

EFFECT OF MINERAL AND BIOFERTILIZATION ON NODULATION, NODULE ACTIVITY AND YIELD IN SOYBEAN (*Glycine max*, L.).

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ABSTRACT: *Two field experiments were carried out in the Experimental Farm, Faculty of Agriculture, Minufiya University, Shebin El-Kom to study the effect of nine mineral fertilization treatments (0, 30 kg N, 60 kg N, 15 kg P₂O₅, 30 kg P₂O₅, 24 kg K₂O, 48 kg K₂O, 30 kg N + 15 kg P₂O₅ + 24 kg K₂O and 60 kg N + 30 kg P₂O₅ + 48 kg K₂O/ fed) and eight biofertilization treatments (0, Rhi., Pho., Pot., Rhi.+ Pho., Rhi. + Pot., Pho + Pot. and Rhi.+ Pho.+ Pot.) on nodulation and productivity of soybean (Giza 111 cultivar) during 2006 and 2007 seasons. The obtained results could be summarized as follows:*

- 1- Mineral fertilization with 30 kg N + 15 kg P₂O₅ + 24 kg K₂O/fed enhanced nodulation and microbial activation as expressed in dry weight of nodules/plant and activities of nitrogenase and dehydrogenase enzymes as well as yield and its components (number of pods/plant, number of seeds /pod, 100-seed weight, seeds weight/pod, seed yield/plant and seed, straw and biological yields/fed) compared with the other mineral fertilization treatments. However, unfertilized plants produced the highest values of number of nodules/plant in both seasons.*
- 2- Seed inoculation with the tested biofertilizers reflected a marked effect on nodulation and microbial activation as well as yield and its components in favour of triple inoculation with Rhi. + Pho. + Pot. followed by dual inoculation with Rhi. + Pho. in most characters with the exception of number of nodules/plant which recorded the highest values by dual inoculation with Rhi. + Pho. in the two seasons.*
- 3- The interactions between the tested mineral and biofertilizers were found to be significant for most traits studied herein. Unfertilized N, P and K plants when inoculated with Rhi. + Pho. recorded the highest number of nodules/plant. However, the application of 30 kg N + 15 kg P₂O₅ + 24 kg K₂O/fed combined with Rhi. + Pho. + Pot. was the most effective treatment for increasing the dry weight of nodules, nitrogenase and dehydrogenase activities, number of pods, seed yield/plant and seed and straw yields/fed compared to the other tested treatments.*
- 4- Significant positive correlation coefficients were detected between nodulation and microbial activation as well as yield and its components indicating that the productivity of soybean could be increased by improving the nodulation and microbial activation, particularly dehydrogenase activity which showed more stronger association with the seed yield/fed than with any other nodulation or enzyme activity attribute.*