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Effect of different organic sources on growth and flowering character of watermelon (*Citrullus lanatus* Thunb.)

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Abstract
The experiment on effect of different organic sources on growth and flowering character of watermelon (*Citrullus lanatus* Thunb.) was carried out at Organic Research and Training Centre, Vasantarao Naik Marathwada Krishi Vidyapeeth, Parbhani. during summer season in year 2018-19. The experiment was laid out in Randomized Block Design in nine treatments with three replications. The treatments were T_1 [RDF 100% through FYM], T_2 [RDF 100% through vermicompost], T_3 [RDF 50% through FYM + RDF 50% through Vermicompost], T_4 [RDF 100% through FYM + Jeevamrut 3 Application], T_5 [RDF 100% through vermicompost + Jeevamrut 3 Application], T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)], T_7 [RDF 100% through Vermicompost + Biofertilizer (*Azotobacter*)], T_8 [RDF 100% through FYM + Panchagavya 3 Application] and T_9 [RDF 100:50:50 N:P:K (Control) Kg/ha].
In respect of growth character, it was also observed that in treatment T_6 [RDF 100% through FYM + biofertilizer (*Azotobacter*)] was found with maximum length of vine (116.75 cm), (130.77 cm) and (186.15 cm) at 30 DAS, 45 DAS and 60 DAS respectively. High number of branches per vine (4.00), (6.13) and (8.13) at 30 DAS, 45 DAS and 60 DAS respectively and high number of leaves per vine (11.07), (28.20) and (35.40) at 30 DAS, 45 DAS and 60 DAS of watermelon than other organic sources and control. In case of flower parameter, the treatment T_6 [RDF 100% through FYM + biofertilizer (*Azotobacter*)] was found with minimum days required for 1st flower to appear on vine (44.13 days), minimum days required for 50% flower to appear on vine (53.40 days) and high number of flowers per vine (11) of watermelon as compared with other organic sources and control.

Keywords: Organic sources, FYM, vermicompost, biofertilizer (*Azotobacter*), jeevamrut, panchagavya, growth and flower

Introduction
The watermelon production done worldwide and China rank 1st with total area of 1,892,570 ha and production of 79,244,271 tones. India rank 25th with an area of 30,110 ha and production of 427,105 tones, (Anonymous 2018) [a]. In India the state Uttar Pradesh rank 1st in production and productivity with 619.65 tonnes and 24.60% share of total production respectively and Maharashtra rank 10th in production and productivity with 46.99 tonnes and 1.87% share of total production respectively (Anonymous 2018) [a].
After the period of green revolution farmer started use of high amount of chemical fertilizer but heavy use leading in depreciation of fertility of soil and heavy use of chemical pesticide also lead many health issues. So, people getting aware about their health and nutrition. Due to this demand organic cultivation getting momentum and started knowing the importance of organically grown vegetables and fruit and because of this farmer also changing their cultivation habit from chemical to organic. Considering the above facts present investigation was undertaken to study the effect of different organic sources on growth and flowering character of watermelon (*Citrullus lanatus* Thunb.).

Materials and Methods
The present investigation was carried out during *summer* season of the year 2018-19 at Organic Farming Research and Training Center, VNMKV, Parbhani to study the effect of different organic sources on growth and flowering character of watermelon (*Citrullus lanatus* Thunb.). A field experiment was laid out with nine treatments *viz.*, T_1 [RDF 100% through FYM], T_2 [RDF 100% through vermicompost], T_3 [RDF 50% through FYM + RDF 50% through Vermicompost], T_4 [RDF 100% through FYM + Jeevamrut 3 Application], T_5 [RDF 100% through vermicompost + Jeevamrut 3 Application], T_6 [RDF 100% through FYM +

Biofertilizer (*Azotobacter*)], T_7 [RDF 100% through Vermicompost + Biofertilizer (*Azotobacter*)], T_8 [RDF 100% through FYM + Panchagavya 3 Application] and T_9 [RDF 100:50:50 N:P:K (Control) Kg/ha].

The treatments were replicated three times in a Randomized Block Design. The hand dibbing of healthy seeds was done in summer season at spacing of 150 cm X 37.5 cm by dibbling method. Recommended dose Nitrogen, phosphorus and potash were applied to control through urea, single superphosphate and murate of potash, respectively at 100 kg N/ha, 50 kg P_2O_5/ha and 50 kg K_2O/ha. Full dose of P_2O_5 and K_2O were applied respectively to control. Farmyard manure was applied at the rate of 25 tons per hectare and vermicompost at the rate of 4 t/ha at the time of land preparation as per treatment. Jeevamrut (500 liter/ha), panchagavya (200 liter/ha) and biofertilizer (*Azotobacter*) (2.5 liter/ha) was applied as per treatments in three application. First applied by drenching and other two by spraying at 15 DAS, 30 DAS and 45 DAS respectively to the treatment.

