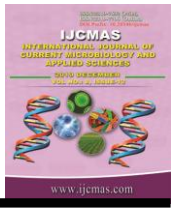
Int.J.Curr.Microbiol.App.Sci (2019) *8*(12): 1637-1645

International Journal of Current Microbiology and Applied Sciences
***ISSN: 2319-7706* Volume 8 Number 12 (2019)**
Journal homepage: http://www.ijcmas.com



Original Research Article https://doi.org/10.20546/ijcmas.2019.812.197

Effect of Integrated Nutrient Management on Growth and Yield Attributes of Summer Pearl Millet in South Gujarat

M. B. Khadadiya[1], A. P. Patel[2*] and V. T. Shinde[3]

[1]N. M. College of Agriculture, NAU, Navsari, Gujarat, India
[2]Department of Agronomy, [3]Department of Soil & Water Engineering, College of Agriculture, NAU, Waghai, Gujarat, India

**Corresponding author*

Keywords

Ear head girth (5.53 cm), Test weight (12.70 g), Grain yield (5035 kg/ha)

Article Info

Accepted:
12 November 2019
Available Online:
10 December 2019

A B S T R A C T

A field experiment was conducted during summer season of 2018 at college farm of N. M. College of Agriculture, Navsari, Gujarat, to study the effect of integrated nutrient management on summer pearl millet under south Gujarat conditions. Two levels of manure (no compost and vermicompost @ 10 t/ha), three fertilizer levels (no RDF, 75 per cent RDF and 100 per cent RDF) and two levels of biofertilizer (no seed inoculation and seed inoculation with *Azotobacter* @ 2 ml/kg seeds) were compared. Application of 10 tonnes vermicompost/ha significantly increased plant height at 30, 60 DAS and at harvest (23.68, 90.79 and 166.23 cm, respectively), dry matter accumulation at 30, 60 DAS and at harvest (24.21, 45.18 and 53.54 g/plant, respectively), number of effective tillers (3.76), ear head length (19.20 cm), ear head girth (5.53 cm), test weight (12.70 g), grain yield (5035 kg/ha) and straw yield (11134 kg/ha) over control. Improvement in plant height at 30, 60 DAS and at harvest (23.20, 88.28 and 161.17 cm, respectively), dry matter accumulation at 30, 60 DAS and at harvest (22.02, 41.84 and 49.16 g/plant, respectively), number of effective tillers (3.33), ear head length (18.73 cm), ear head girth (5.48 cm), test weight (12.45 g), grain yield (4310 kg/ha) and straw yield (9479 kg/ha) were also noticed with 100 per cent RDF. Seed inoculation with *Azotobacter* also increased plant height at 30, 60 DAS and at harvest (22.65, 87.31 and 160.17 cm, respectively), dry matter accumulation at 30, 60 DAS and at harvest (19.96, 39.31 and 46.97 g/plant, respectively), number of effective tillers (3.21), ear head length (18.05 cm), ear head girth (5.41 cm), test weight (12.37 g), grain yield (3904 kg/ha) and straw yield (8704 kg/ha) over control.

Introduction

Pearlmillet (*Pennisetum glaucum* L.) is one of the important millet crops of India. Among the millets, it comes next to sorghum in area and production. Rajasthan ranks first in area and production of pearlmillet. Besides being a staple diet of about 10 per cent population of our country, it is an important fodder crop also. It is the only cereal crop that is capable

of producing a reliable yield under the marginal environments and simultaneously responds to high management conditions. Its nutritious grain forms the important component of human diet and stover forms the principal maintenance ration for ruminant livestock during the dry poultry. It is nutritionally better than many cereals as it is a good source of protein (12.6 per cent), minerals, particularly iron (2.8 per cent) and fat (5 per cent). In India, it is annually grown on 8.74 million ha area producing nearly 8.83 million tonnes of grains with productivity of 1011 kg ha^{-1} (Anon., 2011).

