Status of anthracnose disease caused by *Colletotrichum lindemuthianum* in major mungbean growing area of Rajasthan

ABSTRACT

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

Key Words: Survey, Mungbean, Anthracnose, Disease intensity, Rajasthan

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 factor in the reducing yield and quality in most of the regions of India 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 disease (Parthiban and Kavitha, 2014). Mungbean anthracnose is an economically important disease results in a yield losses 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 systematic survey of this disease in Rajasthan. Hence, 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.

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 *tehsil* selected under each district were surveyed. Under each *tehsil* two villages were selected and under each village three farmers' fields were assessed. The sample were collected, isolated, purified, identified and were subjected to pathogenic test.

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

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

Table 1. Anthracnose disease rating scale of mungbean following Mayee and Dattar, 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

RESULTS AND DISCUSSION

Occurrence and distribution of Anthracnose of mungbean at farmer's field of Rajasthan

Data pertaining to 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 difference 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 result 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 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 28.1 to 62.7 per cent. The highest disease severity 59.8 per cent was obtained in Bidar district followed by Gulbarga (53.8%) and Bijapur (38.4%). Doganya *et al*. (2021) observed disease intensity between 20.0 to 29.60 per cent with an average intensity of 26.06 per cent of mungbean anthracnose at Khandwa district of Madhya Pardesh. While Patil (2022) noted 16.22 to 28.0 per cent disease intensity of mungbean anthracnose at Sehore district of Madhya Pardesh.

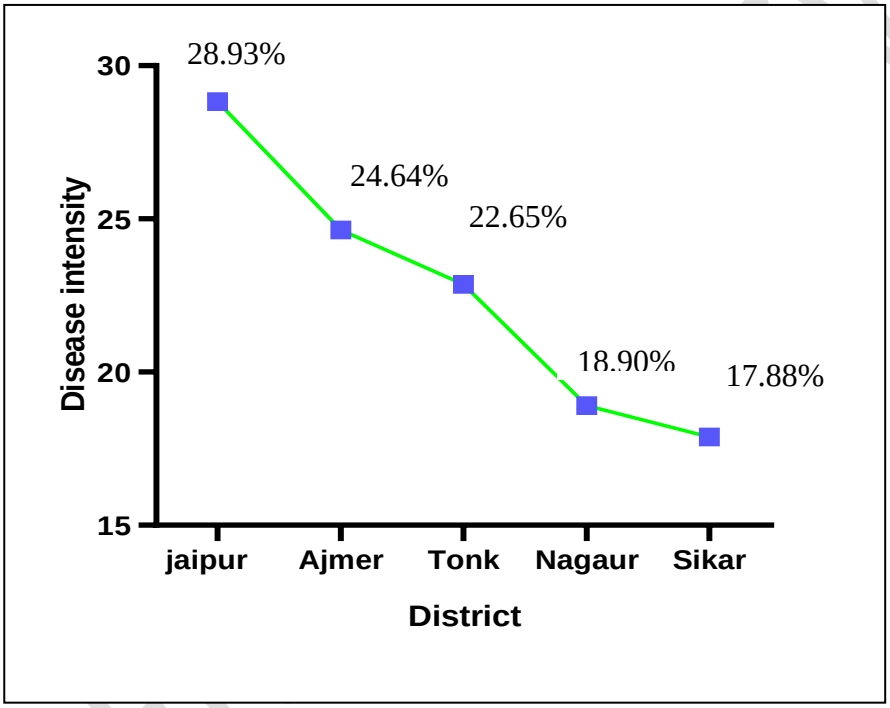

Fig. 1. Disease intensity of anthracnose in major mungbean growing district of Rajasthan

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	**32.89**	**28.93**
		Mangalwara	3	28.66	32.8	30.11	30.52		
	Phagi	Kansya	3	27.71	29.12	23.69	26.84	**24.96**	
		Nimera	3	19.21	22.43	27.57	23.07		
Ajmer	Kishangarh	Bhamolav	3	32.89	26.90	23.90	27.90	**26.62**	**24 .64**
		Chota lamba	3	23.78	24.34	27.91	25.34		
	Kekri	Meodakalan	3	22.10	28	24.21	24.77	**22.67**	
		Juniya	3	17.8	23.11	20.78	20.56		
Nagaur	Nawa	Moondgasoi	3	20.74	23.62	22.86	22.40	**23.28**	**18.90**
		Panchota	3	24.66	25.69	22.13	24.16		
	Riyanbadi	Morikalan	3	13.86	5.67	18.71	12.74	**14.52**	
		Bherunda	3	19	17.18	12.72	16.30		
Tonk	Malpura	Nagar	3	30	25.86	27.78	27.88	**27.16**	**22.65**
		Pachewar	3	28.22	26.21	24.92	26.45		
	Deoli	Deoli	3	8.08	10.12	14.98	11.06	**18.15**	
		Dooni	3	25.37	26.24	24.1	25.23		
Sikar	Khandela	Shyamgarh	3	11.04	7.21	8.96	9.07	**11.7**	**17.88**
		Barsinghpura	3	13.83	19.21	9.96	14.33		
	Srimadhopur	Arniya	3	20.14	19	26.2	21.78	**22.22**	
		Mau	3	24.60	19.56	23.8	22.65		
Overall mean							**22.60**		

Conclusions

Total sixty places visited under ten tehsils of five districts in Rajasthan *viz*., Jaipur, Ajmer, Tonk, Nagaur and Sikar. During survey, anthracnose was found at all the sites and the intensity ranged from 11.7 to 32.89 per cent. Overall mean disease intensity of anthracnose of mungbean was observed 22.60 per cent under surveyed districts of Rajasthan. Lowest anthracnose intensity was noticed in Khandela (11.70 %), while 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%).

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