



ISSN Print: 2664-9926
 ISSN Online: 2664-9934
 NAAS Rating (2026): 4.82
 IJBS 2026; 8(3): 15-17
www.biologyjournal.net
 Received: 01-12-2025
 Accepted: 12-01-2026

Manik Madhavrao Pethkar
 Ph.D. Research Scholar,
 Yeshwant College,
 Nanded, Maharashtra, India

Dr. RG Chillawar
 Ph.D. Research Guide and
 Associate Professor, Yeshwant
 College, Nanded, Maharashtra,
 India

Corresponding Author:
Manik Madhavrao Pethkar
 Ph.D. Research Scholar,
 Yeshwant College,
 Nanded, Maharashtra, India

Grain yield and pathological evaluation of green gram cultivars under treated and non-treated condition

Manik Madhavrao Pethkar and RG Chillawar

DOI: <https://www.doi.org/10.33545/26649926.2026.v8.i3a.588>

Abstract

Among pulses, green gram is the most important crop. In Maharashtra, green gram is one of the widely grown pulse crops. This crop is cultivated extensively. In the present study, three different genotypes, i.e., BM-2003-02, AJIT-11 and Farmers Variety, were collected and evaluated. Two experimental trials were conducted simultaneously. First one was conducted without any treatment while another one was treated with fungicides. The observation was recorded at 30 and 60 days after sowing. The study found that the treated plot has lower disease severity than the non-treated plot. Among the three genotypes, BM-2003-02 is disease tolerant and superior in yield in both trials.

Keywords: Yield, disease tolerance, fungicide

Introduction

Vigna radiata is a predominantly cultivated pulse crop of India. The crop belongs to the Fabaceae family. It is involved in fulfilment of protein requirements and a sustainable crop system. Green gram crop originated in India. Its domestication dated back thousands of years. This crop has many cultivated and wild-form species. Cultivated as well as wild species have a very good reservoir of large genetic variation. Cultivated species are well adaptive, uniform, and tolerant to various diseases. The landraces, i.e., farmers' varieties, have wider adaptation. They possess a good amount of genetic variation. They have tolerance to biotic and abiotic stresses. In the changing environmental conditions, landraces might be one of the good parents for a hybridization programme.

In India, green gram production is very low because of two reasons, i.e., many varieties are susceptible to the various plant diseases caused by fungi, bacteria and viruses. Another reason was unpredictable environmental conditions. Fungal diseases viz., powdery mildew (*Erysiphe polygoni*), cercospora leaf spot (*Cercospora canescens*) and anthracnose (*Colletotrichum lindemuthianum*) account for a large amount of yield loss. These diseases are important constraints that cause severe yield loss in rainfed conditions. A comprehensive study was conducted at the research farm of a farmer at Kandhar tehsil. Two separate trials were conducted, i.e., treated and non-treated.

Material and Methods

The field experiment was conducted at the Experimental Farm in Kandhar tehsil during the *kharif* season of 2024-2025. Three different varieties of green gram were tested viz., BM-2002-3, Farmers variety, and Ajeet-11. The purpose of the experiment was to evaluate various green gram varieties against fungal pathogens. The experiment was conducted in RBD design with three replications. Each green gram variety was planted in a 5-meter length with spacing 45 × 20 cm. The method of sowing was hand dibbling. All the recommended package of practices of green gram was followed during the growing season of the crop. In the first experimental trial, spraying of fungicide was prevented. However, in the second trial, diseases were controlled by applying fungicide. Seeds were treated with the fungicide Carbendazim at a concentration of 2 grams per kilogram of seed to prevent fungal infections. Five plants were randomly selected from each plot and observations were recorded.

