COMPARATIVE STUDIES ON MINERAL AND BIO-FERTILIZATION FOR SOME JUTE CULTIVAR IN SOME DIFFERENT SOILS.
*Field Crops Res. Institute, Agric. Res. Center, Giza, Egypt

ABSTRACT

Four field experiments were carried out at two locations viz. Sabra Basha College of Agric., Alexandria Governorate and Ismailia Exp. Sta., Ismailia Governorate, during 2000 and 2001 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 DCS105 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 were produced by JRC7447 cv. recording (37.016g, 12.023 ton and 435.046 kg) and (30.631g, 9.353 ton and 383.53 kg) under clay loam and sandy soils, respectively. On 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 Sabra 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-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 (height) significantly affected by the interaction between JRC7447 cv. with addition of half of mineral fertilization + bio-fertilizer (N-fixers + P.D.B.) and potassium as foliar spray while, no of capsules, 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 > DCS105 cv.

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

It is concluded that mineral fertilization and bio-fertilization (N-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-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, Brune et al., 1997, El-Shemy 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.


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 (Cull and Truevet, 1988 and El-Sayed, 1998). Also, P.D.O may produce growth promoting substances such as auxin, gibberline and cytokines (Berea et al., 1976 and Yahya, and Al-Ayoubi, 1988), which may improve plant growth and stimulate the microbial development (El-Sayed, 1998, 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 potassium as a source of mineral fertilization caused highly significant increase in most character of rossl 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 Experimental Stations under different agro-climatic 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 (N₂-fixers, phosphate dissolving bacteria and potassium-P (folar sprays) for cultivars of jute.

A split plot design with three replicates was used in every location; whereas, the three cultivars of jute (c. caputum) namely JRC 7447, DC 9106 and PADMA were allocated for the main plots. Plots were 3 m long and two m wide (1/700 rad.), 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 + Potassium-P (30%K₂O + 10% P₂O₅) as foliar spray.
3. 1/2 NPK (half recommended rates)
4. 1/2 NPK as half recommended rates + Potassium-P (30%K₂O + 10% P₂O₅) as foliar spray.
5. 1/2 NPK (half recommended rates) + Bio-fertilizers (N₂-fixers + P.D.B)
6. 1/2 NPK (half recommended rates) + Potassium-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 (10⁶ cells/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 analyses for estimated soil characteristics as listed in Table (1).

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

<table>
<thead>
<tr>
<th>Location</th>
<th>pH</th>
<th>EC (DS/m)</th>
<th>Soluble cations (meq/L)</th>
<th>Soluble anions (meq/L)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Ca⁺⁺</td>
<td>Mg⁺⁺</td>
</tr>
<tr>
<td>Saba Basha</td>
<td>8.2</td>
<td>1.8</td>
<td>6.00</td>
<td>4.00</td>
</tr>
<tr>
<td>Ismailia</td>
<td>8.14</td>
<td>1.4</td>
<td>4.56</td>
<td>2.00</td>
</tr>
</tbody>
</table>

b: Available nutrients (ppm)

<table>
<thead>
<tr>
<th></th>
<th>N**</th>
<th>P***</th>
<th>K***</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saba Basha</td>
<td>40.0</td>
<td>6.50</td>
<td>430</td>
</tr>
<tr>
<td>Ismailia</td>
<td>21.00</td>
<td>3.00</td>
<td>48</td>
</tr>
</tbody>
</table>

c: Particle size distribution

<table>
<thead>
<tr>
<th></th>
<th>Coarse sand %</th>
<th>Fine sand %</th>
<th>Silt</th>
<th>Clay %</th>
<th>CaCO₃ %</th>
<th>Texture class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saba Basha</td>
<td>8.0</td>
<td>24.9</td>
<td>26.2</td>
<td>37.90</td>
<td>21.40</td>
<td>Clay loam</td>
</tr>
<tr>
<td>Ismailia</td>
<td>76.18</td>
<td>15.17</td>
<td>2.36</td>
<td>6.30</td>
<td>0.90</td>
<td>Sandy</td>
</tr>
</tbody>
</table>

* 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 randomly selected 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/ha).
8. Fiber yield (kg/ton) after rotting process and extracting the fiber.
9. Seed yield (kg/ton).

