# 1,3 D, A VALID ALTERNATIVE TO METHYL BROMIDE FOR THE CONTROL OF PLANT PARASITIC NEMATODES.

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In field and plastic-house experiments 1,3 dichloropropene (1,3 D) was very effective in the control of root-knot (*Meloidogyne* spp.) and cyst (*Heterodera carotae*) nematodes. The 97 % fumigant formulation gave excellent control of root-knot nematodes and dramatic tomato yeld increases, compared to the control, at the rates of application of 100 to 200 l/ha in plastic-houses in Sicily (Tables 1, 2 and 3), southern Italy (Table 4) and central Italy (Table 5). The beneficial effect of doses of 200 l/ha applied in July 1999 continued on the second tomato crop planted in February 2000 without any further treatment (Table 3). When applied outdoor in southern Italy,1,3 D gave significant tomato yield increases compared to the control, only at the rate of 200 l/ha, resulting phytotoxic at the rate of 400 l/ha (Table 6). The rates of 200 and 300 l/ha of 1,3 D 97 were the most effective in the control of *H. carotae* on carrot, the yield of which was nil in the untreated plots (Table 7). Very good results were obtained also on tomato and cantaloupe with an application of 1,3 D 94 EC in plastic houses and open fields infested with root-knot nematodes in Sicily and southern Italy. C 35, 1,3 D 65 % + chloropicrin 35 %, was less satisfactory in the control of *Meloidogyne* species on tomato.

Table 1 - Tomato yield and root-knot index in a plastic-house treated with nematicides in Sicily.

| Treatment and rate | Yield (kg/m$^2$) | | Root-knot index (0 – 5) | |
|---|---|---|---|---|
| 1,3 D 100 l/ha | 4.8 | abc | 2.5 | B |
| 1,3 D 150 l/ha | 5.2 | ab | 1.1 | A |
| 1,3 D 200 l/ha | 4.7 | abc | 1.3 | A |
| 1,3 D 300 l/ha | 5.8 | a | 1.3 | A |
| Metham sodium 1000 l/ha | 3.5 | bcd | 3.6 | C |
| Metham sodium 2000 l/ha | 3.8 | bcd | 4.0 | C |
| 1,3 D 100 l/ha + Metham sodium 1000 l/ha | 2.5 | de | 3.6 | C |
| 1,3 D 100 l/ha + Fenamiphos 150 kg/ha | 4.0 | abcd | 3.2 | C |
| Metham sodium 1000 l/ha + Fenamiphos 150 kg/ha | 3.1 | cde | 3.6 | C |
| Fenamiphos G5 300 kg/ha | 1.4 | e | 5.0 | E |
| Control | 1.3 | e | 5.0 | E |

Table 2 - Tomato yield and root-knot index in a plastic-house treated with 1,3 D 97 in Sicily.

| Treatment and rate | Yield (kg/m$^2$) | | Root-knot index (0 – 5) | |
|---|---|---|---|---|
| 1,3 D 50 l/ha | 2.9 | b | 4.4 | A |
| 1,3 D 100 l/ha | 5.9 | a | 1.4 | B |
| 1,3 D 200 l/ha | 5.7 | a | 0.7 | B |
| 1,3 D 400 l/ha | 6.2 | a | 0.5 | B |
| Fenamiphos G5 300 kg/ha | 0.9 | c | 5.0 | A |
| Control | 0.7 | c | 5.0 | A |

Table 3 – Tomato yield and root-knot index of a second crop in a plastic-house treated with 1,3 D and fenamiphos in Sicily.

