The high average laboratory germination rate of rape seed compared with the average rates for cereals and flax is further evidence in support of this.

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SOIL FUMIGATION FOR THE CONTROL OF THE NORTHERN ROOT-KNOT NEMATODE, MELOIDOGYNE HAPLA, ON CELERY[1]

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Abstract

Celery infested with the northern root-knot nematode, Meloidogyne hapla Chitwood, 1949, was treated with Telone, D-D, W-85 and Nemagon. Each treatment significantly reduced the occurrence of galls on the roots with a resultant increase in fresh top weight,

Introduction

The celery block on the Research Laboratory farm at St. Catharines, Ontario, has been used for experiments on the control of early and late blight for twenty-five years, During that time the block has become infested with the northern root-knot nematode, Meloidogyne hapla Chitwood, 1949. To improve the impoverished growth of celery caused each year by M. hapla the soil has been treated with a number of soil fumigants. This paper presents the results obtained in 1957,

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Materials and Methods

The infested celery block was worked until it was in seed-bed condition and then divided into twenty 4.5' x 12' plots separated by pathways two feet wide. There were four rows of five plots each.

Late in May, Dow Telone (dichloropropene), Dowfume W-85 (ethylene dibromide), Shell D-D (1-3-dichloropropene, 1-2 dichloropropane), and Shell Nemagon (1, 2-dibromo-3-chloropropane) were applied as preplanting treatments at rates of 24, 13, 30 Imperial gallons, and 20 pounds per acre respectively. The nematocides were injected into the soil on 9" x 12" centers with a hand gun and were sealed in by compacting and applying water to the soil. Each treatment was replicated four times, once in each row. The plots were assigned at random within the rows. An equal number of plots were left untreated, one in each row. Three weeks after fumigation three rows of celery, of the variety Utah 15, were planted in each plot, twenty-one plants to a row. The rows were spaced 18 inches apart.

In October, every second plant in the center row of each plot was harvested. The fresh top weight, in ounces, and the number of nematode galls per gram of dried root were recorded for each plant. The plants in the outside rows were not used because it was assumed that they acted as buffers against the infested and untreated pathways.

Results

Table 1 shows that the average fresh top weight of plants from the plots treated with Telone, D-D, Nemagon, and W-85 was significantly greater than the average fresh top weight of plants from the untreated plots, but not greater than one another. Analysis was by Duncan's Multiple Range Test.

Table 1. The Effect of Soil Fumigation on Fresh Top Weight and the Number of Root-Knot Galls on the Roots of Celery, 1957.

Treatmcnt	Average fresh top weight of plant in ounces	Average number of galls per gram of dried root
Telone	38.8 a	20 a
D-D	37.6 a	38 a
Nemagon	36.3 a	205 b
W-85	34.3 a	3 a
Check	23.4 b	901 c
L.S.D. .05	8.5	151

A similar analysis showed that the average number of galls on the roots of plants from the plots treated with Telone, D-D, and W-85 was significantly less than the average number of galls on the roots of plants from the Nemagon-treated and check plots, The average number of galls on plants from the Nemagon-treated plots was also significantly less than the average number on plants from the check plots,

Discussion

The fresh top weight of plants from plots treated with the four nematocides were approximately the same. However, there were from five to sixty times as many galls on the roots of plants from the Nemagon-treated plots as on the roots of plants from the other treated plots. A residue of root galls of this magnitude in the soil would represent a large inoculum potential. Subsequent observations suggest that the northern root-knot nematode builds up rather slowly on fine, Vineland type, sandy loam and the need for annual fumigation may be avoided if the lowest possible inoculum potential is maintained. Therefore, the use of the more efficient nematocides is recommended.

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