Nematicide Test Results, Amer. Phytopath. Soc. 38:13.
14. O'Hair, S. K., R. McSorley, J. L. Parrado, and R. F. Matthews. 1983. The production and qualities and Cuban sweetpotato cultivars in Florida. Proc. Amer. Soc. Hort. Sci., Tropical Region 27B:35-41.
15. Roman, J. 1978. Fitonematologia tropical. Univ. Puerto Rico Agr. Exp. Sta., Rio Piedras.
16. Sasser, J. N., and M. F. Kirby. 1979. Crop cultivars resistant to root-knot nematodes, *Meloidogyne* species. N. Carolina State Univ. Dept Plant Pathology and U. S. Agency for Intern. Devel., Raleigh, NC.
17. Thomason, I. J., and H. E. McKinney. 1961. Sweetpotato production on soil treated with soil fumigants. Plant Dis. Rptr. 45: 497-499.
18. Waddill, V. H. and R. A. Conover. 1978. Resistance of white-fleshed sweet potato cultivars to the sweetpotato weevil. HortScience 13:476-477.

Proc. Fla. State Hort. Soc. 97: 162-163. 1984.

EFFECT OF PLANT SPACING AND PLANTING DATE ON SWEET CORN GROWN ON MUCK SOIL IN THE SPRING[1]

J. M. WHITE[2]
University of Florida, IFAS,
Central Florida Research and Education Center,
P. O. Box 909,
Sanford, FL 32771

Additional index words. Zea mays, culture, ear size.

Abstract. **Four within-row plant spacings and 3 planting dates were evaluated for their effects on yield, ear size, and ear tip fill of 2 sweet corn (*Zea mays* var. *rugosa*) cultivars grown on Lauderhill muck. Within-row spacings were 5, 7, 9, and 11 inches between plants and planting dates were March 16, 30, and April 13, 1984. The 2 cultivars evaluated were 'Florida Staysweet' and 'Summer Sweet 7200'. The average yield as measured by the number of ears was lowest for the March 16 planting and highest for the April 13 planting. The closest spacing of 5 inches generally yielded the highest number of ears. The average ear weight and length increased with an increase in within-row planting spacings. There were from 1 to 3 days spread in ear maturity from the 5-inch to the 11-inch spacings. The 5-inch spacing had more variability within the ear maturity and less desirable ear tip fill than the other spacings.**

Improved cultural practices such as higher plant populations, the use of higher-yielding cultivars, irrigation, and fertilization have increased sweet corn production (2, 4, 7, 8, 9, 10). For Florida, 36-inch rows with 8 inches between plants is recommended (5). Ear size and appearance are improved slightly at wider row and plant spacings, but the number of marketable ears is reduced correspondingly. When plant spacing is increased, ear length increases (1, 10). Ear width increased from 4 to 12-inch spacings and then decreased slightly at 14 to 16-inch spacings (1). Guzman (4) found the maximum ear length was obtained in the spring season and the maximum ear width in the winter.

Plant spacing has been shown to affect the average marketable ear weight (7, 9, 10) and marketable yield as measured by the number of ears (2, 5, 8). The season of the year interacts with ear size and spacing (4). Cultivars have been found to respond differently to plant spacings (3, 6, 10). The later maturing, taller hybrids of corn were better adapted to competition in high populations than were the earlier maturing hybrids (3).

The objective of this study was to learn the affect of various in-row plant spacings on two shrunken-2 high sugar retention cultivars planted at intervals during the spring season.

Materials and Methods

Two sweet corn hybrids, 'Florida Staysweet' and 'Summer Sweet 7200', were planted on March 16, 30, and April 13, 1984, in a Lauderhill muck soil. Row spacing was 36 inches on center with in-row spacings of 5, 7, 9, and 11 inches between plants. Seeds were sown thickly and then hand thinned to the desired spacings when the plants were about 4 inches high.

