

COMPARATIVE STUDIES ON MINERAL AND BIO-FERTILIZATION FOR SOME JUTE CULTIVAR IN SOME DIFFERENT SOILS.

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ABSTRACT

Four field experiments were carried out at two location viz.: Saba Basha College of Agric.Farm, Alexandria Governorate and Ismailia Exp. Sta., Ismailia Governorate, during 2000/and 2000/1 seasons, to compared the effect of mineral and bio-fertilizers on the yield and its components of some Jute cultivars, in addition to the uptake of some elements in jute seeds.

Data indicated that DC9105 cv. Ranked first in plant height and technical stem length in both of two tested locations, the highest mean values of green stalk per plant as well as per fed and fiber yield/fed produced by JRC7447 cv, recording (37.016g, 12.022 ton and 435.048 kg) and (30.631g, 9.353 ton and 393.537 kg) under clay loam and sandy soils, respectively. On other hand, PADMA cv. reached maximum values over the other tested cultivars for seed yield and related characters. It could be concluded, that mean values of yield and its components for jute which obtained by investigated cultivars at Saba Basha location were superior than those obtained from jute cultivars grown at Ismailia location.

Data illustrated that, either mineral fertilization with full recommended rates of NPK(control) or half rates combined with each of different sources bio-fertilizer (N_2 -fixers and P.D.B.), caused significantly increases in jute yield and its components over half rates of mineral fertilization alone at both locations. All jute characters significantly affected by the interaction between fertilizers treatments and jute cultivars, except plant height, technical stem length and green stalk yield per plant in both two experimental sites. Green stalk and fiber yield (kg/fed) significantly affected by the interaction between JRC7447 cv with addition of half of mineral fertilization + bio-fertilizer (N_2 -fixers + P.D.B.) and potassin as foliar spray while, no. of capsule, seed yield/plant and seed yield per faddan were significant with PADMA cv when applied the same treatments at both locations.

Nutrients uptake by seed jute was significantly affected by jute cultivars in all tested treatments under both sites. The PADMA > JRC7447 > DC9105 cv.

Data indicated that the N_2 -fixes + phosphate dissolving bacteria combined with a pronounced more increase in nutrients uptake by seed of jut cultivars the highest values of NPK uptake was obtained by PADMA cv with addition of half of mineral fertilization + bio-fertilizer (N_2 -fixers + P.D.B.) and potassin as foliar spray at two experimental sites.

It is concluded that mineral fertilization and bio-fertilization (N_2 -fixers and P.D.B) have great importance in increasing jute productivity and seed nutrients content.

Keywords: Jute cultivars- Mineral fertilizers (NPK) - Bio-fertilization (N_2 -fixers + phosphate dissolving bacteria) sand soils, clay loam soil.

INTRODUCTION

Jute, (*Corchorus capsularis*) belong to the bast fiber crops which extract from their stalks, by retting process. Internationally, jute ranks second after cotton in the cultivated area and the third after cotton and flax in fiber production. Recently, there was an interest for study the possibility of expanding jute cultivation in the newly reclaimed lands and aims to supply our national needs from jute products. Therefore, great efforts had been done to increase fiber quantity and quality of jute under Egyptian environmental conditions. Many investigators revealed that there is variability in jute characters (Lu *et al.*, 1983, Qi *et al.*, 1984, Chakraborty 1991, Bhunia *et al.*, 1997, El-Shirny and El-Sweify 2000. It is necessary to improve jute productivity; this could be achieved by growing more productive cultivars or by improvement of agricultural practices.