Table 1: Per se performance of green gram varieties under Treated and Non-Treated Plot

Source	Treated Plot					Non -Treated Plot						
	Powdery Mildew 60 DAS	Cercospora Leaf Spot 30 DAS	Cercospora Leaf Spot 60 DAS	Anthrachnose 60 DAS	Grain Yield (g)	Powdery Mildew 30 DAS	Powdery Mildew 60 DAS	Cercospora Leaf Spot 30 DAS	Cercospora Leaf Spot 60 DAS	Anthrachnose 30 DAS	Anthrachnose 60 DAS	Grain Yield (g)
BM-2003-02	0.67	2.67	4.33	0	985	3.33	11.67	7.00	17.00	0.00	0.00	621.67
AJIT-11	1.67	1.33	6.33	1.34	627.99	6.00	13.00	8.67	19.99	2.33	7.00	286.67
Farmers Variety	2.67	2.33	3.67	0	730.34	1.67	16.00	11.67	25.99	0.00	0.00	387.00
G. Mean	1.67	2.11	4.78	0.45	781.11	3.67	13.56	9.11	20.99	0.78	2.33	431.78
S.E. +/-	0.11	0.16	0.23	0.02	2.6	0.27	0.32	0.51	0.38	0.04	0.11	2.19
C.D. 5%	0.44	0.65	0.91	0.08	7.4	1.06	1.26	1.99	1.48	0.14	0.45	6.08
C.V.	11.64	13.51	8.35	8.43	9.20	12.71	4.09	9.68	3.11	7.94	8.41	7.65

Results and Discussion

Powdery Mildew

In the treated plot, no (Zero) disease intensity was observed. The first symptom was found at 60 DAS. Among all three varieties, BM-2003-02 (0.67) is tolerant to disease followed by Ajit11 (1.67) and farmers variety (2.67). In case of the non-treated plot, the first symptom was recorded at 30 DAS. Here, Ajit-11 [(6.00 at 30 DAS) (13.00 at 60 DAS)] is highly susceptible to powdery mildew disease, followed by the other two varieties. The local farmers variety showed resistance at 30 DAS. However, later on it became highly susceptible.

It indicated that BM-2003-02 is well adapted and tolerant to powdery mildew disease. Landrace has a good source of resistance genes against diseases. Results agree with Gautam *et al.* (2013) ^[1], Jameel *et al.* (2014) ^[16] and Hinduja *et al.* (2025) ^[10].

Cercospora Leaf Spot is one of the drastic plant diseases that badly affect the green gram crop:

In both (Treated and Non-Treated) trials, disease was found at 30 DAS. In the non-treated trial, Ajit-11 (1.33) is tolerant to disease followed by farmers variety (2.33) and BM-2003-02 (2.67) at 30 DAS in the treated plot. Severity drastically increased in Ajit-11 (6.33) at 60 DAS. However, farmers variety (3.67) shows tolerance during the growing period.

In the non-treated trial, BM-2003-02 (7.0 at 30 DAS & 17.00 at 60 DAS) is highly tolerant to cercospora leaf spot followed by Ajit-11 (8.67 at 30 DAS & 19.99 at 60 DAS) and farmers variety (11.67 at 30 DAS & 25.99 at 60 DAS). The same findings were reported by Khan *et al.* (2005) ^[12], Jameel *et al.* (2014) ^[16] and Kumar *et al.* (2020) ^[13].

Anthrachnose: In both field experimental trials, all three varieties of green gram show tolerance against anthrachnose disease:

Symptoms occur at harvesting time. In both trials, Ajit-11 (1.34 at 30 DAS & 2.33 at 60 DAS) was reported to be susceptible to anthrachnose but severity is very low. However, the remaining two genotypes show tolerance reaction. They withstand anthrachnose disease.

BM-2003-02 and farmers variety were considered as the best genotypes for cultivation. Findings agreed with Khan *et al.* (2005) ^[16] and Kumar *et al.* (2020) ^[13].

Grain Yield: BM-2003-02 (985 g) is a high-yielding variety followed by farmers variety (730.34 g) and Ajit-11 (627.99 g) in the treated plot. It was observed that BM-2003-02 is highly uniform and a well-adapted genotype for cultivation. Due to a resistance mechanism of farmers variety, it produces a good amount of yield. It is also the best genotype for cultivation.

In the non-treated trial, BM-2003-02 (621.67 g) is superior to farmers variety (387.00 g) and Ajit-11 (286.67 g).

