Canola, Ohio's Newest Crop

W.H. Schmidt

Northwest District, Ohio Cooperative Extension Service
952 Lima Ave., Box C, Findlay, Ohio 45840

INTRODUCTION

While canola has been grown for some time in Canada and Europe the first plantings in Ohio were made in the fall of 1986. Two central Ohio farmers harvested 50 acres in June of 1987. Since participation in the government farm programs often restrict crop acreage for growing certain crops, Ohio farmers are always looking for additional crops to grow which are economically advantageous to them. Consumer demand for the finished oil is high and continues to increase. The potential for canola as a crop for Ohio appears to be high and research was initiated on production practices which optimize yields under Ohio conditions.

MATERIALS AND METHODS

Since 1987 canola has been grown in all parts of Ohio except Southeast where coal mines and calf production are predominant. Therefore, research farms in Northwest (Hoytville), Northeast (Wooster) and Southern (Ripley) Ohio were chosen as sites for canola work. Plots were 13.7 m long and 1.5 m wide. Forty five kg/ha phosphorus and 112 kg/ha of potash were broadcast on the test area. No pesticides were used. Two or three varieties were included in the date of planting studies yearly to determine a varietal interaction with the date of seeding. Dates of seeding in 1987 were August 14, September 1, September 11, September 23 and October 13. Seeding dates in 1988 were August 24, September 7 and September 28. In 1989 seedings were made on August 25, September 6 and September 15. Cascade, Ceres, Crystal and Lindora varieties were utilized at various times in this study. Urea nitrogen was spring applied at 56, 112, 168 and 224 kg/ha. Twenty-eight kg/ha nitrogen were applied prior to planting. Plant stands were counted in the fall prior to frost and after spring growth initiation to determine winter kill. Harvest was accomplished with a Massey Harris 35 field combine when seed moisture was 10-11%.

RESULTS

The rainfall pattern in Ohio varied widely from North to South in 1988-89, 60.60 cm to 112.62 cm (Table 1). The Northwest location (NW) varied from a low of 31.72 cm in 1987-88 to a high of 68.05 cm in 1989-90. These variations may have affected winter survival and some grain yield differences.

In 1987-88 the September 23 and October 13 seedings did not survive the winter. In 1988-89 plants seeded on September 28 failed to survive (Table 2). In 1989-90 all plantings survived the winter (Table 3).

Yields (Table 4) are considered low for Ohio and are attributed to limitations in rainfall. When means of three varieties were calculated the Southern and Northwest locations produced acceptable grain yields in 1989 while Northeast yields were decreased due to perennial grass competition (Table 5). The 1990 grain yields, reported only from Northwest Ohio, indicated excellent yields for the 8/25 and 9/06 planting dates (Table 6). The Southern location had considerable sclerotinia in 1990 which pathologists feel probably resulted from several periods of low temperatures occurring after spring growth initiation. A heavy rain destroyed the canola crop at the Northeast location prior to harvest in 1990. These data indicate the variety Cascade, which is shorter season than Ceres, had a large yield decrease in the August 25 and September 9 plantings. Also, the grain yield of both varieties was low in the September 15 seeding due to poor soil conditions at planting time which resulted in low plant populations.

Sulfur studies are reported in (Table 7). Grain yields did not increase significantly with the addition of this element. This is not surprising since Ohio soils do not have a sulfur deficiency. Yield reduction at the 19 kg/ha sulfur for Cascade is not statistically different from that observed at the 0 and 38 kg/ha sulfur rates.

DISCUSSION

Since canola had not been grown in Ohio it was important to learn proper production techniques for this crop quickly. Research sites, representing the potential growing areas, were selected in 1987. Differences in climatic conditions has affected data collection. The ideal planting date for Ohio conditions is the first two weeks in September which is 4 weeks prior to wheat seeding. Murray et al. (1987) and Minor and Meinke (1990) made similar observations. Cramer (1990) observed a 14 day delay in planting reduced yields 15%. Bradley et al. (1990) observed yields in Tennessee dropped 7% for seedings made after mid September. Mid August Ohio plantings had 50% winter kill which delayed maturity 10 days and decreased yield 30%. Ohio seedings after mid September did not survive.

Grant and Bailey (1990) report nitrogen is the most limiting nutrient in canola production. Nitrogen applications of 112-168 kg/ha gave the most economic return. Herbeck and Murdock (1989) found rates of 134 to 168 kg/ha to be best in Kentucky. Brotemarkle (1989) reported 168 kg/ha to be ideal under Kansas conditions. Mahler (1990) reported canola required 45 gm N per 500 gm seed produced in Idaho.

