J. Agric. Sci. Mansoura Univ., 33 (3): 2459 - 2469, 2008

INTERACTIVE EFFECT OF PREVIOUS CROP, RICE STRAW, FYM AND N FERTILIZER RATES ON TOMATO YIELD AND SOIL QUALITY

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ABSTRACT

A pot experiment was performed out at Meniat El-Nasr district, Dakahlia Governorate, Egypt to evaluate the effect of some organic residuals (rice straw and farmyard manure) on vegetative growth, yield components and chemical composition of tomato crop (*Lycopersicon esculentum., Mill*) grown on an alluvial soil during the successive season of 2004/2005 and residual effect of applied treatments on soil quality. Treatments were representing all combination of organic waste sources (control, rice straw (RS) and mixture of rice straw + farmyard manure (RS + FYM) were applied at the rate of 20 m^3 fed^{-1} and N fertilizer rates (0, half and all of recommended rate as sulfate, 20.5% N) in presence of The used soils collected after cotton and the other collected after rice in split- split plot design with three replicates**.**

The obtained results could be summarized as follows:

- The mean values of chlorophyll readings (SPAD), fresh and dry weights (g pot^{-1}) tended to increase high significantly as a result of organic wastes and N- fertilizers applications under studied soils conditions. The highest mean values of chlorophyll readings (SPAD), fresh and dry weights at the 1st and 2nd soil respectively, occurred with the treatment of 20 m^3 fed^{-1} of RS with FYM (W2) + half nitrogen dose (N2) (75 kg N fed^{-1}).
- Data clearly appear that the additional of organic wastes and nitrogen had insignificant effect on N and P and K-uptake by shoot of tomato plant at two alluvial soils under studied. The highest mean values of N-uptake by shoot of tomato plant at the 1st and 2nd soil, occurred for the treatment 20 m^3 fed^{-1} of RS with FYM (W2) + half nitrogen dose (N2) (75 kg N fed^{-1}).
- Statistical analysis shows that means of fresh and dry yields (g pot^{-1}) and fruits number of tomato fruit were increased highly significant due to the different additions of organic wastes and N fertilizer rates. The highest mean values of fresh weight (g pot^{-1}) were observed at the 1st and 2nd soil respectively due to the additional of 75 kg N fed^{-1}(half dose) with (FYM + rice straw) at a rate of 20m^3fed^{-1}.
- Data clearly appear that insignificant differences were observed with nitrogen uptake by tomato fruit due to the applications of 75 kg N fed^{-1} (half dose with (FYM + rice straw) at a rate of 20m^3fed^{-1}. The highest mean values of N, P and K-uptake (mg pot^{-1}) in the 1st and 2nd soil occurred due to the addition of 75 kg N fed^{-1}(half dose) with (FYM + rice straw) at a rate of 20m^3fed^{-1}. The highest means of P-uptake at the 1st and 2nd soil respectively, produced from the additional of W2 (RS+FYM) at a rate of 20 m^3 fed^{-1} with N2 (75 kg N fed^{-1} half dose).

Keywords: Previous crop, organic wastes, N-fertilizer, tomato crop

INTRODUCTION

Tomato (*Lycopersicon esculantum Mill*) is one of the most popular and widely grown vegetable crops in Egypt. It contains some important nutritional compounds for human feedings such as proteins, fats, carbohydrates in addition to some minerals and vitamins especially C and A.

The use and management of crop residues, FYM and GM, are an increasingly important aspect of environmentally sound sustainable agriculture (Timsina and Connor, 2001; Bhandari *et al.,* 2002 and Regmi *et al.,* 2002). Also, the future sustainability of crop production will greatly depend upon improvements in the soil resource base through its effective management in an environmentally benign manner.

In most long term experiments, combination farmyard manures and mineral fertilizer has generally given the best crop yields and soil quality many parts of the world (Bogdevitch *et al.,* 2002); Wahdan, 2004; Wang *et al.,* 2004).