Recently, much interest is focused on using bio-fertilizers to minimize consumption of chemical fertilization, to decrease production cost and environmental pollution. Bio-fertilization with associative and symbiotic N₂-fixers (*Azospirillum* and *Azotobacter*) gave appreciable increase in plant growth and yield of different crops (Rai and Gaur, 1989; Bashan and Levanony, 1990; Mowad, and Abd El Maksoud, 1992, Kavimandan, 1992, El-Aggory *et al.*, 2001 and Abd El-Rasoul *et al.*, 2002)

Some soil microorganisms could improve P-uptake by different field crops. Phosphate dissolving organisms play an important role in releasing P from difficult P forms through producing organic and inorganic acid as well as CO₂ (Curl and Truevove, 1985 and El Sayed, 1999). Also, P.D.O may produce growth promoting substances such as auxine, gibberline and cytokines (Berea *et al.*, 1976 and Yahya and Al-Azawi, 1989), which may improve plant growth and stimulate the microbial development (El-Sayed, 1999; Nassar *et al.*, 2000 and Abd El-Rasoul *et al.*, 2002).

Potassium is a constituent of all plant tissues and is found especially concentrated in younger parts, in flowers and in seeds. This element is particularly important in germination of seed and fruits. Potassium is essential for cell division and development of meristematic tissue (Mengi and Kirkby, 1987). Shalan *et al.*, (2001) found that potassin as a source of potassium caused highly significant increase in most character of rosell plants.

The objective of this study was evaluated the beneficial effect of using NPK bio-fertilizers or alternate or complementary source of mineral fertilization on yield and quality of three different jute cultivars under different soils.

MATERIALS AND METHODS

Four field trials were conducted at two Expenmental Stations under different agricoclimatic conditions viz Saba Basha College of Agric. Farm, Alexandria Governorate and Ismailia Exp. Sta. (Ismailia Governorate during growing seasons 2000 and 2001 to compare the mineral fertilization (in recommended rates) versus co-fertilization with half recommended rates of

mineral fertilizer with specific bio-fertilizers (N_2 - fixers, phosphate dissolving bacteria and potassin-p (foliar sprays) for cultivars of jute

A split plot design with three replicates was used in every location, whereas the three cultivars of jute (*C. capsularis*) namely JRC 7447, DC 9106 and PADMA were allocated for the main plots. Plots were 3 m long and two m wide (1/700 fed.), while the following fertilizer treatments were allocated for sub plots as follows:-

- 1- Control (NPK as mineral recommended rates)
- 2- NPK as full recommended rates + Potassin-P (30%K₂O +10% P₂O₅/fed.) as foliar spray.
- 3- 1/2 NPK (half recommended rates)
- 4- 1/2 NPK as half recommended rates + Potassin-P (30%K₂O + 10 % P₂O₅/fed.) as foliar spray.
- 5- 1/2 NPK (half recommended rates) + Bio-fertilizers (N₂-fixers* + P.D.B)**)
- 6- 1/2 NPK (half recommended rates) + Potassin-P + Bio-fertilizers (N₂-fixers + P.D.B).

Some seeds of jute were mixed with N₂-fixers + phosphate dissolving bacteria (P.D.B) before planting at the rate of 500g / fed. Jute seeds of three cultivars were sown on 2 and 5 May in the two seasons, respectively. After that plants were fertilized with ammonium sulphate 20.5%N at the rate of 60kgN/fed., P as super phosphate 15.5%P₂O₅/fed. and K-as potassium sulphate

* N₂-fixers: Azospirillum spp(10⁷cells/g) and Azotobacter chroococcum

** P.D.B: Phosphate dissolving bacteria monoculture

All the recommended agronomic practices were done in suitable time. Soil samples of the experimental locations were analysed for estimated soil characteristics as listed in Table (1).

Table (1): Some physical and chemical properties of the sample taken from the experimental sites.

a- Chemical properties*										
Location	pH 1:2.5	EC DS/m	Soluble cations (meq/L)				Soluble anions (meq/L)			
			Ca ++	Mg ++	Na + K +	CO ₃	HCO ⁺	Cl ⁻	SO ₄	
Saba Basha	8.2	1.9	6.00	4.00	7.46	1.54	--	3.00	8.80	7.20
Ismailia	8.14	1.4	4.56	2.00	3.07	0.36	--	6.60	2.83	1.16
b- Available nutrients (ppm)										
		N**	P***		K***					
Saba Basha		40.0	4.50		430					
Ismailia		21.00	3.00		49					
c- Particle size distribution										
		Coarse sand %	Fine sand %	Silt %	Clay %	CaCO ₃ %	Texture class			
Saba Basha		9.0	24.9	28.20	37.90	21.40	Clay loam			
Ismailia		76.18	15.17	2.35	6.30	0.90	Sandy			

* Soil past.

