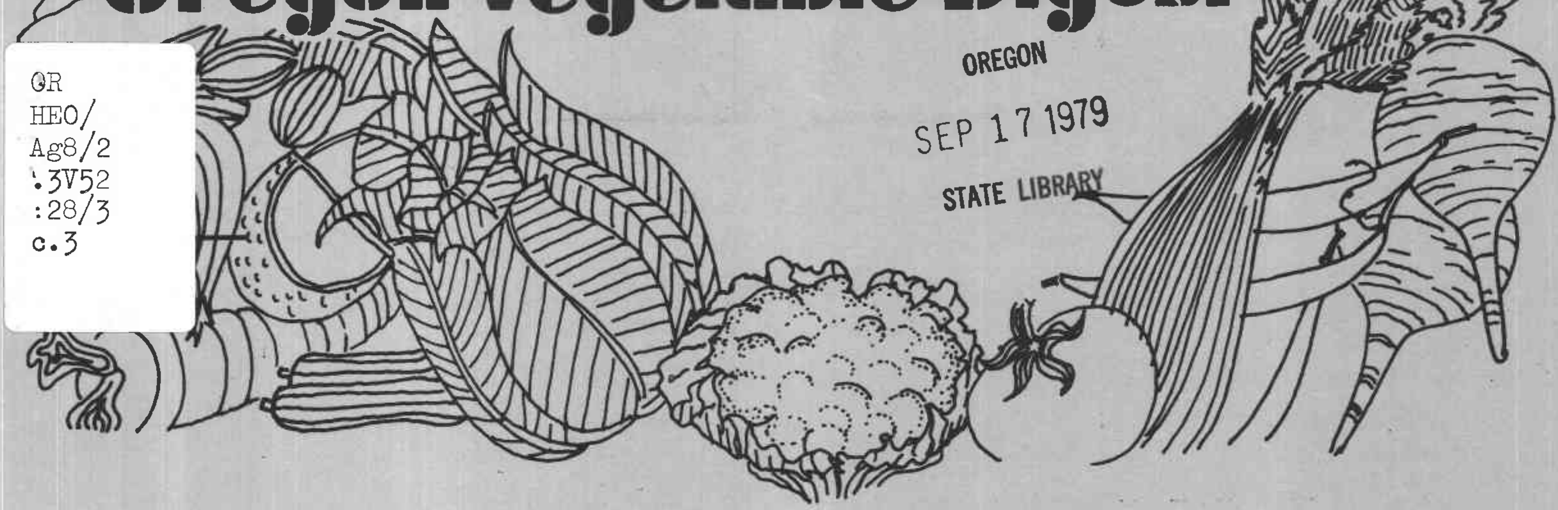
Oregon Vegetable Digest



Volume 28 Oregon State University, July 1979 Number 3

Supersweet corn cultivars evaluated for whole-ear freezing

Certain varieties of the supersweet type of corn (sh_2 or shrunken-2 genotypes) have gained favor for the fresh market trade in the areas of the United States and overseas. The high sugar retention in supersweet corn suggests a good potential for corn-on-cob freezing if definitive information on harvest maturity and freezing preservation requirements for optimum quality expression were known. In 1978, experiments were conducted to determine requirements for the adequate inactivation of enzymes by heat (blanch) in supersweet cob corn, and to identify the harvest maturity range for desirable frozen corn-on-cob quality for supersweet type corn.

Two supersweet cultivars, 'Xtrasweet 77' and 'Florida Staysweet', were planted on June 9 and again one week later at the OSU Vegetable Research Farm, Corvallis, from seed provided by Crookham Seed Company. After a growing season which matured 'Jubilee' in 101 days, the first 'Xtrasweet 77' was harvested 91 days from the early planting and the first harvest of 'Florida Staysweet' at 111 days from early planting. The ears were hand-harvested and were segregated into two or three maturity groups on the basis of visual kernel development and color after husks were removed. Maturity differences between the segregated fractions were then assayed by vacuum oven moisture determinations made on the raw cut kernels. 'Jubilee' sweet corn was processed at one selected maturity as the quality reference.

In this issue . . .