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 analyses 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 LoCicero et al. (1966).

RESULTS AND DISCUSSION

I. 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 divered 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 (247.78 cm and 180.016 cm) in Saba Basha location and (223.752 cm and 177.002 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 189.066 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/ha) and fiber yield kg/ton, produced by JRC 7447 cv. reached maximum values when compared with the other two tested cultivars, recording (37.016 g, 12.022 ton and 435.048 kg) and (30.631 g, 9.053 ton and 383.537 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 varietals differences are due to variability in genetic constituents and potential which in turn affects 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-Shemy 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)

<table>
<thead>
<tr>
<th>Traits</th>
<th>Saba Basha (clay loam soil)</th>
<th>JRC 7447</th>
<th>DC 9105</th>
<th>PADMA</th>
<th>L.S.D. at 5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant height (cm)</td>
<td>243.429</td>
<td>247.759</td>
<td>238.964</td>
<td>6.460</td>
<td></td>
</tr>
<tr>
<td>Technical stem length(cm)</td>
<td>189.069</td>
<td>196.018</td>
<td>161.089</td>
<td>1.963</td>
<td></td>
</tr>
<tr>
<td>Green stalk yield (g/p)</td>
<td>34.036</td>
<td>31.448</td>
<td>30.317</td>
<td>1.084</td>
<td></td>
</tr>
<tr>
<td>Green stalk yield (ton/fed)</td>
<td>12.002</td>
<td>11.659</td>
<td>11.266</td>
<td>0.051</td>
<td></td>
</tr>
<tr>
<td>No. of capsules/plant</td>
<td>63.066</td>
<td>70.612</td>
<td>82.453</td>
<td>0.516</td>
<td></td>
</tr>
<tr>
<td>Seed yield (g/plant)</td>
<td>5.169</td>
<td>5.270</td>
<td>7.732</td>
<td>0.182</td>
<td></td>
</tr>
<tr>
<td>Seed yield (kg/fed.)</td>
<td>224.185</td>
<td>263.866</td>
<td>374.547</td>
<td>3.321</td>
<td></td>
</tr>
<tr>
<td>Fiber yield (kg/fed.)</td>
<td>435.048</td>
<td>405.451</td>
<td>385.130</td>
<td>3.821</td>
<td></td>
</tr>
</tbody>
</table>

| Ismailia (sandy soil)       |                            |          |         |       |               |
| Plant height (cm)           | 217.424                     | 223.752  | 213.968 | 0.297 |
| Technical stem length(cm)   | 170.345                     | 177.022  | 163.641 | 0.209 |
| Green stalk yield (g/p)     | 30.631                      | 26.376   | 27.353  | 0.860 |
| Green stalk yield (ton/fed) | 9.353                       | 8.026    | 8.612   | 0.117 |
| No. of capsules/plant       | 56.099                      | 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  | 348.039 | 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 significantly 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 proving 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).

<table>
<thead>
<tr>
<th>Traits</th>
<th>1 = NPK alone</th>
<th>2 = NPK + Potassium-P</th>
<th>3 = 1/2 NPK</th>
<th>4 = 1/2 NPK + Potassium-P</th>
<th>5 = 1/2 NPK + N fixing + P.D.B</th>
<th>6 = 1/2 NPK + Potassium-P + N fixing + P.D.B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Plant height (cm)</td>
<td>241.335</td>
<td>246.527</td>
<td>233.400</td>
<td>243.252</td>
<td>246.197</td>
<td>246.666</td>
</tr>
<tr>
<td>Technical stem length (cm)</td>
<td>180.060</td>
<td>182.076</td>
<td>180.078</td>
<td>187.575</td>
<td>191.060</td>
<td>192.361</td>
</tr>
<tr>
<td>Green stalk yield (g/plant)</td>
<td>5.686</td>
<td>5.678</td>
<td>5.904</td>
<td>5.904</td>
<td>5.904</td>
<td>5.904</td>
</tr>
<tr>
<td>Seed yield (g/plant)</td>
<td>5.686</td>
<td>5.678</td>
<td>5.904</td>
<td>5.904</td>
<td>5.904</td>
<td>5.904</td>
</tr>
<tr>
<td>Fiber yield (kg/plant)</td>
<td>5.686</td>
<td>5.678</td>
<td>5.904</td>
<td>5.904</td>
<td>5.904</td>
<td>5.904</td>
</tr>
</tbody>
</table>

