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SUMMARY

The optimal use of systemic nematicides and their efficiency are affected by many biotic or abiotic factors. Accordingly, the present study aims to investigate some of these factors

Results obtained are summarized as follows: -

Respecting cowpea plants: - Results illustrated that there were significant differences between the numbers of galls, developmental stages and eggmasses per root system and averages of numbers of eggs per an eggmass in both of root-knot nematode species, *M. incognita* and *M. javanica* infecting treated cowpea plants roots with the used nematicides, (Furadan, Vydate, Nemacur and Rugby) at three different rates (0.01, 0.02 and 0.04 g / kg) of soil in both of loamy and sandy loam soils when compared with the respective control treatments (infected plants and untreated with nematicides). Data revealed that the values of rates of reproduction of *M. javanica* on cowpea roots in both two-soil types were nearly conformed, while the rates of reproduction of M. incognita were more than those in loamy soil. On the other hand, when comparison the rates of multiplication of both nematode species, *M. incognita* and *M. javanica* in a soil type, the results showed that the rates of multiplication were nearly conformed in loamy soil. While in sandy loam soil, the rates of multiplication of *M. incognita* were more than *M. javanica* in sandy loam soil at all nematicides treatments.

Regarding okra plants, data obtained of infected plants with two nematode species and treated with the used nematicides and growing in both loamy and sandy loam soils indicated that there were

significant differences between the numbers of root galls, developmental stages in root system and numbers of juveniles in soil and respective their control treatments of okra plants. Each nematode species had the same trend in cowpea plants roots growing in either loamy or sandy loam soil. When comparison of both of multiplication of *M. incognita* were higher than others of *M. javanica.* While in case of sandy loam soil the values of rates of reproduction were conformed.

In respect to tomato plants, data showed that there were significant differences between the numbers of root galls, developmental stages and eggmasses per root system and averages of number of eggs per an eggmass and other respective control treatments of infected tomato plants with two nematode species, growing in either loamy or sandy loam soils and treated with th used nematicides. Results indicated that both two nematode species, M. incognita and M. javanica infecting treated tomato plants with the used nematicides and growing in either loamy or sandy loam soils had the same trend was observed in cowpea or okra plants under the same conditions. The values of numbers of nematodes on tomato plants were less than others on okra plants, but were higher than cowpea. From aforementioned results, the comparison of a nematode species with difference of plant host and soil type illustrated that: -

1- The values of rates of nematode reproduction of *M. javanica* on infected cowpea, okra and tomato plants and treated with the used nematicides at three different rates were converging in both of two soil types with proportional variation due to the differences in sensitivity of the plant host.

2- The values of rate of nematode reproduction of *M. incognita* were higher in sandy loam soil than loamy soil.

Also, the comparison of one soil type with differences of plant host and nematode species illustrated that: -

1- The values of rate of nematode reproduction of *M. javanica* or *M. incognita* on cowpea and tomato plants roots growing in loamy soil were conformed. In contrast, okra plants roots recorded higher rates of reproduction of *M. incognita* than *M. javanica* at the same soil type.

2- The values of rates of reproduction of *M. incognita* were higher than the others in *M. javanica* on treated cowpea and tomato with the used nematicides and growing in sandy loam soil. In opposite, okra plants roots recorded converging values of rates of reproduction for two nematode species.

Also, when comparison the kind of nematicide and its used rates, Rugby was the most effective against root-knot nematodes and reducing the values of rates of reproduction following with Nemacur, Vydate and Furadan on cowpea and okra plants roots growing in either loamy or sandy loam soils. While tomato plants reflected the most effective for Nemacur, Rugby, Furadan and Vydate. Also, data revealed surpassing of Rugby and Nemacur than Vydate and Furadan in reducing the values of rate of multiplication of root-knot nematodes infecting cowpea, okra and tomato plants. Results showed that there were significant increase in lengths and weights of shoots and roots of infected cowpea, okra and tomato plants with either *M. incognita* or *M. javanica* and treated with the used nematicides when compared with respective control treatments. Increase of plant growth was more

in infected plants and treated with Nemacur, Rugby Vydate and Furadan respectively, especially at high rates of application.