A complete randomized block design was utilized in the experiment with each planting date's design identical. Plots contained 2 rows, 25 feet long, and were replicated 6 times.

Data were collected when each cultivar and spacing were judged to be at optimum fresh market maturity. Measurements were made immediately after harvest. All ear measurements are on husked ears.

Ear tip fill was assigned a value of 1 to 5, depending upon the length of the unfilled kernels at the ear tip. A score of 1 indicated over 1 inch of the tip was not filled; 2 = 3/4 to 1 inch of the tip was not filled; 3 = 1/2 to 3/4 inch of the tip was not filled; 4 = 1/4 to 1/2 inch of the tip was not filled; and 5 = 1/4 inch or less of the tip was not filled. A score of 2.5 or less was considered unmarketable. Ten ears per replication were randomly selected and husked for the length, width, and ear tip fill measurements.

Results and Discussion

As the in-row plant spacing increased from 5 inches to 11 inches, the yield, as determined by the number of marketable ears and marketable ear weight, decreased (Table 1). The yields for 'Florida Staysweet' planted at 5 and 7-inch spacings were not significantly different, but were for 'Summer Sweet 7200.' Both cultivars showed an increase in the average fresh ear weight as the in-row spacing increased. The increase was significant between 5, 7, and 11-inch spacings. There was an increase, but it was not significant, between the 9 and 11-inch spacings and the 7 and 9-inch spacings. Ear size as measured by the husked ear length and width measured one inch from the base generally increased as the in-row spacings increased (Table 1). Ear tip fill was significantly better for spacings greater than 5 inches for both cultivars. 'Florida Staysweet' had a greater range of ear tip fill for the different spacings than did 'Summer Sweet 7200' (4.9 to 4.6 vs. 4.9 to 4.8). The lowest average score of 4.6 was still in the acceptable range for meeting market standards. However, more small ears and unmarketable ears were produced by both cultivars planted at the 5-inch spacing than at other spacings. The 2 close spacings (5 and 7 inches) averaged 1.5 days less time to mature than the 2 wide spacings (9 and 11 inches) for 'Summer Sweet 7200.' The fresh market maturity of Florida Staysweet'

[1]Florida Agricultural Experiment Stations Journal Series No. 6029.
[2]Associate Professor, Associate Horticulturist.

Table 2. Nematode populations at harvest by cultivar and treatment.

	Nematodes/100 cm³ soil[z]							
	Meloidogyne incognita		*Helicotylenchus dihystera*		*Rotylenchulus reniformis*		*Quinisulcius acutus*	
Cultivar	Fumigated	Control	Fumigated	Control	Fumigated	Control	Fumigated	Control
Verde	13 n.s.	90 c	74 n.s.	367 a	427 n.s.	845 n.s.	1 n.s.	11 n.s.
Campeon de Santo Domingo	39	188 bc	40	172 bc	440	948	3	12
Blanco	50	238 ab	8	48 c	145	643	2	6
Santa Barbara	18	246 ab	19	226 ab	266	918	8	13
Engorda Muchacho	32	283 ab	66	329 a	251	735	8	6
Picadito	38	322 a	46	251 ab	517	649	4	9

[z]Means of six replications. Mean separation within columns by Duncan's multiple range test, 5% levels; n.s. = no significant differences.

both cultivars produced similar weights of marketable-size roots, those of 'Blanco' showed significantly more damage from the sweetpotato weevil, despite protective sprays. Although the fresh weight of marketable roots per plant for 'Engorda Muchacho' was similar to that of the 2 former cultivars, it was somewhat lower in marketable root dry weight, in which it was similar to the other intermediate cultivars. 'Verde' performed poorly, producing the lowest root and highest vine weights of the cultivars tested.

