Biological Forum – An International Journal **15(10): 562-565(2023)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Study of Integrated Nutrient Management on Growth and Yield Attributing Characters of Garden Pea (*Pisum sativus* L.)

Malothu Soniya[1*], J. Srinivas[2], J. Cheena[3], B. Naveen Kumar[4] and G. Sathish[5]

[1]M.Sc. Scholar, Department of Vegetable Science, College of Horticulture, Mojerla, SKLTSHU (Telangana), India.
[2]Assistant Professor, Department of Vegetable Science, College of Horticulture, Mojerla, SKLTSHU, (Telangana), India.
[3]Professor, Department of Vegetable Science, College of Horticulture, Rajendranagar, Hyderabad, SKLTSHU (Telangana), India.
[4]Assistant Professor, Department of SSAC, Horticulture Polytechnic College, Ramagiri Khilla, Peddapalli, SKLTSHU (Telangana), India.
[5]Assistant Professor, Department of Agricultural Statistics, PGIHS, SKLTSHU, Mulugu (Telangana), India.

(Corresponding author: Malothu Soniya)*
(Received: 04 August 2023; Revised: 27 August 2023; Accepted: 23 September 2023; Published: 15 October 2023)
(Published by Research Trend)

ABSTRACT: This study was undertaken to evaluate the integrated nutrient management on growth and yield attributes of garden pea. There are significant differences were observed in all treatments. The experiment was laid out in a randomized block design with three replications. Among the seven treatments evaluated it revealed that the maximum plant height (57.68 cm), number of branches (16.78) and number of nodes on the main branch (8.47) were recorded in the treatment T_7 – 100% RDF. The lowest number of days of first flowering recorded in the (28.88 days) and days of 50 % flowering was recorded in treatment T_3 – 75% RDF+ FYM (5t /ha) + Vermicompost (1.5 t/ha) + Azotobacter (5kg /ha). Whereas yield attributing characters, number of green pods per cluster (8.60), total number of pods per plant (16.78), Pod length (8.89cm), pod diameter was recorded (4.15 cm), 100 seed weight (29.54 g), Average pod weight (6.64g) and pod yield per plot (12.54 kg) was recorded Treatment T_3 – 75% RDF+ FYM (5t /ha) + Vermicompost (1.5 t/ha) + Azotobacter (5kg /ha).

Keywords: Garden pea, Integrated Nutrient Management, Treatments, Growth and Yield.

INTRODUCTION

The garden pea, *Pisum sativum* L., belongs to the family Fabaceae with chromosome number 2n=2x=14. The garden pea is one of the most significant and versatile legume crops. It is also one of the most nutrient-dense due to its high protein content, quality (having a good amount of essential amino acids like lysine, methionine, and leucine that the human body cannot synthesise), mineral, oil, and sugar content. The most significant off-season vegetable in the North Indian hills, it is grown as both a summer and an autumn crop, making green pods available from March onwards to the end of October, when they are not available on the lowlands. After Russia, India is the world's second-largest producer of peas.

It is an important pulse crop farmed in India. The USA, China, France, UK and other countries are important pea growers in addition to India. Uttar Pradesh, Bihar, Haryana, Punjab, Himachal Pradesh, Orissa, and Karnataka are the principal pea-growing states in India. Garden peas are grown in an area of about 551 hectares and production of 5363 Mt in India (NHB, 2017-2018).

Pea is a nutritional vegetable crop, it has a significant amount of digestible carbohydrates, protein, lipids, minerals, and vitamins. It also has a high level of antioxidant activity, it contains 2% fat, 60-65% carbohydrates, 25–28% protein, and other minerals. Lysine and tryptophan are two amino acids found in pea in large quantities like cereal grains. The seeds are free of cholesterol, abundant in fiber, and low in fat. It can be cultivated for hay, pasturage, green manure, and as a forage crop. Compared to soybean, it has 5 to 20 % fewer trypsin inhibitors. As a result, it can be fed to animals without undergoing the extrusion heating process. Pea plays a key role in promoting sustainable agriculture by maintaining soil fertility through biological nitrogen fixation in conjunction with symbiotic rhizobium present in its root nodules (Negi *et al*., 2004).