Observations on Length of vine (cm), Number of branches per vine, Number of leaves per vine, Days required for 1st flower, Days required for 50% flowering, Number of flowers per vine, Node at which first flower appeared.

Results

Growth Character

Effect of different organic sources was observed to be significant on growth character throughout the life cycle of crop. From the Table 1 it was revealed that maximum vine length was formed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)]. At 30 days after sowing maximum length of vine (116.75 cm) was observed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which was found at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] (116.02 cm) and minimum length of vine (98.35 cm) was recorded in the treatment T_1 [RDF 100% Through FYM]. At 45 days after sowing maximum length of vine (130.77 cm) was observed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which were found at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] (130.56 cm) followed by the treatment T_3 [RDF 50% through FYM + RDF 50% through Vermicompost] (128.04 cm). The treatment T_2 [RDF 100% through Vermicompost] recorded minimum length of vine (117.79 cm). At 60 days after sowing maximum length of vine (186.15 cm) was observed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which were found at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] (185.25 cm). The treatment T_1 [RDF 100% through FYM] recorded minimum length of vine (171.31 cm).

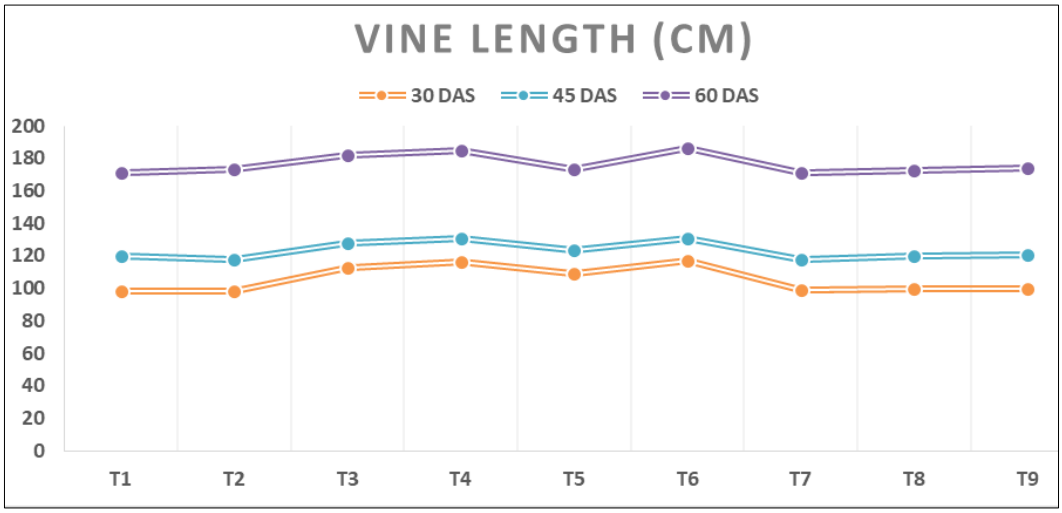

Fig 1: Effect of different organic sources on vine length of watermelon.

At 30 days after sowing maximum number of branches (4.00) was observed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which was at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] (3.93) followed by the treatments T_2 [RDF 100% through Vermicompost] and T_7 [RDF 100% through Vermicompost + Biofertilizer (*Azotobacter*)] with number of branches (3.60) and (3.53) respectively. The treatment T_1 [RDF 100% through FYM] recorded minimum number of branches (2.80). At 45 days after sowing maximum number of branches (6.13) was observed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which was at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] (6.07) followed by the treatments T_2 [RDF 100% through vermicompost], T_3 [RDF 50% through FYM + RDF 50% through Vermicompost], T_5 [RDF 100% through vermicompost + Jeevamrut 3 Application] and T_7 [RDF 100% through Vermicompost + Biofertilizer (*Azotobacter*)] with number of branches (5.60), (5.47), (5.47) and (5.40) respectively. The treatment T_1 [RDF 100% through FYM] and T_9 [RDF 100:50:50 N:P: K (Control) Kg/ha] recorded minimum number of branches 4.60 and 4.60 respectively. At 60 days after sowing maximum number of branches (8.13) was observed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which was at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] (8.00) followed by the treatments T_7 [RDF 100% through Vermicompost + Biofertilizer *(Azotobacter*)], T_3 [RDF 50% through FYM + RDF 50% through Vermicompost], and T_2 [RDF 100% through vermicompost] with number of branches (7.53), (7.40), and (7.33) respectively. The treatment T_1 [RDF 100% through FYM] recorded minimum number of branches (6.53).

