The Interaction Between Organic and Azotic Fertilizers Affected some of the Indicators of the Nigella sativa in the Conditions of Al-Ghab Plain in the North-West of Hamah Governorate, Syria

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Abstract:

During the agricultural season of 2018-2019, the research was carried out at the Agricultural Scientific Research Center in AL-GHAB Plain at Hamah Governorate, Syria.

To study the interaction between four organic fertilizer rates of 0, 10, 20, 30 tons/h, and 5 azotic fertilizer rates of 0.

40, 80, 120, 160 kg/h, on some of the Nigella sativa indicators. The RCBD experience is designed in three replicas.

Organic fertilizers filled the main parts, and azotic fertilizers served the split pieces once.

The search results showed: The interaction between organic and azotic (30 tons/h x 160 kg/h) gave significant values in plant volume 68.22 cm3. The biological crop, 5181.91 kg/h, and the witness (0 organic fertilizer x 0 azotic fertilizer) was superior by 76.86% and 35.15%, respectively

The interaction between organic and azotic rates (20 tons/h x 120 kg/h) has led to a significant increase in seed production values of 1027.44 kg/h.

The harvesting guide 20.20%, crop guide 25.31%, organic fertilizers, and azotic efficiency 101.02%. The witness beat the witness by 50.25%, 20.47%, 29.12%, 101.12%, respectively.

The highest value for the fixed oil ratio was .0036% when the organic and azotic rates (20 tons/h x 40 kg/h) interact with the two rates (30 tons/h x 0 fertilizer).

Keywords: *AL-Ghab Plain, Syria, Organic and azotic fertilizers, Nigella sativa, plant volume, seed production, harvesting guide.*

I. INTRODUCTION

The Nigella sativa belongs to the Ranun calaceae species, a winter plant. Syria has seven species, the most famous of which is the common *Nigella sativa*.

It is a medicinal and food plant that uses food seeds to sour some drinks, improve food taste, compete with pepper, and add bakery and bread. White cheese, yogurts, some pastries and pastries, and coffee to make them taste.

The seeds contain an aromatic oil consisting of Nigllone, Thymo-hydroquinone, and have a high medicinal value. It includes a constant oil that is made up of primary amino acids and a high percentage of unsaturated fatty acids, in addition to vitamin E, B, certain antibiotics, enzymes, and sexual hormones [1].

The plant is cultivated in Syria in several areas, and we estimate the area cultivated will be expanded to 6394, and the productivity will be about 7536kg [2].

This study's challenge that Scientific studies on this plant in Syria are limited and have not been taken up all sides of a plant and the fertilizer equation for it was not determined by regions implanted.

In this research, we have studied several organic fertilization rates and adopted the pill of the *Nigella sativa* and its effect on growth and productivity in al Ghab plain, northwest of Hamah Governorate, Syria.

Scientific references indicate organic fertilizers' role in reducing the PH of Soil, improved electrical conduction, and metal element absorption [3]. It is responsible for the stability of terrestrial clusters, and for determining the reciprocal capacity, Cationic has a 50% ([4], [5]). The improved plant and grain factor for soil when adding 20 tons/h of organic fertilizer compared to the witness's soil made it easier to deepen and spread roots and increase the conscious capacity of roots.

Re. [6] present that organic rate was found to be 20 tons/h, giving the highest values in the number of leaves, the number of blooms, and the number of fruits/plants compared to the compost rates of 2 and 3 tons/h.

Re. [7] received the highest altitude, number of branches, and dry weight of coriander plant at 80 kg/h acute compared to the lowest rates in West Bengal. Also, re. [8] reached the highest pond seed

production at 75 kg/h with the appropriate dose of phosphorus, potassium, and sulfur.

Re.[9] recorded the highest oil ratio of 23.40% in cumin fruits at azote rate of 40kg/h, and the protein ratio fell to 18.77% compared to 80 kgn/h, which gave the values 23.05%, and 20.15%, respectively.