According to Pawar *et al.* (2017), it is the second most valuable legume crop in the world. The dry, green foliage is fed to cattle, and the exceptionally nutrient-dense green pods are preferred for food. According to Gopinath *et al.* (2007), this legume has a high concentration of nutrients per 100 g of edible part,

including digestible protein (7.2 g), carbs (15.8 g), vitamin A (139 I.U.), vitamin C (9 mg), magnesium (34 mg), and phosphorus (139 mg). The availability of nutrients is directly related to food production. The need for chemical fertilizers has increased as a result of the need to produce more and more food for the growing population. Despite the best use of high yielding varieties and higher volumes of chemical fertilizers, the rise of food production has slowed over the past three decades (Sharma *et al.*, 2006).

Pea is the most significant source of vegetable protein, pea enriches the soil and as it is a leguminous crop, it may not require much nitrogen. However, during the early growth and nodulation stages of the young plants, when nitrogen deficiency may manifest and the plant may suffer from nitrogen starvation, a small amount of inorganic nitrogen may be used to stimulate these processes and increase the amount of nitrogen fixed in a plant Uikey *et al.* (2015).

Garden pea has long been recognized as a restorer of soil fertility due to their unique ability of symbiotic nitrogen fixation (Rana *et al.,* 1998). This ability has made the crop one of the most important and useful components of existing cropping systems in the present context of soil fertility degradation. Improving the yield of garden pea depends on proper nutrient management and the genetic makeup of the variety.

MATERIALS AND METHOD

The experiment was carried out at Medicinal and Aromatics Plant Research Station, (MAPRS) Rajendranagar, Hyderabad. Telangana during *rabi* season 2022-2023. The experimental site falls under a semiarid tropical climate with an average rainfall of 800 mm per annum located at an altitude of 542.3 m above mean sea level at latitude of $17^0$19' and longitude of 79°23′. The mean monthly meteorological data *i.e*., rainfall, mean minimum and maximum temperature. The soil was red sand loam with a pH of 7.2 and electrical conductivity of 0.363 dsm^{-1}. the soil had having good drainage facility with low water holding capacity. The nutrient availability of nitrogen, phosphorus and potash per hectare is respectively. Arkel variety was taken for this experiment. The soil of the experiment site was black sandy loam. The soil is prepared by ploughing and at last ploughing soil enriched with well-decomposed farm yard manure @ 10 tonnes per hectare.

The seeds were mixed with sand and sown in a ridge and furrow system at a depth of 1.5 cm in rows as per the treatment. The field was irrigated immediately after sowing, by taking utmost care so that the seeds were not disturbed by the flow of water.

Farmyard manure was applied at 10 tons per hectare at the time of plot preparation and the recommended dose of NPK (25:40:50 kg ha^{-1}) was applied in the form of Urea, Single super phosphate (SSP) and Muriate of potash (MOP). Nitrogen 50 kg ha^{-1} was applied in two splits, half of the nitrogen was applied at the time of sowing and the rest at one month after sowing. The full dose of Phosphorus (40 kg ha^{-1}) and Potassium (50 kg ha^{-1}) were applied as basal.

The crop was irrigated immediately after sowing to obtain better and uniform germination. Subsequently, the irrigations were given at seven days intervals depending upon the moisture condition of the experimental plot to maintain uniform soil moisture throughout the crop growth period.

RESULTS AND DISCUSSION

A. Growth parameters

The effect of integrated nutrient management on the growth parameters of garden pea is depicted in Table 1. The results showed that the maximum amount of growth parameters like plant height (46.79 cm), number of branches per plant (18.25), number of nodes on main branch (8.47), days of first flowering (28.88) and days of 50 % flowering (33.57) were achieved in T_5 followed by T_2 and T_3 were significantly higher than the other treatments. Further, the application of vermicompost, which enables quick and larger availability of plant nutrients and so offers a better environment for root growth and proliferation, maybe the cause of the increased growth, such as increased plant height. Additionally, vermicompost produces a surface that is more nutrient-absorbent. The outcomes are consistent with what Patil *et al*. (2007) discovered with pigeon pea.

The application of organic and inorganic fertilizers contributed to higher plant height and the number of primary branches, which turned into improved yield components including the number of pods per plant, pod length and pod yield per plant.

