

# Effect of *Azospirillum* Bacteria in Reducing Nitrogen Fertilizers (Urea) and the Interaction of it with *Streptomyces Sp* due the Biological Control on the Wheat (*Triticum Asstivum*) Sustinibelation Culture

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**Abstract**—An experiment was conducted in October 2008 due the ability replacement plant associate biofertilizers by chemical fertilizers and the qualifying rate of chemical N fertilizers at the moment of using this biofertilizers and the interaction of this biofertilizer on each other. This field experiment has been done in Persepolis (Throne of Jamshid) and arrange by using factorial with the basis of randomized complete block design, in three replication *Azospirillum SP* bacteria has been admixed with consistence  $10^8$  cfu/g and inoculated with seeds of wheat, The *streptomyces SP* has been used in amount of 550 gr/ha and concatenated on clay and for the qualifying range of chemical fertilizer 4 level of N chemical fertilizer from the source of urea (N0=0, N1=60, N2=120, N3=180) has been used in this experiment. The results indicated there were Significant differences between levels of Nitrogen fertilizer in the entire characteristic which has been measured in this experiment. The admixed *Azospirillum SP* showed significant differences between their levels in the characteristics such as No. of fertile ear, No. of grain per ear, grain yield, grain protein percentage, leaf area index and the agronomic fertilizer use efficiency. Due the interaction *streptomyces* with *Azospirillum SP* bacteria this actinomycet didn't show any statistically significant differences between it levels.

**Keywords**—AzetobacterSP, AzespiriliumSP StreptomycesSP.

## I. INTRODUCTION

In today's world the extensibility of cropping has been attendant with sustainablation, by the references Be twin the unicellular, just prokaryotes have the potential to fixing the atmospheric nitrogen and of curse eleven family of all the fourthy seven groups of butteries and six groups of eight families of cyanobactries have this potency, these microorganisms by the form of free, associating, symbiosis do their process, undoubtedly using of *AzetobacterSP*, *AzespiriliumSP* for Nfixation is more popular than the others and there are several reasons on it by the references, The

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contamination with *Azetobacter* and *Azespirilium* in plants always compeer with increasing, height, dry mater, protein percentage, grain weight, grain yield, leaf area index, roots extension [2],[4], [5], this effects could be affecting e reasons of PGPRs syntheses or the Nfixation process or the plant protection roll of these bacteria's by syntheses some kind of antibiotics [6], [7], [8]Even though some of the experiments shows 270-50 percent of increasing in some factor in compeer of controlling factor but it seems its just an exaggeration and

Most of the increases are at the limitation of 5-30 percent [6], [7]. Actinomysets are on of living microorganisms in the soil between them, family of *Streptomycetace* and the genus Of *sterptomyces* plays impotents roll in the soil such as: decomposing hard organic maters in the soil like keratin or cellulose, producing antibacterial and antifungal and biocontrol of them and microbial blance in the soil [7]most of the studies shows its antagonistically effects on the other microorganisms, by the following stetmentes, A.L. burgy and gattus seen positive roll of this actiomysset due biocontrolling *fusarium tricitium* by this actinomyst.

## II. MATERIAL AND METHOD

This field experiment has been done in Persepolis (Throne of Jamshid) area with latitude of 29.52.312 (Northern) and 52, 49,177(Eastern), and arrange by using factorial with the basis of randomized complete block design, in three replication *Azospirillum SP* has been admixed with consistence  $10^8$  cfu/g and used in two levels inoculated (A1) and uncoated (A0) with seeds of wheat (*triticum sativum*) by chamran cultivar. The actinomysset from the genus of *streptomyces SP*, has been used in amount of 550 gr/ha and has been concatenated on clay in two levels used (S1) and unused (S0) in plots and of curse four level of N chemical fertilizer from the source of urea (N0=0, N1=60, N2=120, N3=180) kg/ha, has been used in this experiment in order to qulificationing range in time of inculation seeds by the pervious bacteria , the amount of pervious level of nitrogens was applied due the soil test result's, in 2 parts and accomplishment process has been based

on I. before planting (zgs 00) II. Before the anthesis mode (zgs60).

