Bulletin of Environment, Pharmacology and Life Sciences
Bull. Env. Pharmacol. Life Sci., Vol 7 [12] November 2018: 73-78

Online ISSN 2277-1808
Journal's URL:http://www.bepls.com
CODEN: BEPLAD
Global Impact Factor 0.876
Universal Impact Factor 0.9804
NAAS Rating 4.95

ORIGINAL ARTICLE **OPEN ACCESS**

Influence of planting method's and organic manure's on physiological characters of *Kharif* onion (*Allium cepa* L.)

Jitendra Singh Gurjar[1], S.S. Singh[2], Manoj Kureel[3] Kamlesh Ahirwar[4] and P.K.S. Gurjar[5]
1Ph.D. Horticulture **2.** Associate Professor, M.G.C.G.V.V., Chitrakoot, Satna, M.P.
3Assistant Professor 4. Scientist KVK, Chhatarpur M.P.
5. Scientist Horticulture, R.V.S.K.V.V., Gwalior, M.P.
Author id- Jitugurjar1184@gmail.com

ABSTRACT
The experiments were conducted at the farmer's field in the near College of Agriculture, Gwalior (M.P.) during two consecutive years of Kharif seasons in 2013-14 and 2014-15 to evaluate the influence of planting method's and organic manure's on physiological characters of Kharif onion in Gwalior conditions. Results revealed that the physiological parameters like Fresh weight of plant (g), Dry weight of plant (g), Crop growth rate (g/m²/day), Absolute growth rate (g/day), Relative growth rate (g/g/day) and Leaf area (cm²) were seedlings transplanted on ridges resulted significantly highest values at 40, 60, 80, 100 and 120 DAT over those transplanted in furrow and flat beds. Furrow planting method was also found significantly superior to flat planting method for all the physiological parameters. Among all the treatments of organics, application of poultry manures @ 4.2 t/ha resulted in significantly highest values of these physiological characters. The second best treatment was S_4 (VC 4.2 t/ha) followed by S_2 (FYM 25.0 t/ha). The PSB inoculated seedlings produced more fresh and dry weight per plant, whereas diameter of neck was superior under Azospirillum inoculated seedlings. Phosphorus is one of the essential major nutrients and needed in adequate amounts in the available form for growth and reproduction of plants. Seedlings inoculated with PSB transplanted on ridges with 25.0 t FYM/ha and PSB 5 kg/ha accrued the highest net monetary return amounting Rs. 97060/ha followed by $P_3S_2B_2$ (Rs. 93790/ha) while the highest B: C ratio of 2.65 was obtained by ridge transplanting with 12.5 t FYM/ha and PSB 5 kg/ha.
Key Words: *Onion, Planting method, Organic nutrient sources, Bio-fertilizer, physiological character*

Received 15.08.2018 Revised 21.09.2018 Accepted 17.10.2018

INTRODUCTION

Onion [*Allium cepa* L.] belongs to the family Amaryllidaceae. It is a bulbous biennial herb of the most important vegetable –cum- condiment, spice crops demanded worldwide. Onion has a paramount effect in preventing heart diseases and other ailments [12]**.** India is the second largest producer of onion in the world, next to China, with 70% of the total production comes as winter crop, and remaining 30 % as *kharif* onion as off season crop, accounting for 11.40 per cent of the area and 10.40 per cent of the world production and 16 per cent of productivity . In India, onion is being grown in an area of 3.64 million hectares with production of 68.45 million tonnes and the average productivity is 18.82 tonnes per hectare. China, India, U.S.A., Pakistan, Turkey, Iran, Brazil, Mexico and Spain are the major onion producing countries in the world. Maharashtra is the leading onion growing state of India [3]**.**

The production of onion in *kharif* season is economically beneficial for farmer, but the water lodging situations drastically reduced the production of crop. So the sowing method provide an option to safely produce the onion in *kharif* season by providing protection from water lodging and moisture conservation in soil during crop season. Organic materials such as poultry manure, green manures and farmyard manure (FYM) can substitute for inorganic fertilizers to maintain productivity and environmental quality [7]. The bio-fertilizers are alternative sources to meet the nutrient requirement of crops and to bridge the future gaps. Further, knowing the deleterious effect of using only chemical fertilizers on soil health, use of chemical fertilizers supplemented with organic waste and bio-fertilizers will be environmentally benign. Therefore, bio-fertilizers are widely accepted as low cost supplements to chemical fertilizers and no deleterious effect either on soil health or environment [5]**.**

