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Winter Garden Spinach Check-Off Referendum Passes !

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The first commodity referendum in the history of the Texas Vegetable Industry was held in September. Ninety percent of the ballots cast favored the implementation of a checkoff program to support spinach research and extension programs. Passage of the referendum is timely in view of the recent budget cuts experienced by the Texas A&M University agricultural programs. Funds obtained from this checkoff will enable the much needed research to solve spinach production problems impacting the industry. The growers who worked to get the referendum called and passed are to be commended for their efforts and their concern for the well being of this industry.

The newly elected Board of Directors to govern the checkoff programs are: Don Laffere, Chairman; Ed Ritchie, III, Vice Chairman; Jimmy Crawford, Secretary/Treasurer; and Jimmy Phillips, Lawrence Wilde, and Bart Wagner, Directors.

Do Foliar Applications of Methanol Really Work ?

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In the early 1990s, claims regarding the ability of foliar methanol applications to increase plant growth, yield, and water-use efficiency surfaced throughout the U.S. Reports of yield increases in excess of 50 percent caught the attention of the media. As a consequence, methanol was hailed as a potential solution to world hunger. Unfortunately, research results with this product have been inconsistent. In an attempt to verify the methanol claims, two teams of scientists (Hartz *et al.* and McGiffen *et al.*) from the University of California conducted several field and greenhouse studies using a wide range of crops. The results of their studies are summarized within this article.

Hartz *et al.* evaluated methanol in seven studies, three with processing tomatoes, three with canteloupes, and

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Soil-Borne Pest Control in Mulched Tomato with Alternatives to Methyl Bromide

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Methyl bromide, combined with chloropicrin for soil fumigation, has been the mainstay of the mulched vegetable production system in Florida for many years. The excellent efficacy of methyl bromide as a soil fumigant is well documented; however, it also is a potential atmospheric ozone depleter. The relative contribution of agricultural uses of methyl bromide to the global atmospheric concentration is debatable, but the U.S. Environmental Protection Agency has decided to ban methyl bromide as a soil fumigant by the turn of the century. It has been estimated that loss of methyl bromide as a soil fumigant will result in a 46 percent reduction in fresh market tomato production in Florida unless an efficacious alternative is identified and labeled for that use. Considering the time required for registration of new pesticides, it is unlikely that new chemicals could achieve registration in time; therefore, existing chemicals must be evaluated.

Field research was initiated in the spring of 1993 to identify pesticides which could serve as replacements for methyl bromide as soil treatments in mulched tomato production in Florida. Evaluation criteria consisted of crop response as well as control of major soilborne pests, including nutsedge (*Cyperus* sp.), *Fusarium* wilt and crown rot, and nematodes. Data obtained from this study is summarized in Tables 1 and 2.

Five soil fumigants, a contact nematocide, and several combinations with pebulate herbicide were compared to methyl bromide/chloropicrin (98 and 2 percent respectively) for control of nutsedge, *Fusarium* wilt (race 3), *Fusarium* crown rot, and parasitic nematodes in tomato (*Lycopersicon esculentum* Mill.) in the spring and fall of 1993. Most chemical treatments did not affect tomato plant vigor during the spring, but plants were more vigorous in plots treated with methyl bromide than in those areas treated with SMDC (sodium methyldithiocarbamate), fosthiazate, or the combination of fosthiazate, SMDC, and pebulate during the fall experiment. Methyl bromide and the Tillam combination of 1,3-dichloropropene + chloropicrin + pebulate provided the best control of purple nutsedge (*Cyperus rotundus*) in the spring; however, methyl bromide, dazomet, and 1,3 dichloropropene + chloropicrin + pebulate were the

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Table 1. Effect of fumigant treatment on tomato yield and purple nutsedge control, Spring, 1993

Treatments	Rates (lbs./A)	Yield (carton/A) ¹	Nutsedge @ 112 days No. plts./Bed ft. ²
Untreated control	-----	1706 c ³	7 ab
98% methyl bromide/ 2% chloropicrin	400	2226 ab	1 bc
Chloropicrin	200	2224 ab	10 a
Basamid	346	2383 a	7 ab
Telone II	182	2271 a	9 a
Telone C-17	227	2336 a	8 ab
Telone C-17	371	2206 ab	10 a
Vapam	318	2124 ab	12 a
Vapam	636	2185 ab	11 a
Telone C-17 + Chloropicrin	227 149	1951 bc	7 ab
Telone C-17 + Vapam	227 159	2372 a	7 ab
Telone C-17 + Tillam	227 4	2275 a	0 c

- 1) 25 lbs/carton
- 2) Number of purple nutsedge plants penetrating mulch/bed foot
- 3) Treatments with letters in common are not significantly different at 5% level as determined by Duncan's new multiple range test

Table 2. Effect of fumigant treatment on tomato yield and purple nutsedge control, Fall, 1993

Treatments	Rates (lbs./A)	Yield (carton/A) ¹	Nutsedge 3 plts./Bed ft. ²
Untreated control	-----	40 d ³	10 cd
98% methyl bromide/ 2% chloropicrin	400	256 a	1 e
Chloropicrin	200	175 bc	12 bc
Basamid	346	218 ab	3 e
Basamid	446	199 abc	6 de
Vapam	318	178 bc	10 cd
Telone C-17 + Tillam	235 , 4	228 ab	2 e
Telone C-17 + Tillam	371 , 4	222 ab	6 de
Fosthiazate	3.7	143 ab	25 a
Fosthiazate + Tillam	3.7 , 4	198 abc	16 b
Fosthiazate + Vapam + Tillam	3.7 , 318 , 4	222 ab	6 de

- 1) Number of 25 pound cartons per acre
- 2) Number of purple nutsedge plants penetrating mulch per foot of mulched bed
- 3) Treatments with letters in common are not significantly different at 5% level of probability as determined by Duncan's new multiple range test

Soil Bedding Treatments Improve Pepper Plant Anchorage

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Peppers usually are hand-harvested, but mechanical harvesting is considered essential to expand production of processing peppers. Stripper mechanical harvesters require plants that are well anchored, because uprooted plants may clog the harvester mechanism. Lodged plants also can affect harvester performance adversely by disrupting the uniform flow of pepper plants into the harvest. There are three types of lodging: branch, stem, and root. Root and branch lodging are most likely to occur in a pepper field. Root lodging occurs when straight and in tact stems lean from the ground level due to a weakening in the root system. Branch lodging occurs when a branch is loaded with fruit and bends to the ground or, in severe cases, breaks.

