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The Residual Effect of Malathion (Organophosphate) and Sevin (Carbamate) Application On Sugar Beet (Chenpodiaceae) Growth

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ABSTRACT: An experiment was conducted at Shambat Agricultural Farm to Study the effect of pesticides residues on soil and plant. Beet Root was planted on January, 2007 and Sevin, Malathion pesticides were added to evaluate weight, length, area and number of leaves per plant. The results revealed that Sevin pesticide at the recommended dose (1.9 kg/ha) gave positive effect on height, weight, leaf area, and number of leaves per plant. The average plant height was 52.3 cm compared with 47.0 cm for the check. The weight average was 493 gm in comparison with control (480 gm). The average number of leaves was 18 compared to 16 for the check. The leaf area was 58.4 cm^2 compared to 53.2 cm^2 . The increased dose of 2.85 kg/ha of Sevin decreased all the parameters. The same trend was observed with Malathion pesticide.

KEYWORD: Malathion, Pesticide, Residues, Sevin, beet root.

INTRODUCTION

The excess use of pesticides results in a great damage to the ecosystem. The production was greatly affected by this phenomena and the soil was polluted. stated that Zaki(1978) same pesticide might undergo a lot of changes and become more toxic.

At the same time Khishin see p 56 (1980) added the effect of the residues on plant part. Abdel Hamed (1989) pointed out that the residues might affect the presence of some minerals specially trace elements. Soil fumigation with Carbon Sulphate resulted in manganese and potassium increase. On the other hand, addition of sodium nitrite and DDT to the soil decreased the production of ammonia and the change of ammonia to nitrate. Omer (2001) studied the residues at Fashir District. He found high amount of pesticides of 0.0156 ppm of Sevin.

When the soil is treated, it is difficult not´to find a trace of residues in the plant parts (Mansour, 1991). An experiment of tomato conducted by Zaki (1978) showed a destructed effect on growth when treated by Sevin.

Younis (1979) working on sevin on lettuce, noticed an increase in the vegetative growth two weeks after treatment. He explained that the pesticides might work as foliar fertilizer. Using Malathion in tomato, he found no effect on height but the roots were graeatly affected. Traul (1987) in south Africa, found a negative result of Malathion in Alfalfa , maize and watermelon.

Pesticicdes effect on the soil was studied by many researchers (Shiah, 1980). Ahmed, (1972) and Omer (2011) reported that soil worms were related to fertility specially forest soil where it acts as natural ploughing. A decrease of some nutrients was found by Dennis (1999), especially heavy minerals. When soil was fumigated by sodium sulphate an increase of phosphorus was detected in the plant while calcium, manganese and potassium were detected in the soil. An

experiment in the College 2004 revealed that Sevin and Malathion at different concentrations in soil resulted in a positive effect on radish growth at the recommended dose and negative effect at the higher dose (Samuel and Gamal) (2004).

The main objectives of this study were to:

1. Study the effect of two pesticides residues on sugar beet growth.
2. Study the effect of these pesticides residues on agricultural soil.

MATERIALS and METHOD

A field experiment was conducted at the College Farm (380m above see level) to study the effect of two pesticides on sugar beet growth. Three treatments, viz. control, Malathion and Sevin were used in six plots each. Two concentrations of each of Malathion and Sevin, the recommended dose (1.09 kg/ha) and 50% higher than the recommended dose, were used. Sugar beet was sown in January, 2007 on ridges 70 cm apart and 10cm between plants. Urea fertilizer was used at a rate of 86 kg/ha after planting. Cultural practices were performed as recommended in the area.

The pesticides were sprayed one month after planting. Plots were separated by sacks to prevent lateral movement of the pesticides. The whole plants were pulled at maturity and then washed for different measurements. Soil samples were taken before and after planting from 30 cm depth for all treatments. Measurements taken were plant height (cm), fresh weight (gm), leaf area (cm²), PH, nitrogen and leaf number. The data was then subjected to statical analysis using MSTATC.

RESULT and DISCUSSION

Table 1 revealed a significant difference on plant height for the upper dose of Malathion where as no significant differences between the control and the recommended dose. The effect was clearly documented on Figure I. The same trend was observed for dry weight (gm), leaf area (cm²) and number of leaves per plant.

