



International Journal of Research in Agronomy

E-ISSN: 2618-0618
P-ISSN: 2618-060X
© Agronomy
NAAS Rating (2026): 5.20
www.agronomyjournals.com
2026; 9(9): 843-845
Received: 11-06-2026
Accepted: 15-07-2026

Dr. D Swetha
Scientist (Agronomy), Agricultural
Research Station, Tornala,
PJTAU, Siddipet, Telangana,
India

Dr. AV Ramanjaneyulu
Principal Scientist & Head, AICRP
on Agroforestry, PJTAU,
Rajendranagar, Hyderabad,
Telangana, India

Agronomic evaluation of Indian mustard (*Brassica juncea* L.) varieties under *Alfisols* conditions

D Swetha and AV Ramanjaneyulu

DOI: <https://www.doi.org/10.33545/2618060X.2026.v9.i9l.6611>

Abstract

Varietal selection is an important agronomic consideration for enhancing mustard productivity and profitability in the light-textured soils of the Central Telangana Zone (CTZ). A field experiment was conducted at the Agricultural Research Station, Tornala, Siddipet district, Telangana, during *rabi* season of two consecutive years (2019–20 and 2020–21) to evaluate and find out the suitability of mustard varieties in *Alfisols*. The experiment was laid out in a randomized complete block design with eight mustard varieties and replicated thrice. The results of pooled analysis over two seasons exhibited pronounced varietal differences in growth characteristics, yield attributes, seed yield and economic profitability. Among growth parameters, significantly highest plant height was recorded with Pusa Mustard-27 (111 cm) whereas Pusa Tarak observed maximum number of branches (15) and number of siliquea plant⁻¹ (72). Further, NRCHB-101 noticed the highest number of seeds siliquea⁻¹ (18), test weight (4.96 g) and seed yield (1415 kg ha⁻¹). The same variety NRCHB-101 registered highest gross return (₹61,103 ha⁻¹), net return (₹31,213 ha⁻¹) and benefit: cost ratio (2.04).

Keywords: Mustard variety, growth attributes, yield parameters, seed yield, economics, *Alfisols*

Introduction

Edible oils constitute an essential component of India's food and nutritional security, with oilseed crops occupying a strategically important position in the agricultural economy. As major sources of dietary lipids, energy and fat-soluble vitamins, oilseeds contribute substantially to dietary adequacy and nutritional well-being, particularly among nutritionally and economically vulnerable populations. Their importance extends beyond nutrition, as oilseed crops serve as valuable commercial crops that generate farm income, employment and livelihood opportunities for millions of rural households. Consequently, the oilseed sector has considerable socioeconomic significance, contributing to rural economic development and livelihood security. Domestically, oilseeds hold the second-highest acreage and production value in Indian agriculture after food grains (PIB, 2025) ^[10].

Oilseeds play a pivotal role in Indian economy, accounting for 5% of the gross national product and 10% of the value of agricultural products. The majority of oilseed cultivation, around 76% of the total area, occurs under rainfed conditions, leaving production vulnerable to climatic variations and yield instability.

Amongst the oilseed, rapeseed-mustard (*Brassica* spp.) ranks second in area next only to soybean in India as well as in the world. It is cultivated in an area of 86.57 lakh ha with an average production of 126.67 lakh t with productivity of 1463 kg ha⁻¹, while in Telangana it is grown in an area of 0.03 m ha with production of 0.03 m t and productivity of 799 kg ha⁻¹ (DES, 2024-25). Indian mustard (*Brassica juncea* L.) is an important *rabi* oilseed crop and contributes substantially to edible-oil production in India. The crop is cultivated across a wide range of agro-climatic environments tolerating annual rainfall between 500 and 1200 mm and temperatures ranging from 6 °C to 27 °C (Singh *et al.*, 2017) ^[13]. The crop generally attains maturity within 100–110 days, and early maturing cultivars (requiring less than 110 days) are considered particularly suitable for expanding cultivation into non-traditional regions such as Telangana. Mustard performs well under relatively cool climatic conditions, with an optimum temperature of approximately 25 °C during sowing, which favours effective germination and is commonly prevalent in Telangana

Corresponding Author:
Dr. D Swetha
Scientist (Agronomy), Agricultural
Research Station, Tornala,
PJTAU, Siddipet, Telangana,
India

(Kumar *et al.*, 2026) [6]. Despite these favourable conditions, variation in soil, temperature, moisture availability and length of the growing season can cause substantial differences among cultivars in growth, yield formation and economic performance (Shekhawat *et al.*, 2012) [12].