Materials and Methods

In order to accomplish the objectives, the present field experiment entitled, "Effect of integrated nutrient management in summer pearlmillet (*Pennisetum glaucum* L.) under south Gujarat condition" was conducted during summer season of 2018 at the College Farm, N. M. College of Agriculture, Navsari Agricultural University, Navsari. The campus is geographically located at 20˚-57′ N latitude and 72˚-54′ E longitude at an altitude of 10 meters above the mean sea level. According to agro-climatic conditions, Navsari is located in south Gujarat heavy rainfall zone-I (Agro-ecological situation-III). The climate of this zone is typically tropical, characterized by humid and warm monsoon with heavy rain, quite cold winter and fairly hot summer. The average annual rainfall of the tract is about 1500 mm. The soil of experimental field was clayey in texture, having pH 7.8 with normal electrical conductivity (0.36 dsm^{-1}), low in organic carbon content (0.72%), low in available nitrogen (150.23 kg ha^{-1}), medium in available phosphorus (49 kg ha^{-1}) and fairly rich in available potassium (307.81 kg ha^{-1}).

The treatments consisted of two levels of manure (no compost and vermicompost @ 10 t/ha), three fertilizer levels (no RDF, 75 per cent RDF and 100 per cent RDF) and two levels of biofertilizer (no seed inoculation and seed inoculation with *Azotobacter* @ 2 ml/kg seeds). These treatments were evaluated in randomized block design with factorial concept (FRBD) and replicate three times. Pearlmillet variety GCH-732 was sown in furrows at 45 cm row spacing using a seed rate of 3.75 kg/ha. Application of fertilizers (120:60:00 NPK kg/ha) was applied as per treatment. Half dose of N and full dose of P and K applied basal at the time of sowing and remaining half dose of N at 30 and 60 days after sowing. Vermicompost (1.74 % N, 0.89 % P, 0.86 % K and 12:1 C: N ration) was mixed in soil at the time of field preparation as per treatment. Seed was uniformly coated with *Azotobacter* @ 2 ml/kg seeds as per treatments. The results were analysed using standard statistical procedure given by Panse and Sukhatme (1985).

Results and Discussion

Manure

Significant effect of vermicompost was observed on growth attributes, yield and yield attributes of pearlmillet. An application of vermicompost @ 10 tonnes/ha significantly increased plant heigtht at 30, 60 DAS and at harvest (23.68, 90.79 and 166.23 cm, respectively), dry matter accumulation at 30, 60 DAS and at harvest (24.21, 45.18 and 53.54 g/plant, respectively), number of effective tillers per plant (3.76), ear head length (19.20 cm), ear head girth (5.53 cm), test weight (12.70 g), grain yield (5035 kg/ha) and straw yield (11134 kg/ha).Increase in these growth parameters has evidently resulted from favorable function on manure. The basic fact is that vermicompost provides secondary elements like Ca, Mg, and S and fairly high amounts of micronutrients to the plants. It also increases CEC, water holding capacity and phosphate availability in the soil. Thus

balanced nutrition due to release of macro and micro nutrients due to application of vermicompost under favorable environment might have helped in higher uptake of nutrients. This accelerated the growth of new tissues and development of new shoots that have ultimately increased the plant height and dry mater accumulation. The results of present investigation are in conformity with those of Narolia *et al.*, (2009), Jadhav *et al.*, (2011), Chaudhary *et al.*, (2014) and Kumar *et al.*, (2014[a]) in pearlmillet (Table 1–8).

Table.1 Interaction effect of manure and fertilizer on plant height of pearl millet

Treatment	Plant height at harvest (cm)		
	Fertilizer (F)		
Manure (M)	F_1	F_2	F_3
M_1	133.41	156.12	145.53
M_2	157.74	164.13	176.81
S .Em. ±	4.55		
C.D. at 5%	13.33		

Table.2 Effect of integrated nutrient management on growth attributes of pearl millet

Treatments	Plant height (cm)			Dry matter accumulation (g/plant)		
	At 30 DAS	At 60 DAS	At harvest	At 30 DAS	At 60 DAS	At harvest
(A) Manure (M)						
No compost (M1)	21.11	78.98	145.02	14.65	27.75	34.83
Vermicompost @ 10 t/ha (M2)	23.68	90.79	166.23	24.21	45.18	53.54
S.Em. +	0.42	1.61	2.62	0.43	0.87	0.97
C.D. at 5%	1.24	4.74	7.70	1.25	2.55	2.86
(B) Fertilizer (F)						
No RDF (F1)	21.33	79.91	145.58	14.66	28.75	36.23
75 per cent RDF (F2)	22.66	86.46	160.12	21.61	38.81	47.16
100 Per cent RDF (F3)	23.20	88.28	161.17	22.02	41.84	49.16
S.Em. +	0.52	1.98	3.21	0.52	1.07	1.19
C.D. at 5%	1.52	5.80	9.43	1.54	3.13	3.50
(C) Biofertilizer (B)						
No seed inoculation (B1)	22.14	82.46	151.07	18.91	33.62	41.40
Seed inoculation with *Azotobacter* (B2)	22.65	87.31	160.17	19.96	39.31	46.97
S.Em. +	0.42	1.61	2.62	0.43	0.87	0.97
C.D. at 5%	NS	4.74	7.70	NS	2.55	2.86

