



International Journal of Research in Agronomy

E-ISSN: 2618-0618
P-ISSN: 2618-060X
© Agronomy
NAAS Rating: 5.20
www.agronomyjournals.com
2025; 8(6): 984-987
Received: 21-04-2025
Accepted: 23-05-2025

Khoda Tagur
Himalayan University, Jollang,
Itanagar, Arunachal Pradesh,
India

Lipi Rina
Himalayan University, Jollang,
Itanagar, Arunachal Pradesh,
India

Kasinam Doruk
Himalayan University, Jollang,
Itanagar, Arunachal Pradesh,
India

Khoda Tading
Himalayan University, Jollang,
Itanagar, Arunachal Pradesh,
India

Hari Phassang
Himalayan University, Jollang,
Itanagar, Arunachal Pradesh,
India

Vishal Chetry
Himalayan University, Jollang,
Itanagar, Arunachal Pradesh,
India

Corresponding Author:
Khoda Tagur
Himalayan University, Jollang,
Itanagar, Arunachal Pradesh,
India

Effect of root bio-stimulant and organic foliar spray on growth of mustard (*Brassica juncea* L.)

Khoda Tagur, Lipi Rina, Kasinam Doruk, Khoda Tading, Hari Phassang and Vishal Chetry

DOI: <https://www.doi.org/10.33545/2618060X.2025.v8.i6l.3165>

Abstract

A field experiment was conducted to find out Effect of Root bio-stimulant and Organic Foliar Spray on growth and yield of mustard (*Brassica juncea* L.) with seven treatments in rabi 2024. with root bio-SOMRE and mycorrhizae and organic foliar spray of (5% vermiwash, 5% panchgavya and 10% jeevamrut) at the Himalayan university field, Department of Agronomy, Himalayan University, Jollang. By all these finding the maximum height findings was recorded significantly higher viz., 181.33 cm, number of leaves were seen significantly higher viz., 82.27 cm, maximum Dry weight was recorded (90.33 g/day), maximum crop growth rate recorded (0.60 g/day/m²) and maximum relative growth rate recorded (0.07 g/g/day) with the application treatment of mycorrhiza and 5% panchgavya. Gross return 132600.00 INR ha⁻¹, net return 94914.00 INR ha⁻¹ and B:C ratio 3.51 was recorded in treatment with the application treatment of mycorrhizae and 5% panchgavya. was more productive and economically feasible.

Keywords: Mustard, mycorrhizae, 5% panchgavya, plant growth

Introduction

Oil seeds have prestigious place in Indian agriculture next to cereals. Oilseeds are the most important crops in India both in respect of remunerative return per unit area and wider adaptability under constrained Agri- climatic conditions. India is world's fourth largest edible oil economy after the U.S., China and Brazil, and is the second largest importer after China. India is the largest rapeseed- mustard growing country in the world occupying the first position in area and second position in production after China. Indian mustard (*Brassica juncea* L.) commonly known as raya, rai or laha is an important oilseed crop, among the brassica group of oilseeds in India. It is the third important oilseed crop in the world after soybean (*Glycine max*) and palm (*Elaeis guineensis* J.). The area, production and productivity of mustard in India is 5.96 million ha, 8.32 million tons and 1397 kg ha, respectively (Anonymous, 2019). Indian mustard is predominantly cultivated in Rajasthan, Uttar Pradesh, Haryana, Madhya Pradesh and Gujarat, also grown under some non-traditional areas of South India including Karnataka, Tamil Nadu and Andhra Pradesh. However, Indian mustard occupies the largest area in Uttar Pradesh.

India has a wide range of agroclimatic conditions for growing mustard, from highlands in the northeast and northwest to lowlands with timely sowing, salty soils, rain-fed crops, and mixed cropping systems. Currently, mustard farming is expanding into new ecosystems and accounts for about 11.75 million tonnes, or 27.8%, of India's total oil seed production. Nevertheless, with an average productivity of 1230 kg/ha, much less than the global average productivity, this output is produced on just 25% (9.17 million hectares) of India's total oil-seed farmed area (DACNET, 2023).

A root bio-stimulant is a synthetic or natural substance that improves root development and function to stimulate plant growth. These stimulants help plants tolerate environmental stressors, strengthen their root systems, and enhance nutrient absorption. Humic acids, seaweed extracts, vitamins, amino acids, and good microorganisms (such as mycorrhizae or rhizobacteria) are examples of common constituents. Bio stimulants improve soil quality, boost yields, and support general plant health by triggering biological activities in the root zone. In order to organically

maximise plant performance, they are commonly utilised in gardening, horticulture, and agriculture.