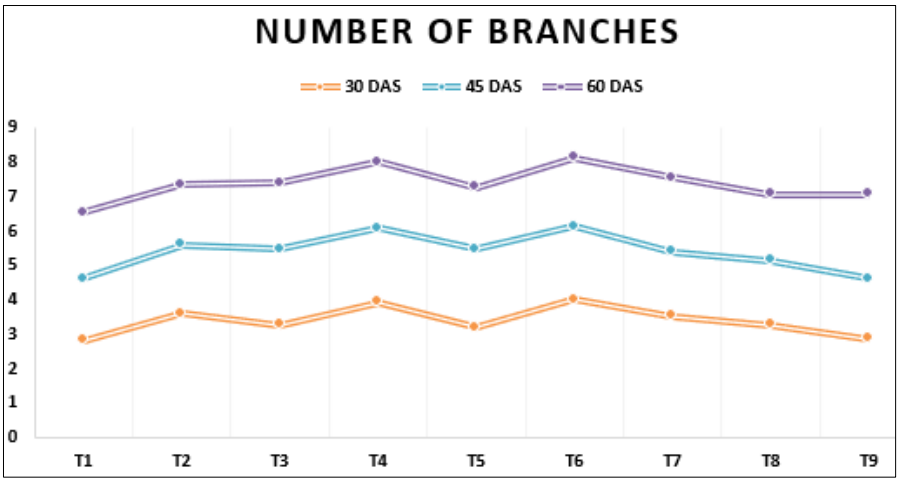

Fig 2: Effect of different organic sources on number of branches of watermelon.

At 30 days after sowing maximum number of leaves (11.07) were observed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which was at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] having (10.93) number of leaves. The treatment T_1 [RDF 100% through FYM] recorded minimum number of leaves (9.40). At 45 days after sowing maximum number of leaves (28.20) were observed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which was at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] with (27.80) number of leaves. The treatment T_8 [RDF 100% through FYM + Panchagavya 3 Application] recorded minimum number of leaves (24.27) and At 60 days after sowing maximum number of leaves (35.40) were observed in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which was at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] with (35.00) number of leaves. The treatment T_1 [RDF 100% through FYM] recorded significantly minimum number of leaves (30.40).

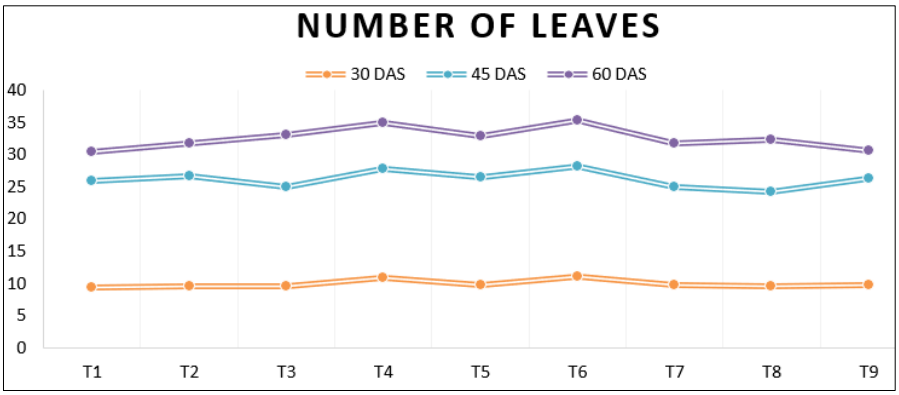

Fig 3: Effect of different organic sources on number of leaves of watermelon.

Flowering Character

The data presented in table 2 revealed that, effect of different organic sources on days required for first flower to appear on vine was found significant. Days required for 1st flower to appear on vine (44.13 days) was found significantly minimum under the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which was at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] (44.47 days). Days required for 1st flower to appear on vine (46.60 days) were found significantly maximum in the treatment T_2 [RDF 100% through Vermicompost].

