



Effect of Different Treatment on Production of Bajra Under On Farm Trial in Agra district

Sushil Kumar Singh¹, and S.P.Singh²

Krishi Vigyan Kendra , R.B.S College, Bichpuri ,Agra.

Head, KVK, Morena (M.P) .

(Received : May, 2016 : Revised : June, 2016 : Accepted : July 2016)

Abstract

The study production and economics of Bajra under On farm trial in Agra district conducted during kharif season was carried out at krishi vigyan Kendra Bichpuri, on the farmers field. OFT are tool to find out the suitability of particular techniques for a region. This was consisting of (T-1, T-2 and T-3) three treatment, T-1 (farmers practices , 60kgN + 0 kg P+ 0 kg k /ha¹), T-2(recommend dose of fertilizer ,100kgN + 40 kg P+ 40 kg K /ha¹) and T-3 (use of phosphorus soluble bacteria, half dose of phosphorus, full dose nitrogen and potash). The result showed that among these treatment T-1, T-2, and T-3. Performed the best in yield of bajra T-3 (2kg PSB culture /ha¹+20 kg P + 100kg N + 40 K kg/ha¹) and maintained superiority highest yield 21.00 q/ha and 20.5 q/ha compared to T-1 (farmer practices, 60kgN + 0 kg P+ 0 kg K /ha¹). The benefit cost Ratio (BCR) of first year T-1 and T-3 were 1.31:1 and 1.90:1 , second year T-1 and T-3 were 1.31:1 and 1.80: 1 respectively.

Keywords :Phosphorus Soluble Bacteria ,On Farm Trial, Bajra, Benefit cost Ratio , Economics, Production.

Introduction

Pearl Millet [pennisetum glaucum(L) R . Br. Emend. Stutz] is a popular name of bajra and bajra is a important crop of rainfed areas of India covering annually 10-12 Million hectares of marginal and sub marginal land primarily in the states of Rajasthan ,Gujarat ,Haryana, utter Pradesh, and Maharashtra .The rainfall in these areas from 200-1200 mm received from middle june to mid September .Pearl millet is the most drought and heat tolerant among cereals or millets and it has the highest water use efficiency under drought stress .It is the major crop that has high levels to tolerance to both acid and saline soil.

Pearl Millet is mainly cultivated by economically poor farmers

using either no improved production technology and using only at sub- optimal levels under rain fed condition despite wide areas covered under the crop and bajra is one of the most important among the millets or nutritious coarse main grain cereal crop grown in kharif seasons all part of the Agra district .Despite wide area covered under the crop .Being a staple food grain as well as dry fodder and green forage constant demand of pear millet is there ,It is of great important to improve the productivity of pearl millet and revival of the dry farming in the Agra district .The causes of low productivity were discussed with farmers and analyzed .It has been observed that along with frequent drought condition and other reasons of low productivity were use of local seed, poor soil fertility, improper interculture operation

Corresponding Author's E-mail : drsksagro@gmail.com

Published by Indian Society of Genetics, Biotechnology Research and Development,
5, E Biotech Bhawan, Nikhil Estate, Mugalia Road, Shastrapuram. Sikandra, Agra 282007
Online management by www.isgbrd.co.in, www.irigt.co.in

,no plant protection measures etc .And improved crop management can play effective role in increasing the productivity and enhancing production stability .with the adoption of new scientific technology of crop production at a large scale on farmer field the concept of adoption of inputs like improved seed ,fertilizer ,chemical ,hired labour and mechanical draft power has greatly increased. Major emphasis in the adoption of new technology was on high yielding varieties , fertilizer management ,biofertilizer , use of chemical .As a result of which the share of purchased inputs in the total cost of production has increased substantially. The farmers are, therefore ,concerned about the cost- returns of crop enterprises that they are growing or of those they can grow as to enable them to taken decision regarding selection of crops with low cost of cultivation and high net returns.

Conducting to OFT on farmer field help to identify potential technology compared to farmer practices and powerful tool to find out the suitable particular technology for a region(G.C.singh et al., 2013) it help in improving the economic and social status.

