Sultanate of Oman
Ministry of Education
Al Dhahirah Governorate
Souda Umm Al-Mu'minin Primary School (5-12)

The effect of using (Deltarin) pesticide on plant growth and on agricultural soil properties

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Abstract:

Our research aims to study the effect of pesticides (DalSoRain) DELTARIN on agricultural crops as well as its effect on soil and agricultural and whereas, by conducting some interviews on farms. We found out that farmers suffer from the problem of the spread of some plants in their farms, including the (Portulaca oleracea), as a result of using a type of pesticide. So, we decided to study the case and follow up on it.

After conducting a practical experiment by planting two fields with lettuce and soil and amount of water and sunlight. The independent variable was spraying the pesticide on one of the fields while monitoring the growth of the crops. We found that the lettuce plant grows normally at appropriate lengths, unlike the plant that was sprayed, which was shorter. The sprayed plant's green leaves have changed also; yellow spots have appeared on it, with a significant increase in the number of leaves on the plant. As for the intended plant, it did not grow due to the weather conditions. So, it has become clear to us that it grows faster in the summer, and we have noticed the growth of some unwanted plants in the study area. In addition to the weeds. Our study was in January and February, i.e. winter. And with the study of the soils, it was shown to us that the properties of soils and agriculture changed to the part that

was sprayed with pesticide. Its acidity has changed (decreased) and its salinity has increased significantly.

Therefore, we demand the Ministry of Agriculture and Fisheries to pay attention to the issue of pesticides, and putting explanatory brochures for the farmers to explain its impact over time and trying to replace them with other pesticides which are inspired from the environment.

Key terms:

Deltarin pesticide: It is a pesticide used for killing the agricultural pests on vegetables.

Purslane: It is herbaceous plant with medicinal benefits, but its spread in the field leads to the drying out of some plants because they need a lot of water.

Lettuce: a type of leafy vegetable that is beneficial to humans.

Research questions:

1- How much influence Deltarin pesticide on the growth of the legume plant and Portulaca oleracea?

2- How does the pesticide affect agricultural crops?

3- What is the effect of pesticide on soil and agricultural?

Introduction:

Pesticides have contributed greatly to increasing agricultural production and meeting humanity's growing food needs. Despite the great benefits that pesticides have provided to humanity, their danger to humans, living organisms and all elements of the ecosystem is considered one of the most important challenges facing humanity at the present time. Dealing with these chemicals requires the utmost caution and care.

From this standpoint, our research aims to address the problem of using some pesticides for agricultural pests, which led to the spread of unwanted plants. It's using affects some agricultural crops; which is the basis of any food chain. As it is the main product, we had to quickly search for a solution to this problem and fix it. Beneficiaries of studies conducted by Ibri School, which resulted in the effectiveness of using neem leaves (Azadirachta) as a pesticide. Hoping from God Almighty all the best.

Research methods:

First: Research plan

1- Identify the existing farms in the villages.

2- Visit the specified sites.

3- Collecting information about the research topic from various information sources.

4- Setting a timetable for implementing the research plan.

5- Distributing the roles to the research team.

6- Using the soil protocol and vegetation cover to determine the extent of soil impact on agricultural crops.

7- Cooperation with the Department of Agricultural Development in Yanqul.

8- Reaching the result and make recommendations.

Distribution the rules on the research team:

Implementation date	Mission	Student's name
January 2025	Collect information about the research topic from different sources.	Aya Al Ghafri Lian Al-Yaqoubi
January 7, 2025	Interviewing farmers	Aya Al Ghafri Lian Al-Yaqoubi
18 January - 4 February 2025	Test the effect of pesticide on plant growth and observe growth and soil properties	Aya Al Ghafri Lian Al-Yaqoubi
February 5, 2025	Interviewing an agricultural engineer specializing in pesticides	Aya Al Ghafri Lian Al-Yaqoubi
12-16 February 2025	Note the final results and write the research.	Aya Al Ghafri Lian Al-Yaqoubi
17-18 February 2025	Complete research and review	Aya Al Ghafri Lian Al-Yaqoubi
18-20 February 2025	Complete research and make recommendations	Aya Al Ghafri Lian Al-Yaqoubi