The primary goal of integrated nutrient management is to combine old and new methods of nutrient management into ecologically sound and economically viable farming system that utilize available. Organic and inorganic sources of nutrients in a judicious and efficient way. Integrated nutrient management optimizes all aspects of nutrient cycling. It attempts to achieve tight nutrient cycling with synchrony between nutrient demand by the crop and nutrient release in the soil while minimizing losses through leaching, runoff, volatilization and immobilization. The problem of high cost of chemical fertilizers fully meet out nutrient requirement of crop by single source therefore integrated nutrients management such as organic matters like farmyard manure, vermicompost, poultry manure and bio-fertilizers use has become necessary. Among various causes of poor growth and income from onion crop, sowing with proper planting method and nutrient management is of supreme importance. Keeping these facts in view, the present investigation is being proposed.

MATERIALS AND METHOD

The experiments were conducted at the farmer's field in the near College of Agriculture, Gwalior (M.P.) during two consecutive years of *Kharif* seasons in 2013-14 and 2014-15. The average rainfall ranges 650 to 751 mm, average minimum and maximum temperature during growing period is 20.2^{o}C and 32.2^{o}C, respectively. The total rainfall received during the crop season from June, 2013 to December, 2013 and June, 2014 to December, 2014 was 666.8 mm and 581.8 mm, respectively. The soil of the experimental field was sandy loam in texture and neutral in reaction (pH 8.0 and 7.9) with 4.56 and 4.80% organic carbon content, analyzing low in available N (212.7 and 215.2 kg/ha), medium P (15.76 and 14.98 kg/ha) and K (286.0 and 281.0 kg/ha) contents having 0.12 and 0.14 mmhos/cm electrical conductivity in 2010-11 and 2011-12, respectively. The experiment was laid out in split-split plot design with 3 replications having 3 Planting method (Flat method, Furrow method and Ridge method) as main plot treatment, 6 organic manure levels (FYM 12.5 t/ha, PM 4.2 t/ha, VC 2.1 t/ha, VC 4.2 t/ha, PM 2.1 t/ha and FYM 25 t/ha) as sub plot treatment, and 2 bio fertilizer levels (PSB 5 kg/ha and *Azospirillum* 5 kg/ha) as sub-sub plot treatment. The total treatment combination was 36. The onion variety Agrifound Dark Red was used for experimentation. When 'F' test showed the significance of treatment, using the critical differences at 5 percent level were worked out for further testing the differences between the treatment means.

RESULT AND DISCUSSION

Effect of planting methods

Some major differences in plant physiological parameters like Fresh weight of plant, Dry weight of plant, Crop growth rate (CGR), Absolute growth rate (AGR), Relative growth rate (RGR) and Leaf area (LR) per plant were noted due to planting methods. In general, an examination of the data and figure will reveal that the growth analysis parameters viz., LA, CGR and AGR increased significantly when seedlings were transplanted on ridges as compared to those transplanted in furrows and flat soils at most of the stages whereas relative growth rate (RGR) differed significantly only upto 40-60 DAT crop growth interval and was found highest under ridge planting methods at 20-40 DAT while it was highest under flat planting method at 40-60 DAT crop growth interval. Increase in growth analysis parameters under ridge planting methods over furrow and flat planting methods may be attributed to the better nutrient availability and better moisture management due to better physical condition of soil. Gethe *et al.* [8] determined the effects of planting layout (flat beds and broad bed furrow), irrigation regimes (0.6, 0.8 and 1.0 IW/CPE) and fertilizer rates (50, 75 and 100% recommended rates of fertilizer + 50, 25 and 0% N in the form of farmyard manure (FYM)) on the growth and yield of onion were in a field experiment conducted in Maharashtra, India during 2000-01. Sowing in broad bed furrow and irrigation at 0.8 IW/CPE resulted in the tallest plants and highest number of leaves and dry matter per plant, neck thickness, equatorial diameter, polar diameter, leaf yield and bulb yield. Higher number of leaves may have resulted in higher fresh and dry weight per plant.

