Grazing crops in a dry year

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Key Messages

Grazing of cereal and canola crops in winter reduced grain yield by between 8 and 21% at seven of eleven sites. Grain yield was unaffected by grazing at four of eleven sites.

Late and/or heavy grazing of a crop increases the risk of incurring a yield penalty. Low rainfall may also be a factor.

Grazing needs to be carefully managed when grazing crops to avoid costly yield penalties in years (such as 2012) when grain prices are high.

Aims

There is growing interest in the practice of grazing crops in winter. Many WA farmers have now been exposed to the concept of grazing crops, but most are reluctant to ‘put the stock in’ for fear of receiving a grain yield penalty.

The aim of these on-farm trials, funded by the Grain & Graze 2 project, was to determine the impact that grazing of crops in winter had on subsequent grain yield and quality, production factors such as weeds, disease and nutrition, and livestock carrying capacity.

Method

Eleven (11) on-farm trial sites were established across the WA wheatbelt from Badgingarra to Esperance. The host farmers sowed and managed crops as per their usual farm practice, using a range of cereal and canola varieties. Temporary electric fencing was used to divide each paddock into grazed and ungrazed areas.

Crop growth stage and biomass were recorded when livestock went in and out of the paddock. Weeds and disease levels were recorded on a regular basis throughout the growing season.

Crop yield was determined by either (a) using yield monitor data from the harvester, or (b) using yield data from small plot harvesters. The measurements taken from the grazed and ungrazed areas were adjacent to each other and either side of where the temporary electric fence was previously located. Grain yield was measured a minimum of two times per treatment with the plot harvester method, and a minimum of 50 times per treatment with the yield monitor method.

Animal grazing data has been standardised into DSE grazing days per hectare using a standard set of conversion rates. All crops were grazed by sheep except the two Gibson crops which were grazed by cattle. The Miling site was grazed by sheep and cattle. Crops were grazed at or before the safe grazing threshold of growth stage Z30 for cereals and bud <10cm long for canola.

Results

Agronomic and grazing data is presented in Table 1. Grazing days, expressed as DSE grazing days per hectare, ranged from 110 to 307. Weed and disease pressure was measured for both grazed and ungrazed areas of each crop (data not presented here), but differences were minor.

Grain yield and quality data is presented in Table 2. The impact of grazing on crop yield ranged from a 5% increase at Williams to a 21% decrease at Woogenellup. At four of the eleven sites, the grazed crop yielded within 5% (+ and -) of the ungrazed control. At another four sites, the grazed crop yielded 5 to 10% less than the ungrazed control, while at three sites the grazed crop yielded considerably less (12 to 21%) than the ungrazed control.

Table 1. Crop grazing data of 11 grazing crop trials conducted throughout WA in 2012.

Location	Crop	Variety	Sowing date	Stock in	Stock out	Grazing days*	Growth stage**
Warradarge	Wheat	Mace	May 26	July 24	July 25	307	Z30-31
Miling	Wheat	Wyalkatchem	May 27	July 3	July 10	137	Z30
Badgingarra	Canola	Crusher TT	May 10	June 21	June 27	175	Bud <5cm
Doodlakine	Canola	Tanami TT	May 1	July 4	July 11	140	5% flower
Kellerberrin	Wheat	Magenta	May 12	July 2	July 13	110	Z30
Williams	Barley	Baudin	May 20	July 6	July 8	n/a	Z14-24
Woogenellup	Barley	Baudin	June 5	July 25	August 9	265	Z29-30
Woogenellup	Canola	Hyola 404RR	May 18	July 27	August 6	241	Bud visible
Cascades	Wheat	Mace	May 6	June 17	June 24	187	Z14-24
Gibson	Wheat	Mace	May 11	June 26	July 8	293	Z30-31
Gibson	Barley	Fleet	May 26	July 16	July 25	283	Z26-30

* Grazing Days = DSE grazing days per hectare
** Growth Stage = Growth stage of grazed crop when stock removed

Table 2. Grain yield and quality of 11 grazing crop trials conducted throughout WA in 2012.

