



EFFECT OF PLANTING DATES AND SPRAYING OF HORTIPHYTE LIQUID AND STYMULANTFORTE EXTRACT IN GROWTH AND YIELD OF CUCUMBER UNDER PLASTIC HOUSE CONDITIONS

Abdullah M.S. Al-Dabagh*, Khaleda A. Omar and Zaynab H. Abdulla

Department of Horticulture and landscape, College of Agriculture and Forestry, Mosul University, Iraq
E-mail: Abdullah.aldabagh2017@gmail.com

Abstract: The experiment was carried out in plastic house in Al-Khader/Horticulture and landscape department/College of Agriculture and Forestry-University of Mosul during the period from 21/1/2018 to 13/5/2018 to study the effect of planting dates and spraying with liquid fertilizer Hortiphyte and Stymulantforte marine extract in growth and yield Option. The second factor was the planting of two types of Hortiphyte fertilizers (2 and 4 ml/L) and Stymulantforte with concentrations (1.5 and 3g/L) and three plants Spray the first brush at the beginning of the flowering and repeated three times by 15 days between the brush and another in addition to the comparison treatment. The global experiment was carried out by designing the complete random sectors with three replicates and the results were tested with a multidisciplinary Duncan test at 0.05%. The results showed the higher number of leaves and the highest paper area. The Stymulantforte nutrient also produces the highest paper area with the highest number of leaves. Interaction between the factors showed results above the second date with Stymulantforte spray of 1.5 ml/L producing the highest number of leaves, leaves and paper area. The highest overall yield was 3.89 tonnes/house as a result of overlapping of agriculture on the first date with Stymulantforte spray at a concentration of 1.5 ml/L.

Key words: Cucumber, Planting date, Foliar nutrition, Nutrition.

1. Introduction

Cucumber (*Cucumis sativus* L.) is the summer vegetables of the Cucurbitaceae family. And is the desired crop for the consumer throughout the months of the year, whether in Iraq or in the rest of the world because of its high nutritional value and its high use. This requires the provision of crops throughout the year, and this is through the production of field crops (summer) or production in the protected environment, especially greenhouses. Which has increased significantly in the provinces of Iraq, especially Central and South.

According to the statistics of the Arab Organization for Agricultural Development on the cultivation of cucumber in Iraq for 2012, the area planted cucumber was 45.5 thousand hectares and the production of 9.99 kg/ha to total production 414 thousand tons.

In a study by Al Bahaash *et al.* (1987) in Al-Fadhilia

area in Baghdad to select three dates for planting cucumber starting from 14/11 and two weeks between one date and another. For the two seasons 1984 and 1985, the results showed that the percentage of fruit contract and number of fruits and total number were significantly higher at the first date. The second date was significantly higher in the dry matter ratio of the fruits with the highest length of fruit, and in the study of four varieties of cucumber (Dats, Celion, Reem, Saif) in the compound of greenhouses, Tikrit for the agricultural season 2013-2014 with the selection of R. The number of dates for planting 30/12/2013, 15/1 and 15/2/2014 that the first date significantly exceeds the weight and length of fruit on the rest of the dates while the second date in the number of fruits for the plant and the total plant.

Organic fertilizer plays an important role in increasing soil fertility, improving its physical and

chemical properties, and increasing nutrient elements availability, especially micronutrient elements [Burhan and Al-Taey (2018)], The success of crops relies upon supplement contribution amid development. Sole utilization of chemical fertilizers frequently decays soil fertility [Al-Taey *et al.* (2018), Al-Taey and Al-Musawi (2019)].

Al-Naimi (2013) studied the effect of adding different levels of humic acid to the soil and the levels (0, 2, 4 g/L) of the GRASS cultivar under the conditions of the non-heated plastic house at Mosul University, which leads to significant increase in the number of fruits and total number. In a study to demonstrate the effect of different levels of organic fertilizer on the growth of Amir Amirich in the growth and yield of hybrid cucumber, the study found that spraying with a concentration of 1.6 ml/L⁻¹ resulted in a significant increase in most vegetative growth indicators and all indicators of the yield. While Al-Azzawi (2016) added that the addition of humic organic fertilizer and the levels (5 and 10 kg e⁻¹) led to a significant increase in most characteristics of vegetative growth and outcome. Abdul Rahman (2017), in his study of the effect of planting dates and spraying with three types of nutritious solutions in the cucumber grown under the non-heated plastic house, concluded that the treatment with the Viviter solution may exceed the length and weight of the fruit and the plant yield is 2124.7g. Fruit and number of fruits, while the solution of nutrient Giant in the proportion of total chlorophyll, The timing treatment showed no significant effect on the measured indicators. Somendra Meena *et al.* (2017) found that spraying of humic acid and micronutrients containing zinc, boron and magnesium components with 0.1% humic acid spraying on the vegetative group gave the highest values in plant length, number of branches and paper area with an increase in total plant yield and unit yield of 15.98 kg/M².