Effect of organic manures

The plant physiological parameters like Fresh weight of plant, Dry weight of plant, Crop growth rate, Absolute growth rate, Relative growth rate and Leaf area per plant per plant was differed significantly by the application of organics at all crop growth stages in pooled data. The growth analysis parameters like LA, CGR and AGR responded to organics on all the periodical stages. Higher LA, CGR and AGR recorded with application of poultry manure @ 4.2 t/ha, while minimum values of these growth analysis parameters were obtained from S1(FYM 12.5 t/ha) closely followed by S3 (VC 2.1 t/ha).

The poultry manure contains growth promoting substances like enzymes and hormones, besides plant nutrients which improve soil fertility and plant productivity [6]**.** Prabhu *et al.* [10] recorded the highest yield of okra with 2/3 RDF + FYM + *Azospirillum* VAM. Correlation study revealed significantly positive relationship between yield attributes (plant height, leaf area, total chlorophyll content, fruit length, fruit

diameter, fruit weight, N, P and K contents in plant) and yield. Amongst the attributes, N content showed the highest correlation (r=0.954) followed by plant height (r=0.934) and P content (r=0.921). The least influence on yield was exhibited by chlorophyll content (r=0.602). Aswani *et al.* [4] studied that effect of 4 levels of N (25, 50, 75 and 100 kg/ha) and 2 sources of biofertilizers i.e., *Azotobacter* and *Azospirillum* as seedling dipping, seed and soil treatments. They founded that application of 100 kg N combined with *Azotobacter* as seedling dipping gave the highest bulb yield and fresh weight of the bulb. Similar promotion of vegetative growth as a result of the application of organics at higher rate has been reported by Ahmed [2], Ghodia [9] and Rao *et al.* [11].

Effect of bio-fertilizers

The plant physiological parameters like Fresh weight of plant, Dry weight of plant, Crop growth rate, Absolute growth rate, Relative growth rate and Leaf area per plant per plant were significantly different among the treatments of bio-fertilizers at different days after transplanting except 20 DAT. In this study, it was interesting to observe that Growth analysis parameters like CGR and AGR differed significantly due to bio-fertilizers at all crop growth intervals but RGR was only at 20-40 and 40-60 DAT crop growth intervals. The maximum CGR and AGR at all the crop growth intervals were recorded from seedlings inoculated with PSB. Bio-fertilizer displayed significantly different trend for RGR only at 40-60 DAT crop growth interval. The maximum RGR was annexed with PSB inoculated seedlings. The increment in vegetative growth characters may be due to the release of fixed atmospheric nitrogen and increasing availability of phosphorus in the root zone [1]. Tawfik [13] added that microbeine, nitrobeine and rhizobacterin are commercial bio-fertilizers which gave the same effect of full dose of mineral nitrogen application. The increment of plant growth of onion with PSB was also reported by Yadav *et al.* [14].

Interaction effects

The interaction between planting method and organics was found significant for physiological parameters fresh and dry weight per plant and leaf area at all stage of observations except 20 DAT while diameter of neck was significantly influenced by this interaction P × S at 60, 80, 100 and 120 DAT. In general, seedlings transplanted on ridges with 4.2 t PM/ha (P3S6) produced maximum values of all these growth parameters followed by P3S4 and P3S2. The experimental variables planting methods and organics interact to each other for growth analysis parameter CGR and AGR at all crop growth intervals. Under each planting method, seedlings transplanted with PM @ 4.2 t/ha produced higher CGR and AGR than other treatments of organics and seedlings transplanted on ridges also produced higher values of both these growth analysis parameters under each treatment of organics over those transplanted in furrows and flat soils. Seedlings transplanted on ridges with 4.2 t PM/ha (P3S6) recorded significantly maximum CGR and AGR followed by P3S4 and P3S2 at all the crop growth intervals.

