Chapter One

INTRODUCTION

Pesticides are the only toxic substances released intentionally into our environment to kill living things. They include substances that kill weeds (herbicides), insects (insecticides), fungus (fungicides), rodents (rodenticides) and others.

The use of toxic pesticides to manage pest problems has become a common practice around the world.

Pesticides are used almost everywhere, not only in agricultural fields but also in homes, parks, school, builds, forests and roads. It is difficult to find somewhere where pesticides aren't used. Our world is filled with pesticides, which, can be found in the air we breath, the food we eat and the water we drink.

Pesticides have been linked to a wide range of human health hazards, ranging from short- term impacts such as headaches to chronic impacts like cancer, reproductive harm and endocrine disruption.

Acute dangers such as nerve skin, and eye irritation and damage, headaches, dizziness nausea, fatigue, and systemic poisoning can sometimes be dramatic and even occasionally fatal.

Pesticides are toxic to living organisms. Some can accumulate in water systems, pollute the air and in some cases have other dramatic environmental effects. Scientists were discovering new threats to the

environment that are equally disturbing. Pesticides use can damage agricultural land by harming beneficial insect species, soil microorganisms, and worms which naturally limit populations and maintain soil health. They also responsible for weakening plant root system and reducing concentration of essential plant nutrients in the soil such as nitrogen and phosphorus.

Right to know provide free and universal notification to resident about pesticides use, including who is using chemicals, where, when, how, what pesticides are being used and why.

Unfortunately, many pesticides can kill more than just their intended targets, namely the necessary microorganisms in the soil. When chemicals are used for a period of time on plant in an area, they will eventually leach into the soil, once in the soil, they can kill the microorganisms living in the soil that break down organic material and aid in plant growth, it can take years before microorganisms can once again live in soil that has toxic chemicals applied to it.

For the average gardener, the use of organic pesticides can keep a healthy balance in the soil. Many organic pesticides are made of minerals or other plant materials that will keep pests and break down quickly in the soil.

Radish (*Raphanus sativus*) is an edible root vegetable of the Brassicaceae family that was domesticated in Europe in Pre- Roman times.

Radish are grown and consumed throughout the world, being mostly eaten raw as crunchy salad vegetable they have numerous varieties varying in size, color and length of time they take to mature. They are sometimes grown as companion plants. They germinate quickly and grow rapidly, smaller varieties being ready for consumption within a month, while larger varieties taking several months. Some radishes are grown for their oil seed radishes, for instance maybe grown for oil production, other are used for sprouting and both roots and leaves are sometimes cooked.

Radishes are vulnerable to several types of insect pests, including cutworm, aphids, flea beetles and root maggots. All but the last damage the plants by eating the leaves, stems and sap. Root maggots tunnel into the radish roots causing root rot and sometimes killing the plant. Radishes are also susceptible to attack from several types of fungus, including those cause club root, downy mildew black rot and leaf spot.

The objectives:

1- To study the effect of two pesticides (Folimat and Icarose) on radish growth.

2- To study the effect of those two pesticides on agricultural soil.

Chapter Tow

LITERATURE REVIEW

2:1 The environment impact of pesticides:

Use of chemical inputs such as pesticides has increased agricultural production and productivity. However, negative externalities from such use have increased too. These externalities include damage to agricultural land, fauna and flora. Another major externality is the destruction of beneficial predators of pests, thereby increasing the virulence of many species of agricultural pests. Furthermore, increased mortality and morbidity of humans due to exposure to pesticides are recorded especially in developing countries. However, despite these negative impacts farmers continue to use pesticides and in most countries in increasing quantities so as to increase production.

The Environmental impact of pesticides consists of the effect of pesticides on non target species. Over 90% of sprayed insecticides and 95% of herbicides reach a destination of their target species, because they are sprayed or spread across entire agricultural fields (Miller, 2004). Run off can carry pesticides into aquatic environments while wind can carry them to other species. Other problems emerge from poor, production, transport and storage practices. (Tashkent 1998) It had been reported that over time application increases post resistance, while its effects on other species can facilitate the pest's resurgence (Damaalas, and Elcftherohorinos, 2011).