Days required for 50% flower to appear on vine (53.40 days) was found significantly minimum in the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] which was at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] (53.53 days). Days required for 50% flower to appear on vine (55.53 days) were found significantly maximum in the treatment T_2 [RDF 100% through Vermicompost].

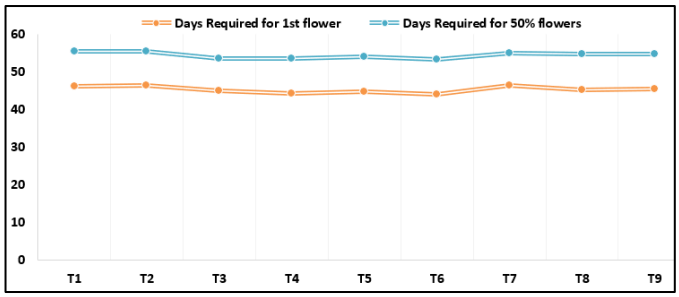

Fig 4: Effect of different organic sources on days required for flowering of watermelon.

Number of flower per vine (11) was found significantly maximum in the treatment T_6 [RDF 100% through FYM +

Biofertilizer (*Azotobacter*)] which was at par with the treatment T_4 [RDF 100% through FYM + Jeevamrut 3 Application] (10.73) followed by the treatments T_3 [RDF 50% through FYM + RDF 50% through Vermicompost] (10.20), T_5 [RDF 100% through vermicompost + Jeevamrut 3 Application] (10.13), T_8 [RDF 100% through FYM + Panchagavya 3 Application] (10.00) and T_7 [RDF 100% through Vermicompost + Biofertilizer (*Azotobacter*)] (9.87) respectively. However, Number of flowers per vine (9.00) was found significantly minimum in the treatment T_1 [RDF 100% through FYM].

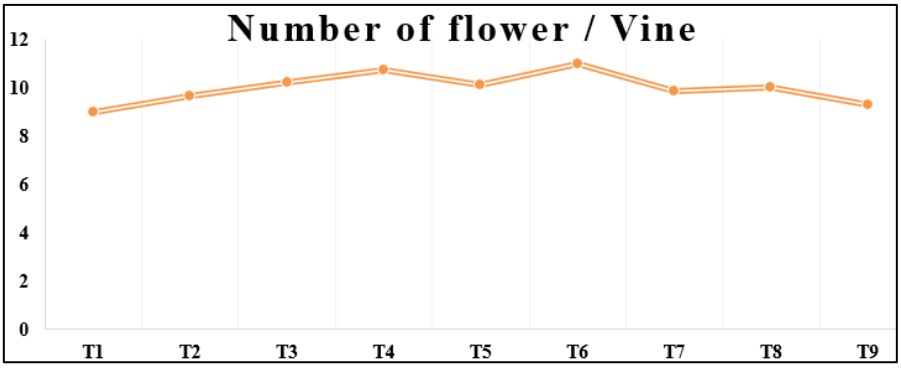

Fig 5: Effect of different organic sources on number of flowers per vine of watermelon.

Discussions

In case of length of vine, it might be evident that vines treated with the treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] gained nitrogen more quickly as that of others, which could be due to action of biofertilizer (*Azotobacter*). Hence, vines treated with treatment combinations containing biofertilizer were observed to be longer than vines under another treatment combination. These results are in conformity with Prasad *et al*. (2009) [10] in bitter gourd, Eifediyi and Remison (2010) [10] in cucumber, Sarhan *et al*. (2011) [11] in summer squash, Anjanappa *et al*. (2012)[a] in cucumber, Patle *et al*. (2018) [9] and Tripathi *et al*. (2018) [14] in bottle gourd.

In case of number of branches per vine, it was clear that plants treated with biofertilizer gained nutrients more quickly as that of others, which could be due to action of biofertilizer (*Azotobacter*). Hence, vines treated with treatment combinations containing biofertilizer and farmyard manure were observed with more branches than another treatment combination. The results are in finding with those observed by Prasad *et al*., (2009) [10] in bitter gourd, Sarhan *et al*. (2011) [11] in summer squash, Anjanappa *et al*. (2012)[a] in cucumber, Thriveni *et al*. (2015) [13] in bitter gourd and Tripathi *et al*. (2018) [14] in bottle gourd.

In case of number of leaves per vine, it was clear that vines treated with biofertilizer observed the more number of leaves might be due to biofertilizer (*Azotobacter*) as its efficient nitrogen fixer and it easily available to vine helps in significant increase in number of leaves as compared to other treatment. The results are in accordance with those observed by Eifediyi and Remison (2010) [10] in cucumber, Sarhan *et al*. (2011) [11] in summer squash and Anjanappa *et al*. (2012) [a] in cucumber.

