Plant Archives Vol. 19 No. 2, 2019 pp. 3588-3592 **e-ISSN:2581-6063 (online), ISSN:0972-5210**

MODERN AGRICULTURAL METHODS TO INCREASE CUCUMBER (*CUCUMIS SATIVUS* L.) PRODUCTION AND SALINE SOIL AVOID UNDER GREENHOUSES

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Abstract

The experiment was conducted during the spring season 2017-2018 in a non-heated greenhouse, Dimensions 9 × 56 (504 m^2), in a farm - Ministry of Agriculture, Thi-Qar province, Rifai district close to Gharraf river. Two factors were used in this experiment: the first factor was representative of four agricultural culture, the second factor of the four varieties was organized into 16 treatments, Each treatment has 4 replicates representing 4 × 4 × 4 = 64 experimental unit, The length of each experimental unit is 3.5 meters and the distance between the plant and the last 30 cm and between the experimental unit and another 1 m, randomized plots were distributed at the site, which included a general design for the whole random segment (Split Plot-RCBD). The results were analyzed according to the Duncan multiple range under probability 0.05, The results showed that the middle of the husk rice gave the highest values in wet and dry weight, paper area and leaves number, the value was 27.68 g, 0.878 g, 204 cm, 29.37 respectively, The highest values of the traits of the components of the crop were accompanied by the plants planted on the center of husk rice, such as fruit diameter, Cortex diameter, fruit length and weight, the value was 28.03 mm, 15.23 mm, 13.81 cm, 13316 g / m^2, respectively.

Key words : Modern agricultural, cucumber production, unsuitable soil avoid, greenhouses.

Introduction

Protected agriculture techniques were a new way of spreading in Iraq, it is important to provide agricultural crops, especially vegetable crops in off-season production, by planting them in glass or plastic houses in order to produce these crops in a time when they are not available in the markets, especially in the winter for planting in the off-season (Singh, 1998). The cucumber (*Cucumis sativus* L.) a crop is classified from creeping plants, a summer vegetable crop cultivated in Iraq and the world, belongs to Cucurbitaceous, believed one of the oldest cultivated vegetable plants by humans (Guner and Wehner, 2004). The cucumber family contains 90 genera and 750 species, the genus Cucumis contains almost 40 species (Haifa-Group, 2014). It is the fourth most important vegetable crop in terms of importance after cultivar, tomato and onion in Asia (Tatlioglu 1997). The production of the continent of Asia cucumber crop about 62756032 tons, the rate of production in hectares 39949 tons, while the rate of production in Iraq about 9288 tons per hectare, this indicates a significant reduction in production and may be due to many reasons, most notably the efficiency of nutrition (FAO, 2013). The cucumber is grown in open fields in Iraq in the spring and autumn, it was also grown in the protected environment under low plastic spending, plastic and glass houses, protected agriculture within the plastic and glass houses have special service requirements, because of the limited space, which requires the exploitation of the space of houses to compensate for the lack of space, requiring the production of unlimited varieties and directing them towards vertical growth, exploitation of this space instead of horizontal growth that needs a large area of land, which requires the removal of lateral huskches to reduce overcrowding among plants and increase the quality of the crop, increased production to the needs of the growing population through various types of service, including fertilization (Jarjis, 2006).

Materials and Methods

The experiment was conducted during the spring season 2017-2018 in one of the greenhouse with dimensions 9 × 56 (504 m^2), in one of the farms affiliated to the Ministry of Agriculture, Thi-Qar province, Al-Rifai district on the Gharraf River (longitude 28 06 o45 and latitude 14° 43 o31 and elevation from sea level 6 m). Five random soil samples were taken before planting, from different places of the experience site, depth 0 to 30 cm and air-dried, then I mixed a homogeneous mixture, brought to the Laboratory of the Faculty of Agriculture, Al-Muthanna University, to conduct its chemical and physical analysis as in (Table 1).

Table 1: Some physical and chemical properties of the soil of the plastic house site before planting.