Blanch requirement

Experiments were performed on cobbetts of 3-inch length cut from ears of the dominant maturity fraction from the harvest of each cultivar. The cobbetts were accumulated into groups of 24 to 40, and each group was blanched in 210°F (99°C) steam for one of the serial times from 0 minutes to 12 minutes in 2-minute increments, followed by immediate cooling in water. Cobbetts drawn randomly from each blanch increment sample were assayed for blanch adequacy for freezing by a standard 3 1/2-minute peroxidase test on kernels deep cut from the cob. Methods used for determination of blanch adequacy, peroxidase activity rate, and fractional enzyme activity for each corn cultivar and blanch period were those described by Masure and Campbell (1).

The blanch data (summarized in Table 1) indicated that 'Xtrasweet 77' had the highest initial peroxidase enzyme activity while 'Florida Staysweet' and 'Jubilee' had lower but similar activity rates. Peroxidase, which is recognized as one of the more heat-resistant of the oxidative enzymes contributing to off-flavor development in frozen vegetables, appeared to be more readily heat inactivated in the supersweet corn than in 'Jubilee'. The peroxidase blanch test results indicated that a negative test occurred for both supersweet cultivars after an 8-minute blanch and for 'Jubilee' after a 10-minute blanch. Table 1 also shows that residual enzyme activity was reduced to less than 1 percent of the original activity in all samples where a negative blanch test was obtained. Since heat inactivation of enzymes in cob corn can vary slightly with physical characteristics such as kernel length, compactness of kernel rows, and maturity, a nominal blanch time of 10 minutes in 210°F (99°C) steam appears to be appropriate for cobbett production from the two supersweet lines as well as 'Jubilee'.

All cobbett units were quick frozen individually following the blanch operation, and were stored for five months in double polyethylene bags at -10°F (-23°C) prior to sensory evaluation of quality. At the time of evaluation, cobbetts were halved longitudinally while frozen to increase the number of representative portion samples for the panelists, and the halves were cooked in boiling water for 9 to 12 minutes depending on the length of blanch treatment. The cooked samples were scored for tenderness, juiciness, flavor, color, and overall desirability by an OSU panel of 20 judges and later by a panel of 15 industry representatives.

Table 2 summarizes for both panels the quality scores affected by length of blanch. The OSU panel rated the samples with no blanch treatment significantly lower in overall quality than those which received an adequate blanch of 10 to 12 minutes at 210°F (99°C). Flavor desirability ratings improved in all cultivars with increasing blanch from 0 to 8 minutes or higher. The effect of blanch duration on other quality factors was mixed. The panel preferred the color of the underblanched 'Xtrasweet 77' corn to the darker color of the fully blanched cobbett, whereas no color preference was indicated with the other cultivars. The full blanch increased tenderness and juiciness of 'Florida Staysweet' and the tenderness of 'Jubilee', but did not affect these textural qualities of 'Xtrasweet 77' significantly. The industry panel data also showed a preference for adequately blanched over unblanched 'Xtrasweet 77' cobbetts in terms of tenderness, juiciness, flavor, and overall quality. However, industry scores for the 'Florida Staysweet' blanch samples generally were lower than the corresponding OSU scores, and all attributes of the four-minute blanch were preferred over the 0, 8, and 10-minute blanch samples.

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Maturity effect

Samples of cobbetts representing a range of ear maturity selected from each harvest of the three cultivars were blanched for 10 minutes in 210°F (99°C) steam, individually quick frozen, and held in frozen storage for five months as described earlier. Sensory evaluation of frozen cobbetts at four selected maturity levels was again performed by the OSU panel and by the industry panel. A summary of the evaluation data for the maturity series appears in Table 3 for 'Xtrasweet 77' and Table 4 for 'Florida Staysweet.' Both panels indicated a preference for the overall quality of the two supersweet cultivars at the highest maturity level (lowest moisture level) tested. Color and flavor qualities improved significantly from low to high maturity and tenderness scores peaked at the intermediate maturity level and declined at the high maturity level. Lack of tenderness might become the limiting factor to greater panel acceptance at more advanced maturity than the highest level studies here.