In case of days required for flowering, it might be possible due to availability nitrogen, phosphorus and potassium in easier and available form through FYM and Biofertilizer (*Azotobacter*) at early stage of life of vine which it helps in foliage growth and early flowering in watermelon. The results are in conformity with those observed by Prasad *et al*. (2009) [10] in bitter gourd, Thriveni *et al*. (2015) [13] in bitter gourd, Baghel *et al*. (2018) [5] in bottle gourd, Singh *et al*. (2018) [12] in cucumber and Kharga *et al*. (2019) [8] in cucumber.

It might be possible due to the high bud initiation take place as proper nutrient supply of macro as well as micronutrient required for flower formation which leads to high number of flower initiation than other treatment. These results are in consent with those observed by Prasad *et al*. (2009) [10] in bitter gourd, Eifediyi and Remison (2010) [10] in cucumber, Sarhan *et al*. (2011) [11] in summer squash, Anjanappa *et al*. (2012)[b] in cucumber and Das *et al*. (2015) [6] in bottle gourd.

Table 1: Growth character influenced by different organic sources

	Vine Length (cm)			Number of Branches			Number of leaves		
Treatments	**30 DAS**	**45 DAS**	**60 DAS**	**30 DAS**	**45 DAS**	**60 DAS**	**30 DAS**	**45 DAS**	**60 DAS**
T_1 - RDF 100% through FYM	98.35	119.92	171.31	2.80	4.60	6.53	9.40	25.93	30.40
T_2 - RDF 100% through vermicompost	98.41	117.79	173.09	3.60	5.60	7.33	9.53	26.60	31.67
T_3 - RDF 50% through FYM + RDF 50% through Vermicompost	112.45	128.04	181.74	3.27	5.47	7.40	9.60	25.00	33.00
T_4 - RDF 100% through FYM + Jeevamrut 3 Application	116.02	130.56	185.25	3.93	6.07	8.00	10.93	27.80	35.00
T_5 - RDF 100% through vermicompost + Jeevamrut 3 Application	108.99	123.77	173.31	3.20	5.47	7.27	9.73	26.53	32.87
T_6 - RDF 100% through FYM + Biofertilizer (*Azotobacter*)	116.75	130.77	186.15	4.00	6.13	8.13	11.07	28.20	35.40
T_7 - RDF 100% through Vermicompost + Biofertilizer (*Azotobacter*)	99.16	118.09	171.39	3.53	5.40	7.53	9.67	24.87	31.67
T_8 - RDF 100% through FYM + Panchagavya 3 Application	99.43	119.70	172.39	3.27	5.13	7.07	9.53	24.27	32.27
T_9 - RDF 100:50:50 N:P: K (Control) Kg/ha	99.98	120.56	174.20	2.87	4.60	7.07	9.80	26.33	30.60
SE ±	1.03	1.13	1.33	0.20	0.26	0.29	0.38	0.41	0.51
CD at 5%	3.08	3.37	4.00	0.59	0.79	0.85	1.13	1.24	1.52

Table 2: Effect of different organic sources on flowering character of watermelon

	Treatment	Days Required for 1st flower	Days Required for 50% flowers	Number of flower / Vine	Node at which first flower to be appeared
T_1	RDF 100% Through FYM	46.33	55.47	9.00	4.67
T_2	RDF 100% Through vermicompost	46.60	55.53	9.67	4.67
T_3	RDF 50% Through FYM + RDF 50% Through Vermicompost	45.07	53.67	10.20	4.33
T_4	RDF 100% Through FYM + Jeevamrut 3 Application	44.47	53.53	10.73	4.27
T_5	RDF 100% Through vermicompost + Jeevamrut 3 Application	44.87	54.07	10.13	4.60
T_6	RDF 100% Through FYM + Biofertilizer (*Azotobacter*)	44.13	53.40	11.00	4.20
T_7	RDF 100% Through Vermicompost + Biofertilizer (*Azotobacter*)	46.40	55.00	9.87	4.73
T_8	RDF 100% Through FYM + Panchagavya 3 Application	45.33	54.73	10.00	4.60
T_9	RDF 100:50:50 N:P: K (Control) Kg/ha	45.60	54.80	9.27	4.47
	S. E (±)	0.148	0.063	0.38	0.12
	C. D at 5%	0.447	0.189	1.13	**NS**

