A COMPARISON OF ANNUAL AND PERENNIAL BASED PASTURES FOR LIVEWEIGHT AND WOOL PRODUCTION OF SHEEP GRAZING ON THE LATERITIC PODZOLIC SOILS OF KANGAROO ISLAND

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Summary

A stocking rate (Merino wethers at 10, 11, 13, 14, 15 and 17 ha^{-1}) x two pasture treatments (viz: volunteer, annual grass plus subterranean clover and a renovated, perennial ryegrass plus subterranean clover) trial was run for four years on a lateritic, podzolic soil on Kangaroo Island.

Except for seven months at the beginning of the experiment sheep grazing the annual pasture weighed as much and usually more than those grazing the perennial pasture. Maximum differences in liveweight gain coincided with an 11 to 14 week interval following the opening rains. Regressions of greasy wool production per hectare (averaged over four years) on stocking rate for each treatment were linear over the range of stocking rates used and not significantly different (PC 0.05).

The practice of renovating volunteer, annual pastures by sowing perennial grass species in this environment is questioned.

I. INTRODUCTION

Volunteer annual grass-es plus subterranean clover (Trifolium subterraneum) pastures have generally yielded high levels of animal production and there is little evidence available which demonstrates that perennial based pastures will substantially increase animal production (e.g. Rossiter 1952; Reed 1970).

However, livestock producers have often been advised to renovate existing annual grass plus subterranean clover pastures to increase animal production, stabilize pasture composition or dilute the intake of potent, oestrogenic subterranean clovers by the grazing animal (e.g. Taylor 1961).

Cutting experiments carried out at the Kangaroo Island Research Centre had shown perennial ryegrass (Lolium perenne) to be the most productive perennial pasture species in this environment (Crawford and Smith, personal communication).

This paper reports results from a grazing experiment designed to compare wool production and liveweight response from an unrenovated, volunteer annual pasture with a renovated, perennial ryegrass based pasture.

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II. MATERIALS AND METHODS

The experiment was conducted at the Kangaroo Island Research Centre, Parndana East on a lateritic podzol, The climate, soil type and climax vegetation of the area prior to clearing have been described by Carter and Day (1970).

Stocking rate (Merino wethers at 10, 11, 13, 14, 15 and 17 ha^{-1} for four years) x five pasture treatments were allocated at random to land cleared from virgin scrub and sown to a subterranean clover based pasture in 1951. Reference in this paper is only made to two treatments composed of:

(i) The existing annual pasture dominated by subterranean clover cv. Yarloop and barley grass (Hordeum leporinum). Other species present wese Mt. Barker, Dwalganup and Bacchus Marsh subterranean clovers, silver grass (Vulpia myuros), soft brome (Bromus mollis), geranium (Erodium botrys) and capeweed (Arctotheca calendula).

(ii) A perennial ryegrass cv. Victorian plus subterranean clover cvv. Mt. Barker and Woogenellup pasture sown into a prepared seedbed in May 1970.

These two treatments are hereafter referred to as A and B respectively.

Treatment A paddocks were grazed uniformly once during the winter of 1970 but treatment B paddocks remained ungrazed until the trial was stocked with the experimental animals in December 1970. Five, one and a half year old, merino wethers (Collinsville) were allocated to each paddock on the basis of greasy fleece weight and live weight.

The live weight of the sheep was recorded and fleeces dyebanded at approximately six weekly intervals and individual fleeces were weighed and classed annually at shearing. Pasture and seed production data were also collected but not presented in this paper.

III. RESULTS

In three of the four years rainfall was above average resulting in excellent pasture growth but in 1972 a late break to the season, coupled with below average rainfall, delayed adequate pasture growth until the beginning of July.

Treatment A pastures continued to be dominated by barley grass and Yarloop subterranean clover throughout the experiment. Treatment B pastures were dominated by perennial ryegrass in 1971 and 1972 but most of the perennial plants died over the 1972/73 summer resulting in an invasion by capeweed and geranium into this treatment in 1973. However, self seeding of the ryegrass in 1973 and 1974 ensured its continued contribution to pasture production. The subterranean clover component was higher in A than B during 1971 and 1972 and the difference was greater during late autumn and winter.

Except for seven months at the beginning of the experiment sheep grazing the annual pasture weighed as much and usually more than those

grazing the perennial pasture. Maximum difference in liveweight gain coincided with an 11 to 14 week interval following the opening rains (Figure 1).

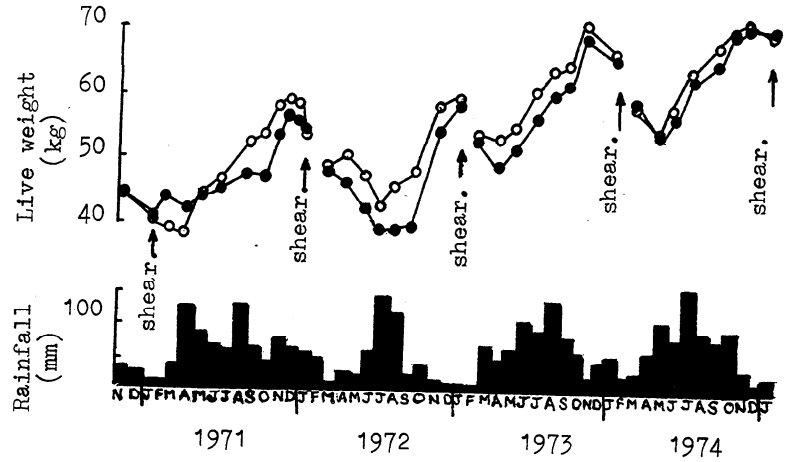

Figure 1 Live weight and rainfall data for experimental period.

