The Pharma Innovation Journal 2022; 11(6): 1290-1293

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(6): 1290-1293

www.thepharmajournal.com
Received: 07-04-2022
Accepted: 16-05-2022

Roopali Patel
Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh, India

Vandna
Assam Agricultural University, Jorhat, Assam, India

Corresponding Author:
Roopali Patel
Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh, India

Effect of different level of nitrogen on growth yield and quality of Raddish (*Raphanus sativus* L.) under Gwalior region of Madhya Pradesh

Roopali Patel and Vandna

Abstract
Radish (*Raphanus sativus* L.). is annual or biennial herb, belongs to cruciferae family and can be considered as an annual as well as a biennial crop. Radish being short duration crop, judicious and proper use of plant growth regulator (GA3) is very essential to get maximum and excellent root quality and yield. The growth regulator different ways but generally seed treatment adapted. The role of nitrogen acceptable as It is a necessary component of protein nucleic acids, chlorophyll and certain important enzymes. On the other hand, deficiency of nitrogen in soil results into poor crop yield with low quality. While, excessive use of negatively affects the quality as well as yield of agricultural crops. Keeping the above fact view, an experiment entitled "Effect of different nitrogen level and gibberellic acid on growth, yield and quality of radish (*Raphanus sativus* L.)" was planned to conducted at Research field with 3 different level of nitrogen. Results revealed that the treatment Application of 120 kg N/ha with produced maximum yield, gross as well as net income and B:C ratio along with superior growth and yield character to rest of the treatment followed by application of 120 kg N/ha.

Keywords: Radish, different level of Nitrogen

Introduction
Radish (*Raphanus sativus* L.). is annual or biennial herb. belongs to cruciferae family and can be considered as an annual as well as a biennial crop. It is an ancient as well as popular vegetable of tropical and temperate regions of the world, widely used as root vegetable, tender leaves and shoots as green (Alam *et al*., 2010) [2]. The juice of fresh leaves is useful as diuretic and laxative. It is available at a cheaper price for the poor people.
Itisarootcumleafyvegetablesuitablefortropicalandtemperateclimate.Theleavesandrootsareconsumedbothassaladandascookedvegetable Theradishrootsaregoodappetizer.Thedifferentpreparationofradishareusefulincuringliverandgallbladderproblems.Roots are used in treating urinary complaint and piles. The juice of fresh leaves is useful as diuretic and laxative. It is available at a cheaper price for the poor people (Sankari *et al*., 2006) [33]. It is an excellent source of carbohydrates protein and vitamins A & C (Bakhsh *et al*., 2006) [7]. In India, radish is grown on an area of 0.17 million hectares with a total production of 2.4 million tons (Annon., 2015) [4] Among macro nutrients nitrogen plays a vital role in the growth and development of plants. It is an essential constituent of metabolically active compounds like protein, nucleic acids, chlorophyll and enzymes etc. When nitrogen is deficient in soil, the harvest is poor in size, weight and quality (Hussain *et al*., 1997) [13].
Nitrogen fertilization is widely adopted to enhance crop production and improve nitrogen utilization all over the world (Eugenius, *et al*., 2011) [31]. Among the factors deciding about successful cultivation of this vegetable nitrogen fertilization is of a special meaning and application level of this element should be targeted not only on the yield size, but, first of all, yield (Kowalaska *et al*., 2006) [19]. If ammonium form is applied (ammonium sulfate) or amide form (Urea), nitrate content in radish roots is usually lower than that of nitrate from introduced (Michalojc 2001).

Materials and Methods
The present experiment conducted at research farm of college of agriculture Gwalior. The average rainfall of district is 751.5 mm. The experiment comprises with three levels of each factor i.e. nitrogen (80,100 and 120 kg/h) with three replication and randomized block design.

All the agronomic operations were practices as per recommended and treatments were applied on time.

Results and Discussion

Growth parameter: The tallest plant (3.36, 16.70, 42.93, 51.49 and 62.54) were recorded with the 120kg of nitrogen at 10, 20, 30 40 and 50 DAS, respectively. The highest number of leaves per plant (4.27, 7.06, 10.09, 10.98 and 14.00) was obtained 120 kg nitrogen/ha at 10, 20, 30, 40 and 50 DAS, respectively. It was at significantly superior over all other nitrogen level tested during experiment.

