



# Status of Anthracnose Disease Caused by *Colletotrichum lindemuthianum* in Major Mungbean Growing Area of Rajasthan, India

Sunita Choudhary <sup>a\*</sup>, Rajesh Kumar Bagri <sup>a</sup>,  
Bhavya Mishra <sup>a</sup>, Ridhi Sankar Sharma <sup>a</sup>  
and Pinki Devi Yadav <sup>a</sup>

<sup>a</sup> Department of Plant Pathology, Rajasthan Agricultural Research Institute, Durgapura, Jaipur-302018, S.K.N. Agriculture University, Jobner, Rajasthan, India.

## Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

## Article Information

DOI: <https://doi.org/10.9734/ijpss/2024/v36i125221>

## Open Peer Review History:

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here: <https://www.sdiarticle5.com/review-history/128504>

Short Research Article

Received: 18/10/2024

Accepted: 21/12/2024

Published: 26/12/2024

## ABSTRACT

Anthracnose caused by *Colletotrichum lindemuthianum* is one of the most important diseases in the mungbean. A roving survey to assess the intensity of anthracnose of mungbean was carried out at 60 locations comprising five districts of Rajasthan state during the *kharif* season of 2022-23. The most extreme disease frequency was seen in plants at the flowering and podding stages. The overall mean disease intensity was observed to be 22.60%. Among the five districts, the lowest

\*Corresponding author: E-mail: [choudharysunita116@gmail.com](mailto:choudharysunita116@gmail.com);

**Cite as:** Choudhary, Sunita, Rajesh Kumar Bagri, Bhavya Mishra, Ridhi Sankar Sharma, and Pinki Devi Yadav. 2024. "Status of Anthracnose Disease Caused by *Colletotrichum Lindemuthianum* in Major Mungbean Growing Area of Rajasthan, India". *International Journal of Plant & Soil Science* 36 (12):471-76. <https://doi.org/10.9734/ijpss/2024/v36i125221>.

anthracnose intensity was noticed in Sikar (17.88%) followed by Nagaur (18.90%), while the highest anthracnose intensity was recorded in Jaipur district (28.93%) followed by Ajmer (24.64%) and Tonk (22.65%).

**Keywords:** Survey; mungbean; anthracnose; disease intensity; Rajasthan.

## 1. INTRODUCTION

Mungbean [*Vigna radiata* (L.) Wilczek] is a short-duration food grain legume cultivated over 7 million hectares, predominantly across Asia and rapidly spreading to other parts of the world. The major mungbean-growing states are Orissa, Maharashtra, Andra Pradesh, Rajasthan, Karnataka and Gujarat. It ranks third among all pulses grown in India after chickpea and pigeonpea. Mungbean seeds are rich in proteins (24%), fiber, antioxidants, and phytonutrients (Itoh et al., 2006). In general, the low productivity of mungbean is due to its cultivation in marginal lands, low rainfall areas, high rate of flower and fruit drop, non-uniform maturity, pod shattering and susceptibility to abiotic and biotic constraints, poor crop management practices and non-availability of quality seeds of improved varieties to farmers are responsible for low productivity (Chauhan et al., 2010 and Pratap et al., 2019). Among biotic stresses, fungal, viral and bacterial diseases are the major factors in the reducing yield and quality in most of the regions of India, which can reduce the yield up to 40-60 per cent in mungbean crop (Kaur et al., 2011).

Anthracnose of mungbean caused by *Colletotrichum lindemuthianum* (Sacc. and Magn.) is one of the most important seed borne diseases (Parthiban and Kavitha, 2014). Mungbean anthracnose is an economically important disease that results in a yield loss upto 30 to 70 per cent (Kulkarni, 2009 & Shukla et al., 2014). The early signs of infection usually appear on the lower leaf surface along the veins, which

show brick red to purplish red discoloration. Later, such discoloration also appears on the upper leaf surface. At the same time, brown lesions of various sizes, with black, brown or purplish-red margins, develop around small veins (Alien et al., 1996). Very little work has been done on a systematic survey of this disease in Rajasthan. Hence, the present investigation was initiated on survey of anthracnose in major mungbean growing districts of Rajasthan, to identify the intensity of the disease over time and geographical locations.

