

Use of Soil Fumigation For Control of Verticillium Wilt of Potatoes

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The soil-borne fungus, *Verticillium dahliae* Kleb, incites an "early maturity disease" of potatoes, causing reductions in potato yields and quality. Disease severity is directly proportional to the fungus density in the soil and the number of root infections which occur.

Soil fumigation reduces the fungus density in the soil and the number of root infections. Trials conducted in Oregon since 1955 have shown that soil fumigation will give economic yield increases on land where Verticillium wilt is the limiting factor in production.

Considerations for successful soil fumigation

1. Have potatoes been grown on the land more than 5 years? Yes..... No.....
2. Is "early maturity" caused by Verticillium wilt the primary factor limiting production? Yes..... No.....
3. Was the land to be fumigated in a low residue crop, such as grain, last year? Yes..... No.....
4. Is the soil to be fumigated a light sandy loam with a low organic matter content? Yes..... No.....
5. Is control of root-knot nematodes, wire worms, symphylans, or quack grass required? Yes..... No.....

Yes answers to questions 1 through 4 are important for successful soil fumigation. The pests listed in statement 5 are controlled by soil fumigation for Verticillium wilt, and a yes answer means additional benefits.

Procedures for successful soil fumigation

1. *Crop residue.* Minimize the previous crop residue by removal or allowing time for decomposition.
2. *Moisture.* Soil is usually at the proper moisture level when it barely retains its shape after being squeezed in the palm of the hand. The moisture should be favorable for germinating seed.
3. *Temperature.* Most fall and spring soil temperatures are adequate. A temperature range between 45° and 60° F. six inches below the soil surface is desirable.

4. *Tilth.* Soil should be in seedbed condition, firm and relatively free from clods.
5. *Application.* Several types of applicators have been designed to apply soil fumigants; however, the most effective for large-scale fumigation is the chisel applicator. The chisels should be spaced 8 to 12 inches apart with an injection depth of 6 to 8 inches. Refer to the product label for specific application instructions.
6. *Sealing.* A "surface seal" should be established immediately after injection to maintain an effective concentration of the fumigant. This is best accomplished by the use of a "smooth-wheeled" cultipacker.
7. *Post fumigation treatment.* Retain the "surface seal" for at least 7 to 10 days after treatment. Then till or plow 8 to 10 inches deep and allow 2 to 4 weeks before planting. When fumigation is done in the fall, the soil should not be disturbed until spring.

Other considerations

1. Soil fumigation should be considered for fields where "early maturity" caused by Verticillium wilt is resulting in yields under 300 cwt per acre.
2. It is desirable to fumigate following a grain crop where the stubble has been burned. Avoid fumigation after a potato crop or after crops which leave a high amount of residue, such as alfalfa, pasture, and corn.
3. Fall fumigation is recommended over spring fumigation.
4. For the greatest economic return, potatoes should be grown two consecutive years following fumigation.

Suggested fumigants and rates

D-D	40 to 60 gallons per acre
Telone	30 to 50 gallons per acre
Vapam	30 to 40 gallons per acre
Vidden D	40 to 60 gallons per acre
Vorlex	20 to 40 gallons per acre



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