** Extracted with 1% potassium sulphate described by Jackson, 1973.

*** Extracted with 0.5M sodium bicarbonate according to Jackson, 1973.

*** Extracted with 1N ammonium acetate Jackson, 1973.

At maturity, ten random guarded plants from each plot were used for recording the following traits:

- 1- Plant height (cm).
- 2- Technical stem length (cm).
- 3- Green stalk yield (g/plant).
- 4- No. of fruiting branches per plant.
- 5- No. of capsules per plant.
- 6- Seed yield (g/plant).
- 7- Green stalk yield (ton/fed).
- 8- Fiber yield (kg/fed) after retting process and extracting the fiber.
- 9- Seed yield (kg/fed).

Samples of seed were dried, ground where N, P and K content were determined according to the standard methods described by Chapman and Pratt (1961).

Statistical analysis:

The crop yield data were statistically analysed according to Snedecor and Cochran (1982). Means were compared by least significant differences (LSD) at 5% level. Combined analysis was performed for all previously mentioned characters over the two seasons according to LeClerg *et al.* (1966).

RESULTS AND DISCUSSION

1- Yield and its components:

1- Effect of cultivars:

Mean values of yield and related characters of three evaluated jute cultivars in the two investigated locations (Saba Basha (clay loam soil) and Ismailia (sandy soil)) from the combined analysis over two seasons are present in Table (2).

Data indicated that jute cultivars significantly differed in all tested traits under the conditions of the two investigated locations. DC 9105 cv. ranked first in plant height and technical stem length with mean values of (247.789 and 196.018 cm) in Saba Basha location and (223.752 and 177.082 cm) in Ismailia location; while PADMA cv was the shorter cultivar in the two above mentioned measurements. The third cultivar (JRC 7447 cv.) recorded the moderate mean values for plant height and technical stem length by (243.429 cm and 189.086 cm for clay loam soil) and (217.424 cm and 170.345 cm for sandy soil), respectively.

Green stalk yield (g/plant), green stalk yield (ton/fed) and fiber yield (kg/fed) produced by JRC 7447 cv. reached maximum values when compared with the other two tested cultivars, recording (37.016g, 12.022 ton and 435.048 kg) and (30.631 g, 9.353 ton and 393.537 kg) under clay loam soil and sandy soil conditions, respectively. PADMA cv. yielded the lowest mean values by 30.317 g, 11.266 ton and 385.13 kg at Saba Basha while it had the same trend in Ismailia location recording 27.353 g, 8.612 ton and 348.839 kg for green stalk yield/plant, green stalk yield as well as fiber yield per fed, respectively.

Concerning seed yield and related characters, data illustrated that PADMA reached maximum values over the other two tested cultivars for number of capsules, seed yield g/plant and seed yield kg/fed whereas producing mean values of 82.453, 7.732 g and 374.547 kg from plants grown under clay loam soil, on the other hand, at sandy soil, the same previous cultivar " PADMA" recorded mean values of 74.004, 6.992 g and 336.842 kg for no. of capsules, seed yield per plant and seed yield per fed., respectively. The lowest mean values for three above mentioned traits were obtained from JRC 7447cv at the two investigated locations. These above mentioned varieties differences are due to variability in genetic constituents and potential which in turn affected growth habit as well as yield components can explain these findings. Many investigators recorded genetic differences in jute characters among cultivars (Chakraborty *et al.*, 1991, El-Shimy and El-Sweify 2000 and El-Sweify and Abd El-Rasoul 2002).

Table (2): The effect of jute cultivars on yield and its components at the two investigated locations, Saba Basha and Ismailia. (Combined analysis of 2001 and 2002 seasons).

