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## Occurrence of Cercospora leaf spot of Mothbean (*Vigna aconitifolia* (Jacq.) in Bikaner District of Rajasthan

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### Abstract

An Intensive survey was conducted in three *tehsil* of Bikaner district during 2019 *khari*f season to know the severity of *Cercospora* leaf spot disease of mothbean. Higher severity of leaf spot was observed in Gusainsar village of Bikaner *tehsil* (32.65%) during survey, followed by Norangdesar village of Bikaner *tehsil* (28.72%) and least in Parwa village of Nokha *tehsil* (21.28%).

**Keywords:** Survey, *Cercospora* Leaf spot, Mothbean, Bikaner

### Introduction

Mothbean, *Vigna aconitifolia* (Jacq.) Marechal is a short-day crop is one of the most drought resistant pulses in India and mainly in Rajasthan. It is commonly called *mat*, *moth*, *matki* in Hindi, *Turkish gram*, *aconite bean* or *dew bean* (English), *Kheri* (Bengali), *Kunkuma* (Telgu), *Math* (Gujrathi), *Madike* (Kannada), *Tulkapulpyrai* (Tamil) and *Bhioni* (Punjabi). It is generally cultivated in hot and dry habitats of Northern-Western parts of India. It is grown for human consumption and also used in many industries. Mothbean is native to India, Myanmar and Pakistan, where it grows as a wild and cultivated plant.

Mothbean grown at wide pH range (3.5–10) and can tolerate slight salinity. Mothbean can tolerate a variety of soil types, while dry sandy soil is most suitable for production. The optimum temperature for the production of moth bean has between 24–32 °C, but has been shown to tolerate up to 45 °C during the day. Major mothbean growing districts of Rajasthan are Bikaner, Churu, Barmer, Jodhpur, Nagaur, Hanumangarh and Jalore. In Rajasthan, Bikaner ranks first in area (3.16 lakh ha.) and production (1.19 lakh MT) (Anonymous, 2017-18).

Among the fungal diseases, the *Cercospora* leaf spot occurs frequently in Asia. In India too, the disease is very important and puts a high risk of mothbean production. In India, leaf spot caused by *Cercospora canescens* Ellis & Martin was first reported by Munjal *et al.*, 1960<sup>[6]</sup> from Delhi and has spread to other parts of the humid tropical regions of India (Pandey *et al.*, 2009)<sup>[8]</sup>. The reduction in yield due to the *Cercospora* leaf spot depends upon how early plant are infected (Poehlman, 1978)<sup>[9]</sup>.

An extensive roving survey conducted during *Khari*f, 2013 it was revealed that the *Cercospora* leaf spot is mostly confined to mid hills (above 1000 m) of Uttarakhand and prevalent both in Garhwal and Kumaon regions (Nagaraja *et al.*, 2017)<sup>[7]</sup>. *Cercospora* leaf spot was found predominant disease ranged 6-28 per cent leaf area. Maximum disease was recorded in Lalpora (26-31%) followed by Shalimar with disease intensity of 26–30 per cent (Bhat; 2019)<sup>[2]</sup>.

In the present investigations, random survey for *Cercospora* leaf spot of mothbean was carried out during *khari*f, 2019 in major mothbean growing areas of Bikaner to get precise information on the severity and incidence of the disease. The observations on survey revealed that *Cercospora* leaf spot severity and incidence different from different regions, because of type of growing varieties, environmental conditions, and presence of inoculum.

### Materials and Methods

A roving survey was conducted during *Khari*f, 2019 to know the prevalence and severity of *Cercospora* leaf spot disease of mothbean in the farmer's fields in three *tehsil* of Bikaner *viz.*, Bikaner, Nokha, Dungargarh. In each *tehsil* three villages were selected and in each village one to three fields were surveyed.

In each field, plants were selected in zigzag manner and the severity of leaf spot disease of mothbean was recorded by following 0 to 9 scale (Mayee and Datar, 1986) [5].

In each field five plants were selected randomly and scored for the disease severity by following 9 point scale. Per cent disease index (PDI) was calculated by using formula (Wheeler, 1969) [10].

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

PDI = Per cent disease index

During survey, characteristic symptoms of disease were recorded and also samples collected for isolation of pathogen.

Grade	Description
0	No symptoms on leaf
1	Up to 1% of leaf area covered by lesions
3	1-10% of leaf area covered by lesions
5	11-25% of leaf area covered by lesions
7	26-50% of leaf area covered by lesions
9	More than 50% of leaf area covered by lesions

## Results and Discussion

Survey for *Cercospora* leaf spot disease of mothbean was carried out in three *tehsil* of Bikaner district during *kharif* 2019-20 to find out the severity of the disease using 0-9 scale was followed as explained in the Material and Methods. The village wise per cent disease intensity has been presented in Table 1

Maximum per cent disease intensity mean of *Cercospora* leaf

spot was observed in Bikaner *tehsil* (29.77 PDI) followed by Lunkaransar *tehsil* (26.30 PDI). The minimum severity was noticed in Nokha *tehsil* (22.57 PDI).

In Bikaner *tehsil* maximum per cent disease intensity of *Cercospora* leaf spot was recorded at Gusainsar village (32.65 PDI) at maturity stage (55 DAS) followed by Norangdesar village (28.72 PDI) at pre-maturity stage (45 DAS). However, minimum per cent disease intensity was observed in Tejrasar village (27.94 PDI) at 50 days after sowing.

In Lunkaransar *tehsil*, the maximum per cent disease intensity of *Cercospora* leaf spot was recorded in Kankarwala village (27.55 PDI) at maturity stage (50 DAS) followed by Rojhan village (26.39 PDI) at 55 days after sowing. The minimum per cent disease intensity was observed in Phooldesar singas village (24.96 PDI) of maturity stage (50 DAS).

In Nokha *tehsil*, the maximum per cent disease intensity of *Cercospora* leaf spot was recorded in Rasisar village (23.97 PDI) at maturity stage (50 DAS) followed by Bhamatsar village (22.46 PDI) at pre-maturity stage (45 DAS). The minimum per cent disease intensity was observed in Parwa village (21.28 PDI) at maturity stage (50 DAS).

These observations are in agreement with the earlier reports of Dubey and Singh (2010) [3], Hossain *et al.*, (2011) [4], Nagaraja *et al.*, (2017) [7] and Bhat (2019) [2] in *Cercospora* leaf spot of greengram.

Further, the disease intensity varied to greater extent in different villages indicating the role of environment factors and existence of physiological races in the fungus. These observations are in similar with the earlier report of Hossain *et al.*, (2011) [4] on *Cercospora* leaf spot of mungbean.

**Table 1:** Survey for the *Cercospora* leaf spot of mothbean during *Kharif*, 2019

Tehsil	Village	Crop stage	Disease intensity (%)
Bikaner	Gusainsar	55 DAS	32.65
	Norangdesar	45 DAS	28.72
	Tejrasar	50 DAS	27.94
Mean			29.77
Lunkaransar	Rojhan	55 DAS	26.39
	Phooldesar singas	50 DAS	24.96
	Kankarwala	50 DAS	27.55
Mean			26.3
Nokha	Rasisar	50 DAS	23.97
	Parwa	50 DAS	21.28
	Bhamatsar	45 DAS	22.46
Mean			22.57

## Conclusion

In general, it is observed that the disease progress in natural conditions was high in the last of September at maturity which coincided with frequent rains with high relative humidity with moderate temperature.

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