Pesticides can contribute to air pollution. Pesticide drift occurs when pesticides suspended the air as particles are carried by wind to other areas, potentially contaminating them (Retrieved on, 2007).

Pesticides that are applied to crops can volatilize and may be blown by wind into nearby areas, potentially posing a threat to wild life. Weather conditions at the time of application as well as temperature and relative humidity change the spread of the pesticide in the air. As wind velocity in areas so does the spray drift and exposure low relative humidity and high temperature result in more spray evaporating. The amount of enterable pesticides in the out door environment is therefore often dependent on the season (Damalas, 2011). Also droplets of sprayed pesticides or particles from pesticides applied as dusts may travel on the wind to other areas, (2007). Pesticides may adhere to substance that blow in the wind, such as dust particles. On Farmers can employ a buffer zone around their crop, consisting of empty land or non- crop plants such as evergreen trees to secure as wind breaks and absorb the pesticides, preventing drift into other areas, (1999).

Pesticides that are sprayed on to fields and used to fumigate soil can give off chemicals called volatile organic compound, which can react with other chemicals and form a pollutant, (2006). What's up Doc? May be less air pollution state wide IPM program, Agriculture.

2:2 The effect of pesticides application on crop growth:

Dennis (1999) observed that tomato (*Lycopersicon esculentum* L.) suffered from dwarfism when treated with an over dose of the Sevin. He ascribed this phenomenon to the deformation of roots accmpained by its incapacity to absorb water and nutritional elements. When the same experiment was conducted using carrot (*Daucus carota* L.). The negative part was greatly increased. Abdalgawad (2001) perfomed an experiment to investigate the effect of Sevin was significantly increased. This could be related to the fact that Sevin acts as growth horomon in certain plants (Younis, 1979). Working on Sevin on lettuce, noticed an increase in the negative 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 roots were greatly affected. Traual (1987) in South Africa, found a negative result of Malathion in Alfalfa, maize and water melon.

2:3 The effect of pesticides application on radish growth:

Experiment carried at Shambat Agricultural farm revealed that Sevin and Malthion at different concentration in soil resulted in a positive effect on radish growth at the recommended doze and negative effect at the higher doze (Samual and Camal, 2004). The residual effect of those insecticides was also studied by (Gafar *et al*, 2012). They reported that the dry weight and length of radish were positively affected. The average length and weight of the treated

plants were 5.2cm and 13.2g higher than their counterpart values of the control respectively. However, when an over doze was examined it negatively affected both variables.

2:4 The effect of pesticides application on agricultural soil:

Many of the chemical used in pesticides are persistent soil contaminate whose impact may endure for decades and adversely affect soil conservation, Environmental Protection Agency (2007), the use of pesticides decrease the general biodiversity in the soil. Not using the chemicals result in higher soil quality (Johnston, 1986).

That more organic matter in the soil allows for higher water retention (Kellogg and Plokins, 2000). This helps increase yields for farms in drought years as organic farms have had yield 20 – 40% higher than their conventional counter parts (Lotter and Liebhardt, 2007).

In addition content smaller of organic matter in the soil increases the amount of pesticides that will leave the area of application, because organic matter binds and helps break down pesticides (Kellogg RL and Plokins, 2000). Degradation and pollution is defined as the chemical or materials, entered into the soil, which caused interference in the natural balance of soil. Material and particles aggregated during the long time in the soil are considered as an important factor in pollution.

Soil pollution will cause loss of vegetation and decrease growth and development of the plants and ultimately lead to the soil erosion and desertification entitled soil (Khakbaz *et al*, 2012). The soil will be polluted are caused by vehicle.

Human activities will also pollute the soil. Dumping toxic substances like different types of solvent, colored materials and detergents will extend earth and soil pollution (Bavandi, Bijan,1975). The heavy and rare elements are of the pollutants which are placed on the soil absorbent complex surfaces and will cause chemical pollution then the polluted soil entered human and animal food chain and consequently, will bring about unpleasant health hazards in the environment (Danesh, 2008). Heavy metals are the elements with atomic weight, ranging from 63.54 to 200.59, and specific weight more than 4.