Saba Basha (clay loam soil)				
Traits	JRC 7447	DC 9105	PADMA	L.S.D at 5%
Plant height (cm)	243.429	247.789	236.964	6.460
Technical stem length(cm)	189.089	196.018	181.089	1.663
Green stalk yield (g/p)	34.016	31.448	30.317	1.084
Green stalk yield (ton/fed)	12.002	11.859	11.268	0.051
No. of capsules / plant	63.066	79.519	82.453	0.516
Seed yield (g/plant)	5.189	5.870	7.732	0.182
Seed yield (kg/fed)	224.185	253.856	374.547	1.331
Fiber yield (kg/fed.)	435.048	405.451	385.130	3.821
Ismailia (sandy soil)				
Plant height (cm)	217.424	223.752	213.968	0.297
Technical stem length(cm)	170.345	177.082	163.641	0.209
Green stalk yield (g/p)	30.631	28.376	27.353	0.869
Green stalk yield (ton/fed)	9.353	9.026	8.612	0.117
No. of capsules / plant	58.609	68.068	74.004	0.463
Seed yield (g/plant)	4.889	5.483	6.992	0.328
Seed yield (kg/fed)	201.945	228.671	336.842	0.197
Fiber yield (kg/fed.)	393.537	364.217	348.839	3.436

It could be concluded, from the previous results, that mean values of yield and its components for jute which obtained by investigated cultivars at Saba Basha location were superior than those obtained from the same cultivars grown in Ismailia location, the increment ratios of mean values for yield and its components traits which recorded by data obtained from the first location when compared with the other location were, 10.03, 9.74, 9.83, 22.77, 11.75, 7.49, 9.99 and 9.71% for plant height, technical stem length, green stalk yield /plant, green stalk yield /fed., number of capsules/plant, seed yield/plant and seed as well as fiber yields/fed., respectively.

In this respect Qi et al., (1984) obtained significant differences between the productivity of jute cultivars as affected by sowing under the different locations.

b-Effect of mineral and bio-fertilization treatments:

Data in Table (3) clearly indicate that the positive effect of different tested bio-fertilizers on improving jute yield and its components and reducing mineral fertilizer requirement in the case of two investigated locations.

Data illustrated that, either mineral fertilization with full recommended rates of NPK or half rates combined with each bio-fertilizer caused significantly increased in jute yield and its components over half rates of NPK treatment alone.

Table (3): Mean values of yield and its components of jute as affected by mineral and bio-fertilizer treatments. (Combined analysis of 2001 and 2002 seasons).

Saba Basha (clay loam soil)							
Traits	1	2	3	4	5	6	L.S.D.at5%
Plant height (cm)	241.335	248.527	233.400	243.252	245.167	246.686	6.587
Technical stem length (cm)	188.050	192.076	180.078	187.757	191.066	193.361	1.197
Green stalk yield (g/p)	27.873	32.278	26.057	30.141	34.108	41.103	1.210
Green stalk yield (ton/fed)	11.294	11.858	10.453	11.188	12.254	12.849	0.062
No. of capsules / plant	74.286	74.990	70.956	71.907	75.543	81.613	0.350
Seed yield (g/plant)	5.888	6.376	5.171	5.311	7.226	7.770	0.088
Seed yield (kg/fed.)	280.447	285.308	275.234	278.574	288.447	297.164	1.202
Fiber yield (kg/fed.)	406.611	408.788	400.905	402.479	413.932	418.543	1.041
ismailia (sandy soil)							
Plant height (cm)	217.245	220.565	210.187	217.079	220.905	224.208	0.342
Technical stem length (cm)	189.234	172.867	182.069	188.982	172.948	178.036	0.341
Green stalk yield (g/p)	24.988	30.697	23.443	27.139	29.260	37.193	1.116
Green stalk yield (ton/fed)	8.355	9.228	7.508	8.267	9.761	10.763	0.153
No. of capsules / plant	66.840	67.491	60.416	61.382	68.390	72.845	0.318
Seed yield (g/plant)	5.120	5.739	4.854	5.185	5.604	7.427	0.261
Seed yield (kg/fed.)	252.372	256.778	247.711	250.704	260.203	267.148	0.136
Fiber yield (kg/fed.)	365.950	371.628	350.803	357.763	374.353	382.689	0.937
1= NPK alone		2= NPK + Potassin-P		3 = 1/2 NPK		4 = 1/2 NPK+Potassin-P	
5 = 1/2 NPK + N ₂ -fixers + P.D.B		6 = 1/2 NPK + Potassin-p + N ₂ -fixers + P.D.B					