Besides, the country has been facing the problem of shortage of oils coupled with continuous increase in their prices. Improved varieties have been evolved, which can yield better than local cultivable varieties with best agronomic practices (Madhukar Rao *et al.*, 2020) [7]. With regard to the above conditions, identification of suitable mustard variety is essential for enhancement of area, production and productivity in Telangana region. The present study was undertaken to identify the high-performing and economically feasible variety of mustard for cultivation on Alfisols.

Materials and Methods

A field experiment was conducted at 'C' block of Agriculture Research Station, Tornala, Siddipet district during two years (Rabi, 2019-20 and 2020-21) to evaluate the suitable mustard variety. The field is geographically located at a latitude of 18°07'07.04" N and a longitude of 78°44'32.40" E, with an altitude of 579.96 m above mean sea level. Experimental soil is sandy clay loam in texture with 66.40% sand, 8.30% silt and 25.30% clay, neutral in soil reaction with pH 7.42, non-saline (EC 0.16 dS m⁻¹), low in organic carbon (0.44%) and available nitrogen (131.3 kg/ha), high in available phosphorus (27.7 kg/ha) and available potassium (302 kg/ha). The experimental trial was laid out in a randomized block design, consisted of eight mustard varieties viz., T₁ - Pusa Mustard-25, T₂ - Pusa Mustard-26, T₃ - Pusa Mustard-27, T₄ - Pusa tarak, T₅ - Pusa Agrani (Sej-2), T₆ - Pusa mehak, T₇ - Pusa jaganath and T₈ - NRCHB-101 and were replicated thrice with a spacing of 45 cm x 15 cm. The recommended dose of fertilizers for (RDF) for mustard is 60-40-40 kg NPK ha⁻¹ in which 30 kg N and entire P₂O₅ and K₂O as applied as basal and remaining 30 kg N applied at 55-60 days after sowing. Weed management is carried by hoeing between the crop rows at 20 DAS and 40 DAS. All the package of practices outlined by PJTAU were adopted for crop management.

Five plants were randomly selected and tagged in each experimental plot for recording observations on phenological events following the methodology of Patel and Mehta (1987) [9]. Data pertaining to crop growth, growth parameters, yield attributes and yield were recorded from each treatment. Seed yield for each treatment was measured at harvest and expressed in kg ha⁻¹. The recorded data were systematically tabulated and statistically analysed following the procedures outlined by Panse and Sukhatme (1967) [8].

Results and Discussion

Growth attributes

The pooled analysis of the two-year experiment revealed considerable variation among the mustard varieties towards

growth attributes viz., plant height and number of branches plant⁻¹ presented in Table 1.

The plant height ranged from 97 cm to 111 cm, indicating substantial varietal differences in vegetative growth. The highest plant height was recorded with Pusa Mustard – 27 (111 cm) and onpar with Pusa Mustard – 26 (108 cm) and Sej-2 (106 cm). Whereas, the lowest plant height was observed in Pusa Mehak (97 cm). The mustard variety Pusa Tarak registered highest number of branches per plant (15) and it was comparable with Sej-2 (14), Pusa Mustard – 25 (13) and Pusa Mustard – 27 (13). The differences in plant stature may be attributed primarily to genetic variation among the cultivars and their differential adaptation to the agro-climatic conditions. Genotypic differences in growth and yield performance are also expected because mustard varieties can respond differently to environmental conditions and management practices. These findings align with earlier reports by Shekhawat *et al.*, 2012 [12].

Yield attributes

Marked varietal differences were observed in the yield attributing characters, particularly number of siliqua plant⁻¹, seeds siliqua⁻¹ and test weight (Table 1).