Table 1. Comparative effect of heat on peroxidase enzyme activity of cobbett kernels from supersweet and regular sweet corn varieties

Cultivar	% kernel moisture	Steam blanch (min @ 210°F)	Peroxidase blanch test[x]	Enzyme activity rate, D/M[y]	Fractional peroxidase activity[z]
Xtrasweet-77	81	0	+	138	1
		2	+	33	0.24
		4	+	20	0.14
		6	+	5	0.04
		8	-	0.2	<0.01
		10	-	0.0	<0.01
		12	-	0.0	<0.01
Florida Staysweet	83.5	0	+	81	1
		2	+	81	0.75
		4	+	38	0.47
		6	+	10	0.12
		8	-	0.3	<0.01
		10	-	0.0	<0.01
		12	-	0.0	<0.01
Jubilee	75.5	0	+	91	1
		2	+	61	0.67
		4	+	43	0.47
		6	+	31	0.34
		8	+	9	0.10
		10	-	0.4	<0.01
		12	-	0.0	<0.01

x + = some visible development of brown coloration within 3 1/2 minutes from initial combination of vegetable extract with reagents.

y D/M = number of 0.01 divisions increase in absorbance per minute per 2 ml extract

z Peroxidase activity compared with activity of 1.0 in unblanched sample. Based on rate of color development per minute per 2 ml of prepared extract.

Table 2. Sensory quality scores[z] for frozen corn cobbetts of supersweet and regular sweet corn types, according to degree of blanch

Cultivar (Moisture)	Blanch Time, min.	OSU PANEL(20 Judges) Color	Tenderness	Juiciness	Flavor	Overall	INDUSTRY PANEL (13 Judges) Color	Tenderness	Juiciness	Flavor	Overall
Xtrasweet-77 (81%)	0	6.4	5.9	6.2	5.0	5.4	5.6	5.2	5.8	4.0	4.2
	4	6.7	5.7	6.4	6.0	6.0	6.1	5.7	6.1	5.2	5.0
	8	6.1	5.2	6.3	6.1	5.8	5.5	6.0	6.5	5.2	5.6
	10	5.4	6.0	6.5	5.8	5.9	-	-	-	-	-
	12	5.7	6.0	6.5	6.0	6.1	5.8	5.8	6.2	5.5	5.5
	LSD(.05)	0.99	NS	NS	0.76	0.69	NS	0.71	0.50	1.04	0.93
Florida Staysweet (83.5%)	0	6.7	4.8	5.5	3.9	4.4	5.2	4.8	4.9	3.5	3.5
	4	6.2	5.8	6.1	5.4	5.5	6.7	5.5	6.0	5.3	5.7
	8	6.5	5.4	6.1	6.0	5.7	4.5	5.1	4.7	4.3	4.1
	10	6.6	5.5	6.7	6.2	6.0	3.9	5.4	5.2	4.4	4.3
	12	6.5	5.7	6.5	6.2	6.1	-	-	-	-	-
	LDS(.05)	NS	0.71	0.57	0.82	0.70	0.64	0.58	0.63	0.93	0.88
Jubilee (75.5%)	0	6.7	5.9	6.9	4.2	5.1					
	4	6.1	5.7	6.4	4.8	5.2					
	8	6.4	6.4	6.8	6.3	6.3					
	10	6.8	6.7	6.5	6.6	6.7					
	12	6.3	6.8	6.5	6.2	6.2					
	LDS(.05)	NS	0.72	NS	0.89	0.77					

[z] Quality scale of 1 to 8 where 1 = extremely tough, dry, or undesirable; 8 = extremely tender, juicy, or desirable.

Table 3. Sensory quality scores[z] for 'Xtrasweet-77' frozen corn cobbetts, according to maturity

Cultivar	% Kernel moisture	OSU PANEL (20 Judges) Color	Tenderness	Juiciness	Flavor	Overall	INDUSTRY PANEL (15 Judges) Color	Tenderness	Juiciness	Flavor	Overall
Xtrasweet-77	80	6.8	5.0	6.3	6.2	6.1	6.3	5.5	6.5	6.2	6.1
	82.5	6.0	5.7	6.3	5.4	6.1	4.4	5.6	5.8	5.5	5.1
	83.5	4.7	5.5	5.9	4.5	4.9	3.6	5.7	5.5	4.6	3.8
	85.5	4.1	5.3	5.8	4.6	4.8	-	-	-	-	-
Jubilee	75.5	-	-	-	-	-	6.4	6.7	6.3	5.5	5.9
	LSD(.05)	0.86	NS	NS	0.74	0.74	0.60	0.79	0.67	0.98	0.69

z Quality scale of 1 to 8 where 1 = extremely tough, dry, or undesirable; 8 = extremely tender, juicy, or desirable.

