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Effect Of *Rhizobium* Bio Fertilizer Treatment On The Production Of Pod Yield In Pigeon Pea (*Cajanus cajan* (L.) Millsp.) In Deola Tahsil Of Nashik District. (Maharashtra)

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ABSTRACT

In India, Pigeon Pea (*Cajanus cajan* (L.) Millsp.) is one of the most popular pulses, being an important source of protein in a mostly vegetarian diet. It is the primary taken with rice or roti. In regions where it grows, fresh young pods are eaten raw or as a vegetable in dishes such as sambar.

In present research paper it is found that, when seeds are treated (Seed dressing) with *Rhizobium* bio fertilizer before sowing increases pod yield by 20 to 25 percent. (Shafie and Shikha 2003)

Key words: Pigeon Pea, *Rhizobium*, Seed dressing.

INTRODUCTION

The pigeon pea (*Cajanus cajan* (L.) Millsp.) is a perennial legume from the family Fabaceae native to the Africa, Europe and Asia. The pigeon pea is widely cultivated in tropical and semitropical regions around the world.

Pigeon pea contain high levels of protein and the important amino acids methionine, lysine, and tryptophan. Pigeon peas can be of a perennial variety, in which the crop can last three to five years (although the seed yield drops considerably after the first two years), or an annual variety more suitable for seed production.

World production of pigeon peas is estimated at 4.49 million tons. About 63% of this production comes from India.

In Deola tahsil of Nashik district it is cultivated for pods as annual variety. The crop is cultivated on marginal land farmers. Short-duration pigeon peas (3–4 months) suitable for multiple cropping have recently been developed. Traditionally, the use of such input as fertilizers, weeding, irrigation, and pesticides is minimal, so present yield levels are low (average = 700 kilograms per hectare). Greater attention is now being given to managing the crop because it is in high demand at remunerative prices.

The sources of information affect the technology transfer and its dissemination and adoption by farmers. Deb and Sharma (1964) stated that, communication is the best method for the significant relationship for

adoption of new farm practices. Patel and Pandya (1973) found that, the lot of farmers is depending on neighbours and relatives for getting information useful in Agriculture. Doiphode (1973) concluded that, many more farmers are followers of neighbours and relatives for new farm practices. In this investigation field demonstration were conducted in the houses, in the fields of sample farmers that include seed dressing by *Rhizobium* bio-fertilizer. It also includes the ratio of *Rhizobium* bio-fertilizer per kilograms of seeds. Application of *Rhizobium* bio-fertilizer in the fields of farmers showed positive impacts for changing their mind to do practice. It is meant to promote, motivate, inculcate and encourage people to go in for beneficial changes.

MATERIAL AND METHODS

The present study was carried out in the three villages of Deola (Maharashtra) during the crop season 2021. Twenty four farmer's from three villages i.e. eight from each village were selected and grouped into 4 classes. To study the effect of application of *Rhizobium* bio-fertilizer for Pigeon Pea crop, land area selected of each farmer was half acre, and it is divided in to two equal plots i.e. one forth acre each, for experiment and untreated one forth acre (control plot) (Thorve, Nagre and Joshi,1989). To determine per acre yield of experimental year of both plots, pods was harvested and weighed separately. The pod yield of treated plot was compared with untreated plot was recorded, tabulated and statistically analyzed.

In present study impact of the external factors are being same i.e. rainfall, climate, pest diseases and soil type on crop of experimental plot. Experimental group of farmers provided 200 gm. of *Rhizobium* bio-fertilizer packets for one forth acre plot and seed dressing was demonstrated at the field before sowing the seeds of Pigeon pea (Bhuiyan et.al. 1997). Out of 24 farmers 12 farmers were an experimental group and 12 were in control group.