Some heavy metals are required in little amount by living organisms, although excessive increase of the same essential, heavy metals can be harmful for the organisms.

The unnecessary heavy metals include arsenic, antimony, cadmium chrome, mercury and lead. These metals are very important with relation to the pollution of soil and surface waters Jordan Gil, (1971). Excessive use of agricultural fertilizer and pesticides, antibiotics and hormones in livestock and irrigation farms.

With contaminated waste water are agricultural factors affecting soil pollution. Cancer, nervous, respiratory and skin disease are of the long- term effects of pesticides on human.

Pesticides enter the soil indifferent ways which include: through direct application in the soil, through spraying and return of pesticides particles suspended in air and their sitting on the ground and plant residues that are added to the soil and the toxins absorbed by the soil organisms.

Chemical pesticides create soil pollution. A number of pests' insects are strengthened against consumable pesticides. Under such circumstances, we have to either increase the number of spraying increase concentration of toxins. These toxins are not decomposed easily and will remain in soil for many years http//www.ebi.ac

Sorptions are both factors which influence the persistence of pesticides in soil. Depending on the chemical nature of the pesticides, such processes control directly the transportation from the soil to water, and in turn to air and our food. Breaking down organic substances, degradation involves interactions among microorganisms in the soil. Sorption affects bioaccumulation of pH and mostly acidic structure. Sorbet chemicals have been shown to be less accessible to microorganisms. Aging mechanism are poorly understood but as residence times in soil increase, pesticide residence times in soil increase, pesticides residues become more resistant to degradation and extraction as they lose biological activity (Estevez *et* al., 2008).

Nitrogen fixation which is required for the growth of higher plants, is hindered by pesticides in soil (Rockets Rusty, 2007). The insecticides DDT, Methy/ parathion, and especially peatachioro-phenol have been shown to interfere with legume- rihzobium chemical signaling. (Rocket Rusty 2007).

Root nodule formation in these plant saves the world economy 10$ billion in synthetic nitrogen fertilizer every year(fox and Mclach, 2007).

On the other side, pesticides have some direct harmful effect on plant including poor root hair development, shoot yellowing and reduced plant growth (Walley and Lupwayi, 2006). Field and laboratory studies showed that pesticides applied to soil at recommended levels rarely had detrimental effect on microbial populations or their activities. When significant changes were observed, a recovery of populations or activities was usually observed 1-3 weeks. This seems partly to confirm the common belief that pesticides applied at recommended levels and intervals are seldom deterious to the beneficial microorganisms and their activities (Wainright, 1978).

Previous studies (Zakki, 1978) have shown that the residues of certain pesticides in soil lead to either increase or decrease in the nutritional elements in soil depending on many interacting factors. Shih, (1980) studied the relation between the concentration of

different pesticides in the soil and their concentration in the plant. The result showed that the ratio fluctuates between 1:1to1:6.

Haworth (1983) demonstrated that, the type of soil has a great impact on residus detected in plant. He found out the amount of lidance detected in carrot (*Dacus Carota*) grown on sand – silt and clay soils was 5.99 ppm, 2.41ppm and 0.156ppm respectively. Omer (2001) investigated the possibility of contamination of soil with Sevin after 7 years had elapsed and documented that, the soil remained contaminated throughout these years.

In fact the result of soil analysis showed that 0.156 ppm of Sevin was detected at the end of the 7^{th} year.

2:5 water pollution:

Water is a unique substance, because it can naturally renew and cleans it self, by allowing pollutants to settle out (through the process of sedimentation) or break down or by dilution the pollutants to a point where they are not in harmful concentrations. However this natural process takes time and is different when excessive quantities of harmful contaminates are added to the water and humans are using more and more materials that are polluting the water sources that we drink from.

Water pollution includes all of the waters materials that cannot be naturally break down by water; these materials include fertilizers and pesticides added to the soil.