Table 4. Sensory quality scores[z] for 'Florida Staysweet' frozen corn cobbetts, according to maturity

Cultivar	% Kernel moisture	OSU PANEL (20 Judges) Color	Tenderness	Juiciness	Flavor	Overall	INDUSTRY PANEL (15 Judges) Color	Tenderness	Juiciness	Flavor	Overall
Florida	78	7.2	5.7	6.6	6.7	6.5	6.3	4.9	5.7	5.9	5.8
Staysweet	81	6.7	6.3	6.4	6.2	6.4	5.9	5.0	5.5	5.2	5.0
	82.5	4.6	6.1	5.6	4.9	4.6	-	-	-	-	-
	83.5	4.4	5.3	5.0	3.3	3.6	3.7	5.3	5.2	3.6	3.7
Jubilee	75.5	-	-	-	-	-	7.0	6.6	6.7	5.6	6.3
	LSD(.05)	0.71	0.79	0.69	0.72	0.67	0.90	0.75	0.67	0.96	0.72

z Quality scale of 1 to 8 where 1 = extremely tough, dry or undesirable; 8 = extremely tender, juicy, or desirable

In the direct comparison between the reference 'Jubilee' sample and the supersweet lines by the industry panel, 'Xtrasweet 77' at the highest maturity level was equally preferred in all respects except tenderness, where 'Jubilee' was preferred. Between 'Florida Staysweet' and 'Jubilee', the panel scored the supersweet significantly lower in tenderness and juiciness.

Conclusions

The supersweet corn cultivars 'Xtrasweet 77' and 'Florida Staysweet' show promise for quality acceptance as frozen cob corn at about 80 percent moisture. Optimum overall quality may occur at some maturity beyond the highest tested in 1978. Field observations, however, indicate that these supersweet lines are not well adapted culturally to the Pacific Northwest. 'Florida Staysweet' is somewhat late (111 days between June 9 planting and harvest) and very uneven in maturity. 'Xtrasweet 77' matures earlier (91 days), but has limited yielding ability since plants generally produce only one ear. The tendency for irregular row development and large, slightly coarse ears are also detractants in the latter cultivar.

Reference:

Masure, M.P. and H. Campbell. 1944. Rapid estimation of peroxidase in vegetable extracts - an index of blanching adequacy for frozen vegetables. The Fruit Products Journal, 23:369.

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Figure 1. Cobbetts of 2 supersweet cultivars and 'Jubilee' corn showing typical kernel conformation at harvest maturity (% moisture) indicated.

Raised bed for vegetables - an update

Research at the North Willamette Station on raised bed production of root crops dates back to 1972. Raised beds commonly are used for many vegetable crops in production areas as diverse as California's Salinas Valley, the Homestead area of Florida, and Wisconsin. However, raised bed culture has not been widely adopted in Oregon, although W.A. Sheets reported improvements in yield and quality of carrots grown on beds at the North Willamette Station, an area with a well-drained sandy loam soil (Oregon Vegetable Digest, Vol. 22, #3). Sheets pointed out the possible advantages of raised beds for other crops such as parsnips, winter turnips, and rutabagas, and overwintered cole crops.

In the study reported here, we attempted to use raised beds formed the previous autumn for production of early crops of carrots and parsnips, compared with the same crops on standard "flat beds" and newly formed raised beds. Preformed raised beds might drain better, dry out faster, and warm up earlier in the spring, allowing carrot or parsnip seeding at earlier than normal dates in addition to the yield and quality advantages already determined by Sheets. Spring and fall lettuce crops also were grown on raised beds to determine if this leafy vegetable would benefit from bed culture.