Nematodes found in the study site and their average initial populations per 100 cm³ of soil in unfumigated plots were: *M. incognita,* 1.7/100 cm³; *R. reniformis,* 93/100 cm³; *Helicotylenchus dihystera,* 9/100 cm³; and *Quinisulcius acutus* (Allen) Siddiqi, 13/100 cm³. Populations of the first 3 species increased by harvest (Table 2). For each species, the F test for the overall ANOVA was highly significant ($P \leq 0.01$), and all species exhibited highly significant ($P \leq 0.01$) differences in numbers with fumigation, except for *Q. acutus,* which had treatment differences significant at $P \leq 0.05$. No significant interactions were found in any case, but significant differences in nematode populations by cultivar were observed for *M. incognita* ($P \leq 0.05$) and *H. dihystera* ($P < 0.01$). Differences in nematode population buildup on light-fleshed sweetpotato cultivars have been observed previously for *H. dihystera* (11), however this nematode is probably of little economic importance on the crop. Differences in cultivar response to *M. incognita* are encouraging, although the cultivar supporting the lowest population was the lowest-yielding one, 'Verde', and it is possible that the low *M. incognita* populations for this cultivar could be a result of the low root mass produced. It should be emphasized that, despite population differences among cultivars, final populations of both *M. incognita* and *H. dihystera* had greatly increased over the initial populations (Table 2). Populations of *R. reniformis* also increased greatly over initial levels, while those of *Q. acutus* dropped slightly. There were no differences in populations of either *R. reniformis* or *Q. acutus* among the light-fleshed cultivars tested, confirming a previous report (11).

No increase in marketable yield with fumigation was evident in this test, nor was there any typical nematode damage to tubers such as cracking (8). However, the slight increases in weight of large roots observed with 2 cultivars may suggest that the observed populations were approaching the damage threshold. Some marketable yield loss could be tolerated before the expense of soil fumigation could be economically justified, but with the preplant populations observed in this study (1.7 *M. incognita* and 93 *R. reniformis* per 100 cm³ of soil), fumigation would be impractical. Populations of these 2 pests greatly increased on all cultivars. Thus, high populations could develop quickly when light-fleshed sweetpotatoes are grown continuously on the same land.

Two of the more common cultivars grown in southern Florida, 'Picadito' and 'Verde', did not perform well in this test. However, 'Verde', and to some extent 'Picadito', is better adapted to cool season production. The cultivars 'Santa Barbara' and 'Blanco' yielded particularly well, and 'Santa Barbara' was most efficient in root production, with the highest harvest index at 0.807. More marketable-size roots of 'Blanco' than 'Santa Barbara' were culled for damage by the sweetpotato weevil, which claimed a high percentage of the marketable yield in all plots. Differences in response of white-fleshed cultivars to this insect have been observed (18). However, the responses to *M. incognita* observed in this study were not as dramatic, suggesting that incorporation of a degree of tolerance to both pests may be a difficult task.

Acknowledgments

This paper reports results from a project that contributes to a cooperative program between the Institute of Food and Agricultural Sciences of the University of Florida and the Gas Research Institute, entitled "Methane from Biomass and Waste".