Pollution is the contamination of air, soil, or water by the discharge of harmful substances. Pollution prevention is the reduction or elimination of pollution at source (source reduction) instead of at the end - of - the pip or stack. Pollution prevention occurs when raw materials, water, energy and other resource are utilized more efficiently, when less harmful substance are substituted of hazardous ones, and when Toxic substances are eliminated from the production process. By reducing the use and production of hazardous substances and by operating more efficiently we protect human health, strengthen our economic and pressure the environment.

2:6 Retention of pesticides in the soil:

Retention prefers to the ability of the soil to hold pesticides in place and not allow it to be transported. Adsorption is the primary process of how the soil retains a pesticides and it defined as the accumulation of a pesticide on the soil particle surfaces. Pesticides adsorption to soil depends on both the chemical properties of the organic matter and clay content, PH, surface charge characteristics, permeability. For most pesticides, organic matter is the most important soil property controlling the degree of adsorption.

For most pesticides, the degree of adsorption is described by an adsorption distribution coefficient (k_a), which is mathematically

defined as the amount of pesticides in soil solution divided by the amount adsorbed to the soil.

2:7 Fates of pesticides in the environment:

Ideally, a pesticides stays in the treated area long enough to produce the desired effect and then degrades into harmless materials. Three primary modes of degradation occur in soil.

- Biological – break down by microorganisms.
- Chemical – break down by chemical reactions, such as hydrolysis and redox reactions.
- Photochemical – break down by ultraviolet or visible light.

The rate at which a chemical degrades is expressed as the half-life. The half- life is the amount of time it takes for half of the pesticides to be converted into something else, or its concentration is half of its initial level. The half- life of pesticides depends on soil type, its formulation, and environmental condition (e. g. Temperature, moisture). Other processes that influence the fate of the chemical include plant uptake, soil sorption, leaching, and volatilization. If pesticides move off – site (e. g. wind drift, run off, leaching), they are considered to be pollutants. The potential for pesticides to move off-site depends on the chemical properties, rate and method of application, pesticides pesticide persistence, frequency and timing of rainfall or irrigation, and depth to ground water.

2:8 Eliminating pesticides:

Many alternatives are available to reduce the effect pesticides have on the environment. Alternatives include manual removed, applying heat covering weeds with plastic, placing traps and lure, removing pest breeding site, maintaining healthy soil, more resistant plants, cropping native pests and supporting biocontrol agents such as birds and other pest predators, Take Action (2003).

Biological controls such as resistant plant varieties and the use of pheromones have been successful and times permanently resolve a pest problem (Lewis, 1997). Integrated Pest Management (IPM) employs chemical use only when other integrated one ineffective. IPM causes less harm to humans and the environment. The focus is broader than on a specific pest, considering ranges of pest control alternatives (Thad Godish, 2000).

Chapter Three

MATERIALS AND METHODS

3:1 Study area:

An experiment was conducted 0n November 2014, at the farm of the College of Agricultural Studies (380 meter) above the sea level in Sudan University of Science and Technology, Khartoum North, Sudan, dry and semi- dry climate, latitudes 15° and 40- North longitude 22° 32- E.

Radish seeds were sown by hand on mid December, two rows on ridge of 60 cm apart and with intra- row spacing of 5 cm. The crop was thinned to one plant per hill. Cultural practices were done as recommended by the ARC. Folimat and Icaros were applied one month after sowing as aqueous pray, at a volume rate of 120L per feddan. Untreated control was included for comparison. The plots received 4 hands weeding at biweekly interval standing from sowing; sub- plot size was 7×2.4m. The treatments were arranged in a randomized complete block design with 3 replicates.

Urea and phosphorus fertilizers were used at the rate of 150kg/ha and 120kg/ha respectively. 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 were washed for different measurements. Soil samples were taken before and after planting, 30 cm depth for all measurements.

3:2 Measurements of plants:

For all treatments of plant height (cm), root fresh and dry weight (g) and leaf area (cm^2).

