The Importance of Neem Tree in Fertilizing Soil

Done by:

Aysha bint Suroor Al Saadi

Shahad bint Muslim Al-Khuzairi.

School:

Umm Kulthum bint Uqba for basic education.

Supervisor:

T. Amira bint Salim Al-Balushi.

2 / January / 2020

Table of contents:

Abstract

Fertilizer, consisting of tree leaves, is an organic fertilizer formed by combining leaves from all sources. It is also used as a nutrient for soil and it increases soil fertility in a healthy way. Therefore, we used the leaves of the Neem plant to obtain a beneficial organic fertilizer for the soil and help to reduce the acidity of the soil and turn it into fertile soil. We raised the following questions:

1- What is the effect of the fertilizer extracted from the neem on the plants?

2- What is the effect of neem tree fertilizer on reducing the acidity level in the soil?

To take advantage of the neem leaves we harvested a large amount of them and dried them in the sun for two weeks due to the cold weather at the time of the study. Then, we grinded and mixed them with the soil with three different proportions and added them to three pots and then we planted seedlings of the eggplant and watered with water and a nutrient solution for a period of five weeks and monitoring the length of the plant and the number of its leaves in the three pots. After that, we recorded the results using the ground cover protocol to get the results. We also took a sample of the soil mixed with neem fertilizer to the laboratory to use soil protocol measurements and compare them with the soil before mixing.

We reached the following results:

When adding neem fertilizer to seedlings, the length of the eggplant plant increased in the pot that contains 75%. In addition, the number of leaves increased as well. We also noticed a low acidity in the fertilized soil and we concluded that the fertilizer extracted from the neem plant is effective in increasing soil fertility, reducing its acidity and combating agricultural pests like insects, rodents, etc. Finally, the research recommends on the importance of this local tree and the need to educate farmers about using it as a fertilizer extract for the soil because it is beneficial. Moreover, it can be obtained in easy and inexpensive ways financially and it has many advantages for soil and plants. So, we hope from the Ministry of Agriculture to adopt this study and generalize it on all local farms.

Research questions:

1- What is the effect of Neem Tree fertilizer on plants?

2- What is the effect of Neem Tree fertilizer on reducing the acidity level in the soil?

Introduction:

Neem tree is an evergreen tree whose scientific name is (azadirachta indica) and it spreads in the tropical regions of the world, dry and hot areas. It also has the ability to resist wind due to the strength of its stem and resists drought and salinity.

It has many benefits in agricultural pest control:

Since neem contains AZTA, and other active substances, it is particularly effective against white flies - thrips - tunnels - beetles - corn worms - and stored grain pests. It turns out that neem is effective against more than 200 types of insects. Therefore, it is necessary to maximize the benefits from the neem tree to achieve several goals, namely:

1. Reducing the serious impacts of global climate change and contributing to environmental programs.

2. Manufacturing safe Neem pesticide.

3. Clean agriculture by producing crops and fruits free of pesticides and chemical fertilizers.

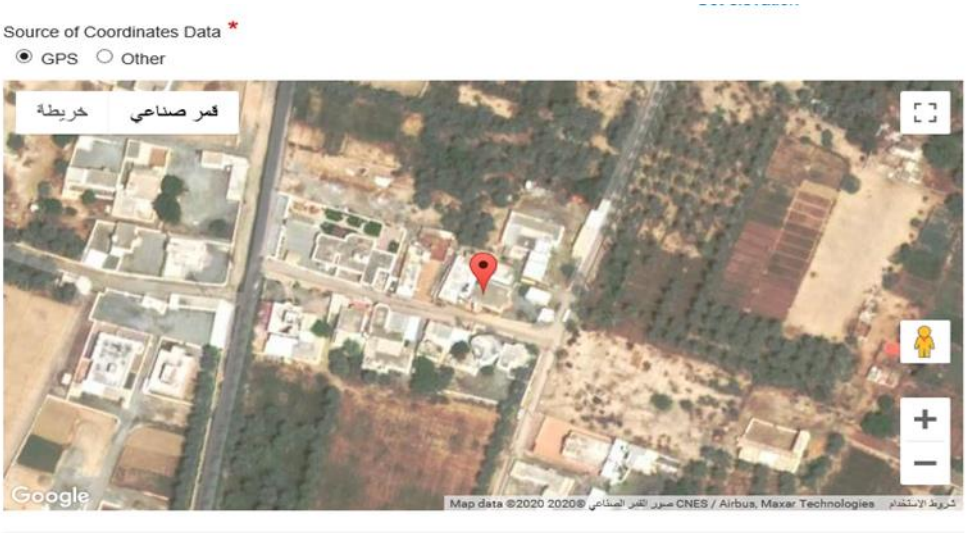
4. Producing biofuel (biodiesel).