The earlier flower bud initiation might be the result of the plant having improved nutritional condition, which led to faster vegetative development and perhaps, more photosynthesis and flowering stimulus (Anburani and Manivannan 2002). In the Dolichos bean, Mishra *et al*. (2019) also noted improved cytokinin and phosphate translocation through the xylem vessels and cytokinin and phosphorus buildup in the axillary buds, which may have favoured the plant's transition into the reproductive phase. These results are consistent with garden pea research by Thakur and Singh (2011) and pea research by Vimala and Natarajan (1999).

B. Yield attributes characters

The findings of the investigation revealed that a maximum increase in the yield parameters like number of green pods per cluster (8.60), total number of pods per plant (16.78), pod length (8.89 cm), pod diameter (4.15 cm), 100 seed weight (29.54 g), average pod weight (6.64 g), pod yield per plot (12.45 kg) and pod yield per acre (124.50 q) were attained in T_3 followed by T_1 and T_6. In the yard log bean, Sindhuja *et al.* (2021) also noted that a larger supply of N, P and K increased uptake by plants may have sped up a variety of physiological processes, resulting in longer pods. The findings agree with those of Sathe (2007); Sen and Dastidar (2010); Saikia *et al*. (2018) in the field of French bean.

The increase in yield attributing parameters observed in the treatments might bedue to the integration of organic manure with inorganic fertilizer increased availability of

nutrients and these nutrients being important constituents of nucleotides, protein, chlorophyll and enzymes involved in various metabolic processes which have a direct impact on reproductive phases of plant observed by Dubey (1997) in soybean, reported similar results with 50% RDF + FYM (5t/ha) Vermicompost (1.5t/ha) + Azotobacter (5kg/ha).

Table 1: Effect of INM treatments on the growth parameters of garden pea.

Treatments	Plant height (cm)	Number of branches per plant	Number of nodes on main branch	Days of first flowering	Days of 50 % flowering
T_1	54.12	15.36	5.21	38.45	39.53
T_2	52.23	14.36	6.77	37.37	37.34
T_3	57.68	18.25	8.47	28.88	33.57
T_4	50.12	12.47	6.49	39.87	43.51
T_5	53.48	14.89	6.55	43.82	45.36
T_6	49.99	12.06	7.28	35.20	35.38
T_7	46.79	8.91	3.79	45.79	47.56
Sem (±)	1.64	1.19	0.20	0.57	0.19
CD (P=0.05)	5.05	3.67	0.63	1.79	0.60

Table 2:Effect of INM treatments on yield attributes characters of garden pea.

Treatments	Number of green pods per cluster	Total number of pods per plant	Pod length	Pod diameter	100 seed weight	Average pod weight	Pod yield per plot (kg)	Pod yield per acre (q)
T_1	6.90	15.58	8.09	3.51	27.74	6.04	11.45	114.50
T_2	6.00	14.94	7.59	3.28	26.94	5.67	10.81	108.10
T_3	8.60	16.78	8.89	4.15	29.54	6.64	12.45	124.50
T_4	5.00	14.34	7.04	3.08	26.44	5.35	9.93	99.30
T_5	6.46	15.21	7.95	3.48	26.72	5.87	11.12	111.26
T_6	5.18	14.58	7.17	3.06	27.95	5.70	10.21	102.14
T_7	3.55	13.10	6.19	2.46	24.99	4.87	8.53	85.30
Sem (±)	0.69	0.69	0.43	0.20	0.91	0.26	0.538	1.846
CD (P=0.05)	2.12	1.90	1.34	1.34	1.81	0.82	1.657	5.688

CONCLUSIONS

It could be concluded from the present investigation that, integrated nutrient management significantly influenced the growth and yield of garden pea (Arkel). Among the different levels of integrated nutrient management maximum growth and yield of garden pea were obtained from treatment T_3 (75 % RDF + FYM (5 t/ha) + Vermicompost (1.5 t/ha) + Azotobacter (5 kg/ha).

Acknowledgement. The authors sincerely thank to J. Srinivas, J. Cheena, B. Naveen Kumar and G. Sathish for their kind help in the research work. I am highly thankful to SKLTSHU, Mulugu, Siddipet, Telangana for providing all the facilities to complete this endeavour.
Conflict of Interest. None.

REFERENCES

Anburani, A. and Manivannan, K. (2002). Effect of integrated nutrient management on growth in brinjal. *South Indian Horticulture*, *50*(4/6), 377-386.

