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Response of *Braddyrhizobium japonicum* strains and soybean varieties under rainfed conditions

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ABSTRACT

A field experiment was conducted during summer season of 1992 and 1993 to find-out interaction between *Braddyrhizobium japonicum* strains and soybean varieties on nitrogen fixation and yield under rainfed conditions. During the year 1992-93, the selected *B.japonicum* strains did not show significant differences in terms of number of nodules, nodule dry weight and plant dry weight. However, varietal differences were observed. *B. japonicum* strains SB-120 fixed maximum nitrogen with variety PK-564 and Pusa-22. Varietal differences were observed during 1993-94 with PK-416, PK-472 and Pusa-16 on nitrogen fixation and grain yield. The highest grain yield due to inoculation of different *B. japonicum* strains was observed in case of variety PK-416 with a maximum yield of 1694.4 kg grains/ha due to inoculation of strain S-12.

Key words : Braddyrhizobium japonicum, Strain, Varieties, Soybean.

Soybean with its 40 per cent protein and 20 per cent oil has the lehigue "two in one" protein and oil combination which holds promise in meeting our oil and protein requirement. Being a legume, soybean is expected to meet its nitrogen requirement through symbiosis with *B. japonicum*. Soybean yield is highly dependent on the fixation and accumulation of nitrogen, 25-60 per cent of the total nitrogen in the mature plant is derived from symbiotic N_2 fixation. Therefore, nitrogen fixation efficiency seems to be a good criterion for the improvement of soybean productivity. So, the present study was conducted to find out the interaction between *Braddyrhizobium japonicum* strains and soybean varieties on nitrogen fixation and yield under rainfed conditions

MATERIALS AND METHODS

The experiment was conducted during summer season at Crop Research Center (CRC), G.B. Pant University of Agriculture and Technology, Pant Nagar, Udham Singh Nagar (Uttranchal) which represents silty and clay loamy, have good moisture storage capacity and are highly productive. CRC is situated in the tarai region of Udhamsingh Nagar, Uttranchal, in submountain tract of a south sloping outwash plain with an average slope of 0.25:1 with a north south width of 18 km. It receives about 1300-1500 mm of rainfall annually. Three varieties of soybean, were tested against four strains of *B. japonicum.* A 2-factor RBD experiment was laid with 3 replications, keeping strains as main treatment and varieties as subtreatment. The details of the treatments were as follows :-

(A) Inoculant strains (Main Treatment):

S_1 = SB-120
S_2 = S-12
S_3 = UASB-229
S_4 = Parbhani
S_5 = Uninoculated

(B) Varieties:

V_1 = PK-472
V_2 = PK-416
V_3 = Pusa-16

The observations on number of nodules, nodule dry weight, plant dry weight and plant nitrogen content were recorded at 45 and 60 DAS of plant growth, and grain yield was recorded at harvest.

RESULTS AND DISCUSSION

Effect on nitrogen content of plants:

The perusal of data indicate a significant differences among strains, varieties and strain variety interactions on N contest of plants (Table 1). Rhizobium strain UASB-229, produced maximum nitrogen content (2.68%) followed by strain SB-120. Strain S-12 produced lowest nitrogen content. Significant varietal differences were also found. Among varieties, variety PK-416 produced significantly higher amount of nitrogen (2.64%) than PK-472 and Pusa-16.

The study of the interactions revealed that the strain SB-120 produced maximum nitrogen (3.14%) with variety