Concerning the effect of using potassin-P, data show that the co-fertilization of full recommended rate of NPK in combination with potassin seemed to be superior, followed by half recommended rates of NPK plus potassin as compared to mineral fertilizer alone; with maximum increments of 5.32, 6.25, 19.277, 11.85, 5.86, 18.91, 3.53 and 1.93% for plant height, technical stem length, green stalk yield per plant, green stalk yield/fed., no. of capsules, seed yield per plant, seed yield/ fed and fiber yield/fed., respectively; when compared with applying only the half recommended rates of NPK to clay loam soil; while the lowest values of increases which obtained by added potassin to full recommended NPK were 2.11, 2.09, 13.65, 4.76, 0.97, 10.79, 1.70 and 0.53% for the above mentioned characters.

respectively under the same previous soil. These results were agreed with El Gazzar and El-Kady, (2000) and Shalan *et al.*, (2001).

Regarding to the effect of other bio-fertilizers (N_2 fixers bacteria + phosphate dissolved bacteria (PDB), data indicate that last fertilizer treatment used in this study (half recommended rates of NPK plus potassin plus (N_2 -fixers +PDB), was more effective than the other treatment which containing the same kinds of fertilizer without potassin-p; in this case, the increases value in tested characters of about 1.519 cm, 2.295 cm, 6.995 g, 0.595 ton, 5.07, 0.544g, 8.717kg and 4.611 kg for plant height, technical stem length, green stalk yield/plant, green stalk yield/fed, no. of capsules, seed yield per plant, seed yield/ fed and fiber yield/fed., respectively, this finding was obtained from data of Saba Basha location.

It be must concluded that significantly increase were recorded for the main important jute yield characters when the last fertilizer treatment [1/2 recommended rates of mineral fertilizer + potassin-P as foliar spray + Biofertilizers (N_2 fixers +phosphate dissolving bacteria)], was used in the clay loam soil and comparing to the fertilizer treatment of only full recommended rates of mineral fertilization, these increase are 1.555 ton, 16.717 kg and 11.932 kg for green yield, seed yield and fiber yield per fed traits, respectively. On other hand, data obtained from the second investigated station (sandy soil) indicated that adding bio-fertilizer (N_2 -fixers + phosphate dissolving bacteria) + potassin-P as foliar spray to the half recommended mineral fertilization significantly increased the mean values of most important traits of jute such as green stalk yield/fed, seed yield/fed and fiber yield/fed by 2.408 ton, 14.77 kg and 16.739 kg, respectively, these increases produced over the mean values which obtained by using the full recommended rates of mineral fertilizer only.

From the previous results, it worth be mentioned that green stalk as well as fiber yields/fed traits were more responded by applying the bio-fertilizer to sandy soil than clay loam soil. This may be due to low fertility of sandy soil (Table 1). The same variation in the location effect on crops productivity when used bio-fertilizers were recorded by El-Aggory *et al.*, (2001).

C-Interaction effects:

It is clear from the data presented in Table (4) that all jute characters significantly affected by the interaction between fertilizers treatments and jute cultivars, except plant height, technical stem length and green stalk yield per plant in both two experimental sites.

Regarding green stalk and fiber yield (kg/fed) significantly affected by the interaction between JRC 1447 cv. with addition of half of mineral fertilization + bio-fertilizer (N_2 -fixers + phosphate dissolving bacteria) and potassin as foliar spray, recording the highest value for the two above mentioned characters (13.223 ton/fed and 445.23kg/fed) in clay loam soil and (11.10 ton/fed and 406.767 kg/fed) in sandy soils, respectively.