The sulfur fertilization in 1989 and 90 did not result in significant yield increases. This agrees with the work of Grant and Bailey (1990), Mahler (1986) and Herbeck and Murdock (1989). Soils deficient in sulfur will show a yield increase when this nutrient is added; however yield increases are not observed on soils with no sulfur deficiency.

CONCLUSIONS

While the early maturing canola varieties allow several days earlier harvest to permit double cropping, 280-560 kg/ha canola is sacrificed. Most Ohio farmers will make more money by utilizing longer season varieties and not double cropping behind canola. Present research indicates applied nitrogen in excess of 168 kg/ha is not economical for yields presently being achieved. Seedings made prior to August 24 and after September 21 have resulted in decreased yields due to winter kill. Additions of sulfur fertilizer are not cost effective in Ohio. New canola varieties may react differently to nitrogen and sulfur than what is presented here. Successful canola production requires more management than corn and soybean production; however, canola can be successfully grown in Ohio. Financial returns from canola are very dependent on market price but the combination of good yields, a minimum of 2500 kg/ha, and reasonable prices, $11 per Cwt to the farmer, would result in a sizeable acreage increase. Ohio presently has 6000-7000 hectares of canola. This could increase to approximately 50,000 in several years if favorable economic conditions exist for canola.

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Table 1. Ohio Rainfall Conditions

	87-88	88-89			89-90
	Northwest	Northwest	Southern	Northeast	Northeast
	cm				
Sept.	2.84	3.02	5.08	7.54	7.26
Oct.	4.57	5.51	5.81	3.58	5.02
Nov.	4.74	9.67	12.92	9.34	4.95
Dec.	6.07	4.03	9.09	3.53	1.65
Jan.	1.24	5.35	9.04	5.35	8.07
Feb.	2.05	1.39	17.88	3.96	11.86
Mar.	3.30	6.42	13.66	7.72	4.49
Apr.	4.77	8.43	11.37	4.52	5.23
May	1.21	13.48	12.80	11.43	11.73
June	.93	10.87	14.93	18.28	7.79
Total	31.72	60.60	112.62	75.28	68.05

Table 2. Canola Winter Survival, 1988-89.

Variety	Southern		Northeast		Northwest	
	plants/m^2					
	Fall	Spring	Fall	Spring	Fall	Spring
8/24 seeding						
Cascade	53	53	64	43	107	107
Crystal	64	43	53	53	0	0
Lindora	53	32	53	53	96	86
9/07 seeding						
Cascade	64	43	107	53	96	64
Crystal	43	43	140	64	53	43
Lindora	43	43	140	64	64	53
9/28 seeding						
Cascade	48	0	125	0	88	0

Table 3. Canola Winter Survival, Northwest 1989-90.

Variety	Seeding Date	Population	
		----------plants/m^2 ----------	
		Fall	Spring
Cascade	8/25	121	106
Crystal		205	114
Cascade	9/8	130	101
Crystal		140	98
Cascade	9/21	124	77
Crystal		89	9

Table 4. Effect of Nitrogen Rate on Canola Yield, Northwest 1988.

Nitrogen Rate	Yield
----------kg/ha----------	
28	1290
84	1680
140	1850
196	2010

Table 5. Canola Grain Yield in Ohio, 1989.

N Rate	Location			Avg
	Southern	Northeast	Northwest	
----------kg/ha----------				
		8/24 planting		
56	2125	1735	2240	2015
112	2295	1790	2350	2125
168	2465	1845	2965	2405
224	2350	1845	2465	2185
		9/07 planting		
56	2520	1790	2630	2295
112	2520	1735	2685	2295
168	2630	1625	2685	2295
224	2295	1790	2855	2295

Table 6. Effect of Nitrogen Rate and Date of Planting on Canola Grain Yield, Northwest 1990.

Nitrogen Rate	Variety	
	Cascade	Ceres
----------kg/ha----------		
	8/05 planting	
56	2400	3470
112	2460	3750
168	2690	3580
224	2630	3470
	9/06 planting	
56	2970	3470
112	3130	3750
168	3300	3750
224	3080	3750
	9/15 planting	
56	2570	2240
112	2800	2130
168	2970	2740
224	2910	2460

Table 7. Effect of Sulfur Application Rate on Canola Grain Yield, Northwest 1990.

	Sulfur		
	----------kg/ha----------		
Variety	0	19	38
Cascade	3190	2850	3130
Ceres	3750	3800	3920
Lindora	2700	2840	2950