



ISSN (E): 2277- 7695

ISSN (P): 2349-8242

NAAS Rating: 5.23

TPI 2022; 11(2): 1313-1314

© 2022 TPI

www.thepharmajournal.com

Received: 01-11-2021

Accepted: 03-01-2022

Tejpal Bajaya

Department of Plant Pathology,
SKN College of Agriculture,
SKNAU, Jobner, Jaipur,
Rajasthan, India

RR Ahir

Department of Plant Pathology,
SKN College of Agriculture,
SKNAU, Jobner, Jaipur,
Rajasthan, India

RP Ghasolia

Department of Plant Pathology,
SKN College of Agriculture,
SKNAU, Jobner, Jaipur,
Rajasthan, India

Mamta Bajya

Department of Plant Physiology,
SKN College of Agriculture,
SKNAU, Jobner, Jaipur,
Rajasthan, India

Meera Choudhary

Department of Plant Pathology,
SKN College of Agriculture,
SKNAU, Jobner, Jaipur,
Rajasthan, India

Corresponding Author:

Mamta Bajya

Department of Plant Physiology,
SKN College of Agriculture,
SKNAU, Jobner, Jaipur,
Rajasthan, India

Impact of weather parameters on Alternaria leaf spot disease of isabgol (*Plantago ovata*)

Tejpal Bajaya, RR Ahir, RP Ghasolia, Mamta Bajya and Meera Choudhary

Abstract

Study was conducted to see the impact of weather parameters on development of Alternaria leaf spot of isabgol (*Plantago ovata* Forssk.) caused by *Alternaria alternata* which has become a severe problem in Isabgol growing areas of Rajasthan. Maximum increase in disease intensity (11.20-14.60%) was recorded from the third week of January, 2017 which was due to occurrence of rainfall with high humidity (89%) and maximum temperature of 24.7 °C. Rate of disease progress was positively correlated with rainfall and relative humidity.

Keywords: Weather, parameters, Alternaria, isabgol, *Plantago ovata*

Introduction

Blond psyllium (*Plantago ovata* Forssk.) also known as “Isabgol”, is an annual herb with narrow linear rosette like leaves belonging to the family *Plantaginaceae*. Among 200 species of blond psyllium, *Plantago ovata* Forssk is known for superior quality of husk. Isabgol seeds and husk is used in medicines especially for relieving constipation. Isabgol is an important cash crop cultivated for its export and being of important medicinal value is reported to have larger demands and is traded in major medicinal drug markets of the world. India commands nearly monopoly in the production and export of the seed and husk to the world market. India is earning about Rs. 1600 million as foreign exchange from the export of blond psyllium products to countries like USA, Germany, France, England, Spain and Belgium (Maiti, 2000) [3]. In India, the isabgol crop is mainly grown as commercial crop in Gujarat, Rajasthan and Madhya Pradesh. However, the crop is spreading to other non-traditional parts of the country such as Haryana, Uttar Pradesh and Karnataka. In Rajasthan, it is being cultivated in 304430 hectare area with a total production of 144177 tonnes of seeds with an average productivity of 474 kg/ha (Anonymous, 2015-16) [1]. In Rajasthan, isabgol is mainly cultivated in Barmer, Jalore, Nagaur, Jodhpur, Pali, Sirohi, Chittorgarh, Udaipur and Jaisalmer districts. In recent years the area of the crop is spreading in Nagour district. Alternaria leaf spot of isabgol (*Plantago ovata* Forssk.) caused by *Alternaria alternata*, has become a severe problem in Isabgol growing areas of Rajasthan. The already weakened plants when get enough moisture become a good reservoir for *Alternaria alternata* and they cause the mortality of plants. Gemawat and Prasad (1971) [2] studied that blight development in cumin requires high humidity (90% and above) for about 3 days and temperature between 23-28 °C. Several factors limiting the productivity of this crop and lack of knowledge of disease management is the major constraints to its productivity. Therefore, it is imperative to know the impact of environmental factors on disease development.

Materials and Methods

Study was conducted to see the impact of weather parameters on the development of Alternaria leaf spot disease of isabgol in 2016-17 at the field, located nearby Agro Meteorological Observatory S.K.N College of Agriculture Jobner, Jaipur. Weather variables viz., temperature, relative humidity and rainfall were recorded and correlation among these factors & disease development was worked out. Observations on per cent disease intensity (PDI) was recorded from initiation of the disease till the maturity of the crop by examining from 10 plants randomly selected at five different locations in the field by using 0-5 disease rating scale of Rathore and Pathak (2001) [7] as, 0 = plant completely free from disease symptoms; 1=20% leaf area of a plant covered with leaf spot; 2=21-40% leaf area of a plant

covered with leaf spot; 3=41-60% leaf area of a plant covered with leaf spot; 4=61-80% leaf area of a plant covered with leaf spot; 5=More than 80% leaf area of a plant covered with leaf spot and per cent disease intensity (PDI) was calculated as per formula given by McKinney (1923)^[4] as follows:

$$\text{Per cent disease intensity} = \frac{\text{Sum of all individual ratings}}{\text{Number of leaves observed} \times \text{Maximum disease rating}} \times 100$$