The results of the study showed that the dates of organic agriculture and fertilizers have an effect on the growth and productivity of the developing option under the conditions of the non-heated plastic house. The aim of this study is to choose the appropriate time to cultivate cucumber seeds under the conditions of the non-heated plastic house in the city of Mosul with an indication of the effect of Hortiphyte and Stimulant forte marine extract.

2. Materials and Methods

The experiment was carried out in the non-heated plastic house in Al-Khadr/Horticulture and Garden Engineering Department, Faculty of Agriculture and Forestry, University of Mosul during the period from 21/1/2018 to 13/5/2018 to study the effect of seed planting and spraying with Hortiphyte and Stimulant forte and the Zain class option. The seeds were planted in plastic germinated trays filled with peat moss for the production of seedlings and planting machines 22/1 and 2/2/2018. The process of plowing, clearing and settling the land and then dividing the land of the house to the extent, and at a distance of 2.5 × 1 m and when the seedlings reached the stage 1-2 real paper was carried out the transplantation for the first date on 22/2/2018 and the second date on 26/2/2018 and at a distance of 33 cm between seedlings and others, depending on the distance between the drip pipes and on both sides of the substrate, following the breeding system on one main leg with the main leg left to hang to the sides. Plants were recorded to a distance of 30 cm from the soil surface. All recommended agricultural operations, such as horticulture and weeding, as well as preventive and curative control, were carried out for signs of disease and disease.

The experiment contained two dates for the seedlings (2/2/2018 and 26/2/2018) and spray with Hortiphyte solution (2 and 4 ml/L) and Stimulant forte spray with concentrations (1.5 and 3g/L).

In addition to the normal spray treatment, spraying was performed three times in the first spray with the beginning of flowering of plants and 15 days in between (Table 1). The results were analyzed according to the SAS program and the results were tested according to Duncan's polynomials and at a probability level of 0.5%. Measurements were taken on the characteristics of vegetative growth, quantitatively and qualitatively.

3. Results and Discussion

The second date was significantly higher than the number of plant height (cm), dry leaf ratio (%) and total chlorophyll (173.40 cm, 16.23% and 47.10 spad respectively). The effect of the spray on Stimulant forte was 3ml/L in the number of leaves relative to the comparison treatment, and did not differ significantly from the other treatments. The same treatment was significantly higher in dry root ratio than the rest of the treatments except the treatment with Hortiphyte at a

Table 1: Components of Stimulant forte and Hortiphyte liquid feeder.

Components of marine extract (Stymulant forte)	Percentage	Liquid nutrient components (Hortiphyte)	Percentages
<i>Ascophyllum nodosum</i> Seaweed extract	100% W/W	Total Nitrogen	3%
Potassium oxide (K ₂ O)	19% W/W	Phosphorus(P ₂ O ₅)	20%
Free amino acids	4.4% W/W	Sulphur Trioxide (SO ₃)	6.7%
		Manganese(Mn)	2%
		Zinc(Zn)	3%

concentration of 4 g⁻¹ Stimulant forte concentration at a concentration of 1.5 ml⁻¹ in the paper area of 5122 cm² compared with the treatment of Hortiphyte with a concentration of 2 gl⁻¹ and did not differ significantly from the rest of the treatments, while the treatment was superior to Hortiphyte at a concentration of 4 g⁻¹ in the total chlorophyll in leaves 47.65 spad and significantly exceeded all treatments except for the treatment of Stimulant forte at a concentration of 1.5 ml⁻¹ while the comparison treatment gave the lowest values of this characteristic 42.11 spad.

