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Dorper sheep in southern Australian rangelands: production success or environmental concern?

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Abstract

The downturn in wool prices in the 1990's coupled with the lower cost of sheep meat production compared to wool production have encouraged many graziers in the southern Australian rangelands to adopt Dorper sheep. The success of the breed has resulted mainly from its reputation as an adaptable animal that can produce marketable lambs under relatively poor pasture conditions, and its perceived 'easy care' characteristics. While Dorper sheep offer important production advantages, little is known from research under Australian conditions about their grazing ecology and management requirements from a natural resource perspective. Field and laboratory experiments were undertaken to quantify the grazing behaviour, diet selection and utilisation of Dorper sheep in relation to Merino sheep, and assess the likely impact on natural resources. Results indicate that Dorpers select a wider variety of species, including browse species, than Merinos. This generalist grazing strategy potentially creates both opportunities and risks for rangeland condition. Less selective grazing may reduce pressure on some species but the capacity to harvest sufficient nutrients over a smaller area could concentrate grazing and promote resource degradation. Together with the enhanced capacity of the breed to utilise low quality forage and maintain high reproduction and survival rates under poor seasonal conditions, these characteristics indicates a heightened need for astute pasture management if adverse environmental consequences are to be avoided.

Introduction

The pastoral industry in the southern rangelands of Australia is undergoing a substantial transformation with the introduction in recent years of new sheep breeds, especially Dorper. The Dorper is a composite breed developed by combining the hardiness of the Black-headed Persian with the meat producing capacity of the Dorset Horn (de Waal and Combrinck 2000; Milne 2000). Due to its productivity (Knights 2010; Snyman and Olivier 2002), hardiness (DAGRIS 2011), and other useful traits the Dorper has become common and widespread in southern Africa. In Australia, the success of the breed has resulted mainly from its reputation as an adaptable animal that can produce marketable lambs under relatively poor pasture conditions.

In Australia, Dorper sheep offer many production and economic advantages. They do not require shearing, crutching or mulesing, thus minimising labour requirements in an environment in which skilled labour is increasingly in short supply. However, little is known to provide a basis for their sustainable management in the rangelands. In this paper we consider the grazing behaviour, diet selection and digestive efficiency of Dorper sheep compared to Merino sheep and evaluate their production advantages and possible impact on the natural resources.

Materials and methods

Field and laboratory investigations were undertaken to study the diet selection, grazing behaviour and digestive efficiency of Dorper sheep in relation to Merino sheep. In the field study botanical

composition, ground cover and shrub utilisation levels were measured in eight sets of adjacent paddocks grazed by Dorper and Merino sheep. Digestive efficiency of the breeds was compared using diets of varying nutritive value in a controlled animal house environment. Diet selection was studied by analysing faecal samples using a metabar-coding approach (Taberlet et al. 2012).

Results and discussion

The field study was undertaken in late autumn and early winter of 2012. Rainfall in the preceding two years was well above the long-term median and ground cover was thus generally above 60%. Sclerolaena (*Sclerolaena spp.)*, bottlewashers (*Enneapogon avenaceus)* and Stipa (*Austrostipa spp.)* were the most abundant species in all of the paddocks. Bluebush (*Maireana spp.)*, Sida *(Sida spp*.), Wards weed (*Carrichtera annua)* and Saltbush (*Atriplex spp.)* were also relatively common. There were no significant differences in botanical composition between paddocks grazed by Dorpers and Merinos, possibly indicating substantial dietary overlap during this period of ample feed availability.

Shrub species such as Prickly Wattle (*Acacia victoriae),* Rosewood *(Heterodendrum plantycarpum),* Needleweed *(Hakea tephrosperma),* and Narrow-leaf hopbush *(Dodonea attenuata)* all occurred in both Dorper and Merino paddocks. The utilisation levels of these species were higher in Dorper paddocks but differences were significant ($P<0.05$) only up to about 500 m from watering points.

Dorper sheep had consistently higher dry matter digestibility (DMD), organic matter digestibility (OMD), crude protein digestibility (CPD), acid detergent fibre digestibility (ADFD) and Nitrogen Balance than Merinos when fed low quality wheaten chaff. However, the difference was significant only for ADFD ($P<0.05$). In contrast to Merinos, nutrient digestibility of Dorpers did not differ between the wheaten chaff diet and a high quality lucerne chaff diet indicating, their superior efficiency in utilising nutrients from low quality feed.

Of the plants identified by DNA metabar-coding, 17 were found in Merino and 28 in Dorper dung. At the Family level, all groups found in Merino dung were also present in Dorper dung but Dorper dung contained species from seven Families that were not present in Merino dung. Dorpers are thus more generalist grazers than Merinos. This characteristic may promote more uniform utilisation of pastures and result in less grazing pressure on the more preferred species. However, it may also concentrate grazing into smaller areas if a larger proportion of the available forage can be utilised to satisfy nutritional requirements, and thus promote resource degradation unless animals are moved regularly.

The ability of Dorpers to utilise low quality feed, and thus maintain production under these conditions, coupled with high fertility and survival rates under widely varying seasonal conditions and hardiness (Knights 2010; Snyman and Olivier 2002; DAGRIS 2011) has potential to result in more rapid shifts in the balance of forage supply and demand than would be expected with traditional Merinos. Adverse impact on resource condition indicators such as ground cover and biodiversity could readily occur unless management is responsive to seasonal variation. While non-continuous grazing informed by a robust pasture monitoring system is desirable for any livestock enterprise the particular characteristics of the Dorper discussed here indicate a heightened need for such systems in Dorper enterprises if adverse environmental consequences are to be avoided.

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