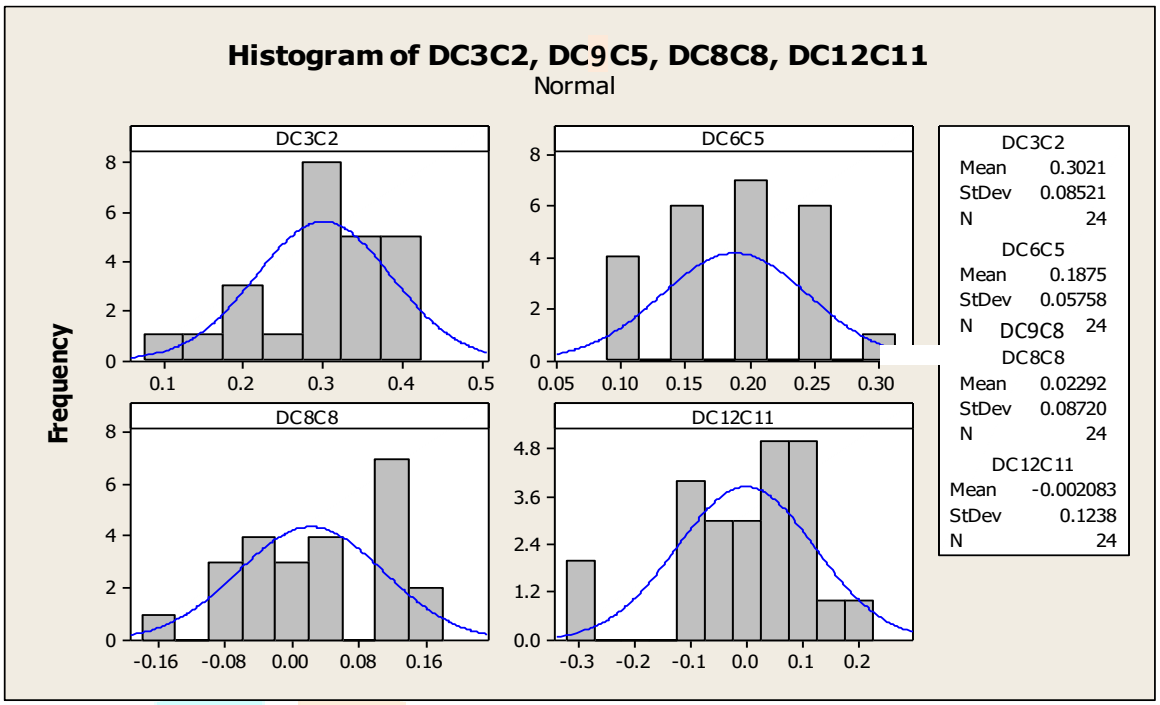
RESULTS AND DISCUSSION

Descriptive Statistics: RBF_0, RBF_1, DC3C2, CF, CFBF, DC6C5, CF_0, CF_1, ...

Variable	N	Mean	St Dev	Coef Var	Minimum	Q1	Median	Q3	Maximum
RBF_0	24	2.2129	0.2749	12.42	1.5500	2.0000	2.2000	2.4000	2.7000
RBF_1	24	2.5150	0.2931	11.65	1.8500	2.3025	2.4500	2.7500	3.0000
DC3C2	24	0.3021	0.0852	28.21	0.1000	0.2700	0.3000	0.3575	0.4100
CF	24	2.2188	0.2230	10.05	1.8500	2.0000	2.2750	2.4250	2.5500
CFBF	24	2.4063	0.2023	8.41	2.0000	2.2500	2.4500	2.5500	2.7000
DC6C5	24	0.1875	0.0576	30.71	0.1000	0.1500	0.2000	0.2500	0.3000
CF_0	24	2.1146	0.3098	14.65	1.4500	1.9000	2.1500	2.3000	2.6500
CF_1	24	2.1375	0.2957	13.83	1.5000	2.0000	2.2500	2.3375	2.6500
DC9C8	24	0.0229	0.0872	380.52	-0.1500	-0.0500	0.0500	0.1000	0.1500
TCM_BC	24	2.0708	0.2710	13.09	1.4000	1.9500	2.1000	2.2500	2.5500
TCM_	24	2.0688	0.2999	14.50	1.3000	1.8875	2.0750	2.2875	2.6500
DC12C11	24	-0.00208	0.1238	-5941.45	-0.3000	-0.0875	0.0250	0.1000	0.2000

CV% small < 20%; indicates natural variability

Individual Value Plot of Differences



Paired T-Test and CI: RBF_1, RBF_0
Paired T for RBF_1 - RBF_0

Treatment	N	Mean	StDev	SE Mean
RBF_1	24	2.51500	0.29306	0.05982
RBF_0	24	2.21292	0.27491	0.05612
Difference	24	0.302083	0.085210	0.017393

