



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; 11(9): 756-758
© 2022 TPI
www.thepharmajournal.com
Received: 16-06-2022
Accepted: 17-08-2022

Kiranjeet Kaur
Department of Agriculture,
GSSDGS Khalsa College,
Patiala, Punjab, India

Harpreet Kaur
Assistant Professor, Department
of Agriculture, GSSDGS Khalsa
College, Patiala, Punjab, India

Production potential of knol-khol (*Brassica oleracea* L. var. *gongylodes*) as influenced by manures and chemical fertilizers

Kiranjeet Kaur and Harpreet Kaur

Abstract

The field experiment was carried out at Campus for Research and Advanced Studies, Dhablan, PG Department of Agriculture, GSSDGS Khalsa College, Patiala during the *Rabi* season in 2021-2022. The field experiment was laid out in randomized block design with comprising of three replications and eleven treatments. In case of different treatments, maximum growth parameters such as plant height (51.07cm), leaf length (36.27cm), leaf breadth (23.16cm), number of leaves plant⁻¹ (19.64), plant spread (49.26cm), fresh weight of knob with leaves (395.11g), dry weight of knob with leaves (131.71g) and yield parameters i.e. diameter of knob (10.54cm), volume of knob (124.42cm³), knob yield plot⁻¹ (11.26 kg plot⁻¹), total yield (198.53 q ha⁻¹) were observed from the treatment T₁₁: 75% RDF + 7 t ha⁻¹ FYM + 1 t ha⁻¹ vermicompost + 3 t ha⁻¹ poultry manure and was significantly superior over the other treatments. The lowest growth and yield was obtained from the treatment T₁ (control).

Keywords: Knol-khol, manures, chemical fertilizers, growth, yield

Introduction

Knol-khol (*Brassica oleracea* L. var. *gongylodes*) is the member of the cole crops belongs to the family Brassicaceae. Kohlrabi is a combination of German word 'kohl' meaning 'cabbage' and 'rabi' meaning 'turnip'. Edible part of knol-khol is swollen stems called as 'Knob' which develops entirely above the ground (Dhaliwal 2020) [3]. Knol-khol is mainly grown in the Mediterranean region, North America, Japan and India. In India, the cultivation of knol-khol is popular in Kashmir valley, Uttar Pradesh, Maharashtra, Assam, Punjab, Himachal Pradesh and some part of South India (Mishra *et al.* 2014) [7].

It contains sulphoraphanes and other isothiocyanates which are believed to stimulate the production of protective enzyme in the human body (Mishra *et al.* 2012) [6]. It has various medicinal properties to cure the many diseases such as asthma, cancer, skin problems, weight loss, diabetes etc. (Chauhan *et al.* 2016) [2].

The inorganic fertilizers are required in smaller amount and easy to store and apply readily to the soil as compare to the organic fertilizers. They do not depend on the activity of microbes to release the nutrients. Knol-khol responds greatly to the essential nutrients like NPK in respect of its growth and yield (Thompson and Kelly 2007) [11]. The organic manure have many advantages in the production of knol-khol as it reduces the soil erosion, increase the water holding capacity, improves the soils physical, chemical and biological properties. It can be maintained by the use of organic manures such as farmyard manure, poultry manure, vermicompost. Due to these various beneficial effects the organic manures should be used in abundance (Sahai 2010) [9]. The combined application of both organic and inorganic fertilizers in optimum quantity which helps to maintain the soil fertility and sustained a higher level of productivity (Islam *et al.* 2020) [4].

Materials and Methods

The experiment conducted during the *Rabi* season in the year 2021-2022 at the Campus for Research and Advanced Studies, Dhablan, PG Department of Agriculture, GSSDGS Khalsa College, Patiala. The experiment was laid out in Randomized Block Design (RBD) with 11 treatments and each treatment was replicated three times. The soil of the experimental field was clayey in texture having pH 8.2 (alkaline), organic carbon 0.65% (medium), available nitrogen 551.93kg ha⁻¹ (medium), phosphorous 22.6kg ha⁻¹ (medium) and available potassium 129kg ha⁻¹ (low).

Corresponding Author:
Harpreet Kaur
Assistant Professor, Department
of Agriculture, GSSDGS Khalsa
College, Patiala, Punjab, India

All the organic manures viz. vermicompost, poultry manure and farmyard manure was applied 10 days prior to the transplanting while all the chemical fertilizers viz. nitrogen in the form of urea, phosphorous in the form of single super phosphate and potash in the form of mutate of potash, was applied at the time of transplanting. The recommended dose of NPK is 75:60:60kg ha⁻¹.