Re.[10] received the highest coriander plant productivity and area unit productivity when the rate of rinderpest (20 tons/h x 80 kg/h) interacts during the search season.

II. MATERIAL AND METHODS

A. Experimental Location

The research was carried out during the year 2019s in the Agricultural Research Center in al Ghab Plain, Hamah Governorate, located in the middle of al Ghab plain on the 35.23 latitudes and 36.19 longitudes. It rises 174 meters above sea level.

The region generally has a hot and dry summer with cold and wet winter with two transitional classes that are moderate and unstable in weather, and an annual rainfall rate of 674 mm.

B. Studied factors

Two factors were studied:

First: Organic fertilizers, four rates of bovine organic fertilizer were used 0, 10, 20, 30 tons/h.

Second: Azotic fertilizers use 5 rates of azotic fertilizer: 0, 40, 80, 120, 160 kg N/h In the form of Eurea fertilizer 46%.

C. Soil Preparation

Basic tillage was conducted 28 to 30 cm in October 2018, and soil samples were taken at a depth of 0 to 30 cm for some tests to determine the soil fertility and content of some of the absorbable mineral elements, table (1).

Table (1): Some chemical and agricultural properties of the experimental soil

PH	EC	%			Mg/kg				MechanicalAnalysis %		
5 : 1	5 : 1/cm	O. M	CaCo3	N	B	K	P	N	mud	silt	sand
7.39	0.22	2.18	30.80	0.11	0.05	220	16	5.7	46	12	42

The results of the analysis in the previous table show that the soil is muddy-formed. To the extent that it interacted fairly too lightly basic, its medium to the good organic content, rich in usable phosphorus, has a medium to a good content of usable potassium, medium containing whole and poor with mineral azote content.

The entire land of the experiment was added 50 kg of potassium fertilizers. The whole of organic fertilizers was added before the second plowing according to the design of the experiment. It was plated at the second plowing depth to 20 cm. Azotine fertilizers were added equally in two waves, the first after the process of dispreading and the second at the beginning of plant branches.

Table (2): The chemical composition of the bovine fertilizer used.

Ec	PH	O. M %	%	% P	N %
6.8	7.82	50.41	1.33	1.04	1.98

D. Experience design

The experiment was designed in the Randomized Complete Block Design (R. CB D) method in three repetitions, with 4 x 5 x 3 = 60 pieces of length 5m. 3 m wide, 15 m^2 piece area, 900 m^2 total area of experiment, excluding trade ways between coefficients and experimental pieces by (1) m in all directions

Leave 1m of space around the experiment as a range of the experiment. The experimental parts were placed in the split pieces' order, the organic fertilizer filled the main pieces, and the azotic fertilizers served the split parts once.

The experimental piece contained 6 lines, the distance between the line and the other 50 cm, and between the hole and the other 12 cm so that the plant density of 166,6666 thousand plants/h.0 is achieved.

Implanted item

Planting was done manually in season 1 17/11/2018, by planting seeds in lines at a rate of 3-4 sources in the hole and then flooding at a depth of 3 cm.

Planting Date

The native common NIGella SATIV L was planted. Seed Source the local market in the jungle area, from the seeds of the previous season, and the cultivation of this species is spread in the same region

Thinging

The plant was dissected after the plant was completed, and 3- 4 leaves were formed on the plants while maintaining the required plant density 16.67 plants/m^2

Irrigation

Rainwater was only relied on, and no supplementary irrigation was provided during the growing season.

Hoeing

The Hoeing was performed three times to maintain soil moisture and eliminate the yearly weeds that appeared after the rains.

E. Statistical analysis:

collected data were calculated and analyzed using the Gen STAT 12 program to calculate the lowest significant difference of L. S.d. and compare mean transactions at a substantial 5% level.

F. Studied readings:

-**Plant volume** (cm^3) measured for 10 plants of the middle two lines of each experimental piece with three iterations, a product of (plant height cm x maximum plant width /cm) in the north-south, east-west, and then calculated averages.