Efficient mechanical harvesting of peppers requires establishing complementary horticultural practices. One such practice is using beds and soil hilled to the base of the plants. Hilling soil to the base of the plants provides structural support and increases anchorage, which helps to reduce plant uprooting during mechanical harvesting. Hilling must be practiced carefully because imprecise cultivation can increase lodging due to root damage.

Nitrogen rates for peppers vary, depending on production area and what pepper types and cultivars

are grown. Rates can vary from 50 to 300 lbs N/A. Nitrogen rates also play a part in determining plant size. Plant size is important when mechanical harvesting is being considered. Upright plants with narrow crotch angles are optimal for mechanical harvesting. High N rates and increased plant densities produce a plant structure favorable for machine harvesting.

In the study reported within, four bedding treatments and two N rates were compared for effects on lodging, uprooting, and fruit yield of chile and paprika-type peppers at two Oklahoma locations. Bedding treatments were (1) no bed [T1]; (2) no bed with 3 inches of soil hilled to the plant bases [T2]; (3) bedded replant, but bed not sustained (i.e., allowed to erode) during the growing season [T3]; and (4) bedded preplant and bed sustained during the growing season [T4]. All plots received preplant N at 40 lbs/A. In 1992, one-half of the plots were side-dressed with 40 lbs/A. In 1993, one-half of the plots were side-dressed with N at 40 and 80 lbs/A for paprika and chile, respectively.

The higher N rates consistently produced larger and higher yielding chile plants and generally increased yield and stem and leaf dry weights of paprika plants. The higher N rates tended to increase lodging, but differences were significant only in one of five studies. Plant uprooting forces also were not significantly affected by

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only treatments which reduced the nutsedge population compared to the population in the non-treated plots. All fumigants reduced *Fusarium* wilt incidence in both experiments. *Fusarium* crown rot incidence was reduced by methyl bromide, the high rate of 1,3-dichloropropene, and 1,3-dichloropropene in combination with SMDC or pebulate in the spring, but in the fall, all chemical treatments, except those containing SMDC, provided better crown rot control than methyl bromide. The incidence of tomato plants with root-knot nematode galls on the crown roots and the severity of infestation was reduced by all treatments except chloropicrin, dazomet, and SMDC.

Production of marketable fruit was not affected by alternative fumigant treatments compared to methyl bromide during the spring of 1993; however, in the fall, plots treated with fosthiazate alone produced fewer tomatoes than those which received methyl bromide, the low rate of dazomet, treatments containing 1,3-dichloropropene, and the combination of fosthiazate + SMDC + pebulate. Methyl bromide treatment resulted in more fruit than chloropicrin, SMDC, or fosthiazate in the fall experiment.

From article in Proc. Fla. State Hort. Soc. 107:156-159. 1994.

one with watermelons. McGiffen and others utilized lemon, wheat, turf grass, Romaine lettuce, carrots, peas, and radishes. Test locations ranged from desert to coastal to inland-valley conditions.

Results from the Hartz *et al.* study indicated that methanol did not significantly increase yield of processing tomatoes, canteloupe, or watermelons, nor did it increase any of the other variable measurements taken from these methanol-treated crops grown under irrigated conditions. Similar results were found by McGiffen and others. In addition, they reported that in some cases, methanol actually caused a yield decrease and significant crop injury.

Based on the results of these two California studies, methanol does not appear to have any merits as a crop-yield enhancing material.

From the articles:

Hartz, T.K., K.S. Mayberry, M.E. McGiffen, M. LeStrange, G. Miyao, and A. Baameur. 1994. Foliar methanol applications ineffective in tomato and melon production. *HortScience* Vol. 29(9): 1087.

McGiffen, Milton E., Jr., Robert L. Green, A. Mantley, Ben A. Folier, A. James Downer, Nicholas J. Sakovich, and Jose Aguiar. 1995. Field test of methanol as a crop yield enhancer. *HortScience* Vol. 30(6):1205-1228.

N. rates. Further research is needed, but based on our study, N rates of 120 lbs/A for chile and 80 lbs/A for paprika appear to be better than 40 lbs/A.

The bedding treatment did not have a consistent influence on fruit yield in our studies; however, in three of four, more force was required to uproot plants when peppers were planted without beds and hilled, or when planted on beds that were sustained, compared to when they were planted on the flat or on beds that were not sustained. Uprooting of plants is not a current problem for Oklahoma chile growers when harvesting by machine, because entire plants are cut off near the soil level and taken into the machine. There is grower interest in a stripper harvest system which is currently used for harvesting paprika peppers in Oklahoma. The stripper system is faster than harvesting the entire plant, but requires stronger plant anchorage. Because soil bedding treatments improved plant anchorage, planting without beds and hilling, or planting on beds and sustaining the beds, are the recommended methods for chile and paprika production on the soils in this study.

From article in *HortScience* Vol. 30(6):1202-1204. 1995.

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