CHEMIC SUGAR

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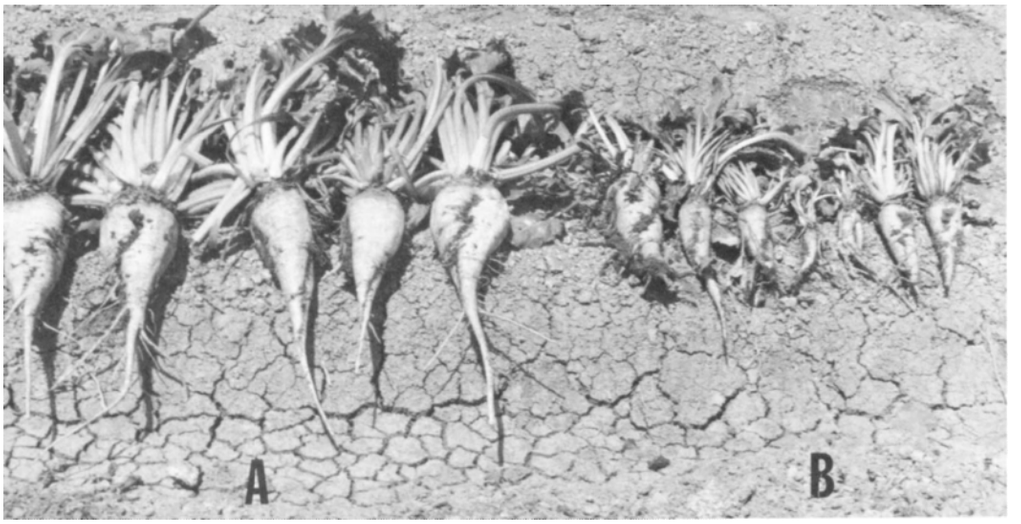

Plants from plots treated with D-D/Temik (A), and plants from non-treated plots (B). Photo taken about 1 month prior to harvest.

Soil treatment with twenty gallons of D-D or Telone in combination with 40 pounds of Temik 10G per acre gave 28 tons of sugar beet root yield per acre versus 7 tons from non-treated plots. The cost of applied materials and gross return per acre was approximately $90 and $1064, respectively.

The sugar beet cyst nematode, *Heterodera schachtii* Schmidt, is common in the Imperial Valley and it constitutes an economically important problem to the local sugar beet industry. About 65,000 acres of sugar beets are grown annually in the Valley, and a 3- to 5-year rotation with non-host crops is practiced to reduce the nematode population below economically damaging levels. Economic considerations and the persistence of injurious population levels under non-host crops (e.g. alfalfa) for rather long periods have prompted research on chemical control of the cyst nematode. The work reported here was undertaken to evaluate the efficacy of two formulations of the fumigant 1,3 dichloropropene in combination with Temik, a systemic nematicide-insecticide.

Materials, methods, and results

The experiment was conducted in a field of Imperial silty clay soil which had been planted to sugar beets the previous year and which had a high nematode infestation. The fumigant D-D (1,3 dichloropropene, 1,2 dichloropropane mixture) or Telone (1,3 dichloropropene) was applied by a tractor equipped with injector shanks. Chemicals were applied at 20 gal./acre, 11 inches deep, one shank per bed (beds 22 inches wide on 42 centers) at listing time. The field was subplowed the third week of July, treated the first week of August, flooded at the end of August, planted to USH 9 variety the last week of September, and irrigated the second week of October, 1974.

At planting time Temik 10G (2-Methyl-2 (methylthio) propionaldehyde O- (methylcarbamoyl) oxime at the rate of 20 pounds per acre was sidedressed 4 inches below bed surface and 3 inches in from the furrow bottom. An additional 20 pounds of Temik 10G were sidedressed in same position in the bed as above the last week of January 1975. The herbicide, Roneet, was incorporated into the soil at preplant time, at the rate of 4 pounds per acre.

The experimental plots varied from 1 to 10 acres in size. Plots consisted of 42-inch beds, center to center, with two rows of beets per bed. Each treatment was replicated four times.

At the time of fumigation, soil temperature was around 99 F at a depth of 6 inches. The soil moisture was not determined, but the field had not been irrigated following the previous harvest. The surface 6 inches were quite dry but the soil below, although below field capacity, was moist.

