

THE POTENTIAL DUAL-PURPOSE USE OF CANOLA FOR GRAZING AND OIL PRODUCTION

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In previously all-pasture systems, winter wheats for grain and grazing can be highly profitable. However, such wheat is exposed to a higher risk of root disease (e.g. take-all) because it is sown early into an area in which the previous 'crop' (pasture grass) is an alternate disease host. A long-season, dual-purpose canola sown between pasture and the wheat, could provide further flexibility and income, in terms of grazing and seed production. As well, it could provide a 'break crop' effect for dual-purpose wheat similar to that provided by spring canola in mixed farming systems (Kirkegaard *et al.* 2005), provided blackleg-resistant winter canola lines were available.

Two pilot studies were conducted at Ginninderra Experiment Station near Canberra. In 2004, the spring canola Hyola 60, plus 2 blackleg-resistant winter canola varieties, were sown in April and were surrounded by a hybrid fodder brassica (cv Hunter) for comparison. The experiment was a randomised block design with 2 blocks containing each of the 3 canola varieties in plots 6 m x 30 m. In mid-August the experimental area was fenced to provide grazed and ungrazed treatments. Ten sheep were initially allowed access to the canola varieties and to an adjacent 6 m strip of the fodder brassica to determine if they preferred this to canola forage. Animals were then confined to the canola area only (6 m x 30 m) for a period of 48 hours. Estimates were made of the biomass removed by grazing and of the *in vitro* digestibility and protein content of the canola forage. The canola was harvested in December and seed yield and oil content determined. Measurements in 2005 were similar, except that grazing was delayed until mid-September to allow more biomass to accumulate and to see if later grazing had a greater effect on seed yield. Oil content data for the 2005 harvest are not yet available. The questions addressed in these trials were: 1) would sheep consume canola forage and what would be their relative preference for this versus fodder brassica? 2) what is the nutritive value of canola forage? 3) would the canola varieties used recover from grazing? 4) would grazing result in reduced seed yield and oil content?

In the first study, sheep showed no preference for Hunter fodder brassica over canola forage and grazed normally when confined only to the latter. The mean biomass removed by grazing was equivalent to 2.5 t DM/ha and the estimated value of the grazing was \$210/ha. The *in vitro* DM digestibility and crude protein contents did not differ significantly between canola varieties; mean values (% of DM) were 80.0 and 20.4 respectively. Grazing delayed flowering by several days compared with no grazing, as grazed plants regrew and branched from lower buds following the removal of the main stem. Despite this delay, there was no significant difference in the yield or oil content of the canola varieties; the earlier flowering of the spring canola Hyola 60 was favoured by the dry spring and it yielded better than the 2 winter types (Table 1).

Table 1. Impact of grazing on the seed yield and oil content of 3 canola varieties in 2004

Variety	Seed yield (t/ha)		Oil (% of DM)	
	Ungrazed	Grazed	Ungrazed	Grazed
Hyola 60	4.84	4.61	50.5	50.5
Winter 1	4.12	4.26	47.9	46.1
Winter 2	4.09	3.95	48.4	47.6

Delaying grazing by 1 month in 2005 resulted in the accumulation of more biomass and the equivalent of 4 t DM/ha was removed by grazing. Crops were more phenologically advanced at the time of grazing which, by contrast with 2004, resulted in a mean reduction in seed yield of 13%. However, the economic value of this reduction (about \$140/ha at current prices) was less than half the estimated value of the grazed forage (\$330/ha).

These preliminary results indicate that canola forage has a high nutritive value and that sheep will graze it without selecting against it relative to the forage of fodder brassica types. Both the winter canolas and, perhaps surprisingly, the spring type Hyola 60 recovered well after grazing, which had either no impact on seed yield (2004) or caused a yield reduction worth considerably less than the value of the grazing itself (2005). There thus seems potential in higher rainfall environments for the inclusion of long-season, dual-purpose canolas in rotation with long-season, dual-purpose wheats. In larger-scale studies, we are now evaluating this potential further in relation to both canola variety selection and grazing management.

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