CONCLUSION

The growth characters like diameter of neck, fresh and dry weight of plant were increased in all the treatments with the advancement of plant growth up to 120 DAT of the crop, whereas the ridge planting was found superior among all the treatments. Significant increase was noted in all these growth characters due to application of each organic at higher level over their respective lower level. Among all the treatments of organics, application of poultry manures @ 4.2 t/ha resulted in significantly highest values of these growth characters. The second best treatment was S_4 (VC 4.2 t/ha) followed by S_2 (FYM 25.0 t/ha). In general, seedlings transplanted on ridges with 4.2 t PM/ha (P3S6) produced maximum values of all these growth parameters followed by P_3S_4 and P_3S_2. Seedlings inoculated with PSB transplanted on ridges with 25.0 t FYM/ha and PSB 5 kg/ha accrued the highest net monetary return amounting Rs. 97060/ha followed by ridges with 25.0 t FYM/ha and PSB 5 kg/ha *Azospirillum* 5 kg/ha (Rs. 93790/ha) and $P_3S_1B_1$ (Rs. 91260/ha) while the highest B: C ratio of 2.65 was obtained with the treatment combination of ridge planting with 12.5 t FYM/ha and PSB 5 kg/ha closely followed by transplanted on ridges with 25.0 t FYM/ha and *Azospirillum* 5 kg/ha (2.58), $P_3S_2B_1$ (2.57) and $P_3S_2B_2$ (2.52).

Table 1: Fresh weight (g/plant) and Dry weight (g/plant) of onion at various growth stages as influenced by planting methods, organic nutrient sources and bio-fertilizers (Two years pooled)

Treatment	Fresh weight (g/plant) (DAT)						Dry weight (g/plant) (DAT)					
	20	40	60	80	100	120	20	40	60	80	100	120
Planting Methods (P)												
P1: Flat method	2.75	21.44	34.61	61.50	111.62	132.56	0.263	0.607	2.410	5.757	10.573	17.289
P2: Furrow method	2.75	23.55	38.91	67.59	117.92	139.80	0.273	0.987	3.210	7.619	14.165	22.059
P3: Ridge method	2.80	26.35	41.41	71.08	122.51	144.68	0.272	1.226	3.769	8.909	16.566	25.052
CD (5%)	**NS**	**0.52**	**0.73**	**1.24**	**2.51**	**2.60**	**NS**	**0.027**	**0.075**	**0.153**	**0.322**	**0.436**
Organics (S)												
S1: FYM 12.5 t/ha	2.75	22.64	36.48	63.29	111.55	132.41	0.269	0.894	2.979	7.071	13.106	20.436
S2: FYM 25.0 t/ha	2.79	24.38	39.28	68.13	120.06	142.52	0.271	0.965	3.210	7.621	14.125	22.020
S3: VC 2.1 t/ha	2.75	22.82	36.76	63.77	112.75	133.42	0.268	0.901	3.002	7.126	13.208	20.595
S4: VC 4.2 t/ha	2.77	24.59	39.62	69.25	121.47	143.74	0.272	0.972	3.237	7.685	14.244	22.206
S5: PM 2.1 t/ha	2.76	23.15	37.30	65.21	114.40	135.38	0.267	0.914	3.046	7.229	13.400	20.894
S6: PM 4.2 t/ha	2.79	25.08	40.41	70.68	123.88	146.59	0.271	0.992	3.302	7.838	14.528	22.648
CD (5%)	**NS**	**0.17**	**0.25**	**0.50**	**0.79**	**0.85**	**NS**	**0.011**	**0.029**	**0.059**	**0.134**	**0.174**
Bio-fertilizers (B)												
B1: PSB 5 kg/ha	2.77	24.04	38.74	67.46	118.67	140.57	0.270	0.946	3.164	7.512	13.923	21.707
B2:Azospirillum 5 kg/ha	2.76	23.51	37.88	65.98	116.03	137.45	0.269	0.934	3.094	7.345	13.614	21.225
CD (5%)	**NS**	**0.10**	**0.13**	**0.25**	**0.44**	**0.46**	**NS**	**0.006**	**0.014**	**0.029**	**0.061**	**0.080**
Interaction												
P×S	**NS**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**NS**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**
P×B	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
S×B	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
P×S×B	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**

DAT-days after transplanting

Table 2: Crop growth rate (g/m²/day) and Absolute growth rate (g/day) of onion at 20-40, 40-60, 60-80, 80-100 and 100-120 DAT crop growth interval as influenced by planting methods, organic nutrient sources and bio-fertilizers (Two years pooled)