Literature Cited

1. Birchfield, W., and W. J. Martin. 1965. Effects of reniform nematode populations on sweetpotato yields. Phytopathology 55:497 (Abstr.).
2. Birchfield, W., and W. J. Martin. 1968. Evaluation of nematocides for controlling reniform nematodes on sweetpotatoes. Plant Dis. Rptr. 52:127-131.
3. Bonsi, C. K., and B. R. Phills. 1979. Reaction of twelve sweetpotato cultivars and breeding lines to two root-knot species with three experimental methods. HortScience 14:539-541.
4. Brathwaite, C. W. D., and D. J. Duncan. 1974. Development and histopathology of *Rotylenchulus reniformis* in sweetpotato roots. Trop. Agr. (Trinidad) 51:437-441.
5. Bridge, J. 1978. Nematodes, p. 76-79. In: Pest Control in Tropical Root Crops. PANS Manual No. 4. Centre for Overseas Pest Research, London.
6. Clark, C. A., V. L. Wright, and R. L. Miller. 1980. Reaction of some sweetpotato selections to the reniform nematode, *Rotylenchulus reniformis.* J. Nematol. 12:218 (Abstr.).
7. Jenkins, W. R. 1964. A rapid centrifugal-flotation technique for separating nematodes from soil. Plant Dis. Rptr. 48:692.
8. Krusberg, L. R., and L. W. Nielsen. 1958. Pathogenesis of root-knot nematodes to the Porto Rico variety of sweetpotato. Phytopathology 48:30-39.
9. Martin, W. J. 1967. Sweetpotato diseases and their control, p. 1-12. In: E. A. Tai, W. B. Charles, P. H. Haynes, E. F. Iton, and K. A. Leslie (eds.). Proc. Intern. Symp. Tropical Root Crops. Univ. West Indies., St. Augustine, Trinidad.
10. Martin, W. J., W. Birchfield, and T. P. Hernandez. 1966. Sweetpotato varietal reaction to the reniform nematode. Plant Dis. Rptr. 50:500-502.
11. McSorley, R. 1980. Nematodes associated with sweetpotato and edible aroids in southern Florida. Proc. Fla. State Hort. Soc. 93: 283-285.
12. McSorley, R., and J. L. Parrado. 1981. Effect of sieve size on nematode extraction efficiency. Nematropica 11:165-174.
13. McSorley, R., and J. L. Parrado. 1983. Control of nematodes on white-fleshed sweetpotatoes with Vydate, 1982. Fungicide and

Table 1. Effects of 4 plant spacings on 2 sweet corn cultivars on yield, ear size, and maturity when grown in the spring on muck soil, Zellwood, Florida, 1984.

Cultivar and in-row spacing	Crates/acre (no.)[z]	Average ear Weight (lb.)	Length (inches)	Width (inches)	Tip[y]	Days to maturity
Florida Staysweet						
5-inch	363 a[x]	0.709 c	7.73 b	1.77 c	4.6 c	77.5
7-inch	331 ab	0.825 b	7.85 ab	1.80 b	4.7 b	77.7
9-inch	281 bc	0.858 ab	7.90 a	1.80 b	4.9 a	78.0
11-inch	233 c	0.921 a	7.91 a	1.82 a	4.9 a	78.0
Summer Sweet 7200						
5-inch	430 a	0.743 c	8.04 b	1.85 b	4.8 b	71.0
7-inch	332 b	0.811 b	8.18 ab	1.87 b	4.9 a	71.5
9-inch	268 c	0.833 ab	8.17 ab	1.88 ab	4.9 a	72.0
11-inch	234 c	0.862 a	8.31 a	1.89 a	4.9 a	73.5

[z]Crates per acre computed on the basis of number of ears (60 per crate).
[y]Ear tip fill based on the scale of 1 = over 1 inch of ear tip not filled to 5 = 1/4 inch or less of tip not filled.
[x]Means separation within each cultivar column by Duncan's multiple range test, 5% level.

Table 2. Effects of 3 spring planting dates on 2 sweet corn cultivars on yield, ear size, and maturity when grown on muck soil, Zellwood Florida, 1984.

Cultivar and planting date	Crates/acre (no.)[z]	Average ear Weight (lb.)	Length (inches)	Width (inches)	Tip[y]	Days to maturity
Florida Staysweet						
March 16	253 b[x]	0.866 a	8.09 a	1.78 b	4.9 a	84.8
March 30	331 a	0.777 b	7.83 b	1.77 b	4.7 c	77.3
April 13	366 a	0.848 a	7.63 c	1.84 a	4.8 b	72.0
Summer Sweet 7200						
March 16	235 b	0.817 a	7.96 b	1.94 a	5.0 a	82.0
March 30	344 a	0.795 a	8.32 a	1.86 b	4.9 b	70.5
April 13	358 a	0.811 a	8.24 a	1.83 c	4.9 b	64.5

[z]Crates per acre computed on the basis of number of ears (60 per crate).
[y]Ear tip fill based on the scale 1 = over 1 inch of ear tip not filled; 5 = 1/4 inch or less of tip not filled.
[x]Means separation within each cultivar column by Duncan's multiple range test, 5% level.

varied from 77.5 to 78 days and was not as affected by or as responsive to plant spacing as was 'Summer Sweet 7200'. Husk cover was not affected by the spacings studied (data not presented).