The maximum leaf length (3.07, 11.66, 29.49, 35.67 and 49.80 cm) at 10, 20, 30, 40 and 50 days after sowing were recorded in the 120 kg nitrogen/ha at all the crop growth stages resulted in significantly longest leaf over other nitrogen levels tes The findings in regard to the effect nitrogen on growth characters confirm earlier results of Singh *et al*. (1990), Yi *et al*. (1992), Abdel (1996), Pawar *et al*. (1997), Singh and Rajodia (2001) [35], Dhariwal (2005), Mitra and pathak (2005), Mukharjee and Roy (2006) Jatav (2007) and Karuppaiah *et al*. (2007) [34, 37, 1, 27, 35, 11, 21, 23, 15, 17].

Yield and yield attributes

Increase in Nitrogen level the fresh weight of leaves per plant weight of leaves per plant was maximum 243.56gm with 120kg.

The maximum root length was obtained in the120kg nitrogen/ha. However, the minimum root length was recorded 80kg N 27.32 cm. The root length of radish was increased with the increment of nitrogen level.

The maximum dry weight of root (312.66 g) was recorded in application of 120kg nitrogen/ha. However, the minimum was recorded in 80 kg N/ha (208.32 gm). The maximum diameter of root was obtained in the 120kg nitrogen/ha (6.18 cm). However, the minimum root length was recorded in 80kg N (5.42 cm). The maximum yield gm per plant, kg per plot and q/ha was recorded through the application of the 120kg/ha N i.e. 480 gm/plant, 32.17 kg/plot and 579.03 q/ha.

Yield attributing characters *viz*., Fresh weight of leaves (gm), Length of root (cm.), Fresh weight of root (g), Diameter of root (cm) and Yield of root (q/ha) respective significantly influenced by the various Nitrogen levels.

Yield of radish was highest (73.92 t/ha) when the crop sown with 120 kg N/ha, this increase in yield as well as yield attributes by Nitrogen due to increase vegetative growth and foliage giving better opportunities for photosynthetic activities and consequently increasing carbohydrates in the root resulting high yield. The positive response of nitrogen application to radish is also recorded. The higher root weight in radish might be result of on time, balanced nutrition of the crop, use of recommended cultural practices including proper plant spacing and sowing time which produced healthy, vigorous plants Mishra (1989), Singh *et al*. (1990) [34], Deore and Bharud (1991), Nirmal *et al*. (1994), Pawar *et al*. (1997) [30], Shakada and Gajipara (1998), Singh and Rajodia (2001) [35], Dhariwal (2005) [11] Karuppaih *et al*. Ganpathi *et al*. (2008) Pervez *et al*. (2004) [22, 34, 10, 24, 30, 32, 35, 11, 12, 16] reported maximum root length in radish when 200 kg N per hectare was applied. Muthuswamy and Muthukrishnan (1984) also reported that root diameter of radish markedly increased with nitrogen application. The reason for maximum root diameter in plots receiving more nitrogen may be due to the fact that these plants were more healthy and vigorous than others. Higher marketable root yield was also obtained with higher nitrogen levels.

Table 1: Plant height as influenced by different treatment of Nitrogen level and at successive crop growth stages

Treatment	Plant Height at Different Growth Stages				
	10 DAS	20 DAS	30 DAS	40 DAS	50 DAS
Nitrogen level					
N1	1.76	8.31	18.89	28.63	42.92
N2	2.97	16.01	37.19	47.53	58.24
N3	3.36	16.70	42.93	51.49	62.54
S.Em +	0.065	0.226	0.826	0.863	0.756
CD@5%	0.195	0.679	2.478	2.589	2.267

Table 2: Number of leaves per plant as influenced by different treatment Nitrogen level at successive crop growth stages

Treatment	Number of leaves at Different Growth Stages				
	10 DAS	20 DAS	30 DAS	40 DAS	50 DAS
Nitrogen level					
N1	2.94	5.52	8.42	8.69	10.97
N2	3.46	5.83	9.59	10.75	12.04
N3	4.27 7	7.06	10.09	10.98	14.00
S.Em +	0.157164	0.144739	0.23044	0.220846	0.300379
CD@5%	0.471199	0.433948	0.690891	0.662125	0.900577

Table 3: Length of leaves per plant as influenced by different treatment of Nitrogen level at successive crop growth stages