It is also clear from Table 2 that the treatment of the binary interference of the first and second quantities with the nutrients caused some significant differences in the studied traits. The treatment of the overlap between the first date and the spray with the Stimulant forte extract at the concentration of 3 ml L⁻¹ was higher in the plant height (cm) and the dry matter ratio of the

leaves. While the second date was superior with the same nutrient in both leaves and dry matter, And the treatment of the second overlap between the second date with Stimulant forte extracts at a concentration of 1.5 ml⁻¹. The best results were in the number of branches and the paper area at 8.88 branches and 6.33 cm² respectively. As for chlorophyll, spray with Hortiphyte liquid feeder at a concentration of 2 gL⁻¹ gave the top The total chlorophyll ratio was 48.93 spades and was significantly higher on some treatments.

The results showed that the Stimulant forte extract significantly increased the number of leaves, the paper area and the percentage of dry matter of the roots relative to the comparison treatment. This may be due to Stimulant forte of potassium, amino acids and marine herb extracts. Potassium has an active role in plant growth as it activates many enzymes involved in respiration and carbon metabolism (Table 1) [Ordog

Table 2: Effect of planting date and spraying with Hortiphyte and Stymulant forte marine extracts in vegetative growth characteristics of ZEN growing cucumbers in non-heated plastic house.

Chlorophyllspad	Dry matter of roots%	Dry matter of leaves%	Paper area cm ² / plant	Leaves number	Branches number	Plant height (cm)	Fertilisers	Appointments
45.43a	3.25b	16.17ab	3421ab	31.89c	6.50b	170.56ab*	Control	First date 1/21
48.93a	3.86ab	16.08ab	3142b	39.67abc	6.44b	165.22ab	Hortiphyte2g.L	
48.83a	4.01ab	16.40ab	3602ab	38.66abc	6.67ab	175.78ab	Hortiphyte4g.L	
45.10ab	4.01ab	15.13ab	4211ab	36.00abc	7.44ab	169.56ab	Stymulantforte1.5ml.L	
47.20a	5.02a	17.38a	3570ab	42.11ab	8.44ab	185.89a	Stymulantforte3ml.L	Second date 2/1
38.80bcd	4.39ab	15.41ab	2458b	35.33bc	7.00ab	147.17b	Control	
36.86d	4.15ab	15.65ab	2176b	37.44abc	7.66ab	156.11ab	Hortiphyte2g.L	
46.46a	4.25ab	14.56b	4041ab	44.44a	7.67ab	149.33b	Hortiphyte4g.L	
43.90abc	3.75ab	14.92b	6033a	43.33ab	8.88a	167.45ab	Stymulantforte1.5ml.L	General average of appointments
37.76cd	5.07a	15.64ab	4169ab	44.45a	8.11ab	164.00ab	Stymulantforte3ml.L	
47.10a	4.03a	16.23a	3589.3a	37.66a	7.10a	173.40a	1/21 First date	
40.76b	4.32a	15.23b	3589.3a	41.00a	7.86a	156.81b	Second date 2/1	
42.11b	3.82b	15.79a	2939.6b	33.61b	6.75a	158.86a	Control	General average fertilizer
42.90b	4.01b	15.86a	2659.3b	38.55ab	7.05a	160.67a	Hortiphyte2g.L	
47.65a	4.13ab	15.48a	3821.6ab	41.55a	7.17a	162.56a	Hortiphyte4g.L	
44.50ab	3.88b	15.02a	5122.0a	39.66a	8.16a	168.50a	Stymulantforte1.5ml.L	
42.48b	5.04a	16.51a	3869.5ab	43.27a	8.27a	174.95a	Stymulantforte3ml.L	

* Numbers with the same alphabetical characters in each column (for each factor and overlap) are not significantly different between them according to the Duncan Multiplicity test at a probability level of 0.05%

Table 3: Effect of Hortiphyte and Stymulantforte in the yield characteristics of the Zin growing cucumbers in the non-heated plastic house.