Treatment	Crop growth rate (g/m²/day)					Absolute growth rate (g/day)				
	20-40	40-60	60-80	80-100	100-120	20-40	40-60	60-80	80-100	100-120
Planting Methods (P)										
P1: Flat method	0.382	1.930	3.755	5.354	7.349	0.0174	0.0888	0.1723	0.2383	0.3317
P2: Furrow method	0.763	2.377	4.955	7.288	8.636	0.0347	0.1094	0.2269	0.3239	0.3899
P3: Ridge method	1.025	2.714	5.774	8.516	9.283	0.0466	0.1252	0.2645	0.3788	0.4192
CD (5%)	**0.015**	**0.049**	**0.123**	**0.181**	**0.184**	**0.0009**	**0.0030**	**0.0066**	**0.0094**	**0.0106**
Organics (S)										
S1: FYM 12.5 t/ha	0.688	2.228	4.596	6.713	8.020	0.0313	0.1026	0.2106	0.2986	0.3621
S2: FYM 25.0 t/ha	0.743	2.400	4.953	7.236	8.638	0.0338	0.1105	0.2269	0.3218	0.3900
S3: VC 2.1 t/ha	0.693	2.245	4.632	6.765	8.083	0.0315	0.1034	0.2122	0.3009	0.3649
S4: VC 4.2 t/ha	0.748	2.421	4.995	7.297	8.711	0.0341	0.1115	0.2288	0.3245	0.3933
S5: PM 2.1 t/ha	0.703	2.278	4.699	6.864	8.199	0.0320	0.1049	0.2153	0.3053	0.3702
S6: PM 4.2 t/ha	0.765	2.469	5.094	7.442	8.885	0.0348	0.1137	0.2334	0.3310	0.4012
CD (5%)	**0.006**	**0.019**	**0.046**	**0.062**	**0.062**	**0.0004**	**0.0010**	**0.0021**	**0.0025**	**0.0028**
Bio-fertilizers (B)										
B1: PSB 5 kg/ha	0.728	2.372	4.882	7.132	8.517	0.0331	0.1092	0.2237	0.3172	0.3846
B2:Azospirillum 5 kg/ha	0.719	2.309	4.774	6.974	8.328	0.0327	0.1064	0.2187	0.3102	0.3760
CD (5%)	**0.003**	**0.009**	**0.020**	**0.028**	**0.028**	**0.0002**	**0.0006**	**0.0012**	**0.0012**	**0.0013**
Interaction										
P×S	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**
P×B	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
S×B	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
P×S×B	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**

DAT-days after transplanting

Table 3: Relative growth rate (g/g/day) at 20-40, 40-60, 60-80, 80-100 and 100-120 DAT and Leaf area (cm²) of onion at 20,40,60,80,100 and 120 DAT crop growth interval as influenced by planting methods, organic nutrient sources and bio-fertilizers (Two years pooled)

Treatment	Relative growth rate (g/g/day)					Leaf area (cm²)					
	20-40	**40-60**	**60-80**	**80-100**	**100-120**	**20**	**40**	**60**	**80**	100	120
Planting Methods (P)											
P1: Flat method	0.0416	0.0653	0.0435	0.0304	0.0245	20.25	86.09	329.88	433.90	443.45	331.76
P2: Furrow method	0.0598	0.0556	0.0432	0.0310	0.0238	20.62	129.96	440.85	627.13	661.59	494.23
P3: Ridge method	0.0710	0.0529	0.0430	0.0310	0.0237	20.77	163.95	546.09	715.49	736.05	596.07
CD (5%)	**0.0018**	**0.0016**	**NS**	**NS**	**NS**	**NS**	**3.41**	**11.74**	**13.97**	**13.32**	**10.84**
Organics (S)											
S1: FYM 12.5 t/ha	0.0574	0.0579	0.0432	0.0308	0.0240	20.442	119.97	417.81	563.56	584.07	449.08
S2: FYM 25.0 t/ha	0.0574	0.0579	0.0433	0.0308	0.0240	20.586	129.37	450.34	607.71	629.86	484.37
S3: VC 2.1 t/ha	0.0574	0.0579	0.0433	0.0308	0.0240	20.416	120.89	421.01	567.94	588.62	453.93
S4: VC 4.2 t/ha	0.0574	0.0580	0.0433	0.0308	0.0240	20.752	131.37	454.13	612.53	634.91	491.09
S5: PM 2.1 t/ha	0.0574	0.0580	0.0433	0.0308	0.0240	20.436	124.05	427.23	576.14	597.11	463.25
S6: PM 4.2 t/ha	0.0577	0.0580	0.0433	0.0308	0.0240	20.665	134.36	463.13	625.15	647.61	502.40
CD (5%)	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**1.36**	**4.55**	**5.74**	**5.71**	**4.11**
Bio-fertilizers (B)											
B1: PSB 5 kg/ha	0.0574	0.0582	0.0432	0.0308	0.0240	20.56	128.09	443.87	595.80	617.52	476.97
B2:Azospirillum 5 kg/ha	0.0575	0.0577	0.0433	0.0308	0.0240	20.54	125.25	434.02	588.55	609.87	471.07
CD (5%)	**NS**	**0.0006**	**NS**	**NS**	**NS**	**NS**	**0.59**	**2.15**	**2.55**	**3.17**	**2.14**
Interaction											
P×S	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**Sig.**	**Sig.**	**Sig.**	**Sig.**	**Sig.**
P×B	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
S×B	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**
P×S×B	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**	**NS**