## 2. MATERIALS AND METHODS

A roving survey was conducted in the five major mungbean growing districts of Rajasthan viz., Jaipur, Tonk, Ajmer, Nagaur and Sikar during *Kharif* 2022-23 in order to find out the intensity of anthracnose. Two *tehsils* selected under each district were surveyed. Under each *tehsil* two villages were selected and under each village three farmers' fields were assessed. The samples were collected, isolated, purified, identified and subjected to pathogenic tests.

The anthracnose severity was recorded on ten randomly selected mungbean plants per field by using 0-9 scale given by Mayee and Datar, 1986 (Table 1). On the basis of numerical rating per cent disease intensity (PDI) was calculated applying the formula given by McKinney (1923).

$$PDI = \frac{\text{Sum of all numerical rating}}{\text{No. of leaves/plant observed}} \times \frac{100}{\text{Maximum disease rating}}$$

**Table 1. Anthracnose disease rating scale of mungbean given by Mayee and Datar, 1986**

Grade	Disease reaction	Disease intensity (%)	Reaction group
0	Highly resistant	0-1	HR
1	Resistant	1.1– 10	R
3	Moderately resistant	10.1 – 20	MR
5	Moderately susceptible	20.1 – 30	MS
7	Susceptible	30.1 – 50	S
9	Highly susceptible	> 50	HS

### 3. RESULTS AND DISCUSSION

#### 3.1 Occurrence and Distribution of Anthracnose of Mungbean at Farmer's Field of Rajasthan

Data about survey conducted during *kharif* 2022 as presented in Table 1 revealed that, among all five districts maximum mean per cent disease intensity (PDI) of anthracnose of mungbean was recorded in Jaipur district (28.93%) followed by Ajmer (24.64%) Tonk (22.65%) and Nagaur (18.90%) whereas minimum disease intensity was recorded in Sikar district having PDI 17.88 per cent. Significant differences in mean PDI were observed in among the five districts.

The anthracnose severity in Jaipur district ranged from 23.07 per cent (Nimera) to 35.26 per cent (Sewa). The disease index ranged between 20.56 (Juniya) to 27.90 per cent (Bhamolav) in Ajmer district. In Nagaur district, the disease ranged between 16.30 per cent (Bherunda) to 22.40 per cent (Nawa). In Tonk, the disease index varied from 11.06 (Deoli) to 27.88 per cent (Nagar). In Sikar district, the disease index

ranged between 9.07 per cent (Shyamgarh) to 22.65 per cent (Mau) (Table 2 & Fig. 1). Similar results reported by Kulkarni and Benagi (2013) conducted a roving survey to assess the intensity of mungbean anthracnose during 2007 and 2008 in eleven major mungbean growing districts of northern Karnataka. The results revealed that during 2007 anthracnose of mungbean was noticed in the range of 21.36 to 58.97 per cent and during 2008, the disease severity was noticed in the range of 24.67 to 60.07 per cent. Roopadevi *et al.* (2015) found the disease incidence and severity of anthracnose in the major mungbean regions of northern Karnataka. The disease severity was recorded from 28.10 to 62.70 per cent. The highest disease severity 59.80 per cent was obtained in Bidar district followed by Gulbarga (53.80%) and Bijapur (38.40%). Doganya *et al.* (2021) observed disease intensity between 20.00 to 29.60 per cent with an average intensity of 26.06 per cent of mungbean anthracnose at Khandwa district of Madhya Pardesh. Patil (2022) noted 16.22 to 28.0 per cent disease intensity of mungbean anthracnose at Sehore district of Madhya Pardesh.