Measurement	Measruing Unit	Soil Traits	
7.2	.....	pH	
1.2	ds.m^{-1}	EC	
183	ppm	HCO_3	
0.7	ppm	TDS	
1130	Mg kg^{-1}	Cl	
109	Mg kg^{-1}	Mg	
360	Mg kg^{-1}	Na	
180	Mg kg^{-1}	Ca	
29.0		N	Available minerals
7.0		P	
182.63		K	
3	%	Sand ratio	
23.5	%	Silts ratio	
73.5	%	Mud ratio	
Clay		Soil texture	

The Split Plot, which includes a complete randomized complete block design (Split Plot-RCBD), the results were analyzed according to the Duncan multiple range under probability 0.05. Two factors were used in this experiment: the first factor was representative of four agricultural culture, the second factor of the four varieties was organized into 16 treatments, Each treatment has 4 replicates representing 4 × 4 × 4 = 64 experimental unit, The length of each experimental unit is 3.5 meters and the distance between the plant and the last 30 cm and between the experimental unit and another 1 m. The treatments were randomly distributed at the site and according to the design indicated.

1. First factor Methods of cultivation (A): agriculture with rice husk (a1), traditional agriculture (a2), agriculture with straw taps (a3) and agriculture with aqueous solutions (a4).
2. The second factor of strains (B): The Rami strain (b1), Star strain (b2), Al-Rafidin strain (b3) and Kareema strain (b4).

Analysis of irrigation water: A sample of the river water to analyze the components of irrigation water to the laboratories of the Department of Soil Science and Water Resources at the Faculty of Agriculture / Al-Muthanna University (Table 2).

Table 2: Characteristics of irrigation water.

Value	Parameters
1.1	Electrical conductivity (dS m-1)
7.2	pH
Positive and negative ions (mmol / L^{-1})	
3.5	Calcium
1.3	Magnesium
4.3	Sodium
0.7	Potassium
0.4	Chlorine
1.6	Sulfur
1.7	Bicarbonate

As well as the analysis of water reservoir after the addition of solution nutritious (table 3.)

Nutrient solution composition

Cucumber crop plantation by culture media, above soil surface, needed to nutrient elements to life cycle complete. Bought manufactured fertilizers from known companies. The nutrient elements mixed according to company recommendations, all compounds mixed in 10 L of water, calcium nitrate Ca (NO_3) 2 can be dissolved alone. Avoid sedimentation in high concentrations, then add to the tank capacity of 1000 liters, the ratio of salts to EC is measured by a TDS meter (hold). The measurement is between 2000-2500 ppm for the cucumber crop, when mixing the solution with the irrigation water tank. the pH values drop to (6.5), It is measured by the hydrogen regulator. The solution is transferred to feed the plants in the treatment of rice husk, straw and traditional agriculture by means of a seismic system operating in the communicating vessels way. The solution is given in two batches per day to moisten the root area by (50 ml) for each point, This method takes five minutes. Treatment of pipes There is a small tank installed under the level of pipes, the solution is pumped by a small pump into the plant root area alternately for every three hours, a section of salt is consumed as a result of nutrient uptake by the plant, the solution is measured every 12 hours by a salt concentration device, compensated in cases of shortages and replace this solution every ten days, it can be used by adding it to other experimental units. In Table 4, Pro Sol is a neutral fertilizer containing the major and

Table 3: Content of nutrients in feed solutions.

Quantity / 750 liters of water	Compound	Elements compound concentration			Fertilizer equation			Growth stage	Fertilization / day
		K%	P%	N%	K	P	N		
700	N	14	14	28	1	1	2	Germination until flowering	20
1000	P_2O_5	18	11	12	1.5	2	2	Flowering until the beginning of harvest	20
1300	K_2O	36	12	12	3	1	1	The beginning of the harvest until the end	40
Other complementary elements%									
59% Hymic acid	Ca (NO3) 2 g	$\%SO_3$	MgO%	Mo%	Cu%	B%	Zn%	Mn%	Fe%
50	200	20	2.720	0.001	0.002	0.01	0.002	0.02	0.02

Table 4: Fertilizer content (PRO.SOL) of nutrients.