Gopinath, K. A., Saha, S., Mina, B. L., Pande, H., Kumar, N., Srivastva, A. K. and Gupta, H. S. (2007). Yield potential of garden pea (*Pisum sativum* L.) varieties, and soil properties under organic and integrated nutrient management systems. *Archives of Agronomy and Soil Science*, *55*(2), 157-167.

Indian Horticulture Database (2017). (http://nhb.gov.in/area-pro/NHB-Database-2017. pdf

Mishra, M., Sahu, G. S., Mohanty, A., Tripathy, P., Pradhan, B. and Mallikarjun, K. (2019). Evaluation of Yield and Yield Attributing Characters in Pole Type of Dolichos Bean (*Lablab purpureus* L.). *Int. J. Curr. Microbiol. App. Sci*., *8*(8), 2074-2079.

Negi, Susheela, Singh, R. V. and Dwivedi, G. K. (2004). Effect of biofertilizers, FYM,NPK and Lime on Pea in Acidic Soil of Uttaranchal hills. *Veg. Science*, *31*, 193 -195.

Patil, S. T., Zhang, L., Martenyi, F., Lowe, S. L., Jackson, K. A., Andreev, B. V. and Schoepp, D. D. (2007). Activation of mGlu2/3 receptors as a new approach to treat schizophrenia: a randomized Phase 2 clinical trial. *Nature medicine*, *13*(9), 1102-1107.

Pawar, Y., Varma, L. R., Verma, P., Joshi, H. N., More, S. G. and Dabhi, J. S. (2017). Influences of integrated use of organic and inorganic sources of nutrients on growth, flowering and yield of garden pea (*Pisum sativum* L.) cv. Bonneville. *Legume Research*, *40*(1), 117-124.

Rana, G. L., Giuffrida, A. and Piomelli, D. (1998). Control of pain initiation by endogenous cannabinoids. *Nature*, *394*(6690), 277-281.

Saikia, J., Saikia, L., Phookan, D. B. and Nath, D. J. (2018). Effect of biofertilizer consortium on yield, quality and soil health of french bean (*Phaseolus vulgaris* L.). *Legume Research-An International Journal*, *41*(5), 755-758.

Sathe, S. K. and Venkatachalam, M. (2007). Fractionation and biochemical characterization of moth bean (*Vigna aconitifolia* L.) proteins. *LWT-Food Science and Technology*, *40*(4), 600-610.

Sen, M. and Dastidar, M. G. (2010). Chromium removal using various biosorbents. *Journal of Environmental Health Science & Engineering*, *7*(3), 182-190.

Sharma, G. D., Thakur, R., Chouhan, N. and Keram, K. S. (2006). Effect of integrated nutrient management

on yield, nutrient uptake, protein content, soil fertility and economic performance of rice (*Oryza sativa* L.) in a Vertisol. *Journal of the Indian Society of Soil Science*, *63*(3), 320-326.

Sindhuja, G., Kiran Patro T. S. K., Salomi Suneetha, D. R., Emmanuel, N. and Chennkesavulu, B. (2021). Effect of integrated nutrient management on yield and yield attributes of yardlong bean (*Vigna unguiculata* (L.) Walp. ssp. *sesquipedalis* verdc.) *Journal of Pharmacognosy and Phytochemistry*, *10*(2), 765-767.

Thakur, N. and Singh, N. (2011). Biochemical Evaluation and Molecular Characterization of Garden Pea (*Pisum sativum* L.) Genotypes. *Indian Journal of Agricultural Biochemistry*, *24*(1), 49-54.

Uikey, V., Verma, H. and Nawange, D. (2015). Influence of organic, chemical and biofertilizers on growth and yield of pea. *Agric. Sci. Digest*, *35*(3), 237-240.

Vimala, B. and Natarajan, S. (1999). Studies on the effect of N, P and biofertilizers on growth, flowering and yield of pea (*Pisum sativum* L. ssp. *hortense*). *South Indian Horticulture*, *47*(1/6), 61-64.

How to cite this article: Malothu Soniya, J. Srinivas, J. Cheena, B. Naveen Kumar and G. Sathish (2023). Study of Integrated Nutrient Management on Growth and Yield Attributing Characters of Garden Pea (*Pisum sativus* L.). *Biological Forum – An International Journal*, *15*(10): 562-565.