Soil samples (0 to 12 inches and 12 to 24 inches deep) were taken from the non-treated check plots on November 18, 1974. They contained 2,157 to 5525 viable eggs per 100 grams of dried soil. On May 27, 1975 soil samples (0 to 20 inches deep) were again taken from all experimental plots. Very good stands of beets were obtained in all treated plots. In the non-treated plots original stands were good but numerous plants "damped off" and there were many "skips," early in the growing season. Many plants were stunted. The growth retardation was noticeable up to harvest time. Both D-D or Telone-treated plots developed well and no growth differences amongst these treatments were noticed.

The plants were mildly infected with powdery mildew and the field was dusted by plane with 40 pounds per acre of sulfur on April 6, 1975. The incidence of yellows virus diseases was very low and aphid infestation of the crop was moderate. In early spring there was a severe infestation of weeds, particularly sowthisle, *(Sonchus asper h.)* Hill, and some competition with the sugar beets occurred. The weeds were cut by hand on April 28-30, 1975.

On May 27, 1975, sugar beets were harvested from 50 feet of each of the two center beds (200 linear feet of plant row) of each treated or non-treated plot. From each harvested plot ten roots were taken and analyzed for sugar content. Table 1 presents yield data, sugar percentage and nematode population in the experimental plots. The root yield data were statistically significant at the 1% level.

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IN IMPERIAL VALLEY

Discussion

The average root yield and sugar content from the treated plots was 28 tons per acre and 15.65% respectively. The non-treated plots gave only seven tons per acre and 15% sugar. We estimate that 50% of the roots from the non-treated plots were too small to pick up if these plots had been harvested by a mechanical digger and therefore, the non-treated plots would have only yielded about 3 to 4 tons usable roots per acre. The over-all yield for the entire 71-acre field was 23.1 tons, with an average sugar content of 16.07%. The valley-wide average root yield from fields harvested the same week with the experimental plots was 22 tons per acre.

The discrepancy in tonnage obtained from the experimental plots (28 tons/A) and over-all yield (23.1 tons/A) is attributed to variation in plant growth due to soil condition rather than to nematode effect.

Data in table 1 on *H. schachtii* population levels indicate that the combination of D-D or Telone and Temik treatment resulted in less eggs per 100 grams of soil than were found in non-treated soil at harvest. However, even in treated soil populations had risen to levels equivalent to those in the check plots at planting time.

The cost of materials applied was about $90 per acre and the gross return was approximately $1064 per acre (28.0 tons/acre x $38). Average production costs for sugar beets in Imperial Valley prepared by the UC Extension Service are approximately $560/ac. To these production costs must be added the $90 for nematicides for a total of $650/acre. Return to grower above costs was $414/acre. With over-all yield of 23.1 tons per acre and 16.07% sugar content the return to grower above costs would be $274/acre (23.1 x $40-$650). The data presented indicate that chemical control of the sugar beet cyst nematode is feasible, and that it can be a profitable cultural practice in the Imperial Valley under prices prevailing in the 1974-1975 growing season.

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TABLE 1. SOIL TREATMENT, NEMATODE POPULATION AND SUGAR BEET PRODUCTION (1974-1975).

Treatment	Nematodes (viable eggs/100 grams dried soil)		Production	
	Preplant	At harvest	Root Yield (tons/acre)*	Sugar (%)**
Non-treated:				
Rep. I	3325	11660	9.1	15.9
Rep. II	4830	15320	7.9	16.7
Rep. III	5525	9400	3.2	14.9
Rep. IV	2157	4740	7.9	12.7
Average	3959	10280	7.0	15.04
Telone/Temik:				
Rep. I	Not done	5600	27.5	15.3
Rep. II	Not done	2140	27.6	15.6
Rep. III	Not done	7160	25.6	15.9
Rep. IV	Not done	2500	29.9	16.7
Average	Not done	4350	27.66	15.88
D-D/Temik:				
Rep. I	Not done	2460	30.2	15.3
Rep. II	Not done	1800	26.4	16.1
Rep. III	Not done	7580	26.0	14.2
Rep. IV	Not done	720	30.7	16.0
Average	Not done	2512	28.36	15.4

*Statistically significant at 1% level over non-treated. No statistical difference between Telone/Temik & D-D/Temik treatments.
**All treatments statistically non-different.

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