Total yield Ton.house	Early yield Kg.plant	Average plant yield Kg.plant	Number of fruits per plant	Fruit diameter	Fruit length (mm)	Fertilizers	Appoint ments
2.17b	**2.18ab	1.33b	13.15d	31.46ab	31.46ab*	Control	First date 1/21
3.24a	3.00a	1.98a	20.61ab	33.73a	33.73a	Hortiphyte2g.L	
3.32a	2.17ab	2.03a	19.21bc	32.76ab	32.76ab	Hortiphyte4g.L	
3.89a	2.58ab	2.38a	24.54a	33.01ab	33.01ab	Stymulantforte1.5ml.L	
3.45a	1.72b	2.11a	20.66ab	33.47ab	33.47ab	Stymulantforte3ml.L	
1.93b	2.57ab	1.18b	13.84d	31.07b	31.07b	Control	Second date 2/1
2.35b	1.87ab	1.44b	17.57bcd	32.27ab	32.27ab	Hortiphyte2g.L	
2.18b	1.68b	1.33b	15.25cd	33.02ab	33.02ab	Hortiphyte4g.L	
2.35b	1.76b	1.43b	14.74cd	33.18ab	33.18ab	Stymulantforte1.5ml.L	
2.22b	1.72b	1.36b	14.37d	32.23ab	32.23ab	Stymulantforte3ml.L	
3.21a	2.50a	1.96a	19.63a	32.88a	17.34a	First date 21/1	General average of appointments
2.20b	1.92b	1.35b	15.15b	32.35a	16.63b	Second date 1/2	
2.05b	2.38a	1.25b	13.49b	31.26b	16.42a	Control	General average fertilizer
2.80a	2.44a	1.71a	19.09a	33.00a	17.31a	Hortiphyte2g.L	
2.75a	1.93a	1.68a	17.23a	32.89a	16.96a	Hortiphyte4g.L	
3.12a	2.17a	1.91a	19.64a	33.09a	17.50a	Stymulantforte1.5ml.L	
2.83a	2.14a	1.73a	17.51a	32.85a	16.74a	Stymulantforte3ml.L	

* Numbers with the same alphabetical characters in each column (for each factor and overlap) are not significantly different between them according to the Duncan Multiplicity test at a probability level of 0.05%.

** Early yield is the first (six harvest).

and Molnár (2011)]. Thus, improving overall growth indicators. The amino acids may play a role in increasing the leafy area of the plant and the volume of the vegetative total, leading to increased shade on the rest of the plant. This makes the oxygen less susceptible to oxidative stress, increasing its concentration and thus increasing the elongation of the plant. This result agrees with Bayoumi and Hafez (2006), AL-Jubouri and Mousa (2009), Altaey and Majid (2018).

As shown in Table 2, the moral superiority of the treatment of Hortiphyte in the total chlorophyll ratio may be due to the fact that Hortiphyte contains nutrients (nitrogen, phosphorus, zinc, and other elements (Table 1). Plant growth, as nitrogen enters the synthesis of enzymes and proteins in the plant and also participates in the composition of groups of Porphyrins in the synthesis of chlorophyll and cytokines important in the process of photosynthesis and breathing, as well as the element of phosphorus activates sugars and enter into the course of important processes in Composition of membranes and thus increase the proportion of chlorophyll in the leaves [Mohammed (1985)]. This is in line with the findings of Abdul Rahman (2017) on the cucumber plant. It also contains the zinc element, which plays an important role in building the amino acid tryptophan, Oxygen in the plant [Mohammed (1985)].

It is generally observed that many of the bilateral interference factors between the factors applied in this study have caused an additional and significant increase in many of the studied traits in relation to the effect of these factors alone. The date of agriculture has a clear role in increasing productivity.

Table 3 shows the effect of planting data and liquid nutrient stymulantforte in the characteristics of the hybrid yield zain, the first date significantly exceeded the second date in all characteristics of the yield (fruit length, the number of fruit/plant yield /plant early yield and total yield / unit (17.34cm, 19.63,1.96 kg/plant, 2.50kg/plant and 3.21T/unit).

The treatment of sptaying with stymulant forte 1.5ml/l was significantly higher in (fruit dimeter, the number of fruit /plant, yield /plant, total yield unit). The interaction between the first date planting with fertilizer used, led to the best results in the score and the first date with Hortiphyte 2gm/l lead to the highest values in (fruit dimeter, fruit length, early yield/ plant). While the interaction between the first data and stymulant forte 1.5ml/l lead to highest values in (number of fruit/yield plant , total yield unit and significantly exceeded the control treatment and other treatments. And this may be due to increase in the occurrence of spraying with

stymulaut forte 1.5ml/l to the increase the number of fruit which reflected positively on the plant yield. And this is consistent with Al-Bayati (2011).

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