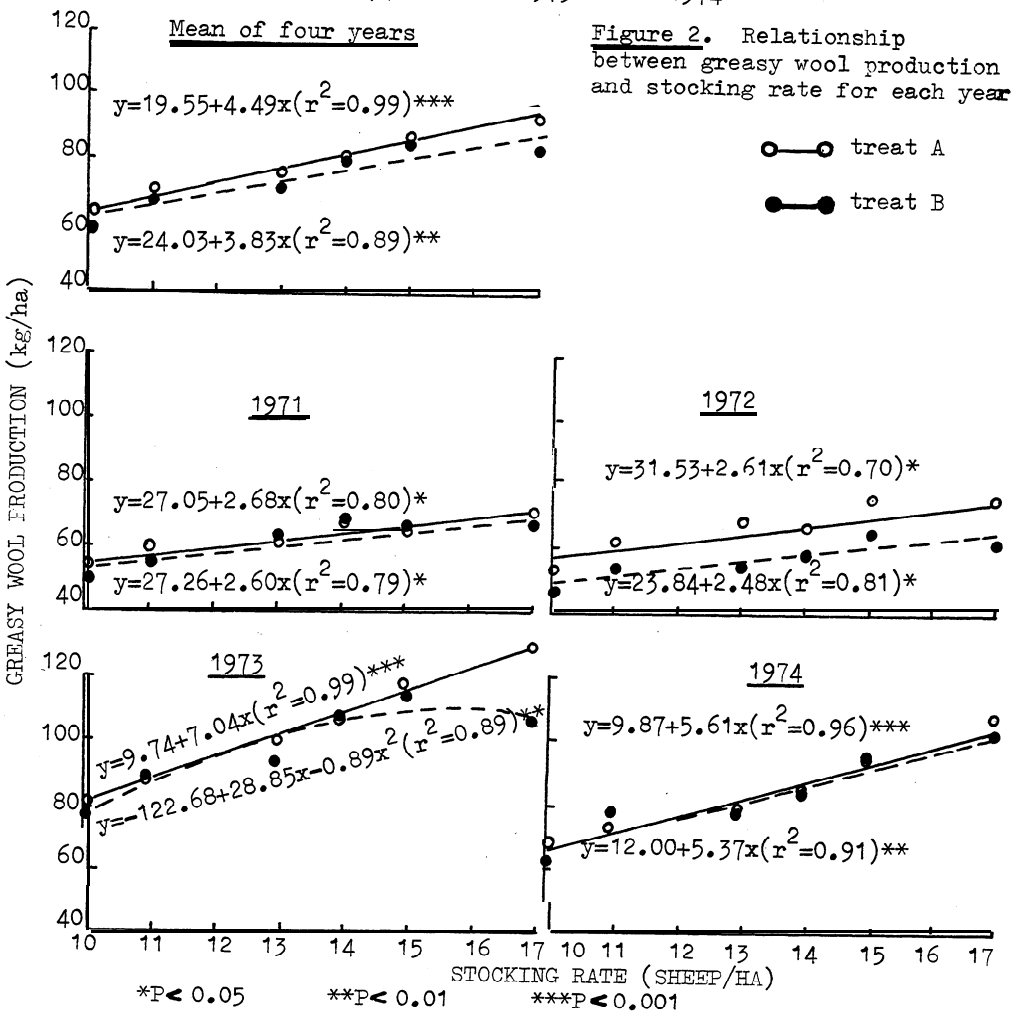

Figure 2. Relationship between greasy wool production and stocking rate for each year

*P< 0.05 **P< 0.01 ***P< 0.001

Regressions of greasy wool production per hectare (averaged over four years) on stocking rate for each treatment were linear over the range of stocking rates used and not significantly different ($P < 0.05$) (Figure 2). Treatment A outyielded B at all stocking rates in 1972 but the difference between the linear regression lines only reached significance at the ten percent level (Figure 2). Only on treatment B in 1973 at the highest stocking rate was there evidence that maximum greasy wool production per hectare may have been reached (the curve of best fit being quadratic). Additional data taken in 1973 show that sheep grazing treatment A at this high stocking rate produced 50 percent more wool than treatment B during the autumn but the difference in growth rate did not persist into the spring of that year.

IV. DISCUSSION

Rapid growth of annual grasses following the autumn break, combined with vigorous growth of Yarloop subterranean clover under waterlogged conditions in the winter, seemed to have ensured high animal productivity under the conditions experienced.

Willoughby (1959) demonstrated the sensitivity of animal production to small increases in availability of green pasture when the latter is inadequate such as occurs in the autumn and usually the winter in this environment. Results from this study indicate that animal production from annual based pasture is at least equal to that from perennial based pasture in this environment and any superior performance shown by the former occurs early in the growing season.

Lack of persistence by perennial species, in addition to poor performance, discourage the hope of overcoming problems related to Yarloop dominance, such as ewe infertility and clover scorch, by sowing perennial grasses on Kangaroo Island. Current studies are investigating ways of dealing with these (Beale and Crawford 1975).

Additionally, there would seem no possible economic advantage to be gained from replacing annual pastures on the lateritic podzolic soils of Kangaroo Island with pastures based on perennial ryegrass.

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