EFFECT OF METAM SODIUM AND METHYL BROMIDE ON ROOT–KNOT NUTSEDGE AND DAMPOFF ON CUCUMBER CV. DASHER II

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In south Florida the cucumber farmer's most serious production problems are root-knot nematodes, soil-borne fungi and yellow nutsedge of the alternative fumigants do not adequately or consistently control all of these pests. However, metam sodium and chloropicrin are the only fumigants labeled for use on tomato and would provide cucumber growers in south Florida (Dade County, Homestead) with an alternative to methyl bromide. Chloropicrin alone will not provide adequate control of weeds or nematodes except at high rates which would be neither economical nor environmentally friendly. Metam sodium when applied at the 60 gallon per treated acre provides adequate control of soil-borne pest and reduces weed populations. Continued studies on vegetable crops from 1980 to 1999 in regards to the delivery systems for metam sodium has shown that soil injections and drenches followed by rapidily rototilling and plastic mulch film application are consistently more effective for the control of soil-borne pests and weeds than injection through drip irrigation tube(s). The purpose of this field study was to evaluate consistency of metam sodium application and compare it with the standard methyl bromide soil fumigation.

The commercial field trial was conducted on Krome gravely loam in the spring of 1999. Prior to fumigation, soil beds were formed 38 inches wide and 6 inches high on 72 inch centers. Fertilizer at 30% of recommended N, K fertilizer and 100% of P fertilizer was banded and rototilled into the bed. Each treatment plot of methyl bromide and metam sodium was 10 acres. Within the 10 acre plots, subplots, 4 beds wide and 100 ft long, of control and fumigant, were selected at random and replicated 4 times.
Two soil fumigants, metam sodium and methyl bromide plus chloropicrin (MC33) were applied. Methyl bromide plus chloropicrin was injected at 250 lbs/acre. The fumigant methyl bromide plus chloropicrin was injected through 3 chisels, spaced at 9 to 10 in apart. The metam sodium was injected at the irrigation pump at 6 gpm for a 40min duration and allowing 45 min to clear the metam sodium from the lines. The metam sodium beds were covered with 1.5 mil polyethylene film and the single bi-wall drip tube was in place 12 hrs prior to the fumigant injection. After 28 days the plastic was perforated in both the methyl bromide (MC33) and the metam sodium blocks to allow venting and 7 days later cucumber cv. Dasher II were direct seeded at a spacing of 12 inches in the row and 72 inches between the row. Supplemental fertilizer applications of 70% of recommended N, K was fertigated through the drip irrigation tubing.
Weed counts were determined at the termination of the field trial. The cucumber roots were evaluated for root-knot nematode galls on a rating of 1 to 9 with1=0 galls to 9=80 to 100% galling at 4-weeks. Yields of marketable, extra large, large and medium cucumber fruit were evaluated.

Early picking packout of 'Dasher II' from the methyl bromide 10 acre plot, packed out 33, bu/acre Fancy fruits. The early packout of marketable (U.S. Fancy, No. 1, and No.2)

fruits from the methyl bromide plots packed out 98 bu/acre. The metam sodium 10-acre plot packed out 40 bu/acre fancy fruits. The early harvest of the of marketable cucumber fruits from the metam sodium plots packed out 95 bu/acre. The total yield after 9 harvest from the plots of methyl bromide yielded 125 bu/acre of Fancy, and 415 bu/acre of marketable fruit cartons as compared to the control with 12 bu/acre of Fancy , 21 bu/acre of marketable fruit. The metam sodium total harvest after 9 harvest yielded 119 bu/acre of Fancy, and 422 bu/acre of marketable fruits as compared to the control with 9 bu/acre Fancy, and 18 bu/acre of marketable fruits.

The mean weed counts in the methyl bromide plots was 12 yellow nutsedge per 100 ft of row. The mean weed counts in the metam sodium plots was 20 yellow nutsedge per 100 ft of row as compared to the untreated control with 2052 yellow nutsedge plants per 100 ft of row.

The percent root-knot galls after 4-weeks in the methyl bromide plots were 0.3 compared to the metam sodium plots provided root-knot gall percent of 0.9. The mean percent root-knot galls in the control was 98 percent.
The percent damp-off from the methyl bromide plots was significant at 0.1 and 0.8 from the metam sodium compared to the untreated controls at 72 percent dampoff.

In conclusion, the metam sodium application of 60 gal. per treated acre through a single drip irrigation tubing increased yields over the control. The standard methyl bromide (MC33) increased yields over the control. The weed control from the metam sodium and the methyl bromide treatments were significantly reduced weed development at the end of the harvest season. Metam sodium is still the only fumigant that can provide cucumber growers with some degree of controlling the soil-borne problems that was easily taken care of by the application of methyl bromide (MC33).