Table 4. Incidence (%) and severity of corky ringspot (CRS) disease symptoms in 4 potato cultivars evaluated at Hastings, FL—1974.

Cultivar	Incidence internal CRS[z]	Severity CRS External[y]	Severity CRS Internal[x]
	%		
Pungo	0.0 d[w]	9.0 a	9.0 a
Sebago	50.0 a	4.8 b	5.5 b
Atlantic	11.9 c	9.0 a	6.5 b
Wauseon	25.0 b	8.8 a	6.8 a

[z]Twenty randomly selected Size 'A' tubers from each plot were scored on a presence-absence basis.
[y]Tubers rated from 9.0 = no disease symptoms to 0.0 = 100% of the surface of all tubers affected. All tubers were rated as they passed across a grading table.
[x]Twenty randomly Size 'A' tubers were cut and rated from 9 = no internal necrosis to 0.0 = all tubers with 15-25% of the interior affected.
[w]Mean separation in columns by Duncan's multiple range test (P—.05).

essing buyers is also a good indication of its superior chipping quality.

'Atlantic' tubers have good conformation and generally make an attractive fresh market potato (Fig. 1). However, during 1976 and 1977 a mild abnormal russetting consisting of circular lesions limited entirely to the periderm was observed in some NF fields. The disorder was found principally in dry locations receiving inadequate irrigation. Symptomatology and consistent association of an *Actinomyces* sp. with the russetting suggest that the problem is a mild form of scab.

Resistance of 'Atlantic' to bacterial wilt and brown rot has not been systematically assessed; however, field observations suggest that it is less tolerant than 'Sebago'. 'Atlantic' is therefore not recommended for planting in fields with a past history of brown rot.

The level of tolerance in 'Atlantic' to CRS reported here and earlier (3) is not commercially acceptable and chemical control (7) is needed to prevent losses.

Hollow heart, which has been an insignificant problem in most of the Hastings trials, was moderately severe when 'Atlantic' was grown under overhead irrigation at Gainesville. Growers should be aware of this tendency and should follow irrigation and other cultural practices which minimize the development of oversized tubers (5). While internal tuber necrosis reported in the North (5) has not been a problem in NF, growers are urged not to unduly delay the harvest of any cultivar after tuber maturation. Although the recovery of 'Atlantic' from freezes during early growth has not been evaluated, it appears to recover well from early flooding rains.

The supply of certified 'Atlantic' seed potatoes will be limited and will likely bring a premium price during the 1978 and 1979 planting seasons. However, by 1980 supply is expected to adjust to demand. Growers interested in obtaining 'Atlantic' seed potatoes should contact State Seed Certification Agencies in the North, predominately Maine, Pennsylvania, and Wisconsin. Although the potential table market has not been completely assessed, the superior yields, high total solids, and desirable chip color of 'Atlantic' should provide NF growers with a valuable new potato cultivar with strong processing demand.

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NITROGEN FERTILIZATION RATES FOR SLICING CUCUMBERS TREATED WITH ETHEPHON[1]

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Abstract. **Nitrogen fertilizer was applied to slicing cucumbers (Cucumis sativus L.) in order to determine if fruit yields could be improved further on plants that produced predominantly female flowers as a result of ethephon application. Slicing cucumbers, 'Poinsett' and 'Gemini', were grown at Gainesville on a coarse sandy soil to which 0, 90, or 180 lb/acre[2] N as NH_4NO_3 was applied preplant and disked in. Just before the vines began to run, an additional 30 lb/acre N was applied to all plots. Ethephon was applied at concn of 0, 125, 250 or 500 ppm after the first true leaf was fully expanded and again 1 week later. Preplant N fertilizer at 90 lb/acre did not affect yield of either cultivar, whereas the 180 lb N rate reduced yield. Ethephon significantly increased early yields of both cultivars but did not increase total yields. Additional N fertilizer did not improve yield when ethephon was applied. Yield of 'Poinsett' was greater than that of 'Gemini'. The amount of cull fruit produced was not affected by ethephon, however, at the highest 2 ethephon concn fruit length-to-diam ratios were reduced. Ethephon significantly reduced the number of male flowers and increased the number of female flowers produced by either cultivar.**

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[2]For metric conversions see Table near the front of this Volume. Ed.

Nitrogen fertilizer recommendations for slicing cucumbers grown on irrigated mineral soils in Florida call for 90 lb/acre N applied in the basic fertilizer application and 30 lb/acre N applied 1 to 4 times as a supplemental application (2). Thus, a crop may receive 120 to 210 lb/acre N during the growing season depending on soil type and rainfall. Although it is sometimes assumed that cucumbers continually require large quantities of N fertilizer to achieve high yields, this is not always true. Several researchers have reported little or no benefit from high rates of supplemental N, except on low fertility poorly-drained soils (1, 3, 7, 9).