Phosphorus is essential nutrients required by plant. It has a defined role in plant metabolisms such as root development , photosynthesis , nutrient transport within the plant , Meiosis , phospholipid in cell walls, reproductive part of plant (Rasipour et al., 2007 and Kianirad,1995).

Phosphorus biofertilizer could help increase availability of accumulated phosphate by solubilization efficiency biological nitrogen fixation and increase availability of Fe,Zn, etc ., through production of plant growth promoting substances (Kucey et al.,1989). Trials with PSB indicated increases yield in cereals(Afzal et al.,2005).Biological phosphate fertilizer containing beneficial bacteria ,fungi increased phosphate solution by increasing soil acidity or alkaline phosphatase enzyme, which can be absorbed by plant easily .

Biological fertilizer with %50 of chemical fertilizer led to increase in plant growth, plant height ,branch number ,fresh and dry weight of safflower in comparison to applying chemical fertilizer and Biofertilizer ,organic fertilizer ,with half rate of chemical fertilizer ,increased grain yield of sunflower(Ojaghloo,2007).The bio-fertilization could provide

a better alternative for the extensive use of phosphate fertilizer. This study was initiated to assess the Effect of Different treatment on production of Bajra under On Farm Trial in Agra district.

Material and Methods

The OFT were conducted by krishi vigyan Kendra ,Raja Balwant Singh College Bichpuri , Agra as per the guide line of OFT to kvk .The OFT was plan year of 2007-08 and 2008-09 in the kharif season for the 3000 meter and pre selective agra district village adopted Garhi Douulta in year 2007-08 and Gamari in year 2008-09 . These village soil are medium phosphorus , low organic carbon and nitrogen.

The Technology used for the OFT were Recommended dose fertilizer and other technology use of phosphorus soluble bacteria . farmers Provide by krishi vigyan kendra Dai ammonium phosphate , Murat of potash , phosphorus soluble bacteria , and potential high yielding varieties of pearl millet recommended for the area and non monetary in put like timely sowing ,seed rate, plant spacing, weeding , thinning , harvesting ,threshing ,chemical use , etc practices were taken cane through farmers training , field visit , etc and production data of pearl millet were observation separate farmer after threshing .

TREATMENT

T-1(farmer practices) :

60 kg per hectare nitrogen ,no use phosphorus and potash.

T-2(recommended dose) :

100kg per hectare nitrogen,40kg per hectare Phosphorus and 40 kg / ha potash .

T-3(use of PSB culture) :

2 kg/ha PSB culture ,100kg per hectare nitrogen, 20 kg/ha Phosphorus and 40 kg / ha potash.

The fertilizer applied in split dose half nitrogen ,full phosphorus ,full potash should be basal placed at the time of sowing and PSB culture should be use inoculation ,rest dose of nitrogen one fourth applied abut 30 days and 60 days after sowing . The BCR formula was calculated in given below.

$$BCR = \frac{\text{Gross return}}{\text{Gross cost}}$$

Table-(1) Effect of various treatment on plant height ,ear length, ear weight, grain yield.

| Treatment | Plant height (cm) (Average) | Ear length (cm) (Average) | Ear weight (gm) (Average) | grain yield (q/ha) (Average) | Number of Farmer |
|---|-----------------------------------|---------------------------------|---------------------------------|------------------------------------|------------------|
| 2007-08 | | | | | |
| T-1(N-60,P-0,K-0 kg/ha) | 105 cm | 23.10 | 24.22 | 12.20 | 5 |
| T-2(N-100,P-40,K-40kg/ha) | 123cm | 28.20 | 31.10 | 20.30 | 5 |
| T-3(N-100,P-20,K,40- and2kg PSB culture/ha) | 125cm | 28.19 | 31.15 | 21.00 | 5 |
| 2008-09 | | | | | |
| T-1(N-60,P-0,K-0 kg/ha) | 102cm | 23.00 | 24.10 | 12.00 | 5 |
| T-2 (N-100,P-40,K,40 kg/ha) | 121cm | 28.32 | 31.00 | 20.56 | 5 |
| T-3 (N-100,P-20,K,40- and2kg PSB culture/ha) | 121cm | 28.32 | 31.00 | 20.56 | 5 |

