THE EFFECT OF PCNB ON THE CONTROL OF TULIP FIRE PRIMARIES [1]

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Abstract

The number of primary infections produced on tulips in fields infested with Botrytis tulipae Lind. was significantly reduced by the broadcast application of PCNB (pentachloronitrobenzene) at the rate of 200 lb, per acre. The treatment did not result in any damage to the tulip bulbs. Lower rates of broadcast applicatioh and equivalent rates in row or dust application were not effective under conditions in coastal British Columbia.

Introduction

Cold, wet springs, such as generally occur in the coastal areas of British Columbia favor the development of tulip fire and the disease may reach epidemic proportions during periods of high rainfall. Planting of healthy stocks, removal of primaries as they appear, and an adequate spray program will almost eliminate secondary infections. Unfortunately, the wet weather and the resultant difficulty in entering the fields to remove the primaries combine to prevent adequate control. Therefore, it was considered necessary to find some material that could be applied in the fall during planting that would prevent the formation of primaries. PCNB (pentachloronitrobenzene) has been found effective against sclerolia-forming fungi, such as Rhizoctonia, Sclerotinia, Sclerotium, and Botrytis spp., in the field (2). Green et al (1) reduced the number of tulip fire primaries by 25% over the checks by using 2 oz. of PCNB per sq. yard, dusted on the soil one day before planting. These results indicated that PCNB could be of value for the control of primaries. The present study was initiated to determine its effects under conditions that prevail in B.C.

Methods and Materials

Plots were set up in a field known to be heavily infested with Botrytis tulipae. Raised beds, each containing 50 bulbs of the variety Demeter in five rows of ten bulbs per row, were set out after the following treatments:

1. Check - no treatment
2. Broadcast - 100 lb. PCNB per acre
3. Broadcast - 200 lb. PCNB per acre

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4. Row - 20 lb. PCNB per acre
5. Row - 40 lb. PCNB per acre
6. Dust - PCNB
7. Dip - Semesan Bel.

Each treatment was in triplicate. In the row treatment, soil was heaped on the bed to a depth of six inches, the rows dug, the bulbs placed 6 inches apart in the rows, and dusted with the calculated amounts of PCNB. In the broadcast treatment, the soil was thoroughly mixed with the PCNB before being heaped on the bed, In the dust treatment, the bulbs were shaken, before being planted, in a bag with PCNB. In the dip treatment, the bulbs were placed in a standard Semesan Bel solution for two minutes, drained, and planted, Starting in February, the beds were ingpected every three or four days, the primaries counted, and removed. In July the bulbs were harvested, weighed, and inspected for sclerotia:

Results and Discussion

The PCNB treatment at 200 lbs. per acre gave a significant (at p=0. 1) reduction in the number of primaries (Table 1). None of the other treatments were significantly better than the check plots,

Table 1. Effect of PCNB on bulb weight and on production of primary infections by B. tulipae.

Treatment	Average weight/bulb	Total Primaries	*Transformed total
Checks	1.36 oz.	22	7.8
Broadcast 100 lb./A	1.40 oz.	19	7.4
Broadcast 200 lb./A	1.46 oz.	4	2.8
Row 20 lb./A	1.23 oz.	26	8.7
Row 40 lb./A	1.33 oz.	38	10.4
Dust	1.23 oz.	27	8.7
Dip	1.23 oz.	33	8.9
L.S.D. (p=0.1	none		1.27

*Data transformed by square root transformation for statistical analyses,

The average weight per harvested bulb was slightly higher with the 200 lb. per acre treatment than with any other treatment, but not significantly so. All treatments where the chemicals came in direct contact with the bulb resulted in average weights lower than the checks,

Although good control of primaries was obtained in this experiment it is doubtful whether the 200 lb. per acre rate would be as effective when applied on a large scale. Thorough mixing of the PCNB with the soil to a depth of at least six inches is required, and with the current methods of soil tillage in use this desirable situation would be hard to achieve. According to Newhall (3) the usual tillage implements, such as the spiketooth harrow, discs, and rotary tillers with spike blades, do not mix soil very much below the top 2. 75 inches.

A rototiller with L-shaped knives will mix as deep as 8 inches, A tillage implement of the latter type would be necessary for successful incorporation of PCNB into the soil.

Literature Cited

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