Farmers variety possesses some resistance gene which expresses. Similar results were recorded by Jain *et al.* (2024) ^[14] and Shingade *et al.* (2025) ^[15].

Conclusion

In the present study, BM-2003-02 performed well against fungal pathogens viz., powdery mildew and anthrachnose in the treated plot, and was tolerated in the non-treated plot. Ajit-11 is tolerant to fungal diseases in the early growing stage, i.e., seedling stage. Farmers variety is tolerant to anthrachnose disease. However, it is susceptible to powdery mildew and cercospora leaf spot. It tolerates disease and performs well in the non-treated trial.

References

1. Singh G, Sharma YR. Diseases of pulse crops and their management. Indian J Pulses Res. 2013;26(2):101-108.
2. Sharma RC, Singh SK. Management of Cercospora leaf spot of mungbean through fungicides. Indian Phytopathol. 2007;60(2):205-208.
3. Singh DP, Singh RA. Epidemiology and management of powdery mildew of mungbean. J Mycol Plant Pathol. 2004;34(2):340-343.
4. Rangaswami G, Mahadevan A. Diseases of crop plants in India. 4th ed. New Delhi: Prentice Hall of India; 1999.
5. Meena AK, Geat N, Kardam VK. Integrated management of foliar diseases of mungbean under natural field conditions. J Sci Res Rep. 2024;30(10):88-94.
6. Nambiar R, Virupaksha PH, Gurupada BB, Parasappa RS, Narayan BM, Revanappa SB. *In vitro* evaluation of new generation fungicides against anthrachnose in mungbean. J Adv Microbiol. 2025;25(6):99-107.
7. Suresh BC, Handa Kakkar P, Khadka P, Phaugat M, Raj A. Powdery mildew in pea (*Pisum sativum* L.): A comprehensive review. Int J Adv Biochem Res. 2025;9(7):1431-1435.
8. Esuyawkal D, Andargie M. Biology, ecology, symptoms and management of downy and powdery mildew diseases: A review. J Dis Med Plants. 2025;11(2):24-33.
9. Suresh BC, Handa Kakkar P, Khadka P, Phaugat M, Raj A. Powdery mildew in pea (*Pisum sativum* L.): A comprehensive review. Int J Adv Biochem Res. 2025;9(7):1431-1435.
10. Hinduja B, Padmaja G, Vidyasagar B, Sandhyakishore N. Identification of powdery mildew-resistant urbean genotypes through field assessment. J Adv Biol Biotechnol. 2025;28(8):377-386.
11. Akhtar J, Lal HC, Kumar Y, Singh PK, Ghosh J, Singh PK, *et al.* Multiple disease resistance in greengram and blackgram germplasm and management through

- chemicals under rainfed conditions. Legume Res. 2014;37:101-109.
12. Khan AA, Khan RU, Singh R. Management of Cercospora leaf spot and anthracnose disease of mungbean by fungicides. Ann Plant Prot Sci. 2005;13(2):465-469.
 13. Kumar N, Kumar S, Prajapati S, Maurya S. Cercospora leaf spot disease of green gram and its management: A review. J Pharmacogn Phytochem. 2020;9(1):1574-1576.
 14. Jain N, Sikarwar RS, Tripathi MK, Tiwari S. Evaluation of genetic parameters for yield and its attributing traits in green gram (*Vigna radiata* L.). Int J Environ Clim Change. 2024;14(2):482-487.
 15. Shingade AC, Shirale ST, Gaikwad GK, Ugile SK, Belge HA. Effect of fertilizer application on growth and yield in green gram (*Vigna radiata* L.). Int J Res Agron. 2025;8(9):975-981.
 16. Jameel A, Khan AA, Khan RU, Singh R. Evaluation of mungbean (*Vigna radiata* L.) genotypes for resistance against major foliar diseases under field conditions. Legume Res. 2014;37(4):421-426.
 17. Kumar K, Meena RK, Singh B, Yadav R. Disease resistance in mungbean: Current status and future prospects. J Food Legumes. 2020;33(2):65-72.