Moreover, several investigators reported that the efficiency of organic wastes in the presence of N fertilization were highest in availability of soil-N, P and K (Ashour *et al.,* 2004; Abdel-Hady *et al*., 2005 and El-Mancy and Selim 2007). Meanwhile, Sheng Mao *et al.,* (2006) reported that the application of farmyard manure along with the mineral fertilizers markedly reduced residual NO_3-N accumulation in the examined soil profiles.

Therefore, the aim of the investigation was to study the interactive effect of organic wastes and nitrogen fertilizer rates on plant growth, yield and quality and nutrient contents of tomato plants as well as soil fertility of studied soil under alluvial soil conditions.

MATERAILS AND METHODS

A pot experiment was performed out at Meniat El-Nasr district, Dakahlia Governorate, Egypt to evaluate the effect of some organic residuals (rice straw and farmyard manure) on vegetative growth, yield components and chemical composition of tomato crop (*Lycopersicon esculentum., Mill*) grown on an alluvial soil during the successive season of 2004/2005 and residual effect of applied treatments on soil fertility.

The experiment was conducted out in plastic containers measuring 50 cm in height and 40 cm in diameter. Each container was filled with twenty kg of soil. Soil samples were collected from the surface layer (0-30 cm) collected after cotton cultivation to represent the 1st soil, meanwhile the other, collected after rice cultivation to represent the 2nd soil.

Soil is considered a clay loam in texture (alluvial soils). Some physical and chemical properties were shown in Table 1.

The experimental design was split–split plot design. Main plots were assigned to the two previous crops (collected after cotton cultivation to represent the 1st soil, meanwhile the other, collected after rice cultivation to represent the 2nd soil. While, the three organic wastes (OW) treatments were arranged in the sub-plots and the three treatments of nitrogen (N) were the sub-sub plots. Hence, the total number of present trial was 2 treatments (previous crops) × 3 sources (OW) × 3 rates (N) = 18 treatments. Each treatment was replicated 3 times to give a total number of 54 experimental units.

Table 1: Some physical and chemical properties for the investigated soils.

Soil Properties		Soil 1	Soil 2
Physical analysis	Clay	43.10	36.30
	Silt	39.13	35.82
	Sand	10.39	19.94
	Texture	Silty clay	Clay loam
Chemical Analysis	pH	7.7	7.5
	$CaCO^{-}_{3}$	4.9	6.25
	EC (dSm^{-1})	1.71	0.92
Avialable Nutrients (mg kg $soil^{-1}$)	N	122.5	131.3
	P	105.3	81.9
	K	487.2	266.8
Cations (meq100 g $soil^{-1}$)	Ca^{+2}	2.31	1.21
	Mg^{+2}	2.49	1.38
	Na^{+}	3.85	2.07
	K^{+}	0.10	0.05
Anions (meq100 g $soil^{-1}$)	$CO^{=}_{3}$	0.00	0.00
	HCO^{-}_{3}	2.24	1.96
	Cl^{-}	6.11	1.22
	$SO^{=}_{4}$	0.41	1.53

1. The first factor (2 treatments): The used soils collected as follows;
The **1st soil** collected after cotton and the **2nd soil** collected after rice.

2. The second factor (2 treatments): Three sources of organic wastes were applied at the rate of 20 m^3 fed^{-1}as follows:

W_0; Control (without addition), **W_1;** Rice straw (RS) and **W_2;** Mixture of rice straw + farmyard manure (RS + FYM).Some chemical analyses of rice straw and farmyard manure are shown in Table 2.

Table 2: Some chemical analyses of rice straw and (Rice straw + FYM) Mixture farmyard manure.

Sources	Total nutrients (%)			O.M %	C %	C/N ratio	pH
	N	P	K				
Rice straw	0.54	0.027	0.55	9.81	43.0	79.6	6.5
(Rice straw + FYM) Mixture	1.12	0.29	2.00	25.17	14.0	12.5	7.8

3. The third factor (3 N rates): nitrogen was applied in the form of ammonium sulfate (20.5 % N) and ammonium nitrate (33.5 % N) at three rates 0, half and all recommended rates (150 N kg fed^{-1}) of nitrogen as the following:-

N_0; Control (Without addition).