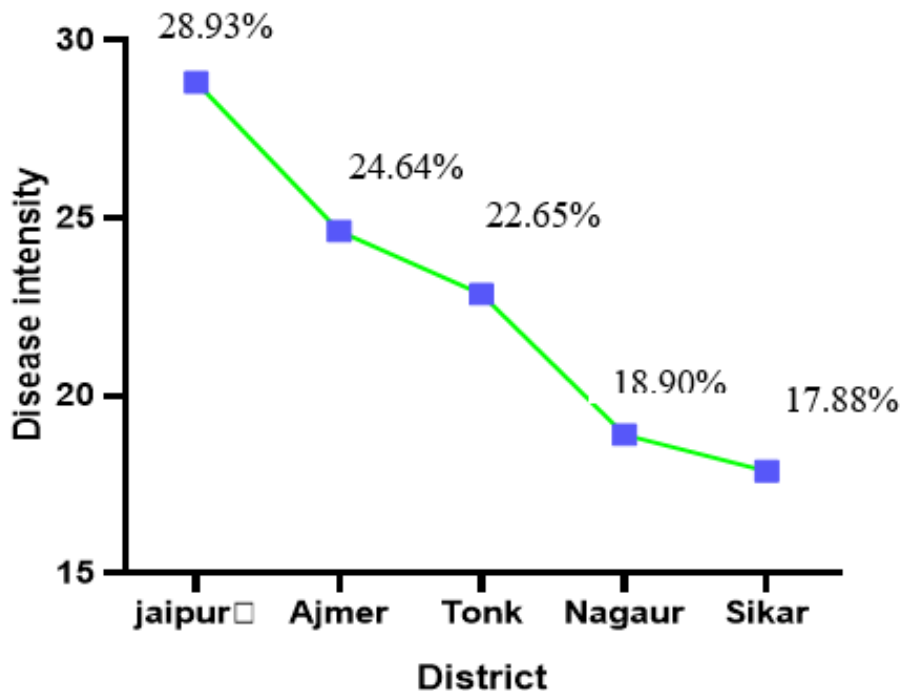


Fig. 1. Disease intensity of anthracnose in major mungbean-growing district of Rajasthan

**Table 2. Survey on severity of anthracnose of mungbean (*Colletotrichum lindemuthianum*) in different villages of the districts in Rajasthan during Kharif, 2022-23**

Districts	Tehsils	Villages	No. of fields	Per cent disease intensity in surveyed field			Avg. disease intensity (avg. of three fields)	Avg. disease intensity (Tehsil)	District Mean
Jaipur	Dudu	Sewa	3	32	35.20	38.50	35.26	<b>32.89</b>	<b>28.93</b>
		Mangalwara	3	28.66	32.8	30.11	30.52		
	Phagi	Kansya	3	27.71	29.12	23.69	26.84	<b>24.96</b>	
		Nimera	3	19.21	22.43	27.57	23.07		
Ajmer	Kishangarh	Bhamolav	3	32.89	26.90	23.90	27.90	<b>26.62</b>	<b>24.64</b>
		Chota lamba	3	23.78	24.34	27.91	25.34		
	Kekri	Meodakalan	3	22.10	28	24.21	24.77	<b>22.67</b>	
		Juniya	3	17.8	23.11	20.78	20.56		
Nagaur	Nawa	Moondgasoi	3	20.74	23.62	22.86	22.40	<b>23.28</b>	<b>18.90</b>
		Panchota	3	24.66	25.69	22.13	24.16		
	Riyanbadi	Morikalan	3	13.86	5.67	18.71	12.74	<b>14.52</b>	
		Bherunda	3	19	17.18	12.72	16.30		
Tonk	Malpura	Nagar	3	30	25.86	27.78	27.88	<b>27.16</b>	<b>22.65</b>
		Pachewar	3	28.22	26.21	24.92	26.45		
	Deoli	Manpura	3	8.08	10.12	14.98	11.06	<b>18.15</b>	
		Dooni	3	25.37	26.24	24.1	25.23		
Sikar	Khandela	Shyamgarh	3	11.04	7.21	8.96	9.07	<b>11.7</b>	<b>17.88</b>
		Barsinghpura	3	13.83	19.21	9.96	14.33		
	Srimadhapur	Arniya	3	20.14	19	26.2	21.78	<b>22.22</b>	
		Mau	3	24.60	19.56	23.8	22.65		
<b>Overall mean</b>							<b>22.60</b>		

#### 4. CONCLUSIONS

Total sixty places were visited under ten tehsils of five districts in Rajasthan viz., Jaipur, Ajmer, Tonk, Nagaur and Sikar. During the survey, anthracnose was found at all the sites and the intensity ranged from 11.70 to 32.89 per cent. Overall mean disease intensity of anthracnose of mungbean was observed 22.60 per cent under surveyed districts of Rajasthan. The lowest anthracnose intensity was noticed in Khandela (11.70%), while the highest anthracnose intensity was recorded in Dudu (32.89 %). Among the district, minimum anthracnose intensity was recorded in Sikar, while maximum anthracnose intensity was recorded in Jaipur (28.93%).

#### DISCLAIMER (ARTIFICIAL INTELLIGENCE)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of this manuscript.

#### COMPETING INTERESTS

Authors have declared that no competing interests exist.