Under normal growing conditions cucumber yields can be limited by the number of female blossoms that open during the season; the greater the number of female flowers that are available, the greater is the potential for high yield. Older monoecious cultivars such as 'Poinsett' produce male flowers on the early nodes, then interspace female and male flowers on the intermediate nodes. The plants will eventually go into an all female flowering phase, however, this does not usually occur until the production season has been completed. With the recent development of gynoecious hybrids such as 'Gemini', female flowers are produced at almost every node, hence, the possibility of higher yield. Ethephon, a chemical which releases ethylene, induces female flowering in cucumber (4, 8) regardless of genetic sex potential. Several reports showed ethephon to be effective in increasing yields of pickling cucumbers (3, 6).

If the numbers of female flowers were increased by ethephon, and thus the yield potential increased, then the N requirement may also be increased. In order to determine if the effectiveness of ethephon could be improved by N fertilizer, low, medium and high rates of N were applied to cucumber plants before ethephon application, and the subsequent effects on yield were evaluated.

Materials and Methods

Preplant fertilizer at a rate of 800 lb/acre as 0-10-20 was applied to the soil when the beds were formed. Nitrogen as NH_4NO_3 was applied to the surface of the beds at rates of 0, 90 and 180 lb/acre N and then rototilled into the bed. Sidedress N at 30 lb/acre was applied to all the plots as the vines began to run. Cucumber (cultivars 'Gemini' and 'Poinsett') seeds were planted on March 30, 1977, with a Stanhay seeder in a Kanapaha fine sandy soil on beds with 4 ft centers with plants 6 inches apart. The plots were 25 ft long. The herbicides dinoseb and naptalam (Dynap) were applied immediately after seeding and then the plots were irrigated with 1/2 inch of water. The plots were irrigated with at least 2 inches of water per week and all other cultural practices, disease and insect control were similar to those recommended for Florida (2).

Ethephon [2-(chloro) ethylphosphonic acid] was applied to run-off at concn of 0, 125, 250 and 500 ppm when the plants were in the first true leaf stage and again one week later. The experimental design was a split-split-plot with main plots arranged in 4 randomized complete blocks. The 3 levels of N formed the main plots, the 2 cultivars served as subplots, and the sub-subplot treatments were the 4 levels of ethephon. The center 15 ft of the plots were picked 11 times and marketable and cull yields (fruit wt and number) were recorded. The sex expression on the first 7 nodes was recorded from 3 plants in each replicate.

Results and Discussion

Additional preplant N did not increase the total marketable yield (weight or number) of cucumbers from either cultivar used in this study (Table 1). At the highest rate of

Table 1. Main effects of preplant nitrogen rate, cultivar and ethephon concentration on yield and fruit quality of slicing cucumbers.

Treatment	Fruit yield: Marketable Tons/acre	Marketable No. fruit/acre	Marketable Wt/fruit	Cull Tons/acre	Cull No. fruit/acre	Fruit quality L:D	Fruit quality Color[v]
Preplant N rate (lb/acre)[z]		(x 1000)	(lb)		(x 1000)		
0	20.3b[w]	81.3b	.499a	0.9a	0.5a	3.7a	4.0a
90	20.4b	79.3b	.503a	0.7a	0.4a	3.8a	4.2b
180	15.4a	58.7a	.524a	0.8a	0.4a	3.7a	4.5c
Cultivar[y]							
Gemini	17.5a	61.4a	.569b	1.0b	0.5b	3.9b	4.1a
Poinsett	19.9b	84.9b	.470a	0.6a	0.3a	3.6a	4.3b
Ethephon concn. (ppm)[x]							
0	18.6a	70.3a	.529b	0.8a	0.5a	3.9b	4.3b
125	19.0a	76.0b	.490a	0.8a	0.4a	3.8b	4.3b
250	19.3a	77.0b	.501ab	0.8a	0.4a	3.6a	4.2ab
500	18.0a	69.3a	.519ab	0.7a	0.4a	3.6a	4.1a
Interactions							
Nitrogen x cultivar	**	**	NS	NS	NS	NS	NS
Nitrogen x ethephon	NS	NS	NS	NS	NS	NS	NS
Cultivar x ethephon	NS	NS	NS	NS	*	NS	NS
Nitrogen x cultivar x ethephon	NS	*	NS	NS	NS	NS	NS