There was no significant differences between the control dose and the recommended dose for Sevin pesticide (table 1). However , both are significantly than tahen the upper dose (47 cm, 52.3 cm and 25.5 cm respectively). The effect was clearly documented on Figure 2. The same trend was observed for dry weight (gm), leaf area (cm²) and number of leaves per plant. Generally the recommended dose out yielded the control for all measured parameters at the two pesticides levels.

Table I : The effect of Malathion and Sevin pesticides on plant growth.

Pesticide	Treatment	Plant Height /(cm)	Dry weight (gms)	Leaf area (cm²)	No of leaves plant
Malathion	Control	47 A	480 A	53.2 A	16.0 A
	Recommended dose	50 A	498.3 A	54.1 A	19.0 A
	Upper dose	29 B	560.4 B	13.8 B	07.0 B
Sevin	Control	47 A	480 A	53.2 A	16.0 A
	Recommended dose	52.3 A	493.8 A	58.4 A	18.0 A
	Upper dose	25.5 B	65.2 B	18.3 B	11.0 B
LSD(5%)		3.1	18.3	6.3	3.1

- Means followed by the same capital letter for each column per pesticide are not significantly different at 5 % level.

Table II : The Soil analysis after and before planting

Pesticides	pH (suspension) 1:5	Total N %
Sevin, Recommended dose	6.8	0.034
Sevin, higher dose	6.6	0.014
Malathion, recommended dose	6.6	0.021
Malathion, higher dose	6.4	0.012
Soil, before planting	7.91	0.01
Soil after planting	6.8	0.034
LSD (5%)	1.1	0.01