Table.3 Effect of integrated nutrient management on yield and yield attributes of pearl millet

Treatments	No. of effective tillers per plant	Ear head length (cm)	Ear head girth (cm)	Test weight (g)	Grain yield (kg/ha)	Straw yield (kg/ha)
(A) Manure (M)						
No compost (M1)	2.05	15.73	5.06	9.41	2215	5329
Vermicompost @ 10 t/ha (M2)	3.76	19.20	5.53	12.70	5035	11134
S.Em. +	0.077	0.38	0.08	0.28	78.43	197.65
C.D. at 5%	0.23	1.12	0.24	0.83	230.04	579.70
(B) Fertilizer (F)						
No RDF (F1)	2.30	16.16	5.09	9.52	2505	6091
75 per cent RDF (F2)	3.10	17.51	5.32	11.20	4060	9125
100 Per cent RDF (F3)	3.33	18.73	5.48	12.45	4310	9479
S.Em. +	0.094	0.47	0.10	0.35	96.06	242.08
C.D. at 5%	0.28	1.35	0.29	1.01	281.74	709.98
(C) Biofertilizer (B)						
No seed inoculation (B1)	2.60	16.88	5.17	9.74	3346	7760
Seed inoculation with *Azotobacter* (B2)	3.21	18.05	5.41	12.37	3904	8704
S.Em. +	0.077	0.38	0.08	0.28	78.43	197.65
C.D. at 5%	0.23	1.12	0.24	0.83	230.43	579.70

Table.4 Interaction effect of manure and fertilizer on dry matter accumulation of pearl millet

Treatment	Dry matter accumulation (g/plant)		
	Fertilizer (F)		
Manure (M)	F_1	F_2	F_3
M_1	24.44	39.71	40.34
M_2	48.02	54.62	57.98
S .Em. ±	1.69		
C.D. at 5%	4.95		

Table.5 Interaction effect of manure and fertilizer on number of effective tillers of pearl millet

Treatment	Number of effective tillers per plant		
	Fertilizer (F)		
Manure (M)	F_1	F_2	F_3
M_1	1.64	2.07	2.45
M_2	2.95	4.14	4.20
S .Em. ±	0.13		
C.D. at 5%	0.39		

Table.6 Interaction effect of manure and fertilizer on ear head length of pearl millet

Treatment	Ear head length (cm)		
	Fertilizer (F)		
Manure (M)	F_1	F_2	F_3
M_1	15.21	15.93	16.06
M_2	17.11	19.10	21.39
S .Em. ±	0.66		
C.D. at 5%	1.94		

Table.7 Interaction effect of manure and fertilizer on grain yield of pearl millet

Treatment	Grain yield (kg/ha)		
	Fertilizer (F)		
Manure (M)	F_1	F_2	F_3
M_1	1449	2447	2749
M_2	3561	5672	5871
S .Em. ±	135.85		
C.D. at 5%	398.44		

Table.8 Interaction effect of manure and fertilizer on straw yield of pearl millet

Treatment	Straw yield (kg/ha)		
	Fertilizer (F)		
Manure (M)	F_1	F_2	F_3
M_1	3846	5742	6399
M_2	8337	12507	12560
S .Em. ±	342.35		
C.D. at 5%	1004.07		

The higher values of yield attributes like number of effective tillers per plant, ear head length and girth and test weight coupled with the higher crop dry matter observed with these treatments might have been the most probable reason of higher grain yield. The increase in grain yield of pearlmillet with these treatments was also largely due to high harvest index that showed high partitioning of the plant assimilates towards the sink. Similar results were also obtained by Chaudhary *et al.,* (2012) in pearlmillet, Anon. (2013) in pearlmillet, Chaudhary *et al.,* (2015) in pearlmillet and Biri *et al.,* (2016) in sorghum.