-Biological yield kg/h^{-1}

Ten plants from each experimental piece were cut with three carrots at the root node. The plant included vegetable totals, major and minor branches, leaves, boxes of seeds, dried for 3 days under the sun, weighed, and estimated averages.

- **Seed productivity** kg/h seeds of the vamps were separated Has 10 plants of the two middle lines of each experimental piece has three her own making and then she calculates the averages

- **Harvest Index**: It was calculated according to an equation

(Economic/Biological crop) x 100

- **Yield Index:** Calculated by (Economy crop weight/dry material weight) x 100

- **Fixed Oil Percentage:** The percentage of solid oil is estimated using the SoxHelt device, and according to re.[11].

- **Competence of organic and azotic fertilizers** (%) is calculated from the following relationship:

$$\frac{\text{Producing the fertilized transaction} - \text{Production of the witness transaction}}{\text{Production of the witness transaction}} \times 100$$

III. RESULTS AND DISCUSSION

Effect of the interaction between organic and azotic fertilizers on plant volume (cm^3):

The results in a table (3) show that the highest value for plant volume is 70.36 cm^3 found when the reaction between (organic rate 30 t/h x azotic rate 160 kg/h) (O4 x n5), followed by the reaction between O4 x n4 which gave the value 68.22 cm^3 compared to the interaction of the witness (O4 x n1) The two interactions were a significant gain for the witness by 76.86% and 76.14% respectively.

The increase in plant volume is due to organic fertilizers' role in the release of nutrients such as azote, phosphorus, potassium, some rare elements, and some growth stimulants [12], all of which are involved in photosynthesis and metabolic processes and contribute to growth. In addition to its role in cell division and expansion, the result was increased plant height, increased the total number of branches, and change in all directions, which increases plant volume.

Table 3 Effect of the interaction between organic fertilizer and Nigilla Sativa L volume (cm^3)

Organic fertilizer rates ton/h				azoticfertilizer rates Kg/h
(40) O4	(20) O3	(10) O2	(0) O1	
41.00	38.46	21.22	16.28	**(0) witnessN1**
50.68	41.66	25.36	23.04	**(40) N2**
65.36	52.56	30.86	23.63	**(80) N3**
68.22	58.56	34.86	28.08	**(120) N4**
70.36	61.76	41.92	30.82	**(160) N5**
161.48				**LSD 5%**
6.89				**CV%**

A. Effect of interaction between organic and azotic fertilizers in biological crop (kg/h):

The highest values of the biological crop were found 5181.92 kg/h when the reaction between (organic 30 t/h x azote rate 120 kg/h) (O4 x n4), followed by the interaction between (O4 x n3), the value given 5141.65 kg/h thus outweighs the reaction of the witness (0 organic fertilizer x 0 azotic fertilizer) (O1 x N1) by 35.15% and 34.64%, respectively, which gave the lowest value to the biological crop 3360.35 kg/h...

The increase in biological crop values is due to the role of organic and azotic fertilizers in increasing

plant volume Table (4) and increasing the accumulation of dry matter in plant organs due to the increase in height, the number of total branches, the number of leaves, their weight, the number of cases, and the number of seeds [13]. These increases result in all the higher values of the biological crop. Similar results were obtained [14] at the organic rate of 15 tons/h sham with a cow compared to the lowest rates.

Table (4): Effect of the interaction between organic and azotic **fertilizers on the biological crop (kg/h) of *Nigilla Sativa* L**

Organic fertilizer rates ton/h				azoticfertilizer rates Kg/h
(30) O4	**(20) O3**	**(10) O2**	**(0) O1**	
4181.99	3768.33	3462.81	336.35	**(0) witnessN1**
4313.39	3910.05	3490.64	3475.51	**(40) N2**
5141.65	4052.56	3600.55	3510.89	**(80) N3**
5181.91	5091.29	4397.31	3605.54	**(120) N4**
4616.10	4760.29	4597.28	4391.27	**(160) N5**
161.48				**LSD 5%**
6.89				**CV%**