3:3 Soil analysis:

The distributed samples were collected from surface soil by auger, were dried under shade by spreading on sheets of stout paper placed inside wooden trays. Each sample was then divided into two unequal portions. The smaller portions were stored in polythen bags. The major portions were grinded and sieved (2mm), the fine earth of each subsample was thoroughly mixed and placed inside labeled glass jars with screw tops.

The chemical characteristics determined on samples were as follows:

Chemical analyses were carried out for soil ECe ds/m by E.C meter of the saturation extract, pH by pH meter of the saturation.

The nitrogen % by Kjeladhal method, phosphorus (ppm) by Spectrophotometer, soluble sodium and potassium (meg/L) by Flame photometer, calcium carbonate % by Calcimeter, CO_3 and HCO_3 (meg/L) by titration of hydrochloric acid, calcium + magnesium meg/L by titration of EDTA and chloride meg/L by titration of $AgNO_3$.

Chapter Four

RESULTS AND DISCUSSION

4:1 The effect of Folimat and Icarose pesticides on radish growth:

4:1:1 fresh weight (g):

The data in table (1) showed that the highest fresh weight for radish plants was recorded for the recommended dose Folimat (683.77g) with no significant difference compared with control treatment whereas, the lowest fresh weight was reported for the upper dose (251.53g) which was significantly lower compare to each of the control and other recommended dose.

When the pesticides Icarose was used, the result revealed that the fresh weight for radish followed the same trend as that for folimat.viz. the fresh weight was given by the recommended dose (589.07g) which was not significant compared to the control (467.23g) and significantly different compared to the upper dose which gave the lowest fresh weight (302.17g).

4:1:2 dry weight (g):

The data for the dry weight of radish almost followed the same trend on that for the fresh weight. The recommended dose of both pesticides gave the highest dry weight (149.87g and 122.33g for Folimat and Icarose respectively.) the difference between the recommend dose and the control was not significant for both pesticides.

The data also showed that the lowest dry weight was reported by the upper doses of the two pesticides (33.07g and 23.67g) for Folimat and Icarose respectively (Table 1).

Gafar *et al*, (2012) stated that the dry weight and length of radish were positively affected when pesticides were applied at the recommended dose, at the height doses (Table 1).

4:1:3 leaf area (cm^2):

The data in table (1) revealed that no significant difference was reported between the recommended dose and the control for both pesticides in leaf area of radish plant, the result clearly showed that the highest values of leaf area were given by the recommended dose for both pesticides (173.2gcm^2 and 181.9g) for Folimat and Icarose

When excessive dose was applied of both mentioned pesticides the result showed that the lowest values of leaf area with the values of 106.60 cm^2 for folimat and 124.43 cm^2 for Icarose.

Younis (1979) working on Sevin on lettuce observed an increase in the vegetative growth two weeks after treatment he explained that the pesticides might work on Folimat fertilizer.

4:1:4 Root length (cm):

Table (1) showed the effect of difference treatments on radish root length. The data revealed that the recommended dose of both pesticides gave significantly longest radish roots with those values of 31.83cm and 30.43cm for Folimat and Icarose respectively but those

values were not significantly different compared to the control treatments which gave the values of 26.70cm and 29.ocm for Folimat and Icarose respectively. The result revealed that the result of the upper dose of both pesticidies gave the shortest roots (24.23 cm and 24.7cm) for Folimat and Icarose respectively) which were different compared to the control treatments as shown in table 1.

Dennis (1999) stated that an over dose pesticide resulted in the deformation of roots accompanied by its incapability to absorb water and nutrient.

Younis ((1979) working on Malathion in tomato, he found no effect on plant height but roots were greatly affected. Experiment carried out Shambat revealed that Sevin and Malation pesticides resulted in a positive effect on radish growth at the recommended dose and negative effect at higher dose (Sanual Gamal, 2004). Walley and lupwayi (2006) reported that pesticides have some direct harmful effect on plant including poor root development, shoot yellowing and reduced plant growth.

