

Managing wild oat in tame oat through the seeding date and seeding rate of tame oat

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Introduction

Wild oat is a weed found across western Canada and in a combined weed survey of Alberta, Saskatchewan and Manitoba wild oat had the second highest rating for relative abundance (Leeson et al. 2005). Currently no herbicides are register for the control of wild oat in tame oat. Therefore growers have to rely on agronomic practices to manage wild oat. Traditionally farmers managed wild oat in a crop of tame oat by using tillage and delayed seeding to control wild oat populations. However, tillage and delayed seeding can have detrimental affects on yield and quality. Several studies (Frey 1959; Nass et al. 1975; May et al. 2004) have found that yield and quality decline as seeding was delayed.

There are many cropping practices that have been used to manage weeds in crops including seeding rate, seeding date, fertility management and cultivar selection. Increasing the seeding rate has been shown to reduce yield loss from wild oats in oat (Wilderman 2004) barley (O'Donovon 1999) and wheat (Carson and Hill 1985). The optimum seeding rate to reduce the effects of wild oat in tame oat have not been developed. Wilderman (2004) found that going from a target plant populations of 250 to 500 plants m⁻² increased yield at 3 out of 4 site years while reducing wild oat biomass and will oat seed production at every site. However, when the target population was increased from 250 to 500 plants m⁻² there was a decrease in the percentage of plump kernels and an increase in the percentage of thin kernels. Very little research is available on the optimum seeding rate needed by growers to maintain yield and quality when wild oat is present in their field.

Objective

- to investigate the ability of early seeded oat to compete with wild oat using high seeding rates.

Materials and Methods

- Four seeding dates, early May, mid-May early June and mid-June
- Four tame oat seeding rates, 150, 250, 350 and 450 viable seeds m²
- Presence or absence of wild oats
- Conducted in 2002, 2003 and 2004 at the Indian Head and Saskatoon, SK, and at Winnipeg in 2002 and Morden in 2003 and 2004
- The cultivar was Pinnacle
- Data were analysed with the PROC MIXED procedure of SAS (Littel et al. 1996) with

Results and Discussion

- Wild oat lowered the grain yield of tame oat in early and mid May when they could not be control with a pre-seed application of glyphosate (Table 1)
- The high yield on the early June seeding date in this study is different from the results reported by May et al (2004)
- As the seeding rate increased the grain yield increased (Table 1)
- Increasing the seeding rate or delaying seeding resulted in a linear decrease in wild oat biomass (Table 2)
- As the seeding rate increased from 150 to 450 seeds m⁻² the oat biomass increased from 6615 to 7583 kg ha⁻¹ (Table 2)
- Test weight declined as the seeding date was delayed (Table 2)
- Test weight increased as the seeding rate increased
- Delaying the seeding date reduced the percentage of wild oats in the harvested sample when the presence of wild oats was elevated (Table 3)
- Increased seeding rates decrease the percentage of wild oats in the harvested sample at high and low densities of wild oat plants (Table 3)

Conclusions

- Increasing the seeding rate of tame oat reduced the effects of wild oat on tame oat
- The early seeding date resulted in lower yield but a higher test weight than the early June seeding date
- Further analysis is required

References

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Table 1. The effect of wild oat competition, tame oat seeding rate and seeding date on the grain yield of oats at Indian Head, and Saskatoon, SK from 2002 to 2004, Winnipeg, MB in 2002 and Morden, MB in 2003 and 2004

	Wild Oat Competition	
	Wild oat	No wild oat
	— (Kg ha ⁻¹) —	
<i>Seeding date</i>		
Early May	3300	3830
Mid May	3205	3506
Early June	3771	3809
Mid June	2222	2311
Contrasts		
Linear	*	**
Quadratic	*	*
<i>Seeding rate</i> (seeds m ⁻²)		
150		3042
250		3229
350		3356
450		3351
Contrasts		
Linear		**
Quadratic		NS

Table 2. The effect of wild oat competition, tame oat seeding rate and seeding date on the test weight of oats at Indian Head, and Saskatoon, SK from 2002 to 2004, Winnipeg, MB in 2002 and Morden, MB in 2003 and 2004

	Wild Oat Biomass (Kg ha ⁻¹)	Tame Oat Biomass (Kg ha ⁻¹)	Test weight (g 0.5L ⁻¹)
<i>Wild oat Density</i>			
Moderate	858	7524	228
Very Low	394	6819	227
Contrast			
Linear	NS	**	NS
<i>Seeding rate (seeds m⁻²)</i>			
150	874	6615	224
250	664	7018	228
350	484	7470	229
450	481	7583	229
Contrasts			
Linear	**	**	**
Quadratic	NS	NS	NS
<i>Seeding date</i>			
Early May	795	7294	241
Mid May	1025	7099	229
Early June	427	7437	233
Mid June	257	6855	207
Contrasts			
Linear	*	NS	**
Quadratic	NS	NS	NS

Table 3. The effect of wild oat competition, tame oat seeding rate and seeding date on wild oats in the harvested sample of tame oats at Indian Head, and Saskatoon, SK from 2002 to 2004, Winnipeg, MB in 2002 and Morden, MB in 2003 and 2004

	Wild Oat Competition	
	Wild oat	No wild oat
	————— (%) —————	
<i>Seeding date</i>		
Early May	1.1	0.3
Mid May	1.7	0.6
Early June	0.3	0.2
Mid June	0.1	0.1
Contrasts		
Linear	**	NS
Quadratic	NS	NS
<i>Seeding rate(seeds m⁻²)</i>		
150		0.7
250		0.6
350		0.4
450		0.4
Contrasts		
Linear		**
Quadratic		NS