Evaluation of used nematicides (Furadan, Vydate, Nemacur and Rugby) or the organic manures (cattle dung, pigeon dropping, sheep dung) individually on the infected okra plants with root-knot nematode *M. incognita* indicated that there were significant differences between the numbers of root galls, developmental stages and eggmasses per root system, numbers of juveniles in soil and averages numbers of eggs per an eggmass and their respective control treatments. Whereas, the nematicides (Nemacur, Rugby, Vydate and Furadan) recorded values of rates of multiplication as following, (5.56, 6.76, 10.36 and 13.58 time) respectively compared with their respective control (51.93 time). While in case of used organic manures, values of the same parameter were 10.53, 19.69 and 25.47 time for pigeon dropping, cattle and sheep dung respectively. Also, results indicated that there was significant increase in lengths and weights of shoots and roots of infected okra plants and treated with used nematicides or organic manures when compared with control treatments (infected plants and untreated with neither nematicides nor organic manures). Nemacur treatments were the highest values followed by Rugby, Vydate and Furadan.

Study the effect of combination of used nematicides and organic manures (either before or after a week from application of nematicides) on the efficacy of the nematicides against *M. incognita* infecting okra plants showed that the efficacy of Nemacur, Rugby, Vydate and Furadan was decreased significantly when organic manure was added before a week from addition of nematicide.

Whereas, data indicated that there was decrease of multiplication of nematode density on okra plants roots (5.57 & 0.93 time) and (6.94 & 7.14 time) when Furadan and Vydate were used before a week from addition of pigeon dropping and cattle dung respectively. While the same criterion increased to 10.92 & 14.77 and 10.69 & 11.49 time when the application of previous nematicides after a week from adding of the same organic manures respectively. Application of Nemacur and Rugby before a week from adding pigeon dropping or cattle dung caused inhibition of multiplication of root-knot nematode infecting okra plants. So, the values of rate of reproduction were (2.90 & 2.47 and 3.49 & 2.30 time respectively, while addition of two previous organic manures before the same nematicides (Nemacur and Rugby) caused increasing of the rate of reproduction (7.45 & 7.84 time) and (7.67 & 10.19 time), respectively.

Finally, application of nematicides before organic fertilizers caused activation and increase of the efficiency of nematicides more than single application of nematicides without organic fertilizers or when were applied after the organic fertilizer.

Respecting the study of presence of free living nematode *Rhabditis* spp. in the soil as microorganisms on the efficacy of the used nematicides (Furadan, Temik, Vydate, Mocap, Nemacur and Rugby) in controlling the root-knot nematode *M. incognita* infecting okra plants roots, results illustrated that there was significant decrease in the values of numbers of root galls, developmental stages and eggmasses per root systems and averages numbers of eggs per an eggmass compared with respective control treatments. This effect of the free living nematode was observed when the rate of penetration of root-knot nematode *M. incognita* in infected okra plants roots, which

treated with aforementioned nematicides and in absence the free living nematode in the soil. The values of rates of penetration were 3.95, 4.55, 5.45, 14.55, 14.80 and 16.05 % when the following nematicides were used, Nemacur, Temik, Rugby, Mocap, Furadan and Vydate respectively. While in presence of free-living nematode, the values of the same parameter were 15.35, 7.15, 17.05, 14.55, 17.40 and 18.40 respectively. Also, the effect of presence of free-living nematode was observed when the percentages of reduction of the rates of reproduction of nematodes infecting treated okra plants roots with Temik, Nemacur, Rugby, Mocap, Vydate and Furadan with absent the free living nematode as follows 97.07, 94.81, 93.64, 79.93, 78.72 and 75.40 % respectively. While in presence of the free-living nematode in soil the values of rates of reproduction were 86.08, 85.42, 85.18, 68.41, 67.82 and 70.58 % respectively. Finally, the study showed that the nematicides, Mocap, Vydate, Temik, Nemacur, Rugby and Furadan were considered as the most affected of efficacy in controlling *M. incognita* and the rate of reduction in their efficacy were 11.52, 10.90, 10.30, 9.39, 8.46 and 4.82, respectively.