Survey on Web Blight of Mungbean [*Vigna radiata* (L.) Wilczek.] Caused by *Rhizoctonia solani* Kuhn in major growing district of Rajasthan, India

Abstract

Web blight (*Rhizoctonia solani* Kühn) is one of the major diseases of mungbean. The mode of infection is soil-borne, seed borne and air-borne. Random survey was conducted during the kharif season (2022) to study the intensity of web blight in mungbean growing areas of Rajasthan which include Jaipur, Ajmer, Nagaur, Sikar and Tonk. The result showed that the disease intensity ranged from 15.70% to 31.04%. An average disease intensity of 23.57 % was recorded in the surveyed districts. The maximum intensity of web blight disease was recorded in Ajmer District (31.04%).

Keyword: Survey, Web Blight, *Rhizoctonia*, Disease, Intensity

Introduction

Indian's vegetarian population has found that pulses are an excellent source of proteins, minerals, and vitamins. Pulses in India are known as 'Poor man's meat' and 'Richman's vegetable' due to their significant contribution to the population's nutritional security. Mungbean [*Vigna radiata* (L.) Wilczek] family leguminosae, now Fabaceae) is one of the major pulses consumed by indians and has its origin traced to South East Asia (Wilczek, 1954). It is grown in kharif, spring and summer seasons. Mungbean also referred as green gram, moong, mung, golden gram or sona is mainly grown for its highly protein content and easily digestible seeds that are used for human consumption. It is consumed as whole grains as *dal, halwa* or sprouts as a fresh salad vegetable and for value addition, dehusked and split, cooked, fermented, ground into flour, milled, fried in fat and as snacks. In India, Mungbean is cultivated on 48.52 lakh ha, production 26.48 lakh tons of grains and average productivity 546 kg ha^{-1}. It is mainly grown in Rajasthan, Madhya Pradesh, Maharashtra, Karnataka, Bihar, Gujarat, Andhra Pradesh, Orissa, Tamil Nadu and Uttar Pradesh (Anonymous, 2021-22). In

Rajasthan it is cultivated on 23.25 lakh ha with production of 11.16 lakh tons and average productivity 480 kg ha^{-1} (Anonymous, 2021-22).

Method

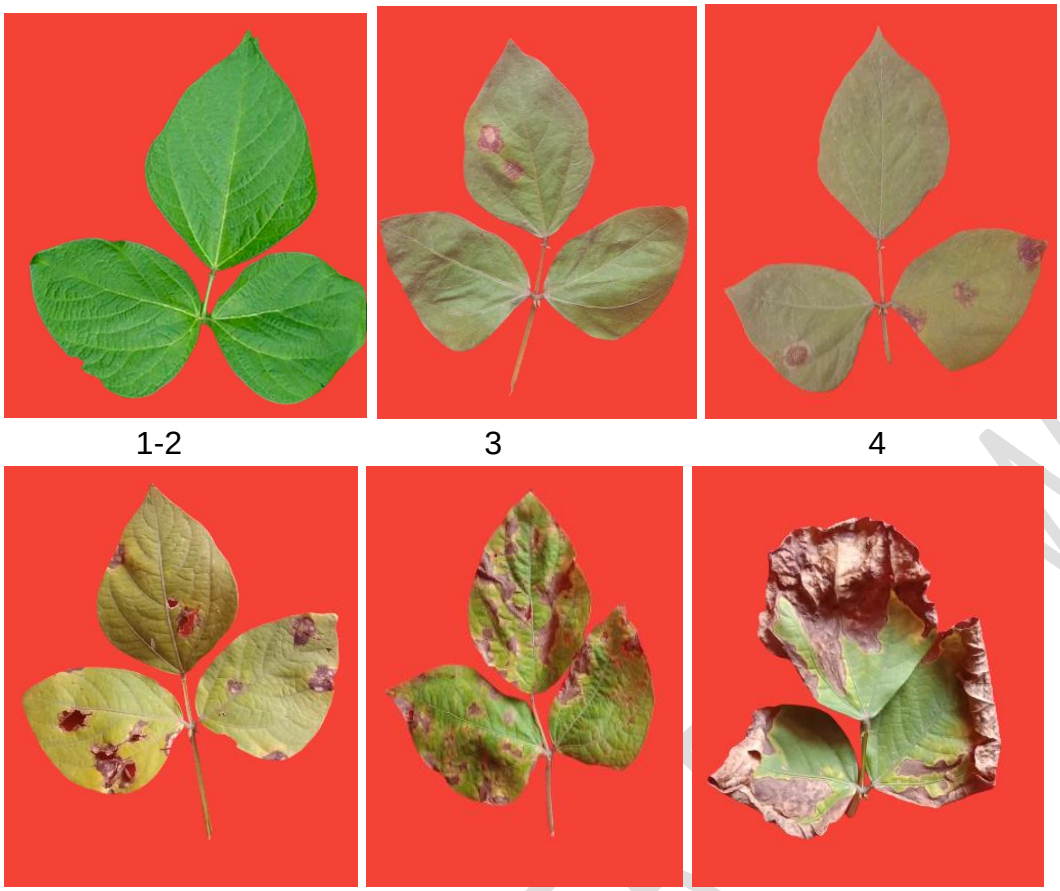
Survey and status of web blight of mungbean

