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GRAZING MANAGEMENT OF TAGASASTE (CHAMAECYTISUS PROLIFERUS) FOR SHEEP AND CATTLE PRODUCTION IN SOUTHERN AUSTRALIA

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ABSTRACT

Direct grazing of hedgerows of tagasaste (*Chamaecytisus proliferus*) by sheep or cattle appear to be very robust systems. Tagasaste persists under a continuous grazing regime with cattle such that plant regrowth maintained between 5 and 10 cm in length produces in excess of 215 kg of animal liveweight/ha/year. This level of production is also sustained within a rotational grazing regime. Under both grazing systems cattle production within a year is highly seasonal, with liveweight gains from young cattle peaking at 1.0-1.5 kg/head/day in winter and spring, but dropping to maintenance only by late summer-autumn. Sheep, like cattle, can be grazed on tagasaste at any time of the year, however their different grazing habits demand sheep be used in an intensive, short-term grazing system for approximately 30 days at a time on any one stand of tagasaste.

KEYWORDS

tagasaste, cattle, sheep, continuous grazing, rotational grazing, animal production

INTRODUCTION

Early "grazing management" of tagasaste involved cut and carry systems (Anon, 1891; Snook 1986; Francisco-Ortega and Jackson, 1991), however over 100 years after being introduced to Australia its potential is only now being realised through the development of *in situ* grazing systems suited to southern Australia's extensive farming enterprises. The Mediterranean-type climate of this region, with it's associated 3-7 month summer drought, has traditionally resulted in hand feeding grain to livestock in order to maintain their production. As little as 5% of the area of a sheep/wheat farm established to tagasaste will eliminate this need for autumn hand feeding, as well as maximise economic return (Oldham, 1993; Lefroy *et al.*, 1997). A drawback with this system, in which tagasaste undergoes intensive, short-term grazing once per year, is that the 3-4 m high shrubs require mechanical cutting to a height of around 0.5 m to ensure all edible material is brought within reach of the animals. Furthermore, sheep must not be allowed to graze individual stands of tagasaste for more than 30-45 days, since they will eat the bark and new regrowth, thereby severely damaging or killing the plants (Oldham, 1993).

Other tagasaste grazing strategies are suited to some sheep farming systems (e.g. summer and/or ration grazing), with cattle providing a further option (Oldham, 1993). Cattle can be grazed continuously on tagasaste to restrict its regrowth to less than 5 cm (Oldham *et al.*, 1994), however rotational grazing of large trees remains the standard industry practice. This paper is a continuation of earlier work (McNeill *et al.*, 1996), in which the productivity between cattle continuously or rotationally grazing tagasaste was compared. The former system, which provided animals with the leaf-rich diet suggested by Borens and Poppi (1990) as being an ideal production feed, was hypothesised to outperform the latter, but be detrimental to plant survival.

EXPERIMENTAL

The experiment was conducted from March 1995 to February 1996 on the same fourteen mature plots of tagasaste described by McNeill *et al.* (1996). The inter-row pasture consisted of subterranean clover on small areas of gravel in some plots, but was generally volunteer grasses and capeweed on deep sands. For the rotation plots the amount of feed remaining after two weeks grazing was visually assessed and the stocking rate was increased or decreased by drawing from a group of 'spare' animals from the same original herd, such that a minimal residual of tagasaste edible dry matter would be left at the end of the month when the cattle were moved onto a new plot. The continuously grazed plots had extra animals removed or added as required to maintain the stem length of the new growth between 5 and 10 cm (i.e. leaf-rich). A total of 24 mixed breed steers (187 ± 2.5 kg) were allocated, after stratification on liveweight, to continuous (6 replicates of 2 animals) or rotational (2 replicates of 6 animals) grazing treatments ('core' animals). All cattle were weighed fortnightly.