Treatment	Length of leaves at Different Growth Stages				
	10 DAS	20 DAS	30 DAS	40 DAS	50 DAS
Nitrogen level					
N1	1.76	8.31	18.89	28.63	42.92
N2	2.16	8.87	19.95	32.50	45.43
N3	3.07	11.66	23.90	35.67	49.80
S.Em +	0.127	0.26	0.542	0.824	1.070
CD@5%	0.383	0.793	1.626	2.472	3.210

Table 4: Length of root (cm), Fresh weight of roots (gm) Diameter of Root (cm) and Fresh weight of leaves (gm)as influenced by different treatment Nitrogen level at harvest

Treatment	Length of root (cm))	Fresh weight of roots (gm)	Diameter of Root (cm)	Fresh weight of leaves (gm)
Nitrogen level				
N1	27.32	208.32	5.42	150.78
N2	29.72	265.01	5.82	189.44
N3	34.74	312.66	6.18	8.471926
S.Em +	0.711	12.99	0.078	8.471926
CD@5%	2.133	38.95	0.234	25.39996

Conclusion

On the basis of present investigation it can be conducted that the treatment application of 120 kg N/ha with produced maximum yield, gross as well as net income and B:C ratio along with superior growth and yield character to rest of the treatment followed by application of 120 kg N/ha.

