Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 6 Special issue [1] 2017: 410-413

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD
Global Impact Factor 0.533
Universal Impact Factor 0.9804
NAAS Rating 4.95

FULL LENGTH ARTICLE **OPEN ACCESS**

Studies on INM practise on yield attributing characters in cotton hybrid under high density planting system (HDPS)

V.S.Ushanandini[1], T.Ramesh[2], B.Anil Kumar[3], A.Padmasri[4], K.Jeevan Rao[5] and J.Aruna Kumari[6]
[1,3,5]Department of Environmental Science & Technology, College of Agriculture, PJTSAU, Rajendranagar, Hyderabad.Telangana, India.banilkumar101@rediffmail.com (Cell: 07893888962).
[2]Department of Crop Physiology, College of Agriculture, PJTSAU, Rajendranagar, Hyderabad. Telangana, India. (Cell: 09440031264).
[4]Seed Research and Technology Centre, PJTSAU, Rajendranagar, Hyderabad. Telangana, India. padmasri_1972@rediffmail.com ; (Cell: 09000791123).
[6]Department of Biochemistry, College of Agriculture, PJTSAU, Rajendranagar, Hyderabad; Telangana, India. jyothiarunakumari_10@rediffmail.com (Cell: 09491881933)

ABSTRACT
The present investigation was conducted at college farm, College of Agriculture, PJTSAU, Rajendranagar, Hyderabad, during kharif 2015-2016. The field trail was laid out in RBD with nine treatments and three replications. The experiment was carried out with hybrid Deltapine (DPC 9121 BGII) with a spacing of 45 × 15 cm, to study the yield characters as influenced by different INM practices.Different yield attributing characters viz., sympodial branches (27.43 plant-1), number of bolls (47.5 plant-1), boll weight (4.38 g) recorded were maximum with the application of 180% RDF + FYM 15 t ha-1(T9) which was on par with T8. Maximum fruit branches (19.60, 23.86 and 27.43 plant^{-1} respectively) were recorded with application of 180% RDF + FYM @ 15 t ha^{-1} which were on par with 180% RDF + FYM @ 10 t ha^{-1} and 180% RDF. Minimum number of branches was recorded with the application of 100% RDF at three growth stages (10.86, 15.90 and 18.56 plant^{-1}). Maximum number of bolls per plant was recorded with the application of 180% RDF + FYM 15 t ha^{-1} (T_9) at 60 DAS (20.5 plant^{-1}), 90 DAS (28.9 plant^{-1}) and 120 DAS (47.5 plant^{-1}) due to maximum sympodial branches on plants. Boll weight (g) was also maximum (4.38 g boll^{-1}) with the application of T_9. Minimum number of bolls per plant and boll weight (g) was recorded with the application of 100% RDF. Thus seed cotton (kapas) and lint yield recorded was also maximum (16.18 and 11.4 q ha-1) with T9.

Received 05.08.2017 Revised 15.08.2017 Accepted 23.08. 2017

INTRODUCTION

Cotton (*Gossypium hirsutum* L.), the 'white gold' or 'money spinner' enjoys a predominant position amongst all cash crops in India and cultivated since Indus civilization. India has the credit of the largest area under cotton (126.55 lakh ha) and ranks second in cotton production (400 lakh bales) during 2014-15. Telangana ranked third in area (1.65m ha) with production of 5 million bales.

The crop in the region records a low productivity of 515 kg ha^{-1}. Development of HDPS is to maximize yield potential, popularizing the system and facilitate mechanisation of cotton picking and harvesting *Bt* cotton in India. The adoption of HDPS along with good fertilizer management is a viable approach to break the current trend of stagnating yield under rainfed *hirsutum* (upland) cotton growing areas. In many countries, narrow row plantings have been adopted after showing improvement in cotton productivity (Ali *et al*., 2010). Manjunatha *et al.* (2010) reported that nutrient uptake by *Bt* cotton was significantly influenced by different plant densities under rainfed condition.

INM components are environment friendly. Upon addition of FYM 5 t ha-1 , cotton yield increased by 20-22% (Blaise *et al.,* 2003). FYM improves the physical & biological soil condition besides improving the soil moisture holding capacity especially true in *rainfed* areas. Thus, influence of FYM is of long term nature since it restores the sustainability of the soil-plant system.

MATERIAL AND METHODS

A field experiment was conducted to study the INM Practices on cotton hybrid (Monsanto-DPC 9109 BGII). Crop was sown with a spacing of 45 cm x 15cm under *rainfed* conditions. The experiment was laid out in RBD design, replicated thrice with nine treatments on Alfisols during *kharif* 2015-16 in the College Farm, Professor Jayashankar Telangana State Agricultural University, Rajendranagar, Hyderabad, Telangana. Data was recorded at three crop growth stages namely at 60, 90 DAS and at harvest(120DAS).

Statistical analysis

The data on the observations made were analysed statistically by applying the technique of analysis of variance for randomized block design as suggested by Panse and Sukhatme (1978). The statistical significance was tested by F-test at 5 per cent level of probability and wherever the "F" value was found significant, critical difference was worked out.