Fertilizer

Successive levels of fertilizer significantly increased the growth attributes, yield and yield attributes. Significantly highest plant height at 30, 60 DAS and at harvest (23.20, 88.28 and 161.17 cm, respectively), dry matter accumulation at 30, 60 DAS and at harvest (22.02, 41.84 and 49.16 g/plant, respectively), number of effective tillers per plant (3.33), ear head length (18.73 cm), ear head girth (5.48 cm), test weight (12.45 g), grain yield (4310 kg/ha) and straw yield (9479 kg/ha) was recorded in treatment receiving 100 % RDF, while the lowest in the control. The reason for better growth and development under these treatments might be the increased availability of nutrients to plant through inorganic fertilizers matching to the need of crop throughout the growing season. Being a cereal crop, pearlmillet required nutrients throughout the growing season. The results obtained in the present investigation are in close conformity with the finding of Rathore *et al.,* (2006), Narolia and Poonia (2011), Kumar *et al.,* (2014b), Singh and Chauhan (2016) and Patel *et al.,* (2018) in pearlmillet, Singh *et al.,* (2017) in maize and Patidar and Mali (2004), Panwar *et al.,*(2014) in sorghum.

Further, P_2O_5 fertilization also improves the metabolic and physiological processes and thus known as “energy currency” which is subsequently used for vegetative and reproductive growth through phosphorylation. In addition to vital metabolic role, P is an important structural component of nucleic acid, phytein, phospholipids and enzymes. An adequate supply of phosphorous early in the life cycle of plant is important in laying down the primordia of its reproductive part. The present findings are in close confirmation with those of Rathore *et al.,* (2006), Chaudhary *et al.,* (2015), Patel *et al.,* (2018), Varia and Sadhu (2012) in pearlmillet, Khan *et al.,* (2015) in sweet sorghum in pearlmillet.

Biofertilizer

Plant height at 30 DAS and dry matter accumulation per plant at 30 DAS in pearl millet remained unaffected due to inoculation of biofertilizers**.** Highest plant height at 60 DAS and at harvest (87.31 and 160.17 cm, respectively), dry matter accumulation at 60 DAS and at harvest (39.31 and 46.97 g/plant, respectively), number of effective tillers per plant (3.21), ear head length (5.41 cm), ear head girth (18.05 cm), test weight (12.37 g), grain yield (3904 kg/ha) and straw yield (8704 kg/ha) was recorded with the seed inoculation with *Azotobacter*.

Increased growth and yield under the influence of *Azotobacter* inoculation might be due to the increased number of efficient and healthy strain of *Azotobacter* in the rhizosphere, which in turn resulted in better utilization of atmospheric nitrogen. These results are in close conformity with the findings of Patel *et al.,* (2014), Rinku *et al.,* (2014) in pearlmillet and Patel *et al.,* (1992), Agrawal *et al.,* (1996) in fodder sorghum.

Interaction

Application of vermicompost @ 10 tonnes/ha with 100 per cent RDF resulted in maximum plant height at harvest (176.81 cm) and dry

matter accumulation per plant at harvest (57.98 g) of pearl millet, being at par with vermicompost and 75 per cent RDF. The reason for better growth and development under these treatments might be the increased availability of nutrients to plant initially through inorganic fertilizers and then by organic manures like vermicompost matching to the need of crop throughout the growing season. Being a cereal crop, pearlmillet required nutrients throughout the growing season. Louraduraj (2006) in maize reported similar results from their experiments.

Application of vermincompost @ 10 tonnes/ha with 100 per cent RDF resulted in maximum grain yield (5871 kg/ha), straw yield (12560 kg/ha), number of effective tillers per plant (4.20), ear head length (21.39 cm) of pearlmillet, being at par with vermicompost and 75 per cent RDF in case of all yield attributes and yield except ear head length. This indicates that use of vermicompost in combination with fertility levels has beneficial effect in improving the crop yield. The beneficial response of vermicompost to yield might also be attributed to the better availability of sufficient amounts of plant nutrients throughout the growth period and especially at critical growth period of crops which has resulted in better plant vigour and superior yield attributes. These results are in line of the result of those reported by Divya *et al.,* (2017) in pearlmillet, Singh *et al.,* (2017) in maize, Sheoran and Rana (2005) in sorghum, Pawar and Patil (2007) in maize, Govindappa *et al.,* (2009) in finger millet and Chaudhary *et al.,* (2014), Shrivastava and Arya (2017, Jain *et al.,* (2018) in pearlmillet.