The nursery raising was done on 25th September and the healthy, disease free seedlings was transplanted on 26th October. The seedlings should be transplanted at the spacing of 30 × 45 cm. Irrigation should be done immediately after transplanting. As it is a winter season crop it requires the less irrigations. Weeding should be done after 15 DAT with the help of khurpi while the minor weeds were removed

manually. The data was taken from each plot from randomly selected 5 plants after every 15 days of interval i.e 15, 30, 45 DAT and at harvest.

Details of layout

Experimental design	Randomized Block Design
No. of replications	3
No. of treatments	11
Total number of plots	33
Spacing	45 × 30 cm
Gross plot size	3.15 m × 2.4 m
Net plot size	2.7 m × 2.10 m
Variety	Early White Vienna

Treatment Details

T ₁	Control
T ₂	75 % RDF
T ₃	100 % RDF
T ₄	10 t ha ⁻¹ FYM + 1.5 t ha ⁻¹ Vermicompost
T ₅	10 t ha ⁻¹ FYM + 1.5 t ha ⁻¹ Vermicompost + 3 t ha ⁻¹ Poultry manure
T ₆	75 % RDF + 10 t ha ⁻¹ FYM
T ₇	75 % RDF + 1.5 t ha ⁻¹ Vermicompost
T ₈	75 % RDF + 4 t ha ⁻¹ Poultry manure
T ₉	75 % RDF + 20 t ha ⁻¹ FYM
T ₁₀	75 % RDF + 3 t ha ⁻¹ Vermicompost
T ₁₁	75 % RDF + 7 t ha ⁻¹ FYM + 1 t ha ⁻¹ Vermicompost + 3 t ha ⁻¹ Poultry manure

Results and Discussion

Response of manures and chemical fertilizers on growth parameters of knol-khol: The effect of manures and chemical fertilizers on the growth attributing characters of knol-khol are presented in Table 1. Treatment T₁₁ (75 % RDF + 7 t ha⁻¹ FYM + 1 t ha⁻¹ vermicompost + 3 t ha⁻¹ poultry manure) shows the maximum plant height (51.07 cm), leaf length (36.27cm), leaf breadth (23.16cm), No of leaves plant⁻¹ (13.11) and plant spread (49.26cm) which was at par with the treatment T₁₀(75 % RDF + 3 t ha⁻¹ Vermicompost). While, the minimum plant height (38.12cm), leaf length (23.13cm), leaf

breadth (13.42cm), no. of leaves plant⁻¹ (13.11) and plant spread (38.70cm) was observed in treatment T₁ (Control). This might be due to the balanced dose of nutrients increases the availability of beneficial nutrients and nitrogenous compounds which increases the vegetative growth of the plant. And it increases the photosynthesis activity in the plants which ultimately induces the growth parameters. The observations recorded with respect to the growth parameters was elaborated by Mishra *et al.* (2014) [7] in knol-khol, Babychand *et al.* (2017) [1] and Mohanta *et al.* (2018) [8] in broccoli.

Table 1: Effect of manures and chemical fertilizers on growth parameters of knol-khol

Treatments	Plant height (cm)	Leaf length (cm)	Leaf breadth (cm)	No. of leaves plant ⁻¹	Plant spread (cm)
T ₁	38.12	23.13	13.42	13.11	38.70
T ₂	42.96	28.92	16.07	16.21	41.54
T ₃	43.32	30.56	16.24	17.47	41.86
T ₄	39.98	26.31	14.32	14.12	40.11
T ₅	41.27	27.83	15.96	15.73	41.05
T ₆	44.91	31.16	17.47	17.52	42.75
T ₇	46.17	33.89	19.25	18.23	44.98
T ₈	48.39	34.46	20.51	18.79	46.36
T ₉	45.23	32.26	18.74	17.73	43.27
T ₁₀	49.35	34.78	21.64	18.86	47.84
T ₁₁	51.07	36.27	23.16	19.64	49.26
SE (m) ±	0.86	0.87	0.79	0.38	0.74
CD 5 %	1.78	1.82	1.65	0.79	1.55

Response of manures and chemical fertilizers on yield parameters of knol-khol

The data regarding yield parameters illustrated in Table 2. Among all the treatments T₁₁ (75% RDF + 7 t ha⁻¹ FYM + 1 t ha⁻¹ vermicompost + 3 t ha⁻¹ poultry manure) gives the maximum knob diameter (10.54cm), volume of knob (124.42cm³), fresh weight of knob with leaves (395.11 g), dry weight of knob with leaves (131.71g), knob yield (11.26kg

plot⁻¹), total yield (198.53 q ha⁻¹) which was at par with the treatment T₁₀ (75% RDF + 3 t ha⁻¹ Vermicompost). However, the lowest diameter of knob (5.23cm), volume of knob (99.46 cm³), fresh weight of knob with leaves (292.74g), dry weight of knob with leaves (96.43g), total yield (112.69 q ha⁻¹) was recorded from treatment T₁ (Control). With the application of nitrogen from both manures and chemical fertilizers macro and micro nutrients are easily available in the soil that

produces the higher yield parameters. And also the balanced dose of nutrients especially nitrogen, phosphorous and potassium plays major role to continue the normal metabolic processes of the plant which leads to the growth of the plant and the meristematic tissues that ultimately enhances the

vegetative as well as reproductive development of the plant. Similar results with respect to the yield parameters were given by Kumar *et al.* (2018)^[5], Shah *et al.* (2019)^[10] in knol-khol, Islam *et al.* (2020)^[4] in knol-khol.