B. The effect of organic and azotic fertilizers on seed productivity (kg/h):

The interaction between organic fertilizer and zombie rates quantity 1022.16 kg/h, 1020.84 kg/h from the interaction gave significant values in seed yields table (5), with the between O4 x N3, O4 x N4, and all of them beat the highest seed production of 1027.44 kg/h when interacting interaction of the witness (0 organic fertilizer x 0 azotic (20 tons/h x Azoti 120 kg/h) (O3 x n4), followed by seeds fertilizer) by 50.25%, 46.99%, and 49.93%, respectively.

Table (5): The effect of organic and azoticfertilizers on seed productivity (kg/h) of Nigilla Sativa L

Organic fertilizer rates ton/h				azoticfertilizer rates Kg/h
(40) O4	**(20) O3**	**(10) O2**	**(0) O1**	
799.18	671.14	566.11	511.11	**(0) witnessN1**
860.51	744.33	595.41	588.22	**(40) N2**
1022.16	790.25	645.22	605.63	**(80) N3**
1020.84	1027.44	850.42	616.09	**(120) N4**
900.14	952.49	911.18	835.21	**(160) N5**
76.14				**LSD 5%**
5.61				**CV%**

Source:

The increase in seed yields is the increase in the total number of branches on the plant and, therefore, the number of capsules on the plant because there is a strong correlation between them of 0.96 according to the results [13] and 0.93 [15]. The number of leaves on the plant, its weight, and the area of its paper surface at the plants of these coefficients [13]. On the other hand, it has the effect of attracting more light and more effective photosynthesis, increasing its organic products that guarantee the requirements of seed cans and seeds, maintaining the largest number of sources, growing them, and developing them to maturity with the least possible loss, and thus increasing plant productivity.

C. Effect of the interaction between organic and azoticfertilizers in the harvesting guide (%):

The interaction between the studied organic and azotine rates resulted in high values in the harvesting manual table (6). The interaction between (organic ratio 20 tons/h × 120 kg/h) (O3 x n4) and (organic ratio 20 tons/h × 160 kg n/h) (O2 x n4) gave the highest values 20.20%, 20.00% respectively, and significant gain on the witness (0 organic fertilizer x

0 azotic fertilizer) of 4.99. 4.79%, the increase is equivalent to 24.70%, 23.95%, respectively.

The increase in the harvesting guide is due to the ability of plants under the influence of these 20 tons/h and 120 kg/h to move and convert the greatest amount of photosynthesis outcomes to seeds instead of being directed to dry material in plant parts as a result of the important role of potassium in this process [16]. Thus, seeds grow, fill, grow, and grow.

Table (6) Effect of the interaction between organic and azoticfertilizersof Nigilla Sativa L

Organic fertilizer rates ton/h				azoticfertilizer rates
(40) O4	(20) O3	(10) O2	(0) O1	Kg/h
19.11	17.81	16.32	15.21	(0) witnessN1
19.95	18.65	17.00	16.25	(40) N2
19.88	19.50	17.92	17.25	(80) N3
19.70	20.20	19.33	18.60	(120) N4
19.50	20.00	19.82	19.02	(160) N5
0.71				LSD 5%
2.33				CV%

D. Effect of the interaction between organic and azoticfertilizers in the yield directory (%):

The interaction between organic and azotic rates studied in the table (7) gave high values at the % yield index, increased the harvesting guide values in a table (6) because the crop index gives the economic crop weight to the weight of dry material in the plant and not to the importance of the biological crop.

The crop guide's highest values were found 25.31% when the O3 x N4 interacted with the witness 17.94% (O1 x N1) reaction and achieved an estimated significant superiority of 29.12%.

The reason for the increase in crop directory values in organically and Azotic fertilizers is that the amount of seed production in Table 1027.44 kg/h (5), due to the increase in the yield indicators of the seed cans in terms of the length and size of the case, the number of seeds in the case, and the weight of the seeds in the case, results [13].

