

## EFFECT OF *RHIZOBIUM* ON HEIGHT AND NITROGEN CONTENT OF PLANTS

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### ABSTRACT

*Rhizobium* species are group of bacteria that fixes atmospheric nitrogen symbiotically in leguminous plants such as soybean and urid beans. The present paper gives an idea of the height and nitrogen content of the selected plants. The study is important as Marathwada region is an area with uncertain range and drought. The study includes identification of nitrogen fixing Bacteria i.e *Rhizobium* strains only, further investigation of identification of species is under way.

**KEYWORDS:** *Rhizobium*, Nitrogen content, Plants, Marathwada.

### INTRODUCTION

The microbial inoculants which are able to fix atmospheric nitrogen by symbiotic and asymbiotic way, *Rhizobium* which fix nitrogen symbiotically and supply to the plant. IBP world catalogue shows about 3000 *Rhizobium* strains from legume in different countries (L.V.Gangavane 2000). *Rhizobium* which belongs to the Rhizobiaceae family (Deshwal and Chubey 2014) has a beneficial effect on growth of plants (Shahzad et.al 2012) *Rhizobium* species can exist as free living nitrogen fixing endosymbionts of leguminous plants associated with plant roots. (Gothwal et.al 2008); (Shamseldin et.al 2008).

The *Rhizobium* strain and their geographical variation nitrogen fixing capacity is not seriously considered (Balmford A.et.al.2005). Urid bean and Soybean which has introduced in the Marathwada region of Maharashtra state.

### MATERIAL AND METHODS

The *Rhizobial* strain were collected from various locations from three districts in Marathwada i.e Nanded, Hingoli, and Parbhani two cultivars of Urid bean and Soybean seeds

of these plants were collected from local market of Nanded. The different parameters of infection in the root of leguminous plants and ability to have their effect were determined by different parameters, such as nitrogen content and height of the plants. The temporary names given to these strains are to be verified and work is going on these accept. Table no. 1.

### **Isolation of *Rhizobium***

The root nodules of Urid bean and Soybean were collected from different locations, colour of nodules are white, brown, pink and green, depending on the pigment in them, pink colour nodules was selected for the isolation (Vincent 1970). These nodules were washed in tap water to remove the adhering soil particles from nodules. The nodules were surface sterilized with 70% ethanol or 0.1% mercuric chloride and wash with sterile distilled water. These nodules crushed with saline solution and identified with Cryema test, Glucose peptone test, and Hofers alkaline broth test and lactose agar.

### **Screening and culturing of *Rhizobium***

**Microscopy:** Under a phase contrast microscope, *Rhizobium* are identified even a simple water mount and shows presence of B-hydroxybutyrate within the cell. (Pelezar et al. 1977) The *Rhizobium* cells has a large irregularly shaped nuclear region in the centre surrounded by a narrow region of denser of protoplasm (Mosse 1964).

**Glucose peptone Agar test (GPA Test):** *Rhizobium* colonies were streaked on YEMA medium and a master plate was made, colonies in the master plates were transferred to GPA medium by replacing plating. Those colonies in the master plates fail to grow GPA medium belong to *Rhizobia*, this test was confirmative test for the purity of *Rhizobium* colonies.

**Hofers alkaline broth test:** The test is based on the fact that *Agrobacteria* grow at high PH level, while *Rhizobium* are not grown on high PH.

**Lactose Agar:** *Agrobacterium* utilized lactose by the action of the enzyme ketolactose were as *Rhizobia* cannot utilize the sugar this can be detected on agar medium containing lactose 10gm/L. (N.S Subba Rao 1971) all these test were carried out with three replicates.

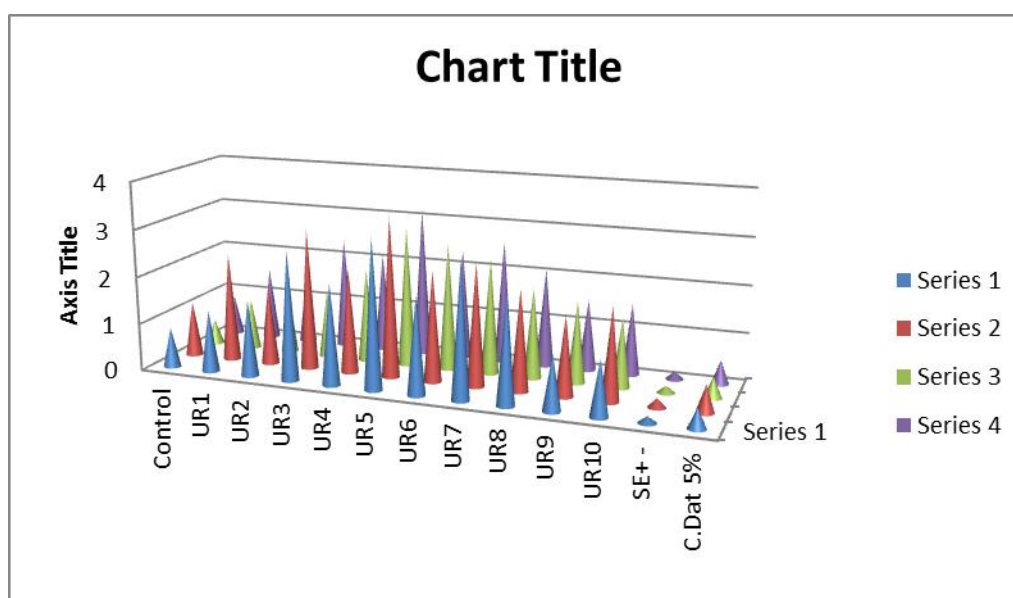
Nitrogen is one of the nutrient required in highest quantity to soybean and Uridbean these legume conduct biological Nitrogen fixation (BNF) when associated with nitrogen fixing bacteria (Wendland et al. 2010). The surface sterilized seeds were used for inoculation. The

seeds were dried in shade and sown in earthen pots to observe various parameters. These pots were watered with an interval of two days or on when required.