RESULTS AND DISCUSSION

The results revealed that the performance of plants differed significantly under rainfed ecosystems FYM @10/15 t ha^{-1} along with recommended dose of fertilizer increased the *Bt* cotton yield and yield attributing parameters as compared to rest of the treatments and control plots.

Yield attributing characters on hybrid cotton under HDPS

Number of Sympodia

Sympodial branches bear fruit directly, so they are called fruiting branches. The secondary branches on monopodial branches are also termed sympodial as they bear fruit directly. Seed cotton yield of crop was influenced by number of sympodial branches per plant.

Sympodial branches $plant^{-1}$ was recorded at different growth stages (Table 1). Maximum fruit branches (19.60, 23.86 and 27.43 $plant^{-1}$ respectively) were recorded with application of 180% RDF + FYM @ 15 t ha^{-1} which were on par with 180% RDF + FYM @ 10 t ha^{-1} and 180% RDF. Minimum number of branches were recorded with the application of 100% RDF at three growth stages (10.86, 15.90 and 18.56 $plant^{-1}$). Narkhede *et al.* (2015) reported maximum number of sympodial branches (25.43 $plant^{-1}$) with the application of 50% RDF + 5 t ha^{-1} FYM + PSB + Azotobacter. Under rainfed ecosystems, significantly maximum number of sympodial branches $plant^{-1}$ was obtained with the recommended dose of fertilizer + FYM (25.64$plant^{-1}$(Hosmath *et al.* 2011).

Boll number and Boll Weight

Boll weight is the weight of seed cotton picked from a single, naturally open boll. The boll or fruit and boll weight decides yield attributing characters and yield. The data on number of bolls per plant and boll weight (g) has been presented in Table 2.

Maximum number of bolls per plant was recorded with the application of 180% RDF + FYM 15 t ha^{-1} (T_9) at 60 DAS (20.5 $plant^{-1}$), 90 DAS (28.9 $plant^{-1}$) and 120 DAS (47.5 $plant^{-1}$) due to maximum sympodial branches on plants. Boll weight (g) was also maximum (4.38 g $boll^{-1}$) with the application of T_9. Minimum number of bolls per plant and boll weight (g) was recorded with the application of 100% RDF.

Jadhav *et al.* (2015) reported that application of fertilizer level 200:100:100 NPK kg ha^{-1} and plant geometry of 150 x 36 cm resulted in significant yield, high number of picked bolls per plant and boll weight. Kumar *et al.* (2007) reported equivalent amount of nutrients applied through organics in combination with chemical fertilizer gave maximum yield attributing characters *viz*., number of bolls per plant and boll weight with combined application of 150% RDF + vermicompost @ 1 t ha^{-1}.

Seed cotton (Kapas) yield and Lint yield

Yield has been essentially controlled by the genetics of the plant and the environment. Number of bolls per plant and boll weight had high direct effect on seed cotton yield. The data on yield of kapas and lint of cotton hybrid are presented in Table 3.

Seed cotton yield increased with increased dose of organic + inorganic fertilizers under high density plant population. Maximum seed and lint yield (16.88 and 13.45 q ha^{-1}) was recorded with the application of 180% RDF + FYM @ 15 t ha^{-1} (T_9) and was sufficiently utilized by high density plantings due to the equivalent amount of nutrients applied through organics in combination with chemical fertilizer.

Closer planting of *Bt* cotton utilizes the land and nutrients effectively, covers up early with better sunlight interception (Dhiphale *et al.* 2012). Jadhav *et al.* (2015) reported maximum yield due to more number of bolls per plant and boll weight and was effectively increased with the application of 200:100:100 NPK kg ha^{-1} under closer spacing.

From the above findings, it can be concluded that increased dose of fertilizers + FYM *i.e.* T_9-180% RDF + FYM @ 15 t ha^{-1} was sufficiently utilized by higher plant population and resulted in maximum seed and lint yield among the treatments. Minimum seed and lint yield was recorded with the application of only 100% RDF.

Table 1: Sympodial branches plant^{-1} as influenced by different fertilizer treatments at various growth stages in cotton hybrid under HDPS

Treatments	60 DAS	90 DAS	120 DAS
T_1 - 100% RDF	10.86	15.90	18.56
T_2 - 100% RDF + FYM @ 10 t ha^{-1}	11.66	17.30	19.50
T_3 - 100% RDF + FYM @ 15 t ha^{-1}	12.36	18.26	20.43
T_4 - 140% RDF	14.50	19.53	21.66
T_5 - 140% RDF + FYM @ 10 t ha^{-1}	15.70	20.30	22.63
T_6 - 140% RDF + FYM @ 15 t ha^{-1}	16.66	21.56	23.50
T_7 - 180% RDF	17.83	22.53	24.36
T_8 - 180% RDF + FYM @ 10 t ha^{-1}	18.70	23.46	26.40
T_9 - 180% RDF + FYM @ 15 t ha^{-1}	19.60	23.86	27.43
S Em±	0.56	0.67	0.75
CD (p=0.05)	1.68	2.01	2.25