Micro elements ppm.						Major elements%		
Mo	Zn	Mn	Fe	Cu	B	K	P	N
5	500	500	1000	500	200	20	20	20

minor elements added to the solution when the level of salts is below the required limit of 200-400 g for the tank.

Prepare the implant medium

Three central seeds were prepared: rice husk, straw, water solution as well as traditional agriculture, The treatments were distributed randomly, treated with rice husks made of plastic bags of three and a half meters long and half a meter wide, filled with rice husks, in conventional agriculture, a 3.5 meter and 1 meter soil dam, in the treatment of straw, the straws were put together, and the length of the cup was 115 cm, width 50 cm, height 35 cm, paving three steps to be a length of 3.5 meters. Pipe treatment consists of 16 tube length of 3.5 m and 4 dang in each tube 9 holes for the purpose of laying the seedling seedlings where the tube represents one experimental unit, the distance between the plant and the last 30 cm, and placed all experimental units vertically along the plastic house, there is a corridor in the middle one meter wide along the plastic house.

Crop traits and contents

Measuring fruit diameter

Measure the diameter of the fruit using the electron (Vernier) for five fruits randomly selected from each harvest for the experimental unit from the beginning of the harvest until the last harvest.

Measuring the diameter of the fruit center

After each experimental unit was taken, five medium-sized fruits were taken randomly and cut by a knife from the middle, and the seed diameter was measured by the Vernier and then the mean was recorded.

Measuring the diameter of the bark

Take five medium-sized fruits at random after each experimental unit is harvested, cut by a knife from the middle, take the bark from the seed area to the outer shell by Vernier, and then multiply the rate.

Measure the length of the fruit

Reap the fruits of the experimental unit and measure three fruits by measuring tape large, medium and small and taking the rate for them.

Measuring the number of fruits per square meter

The number of fruits was calculated from the beginning of the harvest till the last one. Then, divide the number of fruits by the number of plants in the experimental unit and hit the experiment area in square meters, as in the following equation:

Number of total fruits/number of plants in experimental unit × Area of experiment in meters

Measure the weight of fruits per square meter

The total fruit weight is calculated from the first harvest to the last harvest, divided by the area of the experimental units.

Total production (kg.M^{-2})

Calculation of the plants of experimental unit starting from the first fairy, until the last fairy in a synthesis of the experimental unit, and the proportion of the proportions of the house of plastic. The experimental unit value was calculated as Kg^{-2} (total sum of the total fairies until the end of the season on (4/5/2018), then the total production according to the unit and is converted to Kg.

Results and Discussion

Solitary yield for each harvested from 1 to 16

Effect of farming methods

The results showed (Table 5, Figs. 1 to 4) outweighed the treatment of rice husks in the early yield of the first

Table 5: The solitary yield for each harvest from 1-16 for the methods of agriculture (g / m ^{2}).

Ways	Harvesting from 1 to 8							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Rice husk	155.33a	361.56a	384.15a	774.94a	992.35a	549.02a	1533.6a	1067.9a
Traditional	73.26b	255.63b	203.71b	515a	819.52ab	468.75Ab	1158.7b	803.7b
Straw	142.2a	297.98ab	261.81b	645a	744.19b	417.83Ab	1070.5b	986.2b
Solutions	148.63a	353.71ab	358.96b	655a	820.79ab	387.88b	824.2c	585.8b
Harvesting from 9 to 16								
Ways	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
Rice husk	1278.21a	1263.1a	1857.9a	1487.4a	1114.1a	834.17a	526.48a	485.52a
Traditional	621.81c	755.5b	930.7b	1053.8b	672b	577.79b	342.96b	290.92b
Straw	1046.67b	473.2c	954.1b	869.8b	468b	292.58c	279.83b	171.25c
Solutions	682.06c	277.2c	495.8c	326.6c	144.5c	0.0d	0.0c	0.0d

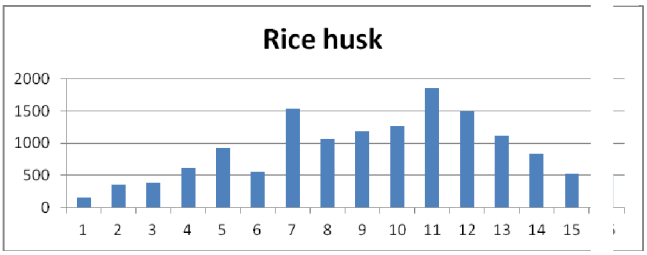

Fig. 1: The yield (g/m^2) shows the growing option in rice husk for harvester 1 to 16 with the period between harvest (day).

