

## Effect of bio-fertilizers on growth and yield of garden pea (*Pisum sativum* L.)

NISAR AHMAD GANIE, R.B. SOLANKI AND FAYAZ AHMAD ALLIE

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### ABSTRACT

The present experiment was carried out to establish the effect of bio-fertilizer inoculation and co-inoculation (interaction) of *Rhizobium*, *Azobacter* and phosphorus solubilising micro-organisms (PSM) on the growth and yield character of vegetable pea. Results of the present experiment clearly indicated that the co-inoculation of *Rhizobium*, *Azotobacter* and phosphorus solubilising microorganism (PSM) produced noticeably highest growth in terms of plant height (45.26 cm), leaves (13.33), branches (2.67), nodules (44.46), fresh weight of nodules (612.34mg) and dry weight of nodules (172.62 mg) and also highest yield in the tune of maximum pod length (9.69 cm), number of pods plant<sup>-1</sup> (19.37), number of seeds pod<sup>-1</sup> (8.22) and yield of pods (74.25q ha<sup>-1</sup>). Moreover, the co-inoculation of *Rhizobium* and phosphorus solubilising microorganism (PSM) also gave beneficial results in respect to the other treatments. However, the individual inoculation of *Rhizobium*, *Azotobacter* and PSM produced promising results in addition to control over the aforesaid character. Obviously, early flowering (29.31 days) and marketable maturity (48.46 days) was also recorded with the co-inoculation of *Rhizobium*, *Azotobacter* and phosphorus solubilising microorganism (PSM).

See end of the article for authors' affiliations

Correspondence to:

**NISARAHMAD GANIE**  
Department of  
Horticulture, Amar Singh  
College, Lakhaoti,  
BULANDSHAHR (U.P.)  
INDIA

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**I**n order to meet the nutritional demands of the increasing population efforts are being made at national and international level to increase per hectare production. Fertilizers being vital agriculture input to increase the population but the main drawbacks by the use and manufacture of chemical *viz.*, energy crisis and unavailability of indigenous effects of chemical fertilizers on our health and environment. All these things have led to the search of alternative renewable source of nutrient for the crop through fertilizers of biological origin (bio-fertilizers). The bio-fertilizers are safe, low cost and easy in application. Bio-fertilizer application have shown good results in case of leguminous (pulse) crop, especially exclusive results have been obtained in case of vegetable pea (garden pea). In view of the above facts, the present investigation was carried out to ascertain the effect of bio-fertilizers and their interaction on growth and yield of crop.

### MATERIALS AND METHODS

The present investigation was carried out at the Horticulture Research Farm of Chaudhary Charan Singh, University Meerut (U.P). The experiment was carried out in factorial randomized block design. The treatments included three bio-fertilizers, *viz.*, *Rhizobium*, *Azotobacter* and PSM (phosphorus solubilising microorganism) each with two levels, inoculated, uninoculated and their co-inoculations (interactions) *viz.*,

*Azotobacter* + PSM, *Rhizobium* + PSM. All the treatments were replicated thrice. The soil of the experimental field was sandy loam and having pH 7.5, organic carbon 0.29%, available nitrogen (0.055%), available phosphorus (0.00079%) and available potash (0.0189%). An optimum dose of nitrogen (30kgNha<sup>-1</sup>) was applied, half of which was given at the time of seed sowing along with the full dose of phosphorus (70kg ha<sup>-1</sup>) and potassium (50kg ha<sup>-1</sup>) and the remaining half dose of nitrogen was applied as top dressing. In the present study the seed treatment method was followed, in this case for each kg of seed, slurry was prepared by mixing and warming 200g of bio-fertilizer culture *i.e.* *Rhizobium*, *Azotobacter* and phosphorus solubilising microorganism (PSM) in 200 ml water containing 50g Juggery and in interactional (co-inoculation) cases equal share of weight was taken from each member of the interaction corresponding to weight of 200g. The seed was kept for 15-20 minutes in slurry. After putting and taking out the seeds from the slurry after 15 – 20 minutes, then they were spread in shade for 20 – 30 minutes prior to their sowing in the prepared plots having size (2.0 × 2.5m) by using 30 × 7.5cm spacing at 2.50cm depth by usual covering of furrows. The observations were recorded for various aspects pertaining to growth and yield of vegetable pea cv. MATER-AGENTA – 6.