Treatment effects on animal performance were determined by comparing the mean fortnightly liveweight gains for those animals that were never removed from their treatment plots throughout the year (i.e. 'core' animals) using repeated measures ANOVA. Treatment effects on total animal production per hectare per year were determined by calculating total liveweight gained ('core' + 'spare' animals) per hectare of land per year on an individual plot basis, with treatment means compared by ANOVA.

RESULTS AND DISCUSSION

It is evident that the hypothesis of Borens and Poppi (1990), that tagasaste would never be a production forage unless a grazing system was devised that provided stock with the major proportion of their intake of tagasaste as a leaf-rich diet, does not hold. Individual liveweight gains were not significantly different between treatments (Fig. 1), nor was liveweight gained per hectare of land (Table 1). These results are in agreement with those presented for the 1994/95 grazing year by McNeill *et al.* (1996), confirming the conclusion that rotational and continuous grazing regimes are equally productive. In addition, these data indicate that direct grazing of hedgerows of tagasaste by cattle is a repeatable and very robust system and that animal production persists under a tight continuous grazing regime. Liveweight gained per hectare of land grazed was, in fact significantly higher for the 1995/96 grazing year than for 1994/95, but when annual rainfall for the two years was taken into account these differences were reversed (Table 1). Our observation that no plant deaths occurred under either system indicates that the plant also persists under both regimes, in contrast to some other highly palatable perennial legumes, such as lucerne. Despite these results, which clearly provide farmers with flexibility in terms of grazing management of their tagasaste, the industry preference so far remains for rotational grazing.

A feature of Fig. 1 is the marked seasonal effect on animal performance, with excellent growth rates from 1.0 to 1.5 kg/head/day achieved in the winter-spring and liveweight maintenance in the dry summer-autumn period. Although this seasonality is normal for grazing systems in the Mediterranean-type climate of southern Australia, ample feed of chemically sufficient quality for modest liveweight gains of 'core' animals was available during the late summer-autumn period (data not shown). Current studies indicate that feed intake may be the factor limiting animal production at these times, perhaps through the production of secondary metabolites by tagasaste which deter grazing during the heat and water stress periods of late summer and autumn (Edwards *et al.*, 1997).

Direct grazing of tagasaste hedgerows has now become the standard system of utilisation in southern Australia, with cattle the preferred

grazing animal in most instances. Autumn cutting and grazing studies with sheep indicate yields of 3,000 kg of edible dry matter (EDM)/ha/year from 400-450 mm of rain in winter and spring, which translate to a carrying capacity of 9-10 DSE† /ha/year (Oldham, 1993). Whilst this is 4 times higher than the 700 kg EDM/ha/year (2 DSE) obtained before tagasaste, it is probably an underestimation of the yield achieved under year-round grazing with cattle where a stocking rate of 1 beast/ha is achievable.

The ideal form of tagasaste is one which has many stems coming from the base of the plant, rather than a tree where there is a single stem or trunk, since the later form is more susceptible to ring barking. Branching is achieved by severe pruning when seedlings are either around 25 cm high or when they are 11 months old, using a mechanical cutter or careful grazing. Tagasaste established on deep sands is economically robust at up to 10% of the arable farm area to replace expensive hand feeding of livestock in autumn, but can also be used to increase wool production through the summer-autumn period, produce forward store calves from autumn calving cows or bring yearling cattle up to mating (heifers) or marketable (steers) weight.

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Table 1
Comparison between rotational and continuous grazing of tagasaste in terms of liveweight gained per hectare of land grazed per grazing year.

Grazing Year	Rotation	Continuous	± Pooled sd
1994/95	240	218	57.5
per mm annual rainfall†	0.62	0.55	
1995/96	335	327	78.5
per mm annual rainfall†	0.52	0.51	

†1994/95 rainfall 386 mm; 1995/96 rainfall 643 mm.

† dry sheep equivalents = the amount of feed required to maintain a 48 kg dry sheep from one year to the next.

Figure 1
Mean fortnightly liveweight gains over time for young dry cattle grazing tagasaste either on a rotational (n=12, ●)or continuous (n=12, ○) basis from March 1995 to February 1996.