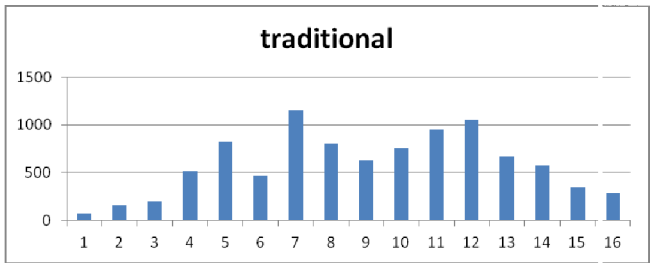

Fig. 2: The yield (g/m^2) illustrates the growing option in the soil for harvesters 1 to 16 with the periods between harvest (day).

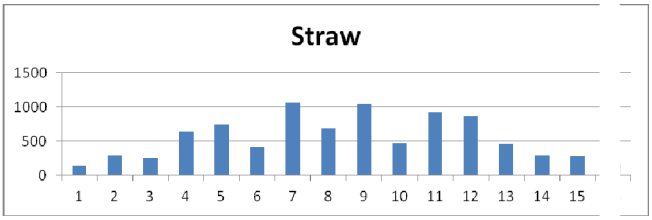

Fig. 3: The yield (g/m^2) shows the growing option in the straw for harvester 1 to 16 with the harvests (day).

five crops (2.668 kg/m^2). Production reached its peak at harvest 11 (1.875 kg/m^2). Water treatment (2.337 kg/m^2) was the second, with peak productivity at 7 (0.8242 kg/m^2) and production stopped at harvest. In the third place was the treatment of straw, which gave an early harvest (2.019 kg/m^2) and the peak production was at 7 (1.0705 kg/m^2). Finally, the conventional treatment, which

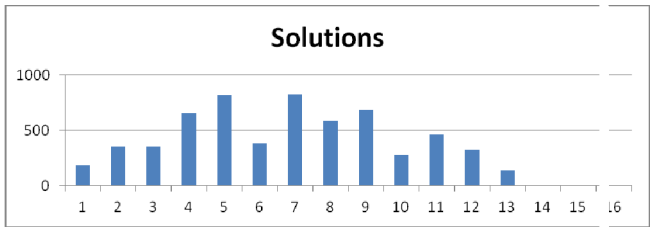

Fig. 4: The yield (g/m^2) shows the growing option in the Solutions for harvester 1 to 16 with the harvests (day).

gave an early yield (1.837 kg/m^2) Seventh harvest (1.1587 kg/m^2). These results were agreed with the results obtained Abdel (2009), when studying five varieties of cucumber, the early yield is one of the most important elements of the economic feasibility of any production project because of the high prices of the crop, prices deteriorate gradually after the early harvest, we conclude a discrepancy in the order of preference of transactions when relying on the early factor compared with the dependence on the total score, the treatment of the solutions and the hay was superior to the traditional agriculture, which is contrary to the reliance on the total amount that surpassed the traditional treatment on straw and the significant deterioration in the output of food solutions, due to the contradiction of environmental conditions, especially heat and evaporation, the weather conditions were good inside the plastic house at the beginning of the season and at the middle of the season there was a drop in temperature. Low temperatures led to the deterioration of cucumber plants developing on the solutions also and at the end of the season the temperature rose accompanied by temporary wilting temporary wilting, wilt was sharp in the hay treatments, and more severe in the solutions, which stopped production at the harvest 13. If the plastic house was heated, and the black-straw rafters that collected the heat at the roots, the results would be different because the roots were affected by heat more than the vegetative total (Abdel, 2011).

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