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## ABBREVIATION

<b><u>A1</u></b>	:	Appendix
<b>A</b>	:	Phosphorus mineral fertilization
<b>B</b>	:	Phosphorus bio-fertilizer
<b>A x B</b>	:	Interaction
<b>C</b>	:	Control, non inoculation treatment
<b>C.V.%</b>	:	
<b>D.F.</b>	:	Degrees of freedom
<b>Ea</b>	:	Experimental error of main plots
<b>Eb</b>	:	Experimental error of sub-main plots
<b>Fed.</b>	:	Feddan = 4200 square meters
<b>Ha</b>	:	Hectare = 10000 square meters
<b>L.E.</b>	:	Egyptian Pound
<b>L.S.D.</b>	:	Least significant difference
<b>M.S.</b>	:	Means squares
<b>N.S.</b>	:	Not significant
<b>P</b>	:	Phosphorus
<b>PDB</b>	:	Phosphate dissolving bacteria
<b>PSB</b>	:	Phosphate solubilizing bacteria
<b>S.O.V.</b>	:	Source of variation

## V. SUMMARY

Two field experiments were carried out in the newly reclaimed desert land in the Nubaria Agriculture Research Station which is located at 47 km. Alexandria – Cairo Desert road , Egypt during the two seasons of 2004 and 2005 to investigate the effect of Phosphorus - mineral fertilization (15, 22.50 and 30 kg. P<sub>2</sub>O<sub>5</sub> / fed.) and bio-fertilization ( non-inoculation , Phosphorein , Microbein and Mycorrhizal ) and interaction between them on some growth attributes , earliness parameters , seed cotton yield and its components , net income and fiber properties . Egyptian cotton (Giza70) was used which represents an extra long stable cotton category .

The experimental design in the two seasons was a split-plot with four replications which used P – mineral fertilization as main plot . The four bio-fertilization occupied the sub plot .

### **The Characteristics Studied :**

#### **1- Plant Growth Attributes .**

- 1.1. Plant height (cms.)
- 1.2. Number of monopodia/plant .
- 1.3. Number of sympodia / plant .
- 1.4. Number of damaged bolls / plant .
- 1.5. First sympodial position in nodes.

#### **2- Earliness Parameters .**

- 2.1. Days to first flower appearance .
- 2.2. Days to first open bolls .
- 2.3. Boll age ( day ).
- 2.4. Earliness percentage ( % ) :

#### **3- Seed Cotton Yield and its Components .**

- 3.1. Number of open bolls / plant .
- 3.2. Boll weight ( gm. )
- 3.3. Seed cotton yield ( gm) /plant .
- 3.4. Seed cotton yield ( Kentar ) / feddan .
- 3.5. Lint percentage ( % ) .
- 3.6. Seed index ( gm. ) .
- 3.7. Number of plants / feddan .

#### 4- Net income (L.E.) / feddan .

- 4.1. Total costs ( L.E. ) / fed.
- 4.2. Total income ( L.E. ) / fed.
- 4.3. Net income ( L.E. ) / fed.

#### 5- Fiber Properties .

- 5.1. Fiber length ( 2.5% span length ) .
- 5.2. Uniformity ratio ( % ) .
- 5.3. Fiber fineness ( Mic. ) .
- 5.4. Fiber Strength ( gm./ tex ) .
- 5.5. Fiber elongation ( % ) .
- 5.6. Reflectance degree ( Rd% ) .
- 5.7. Yellowness ( +b ) .

**The obtained results could be summarized as follows:**

#### 1- Plant Growth Attributes .

- Plant height at harvest was significantly increased with applying phosphorus level in the first level only but not affected by application of bio-fertilization in both seasons .
- The results appearance that number of monopodia / plant was not affected by Phosphorus levels and bio-fertilization in both seasons .
- Number of sympodia / plant was not significantly affected by phosphorus fertilization and bio-fertilization in the two seasons .
- Application of phosphorus fertilizer levels and inoculation of bio-fertilization caused insignificant effect on number of damaged bolls / plant .
- Phosphorus level of 30 kg. P<sub>2</sub>O<sub>5</sub> / fed. gave the lowest of the first sympodial position in the first season only and the inoculation by Mycchizal fungi treatment caused a significant decrease in the first sympodial position as compared with the other bio-fertilizers and control in the first season .
- Regarding the interaction between P fertilizer levels and bio-fertilizer treatments , it had insignificant effects on plant height , number of monopodia / plant number of sympodia / plant , number of damage bolls / plant and first sympodia position during 2004 – 2005 seasons .

## 2- Earliness Parameters .

- Different phosphorus fertilizer levels caused insignificant effect on days to first flower and days to days open boll in both seasons but the result showed that the inoculation by Myccorhizal fungi treatment gave significantly affected with the days to first flowers in one season and the days to first open boll in both seasons .
- The shortest of boll age was observed with 30 kg.  $P_2O_5$ /fed. in the first season and Myccorhizal fungi treatment gave the shortest boll age as compared the other bio-fertilizer treatments in both seasons .
- The highest value of earliness percentage were recorded with 30 kg.  $P_2O_5$ /fed. followed by other treatments and the inoculation with Myccorhizal fungi gave the highest earliness percentage as compared with the other bio-fertilizer treatments and control in the two growing seasons .
- Days to first flower appearance as well as first open boll and boll age were insignificantly affected by the two factors interaction, Ax B, in both seasons while combination of 30 kg.  $P_2O_5$ /fed. with Myccorhizal fungi treatments produced the highest earliness percentages in both seasons .