Table 2: Effect of manures and chemical fertilizers on the yield attributes of knol-khol.

Treatments	Diameter of knob (cm)	Volume of knob (cm ³)	Fresh wt. of knob with leaves (g)	Dry wt. of knob with leaves (g)	Knob yield plot ⁻¹ (kg plot ⁻¹)	Total yield (q ha ⁻¹)
T ₁	5.23	99.46	292.74	96.43	6.39	112.69
T ₂	6.89	113.43	351.74	118.37	8.96	158.02
T ₃	7.04	115.34	362.46	121.32	9.98	176.01
T ₄	6.54	105.46	305.29	101.59	8.05	141.97
T ₅	6.68	109.37	346.31	115.36	8.43	148.67
T ₆	7.17	116.25	365.43	121.62	9.22	162.61
T ₇	8.95	119.46	375.33	124.71	10.08	177.77
T ₈	9.12	122.79	382.75	127.37	10.44	185.12
T ₉	7.27	117.37	368.37	121.47	9.69	170.89
T ₁₀	9.38	123.11	393.89	129.87	10.95	187.85
T ₁₁	10.54	124.42	395.11	131.71	11.26	198.53
SE (m) ±	0.69	0.87	0.95	0.90	0.44	6.53
CD 5 %	1.45	1.82	1.99	1.87	0.93	13.63

Conclusion

On the basis of above findings of present study it can be concluded that treatment T₁₁ (75 % RDF + 7 t ha⁻¹ FYM + 1 t ha⁻¹ vermicompost + 3 t ha⁻¹ poultry manure) was most superior over all the other treatments for growth and yield parameters. As the combined application of both manures and chemical fertilizers in optimum quantity helps to maintain the soil fertility and provides favorable conditions for the proper growth of the plant.

Reference

- Babychand M, Haripriya K, Anuja S. Effect of nutrient management on growth parameters in knol-khol (*Brassica oleracea* L. var. *gongylodes*). International Journal of Agricultural Sciences. 2017;13(1):46-48.
- Chauhan ES, Tiwari A, Singh A. Phytochemical screening of knol-khol (*Brassica oleracea* L. var. *gongylodes*) Powder and Juice. International Journal of Home Science. 2016;2(3):123-126.
- Dhaliwal MS. Handbook of vegetable crops. 2020, Pp: 173-176. Kalyani Publisher Ludhiana.
- Islam Md. A, Kabir Md. Y, Shuvra NT, Islam Md. Amirul, Hera Md. HR. Effect of different organic manures and fertilizers on growth and yield of knol-khol (*Brassica oleracea* L. var. *gongylodes*). Malaysian Journal of Halal Research Journal. 2020;3:2.
- Kumar M, Singh V, Rana DK, Shah KN. Effect of integrated nutrient management on various horticultural traits of knol-khol (*Brassica oleracea* L. var. *gongylodes*) cv. White Vienna under Garhwal Hills. Journal of Pharmacognosy and Phytochemistry. 2018;7(1):2285-2288.
- Mishra PP, Das AK, Battanayak SK, Ray M, Mishra N. Productivity, nutrient uptake and recovery by knol-khol crop under the influence of INM. International Journal of Tropical Agriculture. 2012;33(4):1-4.
- Mishra PP, Das A, Mishra N. Effect of integrated nutrient management on yield, quality and economics of knol-khol (*Brassica oleracea* L. var. *gongylodes*). The Asian Journals of Horticulture. 2014;9(2):382-385.
- Mohanta R, Nandi AK, Mishra SP, Pattnaik A, Hossain MM, Padhiary AK. Effect of integrated nutrient management on growth, yield, quality and economics of sprouting broccoli. Journal of Pharmacognosy and Phytochemistry. 2018;7(1):2229-2232.
- Sahai VN. Soil at a Glance. 2010, Pp: 164-165. Kalyani publisher New Delhi.
- Shah KN, Chaudhary IJ, Rana DK, Singh V. Growth, yield and quality of knol-khol (*Brassica oleracea* L. var. *gongylodes*) as affected by fertilizer management. Fundamental and Applied Agriculture. 2019;4(3):959-969.
- Thompson HC, Kelly WC. Vegetable production. McGraw Hil Book Co. New York; c2007, p. 230-300.