The disease survey was conducted during the kharif season at 2022, for the intensity study of web blight in mungbean growing five districts (*i.e.* Jaipur, Ajmer, Nagaur, Sikar and Tonk districts) of Rajasthan. During the survey, web blight infected mung bean plants were observed at pod formation stage of the crop. Survey was carried out in two tehsil under each district was surveyed. Each tehsil two villages was selected and under each village one farmer's field. The disease intensity was recorded as per 1-9 rating scale given by Stonehouse (1994) (Table .1 and plate-3). Randomly selected ten plants from each field and each plant select 5 leaves were rated as per following description and per cent disease intensity (PDI) on foliage was calculated using the formula of McKinney (1923).

$$PDI\ (\%) = \frac{\text{Sum of all numerical rating}}{\text{Total number of leaves examined x Maximum grade}} \times 100$$

Table .1 Web blight disease rating scale on mungbean

S. No.	Disease rating/grading	Description	Disease Reaction
1.	1-2	No lesions on the leaves	Highly resistant (HR)
2.	3-4	1-25% area covered by lesions	Moderately resistant (MR)
3.	5-6	25.1- 50.00% area covered by lesions	Moderately susceptible (MS)
4.	7-8	50.1-75.00% area covered by lesions	Susceptible(S)
5.	9	75.1-100% area covered by lesions	Highly Susceptible (HS)



1-2 3 4

5-6 7-8 9

Plate: 1 Web blight disease rating scale on mungbean

Result

Disease intensity at the time of survey ranged from 15.70% to 31.04. An average disease intensity of 23.43 per cent was recorded in these surveyed districts. The higher disease frequency (31.04%) was assessed in Ajmer while least in Jaipur location (16.39%). The most extreme disease frequency was seen in plants at a flowering and podding stage. The severity of the disease was highest in the Ajmer region which ranged from 25.44 to 37.46% with an average of 31.04 % followed by Nagaur, Tonk, Sikar and Jaipur district. Information on the predominance of web blight of mungbean summed up (Table 2, Fig. 1 and Plate 1).

Table 2 : web blight disease intensity in different regions of Rajasthan

Districts	Tehsils	Villages	No. of fields	GPS location		PDI in surveyed field and sample No.	Avg. disease intensity (Tehsils)	Soil type	Avg. disease intensity (Districts)
				Longi. (^{0}N)	Latit. (^{0}E)				
Jaipur	Phaghi	Mohanpura	1	26.844119	75.789295	27.75(1)	24.32	Sandy loam	15.70
		Nimera	1	26.844011	75.788996	20.90(2)			
	Dudu	Gidani	1	26.844119	75.789295	5.82(3)	7.08	Sandy loam	
		Mangalwada	1	26.907524	75.739639	8.33(4)			
Ajmer	Kishangarh	Lamba	1	26.717450	74.795876	37.46(5)	34.81	Loamy soil	31.04
		Dang	1	26.339917	74.60352	32.15(6)			
	kekri	Meoda Kalan	1	26.437823	74.35966	25.44(7)	27.27	Loamy soil	
		Kekri	1	26.33443	74.59224	29.10(8)			
Nagaur	Nava	Mundghasoi	1	26.84088	75.78927	25.76(9)	23.79	Clay loam	26.92
		Panchota	1	27.07720	75.00240	21.82(10)			
	Riyabari	Morikalan	1	26.67944	74.48516	31.22(11)	30.05	Clay loam	
		Bherunda	1	26.648897	74.415924	28.88(12)			
Tonk	Malpura	Nagar	1	26.300434	75.342296	30.22(13)	28.86	Clay loam	24.48
		Pachewar	1	26.480438	75.231518	27.50(14)			
	Deoli	Deoli	1	25.75450	75.38470	10.75(15)	20.10	Clay loam	
		Dooni	1	25.87710	75.60350	29.44(16)			
Sikar	Srimadhopur	Arniya	1	27.402185	75.643885	26.22(17)	27.20	Sandy loam	19.00
		Mau	1	27.402146	75.643512	28.17(18)			
	Khandela	Shyamgarh	1	27.367829	75.534272	9.95(19)	10.81	Sandy loam	
		Barsinghpura	1	27.36993	75.535313	11.67(20)			
Mean									23.43

