2010 Spring Canola Nitrogen – Sulphur Project

Ontario Canola Growers

Purpose:
2010 is the first year of a 2 year project to evaluate the benefit of applying nitrogen fertilizer at rates above those recommended by OMAFRA and to evaluate the need for sulphur; the fourth macronutrient of canola.

Methods:

A total of 6 trial co-operators participated in the project in 2010. Each site included 2-3 replications of 3 nitrogen rates (80,120,160 lb/ac) with/without sulphur. Ammonium sulphate was applied to supply 24 lb/ac (27 kg/ac) along with ammonium nitrate to supply the same total amount of nitrogen as treatments without sulphur. Sulphur and nitrogen soil tests to a depth of 12 in.(30 cm) were taken prior to planting and at maturity.

2010 Results (Table 1):

Growing conditions in 2010 were favorable for canola with cool temperatures and adequate rainfall, resulting in average to phenomenal canola yields. The average yield achieved by co-operators was an incredible 2,770 lb/acre! (3078 kg/ha). Nitrogen rates above the recommended 80 lb/ac (89 kg/ha) improved yield but did not improve returns using a canola price of $430/t and nitrogen cost of $0.52/ lb N ($1.14/kg). Table 1 presents a summary of the treatment response across the sites.

Table 1. Canola Yield Response to Applied Sulphur

Location	soil type	Canola Yield lb/acre					
		With Sulphur			No Sulphur		
		80	120	160	80	120	160
Arthur[1]	Clay Loam	1054	1169	1449	841	773	516
Grand Valley	Clay Loam	2711	2980	2989	2691	2910	2989
Owen.Sound	Sandy Loam	3609	3503	3639	3368	3394	3491
Fergus	Loam	1808	1778	2004	1372	1414	2004
Port Elgin	Loam	3250	3280	3265	3032	3135	3118
Meaford	Loam	3681	3968	4159	3310	3442	3525
Average[1]		3012	3102	3211	2755	2859	3026
Yield increase with sulphur vs 0[1]		257	243	186			
Increased return with Sulphur[1]		$44	$41	$30			
Yield Increase vs 80 lb/ac N[1]			90	199		104	271
Increased Return vs 80 lb/ac N[1]			-$3.18	-$2.52		-$0.42	$11.40

1. Results from Arthur site were not included in the average due to extreme weather that resulted in low yields at this site

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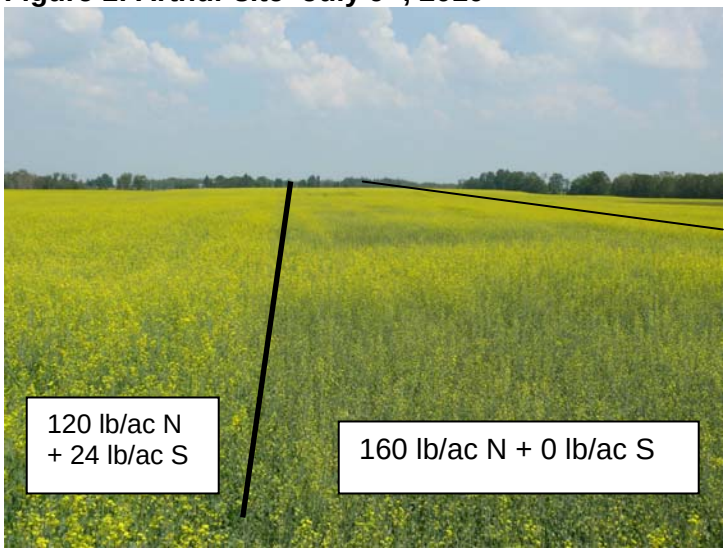
Nitrogen – Sulphur Relationship

Sulphur is the 4th major nutrient required by canola and Agronomists often recommend a N:S ratio of 5:1 – 7:1 be maintained when applying nitrogen and sulphur in canola. If high levels of nitrogen are supplied to canola, when soil sulphur levels are very low, plants can suffer from nitrogen induced sulphur deficiency. Visual sulphur deficiency was clearly evident at the

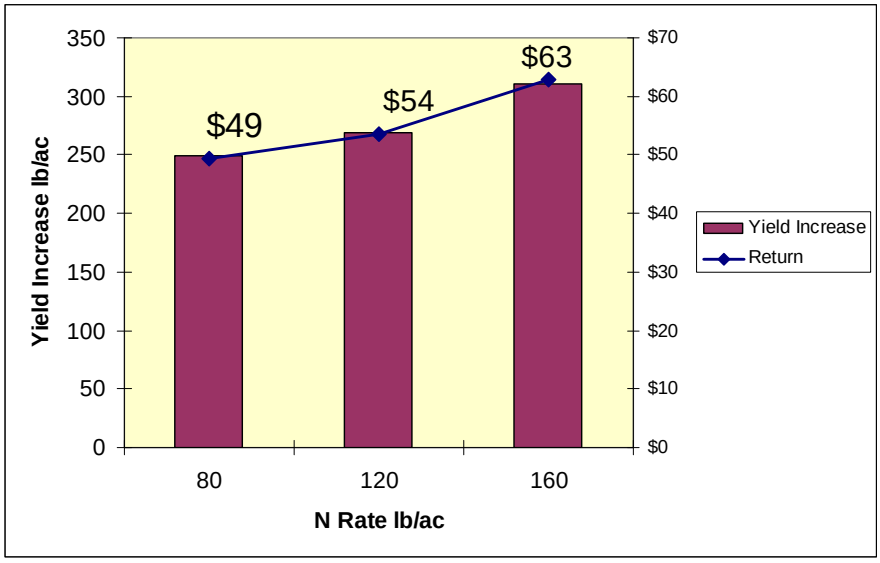
Grand Valley and Fergus site during the growing season. At the Grand Valley site, that increasing the rate of nitrogen without the addition of sulphur accentuated sulphur deficiency symptoms and depressed yields (Figure 1). Western Canada research has proven that once the sulphur requirements of canola have been met, there is no need to increase the rate of sulphur with increasing nitrogen rates.

Figure 1: Arthur site- July 9th, 2010



In this study, sulphur fertilization increased yields on average by 229 lb/ac(254 kg/ha) and revenues by $38/acre across the 3 nitrogen rates (Table 2).

Table 2: Canola Yield Response to Sulphur fertilization



Summary

Nitrogen rates above OMAFRA recommended rates improved yields, but not returns in 2010. Sulphur fertilization improved yields at 5 of the 6 sites by 8% (229 lb/ac) on average across all sites. This was surprising given that the sites selected did not have a history of sulphur

deficiency. One explanation for this may be that in 2009, high precipitation levels may have resulted in leaching of available sulphur beyond the rooting zone of the canola. It may also be the result in reductions in sulphur emissions. In Ontario the old estimate of the amount of sulphur supplied from the atmosphere was about 25 lbs/ac/year of sulphur. Today that estimate is much less at 5 – 7 lbs/ac/year, due to reductions in sulphur emissions.

Next Steps

The project will be continued in 2011.

Acknowledgements:

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