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ORIGINAL ARTICLES

The Effect of Malathion (Organo Phosphate) and Sevin (Carbamate) Application on Garlic Plant and Soil

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ABSTRACT

An experiment was conducted at Shambat Agricultural Farm to study the effect of pesticides on soil and plant. Garlic was planted on January, 2007. Sevin and 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 (1.09 Kg/ha) gave positive effect on height, leaf area, weight and number of leaves per/ plant. The average plant height was 47.2-cm. compared with 45.35cm for the control. The weight average was 45.54 gms in comparison with control 40.30 gms . Number of leaves was 16 compared to 14 for the control. The leaf area was 12.37cm^2 compared to 13.71cm^2 for the control ,while the bulb weight was 25.63gm and 28.80gm compared to 18.46gm and 19.45gm for the increased dose of malathion and sevin respectively. The increased dose observed with Malathion.The recommended dose of both pesticides increased the total nitrogen percentage of the soil.

Key words: Garlic, Malathion, Pesticides, Sevin.

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. Zaki (1978) Stated that some pesticide might undergo a lot of changes and become more toxic. At the same time Abdel Jawad (2001) and others explained the effect of pesticides residues on plant and soil. Abdel Hamed (1989) pointed out that residues might affect the presence of some minerals especially trace elements. Soil fumigation with sodium sulphate resulted in rnanaganese and potassium increase. On the other hand, addition of sodium nitrite and other pesticides to the soil decreased the production of ammonia and change the ammonia to nitrate. Omer (2001) studied the residues at Fashir district. He found high amount of sevin pesticides of 0.0156 pprn .

Pesticides effect on soil was studied by many researchers Abdel Jawad 1993, Abdel Rahman (2005) and Garnal and Somoial (2004). They reported that soil worms were related to fertility specially forest soil where it acts as natural ploughing. A decrease of some nutrient 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 ad potassium were detected in the Soil. An experiment in the college of Agric. Studies, Sudan University of Science ad Tech. (2004) revealed that, Sevin and Malathion at different concentration in Soil resulted in a positive effect on radish growth at the recommended dose and negative effect at higher dose (Samuel and Gamal (2004).

The main objectives of this Study were:

1- To study the effect of pesticides residues on Garlic plant.
2- To study the effect of pesticides residues on agricultural Soil.
3- To study the effect of both Malathion and Sevin on the vegetative root parts of Garlic plant.

Material and Methods

A field experiment was conducted at the college Farm (380 m above sea level) to study the effect of two pesticides on garlic growth . Three treatments control , Malathion and Sevin were used in six plots each . two concentrations of each compared below and above the recommended dose 1.09 kg/ha were used .Garlic plant was sown in January 2007 on ridges 70 cm. apart and 10cm between plants. Urea fertilizer was used at a rate of 86 kg/feddan.

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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 and then washed for different measurement . Soil samples were taken from 30cm depth for treatments .Measurment taken were plant height (cm), fresh weight (gm),leaf area(cm^2),pH, number of leaves/ plant and nitrogen content before and after planting . The data was subjected to statistical analysis using MSTAT-C package.

Results and Discussion

Table (1) revealed a significant decrease on plant height of garlic for the upper dose of Malathion and sevin where as no significant difference between the two pesticides effect . The same trend was observed for number of leaves but the decrease was more for malathion . Plant weight was affected negatively but the pesticide dose and both less or excess dose reduce the weight significantly (table1) but the effect was more pronounced for the less than the recommended dose. However, there was no significant differences between the two pesticides while the reduction was more pronounced for malathion. Table 1 also showed the significant reduction in bulb weight of both doses but the less recommended dose resulted in most reduction for both pesticides.

The effects of both pesticide on soil was shown on table 2. Total nitrogen percent was increased after the application of the recommended dose for both pesticides and the increase was only significant for sevin (0.038%). However, the application of less or excess doses affect the percent total nitrogen negatively, but the effect was only significant for the excess dose. The soil pH was reduced after the application of the pesticide (table2), but the reduction was only significant for the recommended dose and the excess dose for both pesticides.

The results clearly indicated the negative effect of both pesticides on garlic growth . The effect of less than recommended dose as shown in table 1, reduce all parameters. This was in line with Poyer (2003) findings that the negative effect of the pesticide on plants was due to the less nitrogen content in the pesticide. The effect of pesticides was more pronounced for the excess dose in all parameters. Dennis (1999) explained that the higher dose will cause abnormal and stunted growth which affect water absorption. Poyer (2003) added that the high dose affected the photosynthetic rate through the pesticide interference with Co_2 rate inside the plant cell and through its effect on green plastids which will in turn affect Co_2 fixation.

Yassan (2003) - stated the effect of pesticides residues on plant cells by its toxicity on photosynthesis process and its interference with absorption of elements especially the rare trace elements .

Table 1: Effect of Malathion and Sevin pesticide on garlic growth.

Dose	Pesticide	Plant Height (cm)	Number Of leves Per plant	Plant weight (gm)	Bulb weight (gm)
Recommended Doses(control)	Malathion	47.70	16	45.54	25.63
	Sevin	49.90	16	28.25	28.80
Less than Recommended Dose	Malathion	37.70	13	20.85	12.37
	Sevin	45.20	13	30.39	17.52
Excess Dose	Malathion	41.70	11	30.97	18.46
	Sevin	41.20	12	36.70	19.45
LSD (5%)	-	4.23	3.17	14.25	7.26

Table 2: Effect of Malathion and Sevin pesticide on Soil.

Dose	Pesticides	Total Nitrogen %	pH
Befoe Application	-	0.020	8.1
Recommended Dose(control)	Malathion	0.024	6.8
	Sevin	0.038	6.9
Less than Recommended Dose	Malathion	0.019	7.1
	Sevin	0.021	7.3
Excess Dose	Malathion	0.016	6.2
	Sevin	0.018	6.7
LSD (5%)	-	0.004	1.1

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