Conclusions

This and the previous trials demonstrate the benefits of preplant soil fumigation for the control of lesion nematodes on apples in the Oak Glen area of southern California. Similar results have been demonstrated in other parts of the U.S. Benefits of fumigation are evident in the establishment of the orchard and in subsequent yields. Replant problems are minimal following fumigation of soils where lesion nematodes are a potential problem. In this area, 50 gpa of 1,3-D did as good a job in establishing the orchard as did the 70 gpa treatment. Subsequent grower trials in the area have verified our results, and another trial is currently underway using a broad-spectrum biocide to investigate additional benefits of fungus and nematode control.

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Root-knot nematode control in cantaloupe

J. D. RADEWALD · D. G. KONTAXIS · F. SHIBUYA

CANTALOUPE IS GROWN on a wide variety of irrigated soils in southern California. Of the root-knot nematodes, *Meloidogyne incognita*, is the most common species which attacks this crop. This nematode, as well as other species of the genus, is generally a problem on coarser-textured soils in the southern valleys. When *M. incognita* is present at planting time it stunts the young plants soon after emergence and causes severe galling of the roots (photo). Plants infected in the very early stages of growth remain stunted and unproductive and seldom bear marketable melons (photo). Localized infestations in a field range in size from a few square yards up to several acres. Sometimes entire fields are uniformly infested with the nematode and, if proper preplant control measures are not taken, the entire field may be unproductive.

Currently, the university suggests using various preplant fumigants such as the 1,3-dichloropropenes (D-D, Telone, Vidden D), DBCP (Nemagon, Fumazone), or ethylene dibromide to control this pest. Experimental attempts have failed to salvage a crop such as cantaloupe, once it has become infected with root-knot. This failure also holds true for any annual crop.

Occasionally growers find that the registered and suggested preplant fumigants are inadequate, because of faulty application equipment, improper material placement, poor soil preparation prior to application, undesirable level of soil moisture, or large amounts of undecomposed plant root systems which protect nematodes from fumigant action. In the Imperial Valley of southern California one grower's preplant fumigation did not give an adequate degree of root-knot nematode control, and plant damage was obvious in this field before the time of plant thinning. The plants were in the first and second true-leaf stage of growth and slight galling was evident on some of the young plant roots. Large portions of the field were uniformly infested and provided ample space for an experimental plot to test the efficiency of Vydate.

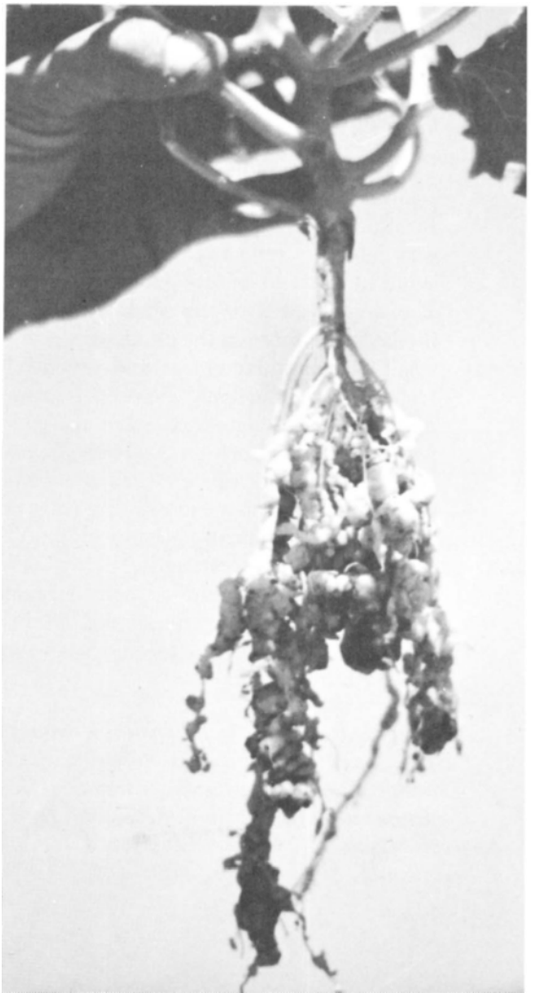
In order to gain information on the

GALL RATINGS OF CANTALOUPE PLANTS DUG AT MATURITY IN THE VYDATE TRIAL FOR CONTROL OF ROOT-KNOT

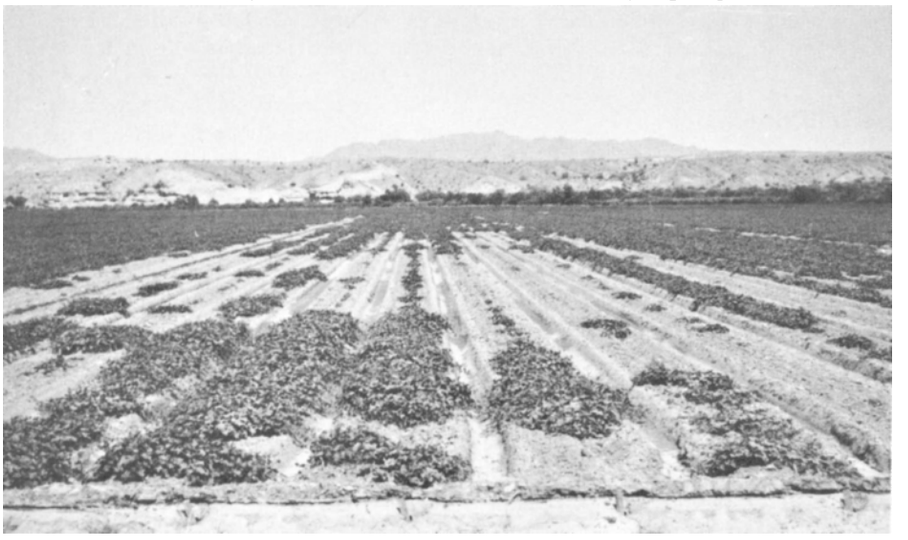
	Replications				Total	Average gall rating per plant	% of plants where galls were detected
	I	II	III	IV			
Foliar Vydate (sprayed)	1.0*	9.0	.6	0	10.6	.26	11%
Checks	16.0	22.6	10.7	18.1	67.4	1.7	75%

* Each number represents the average gall rating for 10 plants.