5. Malaria control by eliminating mosquitoes.

6. Increasing the country's resources from exports of non-oil products.

The use of tree leaves as an organic fertilizer in crop cultivation is not a novel method but has been used since ancient times in South Asian countries. Tree leaf fertilizer can be defined as pruning and collecting tree leaves and twigs from trees, herbs and shrubs and turning them into fertilizers. Forest tree leaves are a major source of organic fertilizer while herbs and twigs grow in the fields. Fertilizer use is a very useful practice, especially in mountainous areas.

Research methods:



Al Musannah / Qurai

Longitude: 57.624193

Latitude: 23.75937

Height: 36 m

The protocol used: land cover and soil

Climatic characteristics: winter

Month: January / February

We brought a sample of valley Soil because it is fertile, moist and nutrient-rich so that it can be used for plant cultivation.

To take advantage of the neem plant cultivated in our environment we carried out a simple experiment by harvesting the leaves and seeds of the neem tree and dried them in the sun for two weeks to ensure that they are completely dry. Then, we took the leaves and dry seeds and milled them to turn into a green powder with a strong aroma and we mixed it with the soil of the valley in three different proportions which are (25% - 50% % - 75%)

Three seedlings of eggplant planted in three pots containing soil from the valley after inquiries and assistance from the agricultural specialist in the region. In addition, the plant was provided with water and nutrients for all plants periodically.

We used the ground cover protocol in which we noticed the following:

After five weeks have passed, we have noticed an increase in the length of the plants, an increase in the number of their leaves, and insects did not pierce their healthy green leaves.

We applied the soil protocol to obtain the following properties: colour - composition - texture

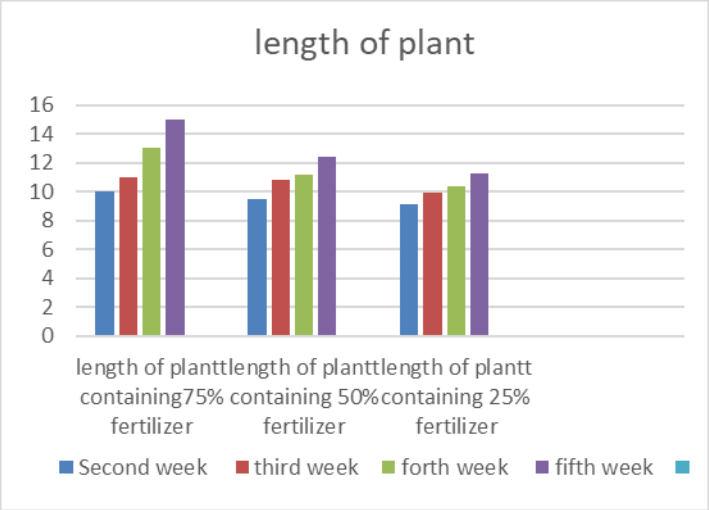
Then we took a sample from the Valley soil to measure its acidity, salinity and conductivity, and another sample from the Valley soil mixture with neem powder (fertilizer).

Team work plan:

Task	**Student**
bringing soil from the valley	Aysha and Shahad
Cutting leaves and drying them	Shahad
grind the leaves and mix them with soil	Aysha
plant growth monitoring	Aysha
the soil protocol	Aysha and Shahad

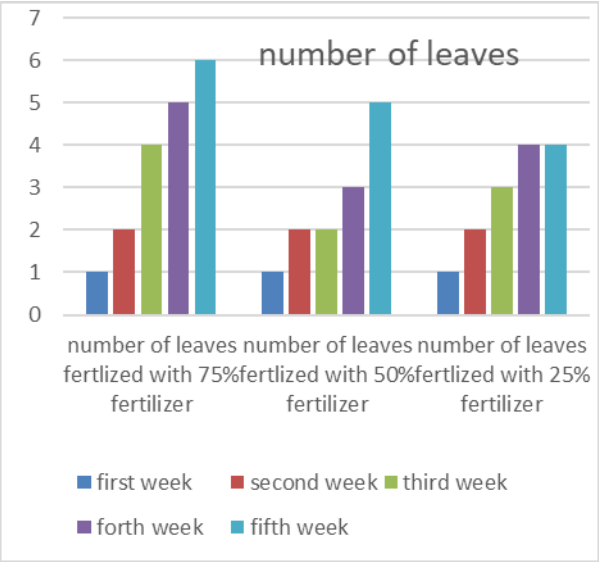
Results:

Comparison	First week	Second week	Third week	Fourth week	Fifth week
The number of leaves of the eggplant plant that contains 75% of neem fertilizer	1	2	4	5	6
The length of an eggplant that contains 75% of neem fertilizer	9.4	10	11	13	15
The number of eggplant leaves containing 50% neem fertilizer	1	2	2	3	5
The length of an eggplant containing 50% neem fertilizer	8	9.5	10.8	11.2	12.4
The number of eggplant leaves that contains 25% of neem fertilizer	1	2	3	4	4
The length of an eggplant that contains 25% of neem fertilizer	8.8	9.1	9.9	10.4	11.3



soil type	Valley soil	soil fertilized with Neem
soil color	10YR4 / 2	10YR4 / 3
soil type	Sandy clay	Clay
soil name	Loamy	Sandy loam
pH value	6.6	6
Salinity	548 ppm	1212 ppm

conductivity	776 us	1720 us
Tape length	2 cm	2.5 cm
amount of carbonate	little	Very little
amount of roots and rocks	little	Very little



