Urea applied to puccinellia-based pastures increases pasture and sheep production

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Introduction In the 1950's large areas of native vegetation in the upper south east of South Australia (SA) were replaced with highly productive Hunter River lucerne. This maintained groundwater recharge at near pre-clearing levels. The area of lucerne was reduced dramatically in the late 1970's by a combination of lucerne aphids, wingless grasshoppers and drought. In 1981 severe flooding inundated large areas of the region, causing the saline groundwater to rise to the soil surface. Since that time, dryland salinity has been a feature of the local farming system and salt-tolerant pastures based on puccinellia (*Puccinellia ciliata*) were widely established. Despite this, few agronomic studies have been conducted on puccinellia to enable management guidelines to be determined. The aim of this experiment was to compare animal and pasture production on volunteer saline pasture and improved saline pasture with and without fertiliser inputs.

Materials and methods One-hundred and twenty 15-month-old Merino wethers were allocated to one of four treatment groups: 1) unimproved saltland pasture (predominantly sea barley grass (*Hordeum marinum*), samphire (*Halosarcia* spp.) and salt scalds); 2) improved saltland pasture (puccinellia-based) with no fertiliser inputs; 3) improved saltland pasture with 75 kg/ha superphosphate (SP); and 4) improved saltland pasture with 75kg/ha SP and 100 kg/ha urea (U). Each treatment was replicated three times, giving a total of 12 plots. The nine improved plots were 2 ha each and stocked at 5 Dry Sheep Equivalents (DSE)/ha. The unimproved plots were stocked at 2 DSE/ha but were 5 ha each to maintain 10 animals per plot. Grazing began at the end of April 2003 and fertiliser was applied in July after the season-opening rains had fallen. Liveweight, condition score, soil salinity and pH and pasture composition and mass were recorded monthly.

Results The three puccinellia-based pastures produced more dry matter than the unimproved pastures from late-autumn (May) to mid-spring (Oct; Fig 1a). Phosphorus did not limit pasture growth in the improved treatment, as there was no difference in pasture growth between this and the improved + SP treatment. This is explained by the fertiliser history of the paddock, which resulted in Colwell P levels of 25mg/kg (0.5M sodium bicarbonate extract) at the start of the project. Consequently, the body weight and condition score of animals grazing the improved + SP pasture was not different from those grazing the improved pasture with no fertiliser (Fig 1b). The addition of SP and U increased pasture mass (Fig. 1a) and resulted in sheep being 9% heavier than those grazing the two other improved pastures (Fig. 1b). Furthermore, during late spring/early summer, when feed availability was declining in other improved pastures, the pasture mass in the SP + U treatment was maintained (Fig 1a).

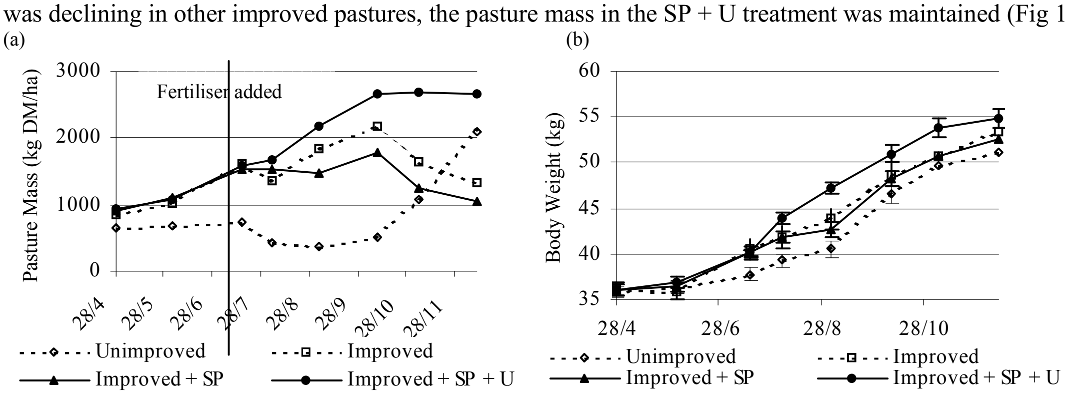

Figure 1 a) Pasture mass, and b) animal liveweight (mean ± sem) during the first year of grazing

Conclusions Saltland pastures based on puccinellia are more productive from both an animal and pasture perspective than if the pastures are left in an unimproved state. GrazFeed modelling indicates that the excess feed grown in the SP + U treatment could have supported approximately 13 extra DSE/ha during 2003. Increased stocking rates are therefore planned for these treatments in spring 2004 to control pasture accumulation and capture some of the benefits in animal production (i.e. liveweight, wool growth and wool quality).

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