



Research Article

SYMPTOMATOLOGY AND SURVEY OF LENTIL WILT IN NORTHERN MADHYA PRADESH

SHARMA OM PRAKASH¹, PACHORI AMITA^{2*}, YADAV SHASHI³, BHADHOURIA D. S.⁴ AND SASODE RAJNI⁵

^{1,2,5}Department of Plant Pathology, Rajmata Vijayaraje Scindia Krishi Vishwa Vidhyalaya, Gwalior, 474002, Madhya Pradesh, India

^{3,4}Department of Soil Science, Rajmata Vijayaraje Scindia Krishi Vishwa Vidhyalaya, Gwalior, 474002, Madhya Pradesh, India

*Corresponding Author: Email-amitapachori9@gmail.com

Received: June 10, 2016; Revised: July 27, 2016; Accepted: July 28, 2016; Published: October 24, 2016

Abstract- For finding status of wilt of lentil in three districts viz., Morena, Bhind and Gwalior of Madhya Pradesh carried out a survey of the lentil growing areas in villages of Gwalior, Bhind and Morena districts during 2010-11 in Rabi season. In all surveyed fields none of them remained free from wilt disease. Incidence of wilt in the surveyed fields ranged from 6.27 to 19.37 per cent. The maximum incidence of wilt was observed in Dandraua (19.38%), followed by Dimni (19.01%), Mehgaon (18.62%), Berja (17.49%) and Gormi (16.40%). The minimum incidence of wilt was observed in Milavali (6.27%) followed by Khera (6.64%), Badagaon (6.76%). The first symptom of wilt occurs as an isolated patch more or less circular. Curling of the leaves begins from the lower end and extends upwards. The crown then droops and this is followed by the death of the plant. The root system is poorly developed and discoloured brown (If we see after splitting of stem).

Keywords- Survey, symptomatology, Lentil, *Fusarium oxysporum f.sp. lentis*, Wilt.

Citation: Sharma Om Prakash, et al., (2016) Symptomatology and Survey of Lentil Wilt in Northern Madhya Pradesh. International Journal of Agriculture Sciences, ISSN: 0975-3710 & E-ISSN: 0975-9107, Volume 8, Issue 50, pp.-2171-2172.

Copyright: Copyright©2016 Sharma Om Prakash, et al., This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited.

Academic Editor / Reviewer: Dr P. Latha

Introduction

Lentil (*Lens culinaris* Medik) is an important leguminous pulse crop (Fixing Nitrogen in soil 101 Kg/hac/annum, [1], the major states producing lentil in India are Madhya Pradesh, Uttar Pradesh, Bihar and Punjab. Lentil has great impact in world agriculture because of its high protein content (23.7%) in seeds, while the straw serve as high value animal feed [6]. It is chief protein source in comparison with high cost animal protein [7]. Vascular wilt (Plugging of xylem vessels by brownish fungal mycelium caused sudden wilting of plant) caused by *Fusarium oxysporum f.sp. lentis* (Belong to family- Moniliaceae, Class- Deuteromycetes)) is one of the most important soil borne fungal (In form of Chlamydospores) disease of lentil worldwide. Erskine and Bayaa [2] worked on vascular wilt caused by *Fusarium oxysporum f.sp. lentis* in the field and the relationship between disease incidence and yield loss in the field were investigated. The fungus attacked the root system, made its way through the epidermis, cortex and finally into xylem vessel of the tap root from where it spread. As a result, the lateral roots might wither off [8,3]. Due to variations in genotypes, climatic conditions and cultivation practices in these districts there are the possibility in the variation in the wilt incidence in different locations of these districts. In this regard survey of all the major lentil growing areas of these districts has been made. So in this research survey has been done in fifteen different areas of three district of Madhya Pradesh for finding wilt incidence in these areas for making a better management strategy in that areas.

Materials and Methods

Survey of lentil growing areas: Lentil fields of Gwalior, Bhind and Morena districts were surveyed to find out the incidence of wilt during Rabi season. Five locations from each district were selected viz., Gwalior (Research Farm, Badagaon, Utila, Berja, Rayru), Bhind (Rampura, Dandraua, Mehgaon, Piproli, Gormi) and Morena (Ambah, Dimni, Khera, Morenagaon, Shanichara). Thus total

of 15 localities were selected and from each locality 5 fields were randomly selected. In each field the wilt incidence was randomly recorded on randomly selected lentil plants (at flowering and podding stage because this disease mainly occur at older stage of crop) 1m² patches. The wilt incidence on the plants selected patches was recorded with the help of following formula:-

$$\text{Wilt incidence (\%)} = \frac{\text{Wilt infected plants}}{\text{Total number of plants}} \times 100$$

The localities wise incidence of root rot was worked out by calculating the mean of five fields of respective locality. District wise incidence of wilt was calculating the average of five localities of respective district [Table-1].

