

## EFFICACY OF SEED TREATMENT AGAINST *Meloidogyne incognita* AND ON PLANT GROWTH OF CHICKPEA

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Seed treatment with aldicarb-sulfone, carbofuran and oftanol resulted in significantly less larval penetration and better plant growth in comparison to untreated. However, oftanol at 2 percent a.i. concentration was phytotoxic. Amongst the tested chemicals, carbofuran was superior in preventing larval penetration, host infestation, nematode multiplication and increasing plant growth than oftanol and aldicarbsulfone.

Keeping in view the high cost of granular nematicides, the importance of root-knot nematode and its role on chickpea wilt and root rot disease-complex in combination with *Fusarium* spp., three chemicals were evaluated as seed dressers for their nematicidal effect against *Meloidogyne incognita* and the results are reported here.

### MATERIALS AND METHODS

Two doses, each of aldicarb-sulfone carbofuran and oftanol were evaluated.

#### Larval Penetration

Chickpea seed cv. JG 62 treated with chemicals were sown in paper cups (one seed/cup) containing 120 g of steam sterilized sand. Three days after seedling emergence, one hundred freshly hatched second stages larvae were liberated near the roots in each cup. The seedlings were harvested after 2,4 and 7 days for recording larval penetration in roots. Plants from untreated seed

but inoculated with nematode served as control. All the treatments were replicated three times.

Plant growth, host infestation and nematode multiplication:

Chickpea (Cv. JG-62) seeds treated with chemicals were sown in 10cm diameter earthen pots, containing 500g of steam sterilized soil + sand (3:1) mixture at the rate of one seed per pot. Seven days old plants were inoculated with 1000 freshly hatched second-stage larvae. Suitable checks were also maintained. Each treatment was replicated four times. Observations on plant growth, galling and nematode population were recorded 60 days after inoculation

### RESULTS AND DISCUSSION

#### Larval penetration :

It was significantly reduced, at each observation the period, with all seed treatments at both the dosage in comparison

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Table 1. Effect of seed treatment of chickpea on penetration of *Meloidogyne incognita*

| Treatments               | % Penetration          |       |         | Mean    |
|--------------------------|------------------------|-------|---------|---------|
|                          | Days after inoculation |       |         |         |
|                          | 2                      | 4     | 7       |         |
| Check-inoculated         | 12.00                  | 35.00 | 58.33 f | 35.11 f |
| Aldicarb sulfone 0.5%    | 8.67                   | 23.33 | 44.67 e | 25.56 e |
| Aldicarb sulfone 1.0%    | 7.33                   | 19.33 | 33.67 d | 20.11 P |
| Carbofuran flowable 1.0% | 0.33                   | 12.33 | 17.00 c | 9.89 c  |
| Carbofuran flowable 2.0% | 0.00                   | 2.00  | 5.33 a  | 2.44a   |
| Oftanol 1.0%             | 5.00                   | 10.33 | 21.00 c | 12.11 c |
| Oftanol 2.0%             | 2.67                   | 6.33  | 11.33 b | 6.78 b  |

z. Data in columns followed by a common letter were not statistically different ( $p=0.05$ ) according to Duncan's multiple range test.

to check (Table 1). Amongst the chemicals tested, carbofuran at 1% a.i. and 2% a.i. concentration was the most effective in reducing nematode penetration in which the least penetration was recorded. Vaishnav (1977) had also reported that nematode penetration on maize was prevented/delayed/reduced in treatments

receiving carbofuran 1.5%, aldicarb 1.5% and fensulfothion 0.5%.

The effect of seed treatment was also reflected on plant growth as expressed by improved shoot and root weight by all the nematicidal treatments compared to inoculated check (Table 2).

Table 2. Effect of seed treatment of chickpea on plant growth host infestation and multiplication of *Meloidogyne incognita*

| Treatments               | Shoot length (cm) | Fresh weight of shoot (g) | Dry weight of shoot (g) | Fresh weight of root (g) | Galls/ Y plant | Nematode population Z |           | Total     |
|--------------------------|-------------------|---------------------------|-------------------------|--------------------------|----------------|-----------------------|-----------|-----------|
|                          |                   |                           |                         |                          |                | Soil                  | Root      |           |
| Chick-uninoculated       | 39.13             | 9.93 bcd                  | 1.90 cd                 | 9.15 cd                  | —              | —                     | —         | —         |
| Chick-inoculated         | 35.25             | 7.38 a                    | 1.20 a                  | 6.10 ab                  | 13.00 e        | 3.0035 e              | 4.4336 e  | 4.4494 e  |
| Aldicarb sulfone 0.5%    | 38.63             | 7.88 ab                   | 1.43 ab                 | 5.85 a                   | 11.73 d        | 2.9315 c              | 4.3319 de | 4.3488 de |
| Aldicarb sulfone 1.0%    | 40.25             | 8.75 abc                  | 1.60 abc                | 6.45 ab                  | 10.09 cd       | 2.9120 c              | 4.2320 d  | 4.2523 d  |
| Carbofuran flowable 1.0% | 41.00             | 9.80 bcd                  | 1.78 bcd                | 9.93 cd                  | 9.19 c         | 2.8016 bc             | 4.0047 bc | 4.0311 bc |
| Carbofuran flowable 2.0% | 43.50             | 11.30 d                   | 2.03 d                  | 11.48 d                  | 3.74 a         | 2.2427 a              | 3.4263 a  | 3.4539 a  |
| Oftanol 1%               | 44.63             | 10.73 cd                  | 1.98 cd                 | 10.05 cd                 | 7.21 b         | 2.5927 d              | 4.0808 c  | 4.0947 c  |
| Oftanol 2.0%             | 40.33             | 8.50 abc                  | 1.70 bcd                | 8.53 bc                  | 6.61 b         | 2.6138 b              | 3.8937 b  | 3.9156 b  |

X : Data in columns followed by the a common letter were not statistically different (P = 0.05) according to Duncan's multiple range test.

Y and Z : Figures are square root and log values respectively.

The increase in shoot length was, however, not statistically significant. With regard to plant growth, carbofran gave the best result followed by oftanol and aldicarb-sulfone in that order. Sivakumar *et al.* (1973) reported that when okra seeds treated with carbofuran at 6% a.i. were sown in *M. incognita* infested soil the yield was increased by 83 per cent.

The enhancements of concentration of chemicals from 1 to 2 percent (from 0.5 to 1.0 percent in case of aldicarb-sulfone) resulted in corresponding increase in plant growth, except in oftanol in which the lower concentration was found to be better than the higher concentration. At the highest dose of 2 percent, oftanol exhibited phytotoxicity as expressed in the form of pale foliage and stunted growth. Similar observation was made by Kaushal (1983) who recorded phytotoxic symptoms on wheat when seeds were treated with oftanol at the dosage of 3 percent and above.

Data (Table 2) on root-galling suggested that host infestation by *M. incognita* was reduced when seeds were treated with pesticides, as there was significant reduction in number of galls recorded on the root system. Further the nematode multiplication was also affected very much as observed from the soil and root populations which were reduced to greater extent. Carbofuran had more adverse effect on nematode population than oftanol and

aldicarb-sulfone. Kaushik and Bajaj (1981) recorded such adverse effects of carbofuran and phenamiphos at 1, 2 and 4 percent on root galling in chickpea. Sivakumar *et al.* (1973) suggested that seed treatment with carbofuran at 3 or 6 percent a. i. was the most economical method of controlling root-knot nematode on okra.

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