As for no. of capsule, seed yield/plant and seed yield per faddan were recording the highest values with PADMA c.v when applied half of mineral fertilization + bio-fertilizers (N_2 -fixers + P.D.B) and potassin-P as foliar spray in both experimental locations.

Table (4): Effect of interaction between fertilizers treatments and jute cultivars on some jute characters. (Combined analysis of 2001 and 2002 seasons).

	Saba Basha (clay loam soil)														
	Green stalk (ton/fed)			No. of capsul			Seed yield g/plant			Seed yield Kg/fed			Fiber yield kg/fed		
	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃
1	11.8	11.3	10.8	81.8	80.8	80.7	4.48	5.24	7.04	220.7	250.2	370.3	431.8	386.5	401.4
2	12.5	12.2	11.9	83.7	82.7	78.4	5.39	6.01	7.73	225.2	255.2	375.4	440.7	390.5	410.5
3	10.8	10.4	10.0	58.2	78.8	74.7	4.10	4.75	6.88	215.4	245.1	365.1	425.8	380.5	396.5
4	11.5	11.1	10.8	80.4	78.7	75.5	4.24	4.92	8.77	218.6	248.8	368.4	430.5	375.7	401.1
5	12.2	11.8	11.3	84.8	84.4	80.3	6.19	6.89	8.58	228.4	258.0	378.8	436.3	382.8	407.2
6	13.2	12.8	12.5	88.8	80.1	87.9	6.60	7.41	9.30	238.6	265.8	388.9	446.2	394.7	415.7
L.S.D at 5%	0.198			0.749			0.227			0.457			4.193		
	Ismailia (sandy soil)														
	Green stalk (ton/fed)			No. of capsul			Seed yield g/plant			Seed yield Kg/fed			Fiber yield kg/fed		
	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃	S ₁	S ₂	S ₃
1	8.7	8.4	7.9	65.1	72.7	72.6	4.04	4.72	5.51	196.7	225.1	333.3	388.8	347.9	381.3
2	9.4	9.2	8.9	66.4	74.5	70.6	4.85	5.41	6.98	202.7	229.6	337.9	396.6	351.4	369.9
3	8.0	7.6	7.2	53.3	70.9	67.3	3.69	4.28	5.99	193.8	220.8	328.8	383.0	342.4	358.9
4	8.6	8.2	7.9	54.4	71.7	67.9	3.82	4.43	6.09	196.7	223.8	331.5	387.5	338.1	360.9
5	10.2	9.9	9.1	58.1	75.4	71.7	6.67	6.31	7.83	208.2	232.8	341.5	398.7	390.6	372.5
6	11.1	10.7	10.4	61.3	78.6	78.5	6.04	7.77	8.47	213.8	239.8	347.9	405.7	381.2	380.1
L.S.D at 5%	0.098			0.676			0.5276			0.2868			3.716		

S₁= JRC7447cv, S₂= DC9105cv, S₃= PADMA cv.

II- Effect of mineral and bio-fertilizer on seed nutrients contents of jute cultivars and their interaction:-

Effect of cultivars:-

It is quite clear from the data reported in table (5) that nutrients uptake by seed of jute was significantly affected by jute cultivars in all tested treatments under both sites. The highest values of seed nutrients contents were obtained with PADM c.v., (5.189, 2.680 and 1.518kg/fed) for N, P and K uptake respectively at Ismailia site while, the main values was (8.211, 4.487 and 2.448 kg/fed) in saba Basha site.

The lowest mean values were obtained from DC 9105 cv at two sites. It may be due to variability in genetic constituents and potential El-Shimy and El-Sweify 2000, and El-Sweify and Abd-El Rasoul 2002.

Effect of mineral and bio-fertilizers:

Estimation of N, P and K amounts taken by jute as affected by mineral and bio-fertilizer, data in Table 5 confirmed the beneficial effect of performing mineral or mineral +bio-fertilization. The highest NPK uptake was obtained with full mineral fertilizer recommended rates + Potassin-Paa(as foliar spray) compared with full fertilizer recommended rates alone in both two experimental sites. While, the lowest values was obtained with half mineral recommended rates alone.