| Treatment and rate | | Yield (kg/m$^2$) | | Root-knot index (0 – 5) |
|---|---|---|---|---|
| Time | | | | |
| July 1999 | January 2000 | | | |
| 1,3 D 50 l/ha | 1,3 D 150 l/ha | 8.3 | a | 1.3 |
| 1,3 D 100 l/ha | 1,3 D 100 l/ha | 8.2 | a | 0.8 |
| 1,3 D 200 l/ha | | 8.3 | a | 2.3 |
| 1,3 D 400 l/ha | | 8.7 | a | 1.8 |
| Fenamiphos G5 300 kg/ha | - | 4.3 | b | 4.2 |
| Fenamiphos G5 300 kg/ha | Fenamiphos G5 300 kg/ha | 5.6 | b | 3.9 |
| Fenamiphos G5 300 kg/ha | 1,3 D 100 l/ha | 8.4 | a | 1.5 |
| Fenamiphos G5 300 kg/ha | 1,3 D 200 l/ha | 10.1 | a | 1.0 |
| Fenamiphos G5 300 kg/ha | 1,3 D 300 l/ha | 9.1 | a | 0.5 |
| Fenamiphos G5 300 kg/ha | 1,3 D 400 l/ha | 9.5 | a | 0.3 |
| Control | | 4.8 | b | 4.6 |

Table 4 - Tomato yield and root-knot index in a plastic-house treated with 1,3 D and fenamiphos in southern Italy.

| Treatment and rate | Yield (kg/m$^2$) | | Root-knot index (0 – 5) | |
|---|---|---|---|---|
| 1,3 D 50 l/ha | 4.4 | b | 4.0 | c |
| 1,3 D 100 l/ha | 4.4 | b | 4.1 | c |
| 1,3 D 200 l/ha | 5.4 | c | 3.2 | b |
| 1,3 D 300 l/ha | 5.6 | d | 2.6 | a |
| 1,3 D 400 l/ha | 5.8 | d | 2.4 | a |
| Fenamiphos G5 200 kg/ha | 4.4 | b | 3.9 | c |
| Control | 3.4 | a | 4.7 | d |

Table 5 - Tomato yield and root-knot index in a plastic-house treated with 1,3 D and fenamiphos in central Italy.

| Treatment and rate | Yield (kg/m$^2$) | | Root-knot index (0 – 5) | |
|---|---|---|---|---|
| 1,3 D 50 l/ha | 5.7 | a | 3.8 | a |
| 1,3 D 100 l/ha | 6.6 | a | 1.2 | bc |
| 1,3 D 200 l/ha | 10.3 | bc | 0.3 | cd |
| 1,3 D 400 l/ha | 10.8 | c | 0.2 | d |
| Fenamiphos G5 200 kg/ha | 8.5 | b | 1.8 | b |
| Control | 5.6 | ab | 4.3 | a |

Table 6 – Tomato yield and root knot index outdoor in southern Italy in soil treated with nematicides.

| Treatment and rate | Yield (kg/m$^2$) | | Root-knot index (0 – 5) | |
|---|---|---|---|---|
| 1,3 D 50 l/ha | 9.7 | c | 2.0 | b |
| 1,3 D 100 l/ha | 8.8 | c | 2.5 | b |
| 1,3 D 200 l/ha | 14.3 | a | 1.4 | c |
| 1,3 D 400 l/ha | 10.9 | bc | 0.8 | c |
| Fenamiphos G5 300 kg/ha | 11.7 | abc | 2.5 | b |
| Cadusaphos G10 50 kg/ha | 11.7 | abc | 1.6 | bc |
| Control | 8.7 | c | 4.6 | a |

Table 7 – Marketable carrot yield in soil infested by *Heterodera carotae* and treated with nematicides in Sicily.

| Treatment and rate | Yield (kg/m$^2$) | |
|---|---|---|
| 1,3 D 97 100 l/ha | 5.8 | b |
| 1,3 D 97 150 l/ha | 6.2 | b |
| 1,3 D 97 200 l/ha | 7.6 | bc |
| 1,3 97 D 300 l/ha | 9.9 | c |
| Metham sodium 1000 l/ha | 0.3 | a |
| Metham sodium 2000 l/ha | 0.6 | a |
| Fenamiphos G5 300 kg/ha | 0.0 | a |
| 1,3 D 100 l/ha + Metham sodium 1000 l/ha | 5.3 | b |
| 1,3 D 100 l/ha + Fenamiphos 150 kg/ha | 5.8 | b |
| Metham sodium 1000 l/ha + Fenamiphos 150 kg/ha | 0.0 | a |
| Control | 0.0 | a |