The plant compression decisional by base on 400 plant per m<sup>2</sup>, and the amount of expenditure of the seed has been based on purity and the vegurity of using seed, by the amount of 200kg/ha, in this experiment some characteristics such as :maximum of leaf area index(an thesis mode)2. Amount of ear per m<sup>2</sup> 3- the revenue of seed kg/ha 4- seed pertain percentage (kgeldal method) 5- the random an expenditure of fertilizers (random of agronomic fertilizer) by using the following formula

$$REF = YFP - YFP0 / AUF \times 100$$

\*YFP: the proceed (yield) in plot witch has been fertilizers used on that \*\*YFP0: proceed (yield) in controlling plot (N0) plot, \*\*\*AUF: amount of using N fertilizer

All in all , dates witch been obtain during the monitoring duration analysis with SAS softer and the average of the dates with significant providing with Duncan test result with two level on 1% and 5%, after that the dates has been compression with control plots.

### III. DISCUSSION

The average of three replication for characteristics such As: maximum of leaf area index, ear per square meter, the biological yield, grain yield kg/ha,protoin percentage and the random an of agronomic use efficiency wrote in Table I and due to this table witch bringing out from variance analysis indicated that the *Azospirillum* bacteria shows statically significant in level of 1% between it levels, of course streptomyses this actinomysset didn't show any statically significant between its levels and due remaining two level of A1S1,A1S0in a statically group in all of the nitrogen's level we can result hat there isn't any antagonistic between streptomyses and *azospirillum* and in this result we can use this actinomysset synchronic with inculcating the seeds with *azospirillum* due the e biological control of soils pathogens., comparison with average in base of Duncan test due the maximum leaf area index, the test shoes 5% difference between it levels, qua (as)the maximum amount for this character was for department N3A1 with average of 7/252, and the minimum was for (treatment)N0A0 with the average of 4/273, and with base we can result that using this bacteria cues the improvement on nitrogen fertilizers., and in that case the 0level and the inoculation seeds with these bacteria both remains in one group of statistical,

The affect of this bacteria on fertilized ear per square meter, the third level of nitrogen by the source of urea (180kg/ha) didn't shows any statically signification between the inculationing seed with the bacteria and uncoated seeds , and of curse but remain in one group by static, it is such a thing that the lower level of nitrogen the difference between the plots with bacteria and the plots without of them are visible by this we can result that this bacteria could have their activity and process(nitrogen fixation) in lower level of nitrogen , and with this base we could see by the increasing the level of

nitrogen the activity of this bacteria become invisible, by the way the highest level for this character was for the N3A1 treatment by the average amount of 717/17 and the minimum was for the N0A0 treatment by the average of 416/67.

The yield for the grain per square meter with the base of average of three replication by the Duncan test the maximum of amount was on the N3a1 treatment with the amount of 76168/8 kg/ha and the minimum was for N0A0 by the amount of 2926/5 kg/ha.

Its fantast tic that all the average of treatment has been replaced in 4 group and just between two treatment N2A0and N2A1 been a statically difference by the level of 5%

This could be one of the results that indicate by increasing the level of nitrogen the activated of this bacteria become invisible due the pertain percentage in the grain, the test by the base of kedjeldal, and comparing the average by the Duncan method shows the treatment N3A1 by the highest average with the amount of 11/82 has the most amount of pertain in the grain and the lowest amount was carried out by the N0A0 treatment with the average of 9/36.its fantastic that booth M3A0 and N2A1 in the average compression remain in one group by the base of Duncan test and didn't shows any statically deference. We can add this assume that *Azospirillum* could increase the potential of sink or by the increase of assimilation materials in steam witch in the end, its votes to the grin.

And the agronomic fertilizer use efficiency with the average of 26/16 for the N3A1 treatment has the highest amount, and due to this ague it's fantastic that the random an of booth N2A1 and N3A0 treatment has been remain in one group due the statistical results.

By the way the results showed that there were Significant differences between levels of nitrogen fertilizer in the entire characteristic which has been measured in this experiment. The admixed *Azospirillum SP* showed significant differences between their levels in the characteristics such as No. of fertile ear, No. of grain per ear, grain yield ,grain protein percentage, leaf area index and the random of agronomic fertilizer use efficiency. Due the interaction *streptomycin* with *Azospirillum SP* bacteria this actinomycet didn't show any statistically significant differences between it levels this subject could be one of the resin's witch could shows this antinomies could be use with this bacterial biofertilizers against pathogens such as *graminearum Fusarium* and *Phytophthora cinnamomi* in sustainable agriculture. The Interaction between admixed *Azospirillum SP* biofertilizers with the levels of nitrogen by the source of urea shows that the upper levels of nitrogen such as N3A0 with 180kg/ha didn't have any statistically signification with lower levels of nitrogen in the moment of using admixed *Azospirillum SP* bacteria with lower levels of nitrogen such as N2A1 this importance could be use in reducing using of N fertilizers in sustainable agriculture.