An organic foliar spray is a natural plant health and growth enhancer that is applied directly to plant leaves in the form of a liquid solution. The spray offers a rapid and effective method of addressing nutrient deficits, promoting development, or guarding against pests and diseases by allowing plants to absorb nutrients through their foliage. popular ingredients in organic foliar sprays are fish emulsion, seaweed extract, compost tea, molasses, aloe vera, and epsom salt. In organic gardening and sustainable farming, organic foliar sprays are frequently utilised as a green way to encourage plant health without using artificial chemicals. Using a sprayer, they can be sprayed in the early morning or late afternoon to maximise absorption and prevent direct sunlight from burning the leaves.

Materials and Methods

The experiment was conducted during the Rabi season of 2024-2025 at the Himalayan university field, Department of Agronomy, Himalayan University, Jollang. This area is situated on the front site of the University and by the back site of central jail, jollang. All the facilities required for crop cultivation were available. The materials used and methods adopted in the present experiment "Effect of Root bio- stimulant and Organic Foliar Spray on growth and yield of mustard (*Brassica juncea* L.)" The soil of the experimental field constituting a part of neutral and deep. Pre-sowing soil samples were taken from a depth of 15 cm with the help of an auger. The soil was sandy loam in texture, low in organic carbon and medium in available nitrogen, phosphorus and low in potassium. The experiment was carried out in Randomized block design consisting of 7 treatments combinations with 3 replications and was laid out with the different treatments allocated randomly in each replications. Root bio-stimulant applied were SOMRE and mycorrhizae and Organic foliar spary used were 5% vermiwash, 5% panchgavya and 10% jeevamrut. Germination test was done using paper towel and petri dish under room temperature conditions. The spacing adopted was (plant to plant 30 cm and 20 cm and row to row 20 cm and 10 cm) and the seeds were drilled at 2-3 cm depth. Weeding was done to remove all weeds from the field in order to check any form of initial crop-weed competition and which also checks the spread of diseases.

Hand weeding was done after 20 DAS and 25 DAS.: Irrigation at initial stages of the crop. First irrigation at 25-30 DAS and second 40-45 DAS.

Results and Discussions

Effect of Root bio-stimulant and Organic Foliar Spray on Plant height (cm) of *Brassica juncea*

Data presented in Table 1, tabulated with parameter plant height (cm) of *Brassica juncea* and there was increasing in crop age plant height was progressively increased with the advancement of the experimentation. The plant height was significantly higher in all different growth intervals. At harvest, the maximum plant height (181.33 cm) was found to be statistically significant in treatment T6 (Mycorrhizae + 5% Panchgavya), T2 (Somre + 5% Vermiwash) i.e 178.23 cm and lowest in to (control) i.e. 152 cm. The probable reasons could be because of the root bio-stimulant (Mycorrhizae + 5% Panchgavya) and foliar spray (Somre + 5% Vermiwash) resulted in significantly taller plants. Taller plant \s at closer spacing might due to longer internodes and more terminal growth.

Table 1: Effect of Root bio-stimulant and Organic Foliar Spray on Plant height (cm) of *Brassica juncea*

Plant height (cm)				
Treatments symbols	Treatments combination	30 DAS	60 DAS	90 DAS
T1	Control	8.17	50.30	152.17
T2	Somre + 5% Vermiwash	18.27	90.73	178.23
T3	Somre + 5% Panchgavya	17.33	90.20	176.20
T4	Somre + 10% Jeevamrut	16.23	88.80	170.37
T5	Mycorrhizza + 5% vermiwash	15.23	88.20	166.27
T6	Mycorrhizza + 5% Panchgayya	19.27	102.11	181.33
T7	Mycorrhizza + 10% Jeevamrut	13.43	62.37	165.20
	F-test	NS	S	S
	S.Ed(±)	0.12	0.07	0.09
	CD (P=0.05)	0.26	0.16	0.21

Effect of Root bio-stimulant and Organic Foliar Spray on Dry weight/plant of *Brassica juncea* Data presented in Table 2, Observation regarding the response of the root bio-stimulant (Mycorrhizae + 5% Panchgavya) and foliar spray (Somre + 5% Vermiwash) on Dry weight (g)/plant of *Brassica juncea* are given in Table no.2. It was observed that that successive stage there was an incremental trend. At 30, 60 and 90 DAS were significant influence in Dry weight (g)/plant due to different treatments. While at 30 DAS the effect of root bio-stimulant (Mycorrhizae + 5% Panchgavya) and foliar spray (Somre + 5% Vermiwash) of the treatments were non-significants. and At harvest highest plant dry weight (90.33g) was observed in treatment T6 (Mycorrhizae + 5% Panchgayya). However, treatment T2 (Somre + 5% Vermiwash) T3 (Somre + 5% Panchgavya), and T4 (Somre + 10% Jeevamru) were statistically at par with treatment T6 (Mycorrhizae + 5% Panchgayya). Through these experiments, they found that because of the root bio-stimulant (Mycorrhizae + 5% Panchgavya) and foliar spray (Somre + 5% Vermiwash) resulted in significantly taller plants with higher dry matter accumulation. These findings suggested that proper root bio-stimulant and foliar spray management can positively impact the growth and yield of *Brassica juncea*.