Conclusion

The overall assessment of the result of present investigation on the " Effect of different organic sources on growth and flowering character of watermelon (*Citrullus lanatus* Thunb.)" concluded that use of treatment T_6 [RDF 100% through FYM + Biofertilizer (*Azotobacter*)] was found superior for most of growth parameters like length of vine (cm), number of branches, number of leaves and flower parameter like days required for 1st flower, days required for 50% flower and number of flowers per vine. Hence, for study the " Effect of different organic sources on growth and flowering character of watermelon (*Citrullus lanatus* Thunb.)" It is evident that the use of (RDF 100% through FYM + Biofertilizer (*Azotobacter*)) as a best for increasing yield of watermelon. The results are on the basis of one season trial therefore need to conduct two or more trials so that conclude proper conclusion.

References

1. Anjanappa M, Venkatesha J, Kumara BS. Growth, yield and quality attributes of cucumber (*Cucumis sativus* cv. Hassan Local) as influenced by integrated nutrient management grown under protected condition. Vegetable Science: An International Journal on Plant Research. 2012;39(1):47-50.
2. Anjanappa M, Venkatesha J, Kumara BS. Influence of organic, inorganic and bio fertilizers on flowering, yield and yield attributes of cucumber (*Cucumis sativus* cv. Hassan Local) in open field condition. Karnataka Journal of Agricultural Sciences. 2012;25(4):493-497.
3. Anonymous. World ranking and production of watermelon [Internet]. 2018. Available from: https://www.atlasbig.com/en-us/countries-watermelon-production (source: FAO).
4. Anonymous. National Horticulture Board, Ministry of Agriculture, Government of India; c2018.
5. Baghel SS, Bose US, Singh SS. Influence of organic manure with inorganic and bio-fertilizer on growth, flowering, yield and yield attributes of bottle gourd (*Lagenaria siceraria* L.). Bulletin of Environmental Pharmacology and Life Sciences. 2018;7(4):30-36.
6. Das R, Mandal AR, Anuj Priya, Das SP, Kabiraj J. Evaluation of integrated nutrient management on the performance of bottle gourd (*Lagenaria siceraria* (Molina) Standl.). Journal of Applied and Natural Science. 2015;7(1):18–25.
7. Eifediyi EK, Remison SU. Growth and yield of cucumber (*Cucumis sativus* L.) as influenced by farmyard manure and inorganic fertilizer. Journal of Plant Breeding and Crop Science. 2010;2(7):216-220.
8. Kharga S, Sarma P, Warade SD, Debnath P, Wangchu L, Singh AK. Effect of Integrated Nutrient Management on Growth and Yield Attributing Parameters of Cucumber (*Cucumis sativus* L.) under Protected Condition. International Journal of Current Microbiology and Applied Sciences. 2019;8(8):1862-1871.
9. Patle BJ, Wagh AP, Umbarkar PS, Bondre SV. Integrated nutrient management studies in bottle gourd. Journal of Pharmacognosy and Phytochemistry. 2018;7(5):1383-1385.
10. Prasad PH, Mandal AR, Sarkar A, Thapa U, Maity TK. Effect of biofertilizers and nitrogen on growth and yield attributes of bitter gourd (*Momordica charantia* L). In: Proceedings, International Conference on Horticulture; c2009. p. 738-739.
11. Sarhan TZ, Mohammed GH, Teli JA. Effect of bio and organic fertilizers on growth, yield and fruit quality of summer squash. Sarhad Journal of Agriculture. 2011;27(3):377-383.
12. Singh J, Singh MK, Kumar M, Kumar V, Singh KP, Omid AQ. Effect of integrated nutrient management on growth, flowering and yield attributes of cucumber (*Cucumis sativus* L.). International Journal of Chemical Studies. 2018;2(6):567-572.
13. Thriveni V, Mishra HN, Pattanayak SK, Sahoo GS, Thomson T. Effect of inorganic, organic fertilizers and biofertilizers on growth, flowering, yield and quality attributes of bitter gourd (*Momordica charantia* L.). International Journal of Farm Sciences. 2015;5(1):24-29.
14. Tripathi YK, Kasera S, Mishra SK, Prasad VM, Dwivedi A. Integrated nutrient management (INM) practices influenced vegetative growth and flowering of rainy season bottle gourd (*Lagenaria siceraria* (Molina) Standl.) c.v. Pusa hybrid-3. The Pharma Innovation Journal. 2018;7(7):555-558.