Search method:

The research questions will also be answered as follows:

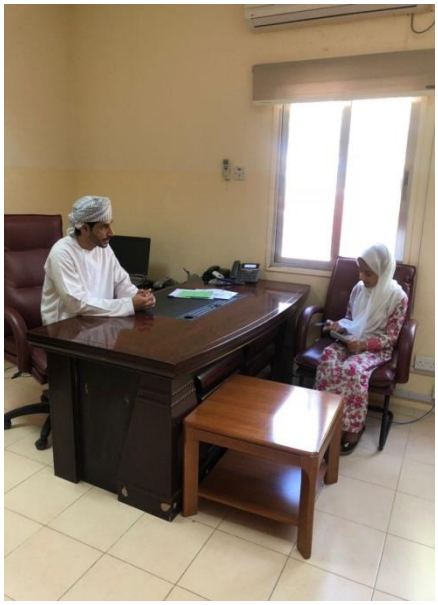
1- Interviews.

2- Experimentation.

3- Using the plant protocol to measure the growth of a legume plant and Portulaca oleracea.

4- Measure the length of lettuce seedlings and the number of its leaves.

5- Using the soil protocol to know the fertility of the soil.



Pictures showing some interviews with farmers and engineers specializing in pesticides

Questions asked during the interview of agricultural engineers:

1- Does Deltarin pesticide affect on plant growth and leaves?

Yes, there are some pesticides that may affect the color of plant leaves.

2- Are there other alternatives to pesticides?

Organic materials from the environment can be used.

3- What are the safest pesticides?

There are no 100% safe pesticides, but there are less toxic types.

4- Does the pesticide affect the soil?

Yes, it does, studies have proven that.

Practical experiment: Planting lettuce seedlings in two fields; one is sprayed with pesticide and the other is not.

Applying the vegetation protocol in the field to determine the heights of plants and the number of their leaves, as well as the changes that occur to them, such as color.

Calculate the height of a lettuce plant. Then, watch the number of leaves of a lettuce plant.

Note: Unwanted plants have appeared and the color of the plant leaves changing to brown.

Application protocols to clarify properties of soil in position of the study (The farm).

Second: Study location

The study was in January and February, in wilayat of Ibri, at DrizIn village in Al-Dhahirah Governorate. The weather was cold; the temperature was 20 degrees Celsius.
The used Protocols: Soil protocol and Vegetation Protocol.
Coordinates:
Longitude: 23.31 Latitude: 56.32 Altitude: 499 m
The maps site explains:

Data collection and analysis:

1- Use of the plant protocol to measure the growth of the legume plant and Portulaca oleracea. In addition to measure the length of the seedlings as well as the number of their leaves.

2- Use of the soil protocol to know the fertility of the soil and to determine its acidity and its salinity, the amount of carbonate, as well as the amount of roots and rocks, and to determine the color and its fabric and consistency.

Results:

First: Vegetation data

twelfth	tenth	The eighth	Sixth	Fourth	The second	Today
11	9	8	7	5	3	Number of leaves of the plant that was sprayed with the pesticide
10	9	9	8	5	3	The plant that was not sprayed

Table (1)