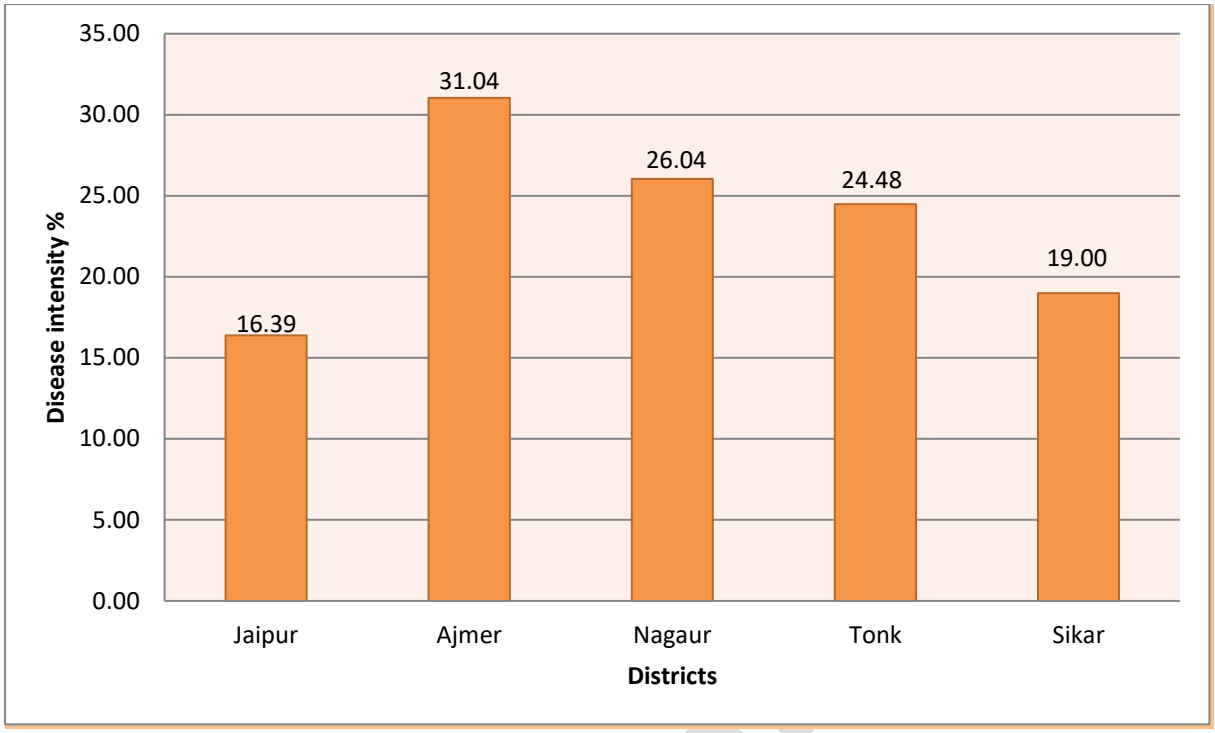


Fig 1: Disease intensity of web blight of mungbean in major mungbean growing districts of Rajasthan

Jaipur

Ajmer

Nagaur

Tonk

Sikar

Plate 2: Disease intensity of web blight of mungbean in major mungbean growing districts of Rajasthan

DISCUSSION AND CONCLUSION

The web blight disease was noticed in almost entire mungbean growing fields of surveyed region. The overall average disease intensity (23.43%) of web blight was recorded in five surveyed districts of Rajasthan. The highest average disease intensity of web blight was observed in the Ajmer (31.04%) district followed by Nagaur (26.92%), Tonk (24.48%), Sikar (19.00%) and minimum in Jaipur (15.70%) district.

The disease intensity also varied among the tehsil and followed the sequence of decreasing order as Kishangarh (34.81%) > Riyabari (30.05%)> Malpura (28.86%) > Kekri (27.27%) > Srimadhopur (27.20%) > Phagi (24.32%) > Nava (23.79%) > Deoli (20.10%) > Khandela (10.81%)> Dudu (7.08%).

Our results are in accordance with the findings of Jhamaria and Sharma (2002) studied that web blight induced by *Rhizoctonia solani* Khun (*Thanatephorus cucumeris*), is a common and wide spread disease on mungbean. They further reported that intensity of disease varied from 17-90 per cent in India and 30-40 per cent in Rajasthan. Singh *et al.* 2003 also reported that status of web blight of mungbean in eastern Uttar Pradesh was 1.0 to 69.0 per cent with an average of 12.7 per cent. Singh *et al*. (2012) and Gupta *et al.* (2010) have also conducted survey and reported that web blight disease at different level of disease severity and in different variety reduced 33 to 40 per cent grain yield and 28.6 per cent in 1000 grain weight of mungbean in eastern parts of UP. Since then web blight disease of mungbean has become one of the most serious problems in Northern India causing extensive damage. Similarly, Singh *et al. (*2020) have also conducted survey on 46 farmer's fields of Sarethi, Chhavari, Mankesher and Barmani Villages in Sidhi District of Madhya Pradesh during 2016-2019. The average web blight intensity ranged from 15.6 to 51.25 % in different surveyed mungbean producing areas.

Similarly, findings of Rawate *et al.* (2022) conducted a random survey during the *kharif* season in 2020-21 to study the incidence of web blight in mungbean growing areas of Chhattisgarh, including Raipur, Balod, Kanker, Narayanpur, and Rajnandgaon. They found that the disease incidence ranged

from 15.5% to 78.85%. The highest incidence was recorded in Raipur District at 78.85%, while the lowest was recorded in Narayanpur District at 15.5%. This suggests that web blight was a significant concern in mungbean cultivation in these areas, with varying levels of severity across districts.

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