Location	Crop	Variety	Treatment	Yield	Oil	Protein	Weight	Colour	Screen*
				t/ha	%	%	kg/hl		%
Warradarge	Wheat	Mace	Grazed	2.60					
			Ungrazed	2.96					
Miling	Wheat	Wyalkatchem	Grazed	2.67					
			Ungrazed	2.77					
Badgingarra	Canola	Crusher TT	Grazed	1.56					
			Ungrazed	1.61					
Doodlakine	Canola	Tanami TT	Grazed	0.73	41.5	22.3			0
			Ungrazed	0.81	43.1	21.2			0
Kellerberrin	Wheat	Magenta	Grazed	2.24		12.4	82		1
			Ungrazed	2.63		12.7	82		1
Williams	Barley	Baudin	Grazed	4.01		9.5	66		9
			Ungrazed	3.81		9.4	67		9
Woogenellup	Barley	Baudin	Grazed	2.30		13.0	65	62	55
			Ungrazed	2.90		11.5	69	60	22
Woogenellup	Canola	Hyola 404RR	Grazed	1.48	39				
			Ungrazed	1.60	41				
Cascades	Wheat	Mace	Grazed	1.47		11.1	80		2
			Ungrazed	1.61		11.1	80		2

Gibson	Wheat	Mace	Grazed	3.46		10.3	78		3
			Ungrazed	3.55		11.3	77		4
Gibson	Barley	Fleet	Grazed	2.45		12.8	56	55	10
			Ungrazed	2.73		11.6	60	54	8

* Screenings % for cereals, Admixture % for canola

Grazing had a variable impact on grain quality. Some sites experienced changes in grain quality parameters, while others did not. There were no discernible trends, except for a decline in oil content in grazed canola. The most obvious impact of grazing on grain quality occurred at the Woogenellup barley site, where screenings increased from 22 to 55%. The delay in crop flowering and grain fill caused by grazing, coupled with a dry spring, is the likely cause in this case.

Table 3. Change in grain yield and factors thought to influence crop recovery after grazing.

Location	Crop	Change in Yield	Time of Grazing#	Type of Grazing+
Warradarge	Wheat	-12%	Late	Crash
Miling	Wheat	-4%	Average	Clip
Badgingarra	Canola	-3%	Early	Crash
Doodlakine	Canola	-10%	Average	Crash
Kellerberrin	Wheat	-15%	Average	Crash
Williams	Barley	+5%	Average	Crash
Woogenellup	Barley	-21%	Late	Crash
Woogenellup	Canola	-8%	Late	Clip
Cascades	Wheat	-9%	Early	Crash
Gibson	Wheat	-3%	Average	Clip
Gibson	Barley	-10%	Late	Clip

Time of Grazing: Early = late June; Average = early-mid July, Late = late July to early August

+ Type of Grazing: Crash = heavily grazed; Clip = lightly grazed

Factors thought to influence crop recovery after grazing are listed for each site in Table 3. Based on preliminary results from 2011, we contended that crops that are grazed late and/or very heavily are more likely to experience a yield penalty. The 2012 data supports this view, as the grazed crops in these trials with the largest yield penalties (Warradarge, Doodlakine, Kellerberrin, Woogenellup Barley, Gibson Barley) were grazed heavily (crash grazed) and/or grazed late. The crops where yield was largely unaffected by grazing (Miling, Badgingarra, Williams, Gibson Wheat) were either lightly grazed (clip grazed) and/or grazed early.

Conclusion

These on-farm trials once again demonstrate that it is possible to graze crops in winter and maintain grain yield. However, the frequency that yield penalties occurred (when grazing crops) increased when compared to the same set of trials in 2011. Yield penalties (i.e. greater than 5% yield reduction) occurred in seven out of eleven (64%) trials in 2012 compared to two out of seven (29%) trials in 2011. There are three possible reasons for this increase. Firstly, growing season rainfall was significantly less in 2012 with most sites receiving only decile 1 or 2 rainfall. Moisture stress may reduce the ability of crops to recover from grazing. Secondly, a number of the 2012 trial sites were located in the low rainfall zone where the short seasons are less suited to crop grazing. And finally, the timing and intensity of grazing may have increased the frequency of yield penalties experienced. Four out of the eleven crops were grazed later than recommended and seven out of eleven crops were grazed heavily. It is quite likely these three factors interact, and that a dry year or location exacerbates the negative impacts of late and/or heavy grazing.

The average amount of grazing value provided by crops was significantly less in 2012 compared to 2011 (214 vs 307 DSE grazing days per hectare). This was mainly due to the late start and the cold and very dry July experienced in 2012. The amount of grazing value provided by the crop is important when considering the economic implications of crop grazing. In a year such as 2012, when grain prices were high, a small yield penalty caused by crop grazing can have a large impact on grain income per hectare. At the current relatively low livestock prices, a lot of grazing value is needed to make up for any grain yield penalty.

Key Words

Grazing Crops, Wheat, Barley, Canola

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