[z]Data for both cultivars and ethephon concn summarized for each N rate.
[y]Data for all N rates and ethephon concn summarized for each cultivar.
[x]Data for all N rates and both cultivars summarized for each ethephon concn.
[w]Mean separation within columns by Duncan's multiple range test, 5% level.
[v]Color rating: Green quality and uniformity, 5 excellent, 1 poor.
*Significant at the 5% level.
**Significant at the 1% level.

preplant N (180 lb/acre) total yields were reduced. A significant cultivar x N interaction showed that the yield reduction at the 180 lb/acre N rate was less for 'Gemini' than 'Poinsett' (Table 2). Fruit size, the amount of cull fruit produced and fruit length-to-diam (L:D) ratios were unaffected by preplant N. Green-color—uniformity ratings were improved by an increase of N fertilizer rate. 'Poinsett' outyielded 'Gemini' at the 0 and 90 lb/acre N levels even though the fruit size of the former was smaller. The amount of cull fruit produced was about 40% less and fruit color ratings were better in 'Poinsett' than 'Gemini'. Ethephon did not increase the total yields of either cultivar but it did increase the number of fruit produced when 125 or 250 ppm were applied. Individual fruit weights tended to be less in fruit from ethephon-treated plants. Ethephon did not influence the number of cull fruit produced. Fruit L:D ratios and color ratings were somewhat less in fruit from the 250 and 500 ppm ethephon treatments.

The 180 lb preplant N rate delayed harvest by 1 week and yields from this treatment were much lower compared to yields from the 0 or 90 lb rate during the May 20 to May 27 harvest period (Table 3). However, yields were similar for all preplant N treatments during the remainder of the harvest season. 'Poinsett' significantly outyielded 'Gemini' during the first week of harvest but not during the later part of the season. This higher early yield led to the higher total yield of 'Poinsett'. This difference in early yield is unusual since 'Gemini' is a gynoecious hybrid and should set fruit earlier than the monoecious 'Poinsett'. The more vigorous growth pattern of 'Poinsett' may have contributed to this in that 'Poinsett' plants generally appeared to have a longer main stem with a greater number of laterals than 'Gemini'. Although ethephon did not increase total yields, it clearly increased early yields of fruit at any concentration from either cultivar. As the season progressed, yields from the ethephon-treated plants fell below those of the control plants.

Nitrogen had little effect on sex expression of either cultivar (Table 4). Increasing rates of N preplant fertilizer to 180 lb/acre N led to a decrease in the number of males produced by 'Gemini' but led to a slight increase in the number of males produced on 'Poinsett'. 'Gemini' had less male flowers than 'Poinsett'. Ethephon significantly reduced the number of male flowers and plants with male flowers and increased the number of female flowers on both cultivars. Ethephon at the 125 or 250 ppm concentration appeared to do this most effectively.

'Poinsett' produced about twice as many male flowers per plant as 'Gemini' when ethephon was not used (Table 5). When ethephon was applied, the number of male flowers produced was reduced approximately 70% in 'Poinsett' and 77% in 'Gemini' regardless of ethephon concentration. The number of female flowers was increased about 30% in 'Gemini' by 125 or 250 ppm of ethephon. The highest ethephon rate was no different than the control. The 500 ppm ethephon concn may have caused abortion of early female flowers. When ethephon was applied to 'Poinsett' the same number of females was produced as in the ethephon-treated 'Gemini'. Again, the 125 and 250 ppm rates were most effective.

Table 2. Effect of N rate on total yield of two cucumber cultivars.

Cultivar	N (lb/a) 0	90	180
	Tons/acre		
Gemini	17.6a[z]	18.3a	16.5b
Poinsett	23.0b	22.6b	14.2a

[z]Mean separation between rows and columns by Duncan's multiple range test, 5% level.

Table 3. Effects of preplant nitrogen rates, cultivar and ethephon concentrations on early and late marketable yields of slicing cucumbers.

Treatment	Harvest dates: May 20-27	May 31-June 13
	(Tons/acre)	
Preplant N rate (lb/acre)[z]		
0	6.6b[w]	13.7a
90	6.5b	13.9a
180	0.7a	14.7a
Cultivar[y]		
Gemini	4.9a	12.6a
Poinsett	6.9b	13.0a
Ethephon concn. (ppm)[x]		
0	4.4a	14.2b
125	6.4b	12.6a
250	6.7b	12.6a
500	6.0b	12.0a

[z]Data for both cultivars and ethephon concn summarized for each N rate.
[y]Data for all N rates and ethephon concn summarized for each cultivar.
[x]Data for all N rates and both cultivars summarized for each ethephon concn.
[w]Mean separation within columns by Duncan's multiple range test, 5% level.

Table 4. Main effects of preplant nitrogen rate, cultivar and ethephon concentration on sex expression on the first 7 nodes of slicing cucumbers.