Table 2: Number of bolls and boll weight of cotton hybrid as influenced by different fertilizer treatments at various growth stages

Treatments	Number of bolls plant^{-1}			Boll weight (g boll^{-1}) at 120 DAS
	60 DAS	90 DAS	120 DAS	
T_1 - 100% RDF	8.4	10.5	25.6	2.01
T_2 - 100% RDF + FYM @ 10 t ha^{-1}	10.3	11.1	26.8	2.08
T_3 - 100% RDF + FYM @ 15 t ha^{-1}	11.5	13.4	28.4	2.13
T_4 - 140% RDF	13.2	15.9	30.1	2.59
T_5 - 140% RDF + FYM @ 10 t ha^{-1}	14.9	18.6	33.5	2.97
T_6 - 140% RDF + FYM @ 15 t ha^{-1}	16.2	21.2	37.8	3.18
T_7 - 180% RDF	18.0	23.7	41.4	3.46
T_8 - 180% RDF + FYM @ 10 t ha^{-1}	18.8	26.2	45.2	3.92
T_9 - 180% RDF + FYM @ 15 t ha^{-1}	20.5	28.9	47.5	4.38
S Em±	0.29	0.76	0.98	0.12
CD (p=0.05)	0.86	2.27	2.93	0.35

Table 3: Seed cotton yield and Lint yield of cotton hybrid as influenced by different fertilizer treatments at various growth stages

Treatments	Seed cotton yield (q ha^{-1})	Lint yield (q ha^{-1})
T_1 - 100% RDF	8.50	4.9
T_2 - 100% RDF + FYM @ 10 t ha^{-1}	10.60	5.7
T_3 - 100% RDF + FYM @ 15 t ha^{-1}	11.18	5.8
T_4 - 140% RDF	11.56	6.1
T_5 - 140% RDF + FYM @ 10 t ha^{-1}	12.29	7.4
T_6 - 140% RDF + FYM @ 15 t ha^{-1}	12.67	8.0
T_7 - 180% RDF	13.74	9.5
T_8 - 180% RDF + FYM @ 10 t ha^{-1}	15.21	10.7
T_9 - 180% RDF + FYM @ 15 t ha^{-1}	16.88	11.4
S Em±	0.35	0.12
CD (p =0.05)	1.01	0.38

REFERENCES

1. Ali, M.L., Ali, M., Sattar and Ali, M.A. 2010. Response of seed cotton yield to various plant populations and planting methods. *Journal of Agriculture Research*. 48 (2): 163-169. Narkhede, W.N., Nayak, S.K., Khazi, G.S and Jaware, B.H. 2015. Effect of land configuration and nutrient management on productivity of *Bt* cotton. *International Journal of Tropical Agriculture*. 33 (3): 2293-2297.
2. Blaise, D., Singh, J.V., Venugopalan, M.V. and Mayee, C.D. 2003. Effect of continuous application of manures and fertilizers on productivity of cotton-sorghum rotation. *Acta A*gronomica *Hungarica*. 51: 61-67.
3. CIC, 2016. Cotton Corporation of India. http://cotcorp.gov.in/statistics.aspx.
4. Dhiphale, V.V., Ghule, P.L., Jadhav, J.D and Palve, D.K. 2012. Nutrient uptake and its availability as influenced by plant geometry in *Bt* cotton. *An Asian Journal of Soil Science.* 7 (2): 358-366.

5. Hosmath, J.A., Biradar, D.P and Deshpande, S.K. 2011. Response of *Bt* cotton to organic and inorganic nutrient management under rainfed and irrigated ecosystems. *International Research Journal of Plant Science*. 1 (8): 244-248.
6. Jadhav, S.G., Chavan, D.A., Gokhale, D.N and Nayak, S.K. 2015. Influence of plant geometry, growth regulator and nutrient management on performance of *Bt* cotton under irrigated condition. *International Journal of Tropical Agriculture.* 33 (2): 1755-1759.
7. Kumar, A., Pujari, B.T., Halepyati, A.S and Patil, M.G. 2007. Influence of integrated use of organic and inorganic sources of nutrients on yield and yield components of *Bt* and non-*Bt* cotton hybrids. *Karnataka Journal of Agricultural Sciences*. 20 (3): 556-576.
8. Manjunatha, M.J., Halepyati, A.S., Koppalkar, B.G and Pujari, B.T. 2010. Yield and yield components, uptake of nutrients, quality parameters and economics of *Bt* cotton (*Gossypium hirsutum* L.) genotypes as influenced by different plant densities. *Karnataka Journal of Agricultural Scienc.* 23 (3): 423-425.
9. Panse, V.G and Sukhatme, P.V. 1978. Indian Statistical methods for agricultural workers I.C.A.R., New Delhi.

CITATION OF THIS ARTICLE

V.S.Ushanandini, T.Ramesh, B.Anil Kumar, A.Padmasri, K.Jeevan Rao and J.Aruna Kumari. Studies on INM practise on yield attributing characters in cotton hybrid under high density planting system (HDPS). Bull. Env. Pharmacol. Life Sci., Vol 6 Special issue 1, 2017: 410-413