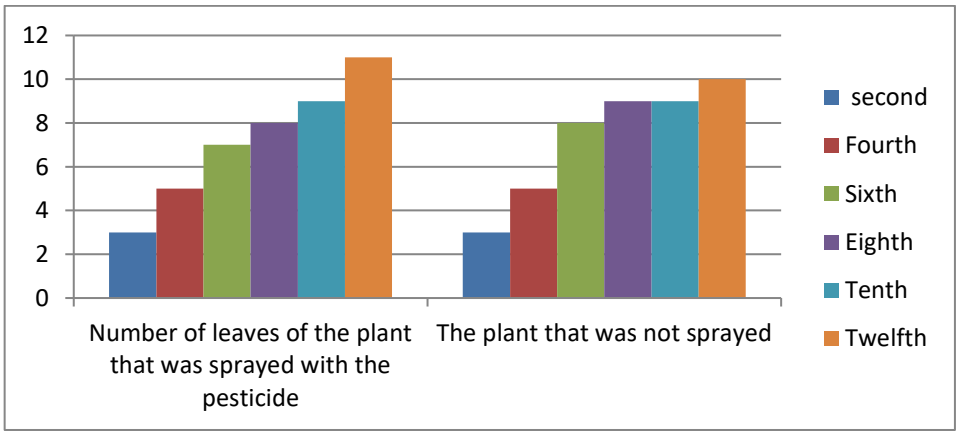


Chart (1)

fourteenth	twelfth	tenth	The eighth	Sixth	Fourth	the second	today
52	49	44	40	34	30	25	Length of plant sprayed with poison
77	68	56	49	41	35	27	The length of the plant that was not sprayed with the poison pesticide

Table (2)

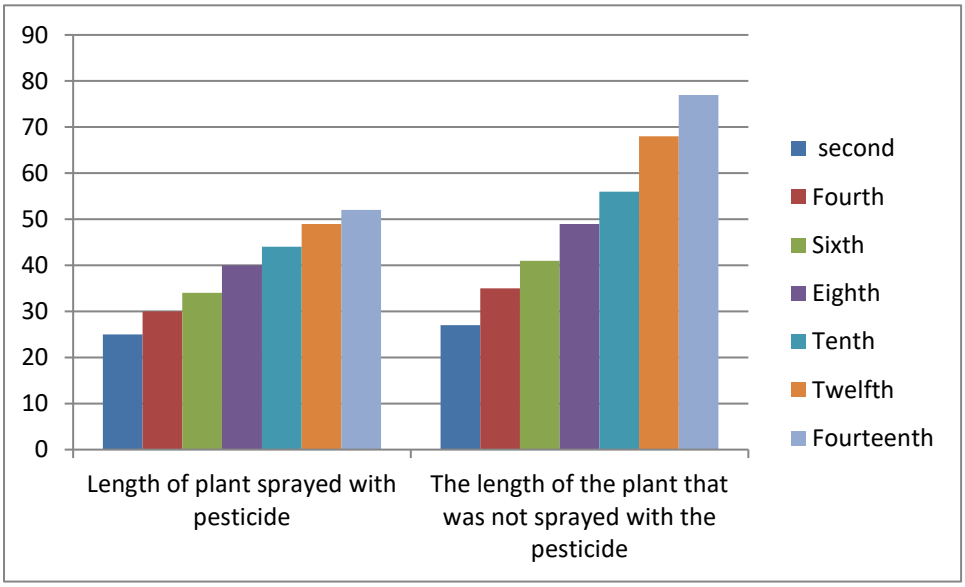


Chart (2)