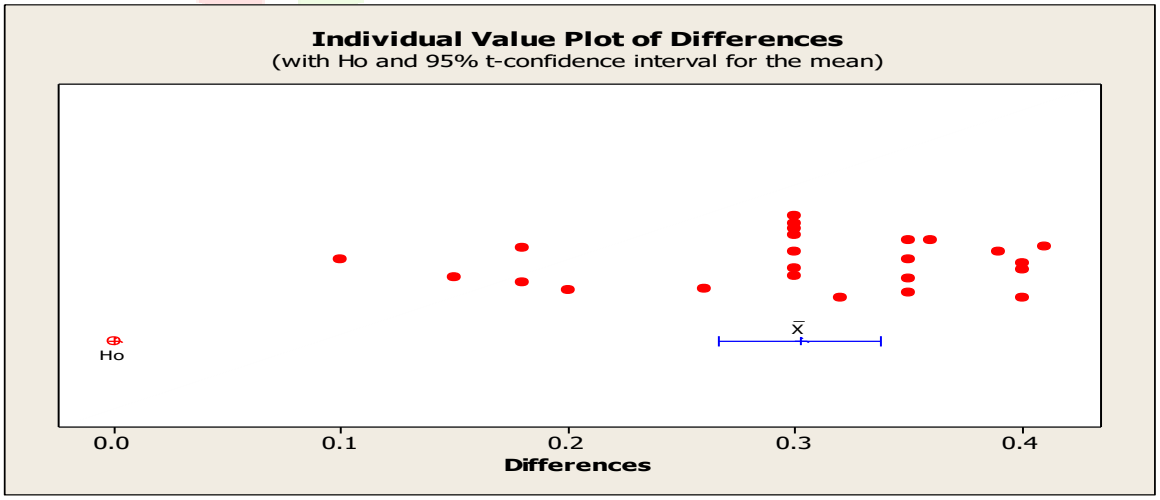
95% CI for mean difference: (0.266102, 0.338064)

T-Test of mean difference = 0 (vs not = 0): T-Value = 17.37** P-Value = 0.000

(** indicates test is highly significant at 5% and 1% level of significance)

P-value is small (close to zero); it indicates that the treatment difference is statistically significant.

Individual Value Plot of Differences



Paired T-Test and CI: CFBF, CF
Paired T for CFBF – CF

Treatment	N	Mean	StDev	SE Mean
CFBF	24	2.40625	0.20233	0.04130
CF	24	2.21875	0.22303	0.04553
Difference	24	0.187500	0.057578	0.011753

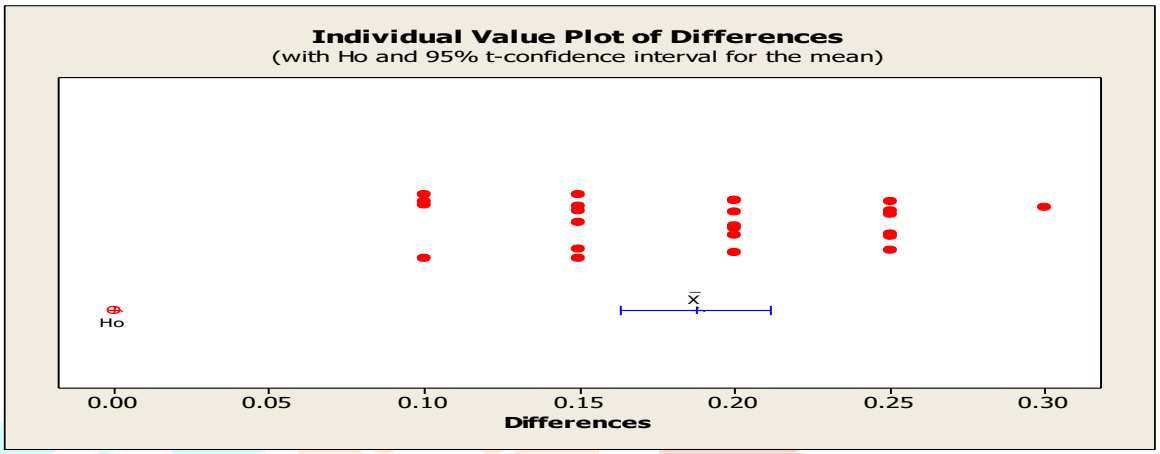
95% CI for mean difference: (0.163187, 0.211813)

T-Test of mean difference = 0 (vs not = 0): T-Value = 15.95** P-Value = 0.000

(** indicates test is highly significant at 5% and 1% level of significance)

P-value is small (close to zero); it indicates that the treatment difference is statistically significant.