#### IV. CONCLUSION

In the base of this experiment and by the references this bacteria could affect on characteristic such as: No. of fertile ear, No. of grain per ear, grain yield, grain protein percentage, leaf area index and the agronomic fertilizer use efficiency, and if we look visually to the Table II we could see there isn't any statically deference between the highest level of the nitrogen with inoculation the seed by azospirillum and the lost level of nitrogen and the inculcation of the seeds Of curse the matter of organic amount of the soil and viability of the this bacteria plays important rolls by the way with the base of 46 percent ratio of nitrogen in urea chemical fertilizers and remaining N3A0 and N2A1 in one statically group at random of agronomic fertilizer (RAF) it indicated this bacteria almost fixing 27.6 kg nitrogen per hectare, this decreasing has some subsequence in environment due the harmful effect of increasing density of nitrogen in the environment.

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TABLE I  
ANALYSIS OF VARIANCE FOR CHARACTERISTIC

Variable	DF	LAI	EP	GY	RAF	GPP
<b>Replication</b>	2	0.284	2006.63	971870	7.002	0.580
<b>A</b>	1	1.294**	17442.1**	7519487.06**	243.766**	0.651**
<b>S</b>	1	0.019 ns	609.88 ns	279425.05 ns	2.25 ns	0.032 ns
<b>Az×S</b>	1	0.014 ns	38.521 ns	643176.5 ns	0.431 ns	0.022 ns
<b>N</b>	3	16.700**	171362.633**	38458960.03**	1345.869**	11.265**
<b>N× Az</b>	3	0.021 ns	265.243 ns	858481.8 ns	36.589**	0.176*
<b>N×S</b>	3	0.019 ns	15.799 ns	504964.06 ns	0.272 ns	0.058 ns
<b>N×Az×S</b>	3	0.035 ns	33.465 ns	50847.07 ns	0.111 ns	0.062 ns
<b>Error</b>	30	0.134	1088.796	623467.02	4.452	0.059
<b>Totall</b>	47	1.197	12123.347	6358310.02	96.65	0.793
<b>c.v</b>		6.59	6.03	16.51	14.18	2.29

ns , \* and \*\*: Non significant , significant at the 5% and 1% levels of probability, respectively.

TABLE II  
 COMPARISON THE CHARACTERISTIC MEANS WITH THE BASE OF DUNCAN TEST

LAI	EP	GY	RAF	GPP
N0A0S0 9/46 G	4/24 F	412/33 F	2911/700 E	0/00 G
N0A0S1 9/27 G	4/30 EF	421/00 F	2941/30 E	0/00 G
N0A1S0 9/61 G	4/47 DEF	443/33 EF	3339/00 E	0/00 G
N0A1S1 9/5 G	4/53 DEF	449/00 EF	3368/3 E	0/00 G
N1A0S0 10/143 F	4/67 DEF	456/00 EF	3567/30 DE	10/98 F
N1A0S1 10/43 EF	4/69 DEF	459/00 EF	3586/00 DE	11/29 F
N1A1S0 10/27 F	4/99 DE	492/00 E	4031/300DE	18/71 DE
N1A1S1 10/193F	5/15 CD	500/67 DE	4094 DE	19/75 CDE
N2A0S0 10/85 DE	5/717 BC	550/67 CD	4910/7 CD	16/68 E
N2A0S1 10/72 E	5/82 B	555/00 BCD	3300/6 E	17/217 E
N2A1S0 11/23 CD	6/18 B	595/67 B	5645/7 BC	22/11 ABC
N2A1S1 11/41 BC	5/92 B	612/00 B	5722/00 BC	23/44 ABC
N3A0S0 11/63 ABC	6/18 A	681/33 A	6929/3 AB	22/33 BCD
N3A0S1 11/52 BC	6/89 A	686/67 A	6954/700AB	22/47 BCD
N3A1S0 11/94 A	7/22 A	714/67 A	7543/00 A	26/56 A
N3A1S1 11/70 AB	7/28 A	719/67 A	7690/70 A	26/56 A

LAI: Leaf Area Index –EP: Ear per m<sup>2</sup> -GY: grain Yield, RAF: random of agronomic fertilizer Kg/ha), GPP: Grain pertain percentage