Root Crops - Methods

In the root crop experiment, beds (40 inches wide with 20 inch top) were shaped on November 4, 1976. Half the beds were covered with 1.5 mil black plastic. Plastic was removed on March 15, 1977, 200 pound/acre ammonium nitrate was broadcast, and beds were seeded with Imperator long carrot on March 16 with two rows per bed. Linuron (1.0 pound/acre) was applied for weed control. The autumn-shaped but uncovered beds were treated similarly as were newly formed flat and raised beds. Both covered and uncovered raised beds held up well through the unusually dry winter, although the uncovered beds had subsided to a greater degree. Weeds were controlled on the uncovered portion by a late fall and pre-seeding application of paraquat. Harris Model Parsnips were planted in the same fashion as the carrots. A summer crop of carrots was sown on July 8, 1977 using only flat beds and newly formed raised beds. All plots received 35 pound/acre supplemental N about 6 weeks after planting. All experiments were laid out in randomized block design with four or five replications. Spring-planted carrots were harvested on July 18 and August 19 and parsnips on August 24. Summer carrots were harvested on October 19. A 10-foot section from each plot was harvested, the plants were topped and cleaned, and separated into quality grades as follows:

- Grade 1: no defects, greater than 8-inch length (10-inch for parsnip)
- Grade 2: no defects, 5 to 8-inch length (6 to 10 for parsnips)
- Grade 3: undersized, broken, split, doubles, bent, etc.

Separate counts were made of splits, doubles, and bents for the spring plantings.

Root Crops - Results

For the spring carrot crop, newly formed raised beds produced higher yields of No. 1 carrots than any other treatment (Table 1), a lower yield of culls, and larger number of normal roots than either covered or uncovered pre-shaped beds. Flat beds also were better than pre-shaped beds in numbers of normal vs. bent roots. Total yields were not greatly affected by treatment and the most striking advantage of new raised beds was greater production of marketable roots and lesser production of culls. Results from the second harvest of spring-planted carrots were similar. Raised beds produced slightly higher yields of grade No. 1 roots and higher total yields than did flat beds for the summer crop (Table 2). Thus, the anticipated advantages of pre-shaped beds did not materialize: they were far poorer than newly formed beds and in some respects less desirable than freshly prepared flat beds. However, preformed beds or ridges might dry out earlier in the spring allowing earlier planting dates, but the beds should be reshaped before planting.

Table 1. Carrot Yields and Quality, Spring Crop, First Harvest

	Treatment			
	Flat	New Raised	Old Raised, Uncovered	Old Raised, Covered
			T/A[z]	
Grade 1	7.7 a	13.7 b	2.0 c	3.4 c
Grade 2	6.6 a	5.7 a	6.0 a	6.6 a
Grade 3	10.1 ab	7.8 a	13.5 bc	16.9 a
Total Yield	24.4 ab	27.2 b	21.5 a	26.9 b
			% by number[z]	
Split	4 a	4 a	1 a	2 a
Double	4 a	2 a	12 a	4 a
Bent	40 ab	26 a	55 b	60 b
Normal	53 a	69 a	35 b	35 b

[z] Means within a row followed by the same letter are not significantly different (95%) by Duncan's Multiple Range Test

The advantages of raised beds for parsnips were less striking than for carrots (Table 3). Total yields were not affected, but both newly shaped and preformed, covered raised beds produced increased yields of No. 1 and No. 2 roots and fewer culls than did the other treatments.

Lettuce - Methods

In 1976, the cultivars Bibb, Buttercrunch, Oak Leaf, Parris Island Cos, and Ruby were direct-seeded on flat and raised beds on August 19. Fertilizer and pesticide applications were 900 pound/acre of 10- 20-10, 400 pound/acre dolomite, 0.75 pound/acre trifluralin and 4 pound/acre diazinon. The initial stand was thinned to 3-inch in-row spacing, with 2 rows per 40-inch wide bed. Plots were harvested on October 20.

In 1977, the cultivar Ithaca was added to the trial. Plots were seeded on April 11. Soil prep and pest control

Table 2. Carrot Yields, Summer Crop

	Treatment	
	New Raised Bed	Flat Bed
	T/A	
Grade 1	17.7	13.8
Grade 2	12.2	12.2
Grade 3	13.5	9.6
Total	43.4	35.6

were similar to 1976 except that a side dressing of 50 pound/acre was applied on May 20. Stands were thinned to 6 inches for all cultivars but Ithaca which was thinned to 12 inches in the row. All but Ithaca (July 7) were harvested on June 24. In both years, irrigation was by overhead sprinkler as needed. Heads were graded on a 5-point scale with 1 corresponding to excellent size and quality without defects and 5 to extremely poor quality.

