Phosphate fertilization increases the growth and yield of two soybean varieties.

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Abstract

Soybean (Glycine max L.) is a popular source of oil and protein in both human and animal diets. It is necessary to concentrate on the application of various important nutrients in the form of fertilisers in order to improve soybean output. The application of P fertiliser has a direct impact on the production of soybean nodules. Although the application of phosphorus increased soybean yields, the application of their excess quantity had a negative impact on soybean yields. We must concentrate on soybean because it is the world's most significant oil seed crop. It's also regarded as a globally significant grain legume. This research looks at the role of phosphorus in boosting oil seed crop output, as well as the role of phosphorus in improving Soybean growth yield and quality. Glycine max (soybean) Merr is an important crop in Cambodia, serving as both human food and cattle feed, but yields are poor due to the adoption of low-yielding cultivars and insufficient inputs. The goal of this study was to see how different genotypes and N and P fertiliser sources affected soybean growth, seed yield, and seed protein.

Keywords: Oil, Soybean, Phosphorous, Crop Production.

Introduction

Soybean (Glycine max L. Merrill) is one of the world's most important legume crops, providing high-quality protein, edible oil, and minerals for human and livestock feed. Soybean protein is high in the essential amino acid lysine, which is lacking in most cereals. Soybeans, like other legumes, fix atmospheric nitrogen through their interaction with Bradyrhizobium and Sinorhizobium gram-negative bacteria. Because no one organic or inorganic source can supply all of a plant's nutritional requirements, the integrated use of all nutrient sources, including organic (e.g., compost, crop residues, and manures), inorganic chemical fertilisers, and biofertilizers, requires careful attention and study [1]. The nitrogen demand of leguminous crops is largely met by symbiotic N2 fixation by Rhizobium. Furthermore, legumes leave enough for subsequent cereal crops. Aboveground vegetative growth and partitioning are aided by the macronutrient N. It is a necessary component of amino acids and related proteins, as well as a variety of other substances, such as chlorophyll and enzymes, that are required for photosynthesis and plant growth. It's also necessary for glucose metabolism in plants, root development stimulation, and nutrient uptake. Phosphorus, a macro element in agricultural production systems, is in highest demand in soybean plants during pod and seed development, with the majority of phosphorus ending up in the pod and seeds. It is essential for photosynthesis, energy transfer, nutrient flow, and glucose metabolism and biological nitrogen fixation [2].

The response of crop plants, especially soybeans, to nutrients is influenced by the type of fertiliser used, whether organic or inorganic. Most farmers utilise urea, single super phosphate, diammonium phosphate, or mixed fertilisers as conventional sources of N and/or P. Due to environmental circumstances and poor management techniques, these fertilisers can be lost if they are not administered properly. Inorganic fertiliser use is limited in Cambodia due to a lack of supply, high costs, and high losses; farmers are encouraged to explore other sources to improve soil fertility and crop production [3]. New sources of nutrients have emerged in recent years that can reduce nutrient losses, boost plant uptake, and make nutrients more accessible to plants. Nano-fertilizers are one such source, as they offer a huge surface area and a slow and consistent release of nutrients, making them ideal for use in modern agriculture [4]. According to some recent estimates, soybean reacts well to around of crop productivity when diverse fertiliser sources are used, such as nano-fertilizer, biofertilizer, inorganic fertiliser, and rhizobium. Plant-growth promoting rhizobacteria (PGPR), such as Nitroplus, have been proven to be effective for inoculation in sorghum (Sorghum bicolor Moench) and millet (Pennisetum glaucum), according to Okon and Labandera-Gonsales. The use of PGPRs increased the density and length of root hairs, the pace at which lateral roots appeared, and the root surface area, all of which resulted in increased N and P uptake, reduced losses, and promoted nodulation [5].

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Conclusion

Soybean genotypes responded differently to various N and P fertiliser sources. The genotypes differed significantly in terms of growth, yield parameters, and seed protein. In particular, genotype Sbung provided the highest overall aboveground biomass and seed production, as well as the highest seed protein content. Additionally, under nano and urea settings, the maximum total aboveground biomass, leaf chlorophyll index, seed yield, and seed protein were attained, followed by Nitroplus conditions.

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