It can be concluded that generally the resulted of this study reveled that all examined parameters (fresh and dry weight, leaf area and root length of radish plant) followed the same trend with the two studied pesticides. The recommended dose out-yielded the control treatment with no significant difference between then and that the upper dose of both pesticides gave significantly lowest value of each of the examined trait.

Soil analyses:

Soil samples were collected from each treatment before planting and after for chemical analysis. The results were shown in table (2).

The soil is alkaline in reaction with pH values of 7.9 and 7.8 for all treatments, which may indicate that the studied pesticides had no effect on soil pH. The electrical conductivity of the saturated soil extract ranged between 0.82 and 0.63ds/m indicating that the soil not saline. It also revealed that the application of the studied pesticides at different doses had no effect on the ECe ds/m values.

The soluble cations examined include Na^{+}, K^{+}, ca^{++} and Mg^{++} the result indicated that the concentrations of these cations were decreased with the applications of Folimat and Icarose. The highest concentrations of these cations were reported for the soil before planting, and after planting, the result they planting the result decreased with the application of pesticides at different doses. The soluble anions CO_3, HCO_3, Cl and SO_4 results decreased with the exception of sulphate (SO_4).

The application of both pesticides result in a noticeable difference in the concentrations of each of HCO_3, CO_3 and Cl. In case of the SO_4 a marked decrease in the concentration was observed when comparing the value of this anion reported for the soil before planting with the values after the application.

The soil total nitrogen was very low ranging between 0.02- 0.04% which was usual case in the arid and semi-arid regions of the Sudan.

The amount of available soil phosphorus for all treatments was low ranging between 6.0-7.3ppm. similar values of soil nitrogen and available soil phosphorus had been reported by Blockhuis (1993) for the Sudan soils of the two studied pesticides at different rates resulted in low calcium carbonate ($CaCO_3$) that were very close to each other ranging between 5.5 and 6.0%. This observation may suggest that the application of the studied pesticides at the two examined doses had no effect on the amount of $CaCO_3$ in the soil. The decrease or increase in some soil parameters mainly due to effect of pesticides reactions, but the general reduction was noticed during the excessive dose of both pesticides.

Over 90% of sprayed insecticides and 95% of herbicides reach a destination of their target species because they sprayed across entire agricultural fields (Miller, 2004).

According to Restrieredon (2007) pesticide drift when particular suspended in air are carried by wind to other areas potentially contaminating the soil. Johaston (1986) reported that the use of pesticides decreases the general biodiversity in the soil.

Organic matter in the soil increases the amount of pesticides that will live in the area of application, because organic matter leads to and helps break down pesticides (Kelloggal and Plotking, 2000).

Pesticides applied to the soil at recommended levels and intervals are seldom deterious to the beneficial microorganisms and their activities (Wainivigh, 1978). Omer (2001) investigated the possibility of contamination of soil with Sevin after 7 years had elapsed and documented that the soil was still contaminated o.150ppm of Sevin was detected at the end of the 7^{th} year.

Soil pollution with pesticides will decrease the growth and development of vegetable plants and ultimately lead to the soil erosion and desertification (Khakbaz *et al*, 2012). The decrease of soil fertility mainly due to the pollution (Table 2).

Table(1): the effect of folimat and Icrose pesticides on radish growth

Pesticide	Treatment	Fresh weight (g)	Dry weight (g)	Leaf area (cm^2)	Root length (cm)
Folimat	Control	530.93^{ab}	106.83^{ab}	153.43^{ab}	26.70^{abc}
	Recommended dose	683.77^{a}	149.87^{a}	173.27^{a}	31.83^{a}
	Upper dose	251^{d}	33.07^{b}	106.60^{b}	24.23^{c}
	Control	467.23^{bc}	101.00^{ab}	148.93^{ab}	29.00^{abc}
Icarose	Recommended dose	589.07^{ab}	122.33^{a}	181.97^{a}	30.43^{ab}
	Upper dose	302.17^{cd}	73.67^{ab}	124.43^{ab}	24.70^{bc}
L.S.D		202.11	87.08	64.36	6.11
SE±		90.71	39.08	28.88	2.74
CV%		23.60	48.94	23.88	12.07