It could be concluded that application of vermicompost @ 10 tonnes/ha with 100 per cent RDF and inoculation of *Azotobacter* improved growth attributes, yield and yield attributes in pearl millet under the prevailing agro-climatic condition.

References

Agrawal, S. B., Dubey, K., Thakur, G. S. and Dubey, R. K. (1996). Saving of nitrogen by *Azotobacter* inoculation in forage sorghum (*Sorghum bicolor* L. Moench). *Advances Agric. Res. India.*, 5: 52-54.

Anonymous (2011). Area and production of pearl millet in India. Agricultural Statistics, Directorate of Economics and Statistics, Govt. of India

Anonymous (2013). AGRESCO report of crop production of AAU, Anand presented 9th meeting of combined joint AGRESCO of SAU's at SDAU, Sardar krushinagar. pp. 39-42.

Biri, A., Kaba, S., Taddesse, F., Dechassa, N., Sharma, J. J., Zewidie, A. and Chavhan, A. (2016). Effect of vermicompost and nitrogen application on striga incidence, growth, and yield of sorghum [*Sorghum bicolor* L. monech] in Fedis, Eastern Ethiopia. *International Journal of Life Sciences*, 4(3): 349-360.

Choudhary, R., Yadav, L. R. and Parihar, S. (2014). Studies on the interactive effect between vermicompost and fertility levels on pearl millet (*Pennisetum glaucum* L.). *Annals of Agri-Bio Research*, 19 (3): 430-433.

Choudhary, R., Yadav, L. R. and Parihar, S. (2015). Effect of vermicompost and fertility levels on growth and yield of pearl millet (*Pennisetum glaucum* L.). *Annals of Arid Zone*, 54(1&2): 59-61.

Choudhary, R., Yadav, L. R., Shivran, A. C. and Parihar, S. (2012). Effect of vermicompost and fertility levels on growth, yield, nutrient uptake and net returns in pearlmillet (*Pennisetum glaucum). Indian Journal of Agricultural Sciences*, 8: 1428-1430.

Divya, G., Vani, K. P., Babu, P. S. and Suneetha Devi, K. B. (2017). Yield

attributes and yield of summer pearlmillet as influenced by cultivars and integrated nutrient management. *International Journal of Current Microbiology and Applied Sciences*, 6(10): 1491-1495.

Govindappa, M., Vishwanath, A. P., Harsha, K. N., Thimmegowda, P. and Jnanesh, A. C. (2009). Response of fingermillet (*Eluesine coracana* L.) to organic and inorganic sources of nutrients under rainfed condition. *Journal of Crop and Weed*, 5(1): 291-293.

Jadhav, R. P., Khafi, H. R. and Raj, A. D. (2011). Effect of nitrogen and vermicompost on protein content and nutrients uptake in pearlmillet (*Pennisetum glaucum* (L.) R. Br. Emend stuntz.). *Agricultural Science Digest*, 31 (4): 319-321.

Jain, A. K., Shrivastava, S. and Arya, V. (2018). Response of organic manure, zinc and iron on soil properties, yield and nutrient uptake by pearlmillet crop grown in Inceptisol. *International Journal of Pure and Applied Bioscience*, 6(1): 426-435.

Khan, M. A. A., Rajesh, P., Reddy, A. P. K. and Krishna, A. (2015). Nutrient management in different millet crops under pongomia based agrisilvi system in semi-arid region of Telangana Stat, India. *International Journal of Tropical Agriculture*, 33(2): 1661-1667.

Kumar, P., Kumar, R., Singh, S. K. and Kumar, A. (2014[a]). Effect of fertility on growth yield and yield attributes of pearl millet (*Pennisetum glaucum* L.) under rainfed condition. *Agriways*, 2 (2): 89-93.

Kumar, P., Singh, R., Singh, A., Paliwal, D. and Kumar, S. (2014[b]). Integrated nutrient management in pearl millet (*Pennisetum glaucum*) - wheat (*Triticum aestivum*) cropping sequence in semi arid condition of India. *International Journal of Agricultural Sciences*, 10(1): 96-101.

Louraduraj, A. C. (2006). Identification of optimum quantity of vermicompost for maize under different levels of fertilization. *Journal of Ecobiology*, 18: 23-27.

Narolia, R. S. and Poonia, B. L (2011). Growth dynamics, yield and economics of pearl millet (*Pennisetum glaucum*) as influenced by vermicompost and fertilizers. *Annals of Arid Zone*, 50(2): 145-149.