Table-(2) Economics of various treatment (2007-08)

| TEATMENT | Gross Cost (ha) | Gross return (ha) | Net return (ha) | C:B Ratio |
|--|---------------------|-----------------------|--------------------|-----------|
| T-1(N-60,P-0,K-0 kg/ha) | 4900.00 | 6431.00 | 1531.00 | 1:1.31 |
| T-2(N-100,P-40,K-40kg/ha) | 6150.00 | 10657.00 | 4507.00 | 1:1.73 |
| T-3(N-100,P-20,K,40- and2kg PSB culture/ha) | 5800.00 | 11025.00 | 5225.00 | 1:1.90 |

[Bajra @ 525 Rs Per quintal]

Table-(3)Economics of various treatment (2008-09)

| TEATMENT | Gross Cost (ha) | Gross return (ha) | Net return (ha) | C:B Ratio |
|---|---------------------|-----------------------|--------------------|-----------|
| T-1(N-60,P-0,K-0 kg/ha ¹) | 5700.00 | 7500.00 | 1800.00 | 1:1.31 |
| T-2 (N-100, P-40,K- 40 kg /ha ¹) | 6762.00 | 11937.00 | 5488.00 | 1: 1.76 |
| T-3(N-100,P-20,K-,40 and 2kg PSB culture/ha ¹) | 7112.00 | 12812.00 | 5700.00 | 1:1.80 |

[Bajra @ 625 Rs Per quintal]

Results and Discussion

The result of the study were divided in to three parts (1) Plant height and Yield attributes (2) Grain yield (3) Economics of On Farm Trials .

(1) Plant height and Yield attributes

(i) **Plant height** : The data recorded on the plant height (cm) are presented in (table -1) The perusal of the data revealed that the longest plant heights of three different treatment T-3,T-2,T-1were 125cm , 123 cm ,102 cm it was recorded in first year . There T-3(N-100,P-20,K-40,PSB-2 kg/ ha) and T-2 (N-100,P-40,K-40 kg/ha) found better of T-1(farmer practice) both the year result supported by Hilda et al (1999), Rodriguer and Fraga (1999) .

(ii) **Ear length** : The data clear maximum ear length (cm) as obtained in T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) compared to T-2 (N-100,P-40,K-40 kg/ha) and T-1(farmer practice) both the year respectively .these T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) more 2cm and 1 cm ear length first and second year compared to T-2 (N-100,P-40,K-40 kg/ha) respectively.

(iii) **Ear weight** : The data recorded ear weight obtained in different treatment are T-1(local check) 24.22gm , T-2 (N-100,P-40,K-40 kg/ha) 31.10 gm , T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) 31.15gm and second year T-1(local check) 24.10gm , T-2 (N-100,P-40,K-40 kg/ha) 31.00gm , T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) 31.10gm . The maximum ear weight clear is treatment T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) comparison to treatment T-2 (N-100,P-40,K-40 kg/ha) and T-1 (farmer practice) both the year respectively .

(2) Grain yield production

The grain yield increased T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) and T-2 (N-100,P-40,K-40 kg/ha) were higher against

T-1(farmer practices) . The highest grain yield was recorded from T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) both the year . T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) realized due to fact of its better grain yield compare to other treatment under OFT. More than 58% increase grain yield was recorded over the T-1(local check).

It is evident from the T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) data given in table that use of PSB culture increased grain yield and beneficial both the year result supported by Viruel et al (2014), Hassan et al (2012) and Singh et al (2010) .