Table (2): soil analysis before planting and after pesticides(folimat and Icrose applications

Treatment	PH paste	ECe Ds/m	Soluble cations Meg/L				Soluble anions meg/L				Total N %	P ppm	$CaCO_3$ %
			Na	K	Ca	Mg	HCO_3	CO_3	Cl	SO_4			
Soil before planting	7.9	0.82	6.4	1.3	2.4	1.6	2.8	0.0	7	8.6	0.02	6.0	6.0
Folimat,recommended dose	7.8	0.66	5.5	0.3	0.7	1.1	2.7	0.0	6	3.9	0.04	6.4	5.8
Folimat, upper dose	7.9	0.63	4.8	0.1	0.7	0.9	2.5	0.0	5	3.0	0.03	8.0	5.5
Soil before planting	7.9	0.28	6.4	1.3	2.4	1.6	2.8	0.0	7.0	8.6	0.02	6.0	6.0
Icrose,recommended dose	7.9	0.63	5.1	0.1	0.9	1.0	2.8	0.0	5.5	3.4	0.02	7.3	5.8
Icrose,upper doae	7.9	0.73	5.7	0.1	0.6	0.8	3.0	0.0	5.0	3.2	0.04	6.6	5.5

Chapter Five

CONCLUSION AND RECOMMENDATIONS

5:1 Conclusion:

The main findings in this study can be summarized as follows:-

1. The recommended dose of each of the studied pesticides (Folimat and Icarose) gave the highest values of each of fresh weight, dry weight, leaf area and root length of radish plant, but these values were not significantly different compared to the control treatments.

2. The upper dose of the examined pesticides resulted in the lowest values of each of the studied parameters which were significantly different compared to the control treatment.

3. The result of soil chemical analyses revealed that the examined pesticides had no noticeable effect on each of soil pH, ECe, soluble anions except for SO_4, total soil nitrogen, available soil phosphors and percentage $CaCO_3$. Whereas, the values revealed for each of soluble cat ions (Na^+, K^+, Ca^{++} and mg^{++}) and SO_4 decreased with the applications of each of the studied pesticides compared to their values for the soil before planting.

5: 2 Recommendations:-

The following recommendations can be withdrawn from this study:-

1. Pesticides should be applied at the lowest effective level (recommended dose).
2. Apply proper rates and times and label indicated.
3. Calibrate application equipment.
4. Apply formation that minimizes drift.
5. Use safety equipments where handling.
6. Use integrated pest control.
7. Alter farming or cropping systems control pests.

Referecnces:

Arias – Estevez, Manuel; Euqerio Lopez Periaga – Rio (February 2008). The mobility and degradation of pesticides in soil and the pollution of groundwater resources" Agricultural, Ecosystem and Environment 123:47-260. Doi:10.1016/j.agee.2007-07-011.ISSN 0167 8809.Retrieved 2011-11-10.

Bavandi, Bijan, Ecossystem, pubilicable of the Department of the Environment (DOE).1975.

Damalas, C. A.; and Eleftherohorinos, I.G. (2011). "Pesticide Exposure. Safety Issues. and Risk Assessment Indicators''. International Journal of Environmental Research and public Health 8(12): 1402-19.doi:10.3390/ijerph8051402. PMC3108117. PMID21655127.edit.

Dennis, G, A.; and lee. PN, (1999). Phase I volunteer study to establish the degree of absorption and effect of cholinesterase activity of four head lice preparation containing Malathion.

Environment Canada (September- October 2001), Agricultural pesticides and the atmosphere. Retrieved on 2007- 10-12.

Environmental Protection Agency (2007). Sources of common contaminants and their health effects Epa. Gov. Retrived on 2007.

Erfan – Manesh, Majid, (2008). Environment, water, soil and Air pollution, publication of Arkan Danesh, 2008.

Estevez, Manuel; Eugenio Lopez- Periago, Elena Martinez- Garballo, Losu's Simal- Gandane, Juan- Carlos Mejuto, luis Garcia- Rio (2008).

