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IMPACT OF GRAZING SYSTEMS ON SOILS AND VEGETATION IN NORTH-WESTERN NEW SOUTH WALES

E.J. Humphries and B.M. Alchin

Department of Plant Production, Uni. of Queensland Gatton College, Lawes Qld 4343

ABSTRACT

Environmental and economic pressures have resulted in previously cropped country being re-established to native pastures in semi-arid areas of north-western NSW. Grazing systems have been considered an important factor in developing pasture viability. This is a study into the effects of short duration high intensity grazing under Holistic Resource Management (HRM) (Savory 1988) on a property in the Moree region of northern NSW. The short-term effects on aspects of the soil and native pasture will be measured over an autumn graze and rest period. The longer term effects will be assessed by a comparison with a continuously grazed native pasture. The main soil properties studied will include infiltration, porosity, bulk density, soil surface strength, soil moisture characteristics, water stable aggregates, carbon, nitrogen, phosphorus and several cations. Vegetation measurements will involve botanical composition, plant frequency and basal cover.

INTRODUCTION

Management of native pastures to prevent and reverse land degradation as well as to achieve profitability are major considerations in achieving sustainable land use of grazing lands. Short duration high intensity planned grazing, as part of property management under the Holistic Resource Management, is claimed to prevent and reverse land degradation problems as well as to improve profitability (Savory 1988). This study will evaluate some of those claims by studying the effects of this type of grazing on some soil and vegetation properties.

The study will:

1. Evaluate the effects of a short duration high intensity planned graze in autumn on the soil and the native pasture in the paddock.
2. Compare two nearby sites where one is under planned grazing and the other under continuous conservative grazing.
3. Measure the effects on the soil of a known rate of hoof pressure under different rates of trampling and moisture levels in a glasshouse trial.
4. Evaluate the effects of different rates and timing of defoliation on a perennial grass species from the study area under a glasshouse trial.

The field studies will be on a property in the Moree region in north-western NSW with native pastures growing on cracking clay soils. The property is being managed under Holistic Resource Management principles. A comparison is to be made with the neighbouring property which has been under conservative, continuous grazing management. Glasshouse and seed bank germination trials are to be conducted at the University of Queensland Gatton College.

METHODS

Measurements

1. *Effects of an autumn grazing and rest period:* The effects of a short duration high intensity graze during autumn on the soil and pasture are to be investigated. The effects of the graze and rest period are to be examined over three time periods (just before grazing, just after grazing and at the finish of the rest period, i.e. just prior to the next graze).

The effects on the soil are to be measured in terms of infiltration rates, pore sizes, strength (from penetrometer readings), and water stable aggregates of the top 20 centimetres of the soil. Pasture measurements to be made include botanical composition, frequency, soil cover and utilisation.

2. *Comparison between a conservatively continuously grazed site and a planned grazed site:* Data collected at the continuously grazed site and at the site under planned grazing will include soil chemical characteristics of organic carbon and nitrogen; soil physical characteristics of infiltration rate, strength and water stable aggregates (to 40 centimetres depth); and vegetation measurements of botanical composition, frequency, dry matter yield and soil seed banks (in the top 5 centimetres).
3. *The effect of different rates and timings of defoliation on the dry matter production of a perennial grass under controlled conditions:* A perennial grass species, collected from the study area, will be grown under glasshouse conditions and treatments with different rates and times of defoliation carried out. The amount of dry matter production and the effect on plant health of these treatments will be measured.

Time of Measurements

The first data, for the effect of the short duration high intensity autumn graze, will be collected in March, the second when the graze is finished and the third at the finish of the rest period (about July). Data for the comparison between the two different types of grazing will be collected in April. The glasshouse experiments will be conducted from April to September.

REFERENCE

Savory, A. (1988). 'Holistic Resource Management'. Island Press. California.