals supplemented with Se demonstrated a significant elevation in both whole blood Se concentration and GSHPx activity levels in comparison to those measured in the control animals. This elevation in the treatment group was apparent for the full term of the study (Figure 1).



Whole Blood Selenium Concentrations (µg/ml)

Glutathione Peroxidase Activity (IU/g Hb at 30°C)

Figure 1. Blood Selenium Concentration (µg/ml) and Glutathione Peroxidase (GSHPx) Activity Levels (IU/g Hb at 30°C) in Unsupplemented (Control; ●) or Se-Supplemented (Treatment Group; ○) Merino Sheep. Values are Mean ± SD. *P<0.05; **P<0.01; *P<0.001; significantly different to the control.**

Selenium is an essential mineral in animal health and production. Animals grazed on Se deficient pastures when not supplemented with this trace element, had low whole blood selenium content. In contrast, sheep dosed with an intra-ruminal device, *Rumetrace™ Ezymin Sheep Selenium Pills*, exhibited significant elevation in whole blood Se levels and in the activity levels of the functional marker, GSHPx. This observation was apparent for the full 5 year term of the investigation and was indicative of a regular and sustained release of elemental selenium. In conclusion, *Rumetrace™ Ezymin Sheep Selenium Pills* are effective in protecting sheep from Se deficiency for a period of at least five years.

Standing Committee on Agriculture (1990): "Feeding Standards for Australian Livestock: Ruminants", (CSIRO Australia Publishing)

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