Figure I: Effect of Sevin pesticides on sugar beet growth

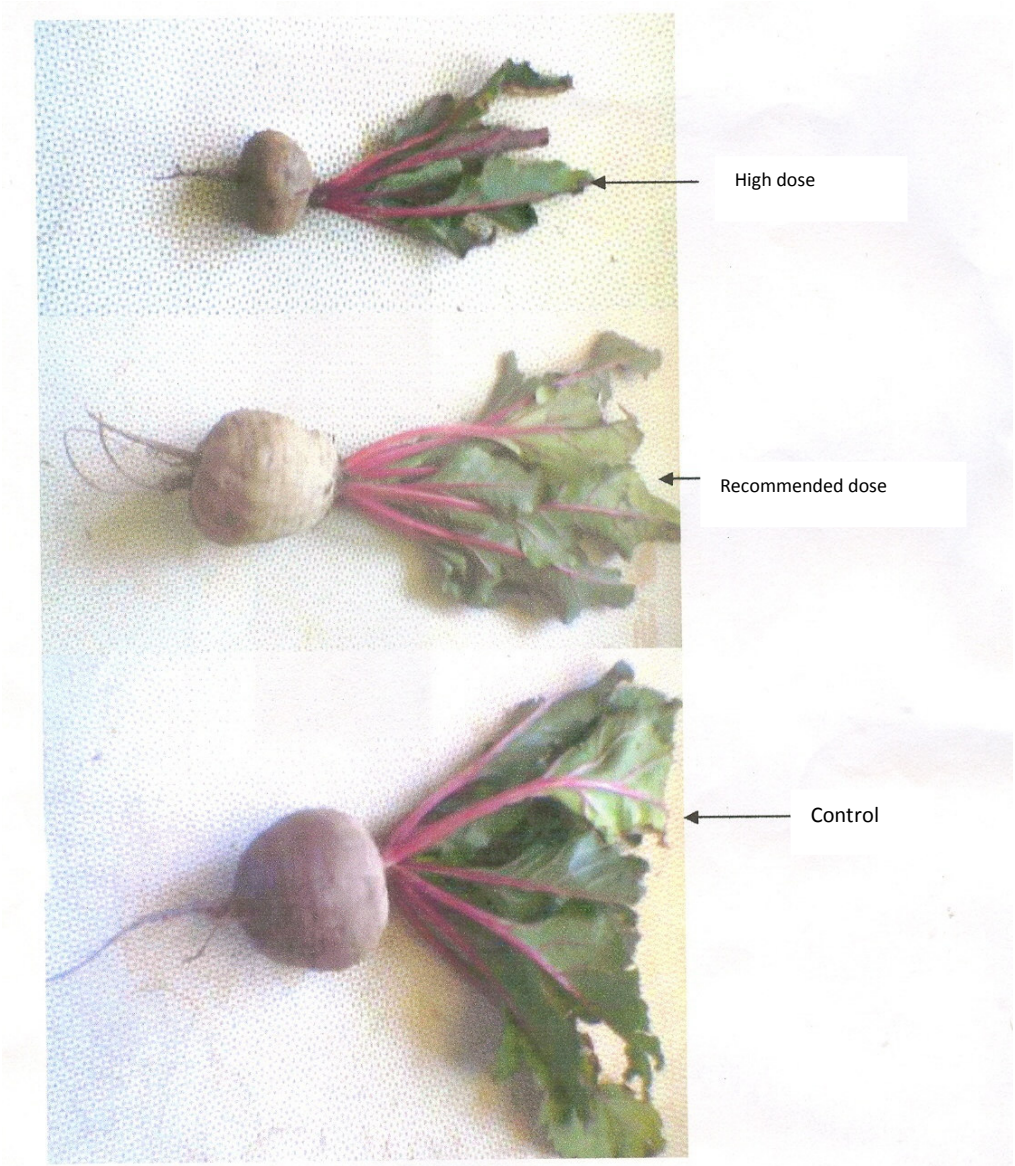

Figure 2 : Effect of Malathion pesticides on sugar beet growth

The effect of Sevin on growth of sugar beet was positive at the recommended dose and negative at the higher dose (Table I and figure 2). Dennis (1999) belived that the positive effect was due to the presence of nitrogen in the composition of Sevin. The highr dose resulted in root malformation and stunted growth as the higher dose affected soil micro organisms. Abdel Hamed (1989) found pesticides residues in the soil. Additionally, sevin resulted in changing the media from alkaline to acidity. This was supported by Omer (2001) findings at Al - Fashir district.

Malathion acted positively on all sugar beet parameters with the recommended dose but the increase was less than that of Sevin. The reason might be due to the lesser amount of nitrogen released by this pesticide. The same results were found by Traul (1987) in South Africa. He reported 2 ppm concentration of Malathion as an average for alfalfa, maize and watermelon. The presence of the pesticide might caused a big reduction in bacterial

number for two to three weeks followed by an increase in number (Shiahn, 1980). Abdel Jawad (2001) found a similar results and noted that, the pesticides will affect the bacteria responsible of changing nitrite to nitrate.

REFERENCE

1. Abdel Hamed, Z. H. (1989). Food pollution and pollutants. Ain shamish University. Arabic, distribution and printing House. Baruit, Lebnan.
2. Abdel Jawad, A. A. (2001). Agric. Soil pollution. University of Cairo Alsagafa House. Cairo. Egypt.
3. Ahmed, S.N. (1972). Principles of Crop Production. AL. Maaried Printing House. Cairo, Wgypt.
4. Dennis, G.A. and lee, P.N. (1999). Phase 1 volunteer, study to establish the degree of absorption and effect of cholinesterase activeity of four head lice preparation containing Malathion.
5. Khashin. (1980). Vegetables and fruit pollution. Arabic, distribution and Printing House. Baruit. Lebnan.
6. Mansour, K. (1991). The Impact of the application of Sevin on carrot root plant. Arabic distribution and Baruit, Lebnan.
7. Omer, I. S. (2001).Pesticides residues at Al Fashir District, West of Sudan.

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8. Samuel and Gamal, (2004). The effect of Pesticides residues on radish-growth. Research Project for B.Sc degree. Collefe of Agricultural Studies, Sudan University of Science and Technology. Khartoum.
9. Shiah, S. (1980). Mutagen City and DNA Damaging activity for several Pesticides tested with Bacilus Subtilis Mutants, Mutation Research-Station.
10. Trual K. J. (1987). Evaluation of Malathion in the bacterial micro organism, Mutahen City, American Cyanamid Company Project No 114, South Africa.
11. Zaki, M. M. (1978). Effect of chemical Pesticides on the environment. Ain shamish University. Arabic, distribution and printing House. Cairo. Egypt.
12. Younis, Z. M. (1979). The effect of chemical pesticides on the envir-onment. University of Alexandria, Egypt