N_1; All recocomended rate (150 N kg fed^{-1}) equal 0.30 g pot^{-1} (0.13 g of ammonium sulfate + 0.17 g of ammonium nitrate).and

N_2; Half recocomended rate (75 N kg fed^{-1}) equal 0.15 g pot^{-1} (0.065 g of ammonium sulfate + 0.085 g of ammonium nitrate)

Organic wastes were incorporated into the soil and then soil was irrigated and left for 15 days before sowing. Three tomato seedlings were placed in the center of each pot and water was applied to the pots to maintain the soil water potential near available moisture.

Also, the nitrogenous fertilizer was added at three equal doses; the first and two doses were added after 20 days from transplanting and at the beginning of flowering and fruit set (45 days after transplanting). While the third dose was added after fruit setting stage (65 days after transplanting). With exception of the studied treatments, other cultural practices for tomato were used according to the recommendations of Agriculture Ministry.

1. Agronomic characters:-

One sample was taken after cultivation to determine the following;

1.1. Growth attributes:-

- Fresh weight (g/pot).
- Dry weight (g/pot).
- Chlorophyll was measured by a Minolta SPAD chlorophyll meter (Yadova, 1986).

1.2. Yield:-

At maturity, after 120 days from planting season, the fruit samples were removed to measure the following attributes:-

- Number of fruit per pot.
- Fresh weight of fruits (g/pot)
- Dry weight of fruits (g/pot).

Also, fruit branches were carefully taken from plants before harvesting and available soil-N, P and K were estimated as mentioned in Cottenie *et al.,* (1982).

2. Soil quality:-

The representative soil samples were taken from the two soils before addition of any treatments and after harvesting of tomato to determine soil-available N, P and K (mg kg soil^{-1}) and organic matter % as mentioned by (Hesse, 1971).

All data were statistically analyzed according to the technique of analysis of variance (ANOVA) and the least significant differences between the treatment means were compared as published by Gomez and Gomez (1984).

RESULTS AND DISCUSSION

1. Growth attributes:-

Table 2 reveals that the fresh and dry shoot weights (g pot^{-1}) increased significantly and highly significant for chlorophyll readings (SPAD) of tomato plants with the interactive effect of organic waste sources and N fertilization rates under either soil cultivated with cotton crop (1st soil) or soil cultivated with rice crop (2nd soil) during 2005/2006 season.

Concerning the effect of organic waste sources on chlorophyll readings, fresh and dry shoot weight, data in Table 3 indicate that mean values of these attributes tended to increase with application of organic wastes as compared to the control, respectively. In addition, the additional

rates of nitrogen caused an increase in all studied vegetative growth attributes as compared to the control.

Finally, the highest mean of chlorophyll readings was (73.65 SPAD) produced from all recommended rate (75 N kg fed^{-1}) of nitrogen fertilizer application with rice straw + FYM (W_2) for the soil collected the soil collected after rice cultivation (2nd soil). While, the lowest means of this attribute was (53.00 SPAD) obtained from the rated pots of organic wastes and N fertilizer for the same soil (2nd soil). On the other hand, the highest means of fresh and dry shoot weights were (160 and 71.21 g pot^{-1}) obtained from all RR of N application with rice straw + FYM (W_2) for the soil collected after cotton cultivation, respectively.

Table 3: Some vegetative growth of tomato plants as affected by the interactive effect of previous crops, organic wastes and nitrogen rates during 2004/2005 season.

Treatments			Chlorophyll readings (SPAD)	Fresh shoot (g pot^{-1})	Dry shoot (g pot^{-1})
Cotton crop	W0	N0	54.95	41.60	20.68
		N1	61.05	54.13	26.75
		N2	63.56	63.70	30.86
	Means		**59.85**	**53.14**	**26.10**
	W1	N0	56.32	82.09	38.27
		N1	61.95	132.95	44.65
		N2	63.95	157.45	51.86
	Means		**60.74**	**124.16**	**44.93**
	W2	N0	56.95	83.59	40.26
		N1	64.60	141.35	56.38
		N2	67.77	160.08	71.21
	Means		**63.11**	**128.34**	**55.95**
Average			**61.23**	**101.88**	**42.33**
Rice crop	W0	N0	53.00	71.94	37.22
		N1	64.15	83.86	43.73
		N2	66.83	87.40	47.81
	Means		**61.33**	**81.07**	**42.92**
	W1	N0	61.67	72.94	38.96
		N1	66.65	101.84	43.07
		N2	70.05	121.86	53.57
	Means		**66.12**	**98.88**	**45.20**
	W2	N0	63.75	75.25	44.94
		N1	68.40	119.13	55.44
		N2	73.65	124.69	63.89
	Means		**68.60**	**106.36**	**54.76**
Average			**65.35**	**95.44**	**47.63**
LSD at 0.05			**1.16***	**4.52***	**1.23****