Results and Discussion

Scanty information is available in the literature on the environmental factors affecting infection and development of *Alternaria* leaf spot of isabgol in Rajasthan. In present investigation, an attempt has been made to study the effect of temperature, relative humidity, and rainfall for initiation and development of *Alternaria* leaf spot of isabgol. The results (Table 1) of cropping seasons with respect to weather parameters revealed that *Alternaria* leaf spot of isabgol is

greatly favoured by relative humidity more than 80% and rainfall. The correlation studies (Table 2) indicated that maximum temperature had negative correlated with disease intensity whereas, relative humidity had positive correlation and rainfall showed significant positive correlation. This finding is supported with results obtained by earlier workers. Gemawat and Prasad (1971)^[2] has also reported that high humidity (90% and above) for about 3 days and temperature between 23-28 °C and rainfall, sunshine hours and wind speed play important role in the development of cumin blight caused by *A. burnsii*. Sharma and Pandey (2013)^[10] has also noted that maximum temperature between 29-35.5 °C, minimum temperature between 9.6-19.7 °C, average relative humidity of more than 60 per cent in the morning and more than 28 per cent in afternoon, wind speed 2.1-4.8 km/hr and bright sunshine hours favourable for development of blight of cumin. Singh and Shukla (1986) pointed out that *Alternaria alternata* is favoured by temperature of 28.7 °C to 32.2 °C and relative humidity of 74 per cent.

Table 1: Percent disease intensity of isabgol in relation to environmental factors during 2016-17

Meteorological week	Temperature (°C)		Relative humidity (%)		Rainfall (mm)	Per cent disease intensity	Weekly increase in PDI
	Max	Min	Mor.	Even.			
01 (Jan. 07)	24.4	7.2	91	52	000.0	0.0	0
02 (Jan. 14)	20.4	2.8	86	40	000.0	2.6	2.6
03 (Jan. 21)	21.1	4.9	89	38	000.0	9.2	6.6
04 (Jan. 28)	23.2	10.5	89	55	021.8	23.8	14.6
05 (Feb. 04)	24.7	09.9	86	44	000.0	35.0	11.2
06 (Feb. 11)	24.4	07.8	76	33	000.0	39.6	4.6
07 (Feb. 18)	27.9	08.9	70	27	000.0	48.2	8.6
08 (Feb. 25)	29.9	09.1	66	25	000.0	49.8	1.6
09 (Mar. 04)	30.8	11.1	65	34	000.4	51.1	1.3
10 (Mar. 11)	29.3	10.9	72	33	002.6	51.4	0.3

Table 2: Simple correlation of disease intensity with major meteorological factors

S. No.	Variable	Simple correlation coefficient
1	Temperature	
	Maximum	-0.3630
	Minimum	0.175
2	Relative humidity	
	Morning	0.382
	Evening	0.383
3	Rainfall	0.625**

** Correlation is significant at 1%.

References

- Anonymous. Directorate of Horticulture (Statistics) 3137 laguna Street Jaipur, Rajasthan. 2014-2015.
- Gemawat PD, Prasad N. Epidemiological studies on *Alternaria* blight of *Cuminum cyminum*. Indian Journal of Microbiology and Plant Pathology. 1971;2:65-75.
- Maiti S. Cultivation of isabgol (*Plantago ovata* Forssk). Bulletin: National Research Centre for Medicinal and Aromatic Plants. Boriavi, Anand, Gujarat, 2000, pp. 1.
- McKinney HH. A new system of grading plant diseases. Agriculture Research. 1923;26:95-98.
- Mehta N, Madaan RL, Thakur DP. Record of isabgol wilt from Haryana. Haryana Agricultural University Journal of Research. 1985;15:473-474.
- Patel JG, Patel ST, Patel AJ. Leaf disease of *Plantago ovata* in Gujarat. Indian Phytopathology. 1984;37:582.
- Rathore BS, Pathak VN. Management of downy mildew of blond psyllium through seed treatment-cum-foliar sprays. Indian Phytopathology. 2001;54:465-468.
- Richardson MJ. An annotated list of seed-borne diseases. 4th Ed. The International Seed Testing Association, Switzerland, 1990.
- Russel TE. *Plantago* wilt. Indian Phytopathology. 1975;65:359-360.
- Sharma S, Pandey RN. Survival, epiderminology and management of *Alternaria* blight of cumin in Gujarat. Bioinfolet. 2013;10(2B):639-642.
- Singh M, Shukla TN. Epidemiology of *Alternaria* leaf spot and fruit rot of brinjal. Indian Phytopathology. 1986;39:119-120.
- Taneja A, Bhat CM, Arora A, Kaur AP. Effect of incorporation of *isabgol* husk in low fibre diet on *faecal excretion* and serum level of lipids in adolescent girls. European Journal of Children Nutrition. 1989;43:197-202.