Yield, measured as the number of marketable crates per acre, increased with the later planting dates for both cultivars (Table 2). There was a significant yield increase between the March 16 and 30 plantings. This may be a weather related difference for the 1984 season. The March 16 planting was made when the soil was dry. Irrigation was used to achieve uniform germination. Three days after hand thinning, a wind storm reduced some plot stands. The same storm affected the March 30 planting. In addition, the increasing average temperature and daylength from the March 16 to the March 30 planting may account for the increase in yield.

The average fresh ear weight for 'Florida Staysweet' was significantly greater for the March 16 and April 13 plantings. There were no differences by planting date for 'Summer Sweet 7200' (Table 2). 'Florida Staysweet' had a decrease in ear length for each later planting date while 'Summer Sweet 7200' tended to increase. 'Summer Sweet 7200' had a decrease in ear width for each later planting date while 'Florida Staysweet' had an increase in the April 13 planting. The ear tip fill had significant differences by planting dates, but the range was still acceptable for market quality. The earlier the planting, the more time was required for each cultivar to reach fresh market maturity. 'Florida Staysweet' ranged from 84.8 to 72 days and 'Summer Sweet 7200' from 82 to 64.5 days.

In summary, yield is generally increased, average ear weight is decreased, ear length is decreased, and ear tip fill is not as desirable as plant populations are increased. In this study, the 7-inch spacing produced the highest yield of highest quality ears.

Literature Cited

1. Bailey, R. M. 1941. The effect of plant spacing on yield, ear size, and other characters in sweet corn. Proc. Amer. Soc. Hort. Sci. 38:546-553.
2. Chipman, E. W., and D. C. MacKay. 1960. The interactions of plant populations and nutritional levels on the production of sweet corn. Proc. Amer. Soc. Hort. Sci. 76:442-447.
3. Giesbrecht, J. 1969. Effect of population and row spacing on the performance of four corn (*Zea mays* L.) hybrids. Agron. J. 61:439-441.
4. Guzman, V. L. 1972. The effect of two fertilizer rates, three row, and three plant spacings during four seasons on yiield and quality of *Zea mays* var. rugosa. Proc. Tropical Region Amer. Soc. Hort. Sci. 16:231-246.
5. Guzman, V. L., H. W. Burdine, W. T. Forsee, Jr., E. D. Harris, Jr., J. R. Orsenigo, R. K. Showalter, C. Wehlburg, J. A. Winchester, and E. A. Wolf. 1967. Sweet corn production on the organic and sandy soils of Florida. Fla. Agr. Exp. Sta. Bul. 714.
6. Lana, E. P. 1956. Effects of plant population and seasons on the performance of sweet corn. Proc. Amer. Soc. Hort. Sci. 67:460-467.
7. Mack, H. J. 1972. Effects of population density plant arrangement, and fertilizers on yield of sweet corn. J. Amer. Soc. Hort. Sci. 97: 757-760.
8. Moss, J. D., and H. J. Mack. 1979. Effects of plant density and nitrogen fertilizer on sweet corn. HortScience 14:176-177.
9. Watson, A. N., and R. L. Davis. 1938. The statistical analysis of a spacing experiment with sweet corn. J. Amer. Soc. Agron. 30:10-17.
10. Wolf, E. A., and H. W. Burdine. 1957. Effect of plant spacing on yield and plant and ear characteristics of a single and a double eared sweet corn hybrid. Proc. Fla. State Hort. Soc. 70:90-93.