Treatment	No. Flowers: Male	Female	Plants with male flowers
			(%)
Preplant N rate (lb/acre)[z]			
0	2.7a[w]	4.7a	43a
90	2.2a	4.1a	49a
180	2.6a	4.1a	56a
Cultivar[y]			
Gemini	1.5a	4.2a	31a
Poinsett	3.5b	4.4a	67b
Ethephon concn (ppm)[x]			
0	5.5b	2.5a	77b
125	1.4a	5.5c	47a
250	1.4a	5.1c	32a
500	1.7a	4.1b	42a
Interactions			
Nitrogen x cultivar	*	NS	*
Nitrogen x ethephon	NS	NS	NS
Cultivar x ethephon	**	**	*
Nitrogen x cultivar x ethephon	NS	NS	NS

[z]Data for both cultivar and ethephon concn summarized for each N rate.
[y]Data for all N rates and ethephon concn summarized for each cultivar.
[x]Data for all N rates and both cultivars summarized for each ethephon concn.
[w]Mean separation within columns by Duncan's multiple range test, 5% level.
*Significant at the 5% level.
**Significant at the 1% level.

Table 5. Effect of ethephon concentration on sex expression of two cultivars of slicing cucumbers.

Cultivar	Ethephon concentration (ppm)[z] 0	125	250	500
		No. male flowers		
Gemini	3.4b[y]	0.7a	0.4a	1.3a
Poinsett	7.5b	2.0a	2.5a	2.1a
		No. female flowers		
Gemini	3.7a	5.1b	4.8b	3.3a
Poinsett	1.4a	5.8c	5.5bc	4.9b

[z]Data summarized for all N rates.
[y]Mean separation within rows by Duncan's multiple range test, 5% level.

The spring of 1977 was unusually dry. Under these conditions excessive preplant N fertilizer delayed seedling emergence and, thereby, delayed harvst of slicing cucumbers even when adequate irrigation water was available. High rates of N fertilizer did not appear to improve early or total yields when ethephon was used to increase female flower production. Ethephon effectively increased early yields of cucumbers but did not increase total yield. Ethephon increased the number of female flowers produced during the physiological flowering phase where there is normally a higher tendency to produce male flowers. This probably led to the higher early yields in the ethephon treatments. Later in the season, as the plants became older and they physiologically produced more female flowers, yields improved regardless of ethephon application.

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TOMATO YIELDS AFFECTED BY CULTURAL MANAGEMENT[1]

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Abstract. **The effect of control practices on pest populations and yield was measured on tomatoes grown under different cultural methods. Main variables were plant seedling size (2″ and 1″), two cultivars ('Fla MH-1', 'Homestead 24') set in untreated or fumigated soil (Vorlex) and maintained under one of four pesticide spray programs: insecticide and fungicide weekly at maximum rate, weekly use of 1/2 maximum (minimum), treatment with maximum rate on demand and a control.**

Larger (2″) seedlings produced greater total yield weight and greater amount of insect damaged fruit than did the smaller 1″ seedlings. 'Florida MH-1' produced a greater yield weight and greater amounts of insect damage but less percent marketable fruit weight than did 'Homestead 24'. Fumigation with Vorlex resulted in yields consistently greater than no fumigation for total weight of fruit, total insect damaged fruit and percent weight of fruit culled due to insect damage.

All yield measurements were influenced by spray treatment. More yield weight was obtained under the demand program. However, percent marketable fruit was greatest with minimal treatment. Smallest loss of fruit to insects was obtained where the maximum program was followed.

The current preoccupation of crop protection scientists with the principles and philosophy of interdisciplinary pest management has pointed out the need to optimize manipulation of several variables governing crop yields. Identification of determinant or key production variables as well as their relationship to pest populations is a first step in developing a sound protection management system.

Several cultural variables involved in vegetable production in Florida have been demonstrated to be of value to tomato yields. Recommendations for full bed mulches (3, 4) proper fertilization rates (3, 7) plant density (7) and vine culture (1) are made to assure realization of the greatest potential yield of tomatoes. In addition, sound programs must be implemented to protect the plants and fruit from insect (2, 5), nematode (8) and plant pathogen (6) pests. The beneficial effect of resistant cultivars, mulches, and fumigation on soil pathogen control and nematode damage (6, 9) integrates cultural practices with crop protection. Yield data obtained from plants grown under selected use of pesticides (10) indicate that pesticides can be applied most advantageously when tomato fruit are present; applications to non-fruiting plants may not be necessary. Ideally, a production management program should be constructed around the use of a high yielding cultivars resistant to key pests but complemented by pest supressive cultural

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