Individual Value Plot of Differences



Paired T-Test and CI: CF_1, CF_0
Paired T for CF_1 - CF_0

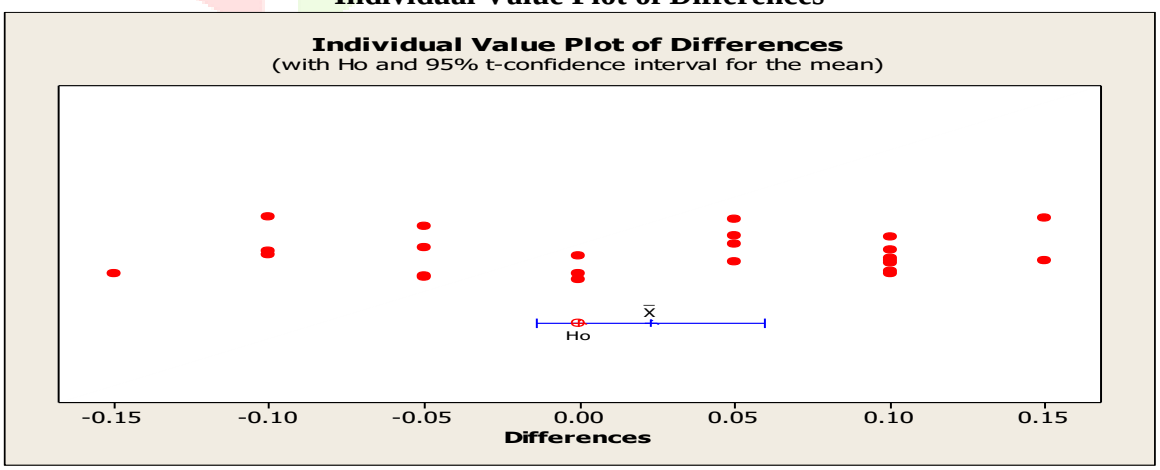
Treatment	N	Mean	StDev	SE Mean
CF_1	24	2.13750	0.29571	0.06036
CF_0	24	2.11458	0.30980	0.06324
Difference	24	0.022917	0.087202	0.017800

95% CI for mean difference: (-0.013905, 0.059739)

T-Test of mean difference = 0 (vs not = 0): T-Value = 1.29 P-Value = 0.211

P -value is not close to zero because target farmers used chemical fertilizer i.e. super phosphate which is not productive for Pigeon pea crop.

Individual Value Plot of Differences



Paired T-Test and CI: TCM_, TCM_BC
Paired T for TCM_ - TCM_BC

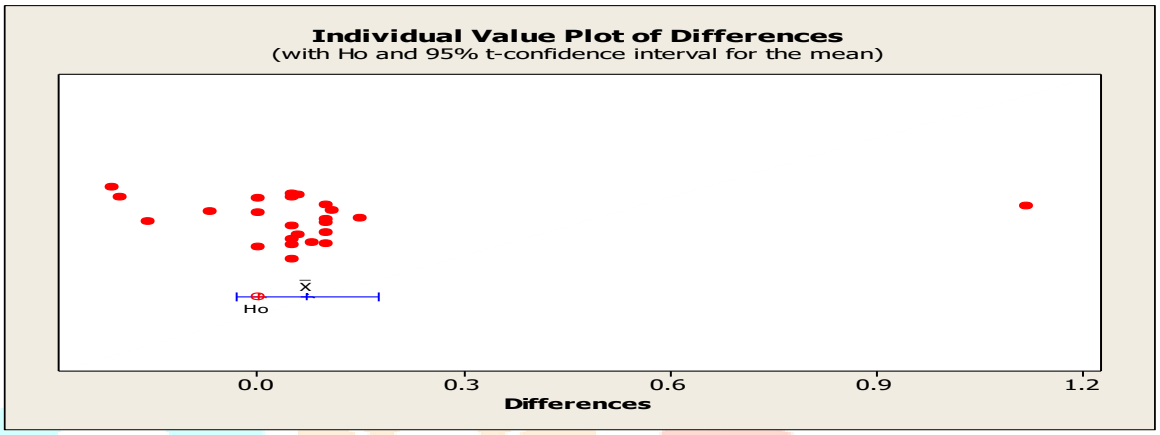
Treatment	N	Mean	StDev	SE Mean
TCM_	24	2.06875	0.29993	0.06122
TCM_BC	24	2.07083	0.27104	0.05532
Difference	24	-0.002083	0.123780	0.025267

95% CI for mean difference: (-0.054351, 0.050184)

T-Test of mean difference = 0 (vs not = 0): T-Value = -0.08 P-Value = 0.935

P -value is not close to zero because target farmers cultivated Pigeon pea by traditional method.

Individual Value Plot of Differences



In present investigation data of Pigeon pea pod yield for experimental year by giving four different treatments was recorded and statistically analysed. In case of first three treatments (i.e. *Rhizobium* bio fertilizer only, *Rhizobium* bio fertilizer and chemical fertilizer and chemical fertilizer only) yield of neighbouring plots was also recorded. It was observed that, there was statistically significant different between the yields of treated and untreated plots. The results obtained from fourth treatment was found to be non-significant. Thus the results shows that, the application of *Rhizobium* bio fertilizer, the per acre yield of Pigeon pea pods increased. The results also prove that continuous use of *Rhizobium* bio fertilizer for Pigeon pea increases yield, where the use of costly chemical fertilizers reduced at some extent. The results of present work are similar to the study of earlier workers like Omusub Nopamornbodi; Jirasak Arunsri; Thammauragul (1985), Bhuiyan et.al. (1997), Joshi and Bantilan (1998), Khokhar, Razzaq and Majeed, (2002), Gaikawad and Saler (2006) and Raychaudhuri Mausumi, Raychaudhuri S. (2008).

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