Table 2: Effect of Root bio-stimulant and Organic Foliar Spray on Dry weight/plant of *Brassica juncea*

Dry weight/plant				
Treatments symbols	Treatments combination	30 DAS	60 DAS	90 DAS
T1	Control	2.10	30.20	60.13
T2	Somre + 5% Vermiwash	3.53	36.73	88.23
T3	Somre + 5% Panchgavya	3.30	36.20	86.20
T4	Somre + 10% Jeevamrut	3.13	35.80	84.37
T5	Mycorrhizza + 5% vermiwash	2.57	35.20	82.27
T6	Mycorrhizza + 5% Panchgayya	4.13	38.11	90.33
T7	Mycorrhizza + 10% Jeevamrut	2.33	31.37	80.37
	F-test	NS	S	S
	S.Ed(±)	0.11	0.07	0.10
	CD (P=0.05)	0.24	0.16	0.23

Effect of Root bio-stimulant and Organic Foliar Spray on Growth parameters of *Brassica juncea*

Observation regarding the response of Root bio-stimulant and Organic Foliar Spray on Growth and Growth parameters of *Brassica juncea* are presented in Table 3, tabulated with parameter shows growth of plant height (cm) of *Brassica juncea* and there was increasing in crop age plant height was progressively increased with the advancement of the experimentation. The plant height was significantly higher in all

different growth intervals. At harvest, the maximum plant height (181.33 cm) was found to be statistically significant in treatment T6 (Mycorrhizae + 5% Panchgavya), T2 (Somre + 5% Vermiwash) i.e. 178.23 cm and lowest in T1 (control) i.e. 152 cm. The probable reasons could be because of the root bio-stimulant (Mycorrhizae + 5% Panchgavya) and foliar spray (Somre + 5% Vermiwash) resulted in significantly taller plants. Taller plants at closer spacing might be due to longer internodes and more terminal growth. Jyoti, and at harvest, the maximum Numbers of Siliqua/ plant was found to be statistically significant in treatment T6 (Mycorrhizae + 5% Panchgavya) i.e. 72.37 and T2 (Somre + 5% Vermiwash) i.e. 58.23 and lowest in T1 (control) i.e. 20.17. The research findings demonstrated that the utilization of Root bio-stimulant and Organic Foliar Spray had a significant positive influence on the growth yield. At harvest the maximum Numbers of leaves/ plant was found to be statistically significant in treatment T6 (Mycorrhizae + 5% Panchgavya) i.e. 82.27 cm and T2 (Somre + 5% Vermiwash) i.e. 65.30 cm and lowest in T1 (control) i.e. 15.27. At 30-60 DAS, significant and highest crops growth rate (0.35g) was observed in treatment T6 (Mycorrhizae + 5% Panchgavya). However, treatment T2 (Somre + 5% Vermiwash), T3 (Somre + 5% Panchgavya), T4 (Somre + 10% Jeevamrut), and T5 (Mycorrhizae + 5% vermiwash) were statistically at par with treatment T6 (Mycorrhizae + 5% Panchgavya). At 60-90 DAS, significant and highest crops growth rate (0.60 g) was observed in treatment T6 (Mycorrhizae + 5% Panchgavya). However, treatment T2 (Somre + 5% Vermiwash), T3 (Somre + 5% Panchgavya), T4 (Somre + 10% Jeevamrut), and T5 (Mycorrhizae + 5%

vermiwash) were statistically at par with treatment T6 (Mycorrhizae + 5% Panchgavya). At 0-30 DAS, Non- statistically significant and highest Relative growth rate (2.26g) was observed in treatment T6 (Mycorrhizae + 5% Panchgavya). However, treatment T2 (Somre + 5% Vermiwash), T3 (Somre + 5% Panchgavya), and T4 (Somre + 10% Jeevamrut) were statistically at par with treatment T6 (Mycorrhizae + 5% Panchgavya). At 30-60 DAS, Significant and highest Relative growth rate (0.09g) was observed in treatment T6 (Mycorrhizae + 5% Panchgavya). However, treatment T2 (Somre + 5% Vermiwash), T3 (Somre + 5% Panchgavya), and T4 (Somre + 10% Jeevamrut) were statistically at par with treatment T6 (Mycorrhizae + 5% Panchgavya). At 60-90 DAS, Significant and highest Relative growth rate (0.07g) was observed in treatment T6 (Mycorrhizae + 5% Panchgavya). However, treatment T2 (Somre + 5% Vermiwash), T3 (Somre + 5% Panchgavya), and T4 (Somre + 10% Jeevamrut) were statistically at par with treatment T6 (Mycorrhizae + 5% Panchgavya).

