

# A Progress Report

## ON THE CONTROL OF THE ROOT-KNOT WHITE ROSE POTATO WITH GRANULAR

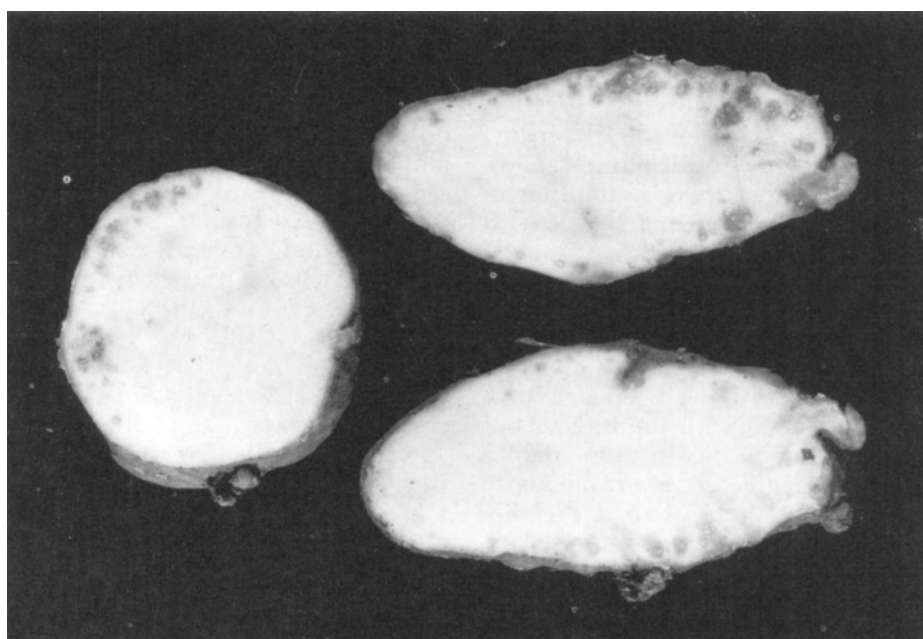
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The root-knot nematode, *Meloidogyne incognita*, occurs in all potato growing areas of California and if not controlled can cause serious reductions in market quality of white potatoes (photo). Currently the University suggests the use of two fumigant nematicides for the control of this pest. These materials are the 1,3-dichloropropenes (D-D and Telone) and ethylene dibromide. Both do a good job of nematode control.

The purpose of this report is to inform growers of results obtained in 1974 on the performance of some nonfumigant insecticide/nematicides for the control of root-knot nematode on white potato.

The experiment was conducted at University of California at Riverside on a sandy loam soil that was heavily infested with root-knot nematode. The soil was prepared and irrigated and the row furrows opened (32 inch centers) and White Rose variety of potato was hand planted on 15 April 1974. A two- and a four-pound rate of seven of the nematicides (granular formulations) listed in the table was applied in a 6 inch band over the seed pieces before the seed was covered. Nelite was applied as a drench (2 qt. volume per 50 ft. of plot row). Plot size was a single row by 50 feet and all treatments were replicated four times. Appropriate check plots were included. The plot was watered by sprinklers for the first two irrigations, and then furrow irrigated until maturity (150 days). The plots were machine harvested and all tubers were hand cut and observed for root-knot infection. Yield data was not taken because the planting was late and would not truly reflect the yield potential in the area. The percentage of the total harvested tubers infected with root-knot is presented in the table.

All materials significantly reduced the percentage of infected tubers over the untreated check but



Root-knot nematode on potato

A LIST OF GRANULAR INSECTICIDE/NEMATICIDES  
USED ON WHITE POTATO AND THE PERCENT  
INFECTION OF TUBERS WITH ROOT-KNOT NEMA-  
TODE AT HARVEST.

Chemical treatment	Rate per acre (lbs. active ingredient)	Percent infection
Furadan	2	1 a*
Dasanit	4	2 a
Geigy 12223	2	3 a
Furadan	4	5 a
Geigy 12223	4	5 a
Temik	4	7 a
Nelite	4	9 a
Nelite	2	10 a
Vydate	2	11 a
Dasanit	2	11 a
Mocap	2	11 a
Nemacur	2	12 a
Nemacur	4	13 a
Temik	2	13 a
Mocap	4	16 a
Vydate	4	20 a
Check	0	42 b

\*All treatments followed by the same letter are not significantly different at the 5 percent level by Duncan's Multiple Range Test. Those separated by different letters are statistically significant at the 5 percent level.

there was no statistical difference between the chemical treatments. All gave a significant degree of control when compared to the check. The percentage infection of the various treatments ranged from 1 percent to 20 percent (see table). Geigy's 12223 nematicide is the only material that showed phytotoxicity at both rates, killing a large majority of the plants after emergence. Plants treated with this compound emerged in what appeared to be a normal fashion, but within 30 days after emergence the leaves became chlorotic and dropped and the majority of plants died by June 15.

