

Impact of grazing on the silage yield of forage oat crops

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Introduction

Winter forage oat crops are increasing in acreage on Tasmanian dairy farms. Such crops can be grazed multiple times during vegetative development in winter then later harvested for silage at the booting or soft dough growth stages in spring. Although effects of grazing on grain yield of winter cereal crops have been well characterised (Harrison *et al.* 2011), little research has been conducted on the influence of grazing on the forage and silage yield potential of oats grown in Tasmania.

We aimed to explore the influence of grazing management on the yields of forage for grazing and ensiling of oat crops using a biophysical crop model.

Methods

The grazed and silage yields of forage oat crops at Edith Creek (41.0°S, 145.1°E; red ferrosol), Cressy (41.7°S, 147.1°E; red tenosol), Bushy Park (42.8°S, 146.9°E; black vertosol) and Scottsdale (41.2°S, 147.5°E; brown dermosol) in Tasmania were simulated with APSIM-Oats using site-specific soil data and historical climate data

(1962-2007). All crops were sown on 20 April, grazed either once, twice or three times between the Zadoks growth stages of 25 and 29, then later harvested for silage at the booting (Zadok stage 45) or soft dough (Zadok stage 82) growth stages. An ungrazed control was also simulated. Soil C, N and water were reset annually to prevent compounding of carry-over errors across years.

Results and discussion

At all locations grazed forage yield increased as the number of grazings increased, though with diminishing returns (Fig. 1). As crop development advanced from the vegetative stage in winter to the boot- and soft dough-stages in spring, differences in forage yields became more apparent. Median ungrazed yield potential of crops harvested at soft dough stage were around 25 t DM/ha at Edith Creek, due to soils with high plant available water capacity (PAWC; 167 mm) and high average annual rainfall (1106 mm; see Harrison *et al.* 2013) and more favourable temperatures. In contrast, lower PAWC and lower average rainfall at Scottsdale (124 mm and 922 mm respectively) meant that soft dough stage yield

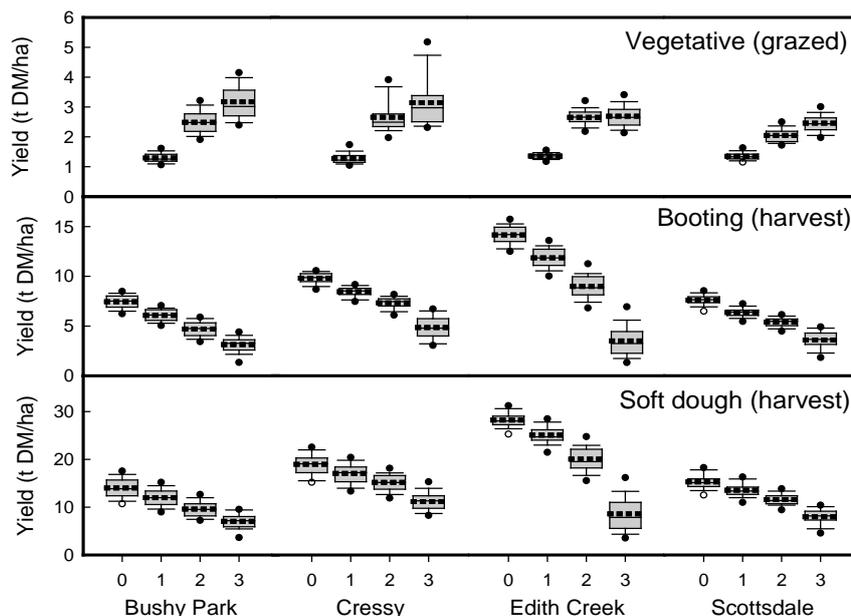


Figure 1. Boxplots of oat forage crop yield at the vegetative, booting or soft dough growth stages that were subjected to 0, 1, 2 or 3 grazings (solid and dotted lines represent the median and mean respectively; dots (•) represent the 5th and 95th percentiles) in four key dairy regions of Tasmania.

potential of ungrazed crops was substantially lower, having a median value of about 15 t DM/ha.

The yield of forage harvested at the booting or soft dough growth stage decreased as the number of grazings increased. This reduction was generally correlated with the number of grazings. Increasing the number of grazings had the greatest impact on resultant yields of forage harvested at booting and soft dough stage at Edith Creek. The favourable temperatures at this site meant that the final grazing in the three grazing treatment at Edith creek occurred right at the end of the grazing window. This reduced the recovery time between grazing and the silage harvests leading to the relatively greater decrease in silage yields compared to the other locations.

Conclusions

Winter grazing of oat crops decreased the yield of forage harvested for silage in spring at both the booting or soft dough growth stage in all Tasmanian locations investigated. This finding is consistent with results found in field experiments in south-west Victoria (Jacobs *et al.*

2009), suggesting that guidelines derived from previous field research conducted in similar (temperate) environments to those studied here should also be applicable in Tasmanian dairy regions. The present study demonstrated that to maximise forage harvested for silage at either the booting or soft dough growth stage, the number of grazings during vegetative development in winter should be restrained. This outcome is particularly valid for sites with high potential productivity.

References

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