Generally, the beneficial effects of organic manure on vegetative growth might be related to the application of organic materials improved the physical conditions of the soil, provided energy for microorganisms' activity, increased nutrient supply and improved the efficiency of macro elements as

well as its ability to meet some micro nutrient requirements (Tisdale *et al*., 1993 and Hammad, 1996). These results are confirmed with those reported by Shehata *et al.,* (2004) and El-Mancy and Selim (2007) on tomato plants.

2. Yield:-

The statistical test in Table 4 shows that, the differences among mean values of fresh and dry yields of tomato fruit (g pot^{-1}) were significant (*p=0.05*) except for fruit number of fruits with the interactive effect of organic waste sources and N fertilization rates under either soil cultivated with cotton crop (1st soil) or soil cultivated with rice crop (2nd soil) during 2005/2006 season.

Table 4: Means of fresh, dry fruits and fruits number of tomato crop as affected by the interactive effect of previous crop, organic wastes and nitrogen rates after 2004/2005 season.

Treatments			Fresh yield (g pot^{-1})	Dry yield (g pot^{-1})	Fruits (No./plant)
Cotton	W0	N0	20.99	1.26	2.33
		N1	45.72	2.74	3.33
		N2	63.26	3.79	3.37
	Means		**43.32**	**2.60**	**3.01**
	W1	N0	31.23	1.87	5.33
		N1	92.20	5.53	7.67
		N2	105.47	6.33	12.00
	Means		76.30	4.58	8.33
	W2	N0	54.30	3.26	6.00
		N1	145.06	8.7	13.67
		N2	235.10	14.10	16.33
	Means		**144.82**	**8.69**	**12.00**
Average			**88.15**	**5.29**	**7.78**
Rice	W0	N0	21.43	1.29	2.33
		N1	35.37	2.12	2.67
		N2	46.05	2.76	3.67
	Means		**34.28**	**2.06**	**2.89**
	W1	N0	40.33	2.42	6.00
		N1	96.16	5.77	8.00
		N2	144.46	8.66	11.33
	Means		**93.65**	**5.62**	**8.44**
	W2	N0	116.02	6.96	6.00
		N1	135.6	8.14	10.67
		N2	258.03	15.48	11.67
	Means		**169.88**	**10.19**	**9.45**
Average			**99.27**	**5.96**	**6.93**
LSD at 0.05			**14.09**	**0.89**	**NS**

Table 4 reveals that the additional rates of rice and FYM vigorously enhanced fresh and dry fruit weights (g pot^{-1}) and fruits number as compared to the untreated treatment at two alluvial soils during 2004/2005 season. The highest mean values fresh and dry fruit weights were (258.03 and 15.84 g pot-

^{1}) in the soil collected from rice cultivation and fruit number were (16.33) in the soil collected from cotton cultivation produced from the application of RS + FYM (W_2) + half nitrogen dose (75 kg N fed^{-1}) (N_2). Meanwhile, the lowest mean of these attributes were (20.99 g pot^{-1}, 1.26 g pot^{-1} and 2.33) occurred with the check treatment in the soil collected from cotton cultivation.

Generally, the beneficial effects of organic manure on vegetative growth might be related to that the application of organic materials improved the physical conditions of the soil, provided energy for microorganisms activity, increased nutrient supply and improved the efficiency of macro elements as well as its ability to meet some micro nutrient requirements (Tisdale *et al*., 2002).