Table (5): Effect of mineral and bio-fertilizer on seed nutrients contents of jute cultivars and their interaction. (Combined analysis of 2001 and 2002 seasons).

Saba Basha (clay loam soil)												
Nutrients uptake (kg/fed)												
	N				P				K			
	S ₁	S ₂	S ₃	Means	S ₁	S ₂	S ₃	Means	S ₁	S ₂	S ₃	Means
1	2.885	4.729	7.881	5.158	2.987	2.373	4.00	3.120	1.093	1.614	2.278	1.662
2	2.940	4.810	8.448	5.399	3.716	3.179	4.788	3.894	1.189	1.875	2.535	1.866
3	2.414	3.181	5.784	3.793	1.303	1.483	2.585	1.790	0.924	1.147	1.708	1.259
4	2.938	4.317	8.842	5.366	3.751	3.245	4.476	3.307	1.421	1.902	2.817	2.047
5	4.455	5.275	9.035	6.255	4.544	3.522	5.455	4.507	1.336	1.742	2.330	1.803
6	4.799	5.880	9.277	6.652	4.768	3.948	5.689	4.795	1.782	2.114	3.066	2.301
Means	3.402	4.699	8.211		3.512	2.958	4.487		1.291	1.732	2.446	
L.S.D at 5%	Cultivars: 0.0325				0.0019				0.0008			
	Treatments: 0.0286				0.0032				0.0014			
	Interaction: 0.0564				0.0054				0.0023			
Ismailia (sandy soil)												
1	2.346	3.153	5.067	3.522	2.443	1.643	2.400	2.152	0.894	0.968	1.366	1.073
2	2.412	3.330	5.069	3.603	3.040	2.044	2.702	2.595	0.973	1.125	1.521	1.206
3	1.977	2.603	4.733	3.104	1.008	1.213	1.939	1.387	0.756	0.794	1.282	0.944
4	2.203	2.775	5.305	3.428	2.596	1.947	2.686	2.409	0.984	1.140	1.692	1.272
5	3.093	3.399	5.431	3.974	3.155	2.119	2.945	2.739	0.928	1.048	1.400	1.125
6	3.332	3.857	5.533	4.240	3.310	2.375	3.410	3.032	1.175	1.271	1.844	1.430
Means	2.561	3.186	5.189		2.592	1.690	2.680		0.952	1.057	1.518	
L.S.D at 5%	Cultivars: 0.0444				0.0020				0.0012			
	Treatments: 0.0544				0.0021				0.0008			
	Interaction: 0.1340				0.0039				0.0008			

1 = NPK alone
 2 = NPK + Potassin-P
 3 = 1/2 NPK
 4 = 1/2 NPK + Potassin-P
 5 = 1/2 NPK + N₂-fixers + P.D.B
 6 = 1/2 NPK + Potassin-p + N₂-fixers + P.D.B
 S₁ = JRC7447cv. S₂ = DC9105cv. S₃ = PADMA cv.

Concerning the effect of bio-fertilizers, data indicated that the N₂-fixers + phosphate dissolving bacteria combined with a pronounced more increase in nutrients uptake by seed of jute cultivars. These findings are in harmony with those of Nassar *et al.*, (2000); Sobh *et al.*, 2000 and Abd El-Rasoul *et al.*, (2002 and 2003). Also, the nutrients uptakes by seed of jute cultivars in Saba Basha (clay loam soil) were superior to Ismailia site (sandy soil).

The interaction effect:

The effect of the interaction between fertilization and jute cultivars on seed nutrients uptake was significantly (Table 5).

The highest values of NPK uptake was obtained by PADMA cv with addition of half of mineral fertilizer recommend rates + bio-fertilizers (N₂-fixers + phosphate dissolving bacteria) + potassin-P as foliar spray in the two experimental sites.

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دراسات مقارنة على التسميد المعدني بالتسميد الحيوي وتأثيره على المحصول ومكوناته لبعض أصناف من الجوت في بعض أنواع الأراضي.