DAT-days after transplanting

REFERENCES

1. Abdalla (2002). Effect of bio and mineral phosphorus fertilizer on the growth, productivity and nutritional value of faba bean. *Egypt .J. Hort*., **29**(2): 187-203.
2. Ahmed, M.E.M. (2009). Effect of some bio and mineral fertilization levels on the growth, productivity and storability of onion. *Annals of Agricultural Science (Cairo).* **54**(2): 427-436.
3. Anonnymous, (2013). Indian Horticulture Database-2013, National Horticulture Board, Ministry of Agriculture, Govt. of India, Guragaon, pp. 267.
4. Aswani, G.; R. Paliwal and D. K. Sarolia (2005). Effect of nitrogen and bio fertilizer on yield and quality of rabi onion (*Allium cepa* L.) cv. Puna Red. *Agric. Sci. Digest*, **25**(2): 124-126.
5. Bhagyaraj, D. J. and Suvarna C. V. (1999). Biofertilizers and their application. *AGRIEAST*, **1**: 16-21.
6. Bhuma, M. (2001). Studies on the impact of humic acid on sustenance of soil fertility and productivity of greengram (VBNGG-2). M. Sc. (Agri.) Thesis, Tamil Nadu Agricultural University, Coimbatore (India).
7. Choudhary, B. R.; M. S. Fageria and R. S. Dhaka (2002). Role of growth hormones in chillies – A review. *Agric. Rev*. **23**(2): 145-148.
8. Gethe, R. M. Pawar, V. S. Pathan, S. H. Sonawane, D. A. and Kadlag, A. D. (2006). Influence of planting layouts, irrigation regimes and fertilizer levels on growth and yield of onion under micro-sprinkler. *Journal of Maharashtra Agricultural Universities*. **31**(3): 272-274.
9. Ghodia, R.H.A. (2012). Productivity improvement of onion (*Allium cepa* L.) under Siwa Oasis conditions. *J. Plant Production, Mansoura Univ*. **3**(12): 3037 -3049.
10. Prabhu, T.; Narwkadkar, P.R.; Sajindranath, A.K. and Jadhav, R.S. (2003). Correlation studies of okra. *Journal of Soils and crops*, **13**(1): 170-171.
11. Rao, K.R.; Mushan, L.C.; Mulani, A.C.; Khatavkar, R.S.; Parlekar, G.Y. and Shah, N.V. (2010). Effect of vermicompost on the growth and yield of onion (*Allium cepa* L.). *Karnataka Journal of Agricultural Sciences*, **23**(2): 361-363.Saini, G.S. (1997). A textbook of olericulture and floriculture. Mar pub. House Meerut, U.P. India.
12. Saini, G.S. (1997). A textbook of olericulture and floriculture. Mar pub. House Meerut, U.P. India.
13. Tawfik, K.M. (2008). Evaluating the use of rhizo-bacterin on cowpea plants grown under salt stress. *Research J. of Agric. and Biological Sci*., **4**(1): 26-33.

14. Yadav.R, D.H. Dwivedi, Govind And S. Maji (2015). Effect of integrated nutrient management on growth and yield of onion (*allium cepa* L.) cv. Pusa Madhvi. *J. Crop and weed.* **11**(1): 49-53.

CITATION OF THIS ARTICLE

Jitendra Singh Gurjar, S.S. Singh, Manoj Kureel, Kamlesh Ahirwar and P.K.S. Gurjar. J Singh Gurjar, Influence of planting method's and organic manure's on physiological characters of *Kharif* onion (*Allium cepa* L.). Bull. Env. Pharmacol. Life Sci., Vol 7 [12] November 2018 : 73-78