

**REPORT TO THE OREGON PROCESSED VEGETABLE COMMISSION, 1998-1999**

**TITLE:** Long-Term Vegetable Crop Rotation Study

**PROJECT LEADER:** Delbert D. Hemphill, North Willamette R&E Center

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**PROJECT STATUS:** Continuing

**FUNDING:** \$3,000 in 1998-99 from OPVC. Additional funding from OSU and ODA. Funds spent for fertilizers; soil and tissue analysis; sample collection; labor for plot establishment, maintenance and harvest; travel, Corvallis to Aurora.

**OBJECTIVES FOR 1998:**

1. To evaluate effects of several winter cover crop systems, including fall-seeded and overseeded triticale, fall-seeded triticale plus winter pea, and overseeded red clover on yield and quality of sweet corn at three rates of N. The cover crops followed broccoli fertilized with three rates of N in 1997.
2. To evaluate the effect of these cover crops and the N applied to broccoli in 1997 on the amount of nitrate leached below the root zone during the winter of 1997-98.

**PROGRESS REPORT:**

1. Nitrogen Rate and Cover Crop on Sweet Corn Yield

During winter the plots had been fallow, or in the cover crops listed under Objectives. The cover crops had been interseeded into the standing broccoli crop in July 1997 or were broadcast-seeded and harrowed into the soil in early October, 1997. While the cover crops were rather sparse and slow-growing, all plots seeded to cover crops had significantly greater ground cover than did fallow plots, when measured in February (Table 1). In addition, most the biomass on fallowed plots was attributable to annual bluegrass, which is shallow-rooted and does not recover much N.

Cover crop biomass accumulation and nitrogen uptake were below average for these plots, but some interesting trends emerged. The yield of overseeded crops was generally larger than for the fall-seeded crops, a reversal of the previous trend (Table 2). This may have due to the late planting date of the fall-seeded crops, saturated soil during much of the winter, and a soil pH which is getting lower than desired. Except for the overseeded red clover, cover crop biomass and N accumulation did tend to increase with increasing rate of N applied to the preceding broccoli crop.

'Jubilee' sweet corn was seeded on 1 June in rows 30 inches apart. Plot size was 600 sq. ft. Nitrogen rates were 0, 50, and 200 lb/acre, with half the N applied just after seeding and the remainder applied 5 weeks after seeding. At this time the appropriate plots were overseeded to cereal rye or 'Kenland' red clover in preparation for the 1999 experiments. Harvest was on 9 Sept.

Table 2. Interaction of cover crop and rate of N applied to preceding broccoli crop on cover crop biomass and N uptake, NWREC, 1998

Cover crop	N rate, lb/A	Cover dry biomass, lb/A	N uptake, lb/A
Overseeded triticale	0	1712	26
	125	3090	46
	250	3759	58
Overseeded clover	0	1893	46
	125	2141	37
	250	2249	38
Fall-seeded triticale	0	796	17
	125	743	16
	250	1128	28
Fall-seeded triticale/pea	0	716	13
	125	607	10
	250	1054	20
LSD (0.05)		700	14

Table 3. Main effects of preceding cover crop and rate of applied N on yield of sweet corn, NWREC, 1998

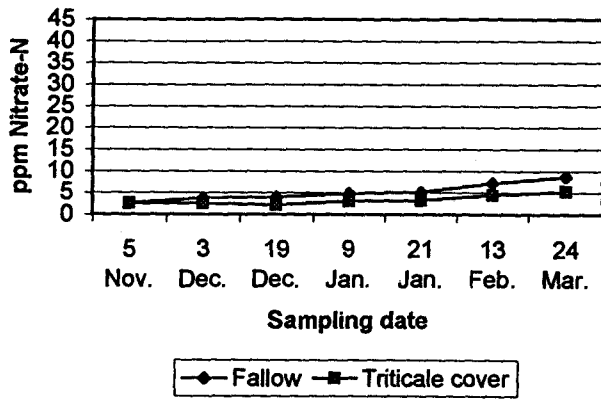
Treatment	Yield (T/A)	Mean ear wt. (g)	Ear length (inches)	Tipfill
Cover crop (avg. over N rates)				
Fallow	7.5	203	8.2	2.1
Overseeded triticale	5.6	164	8.0	1.6
Overseeded clover	7.3	210	8.1	1.9
Fall-seeded triticale	7.5	210	8.1	2.3
Fall-seeded triticale/pea	7.0	198	8.1	2.2
	LSD (0.05)	NS	NS	NS
N rate, lb/acre (avg. over covers)				
0	4.5	140	7.3	1.2
125	7.6	206	8.2	2.0
250	8.9	245	8.8	2.9
	LSD (0.05)	0.8	0.2	0.3

Table 4. Main effects of rate of N applied to 1997 broccoli crop and a triticale cover crop on nitrate concentration of leachate collected during the 1997-98 rainy season.

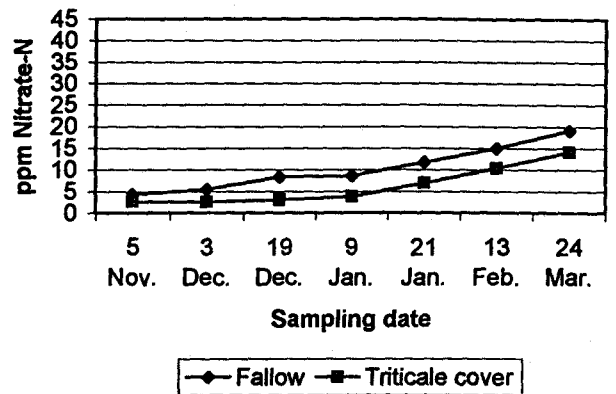
Cover crop	Collection date						
	Nov. 5	Dec. 3	Dec. 19	Jan. 9	Jan. 21	Feb. 13	Mar. 24
	-----ppm Nitrate-N-----						
Triticale	3	4	6	7	10	15	20
None	6	7	9	9	12	16	18
Significance	NS	**	*	NS	NS	NS	NS
N rate, lb/A							
0	3	3	3	4	4	6	7
125	4	4	6	6	9	13	16
250	8	10	13	15	19	28	34
Significance	*	**	**	**	**	**	**

\*\*\*,NS Significant differences at 1% and 5% probability levels, and no significant differences, respectively.

**Fig. 1. Effect of cover crop on nitrate leaching at zero applied N**



**Fig. 2. Effect of cover crop on nitrate leaching at medium N rate**



**Fig. 3. Effect of cover crop on nitrate leaching at high N rate**