3. N, P and K nutrients uptake:-

Regarding the effect of previous crops, rice straw RS, mixture of (RS + FYM) and nitrogen fertilizer rates on N, P and K-uptake (g pot^{-1}), data in Table 5 clearly appear that insignificant differences were observed with N and P except for K absorbed by tomato fruits (g pot^{-1}) at 0.05 probability.

Table 5: Means of N, P and K uptake (mg pot^{-1}) by tomato crop as affected by the interactive effect of previous crop, organic wastes and nitrogen rates during 2004/2005 season.

Treatments			N uptake (mg pot^{-1})	P uptake (mg pot^{-1})	K uptake (mg pot^{-1})
Cotton	W0	N0	360.08	74.11	167.10
		N1	548.27	144.60	230.31
		N2	802.53	169.49	268.06
	Means		**570.29**	**129.39**	**221.82**
	W1	N0	765.8	191.08	343.61
		N1	960.02	250.24	419.98
		N2	1488.48	315.27	498.32
	Means		**1071.43**	**252.20**	**420.64**
	W2	N0	990.43	209.69	423.33
		N1	1618.23	321.31	710.23
		N2	2279.24	455.93	1175.51
	Means		**1629.30**	**328.98**	**769.69**
Average			**1090.34**	**236.86**	**470.72**
Rice	W0	N0	990.16	119.14	268.32
		N1	1346.65	187.78	353.98
		N2	1673.35	209.51	530.29
	Means		**1336.72**	**172.14**	**384.20**
	W1	N0	1075.34	194.82	455.80
		N1	1378.64	233.18	542.57
		N2	2029.29	326.47	691.22
	Means		**1494.42**	**251.49**	**563.20**
	W2	N0	1348.83	234.86	593.87
		N1	1984.34	304.63	748.92
		N2	2467.24	403.89	899.68
	Means		**1933.47**	**314.46**	**747.49**
Average			**1588.20**	**246.03**	**564.96**
LSD at 0.05			**NS**	**NS**	**126.67**

It is worthy to point out that, the highest means of N-uptake was (2467.24 mg pot^{-1}) produced from the addition of W_2 (RS+ FYM) at a rate of 20 m^3 fed^{-1} with N_2 (75 kg N fed^{-1} half dose) in the soil collected from rice cultivation. Meanwhile, the lowest mean of this attribute was (360.08 mg pot^{-1}) occurred with the check treatment (control) in the soil collected from rice cultivation. On other hand, Data in Table 5 show that the highest means of absorbed P by tomato fruits were (455 mg pot^{-1}) produced from the treatment of (rice + FYM) mixture plus the rate of 75 N kg fed^{-1} (N2) under conditions of the 1st soil respectively.

In addition, Table 5 reveals that K absorbed by was (1175.51mg pot^{-1}) produced from the addition of W_2 (RS+ FYM) at a rate of 20 m^3 fed^{-1} with N_2 (75 kg N fed^{-1} all dose) in the soil collected from rice cultivation. Meanwhile, the lowest mean of this attribute was (899.68 mg pot^{-1}) occurred with the check treatment (control) in the soil collected from rice cultivation. These results are in agreement with those of Bogdevitch *et al.,* (2002) and El-Mancy, and Selim (2007).

4. Soil quality:-

As shown in Table 6, data clear that application of organic wastes (rice straw RS, rice straw RS with farmyard manure FYM) treatments and N fertilizer levels individually or combination of them had a pronounced effect on soil-N, P and K contents (mg kg $soil^{-1}$) as well as organic matter (%) after tomato planting at two alluvial soils after 2004/2005 season.

The plots that received 20m^3 fed^{-1} (RS + FYM) mixture (W2) and fertilized with nitrogen fertilizers (75 kg N fed^{-1})- half nitrogen dose - (N2) contained the highest value of soil-N content (96.25 and 102.81mg kg $soil^{-1}$) at the 1st and 2nd soil, respectively. Meanwhile, the lowest values soil-N content were (32.81and 45.94 mg kg $soil^{-1}$) at the 1st and 2nd soil respectively, produced from untreated plots (control).

Generally, the addition of organic materials to the soil can improve its physical and biological properties, which are reflected generally, on soil fertility status and thus the dynamic changes of (NH^+_4 +NO^-_3)-N in the upper 30 cm of soil could be influenced, to a great extent, by organic materials Hammad (1996) and Wang *et al.,* (2004).