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أقيمت أربعة تجارب حقلية في موقعين مختلفين مزرعة كلية الزراعة بساها باشا بمحافظة
الاسكندرية (أرض طينية طمية) والأخرى محطة البحوث الزراعية بمحاطة الاسماعيلية (أرض رملية) وذلك
خلال الموسمين الزراعيين 2001-2002 و 2002-2003.

وذلك لمقارنة تأثير استخدام مصادر مخنبة وأخرى حيوية للمناصر السبائية للتزوجين
والفوسفور والبوتاسيوم على إنتاجية بعض الأصناف من الجوت وذلك في كلا من الأراضي الطينية والرملية
والتي تمثلها كل من المحطتين السابقتين.

أوضحت النتائج تفوق الصنف DC9105 على الأصناف الأخرى في صفى الطول القعالي
والطول الكلي في كلا الموقعين تحت الدراسة. في حين أن الصنف JRC7447 نتج أعلى القيم بالنسبة
لصفات محصول العيدان الأخضر/جيات وكذلك للفدان بالإضافة الى صفة محصول الألياف مسجلا
(16.37، 12.22 طن، 48.48 كجم) تحت ظروف الأرض الطينية (ساها باشا) في حين أعطى
(13.13، 9.35 طن، 37.93 كجم) تحت ظروف الأرض الرملية (الاسماعيلية) وتلك للصفات
السابقة على التوالي.

يجدر الإشارة الى أن النتائج المتحصل عليها تبين أن منسوبات الصفات المدروسة
للمحصول ومكوناته تحت ظروف الأرض الطينية الطمية أعلى من تلك المتحصل عليها تحت ظروف
الأرض الرملية.

أظهرت النتائج أن استخدام المعدل الموسمية من التسميد المعدني (نيتروجين-فوسفور -
بوتاسيوم) كمعاملة مقارنة أو نصف هذا المعدل مضافة اليه التسميد الحيوي (البكتيريا المثبتة للنيتروجين
والبكتيريا المثبتة للفوسفات) أدى الى الحصول على زيادة معنوية في كل الصفات المدروسة لمحصول
الجوت وذلك عند المقارنة باستخدام نصف المعدل الموصى به من تلك العناصر متفرنا.

كما أظهر تأثير التفاعل بين التسميد والأصناف المختبرة للجوت، تأثيرا معنويا على كل الصفات المدروسة
علاوة على تفاعل الطول القعالي ومحصول العيدان لكل نبات في كلا من الأرضين.

تركت القيم المالية لمحصول العيدان ومحصول الألياف بتأثير التفاعل بين الصنف JRC7447 عند إضافة
نصف المعدل من التسميد المعدني + التسميد الحيوي (البكتيريا المثبتة للنيتروجين والبكتيريا المثبتة
للفوسفات) + إضافة البوتاسيوم رشا.

بينما ارتفعت القيم العالية لعنصر الكسولات لكل نبات ومحصول البذرة لكل نبات وذلك لكل فدان و
بتأثير التفاعل بين الصنف PADMA وذلك عند إضافة نصف المعدل من التسميد المعدني + التسميد
الحيوي (البكتيريا المثبتة للنيتروجين والبكتيريا المثبتة للفوسفات) + إضافة البوتاسيوم رشا .
تأثر امتصاص بذور الجوت لكل من النيتروجين والفوسفور والبوتاسيوم تأثيرا معنويا باختلاف
الأصناف وكذلك باختلاف معاملات التسميد المختلفة وذلك في كلا الأرضين.

ارتفعت القيم العالية لامتناس العناصر بالصنف PADMA عن الأصناف الأخرى وكانت الأرض الطينية
أعلى من الأرض الرملية وذلك مع إضافة نصف المعدل من التسميد المعدني - التسميد الحيوي (البكتيريا
المثبتة للنيتروجين والبكتيريا المثبتة للفوسفات) + إضافة البوتاسيوم رشا .

توصى الدراسة بأهمية التسميد الحيوي بالبكتيريا المثبتة للنيتروجين - البكتيريا المثبتة للفوسفات
لزيادة إنتاجية محصول الجوت ومكوناته.