Root of young cantaloupe plant showing severe galling caused by root-knot nematode



Stunted cantaloupe plants infected by root-knot nematode in early stage of growth



potential of Vydate (*S*-methyl 1-(dimethylcarbamoyl) - *N* - [(methylcarbamoyl) oxy]thioformimidate) for control of this pest on established plants, foliar applications of the material were made on the infected melons. Vydate is an experimental insecticide-nematicide which has demonstrated the capacity to be translocated *downward* when applied to plant foliage and in certain instances controls nematodes attacking roots. This is one of only two compounds now recognized which has that type of activity, and both are in the experimental stages of development.

Plot size was a single row 125 ft in length; each treatment was replicated four times. Treatments were: (1) Vydate foliar sprays and (2) untreated check. Vydate was applied by hand sprayer three times. The first spray was applied when plants were in first or second true-leaf on March 12 (4# ai/100 gal H_2O sprayed to run-off). The second application was on March 25, and the third on April 17. The Vydate was reduced to 2# ai/100 gal water in the second and third sprays. The melon variety was Top Mart, and cultural practices within the test area were those of the growers. On June 21, the experiment was terminated and ten plants were selected at random from each plot. The root systems were dug and rated for nematode galling. If no nematodes were present a zero rating was given, and if 100% of the roots on a given plant were galled, a rating of five was given. The results of the gall rating are presented in the table.

The data demonstrate that the foliar Vydate sprays reduced the incidence of root-knot galling on the mature plants. In addition, the protection to the plants was definitely reflected in plant size and stand at the end of the growing season. Plants sprayed with the Vydate covered the beds and those in the check plots were small and irregular in size and produced few marketable melons. This report demonstrates that Vydate will retard and prevent nematode attack on established cantaloupe plants but this conclusion *should not* be construed to mean that the authors suggest such a control measure in lieu of proper preplant treatments. Using systemic nematicides shows considerable promise but many avenues must be investigated before it can be suggested for grower usage.

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SURFACE RUNOFF IN DAIRIES

A. C. CHANG · K. AREF · D. C. BAIER

Hydrologic analysis indicated that surface runoff from manure accumulated in dairy areas would not occur very frequently in southern California. This was verified by a field test using simulated rainfall. Hydrologic data collected in this experiment were used to establish the runoff-rainfall relationship for the Chino-Corona dairy preserve. Though the amount of runoff may not be large, the high mineral and organic carbon contents of manured runoff is detrimental to the water quality of receiving streams. The high salinity and low nutrient content would make its possible beneficial use on cropland seem doubtful. In wet years, the disposal of salt-laden wastewater could become a problem. Holding ponds and retention structures for surface runoff merely prevent it temporarily from entering the receiving water.

SURFACE RUNOFF from livestock-manured areas usually carries a high water pollution potential. Researchers in Texas, Nebraska, and Kansas have characterized the surface runoff from beef cattle feedlots by its high biochemical oxygen demand, nutrient contents, and mineral constituents. Although dairies differ from feedlots in feed rations, animal stocking rate, etc., runoff from dairies is not expected to differ much from that of feedlots. In an area with a heavy concentration of livestock, such as the Chino-Corona dairy preserve in southern California, manure-laden runoff could be a significant portion of the total surface runoff of the watershed and could degrade the quality of the receiving stream. This study was an attempt to determine the hydrologic and water quality characteristics of surface runoff from this area.

Rainfall simulation

A pre-experiment hydrologic analysis was conducted to determine the precipitation pattern of the study area. Data used for this analysis were obtained from a gauging station of the San Bernardino County Flood Control District, located at lat. 34°58′, long. 117°36′, with continuing record dated back to 1940. The result indicated that the annual rainfall at the dairy area ranged from 3.98 inches to 27.66 inches, with annual average of 11.67 inches. A 24-hour storm recurring at ten-year intervals produces 3.95 inches of rain. Further analysis of the magnitude and distribution pattern of daily rainfall indicated that precipitation was infrequent. In the past 32 years (1940–1972), recorded daily rainfall for 97.8% of the days was less than 0.5 inches, and considerable time would have to elapse to accumulate enough runoff data for analysis.

Instead of waiting for runoff-generating storms, researchers simulated precipitation on the surface of dairy corrals where animals are confined. A simple rainfall simulator was fabricated by using 2-inch OD schedule 40 PVC pipe with spraying nozzles on 8-inch risers spaced 5 ft apart. It produced simulated rainfall with intensity ranging from 0.5 inches per hour, to 2.50 inches per hour, at a uniformity coefficient ranging from 81 to 96 (uniformity coefficient of a perfect distribution pattern is 100). It covered a strip of corral surface 15 ft wide and 200 ft long. In comparison with natural rainfall, the simulated rainfall had two shortcomings. First, the simulated raindrops did not travel sufficient distance to reach the terminal velocity of natural raindrops, so they did not have the impact momentum of natural raindrops when they reached the ground. Second, with the non-