The highest mean value of soil-P were (154.95 mg kg $soil^{-1}$) at the soil collected from rice cultivation obtained from 20 m^3 fed^{-1}(RS + FYM) mixture with at a rate of 75 kg N fed^{-1} (half nitrogen dose) of N fertilizer. Meanwhile, the lowest mean value of the same form was (38.02 mg kg $soil^{-1}$) occurred with the control treatment under the soil collected from cotton cultivation, respectively. It might be attributed to the effect of several organic acids produced during organic matter decomposition which might have also increased nutrients availability.

As shown in Table 6, the highest mean values of soil- K content (mg kg $soil^{-1}$) were (365.40 mg kg $soil^{-1}$) obtained from plots that received 75 kg N fed^{-1} (half nitrogen dose) with the combined effect of added (FYM + RS) mixture at a rate of 20 m^3 fed^{-1} at the soil collected from cotton cultivation. Meanwhile, the lowest mean values of soil-K content were (138.80 mg kg $soil^{-1}$) at the same soil produced from the untreated plots (control).

With regard to the combined effect of farmyard manure with rice straw, and N fertilizer on OM%, data clear that application a rate of $20m^3$ fed^{-1} (FYM + RS) and 75 kg N fed^{-1} (half dose) achieved the highest mean values (5.12 %) of organic matter at the 2nd soil. Whereas, the lowest mean values of organic matter percentage were (2.31%) obtained from untreated plots. The role of organic matter would reduce the need of mineral fertilizers and decrease adverse environmental pollution. Also, microorganisms are important in agriculture in order to promote the circulation of plant nutrients and give residual effect and reduce the need for chemical fertilizer. These results are confirmed the obtained results of El-Mancy and selim (2007).

It could be concluded that application a rate of $20m^3$ fed^{-1} (FYM + RS) and 75 kg N fed^{-1} (half N dose) led to increasing the yield and nutrients uptake by tomato plants consequently maximizing the soil quality under alluvial soil conditions.

Table 6: Soil quality as affected by the interactive effect of previous crop, organic waste and nitrogen rates after tomato cultivation during 2004/2005 season.

Treatments			N (mg kg^{-1})	P (mg kg^{-1})	K (mg kg^{-1})	O.M. %
Cotton	W0	N0	32.81	64.35	208.80	2.31
		N1	52.50	76.05	249.40	2.50
		N2	56.88	87.75	255.20	3.46
	Means		**47.40**	**76.05**	**237.80**	**2.76**
	W1	N0	33.81	93.00	255.20	3.62
		N1	67.81	93.60	266.80	3.65
		N2	76.56	105.30	278.40	4.29
	Means		59.39	97.30	266.80	3.85
	W2	N0	43.75	117.00	284.20	4.33
		N1	87.50	140.40	307.40	4.58
		N2	96.25	154.95	319.00	4.71
	Means		**75.83**	**137.45**	**303.53**	**4.54**
Average			**60.87**	**103.60**	**269.38**	**3.72**
Rice	W0	N0	45.94	38.02	138.80	3.35
		N1	67.81	40.95	145.00	3.69
		N2	72.19	46.80	156.60	3.70
	Means		**61.98**	**41.92**	**146.80**	**3.58**
	W1	N0	59.06	46.80	168.20	3.77
		N1	78.75	58.50	307.40	3.81
		N2	80.94	64.35	313.00	3.90
	Means		72.92	56.55	262.87	3.83
	W2	N0	61.25	70.20	313.20	3.96
		N1	87.50	73.12	330.45	4.38
		N2	102.81	76.05	365.40	5.12
	Means		**83.85**	**73.12**	**336.35**	**4.49**
Average			**72.92**	**57.20**	**248.67**	**3.96**

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تأثيرالتداخل بين المحصول السابق وبعض المخلفات العضوية ومعدلات التسميد النتروجيني على محصول الطماطم ومحتواه من العناصرالغذائية وجودة التربة

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أقيمت تجربة أصص خلال موسمي 2005/2004 م بمركزمنية النصر، وذلك لدراسة تأثيراضافة بعض المخلفات العضوية (مخلفات قش الأرز، ومخلفات حيوانات المزرعة) والتسميد النيتروجيني بمستويات مختلفة لنوعين من الأراضي الرسوبية النهرية علي شتلات الطماطم (***L. esculentum., Mill***) .