The severity of infection on individual tubers within the various treatments in this experiment ranged from a very few females per tuber to several hundred. Severely infected tubers were cracked and swollen and unfit for market. Soil in which the experiment was conducted had an extremely heavy

## NEMATODE ON NEMATOCIDES

infestation of nematodes and these compounds were subjected to a severe performance test. Growers would seldom encounter such high nematode inoculum levels under their normal field growing conditions.

We therefore feel that several of these compounds show promise as nematocides for the control of root-knot on potato. They have both advantages and disadvantages in comparison to conventional fumigants now being used. Potential advantages include:

- Application could be accomplished with seeding and avoid an additional mechanical application and waiting period after treatment.
- Some of the compounds have residual insecticidal properties which could lessen insect control programs.
- A granular material is more easily handled than a liquid fumigant.

Disadvantages include:

- Contact nematocides have a high level of toxicity to humans in comparison with standard fumigants.
- The pesticide has a potential of persistence in soil and environmental contamination residue problems in soil and tubers.

Research will continue in 1975 on the potentials of this method of nematode control in various growers' fields in southern California. In these yield trials, comparisons will be made between the contact materials and the currently used soil fumigants.

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## CALIFORNIA'S CITRUS VARIETY IMPROVEMENT PROGRAM

Forrest Cress

Walter Reuther

E. C. Calavan

CALIFORNIA CITRUS GROWERS and nurserymen today can draw from a unique bank that should be of progressively increasing value to them in future years as its holdings grow.

This bank, developed through the Citrus Variety Improvement Program (CVIP), serves as the California citrus industry's primary source of virus-free germ plasma from which to develop and maintain healthy, productive, bearing orchards of important commercial varieties.

The CVIP germ plasma bank has reached the stage where its budwood — registered to be free of known viruses and similar pathogens and true to its variety — now can be sold in quantity to the state's citrus growers and nurserymen.

To date, more than 30,500 "clean and true" buds have been sold from the CVIP bank. Many of these buds are being used in nurseries to produce more budwood. Larger amounts of CVIP budwood will be available in the future, putting into practice more than 35 years of accumulated research knowledge on the prevention of citrus virus and virus-like diseases.

The University of California, in cooperation with the Nursery and Seed Services of the California Department of Food and Agriculture, started the CVIP in 1958 upon the urging of the statewide Citrus Research Advisory Committee.

By the 1950s, it was obvious to researchers and growers alike that virus diseases were an important factor in reducing orchard vigor, yield, and fruit quality in California and all other major citrus-growing areas of the world. An estimated one-half million California citrus trees had been destroyed by tristeza (quick decline). Other diseases such as exocortis and psoriasis, as well as stubborn disease (thought at that time to be a virus-caused malady), were reducing yields in mature orchards, generally by about one-third, were signifi-

cantly affecting fruit quality, and were confusing the evaluation of rootstock performance.

The University was asked to lend California citrus growers a helping hand. Sources of virus-free budwood of desirable commercial varieties were needed to help check the spread of disease in the state's citrus orchards.

The CVIP began as a joint effort of UC Riverside's plant pathology and horticultural science departments. It was planned in consultation with the Nursery and Seed Services of the California Department of Food and Agriculture. The UC program continues to operate today in close cooperation with the Nursery and Seed Services citrus registration and certification program.

Broad policy of the CVIP is set by a committee. Its dozen or so members include University of California at Riverside agricultural scientists, U.C. Cooperative Extension, and U.S. Department of Agriculture personnel.

Although CVIP is the most advanced program of its kind in the world, it is an avoidance procedure, one which is lengthy and involved.

Several major steps are involved in the CVIP procedure. First, "parent source trees" are selected. Most of them are chosen for trueness to type, good growth, high fruit production, and lack of obvious infection by viruses or by Spiroplasma, the mycoplasma-like pathogen that UCR researchers recently have shown to be the cause of stubborn disease. After a rigorous program of testing for infection, "clean" source trees are propagated in a protected screenhouse at the Rubidoux quarantine facility in Riverside and also maintained in "foundation blocks" at the U.C. Lindcove Field Station. These trees are under continuous inspection and testing by both U.C. and State Nursery and Seed Services personnel for freedom from viruses and the stubborn disease Spiroplasma, trueness to type, fruit quality, and yield performance.