Concerning the effect of using potassium-P data show that the co-fertilization of full recommended rate of NPK in combination with potassium seemed to be superior followed by half recommended rates of NPK plus potassium as compared to mineral fertilizer alone, with maximum increments of 5.32, 6.25, 19.277, 11.65, 5.66, 18.81, 3.63 and 1.93% for plant height, technical stem length, green stalk yield per plant, green stalk yield/feed, no. of capsules, seed yield per plant, seed yield fed, and fiber yield, 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 potassium 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 the effect of other bio-fertilizers (N₂-fixers bacteria - phosphate dissolving bacteria (PDB)) data indicate that last fertilizer treatment used in this study (half recommended rates of NPK plus potassium (N₂-fixers +PDB), was more effective than the other treatment which containing the same kinds of fertilizer without potassium-P. In this case, the increases in tested characters of about 1.819 cm, 2.295 cm, 6.096 g, 0.596 ton, 5.07 0.544kg, 8.777 kg, and 4.611 kg for plant height, technical stem length, green stalk yield/plant, green stalk yield/ted, no. of capsules, seed yield/plant, seed yield/ted and fiber yield/ted, 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 + potassium-P as foliar spray + Biofertilizers (N₂-fixers + phosphate dissolving bacteria)] was used in the clay loam soil and comparing to the fertilizer treatment of only full recommended rates of mineral fertilizer, these increase are 1.565 ton, 16.717 kg and 11.932 kg for green yield, seed yield and fiber yield per fedd trials, respectively. On other hand, data obtained from the second investigated station (sandy soil) indicated that adding bio-fertilizer (N₂-fixers + phosphate dissolving bacteria) + potassium-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/ted, seed yield/ted and fiber yield/ted by 2.406 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/ted trials were more responded by applying the bio-fertilizer to sandy soil than clay loam soil. This may be due 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-Agory 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 cultivators, 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 (N₂-fixers + phosphate dissolving bacteria) and potassium as foliar spray, recording the highest value for the two above mentioned characters (13.223 ton/fed and 445.23 kg/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 PAOMA cv when applied half of mineral fertilization + bio-fertilizers (N₂-fixers + P.D.B) and potassium-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)

<table>
<thead>
<tr>
<th>Saha Basha (clay loam soil)</th>
<th>Seed yield g/plant</th>
<th>Fiber yield kg/ha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Green stalk</td>
<td>No. of capsules</td>
<td></td>
</tr>
<tr>
<td>S1</td>
<td>S2</td>
<td>S3</td>
</tr>
<tr>
<td>1</td>
<td>15.4</td>
<td>15.5</td>
</tr>
<tr>
<td>2</td>
<td>15.2</td>
<td>15.3</td>
</tr>
<tr>
<td>3</td>
<td>15.0</td>
<td>15.1</td>
</tr>
<tr>
<td>4</td>
<td>14.8</td>
<td>14.9</td>
</tr>
<tr>
<td>5</td>
<td>14.6</td>
<td>14.7</td>
</tr>
<tr>
<td>6</td>
<td>14.4</td>
<td>14.5</td>
</tr>
<tr>
<td>LSD 0.05%</td>
<td>0.108</td>
<td>0.102</td>
</tr>
</tbody>
</table>