Narolia, R. S., Poonia, B. L. and Yadav, R. S. (2009). Effect of vermicompost and inorganic fertilizers on productivity of pearl millet (*Pennisetum glaucum*). *Indian Journal of Agriculture Science*, 79: 506-509.

Panse, V. G. and Sukhatme, P. V. (1985). Statistical Method for Agricultural workers, I. C. A. R., New Delhi.

Panwar, D., Singh, P. and Sumeriya, H. K. (2014). Growth, dry matter partitioning and yield of sorghum [Sorghum bicolour (L) Moench] genotypes as influenced by different fertility levels. *Annals of Biology*, 30(3): 491-494.

Patel, P. C., Patel, J. R. and Sadhu, A. C. (1992). Response of forage sorghum (*Sorghum bicolor*) to bio-fertilizer and nitrogen levels. *Indian J. Agron.*, 37 (3): 466-469.

Patel, P. R., Patel, B. J., Vyas, K. G. and Yadav, B. L. (2014). Effect of integrated nitrogen management and bio-fertilizer in *Kharif* pearlmillet (*Pennisetum glaucum* L.). *Advance Research Journal of Crop Improvement*, 5(2): 122-125.

Patel, S. A., Chaudhary, P. P., Chaudhary, N. and Chaudhary, H. L. (2018). Effect of wheat residue management and fertilizer levels on growth, yield attributes and yield of summer pearl

millet [*Pennisetum glaucum* (L.) R. Br.] under north Gujarat condition. *Journal of Pharmacognosy and Phytochemistry*, 7(6): 1292-1295.

Patidar, M. and Mali, A. L. (2004). Effect of farmyard manure, fertility levels and bio-fertilizers on growth, yield and quality of sorghum (*Sorghum bicolor*). *Indian Journal of* Agronomy, 49(2): 117-120.

Pawar, R. B. and Patil, C. V. (2007). Effect of vermicompost and fertilizer level on soil properties, yield and uptake of nutrients by maize. *Journal of Maharashtra Agricultural University*, 32(1): 11-14.

Rathore, V. S., Singh, P. and Gautam, R. C. (2006). Productivity and water-use efficiency of rainfed pearlmillet (*Pennisetum glaucum*) as influenced by planting patterns and integrated nutrient management. *Indian Journal of Agronomy*, 51(1): 46-48.

Rinku, Shekhawat, P. S., Kumawat, N., Rathore, P. S., Yadav, P. K. and Om, H. (2014).Effect of nitrogen levels and biofertilizers on growth and yield of pearl millet (*Pennisetum glaucum* L.) under north western Rajasthan. *Ann. Agric. Res. New Series*, 35 (3): 311-314.

Sheoran, R. S. and Rana, D. S. (2005). Relative efficacy of vermicompost and farmyard manure integrated with inorganic fertilizers for sustainable productivity of sorghum (*Sorghum bicolor* L. Moench.). *Acta Agronomica Hungarica*, 53: 303-308.

Shrivastava, S. and Arya, V. (2017). Effect of integrated application of inorganic and organic sources of manures on test weight, length of earhead and available soil micronutrient under pearlmillet crop. *International Journal of Pure and Applied Bioscience*, 5 (5): 720-724.

Singh, L., Kumar, S., Singh, K. and Singh, D. (2017). Effect of integrated nutrient management on growth and yield attributes of maize under winter season (*Zea mays* L.) *Journal of Pharmacognosy and Phytochemistry*, 6(5): 1625-1628.

Singh, S. B. and Chauhan S. K. (2016). Effect of integrated nutrient management on pearl millet crop grown in semi-arid climate. *TECHNOFAME- A Journal of Multidisciplinary Advance*, 5(2): 54-57.

Varia, S. D. and Sadhu, A. C. (2012). Influence of row ratios and fertility levels on yield attributes and yield of pearlmillet-greengram intercropping system and nutrient status of the soil. *International Journal of Forestry and Crop Improvement*, 3(2): 144-146.

How to cite this article:

Khadadiya, M. B., A. P. Patel and Shinde, V. T. 2019. Effect of Integrated Nutrient Management on Growth and Yield Attributes of Summer Pearl Millet in South Gujarat. *Int.J.Curr.Microbiol.App.Sci.* 8(12): 1637-1645. doi: https://doi.org/10.20546/ijcmas.2019.812.197