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Diet selection and digestive efficiency of Dorper sheep and farmed goats and their implications for natural resource management in western NSW

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Abstract

The recent introduction of new sheep breeds such as the Dorper and the increasing trend to farming feral goats, pose serious questions for the ecological sustainability of the semi-arid and arid rangelands of western New South Wales. While Dorper sheep offer important production advantages, little is known from Australian research about their grazing habits and management requirements from a natural resource perspective. Similarly, the knowledge base on goat management in rangelands is limited to their control as a pest or their use in controlling some woody species and little attention has been directed to their management as livestock. This paper reports on a project that aims to evaluate the diet selection and digestive efficiency of Dorper sheep and farmed goats and their likely impact on the environment compared to Merino sheep. Possible opportunities and risks due to the introduction of these species are discussed. Grazing management strategies will be developed based on the findings.

Keywords: Dorper grazing behaviour, grazing strategy

Introduction

The introduction of exotic herbivores into the semi-arid and arid zones of Australia resulted in dramatic change in the native vegetation (e.g. Noble and Tongway 1986, Friedel et al. 1990). Overgrazing and trampling reduced ground cover and changed species composition from dominance by perennial grasses and shrubs to dominance by annual species over extensive areas (e.g. Gunn 1986), or assisted the encroachment of woody species (Wilcox and Cunningham 1994).

It is particularly in this context that the recent introduction of new sheep breeds, reputedly hardier than traditional Merinos, and the increasing trend to farming or re-domestication of feral goats, poses serious questions for the ecological sustainability of the region.

The new sheep breeds, especially the Dorper offer many production and economic advantages and are growing in popularity among graziers in the arid and semi-arid rangelands of western NSW. Little is known, however, about their grazing habits and their management requirements.

Feral goats have been harvested in Australia for export of meat since the early 1950s (Restall 1982). The majority of goats sold from the Western Division of New South Wales are still opportunistically harvested rather than farmed commercially.

However, some landholders have started to fence a portion of their property into a ‘goat paddock’ that may be used to hold small animals until they reach marketable weight. Furthermore, farmed goat enterprises are emerging, involving retention of a selection of harvested feral does which are subject to commercial standards of management, including infusion of exotic breeds (e.g. the South African Boer goat) to improve productivity (Pople and Froese 2012).

This project aims to combine information from laboratory experiments, field studies and producer experience to develop practical management strategies that are supportive of regional and national ground cover targets aimed at reducing wind erosion and maintaining biodiversity values.

Method

Literature review and producer knowledge

A review of literature was undertaken to collate relevant information from overseas and limited Australian sources on the biology and grazing behaviour of Dorper and goats and their likely impact on the rangelands.

Following the literature review, producer forums were convened to collate practical knowledge relating to grazing and watering behaviour, diet selection and vital rates (fertility, fecundity, growth, mortality) for Dorpers and goats.

Field observations

Sets of three paddocks in eight locations (24 paddocks) covering a range of vegetation types were selected in which merinos, Dorpers and farmed goats could be observed within reasonable proximity. All paddocks were grazed by the target species for at least two years prior to measurement.

Within each paddock a set of 25 sampling points was established on a grid varied to suit the size of the paddock. At each grid point, a transect of 100m will be sampled using the step point method (Campbell and Hacker 2000) to measure ground cover, botanical composition, standing biomass and shrub cover. Diet selection will be surmised from species that were left un-grazed in each paddock. Plant parts and dung samples will be collected from each paddock for DNA study (see below)

Laboratory experiments

An animal house experiment was undertaken to compare nutrient digestibility and rumen microbiology in Merinos, Dorper and goats.

Fresh dung and plant parts collected from grid sampling points in the field will be matched using DNA bar-coding in an attempt to define diet selection, at least qualitatively.

Results and discussion

Field and laboratory studies are still in progress and no results are available at the time of writing. However, some key issues have emerged from discussions with landholders and from the review of literature. These issues involve both opportunities and risks. Opportunities include:

- Dorpers are well suited to organic management in pastoral areas which can attract higher premiums compared to traditional Merino and/or terminal sire crossbred lambs;
- There is no need for shearing, crutching or mulesing, minimising labour requirements in an environment in which skilled labour is increasingly in short supply;
- Their reputedly hardy nature, high fertility and capacity to produce superior meat carcases makes them well suited to the rangelands pastoral industry;

- Dorper enterprises are generally more flexible and stocking rates can be adjusted quickly depending on the seasonal conditions as they can be marketed at young age;
- Well managed goats may facilitate rangeland regeneration as they are 'softer' on country than sheep due to their highly flexible diet;
- Goats can be a significant source of income; some graziers claim to have generated more income from goats than from sheep, cattle and, in some cases, cropping combined over the last 15 years.

On the risk side, major adverse consequences for rangeland condition can be expected if seasonal or market conditions result in an imbalance between population growth and off-take, resulting in high levels of grazing pressure. While this is true of all livestock production systems the capacity of the Dorper and goats to survive and reproduce under a wide range of seasonal conditions makes this problem potentially more serious than for traditional sheep or cattle enterprises.

The risk of population explosion is particularly high for goats as numbers may be difficult to control for several reasons. First, they have a remarkable capacity to reproduce despite low feed availability. Second, the reproductive process is generally uncontrolled, even when goats are confined behind fences. Finally, although goats can maintain reproduction under poor seasonal conditions the growth rate of young animals may restrict turnoff because of the market preference for animals above 24 kg liveweight.

It is therefore important that graziers have well planned strategies to ensure that the risk of any such imbalance is reduced and the potential for critical situations identified early so that corrective action can be initiated. These strategies might include:

- Stocking at a lower rate than would be practised with Merinos;
- Use of seasonal risk management tools such as trigger points (Hacker *et al.* 2006) or forward projections based on a DDH/100mm[1] benchmark and rolling annual rainfall totals (Hacker and Smith 2007)
- Establishment of on-property feed lots, or development of alliances with off-property finishers, to ensure that turn off can be maintained under all seasonal conditions;
- Restricted joining of females or heavier culling of older age groups under poor seasonal conditions.

Conclusions

To avoid overgrazing and degradation associated with a change to Dorper sheep or domesticated goat enterprises, well planned strategies are required to ensure that the risk of imbalance between population growth and off-take is minimised.

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[1] DDH/100 mm – DSE days per ha per 100mm of annual rainfall

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