References

1. Abdel RAH. Effect of N-fertilizer levels and gibberellic acid concentration on carrot yield in sandy soils Alexandria J Agri. Res. 1996;41(2):379-388.
2. Alam MK, Farooque AM, Nuruzzaman M, Jamal Uddin AFM. Effect of sowing time on growth and yield of three radish (*Raphanus sativus* L.) varieties. Bangladesh Research Publications Journal. 2010;3(3):998-1006.
3. Anon. Statistics of Pakistan. 2005-2006 Government of Pakistan Ministray of food and Agriculture and livestock (Economics wing), 2006.
4. Anonymous. Indian Horticulture Database, NHB, Gurgaon, India, 2015.
5. Asghar HN, Ishq MZA, Zahir ZA, Khalid M, Arshad M. Response of bradishto integrated to use of nitrogen fertilizer and recycled organic waste Pakistan journal of Botanay. 2006;38(3):691-700.
6. AOAC. Official method of Analysis of the association of official Agriculture chemists. Edn, 14. Association of official Agriculture chemists, D.C., USA, 1984.
7. Bakhsh KB, Ahmad Z, Hassan S. Estimating indicators of higher yield in radish cultivation. International Journal of Agriculture and Biology. 2006;8(6):783-787.
8. Bahudar A, Maurya VN. Effect of GA_3 and foliar seedling of urea on bulb production of onion (*Allium cepa*). Veg. Sci. 2001;28(1):90-91.
9. Backman GE. The application of the concept of growth analysis to the assessment of productivity. UNESCO Paris, 1968, 112-116.
10. Deore BP, Bharud RW. Effect of growth substance on growth and yield of onion (*Allium cespa* L,) cv. N-2-4-1. Maha. J Hort. 1991;5(2):64-67.
11. Dhariwal KS. Effect of plant growth regulator on growth and yield of Radish (*Raphsnus sativus* L.) Var. Japanese white. M.Sc. (Ag) Thesis, JNKVV, Collage of Agriculture, Gwalior, 2005.
12. Ganpathi M, Hiremath SM, Uppar DS, Cheeti MB, Koti RV. Influnces of oragnics, plant growth regulator and micronutrient on yield and yield component in carrot. Int. J PI. Sci. 2008;3(2):342-344.
13. Hussain I, Haq I, Sajid M, Rehman A. Effect of nitrogen alone and in comibination with constant of potassium on yield of radish J Agric. 1997;13:39-43.
14. Jackson CS. Soil chemical analysis. Prentice Hall of India Pvt. Ltd. New Delhi, 1950, 183S.
15. Jatav BS. Effect of different plant growth regulators on growth and yield of radish (*Raphanus sativus* L.). Thesis M.Sc. (Ag), college of agriculture Gwalior, JNKVV, 2007.
16. Jatav MK, Sharma RP, Kumar M, Trehan SP. On potassium content in two root crops under nitrogen fertilization. International Journal of Environmental Sciences. 2011;2(2):1030-1038.
17. Karuppaiah P, Kumar SR, Sendhinathan R. Effect of growth regulator on growth, Physiological and yield attributes of radish. Advances in plant science. 2007;20(2):457-459.
18. Kovacik P. Effect of Nitrogenous nutrition and sucrose foliar application on yield parameter of radish. Zahradhictvi-Horti. Sci. 1999;26(3):97-102.
19. Kowalska I, Sady W, Shura A. Effect of nitrogen fertilizer foliar feeding and place of cultivation on the yield and quality of lettuce. Acta Agrophysica. 2006;7(3):619-631.
20. Majkowaska Gadomska J, Wierzbicka B. Effect of growing cycle on the yield and nutritive vaule of radish roots Sodininkyste-ir-Darzininkyste. 2005;24(3):221-226.
21. Mehta SK, Patnayak CP. Studied on growth hormone (GA_3) on growth yield attributes of radish var. Pusa Deshi. Ad. P. Sci. 2005;24(2):121-126.
22. Mishra MP. Efficiency of growth regulators and insecticide on the yield of radish. M.Sc. (Ag) Thesis submitted to the Collage of Agriculture, J.N.K.V.V., Rewa (M.P.), 1989.
23. Mukaherlee DK, Roy MC. Effect of seed treatment gibberellic acid on germination, growth and yield of radish (*Raphanus sativus* L.) Ad. Hort. J. BCKVV. 2006;181(2):115-117.
24. Nirmal SV, Deore BP, Patil RC. Effect on growth substance on yield and yield attributing traits in onion. J of Maha. Agri. Univ. 1994;19(1):136-137.
25. Nishijima T. Gibberellin physiological and control of flowering and bolting of Japnese radish (*Raphanus sativus* L.) Bulletin of the National RES. Institute of vegetable, Ornamental Plant and Tea. 2000;15:135-208.
26. OLSEN SR, Cole CV, Watanble FS, Dean LA. Estimation of available phosphorus in soil with sodium bicarbamate. In: Black, C.A. eds, Method of Soil analysis, Part 2, Am. Soc. Agron., Inc Madicon, USA, 1954, 1044-1046.
27. Pawar PR, Joshi AT, Mahakal KG. Effect of seed treatment with gibberellic acid on germination, growth and yield of radish (*Raphanus sativus* L.). J Maharastra Agril. Univ. 1997;2(1):63-64.
28. Panwar AS, Balyan JS, Verma. Yield and quality of radish (R S.) as affected by fertility level and Bifertilizer Indian J Agron. 2000;45(4):822-826.
29. Parvez MA, Ayab CM, Saleem BA, Virak NA, Mahmood N. Effect of nitrogen level and spacing on growth and yield of radish (*Rapahnus sativus* L.). International Jouranal of Agriculture and Biology. 2004;06(3):504-506.
30. Pawar PRY, Joshi AT, Mahakal KG. Effect of seed treatment with gibberellic acid on germination, growth and yield of radish (*Rastra agriaphanus sativus* L.). J Maharastra Agril. Univ. 1997;2(1):63-64.
31. Piotr C, Eugeniusz K. The effect of nitrogen fertilization on radish yielding. Acta. Sci. Pol. Hortorum Cultus. 2011;10(1):23-30.
32. Shakhada VP, Gajipara NN. A note on influence of IAA, IBA and GA3 ongrowth and yield of onion (*Allium cepa* L.) Veg. Sci. 1998;25:185-186.
33. Sankari S, Gopi R, Gomathinayagam M, Sridharan R, Somasundaram R, Somasundaram R, *et al*. Responses of triazoles on growth and antioxidant levels in white radish. Indian J Appl Pure Biol. 2006;21:77-80.
34. Singh Mahabir, Singh BRS, Chattarjei P. Effciency of different method of nitrogen application along growth regulator on growth and yield attributes of radish (*Raphanus sativus* L.). Science and Culture. 1990;56(3):127-129.
35. Singh Mahabir, Rajodia RB. Effect of gibberellic acid on growth and yield attributes of radish varieties. Crop Res. Hisar. 2001;21(2):174-177.

36. Singhvi NR, Chturvedi HK. Effect of presoaking seed treatment with Azospirillium and Gibberellic acid on growth and yield of radish. South Indian Hort. 1990;41(4):212-213.
37. Yi YB, Ku WS, Yang SJ. Growth of leaves and development of root in radish (*Raphanus sativus* L.). role of gibberellic acid. J of the Korean Soc. Hort. Sci. 1992;33(2):235-243.