Discussing the results:

After plant cultivation for five weeks, we noticed:

- We noted that the soil colour varies in valley soil before the experiment and the soil after the experiment (fertilized with Neem).
- We note a decrease in the pH and an increase in acidity to 6, which is the appropriate medium for plants to grow.
- We note low salinity in the valley soil and its slight rise in the soil fertilized with Neem because Neem trees are resistant to salinity and absorb salinity from the soil in which they are grown.
- We note high conductivity in the soil fertilized with Neem, because the conductivity follows salinity.
- We noticed growth of the leaves of the eggplant in the fertilized container by 75% more than that of the seeds planted in the fertilized container by 25%
- We noticed an increase in the length of the eggplant in the fertilized container by 75% more than that planted in the fertlized container by 25%

Error sources:

• We faced the problem of increasing amount of water on the plant, which led the plant to stop growing, then we reduced the amount of water to accommodate the plant growth.

Comparing to other researches:

After reading several studies on Neem plants around the world, we extracted the following information, which we compared with our research and was applicable to what we concluded:

The remaining solids from the neem seed after obtaining the oil use an organic fertilizer containing 7.5% nitrogen, 8.1-% phosphorous, 5% potassium. Neem can also be used as a material that encapsulates or covers urea fertilizer so that nitrogen release becomes slow due to the effect of neem in Bacteria that convert nitrogen to nitrate and ammonia which is useful for the plant.

Neem trees are also cultivated in low fertile lands with the aim of improving PH and increasing soil fertility and absorbing salinity.

In another study, it was found that neem trees are also cultivated in low-fertile lands in order to improve phosphorous.

Neem leaves can also be used as green fertilizer, and dry and decomposing leaves in soil are useful for killing harmful organisms.

Through our research, we found that Neem tree fertilizer helps reduce acidity and increase soil fertility and prevents worms and insects from getting close to any plant fertilized with Neem fertilizer, because neem fertilizer is characterized by a strong aroma that makes insects repel from plants.

Answer questions:

1- What is the effect of Neem fertilizer on plants?

Increase the length of the plant, the number of leaves and keep insects away from them because they have a strong smell that keeps insects away

2- What is the effect of Neem tree fertilizer on reducing the acidity level in the soil?

- Reducing the pH scale and increasing acidity in the soil to reach number 6, which is suitable for plant growth.

Conclusion and recommendations:

We found through our research that Neem fertilizer helps to reduce the acidity rate, prevents insects from getting close to plants, increasing the length of the plant and the number of its leaves.

We concluded that the higher the amount of fertilizer in the soil, the lower the acidity rate and the more fertile the soil will be.

We can re-study using neem tree seeds to make an insecticide

The research recommends on the importance of this local tree and the need to educate farmers about using it as a fertilizer extract for the soil because it is beneficial. Moreover, it can be obtained in easy and inexpensive ways financially and it has many advantages for soil and plants. So, we hope from the Ministry of Agriculture to adopt this study and generalize it on all local farms.

Thanks and appreciation:

We extend our sincere thanks and appreciation to all who supported us and helped to the completion of this research and they are:

One of the parents' families who cooperated with us by providing us with the leaves of the Neem tree.

T. Souaad Al-Manwari: Laboratory Specialist:who assisted in conducting experiments and providing measurement equipment.

T. Hoda Al-Nomani: Information Technology Teacher: She cooperated with us in the use of programs and designing poeters.

T. Afrah Al-Khamisi: The Learning Resource Centre specialist: helped us use the information network and encyclopaedias network to search for information related to the research.

Engineer: Nasser Al-Wahaibi, Senior Soil Specialist at the Scientific Research Centre: provided us with valuable information on plants related to our research.

References:

- Oman Encyclopedia, tenth volume, first edition (1443AH / 2013AD)

Publisher: Ministry of Heritage and Culture

- M / Yasser Al-Taher Al-Neem tree treasure Neem / 20 June 2012

- file: /// C: / Users / moe / Desktop / Neem / Tree% 20 Treasure% 20 Sleep. Htm

•. Neem tree: a natural pharmacy that protects the environment and health / Posted: 27/03/2011

• file: /// C: / Users / moe / Desktop / Neem / Tree% 20 Neem% 20 Pharmacy% 20 Natural% 20% protect 20% environment and health. Htm

• fertilizer consisting of tree leaves

• C: \ Users \ moe \ Desktop \ Neem \ Organic Fertilizer consisting of tree leaves - the perennial plantation site Arabic version.