I. 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 cv. (0.189, 2.680 and 1.918 kg/ha) for N, P and K uptake respectively at Ismailia site while, the main values was (0.211, 4.487 and 2.446 kg/ha) in Saha 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 E-Simy 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 + Potassium-Potassium 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>
<thead>
<tr>
<th></th>
<th>Saba Basha (clay loam soil)</th>
<th>Ismailia (sandy soil)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nutrients uptake (kg/ha)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>N, P, K</td>
<td></td>
</tr>
<tr>
<td></td>
<td>S1, S2, S3, S4, Means, S5, S6, S7, Means, S8, S9, S10, Means</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cultivars</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Treatments</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Interaction</td>
<td></td>
</tr>
<tr>
<td>Means</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L.S.D.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Concerning the effect of bio-fertilizers, data indicated that the N fertilizer + phosphate dissolving bacteria combined with a pronounced more increase in nutrients uptake by seed of jute cultivars. These finding are in hormone with those of Nassar et al. (2000), Sobh et al. 2000 and Abd El Rasoul et al. (2002 and 2003). Also, the nutrients take up 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 (N, P, K, + phosphate dissolving bacteria) + potassium P as foliar spray in the two experimental sites.
REFERENCES


دراسات مقارنة على التسميد العضوي بالتمثيل الحيوي وتأثيره على المحصول

واستعمال بعض الأصناف من الورود في بعض الأنواع الأراضي

4. رشح جيل محمد العمري

2. موجه بحوث المحاصيل الحقلية - مركز بحوث الزراعة - الحيرة

1. سهيل بحوث الأراضي والأغذية والبيئة - مركز بحوث الزراعة - الحيرة

فيما كانت محاولات تزيز من مواسم مختلفة من مواسم الزراعة تناولت بالإضافة

الإلكترونية لإنتاج الأسمدة والثروة في محاصيل الأراضي (عند رمية) وذلك

تقليل المواد الزراعية (2017-2020).

واذاع ملاحظات قليلة استخدام مغذيات وأخرى سلبية للتنمو النباتي

وقسوة رشح جيل محمد العمري على الأصناف في بعض الأصناف من الورود وذلك في كل الأراضي السطحية والثوبية

والتي تटقرها كل من المحاصيل المختلفة.

أجريت القنادق فوق الصدف 0100 على الأصناف الأخرى في محاور الطور المعدل

للفصل الثاني إلى كل الورود تحت الظروف القلية، وجاءت النتائج على أن الصدف 4C7467

تقلل محصول الفيضاء الأعلى وذلك بالنسبة للتنمو النباتي، وذلك بالقياس إلى

(0.30, 0.11, 0.43, 0.49, 0.41, 0.42, 0.38, 0.32, 0.31, 0.30) كم. مل. لم._counts للنفاذ

الآثار على نتائجها.

يعتبر الفاصل إلى أن التنافيج المحصول عليها دفع عالي أن تتوسع الصدف المعلومة

المحسوب وكثافة النباتات اعتماداً على الظروف الشتلية القلية التي أظهرها من تلك المحصول عليها تحسين طرود

الثلج الرطبة.

- يمكن أن ينتج أن استخدام المغذيات غير القيمة من أملاح السمأكية المصلبة (بار לבين-ويسار) -

- يمكن القيام بالعملية بالحفرة، وذلك màuضلاً في الأقطاب المصلبة في السطح، والتي تDeserialize

- في تنافيج المحصول (B.ع.)m 0100، 0200، 0300، 0400، 0500، 0600، 0700، 0800، 0900، 1000

- مادة بإمكانية نقطة، أو استشارة هذا المعدل من التخليل، التي تسمى مادة الحديمة الفكري (أ) القصير

- الحديمة المعملية المصلبة، في رشح جيل محمد العمري على زراعة محصول الأراضي (عند رمية) وذلك

- الجيلين أو الرامي في اختبار نصف الجيل الموسيقى من كل الأطوار المعبرة.

- كما تظهر فئة الأراضي في السماء المحصول (B.ع.)m 0100، 0200، 0300، 0400، 0500، 0600، 0700، 0800، 0900، 1000

- يمكن أن يؤدي إلى المحصول العذب في كل الأراضي (عند رمية).

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