Original Research Article

Response of French Bean (*Phaseolus vulgaris* L. cv. Arka Arjun) to Rhizobium Inoculation under Varied Levels of Nitrogen and Molybdenum

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ABSTRACT

A study was conducted on French bean (*Phaseolus vulgaris*) at the coastal saline zone of West Bengal during winter 2017-18 and 2018-19. The soil texture was clay loam with pH 7.03. A location specific trial was done to standardize the combination dose for French bean towards productivity enhancement. The experiment was laid out in randomized bock design having 3 replications with 12 different treatments. The investigation was conducted with two strains of Rhizobium species -R (Rhizobium V_1B/Bean-15 & Rhizobium V_1B/F.bean-21) interacting on three applied levels of nitrogen-N (75%, 50%, 25% of the recommended dose @ 40kg/ha), and two levels of ammonium molybdate-Mo (50%, 100% of the recommended dose @30kg/ha) in variety "Arka Arjun" of French bean. The study generated information on the combined effects of biofertilizer and chemical fertilizer on several morphological attributes, protein content, nodulation and their final culmination on the yield. Studies on changing soil profile with respect to available nitrogen and population count of nitrogen fixers were also worked out to support the results. The mean sum of squares for all the traits were found statistically significant. The conclusive study suggests that the following treatment combinations viz. Rhizobium V_1B/bean-15 +Nitrogen 50 % +Molybdenum 100 % and Rhizobium V_1B/bean-15 +Nitrogen 25 % + Molybdenum 50 % applied to the French bean cv. Arka Arjun may be advised to the farmers of Coastal Saline Zone of West Bengal for productivity enhancement and maintaining soil sustainability.

Introduction

French bean (*Phaseolus vulgaris* L.) is a pulse crop which is rich in vitamins and minerals like calcium, iron, magnesium, phosphorus, potassium, zinc etc. It is a short duration high yielding grain legume crop that can be used both as pulse and vegetable French bean is consumed as immature tender pods, green grains are consumed as vegetables and dry grains are a good source of protein. French bean also depicts some medicinal properties that include control of diabetes, cardiac problems and natural cure for bladder burn.

As per the FAO estimates, it is grown in the world in an area of 28 million hectares with an annual production of 20 million tons and productivity of 729 kg/ha (Prakash and Ram, 2014). Foliage of the crop may also provide

hay, silage and green manures and plants can be fed to cattle after harvest (Kakon *et al.*, 2016).

Agronomical practices play a pivotal role to exploit the genetic worth of a crop for

Declining soil fertility and high cost of fertilizer are major limitations to crop production. Requirements for nitrogen exceed any other major nutrients needed for agriculture and rarely does soil have enough of this nutrient to produce high sustainable