Pusa Tarak has obtained significantly higher number of siliqua plant⁻¹ (72) followed by Sej-2 (69) and lowest observed in Pusa Mustard-25 (49). The higher siliqua production might be due to favourable weather condition and translocation of more photosynthates from source to sink resulted in higher number of siliqua. Similar results were suggested by Aziz *et al.* (2011) [1] and Sharif *et al.* (2016) [11].

Whereas, NRCHB-101 recorded the highest number of seeds siliqua⁻¹ (18), followed by Pusa Mustard-26 (17). Similarly, the highest test weight was also found in NRCHB-101 mustard variety (4.96 g) indicating better reproductive efficiency and substantial genetic variation for yield-contributing traits resulting variety NRCHB-101 as a promising genotype for seed yield and associated characters. Similar results were reported by Chouksey *et al.*, 2015 [4] and Basavanneppa *et al.* 2020 [2].

Seed Yield

The data on seed and stover yield of different mustard varieties shown significant difference among each other and tabulated in Table 1. Among the varieties, highest seed yield was obtained with NRCHB-101 (1415 kg ha⁻¹) followed by Pusa Mehak (1375 kg ha⁻¹) and lowest seed yield was recorded in Pusa Tarak (866 kg ha⁻¹). Further, NRCHB-101 produced approximately 63.4% higher seed yield than Pusa Tarak, demonstrating its superior yield potential under the Alfisol conditions of Central Telangana. The higher seed yield in NRCHB-101 may be due to the contribution of cumulative favourable effects of the crop characteristics viz, higher seeds siliqua⁻¹ and greater test weight than other varieties. These results are in accordance with Sowjanya *et al.*, 2021 [14] and Biswas *et al.* 2019 [3].

Table 1: Effect of growth & yield parameters and yield of different mustard varieties (rabi, 2019-21)

Varieties	Plant height (cm)	No. of branches plant ⁻¹	No. of siliqua plant ⁻¹	No. of seed siliqua ⁻¹	Test weight (g)	Seed yield (kg ha ⁻¹)
T ₁ - Pusa Mustard-25	104	13	49	15	4.67	1223
T ₂ - Pusa Mustard-26	108	11	54	17	4.40	927
T ₃ - Pusa Mustard-27	111	13	66	16	4.74	1197
T ₄ - Pusa Tarak	102	15	72	16	3.98	866
T ₅ - Sej-2 (Pusa Agrani)	106	14	69	15	4.65	948
T ₆ - Pusa mehak	97	11	58	14	4.66	1375
T ₇ - Pusa jaganath	102	12	63	16	4.53	1064
T ₈ - NRCHB-101	104	12	63	18	4.96	1415
SEm (±)	2.1	0.5	0.15	0.2	0.03	05
CD (P=0.05)	6.4	1.4	0.5	0.6	0.11	17

Economics

The data pertaining to economics in terms of cost of cultivation, gross returns, net returns and benefit cost ratio as influenced by varieties were presented in Table 2. Among varieties, cost of cultivation was similar among all varieties (₹ 29,890 ha⁻¹). Maximum gross returns (₹ 61,103 ha⁻¹), net returns (₹ 31213 ha⁻¹) and benefit cost ratio (2.04) were observed with variety

NRCHB-101 followed by Pusa Mehak (₹ 59,387 ha⁻¹, ₹ 29,497 ha⁻¹ and 1.99) respectively. The NRCHB-101 variety recorded higher seed yield which in turn resulted in higher monetary returns in terms of gross and returns and benefit-cost ratio. Whereas, Pusa Tarak registered lower gross returns (₹ 37430 ha⁻¹), net returns (₹ 7540 ha⁻¹) and benefit cost ratio (1.25).