Lettuce Results - 1976

Yields expressed as average head weight were significantly reduced on raised beds for all cultivars (Table 4). This was probably because of difficulty in applying sufficient moisture to the raised beds without overwatering the flat beds.

Raised beds needed water almost daily to prevent dessication of the top two inches of soil. This delayed germination and early seedling growth. For all cultivars but Oak Leaf, average grade was also poorer for the raised bed plants. This mainly reflects the smaller head size since there were no significant differences in specific defects. Soil temperature readings were higher on raised beds as follows: 1-inch depth -1.9°F; 4-inch -1°; 8-inch -1.2°; 12-inch -1.9°.

Table 3. Parsnip Yields

	Treatment			
	Flat	New Raised	Old Raised, Uncovered	Old Raised, Covered
			T/A	
Grade 1	3.6 a	4.9 b	2.6 a	5.5 b
Grade 2	4.2 a	7.5 b	4.7 a	8.6 b
Grade 3	13.8 a	9.6 b	15.3 a	12.0 ab
Total	21.6 a	22.1 a	22.6 a	26.0 a
			% by number	
Split	5 a	3 a	4 a	3 a
Double	3 a	3 a	3 a	4 a
Bent	31 a	11 b	29 a	20 c
Normal	61 a	83 b	65 a	77 ab

Table 4. Yield and Quality of Lettuce - 1976.

Cultivar	Treatment	Mean Head Wt (lb)^{y}	Yield/plot (lb)^{y}	Mean Grade^{z}
Bibb	Flat	0.20 a	4.4 a	3.1
	Raised	0.12 b	4.6 a	3.7
Buttercrunch	Flat	0.22 a	4.6 a	3.0
	Raised	0.13 b	2.5 b	3.9
Oak Leaf	Flat	0.13 a	5.5 a	3.4
	Raised	0.10 a	2.2 b	3.6
Parris Island Cos	Flat	0.18 a	3.4 a	3.7
	Raised	0.10 b	1.9 b	4.5
Ruby	Flat	0.13 a	2.9 a	3.5
	Raised	0.07 b	1.1 b	4.4

^{z} Grade rated on 5-point scale with 1 the best quality and 5 the poorest.

^{y} Means within a cultivar which are followed by the same letter are not significantly different.

Lettuce Results - 1977

In contrast to the 1976 summer crop, yields from raised beds exceeded those from flat beds for Bibb and Buttercrunch and there were no significant differences for the other four cultivars (Table 5). Superior grades were obtained on raised beds for Bibb, Ruby, and Ithaca. This was caused partly by larger size but mainly to decreased severity of anthracnose lesions on raised bed plants.

Results for 1976 and 1977 were conflicting, partly because of greater success in maintaining adequate soil moisture on the raised beds in 1977. Increased soil temperatures on raised beds also may have been more important for the early 1977 crop. The decreased severity of anthracnose on raised beds may be attributed to better air or water drainage. These results are not conclusive, but certainly do not point to large advantages for raised bed lettuce culture under Willamette Valley conditions unless drainage is a problem.

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Table 5. Yield and Quality of Lettuce - 1977.

Cultivar	Treatment	Mean Head Wt(lb)	Yield/plot (lb)	Mean Grade	Mean Severity of Anthracnose
Bibb	Flat	0.27 a	8.4	2.1 a	2.1 a
	Raised	0.33 b	10.6	1.6 b	0.4 b
Buttercrunch	Flat	0.35 a	9.1	1.9 a	1.7 a
	Raised	0.43 b	15.1	1.8 a	1.6 a
Oak Leaf	Flat	0.45 a	14.4	1.7 a	0.8 a
	Raised	0.38 a	12.9	1.5 a	0.7 a
Parris Island Cos	Flat	0.47 a	14.6	1.9 a	1.5 a
	Raised	0.45 a	15.8	1.8 a	1.5 a
Ruby	Flat	0.27 a	10.0	2.0 a	1.0 a
	Raised	0.29 a	8.4	1.4 b	0.2 b
Ithaca	Flat	1.01 a	27.3	1.8 a	--
	Raised	1.13 a	24.9	1.3 b	--

Means within a column and for a single variety which are followed by the same letter are not significantly different (95%) according to Duncan's Multiple Range Test.

