5- SUMMARY.

This study aims at investigating the effects due to some natural, inorganic and organic as well as biological fertilizers on maize (corn) productivity and utilization (uptake) of macronutrients (N, P and K). Contents of available N, P and K at flowering 60 days after sowing and harvest (120 days after sowing) were also investigated.

(1)Farmyard manure "FYM"(as an organic source of N).

(2)Ammonium sulphate "AS" (as a chemical source of N).

(3) Rock phosphate "RP" (as natural P source). (4) Ordinary super phosphate "SP" (as a chemical P source).The biological fertilizers were in forms of bacterial inoculants of (*Paenibacillus polymyxa* and *Bacillus megaterium var. phosphaticum*). The crop was grown on a sandy soil under 2 irrigation systems, drip and sprinkler .The field experiment was conducted in the farm of the Agriculture Research Center (ARC) at El Ismailia experimental farm. The soil is sand in texture .The experimental design was a randomized complete block, factorial, including 4 factors of: (a) N-source (FYM and AS); (b) Inoculation (no-inoculation, inoculation with *P.polymyxa* and *B.megaterium*); (c) irrigation (drip and sprinkler), and (d) P- source (RP and SP each in two arrangements). The number of treatment combinations was 48 as follows 2(irrigation systems) ×3 (inoculation treatments none, and two inoculations) ×2(N-sources) ×4(P "2 sources each at 2 rates"). Treatments were executed in 3 replicates. The total treatments are thus 48×3=144. All treatments received K at 50 kg K / fed.

a) The most important results could be summarized as follows:

(1)-Yield (metric t /fed).

-Sprinkler irrigation increased the grain yield over the drip irrigation system (6.18 and 2.68 ton fed^{-1}) respectively.

-Bio fertilizers increased yield. Average yields were: values 3.12, 4.38 and 4.77 t/ fed under no- inoculation, *P.polymyxa* and *B.megaterium*, respectively.

-AS increased in grain yield more than FYM.

-In some cases SP was superior to RP.

(2)-N, P and K-uptake at flowering.

-Sprinkler irrigation increased N uptake over drip irrigation system (3454 and 3333 mg plant $^{-1}$ respectively). –Bio fertilization increased N-uptake with values of 2045, 3610 and 4527 mg plant $^{-1}$ for treatments of no inoculation, *Paenibacillus polymyxa* and *Bacillus megaterium*, respectively. As increased in N-uptake more than FYM.

-Drip and sprinkler irrigation were comparable regarding P-uptake.

-Inoculation increased P with average value of 730, 1227.6 and 1534.9 mg plant $^{-1}$ for no inoculation, *Paenibacillus polymyxa* and *Bacillus megaterium*, respectively. FYM increased P-uptake more than AS.

- Resounding K-uptake, inoculation increased K-uptake.

- N, P and K-uptake at harvest show that sprinkler increased N-uptake over the drip irrigation system (5287 and 4463 mg plant

$^{-1}$, respectively). Inoculation increase N-uptake with average values of 3288, 5133 and 6210 mg plant $^{-1}$ for no-inoculation, *Paenibacillus polymyxa* and *Bacillus megaterium*, respectively.

-AS increased N- uptake more than FYM.

-With regard to P-uptake drip and sprinkler systems were similar. Inoculation increased P-uptake.

FYM was superior to AS .Regarding.

Inoculation increased K-uptake .Regarding contents of available N, P and K in soil, inoculation increased available N, P and K.

SUMMARY