تم تصميم التجربة فى قطع منشقة مرتين في قطاعات كاملة العشوائية حيث كانت القطع الرئيسية تمثل نوعين من الأراضي (تربة ما بعد زراعة القطن، تربة ما بعد زراعة الأرز)، والقطع تحت الرئيسية تمثل المخلفات العضوية فى مستويين (كنترول، ومخلفات قش الأرز، ومخلوط مخلفات قش الأرز+ مخلفات حيوانات المزرعة)، بينما كانت القطع تحت تحت الرئيسية تشمل النتروجين فى 3 مستويات (كنترول، كل المعدل الموصى به، و2/1 المعدل الموصى به في صورة نترات نشادر وسلفات النشادر)، **وفيما يلى عرض لملخص النتائج المتحصل عليها :**

- أظهرت النتائج أن متوسطات قراءات الكلوروفيل والوزن الطازج والوزن الجاف لنباتات الطماطم زادت معنوياً تحت تأثير كل من إضافة المخلفات العضوية (مخلفات قش الأرز، ومخلفات حيوانات المزرعة) مقارنة بالكنترول ، كما زادت أيضاً بزيادة معدلات التسميد النتروجيني تحت كلا الأرضين المزروعتين.
- أشارت النتائج أن أعلى قيم لمتوسطات الوزن الجاف تحقق عندما أضيف إليها مخلف عضوي (مخلف حيواني + قش الأرز) بمعدل 20 م3/فدان + 75 كجم نتروجين/فدان في كلا الأرضين.
- أوضحت البيانات أن النيتروجين والفوسفور والبوتاسيوم الممتص بواسطة المجموع الخضري (مجم/إصيص) يزداد معنوياً باضافات المخلفات العضوية تحت ظروف الأراضي الرسوبية.
- كما أشارت النتائج أن النيتروجين والفوسفورالممتص بواسطة المجموع الخضري (مجم/إصيص) لم يتأثرمعنوياً فيما عدا البوتاسيوم تحت تأثير التفاعل بين اضافات المخلفات العضوية وزيادة معدلات التسميد النتروجيني تحت ظروف الأراضي الرسوبية.
- كما أن الأراضي التي أضيف إليها مخلف عضوي (مخلف حيواني + قش الأرز) بمعدل 20 م3/فدان أعطت أعلى متوسطات للوزن الطازج والوزن الجاف للثمار في كلا الأرضين. ولكن وجد أن التفاعل الثلاثي بين عوامل الدراسة لم يؤثرمعنوياً على هذه الصفة تحت ظروف الأراضي الرسوبية النهرية.
- كما أشارت النتائج أن النيتروجين الممتص في الثمار (مجم/إصيص) لم يتأثرمعنوياً تحت تأثير التفاعل بين اضافات المخلفات العضوية وزيادة معدلات التسميد النتروجيني تحت ظروف الأراضي الرسوبية.
- ولقد أوضحت النتائج أن أعلى قيم للنتروجين والفوسفور الممتص (مجم/إصيص) كان نتيجة اضافة 75 نتروجين/فدان مع المخلفات العضوية بمعدل 20 م3/فدان تحت ظروف الأرضين. ولكن وجد أن التفاعل الثلاثي بين المخلفات العضوية (مخلفات المزرعة + قش الأرز) والتسميد النتروجيني (75 وحدة نتروجين/فدان) ونوعي الأرض أدي إلى الحصول على أعلى متوسط للبوتاسيوم الممتص في ثمار نباتات الطماطم.
- كما أشارت النتائج أن أعلى تركيزلقيم النيتروجين والفوسفوروالبوتاسيوم (مجم/كجم تربة) والمادة العضوية (%) في التربة كان تحت تأثير التفاعل بين اضافات المخلفات العضوية وزيادة معدلات التسميد النتروجيني تحت ظروف الأراضي الرسوبية.

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