VEGETABLE DIGEST
NOTES AND NEWS

Nitrogen Losses From Fertilizer by Volatilization

Growers applying supplemental nitrogen to the soil surface to vegetable crops without incorporating the fertilizer into the soil can experience substantial nitrogen losses by volatilization. Losses are dependent on soil temperature, soil pH, and the type of nitrogen fertilizer being used.

Losses at soil temperatures of 75°F are about double that at 60°F and three times greater than at 45°F. Volatilization as percent nitrogen is greatest with urea; losses from ammonium nitrate are about half that of ammonium sulfate.

Nitrogen volatilization is five times greater at a pH of 7.5 than at a pH of 5.0. It is greatest from freshly limed fields where free calcium particles might be occurring on the sufface.

Nitrogen conservation can be enhanced by applying the nitrogen during cool weather or when the soil temperature is cool and by incorporating the fertilizer into the soil as soon as possible.

Penn State Hort News

Beneficial Root Fungi

Scientists at the Georgia Agricultural Experiment Station have shown that a group of beneficial fungal microorganisms called mycorrhizae invade the roots of many plants, and assist in the uptake of phosphorous. In some cases they have even been found to protect against root knot nematodes.

There are many types of mycorrhizal fungi. The two major groupings are those that inhabit the external surfaces of the root, the ectomycorrizal fungi, and those that invade the root system, the endomycorrhizal fungi. In greenhouse experiments inoculated with different strains of endomycorrhizaea, plant growth has been stimulated in soils low in phosphorous.

The role of micorrhizae in vegetable crop production is just beginning to be researched.

Frequent Pickle Picking Pays Better

A report published by Ohio horticulturists regarding the frequency and thoroughness of hand harvest of pickles indicated that gross dollar returns increased but total yield decreased with frequency of harvest. Greatest gross dollar returns were obtained from daily pickings, next from five pickings per week, (not picked on weekends), and next three days, two days, and one day per week respectively. As frequency of harvest increased, the percentages of sizes No. 1 and No. 2 increased and sizes No. 3 and No. 4 decreased.

Thorough picking resulted in high gross returns but lower total yield. Thorough picking decreased the yield of cull fruit. The two cultivars tested, Pioneer and Premier, responded similarly to treatment although Pioneer averaged more cull fruits than Premier throughout the season.

Studies conducted to determine the possible influence of the source of nitrogen on yield and gross returns indicated no statistically significant effects from the nitrogen sources tested. The sources were urea (45 percent nitrogen), liquid nitrogen (28 percent), ammonium nitrate (33.3 percent), calcium nitrate (15.5 percent), ammonium sulfate (21 percent), and a controlled release metholyne urea (39 percent).

Ohio Agricultural Research and
Development Center-Horticultural
Series Report 469, January 1979

Tillage of U.S. Farm Land Reduced

An article in No-Till Farmer indicates the "no-till" acreage in the United States doubled to more than seven million acres between 1972 and 1978. Furthermore, it is reported that there was a 257 percent increase for "minimum tillage" to a U.S. total of more than 67 million acres in 1978.

"No-till" and "minimum-till" deemphasize the reliance on plowing and stress the advantages of cover crop mulches and other erosion-reducing cultural practices. Other synonyms for "no-till" are "till-plant", "chisel-plant", and "conservation-tillage." These terms apply to the preparation of only the immediate seed zone, where up to 25 percent of the surface area can be tilled. Minimum tillage refers to the working of the total field surface by plowing, disking, or some other practice to a limited depth by a limited number of operations. Conventional tillage is the mixing or inverting of the total topsoil by plowing, power tillage, or multiple diskings.

No-Till Farmer, March 1979

Jeffrey C. Miller - new OSU Vegetable Entomologist

Dr. Miller has recently joined the OSU staff to fill the vacancy created by the retirement of Dr. Bud Crowell. Dr. Miller received his B.S. from the University of California at Davis and his doctorate also from Davis (1977).

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