Table 2: Economics of different mustard varieties (rabi, 2019-21)

Varieties	Cost of cultivation (₹ ha ⁻¹)	Gross returns (₹ ha ⁻¹)	Net returns (₹ ha ⁻¹)	B:C ratio
T ₁ - Pusa Mustard-25	29890	52838	22948	1.77
T ₂ - Pusa Mustard-26	29890	40087	10197	1.34
T ₃ - Pusa Mustard-27	29890	51684	21794	1.73
T ₄ - Pusa Tarak	29890	37430	7540	1.25
T ₅ - Sej-2 (Pusa Agrani)	29890	40973	11083	1.37
T ₆ - Pusa mehak	29890	59387	29497	1.99
T ₇ - Pusa jaganath	29890	45960	16070	1.54
T ₈ - NRCHB-101	29890	61103	31213	2.04

Conclusion

The results indicated that, the varietal selection is an important agronomic strategy for improving mustard productivity and profitability on light-textured soils of Central Telangana. Based on the experiment results, The NRCHB-101 may be recommended as a promising variety for mustard cultivation under *Alfisol* conditions of the Central Telangana Zone.

References

1. Aziz MA, Chakma R, Ahmed M, Rahman AKMM, Roy K. Effect of sowing dates on the growth, development and yield of mustard in the hilly areas. *Journal of Experimental Biosciences*. 2011;2(1):33-36.
2. Basavanneppa MA, Kumar BA. Production and economic efficiencies as influenced by mustard genotypes in paddy fallows of Tungabhadra Command Area of Karnataka. *International Journal of Current Microbiology and Applied Sciences*. 2020;9(6):2376-2380.
3. Biswas M, Alom MS, Mondol NA, Khatun F, Banik BR, Kundu BC. Performance of late sown rapeseed-mustard under variable management levels. *Pakistan Journal of Biological Sciences*. 2002;5(10):1017-1020.
4. Chouksey H, Sardana V, Sharma P. Variability in Indian mustard (*Brassica juncea*) genotypes in response to applied phosphorus. *Indian Journal of Agronomy*. 2017;62(3). doi:10.59797/ija.v62i3.4312
5. Directorate of Economics & Statistics, Department of Agriculture & Farmers Welfare, Government of India. *Agricultural statistics*, 2024-25.
6. Kumar MP, Sridhar K, Nalini N, Goverdhan M, Reddy MM. Performance of mustard (*Brassica juncea* L.) genotypes with varied sowing dates under Southern Telangana Zone. *Archives of Current Research International*. 2026;26(6):82-90. doi:10.9734/acri/2026/v26i61939
7. Madhukar Rao P, Padmaja D, Madhukar P, Uma Reddy R. Evaluation of different mustard varieties under Northern Telangana Zone. *Indian Journal of Oilseed Research*. 2020;Special Issue:37-38.
8. Panse VG, Sukhatme PV. *Statistical methods for agricultural workers*. New Delhi: Indian Council of Agricultural Research; 1967.
9. Patel IG, Mehta AN. Assessment of growth and yield of mustard (*Brassica juncea* (L.) Czern and Coss) in relation to heat units. *International Journal of Ecology and Environmental Science*. 1987;13:145-155.
10. Press Information Bureau. National Mission on Edible Oils: Strengthening India's edible oil ecosystem. 2025. <https://www.pib.gov.in/PressReleasePage.aspx?PRID=2200287®=3&lang=1>
11. Sharif MAR, Haque MZ, Howlader MHK, Hossain MJ. Effect of sowing time on growth and yield attributes of three mustard cultivars grown in Tidal Floodplain of Bangladesh. *Journal of Bangladesh Agricultural University*. 2016;14(2):155-160.
12. Shekhawat K, Rathore SS, Premi OP, Kandpal BK, Chauhan JS. Advances in agronomic management of Indian mustard (*Brassica juncea* (L.) Czernj. Cossn): An overview. *International Journal of Agronomy*. 2012;1-14. doi:10.1155/2012/408284.
13. Singh AK, Singh H, Rai OP, Singh G, Singh VP, Singh NP, Singh R. Effect of sowing dates and varieties for higher productivity of Indian mustard (*Brassica juncea* L.). *Journal of Applied and Natural Science*. 2017;9(2):883-887. doi:10.31018/jans.v9i2.1292.
14. Sowjanya M, Reddy SG, Revathi P, Chandrashaker K. Effect of sowing dates and varieties on productivity of mustard under Northern Telangana Zone. *The Pharma Innovation Journal*. 2021;10(9):183-187.