#### REFERENCES

- Alien, D. J., Ampofo, J. K. O., & Wortman, C. S. (1996). *Pest, disease, and nutritional disorders of the common bean in Africa: A field guide*. Centro Internacional de Agricultura Tropical, Cali, Colombia.
- Chauhan, Y. S., Douglas, C., Rachaputi, R. C. N., Agius, P. M., & King, K. (2010). Physiology of mungbean and development of the mungbean crop model. In *Proceedings of the 1st Australian Summer Grains Conference*, Gold Coast, QL, Australia (pp. 21–24).
- Datar, V. V. (1986). *Phytopathometry*. Technical Bulletin-I, Marathwada Agricultural University, Parbhani, India.
- Doganya, D., Bobade, A., Jain, V. K., Arsia, S. K., & Vani, D. K. (2021). Survey of anthracnose of green gram in East Nimar region of Madhya Pradesh. *Progressive Research: An International Journal*, 16(1), 8–13.

- Kaur, L., Singh, P., & Sirari, A. (2011). Biplot analysis for locating multiple disease-resistant diversity in mungbean germplasm. *Disease Research*, 26, 55–60.
- Kulkarni, A. S. (2009). *Epidemiology and integrated management of anthracnose of green gram* (Ph.D. thesis). University of Agricultural Sciences, Dharwad, India.
- Kulkarni, S., & Benagi, V. I. (2013). Survey for the status of anthracnose of green gram in Northern Karnataka. *International Journal of Agricultural Sciences*, 9(1), 1–13.
- Mayee, C. D., Itoh, T., Garcia, R. N., Adachi, M., Maruyama, Y., Tecson-Mendoza, E. M., & Mikami, B. (2006). Structure of 8Sα globulin, the major seed storage protein of mung bean. *Acta Crystallographica Section D: Biological Crystallography*, 62, 824–832.  
<https://doi.org/10.1107/S090744490601804X>
- McKinney, G. M. (1923). A new system of grading plant disease. *Journal of Agricultural Research*, 26, 195–218.
- Parthiban, V. K., & Kavitha, R. (2014). In vitro screening of effective biocontrol agents against bean anthracnose pathogen, *Colletotrichum lindemuthianum*. *International Journal of Pharmaceutical Science Methods*, 4(1), 32–35.
- Patil, V. (2022). *Management of Colletotrichum lindemuthianum (Sacc. & Magnus) Briosi and Cav. causing anthracnose of green gram* (M.Sc. thesis). Rajmata Vijayaraje Scindia Krishi Vishwa Vidyalaya, Gwalior, Madhya Pradesh.
- Pratap, A., Gupta, S., Basu, S., Tomar, R., Dubey, S., & Rathore, M. (2019). Towards development of climate-smart mungbean: Challenges and opportunities. In C. Kole (Ed.), *Genomic designing of climate-smart pulse crops* (in press). Springer Nature.  
[https://doi.org/10.1007/978-3-319-96932-9\\_5](https://doi.org/10.1007/978-3-319-96932-9_5)
- Roopadevi, B., Jamadar, M. M., & Anusha, B. G. (2015). Survey for incidence and severity of green gram (*Vigna radiata* [L.] Wilczek) anthracnose caused by *Colletotrichum truncatum* (Schw.) Andrus & Moore. *Trends in Biosciences*, 7(23), 3941–3943.
- Shukla, V., Baghel, S., Maravi, K., & Singh, S. K. (2014). Yield loss assessment in mungbean (*Vigna radiata* [L.] Wilczek)

caused by anthracnose (*Colletotrichum truncatum* [Schw.]). *Journal of Research of Punjab Agricultural University*, 6, 345–348. Wilczek, R. (1954). *Vigna radiata* (L.) R. Wilczek. *Flore du Congo Belge et du Ruanda-Urundi*, 6, 343–393.

**Disclaimer/Publisher's Note:** The statements, opinions and data contained in all publications are solely those of the individual author(s) and contributor(s) and not of the publisher and/or the editor(s). This publisher and/or the editor(s) disclaim responsibility for any injury to people or property resulting from any ideas, methods, instructions or products referred to in the content.

© Copyright (2024): Author(s). The licensee is the journal publisher. This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:*

<https://www.sdiarticle5.com/review-history/128504>