Table (7) Effect of interaction between organic and azotic fertilizers in crop directory (%) of *Nigilla Sativa* L

Organic fertilizer rates ton/h				azoticfertilizer rates
(40) O4	(20) O3	(10) O2	(0) O1	Kg/h
19.11	17.81	16.32	15.21	(0) witnessN1
19.95	18.65	17.00	16.25	(40) N2
19.88	19.50	17.92	17.25	(80) N3
19.70	20.20	19.33	18.60	(120) N4
19.50	20.00	19.82	19.02	(160) N5
0.71				LSD 5%
2.33				CV%

E. Effect of organic and azotic fertilizers reaction to the fixed oil ratio (%):

The results in table 8 show that organic fertilizers caused an improvement in oil ratio while azotic fertilizers gradually reduced oil ratio, and with the interaction between the two factors, the highest oil ratio was found at 36.00% when the reaction between the two elements (Organic rate 30 tons/h x 0 fertilizer) (O4 x N1) and (organic rate 20 tons/h x 40 kg/h) (O3 x n2) and significant superiority over the witness (0 organic fertilizer x 0 azotic fertilizer),

which gave the lowest values 34.80%, and the ratio of these interactions on the witness was estimated at approximately 33.33% each.

The increase is due to the role of organic matter in the release of mineral elements, its availability to roots, and its increased conformal capacity, thus increasing the efficiency of photosynthesis and its organic and oil products. Similar results obtained [17] when using the bovine fertilizer rate of 15 tons/h compared to the chemical witness on coriander plants.

Table (8): Effect of organic and azotic fertilizers reaction to the fixed oil ratio (%) of *Nigilla Sativa* L

Organic fertilizer rates ton/h				azoticfertilizer rates Kg/h
(40) O4	(20) O3	(10) O2	(0) O1	
36.00	35.76	35.28	34.80	(0) witnessN1
35.70	36.00	35.42	35.00	(40) N2
35.69	35.48	35.00	34.500	(80) N3
35.20	35.20	34.90	34.21	(120) N4
34.11	34.20	35.65	34.00	(160) N5
0.55				LSD 5%
18.00				CV%

F. Effect of interaction between organic and azotic fertilizers on the efficiency of organic and azotic fertilizers (%):

The highest organic efficiency value of the azotine was found at 101.02% when the organic rate (20 tons/h x 120 kgn/h) (O3 x 4) interacted with all reactions except the interaction between O4 x n3 and O4 x n4) as they achieved high values in the efficiency of organic and azotic fertilizers on the *Nigilla Sativa* L

This shows the importance of integrating organic fertilizers and azotine fertilizers into the growth and composition of crop components and the high yield of seeds, which is directly reflected in the harvesting manual, crop directory, and fertilizer efficiency. These are important indicators of overall field crop productivity and Nigilla Sativayields.

Table (9) Effect of interaction between organic and azotic fertilizers on the efficiency of organic and azotic fertilizers (%) of *Nigilla Sativa*

Organic fertilizer rates ton/h				azoticfertilizer rates Kg/h
(40) O4	(20) O3	(10) O2	(0) O1	
56.36	31.31	10.76	50.5	(0) witnessN1
68.36	45.63	16.49	15.09	(40) N2
99.99	54.61	26.24	18.49	(80) N3
99.73	101.02	66.39	20.54	(120) N4
76.11	86.35	78.28	63.41	(160) N5
11.88				LSD 5%
9.08				CV%

IV. CONCLUSION

When growing *Nigilla Sativa* in Alghab conditions, we suggest adding organic fertilizer (20 tons/h x 120 kg/e) to get high seed productivity, high yield, and high efficiency of organic and azotic fertilizers.

Although the percentage of fixed oil at the organic reaction rate (20 tons/h x 40 kg/h) is higher than 36%, the amount of seed production is much greater than 1027.44 kg/h compared to 744.33 kg/h.

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