Fox, JE,Gulledge, J, EngelhauPT, E, Burrow, ME and Melaehlan , JA(2007). Pesticides reduce symbioyic efficiency of nitrogen – Fixing rhizobia and host.

George Tyler Mller (1 January 2004), sustaining the Earth: An Integrated Approach. Thomson / Brooks/ cole. pp.211-216.ISBN 978-0-534-40088-0.

Gomez, K. A. and A. A. Gomez (1984). Statistical procedures in Agricultural Research 2nd ed. John Wiley and Sons Inc. New York.

http:// www.ebi.ac

John Ryan, George E. and Abdula R. (2001). Soil and Plant Analysis Laboratory Manual. Second Edition, (ICARDA).

Johnston, A. E. (1986), soil organic- matter, effect on soil and crops". Soil use management 2(3):97-105. Doi:150.1111/j.1475-2743-1986.Tb00690X.

Jordan, Gil, the Soviet Environment, Clear Greek, 1971.

Lewis, W. J. J. C.Van Lenteren, Sharad C. Phatak, and J. H. Tumlinson, III, "A total system approach to sustainable pest management." The national Academy of sciences 13 August 1997.web of science.

Lotter DW, Seidel R. and Liebhardtw (2003). The performance of organic and conventional cropping systems in an extreme tear".

American Journal of Alternative Agriculture (2003) 18(03):146-154, doi:10.1079/AJAA 200345.

National park service. US Department of the Interior. (August 1, 2006), sequoia and kings canton national park:Air quality – Airborne synthetic chemicals. NPS.gov.Retried on September 19, 2007.

Olsen, S. R. and Cole, C. N. (1954). Estimation of available phosphorous in soil by extraction with $NaHCO_3$. W. S. Dept. Agric. Circular No. 393.

Palmer, WE, Bromly, PT, and Brandenburg, RL.wild life and pesticides – peanuts. North Carolina cooperative Extension service. Retrieved on 2007-10-11.

Pesticide Registration (PR) notice 2001-X Draft: spray and dust drift lable statements for pesticides products, Epa.gov. Retrieved on September 19, 2007.

Richard, A. (1954). Diagnosis and improvement of saline and alkali soils. Hand Book No. 60. USA.

Rockets, Rusty (June 8, 2007), Down on the farm? Yield, Nutrients and soil Quality. Science ceagogo-com Retrieved on September 15.2007.

Science Daily (November 19, 1999), Envergreens help block spread of pesticide from crop fields. Science daily.com. Retrieved on September 19, 2007.

Tashkent (1998), part1.conditions and provisions for developing a national strategy for biodiversity conservation. Biodiversity conservation national strategy and action plan of Republic of Uzbekistan. Prepared by the national Biodiversity strategy project steeying committee with the Financial Assistance of the Global Environment facility (GEF) and technical Assistance of United Nations Development programme (UNDP). Retrieved on September 17, 2007.

Thad godish (2 November 2000). In door Environmental / Quality. CRC press. Pp.325 –326.15BN9781- 4200 – 5674 -7.

"Take Action How to eliminate pesticides use", (2003). National Audubon Society. pages 1-3.

U.S. Environment protection Agency (2007), sources of common contaminants and their health effect. Epa. gov. Rtrived on 2007-10-10.

UC IPM online. (August 11, 2006), what, up, Doc? May be less air pollution. State wide IPM programme agriculture and natural Resources, university of California. IPM. Ucdavies. edu. Retrieved on 2007-10-15 Kellogg RL, Nehring R, Grube A, Goss DW, and Plotkins (February 2000), Environmental indicators of pesticides leading and run off from farm fields.

United states Department of Agriculture (2007) Resources conservation service. Retrieved on 2007-10-03.

US environmental protection Agency (September11th, 2007).

Walley F, Taylor A and Lupwayi (2006) Herbicide effects on pulse crop nodulation and nitrogen fixation. Farm tech 2006 proceedings 121-123.