

WHAT DO WE KNOW ABOUT THE USE OF VAPAM FOR POTATO PRODUCTION

by

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I was asked to talk about what we know about vapam. First of all, vapam has been on the market for about thirty years. Secondly, it has registration as a fumigant for the control of nematodes, sclerotinia, verticillium wilt and weed seeds as well as numerous other soil borne disease. Vapam has not been used much on a commercial basis except for green houses and nursery stock because it was expensive in relation to other fumigants and in many cases there were failures due to application methods.

You are probably wondering why all of a sudden it has come to the front. Prior to moving to Canada, I had tried to talk Stauffer into taking another look at vapam. At that time other fumigants were not as expensive as they are now, and they said no. On returning from Canada, I again approached Stauffer about what I felt about vapam. This time they agreed and gave Mickey Qualls, Stauffers R & D man, 400 gallons of vapam for a test plot. Mickey and I teamed up and the first field plot went on over by George, Washington, on Bob Hammond's farm. Because of Mickey's experience with sprinkler application of chemicals and my experience with vapam being sprinkled in, it was decided to apply it through a center pivot system. Mickey did some preliminary research and determined it was not corrosive to anything it would come in contact with on a pivot system. He also made some studies and found that it did not volitize readily.

With a lot of assistance from Dr. Max Hammond our plots were put on with application rates of 30, 50 and 100 gallons with two checks. These were applied on half of a circle with the rest of the circle receiving a normal application of a standard fumigant used for nematode and vert wilt control. Through out the summer we followed the plots and infra red photography was used to keep track of the results. The results were that the checks went down first with the thirty gallon treatment following and then the standard treatment followed by the fifty and one-hundred gallon treatment. Upon harvest we found that the checks yield 18.5 tons of 1's and 2's per acre while we had 16.9 tons for the 30 gallon treatment, 26.4 tons for the 50 gallon treatment, 25.3 tons for the 100 gallon treatment and 21.0 tons for the standard treatment. This gave us encouragement and we decided to put out tests in 1979.

In 1979 we had 6 field tests involving five half or full circles. All tests had the other portion of the circle treated with a standard fumigant. One field was a wheel line that had a history of nematodes and verticillium wilt. One field had a layer of heavy corn stalks on the surface and another field had a stand of alfalfa with a very high count of nematodes. One field had a cover crop of winter wheat. All fields had nematode from light to heavy and all fields had a history of verticillium wilt. Each vapam treated field had two checks which were made by stretching a 20 x 100 foot plastic tarp over the soil before treating.

Observations were made during the summer and infra red photographs were taken weekly toward the end of the season - in all fields we found that the vapam treated fields were two to three weeks later than the standard treatments before dying.

In some of the fields where it was not possible to dig the two treatments separately, ten - ten foot samples were dug to establish yield. In the other fields the two treatments were dug separately and the yield and quality was obtained from the records supplied to the grower by the processor.

I should also mention that Dr. Harold Toba, USDA Entomologist had wire worm studies where he buried live wire worms to a depth of 36 inches. The results of his studies showed that wireworms were killed to a depth of 24 inches. Also, Dr. Alex Ogg, USDA Weed

Specialist, also made studies of weed seed kill and found that vapam eliminated or killed most of the weed seed in the top foot. The only viable weed seed were those that were on the soil surface or those that blew in after the treatment. In proof of this one field, the previous season had been so foul with nightshade the grower was wondering what to do with the field. This field received the vapam treatment and one application of sencor. The other half received a standard fumigant and two applications of sencor. In the vapam treated half we found no nightshade across the whole field while in the other half we could find nightshade without difficulty.

So what do we know about vapam? Based on field observations and yield data we know these things. One, that vapam controls nematodes in almost all cases. We had a failure in the alfalfa field with rates up to 50 gallons per acre. Dr. Gerry Santos felt that this was due to the extremely high population that was present and the very late time of digging which was about the middle of November. We know that vapam extends the growing season by two to three weeks. We also know that there was a great suppression of verticillium wilt as well as sclerotinia. We found that we had from 3.5 tons to 6.5 ton increase in the vapam treated fields with a higher percentage of number 1's and 2's in all fields. All vapam treated fields had a smaller number of small process grade potatoes and a higher specific gravity. As I mentioned before we found that we killed most weed seed and perennial weeds. We also know that vapam will kill any volunteer potatoes left in a field. Dr. Mary Powellson, Oregon State University Plant Pathologist found that the 50 gallon rate eliminated about 89% of the verticillium microsclerotia in the soil while the 75 gallon rate eliminated about 93% of the microsclerotia. It also kills wireworms down to at least 24 inches. We know that there has to be a lot of finite research to be done but preliminary results show that it is a very promising compound and one that may lick many of the problems that face a potato farmer.