After 40 days of sowing the thinning was done and five plants were maintained in each pot. The observations were recorded and plants were uprooted carefully washed and nitrogen content was determined by Microkjeldhals method, a pot culture experiment was conducted, in this experiment medium type of soil was sterilized in autoclave at 30lbs for two hours and used in the experiments. The different strains isolated from different locations were tested with Urid bean and Soybean cultivars. The strain UR5 and SR5 which were obtained from Parbhani district was found superior as compare to control.

**Table No 1: Location wise isolates of *Rhizobium* obtained from Urid bean and Soybean.**

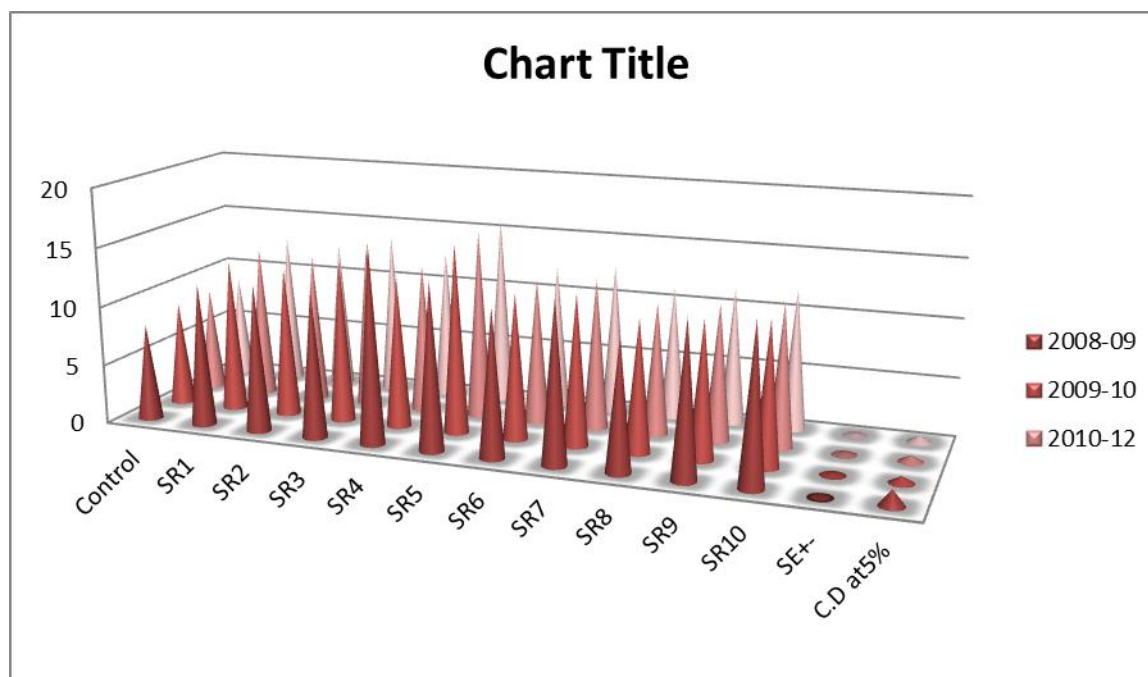
Sr. No	Isolates No	Location	District
1	UR1/SR1	Degaon	Nanded
2	UR2/SR2	Dhamdari	Nanded
3	UR3/SR3	Dour	Nanded
4	UR4/SR4	Kharbi	Nanded
5	UR5/SR5	Chudawa	Parbhani
6	UR6/SR6	Wanegaon	Nanded
7	UR7/SR7	Hingoli	Hingoli
8	UR8/SR8	Chitgiri	Nanded
9	UR9/SR9	Gour	Parbhani
10	UR10/SR10	Limbgaon	Nanded



**Fig No.1: Effect of different isoletes of *Rhizobium* on % Nitrogen content of Urid bean.**

Y-axis % Nitrogen content

X-axis- Isolet Number



**Fig No.2:.**Effect of different isoletes of *Rhizobium* on height of Soybean after 23<sup>rd</sup> day of sowing.

## RESULT AND DISCUSSION

Isolated bacterium was proved as *Rhizobium* on the basis of microscopy test GPA test, lactose agr test etc. Fig No.1 shows that percent nitrogen content of the plant was determined after 40 days of sowing, it was determined by Microkjeldhals method. Its results shows that the strain UR5 which has high capacity to produce high percent nitrogen content in the urid bean plant.

Table no 2, shows that height of soybean after 23<sup>rd</sup> day of sowing strain SR5 which produced maximum height 14.01 cm, 15.92 cm, 14.33cm as compare to control. These results were submitted to analysis of variance and regression at 5% through sisvar spastically programme (Siswar 2011). However the technological approaches on Microbial diversity which is the least investigation matter is a subject for forever investigation.

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