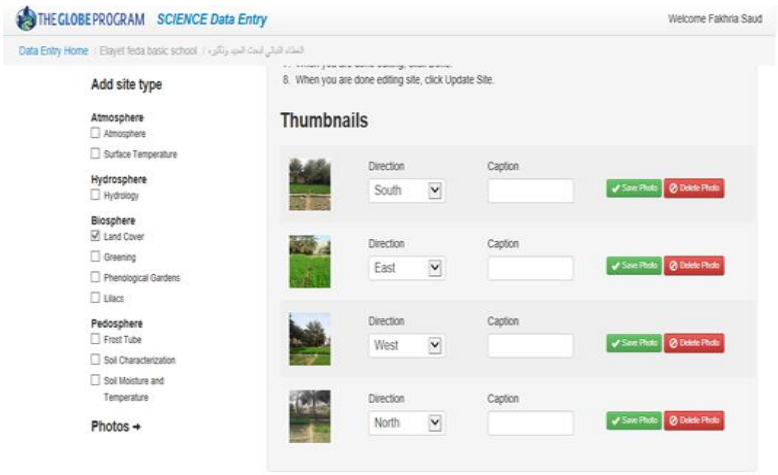
Second: Soil data

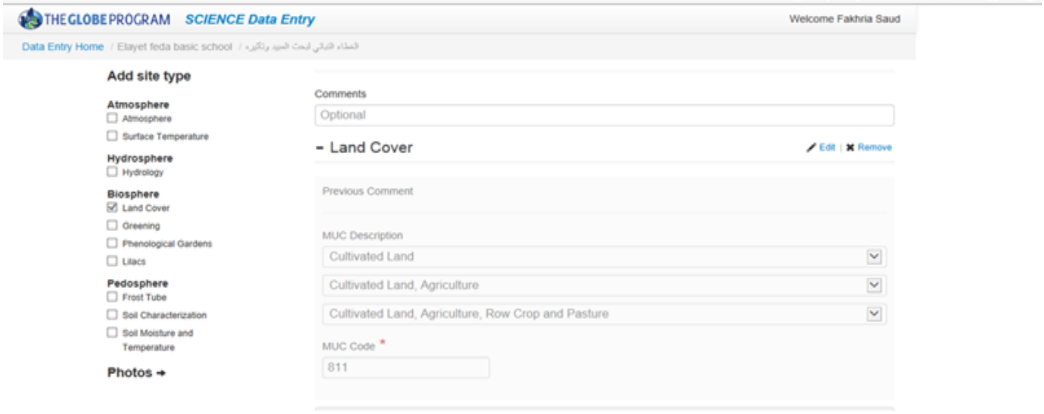
Salinity	Acids	Carbonates	Roots	Rocks	Fabric	consistency	the color	Structure	Soil type
ppm619	8.1	Many	Middle	Nothing	Clay loam	Harsh	10YR:4/4	dearat	Spray with pesticide
914ppm	8.9	Middle	Nothing	Nothing	Clay loam	Harsh	10YR:4/4	grains	Without pesticide

Table (3)

Data images from the website:

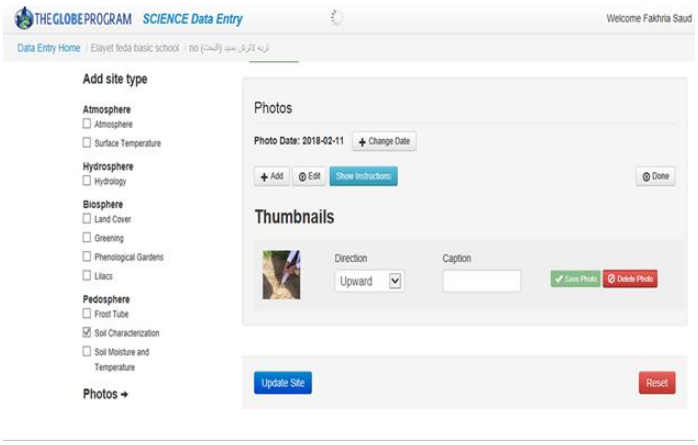
First: Vegetation covers data



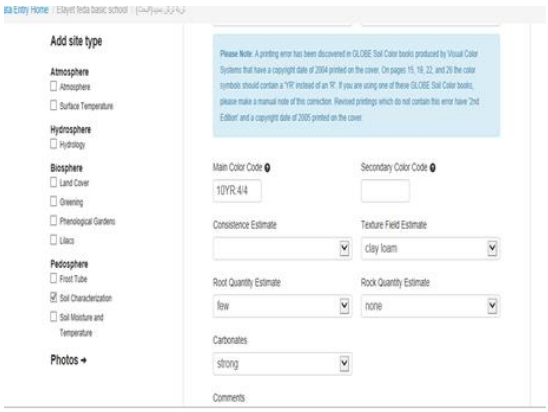


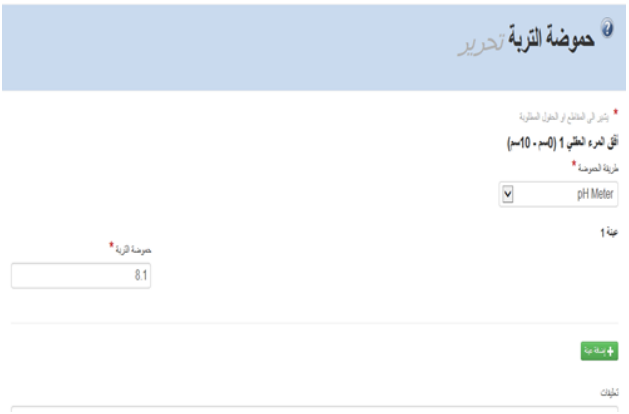
Second: Soil data

1- Soil not sprayed with pesticides



2- Soil sprayed with pesticide





Discussion of results:

To answer question No (1), we have noticed that the purslane plant did not grow due to the weather conditions. As this plant grows more in summer, noting the growth of other unwanted plants and weeds.

Regarding to question No (2), by watching the plants, we concluded the following: For plants that were sprayed with the pesticide, the number of their leaves increased more than for plants that were not sprayed. Especially in the second week, that is, day tenth and twelfth since started studying. According to Chart (1) and Table (1).

From the chart and table (2); the sprayed plant was graw slowly compared to the unsprayed plant, and it is possible to say that the pesticide affected the soil, as the length of the plant that was not exposed to the pesticide became 72 cm, compared to the sprayed plant, which was 52 cm long.

This means that the pesticide increases the number of leaves on the plant but reduces its growth compared to the plant that was not exposed to the pesticide.

The interview with the agricultural engineer showed us that some pesticides affect the leaves of the plant, and indeed we noticed that this type of pesticide led to change the color of the leaves as well as the seeds.

As for the last question: According to the data from table (3); Its effect on the soil was as follows: Agricultural soil properties changed ;where Acids affected and it has become less than dust, and the area that was sprayed also had an increase in carbon content compared to the area that was not sprayed. Also, the salinity increased in the soil affected by

the pesticide to a very large extent, which negatively affects plant growth.

Conclusion:

Pesticides are chemical compounds. They used to kill harmful pests and insects. They are in the form of powder or granules or aqueous solution. Their use has spread among farmers because of their rapid effect in eliminating agricultural pests, and because of the simplicity of their use. Our team has conducting a study on the effect of a type of pesticide on soil and plants due to its great importance. We concluded that this type of pesticide is completely unsafe, because it has an effect on the acidity of the soil, as well as the leaves of the plant and its length. Therefore, we recommend the concerned authorities which represented in the Ministry of Agriculture and in cooperation with the Ministry of Information, to spread awareness of the dangers of pesticides and to exercise caution when dealing with them, with the necessity of providing a laboratory that measures the quality of some crops to ensure their suitability for human use and to move towards less pesticides and toxicity, like(ammoniaNH3) and (castor oil Ricinus communis) and (rice oil) and (lemon grass oil). Also, take into account the study that we presented in Ibri School on the use of neem leaves (Azadirachta) which shows that the leaves of this tree can be used as an organic pesticide. We hope to conduct more advanced studies on other pesticides using other protocols such as the atmospheric protocol. We thank God Almighty and praise Him for completing this research.

Thanks and appreciation:

We would like to extend our sincere thanks and appreciation to the school principal, for her continuous cooperation and constant support to the GLOBE program team. We also thank the agricultural development staff, for their cooperation in providing information, as well as the villagers, to clarify the problem. Also, many thanks for guardians and especially Professor Bader Al-Maamari. In addition to Dr. Ahmed Moussa for his continuous support for us. And we extend our thanks and appreciation to everyone who left their mark of advice , assistance and helped us by answering questions and overcoming obstacles in implementing this research. Finally, we would extend our thanks to our supervisor in the research: Ms. Fakhriya Al-Balushi, to allow us to conduct this research.

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