The growth attributes for growth of mustard is directly proportional to the number of leaves of plants, plant height, number of branches, flowering, crop growth rate, Relative growth rate and also due to root bio-stimulant and organic foliar sprays development of roots increases "Growth and Yield Response of Mustard, *Brassica juncea* L. to Soil and Foliar Nitrogen Application." And the result indicate that the nitrogen management have significant effects on the growth, development, and yield enhancement of agricultural crops especially in mustard Nikhitha *et al.*, (2021) [7].

Table 3: Effect of Root bio-stimulant and Organic Foliar Spray on Growth parameters of *Brassica juncea*

Growth parameters									
Treatments symbols	Treatments combination				Plant height	No of leaves	Dry weight(g)	CGR (g/g/day)	RGR (g/ g ¹ day ¹)
T1	Control				152.17	15.27	60.13	0.11	0.01
T2	Somre	+ Vermiwash		5%	178.23	65.30	88.23	0.40	0.05
T3	Somre	+ Panchgavya		5%	176.20	63.37	86.20	0.17	0.03
T4	Somre	+ Jeevamrut		10%	170.37	60.50	84.37	0.15	0.01
T5	Mycorrhizza	vermiwash	+	5%	166.27	58.30	82.27	0.14	0.01
T6	Mycorrhizza	Panchgayya	+	5%	181.33	82.27	90.33	0.60	0.07
T7	Mycorrhizza	Jeevamrut	+	10%	165.33	55.57	80.37	0.13	0.01
	F-test				S	S	S	S	S
	S.Ed(±)				0.09	0.02	0.10	0.04	1.23
	CD (P=0.05)				0.21	0.05	0.23	0.10	2.56

Conclusion

Study suggests that to achieve maximum plant height was recorded significantly higher viz., 181.33 cm, Number of leaves/plant recorded (82.27) maximum dry weight was recorded (90.33 g/day), maximum crop growth rate recorded (0.60 g/day/m²) and maximum relative growth rate recorded (0.07g/g/day) with the application of treatment combination T6 (Mycorrhizae + 5% Panchgavya). Maximum yield attributes viz., harvest index (34.77), economics viz., 301.57 and biological yield (285.10) Gross return 132600.00 INR ha⁻¹, net return 94914.00 INR ha⁻¹ and B:C ratio 3.51 was recorded in treatment with the application of T6 (Mycorrhizza + 5% Panchgavya).

References

- Al-Hilfi RG, Hussin WA. Response of three beetroot cultivars to organic fertilization and foliar application. Iraqi J Market Res Consumer Prot. 2023;15(2):221-34.
- Chandra G, Dash D. Influence of foliar spray of bio-inoculant and micronutrient on soil biology and yield in broccoli. Asian J Microbiol Biotechnol Environ Sci. 2023;25(2):282-7.
- Khan A, Irfan M, Hasan SA. Comparative analysis of chemical fertilizers, nanoparticles and biofertilizers on the growth and yield responses of mustard cultivars. Comp Anal Chem Fert Nanopart Biofert Mustard Cultiv. 2024;2(1):1-10.
- Laishram D, Jaswal A. Interactive effect of foliar application of zinc, iron, and nitrogen on growth and productivity of mustard (*Brassica juncea* L.). J Food Chem Nanotechnol. 2023;9.
- Manasa N, Krishna KV, Nayak BB, Kumar S. Impact of biofertilizers and zinc foliar spray on mustard growth, chlorophyll content and yield. 2024 Aug 15.
- Nguyen LT. Effects of organic foliar fertilizer concentrations on growth, yield and economic efficiency of malabar spinach and mustard greens. J Agric Dev.

- 2022;21(4):9-16.
7. Nikhitha SN, Kaur JK, Singh SS. Growth and yield response of mustard (*Brassica juncea* L.) to soil and foliar nitrogen application. Int J Sci Eng Appl Sci. 2021;7(7).
 8. Ramya B, Sampath O, Mahesh N, Saikumar R. Effect of organic manures, sulphur and foliar application of micronutrients (zinc and boron) on growth and yield of mustard (*Brassica juncea* L.). Int J Environ Climate Change. 2022;1044-51.
 9. Rana MS, Hoque TS, Abedin MA. Improving growth and yield performance of cauliflower through foliar application of moringa leaf extract as a bio-stimulant. Acta Sci Malaysia. 2019;3(2):7-11.