## 3- Seed Cotton Yield and its Components .

- Number of open bolls / plant was significantly increased with increasing Phosphorus level in the two seasons , the high value of number of open bolls / plant were recorded with Myccorhizal fungi as compared with the other treatments in both seasons and the first – order interaction between Phosphorus levels and bio-fertilization was significant in regard to number of open boll / plant in 2005 only .
- The data showed that boll weight was not affected by application of Phosphorus fertilizers in both seasons , but different bio-fertilizer forms caused a significant increase in boll weight in 2005 season only . Boll weight was not significantly affected by the first-order interaction , Ax B, in the two seasons .
- Application the high Phosphorus level gave the greatest seed cotton yield / plant in the two growing seasons . The Myccorhizal fungi produced the highest seed cotton yield / plant than the other bio-fertilization treatments in both seasons and the interaction between phosphorus level and bio-fertilization was significantl effect on seed cotton yield /plant in the two seasons .Inoculation of cotton seeds with Myccorhizal fungi bio-fertilization when conjugated with the high phosphorus rate (30 kg.  $P_2O_5$ /fed) produced the highest values for seed cotton yield / plant ( 41.85 , 37.58 gm.) in both seasons , respectively .
- Application of 30 kg.  $P_2O_5$ /fed gave the highest seed cotton yield / fed. as compared with the other Phosphorus fertilizer levels in both seasons , seed cotton yield / fed. significantly increased when Myccorhizal bio-fertilizer was used during both seasons.
- Results showed that the increase in seed cotton yield/fed due to inoculating cotton seeds followed the following sequence Myccorhizae > Microbein > Phosphorein > uninoculation (control). The increase in seeds cotton yield of Myccorhizae and Microbein is due to the fact that those biofertilizers help in  $N_2$ -fixation and improving P-dissolving which make it available for absorption by plant roots.

- The first order interaction between fertilization Phosphorus levels (A) and bio-fertilization (B) was significant in regard to seed cotton yield /fed. in both seasons . Mycorrhizal fungi bio-fertilizer with the high phosphorus rate 30 kg. P<sub>2</sub>O<sub>5</sub>/fed produced the highest value for seed cotton yield / fed . ( 12.14 , 9.65 Kentars ) during 2004 and 2005 seasons respectively .
- Lint percentage , seed index and number of plant / fed. were not significantly affected by P fertilizer levels , bio-fertilization treatments or the interaction between them in both seasons .

#### 4- Net Income in Pounds (L.E.) / feddan .

- Total costs (L.E.)/ fed. was significantly greater with 30 kg. P<sub>2</sub>O<sub>5</sub>/fed. than that of the other Phosphorus level in both seasons Mycorrhizal inoculation gave the highest total costs (L.E.) / fed. as compared with the other bio-fertilizer treatments in the two growing seasons . The interaction between P fertilizer levels and bio-fertilizer treatments was significant for total costs (L.E.) / fed. in the two seasons .
- Total income ( L.E.)/fed. was increased by increasing Phosphorus level up to 30 kg. P<sub>2</sub>O<sub>5</sub>/fed in the two growing seasons , and the inoculation with Mycorrhizal fungi gave the highest total income (L.E.) / fed. as compared to the other bio-fertilization treatments in both seasons . The first – order interaction between Phosphorus levels and bio-fertilization treatments was significant in regard to total income (L.E.) / fed. in the second season only .
- Net income ( L.E.) / fed. was increased by increasing Phosphorus level up to 30 kg. P<sub>2</sub>O<sub>5</sub>/fed. in both seasons , Mycorrhizal fungi inoculation gave the highest net income (L.E.) as compared with the other bio-fertilization treatments in both seasons . The interaction between P levels and bio-fertilization treatments were significant in regard to net income (L.E.) in the both grows seasons .

#### 5- Fiber Properties .

- Fiber properties were not affected by application of P levels in both seasons except fiber strength was significantly increased with applying Phosphorus fertilizer in the second season only , also bio-fertilizer treatments had no significant effect on fiber properties in the two growing seasons but fiber length and fiber strength were significantly affected with non-inoculation treatment in the second and first seasons , respectively . Observed that the first-order interaction between P levels and bio-fertilization treatments were significant in fiber strength in the second season and uniformity ratio in the first season .

#### Conclusion :

- As a conclusion of the above results , it is advisable to inoculate cotton seeds with Mycorrhizal fungi bio-fertilizer when conjugated with using the high P level 30 kg. P<sub>2</sub>O<sub>5</sub>/fed. to obtain the highest seed cotton yield / fed. (12.14 , 9.65 Kentars ) and consequently to get the highest values of net income (L.E.) / fed. ( 4412.5 , 6804.75 L.E. )in both seasons and this should be considered in growing cotton crop on the highly calcareous soil of West Nubaria region and Alexandria governorate .