(3) Economics of On Farm Trails

Economic indicators i.e gross cost ,gross return , net return and benefit cost ratio of On Farm Trail of bajra crop are presented in Table-2 and Table-3 . The data clearly revealed that , the net income from On Farm Trail were substantially , T-3 (N-100,P-20,K-40,PSB-2 kg/ ha) higher than against T-1(farmer practices) and T-2 (N-100,P-40,K-40 kg/ha) . The maximum net return of treatment T-3 Rs 11025.00 comparison to treatment T-2 Rs 10657.00 and treatment T-1 Rs 6431.00 per hectare respectively first year and second year is T-3 Rs 12812.00 higher income than T-2 Rs 11937.00 and T-1 Rs 7500 per hectare , that clear T-3 more net return for T-2 and T-1. Income is attributed to the technological intervention provided in On Farm Trial.

Economic analysis of the yield performance revealed the BCR of On farm trail plated were observed T-3 higher than RDF and Farmer practices. T-3 (N-100,P-20,K-40,PSB-2 kg/ ha),T-2 (RDF) and T-1 (Farmer practices) was 1.90:1, 1.73: 1 and 1.31:1 respectively first year and second year was 1.80: 1 , 1.76: 1 , and 1.31 : 1 respectively second year. Hence, favorable benefit cost ratio proved the intervention made under On Farm Trail and convinced the farmers on the utility of intervention .

References

- (1) Afzal ,A., Ashrat Saeed, M ., Asad, A. and Farooq, M., 2005. Effect of phosphate solubilizing microorganisms on phosphorus uptake , yield and yield trails of wheat in rainfed area .International Journal , Agri , Bio ., 2(3) :237-238.
- (2) Hilda, R. and Fraga , R., 1999.Phosphate solubilizing bacteria and their role in plant growth promotion .Bio tech,Adv,17:319-359.
- (3) Hassan, Shokrivahed., Parisa ,Shahinrokhsar and Fatemeh,Heydarnezhad, 2012.Performance of phosphate solubilizing bacteria for improving growth and yield of Rice (Oryza Sativa) in the presence of phosphorus fertilizer .Int Jou Agri Crop Sci ,Vol (17):1228-1232.
- (4) Kianirad ,M.,1995. Evaluation of phosphate solubilizing micro orgnisms and their effect on the reducing the consumption of phosphate fertilizer on

- Soybean crops. Thesis ,Tehran Uni Faculty of Agriculture :111 pages.
- (5) **Kucey, R. M .N., Janzen, H. H. and Leggett, M. E.,** 1989. Microbially Mediated increases in Plant and available phosphorus . *Adv, Agro*,42:199-228.
- (6) **Ojaghiou, F.,** 2007 Effect of inoculation with biofertilizer (Azotobacter and Phosphate fertilizer) on growth, yield , and yield component of sunflower. Thesis of Agriculture ,Faculty of Agriculture ,Islamic Azad University of Tabriz .
- (7) **Rasipour, L. and Asgharzadeh, N. A.,** 2007. The interaction between the PSB and Bradirhizobium Japonicum growth factors, tumor size and uptake of some nutrients in soybean . *Agriculture and Natural Resource Science* ,11(5):40-46 .
- (8) **Rodriguez, H ., Fraga, R .,** 1999. Phosphate solubilizing bacteria and their role in plant growth promotion .*Bio technology ,Advances*,17: 319-339.
- (9) **Singh, G. C. and Singh, S. K.,** 2013. Impact of On Farm Trials and various varieties of Okra on the farmer field . *Journal of Agri Res* , val, 13(1) :78-80.
- (10) **Singh, Prassoon., Elamathi, S. and Gill, R.,** 2010. Response of phosphorus ,sulphur and PSB inoculation on yield and nutrient content and up take in Wheat . *Jou of Rural and Agri Res* ,vol 10 (2):73-74.
- (11) **Viruel, E., Erazzu, L.M., Martinez Calsina, L., Ferrero, M.A., Lucca,M.E. and Sineriz , F.** 2014. Inoculation of Maize with PSB effect on plant growth and yield . *Jou of Soil Sci and Plant Nutrition* ,14(4):819-831.