Table-1 Collection of diseased plant / root samples of lentil, collected from different districts of Northern Madhya Pradesh

S. No.	Code	Districts	Village/Locations
1	GWL ₁	Gwalior	Research Farm
2	GWL ₂	Gwalior	Badagaon
3	GWL ₃	Gwalior	Utila
4	GWL ₄	Gwalior	Berja
5	GWL ₅	Gwalior	Rayru
6	BND ₁	Bhind	Rampura
7	BND ₂	Bhind	Dandraua
8	BND ₃	Bhind	Mehgaon
9	BND ₄	Bhind	Pipproli
10	BND ₅	Bhind	Gormi
11	MRN ₁	Morena	Ambah
12	MRN ₂	Morena	Dimni
13	MRN ₃	Morena	Khera
14	MRN ₄	Morena	Morenagaon
15	MRN ₅	Morena	Shanichara

Results and Discussions

Symptomatology

The first symptom of wilt occurs as an isolated patch more or less circular in outline, which enlarges as the season advances. Curling of the leaves begins from the lower end and extends upward. The crown then droops and this is followed by the death of the plant. The root system is poorly developed and discoloured brown. The discoloration of root system may be partial or whole (seen after splitting of infected stem). In early cases the tap root system is destroyed at the tip and is abnormally short. Proliferation of secondary roots occurs in a cluster above the affected level. In a section of affected root the walls of some vessels are discoloured brown and fungal hyphae are observed in some vessels, running close to the walls. Similar work was carried out by [10] and reported the symptoms of wilt of lentil as the curling of leaves which begins from lower part and extends upwards and the root system gets poorly developed and discoloured brown.

Survey of wilt of lentil:

To find out the prevalence of the disease on farmer's field a planned survey of the lentil growing area was carried out. Five villages from each districts viz., Gwalior, Bhind and Morena was surveyed for recording the incidence of wilt at flowering and podding stage (wilt disease occur at old plant). In all the locations surveyed none of the field remained free from the wilt disease. It is evident from [Table-2] that incidence of wilt in the surveyed fields ranged from 6.27 to 19.38 percent. The minimum incidence of wilt was observed in Milavali (6.27%) followed by Khera (6.64%), Badagaon (6.76%), Rairu (8.07%) and Piproli (8.22%). The maximum incidence of wilt was observed in Dandraua (19.38%), followed by Dimni (19.01%), Mehgaon (18.62%), Berja (17.49%) and Gormi (16.40%). The survey also revealed that, the severity and incidence of wilt of lentil varied from location to location, obviously due to various factors like temperature, relative humidity, rainfall, sowing dates, diverse cultivars used and even it could also be attributed to existence of pathogenic variability. The higher disease incidence may be due to susceptibility of the cultivars or favourable environmental conditions. That must have helped for buildup of inoculum and subsequently resulting in increased disease severity. Present finding is in agreement with [9] who carried out periodic survey on wilt incidence of gram in 30 villages of northern region of Madhya Pradesh for two consecutive years (1976-77 and 1977-78) showed that *F. oxysporum f. sp. ciceri* was constantly associated with wilted plants of gram at all the locations. [2] also carried out the survey in May 1996, 47 randomly-selected lentil fields of south-east Anatolia, Turkey for finding incidence and severity of diseases. [5] worked on vascular wilt caused by *Fusarium oxysporum f.sp. lentis* and the relationship between disease incidence and yield loss in the field were investigated. [4] also reported that in lentil suitable soil temperature and moisture during early crop growth, winter rains and terminal drought favour invasion of the crop by many root-invading pathogens.

Table-2 Incidence of wilt of lentil in different locations of Gird zone of Madhya Pradesh

S. No.	Location	Season	Soil Type	Crop Stage	Disease incidence (%)*
Gwalior					
1	Research Farm	Rabi	Black	Podding	15.73
2	Badagaon	Rabi	Black	Podding	6.76
3	Berja	Rabi	Sandy Loam	Flowering	17.49
4	Rairu	Rabi	Black	Flowering	8.06
5	Milavali	Rabi	Black	Flowering	6.27
Bhind					
6	Rampura	Rabi	Black	Flowering	14.10
7	Dandraua	Rabi	Sandy Loam	Podding	19.38
8	Mehgaon	Rabi	Sandy Loam	Podding	18.62
9	Piproli	Rabi	Sandy Loam	Flowering	8.22
10	Gormi	Rabi	Black	Podding	16.40
Morena					
11	Ambah	Rabi	Sandy Loam	Flowering	8.27
12	Dimni	Rabi	Sandy Loam	Flowering	19.01
13	Khera	Rabi	Black	Flowering	6.64
14	Morenagaon	Rabi	Black	Podding	14.22
15	Shanichara	Rabi	Black	Podding	17.05

* Average of 5 locations.

Conflict of Interest: None declared

References

- [1] BINA (2012) A compilation of improved agricultural technologies developed by Bangladesh Institute of Nuclear Agriculture (BINA), BAU Campus, Mymen Singh-2202, Bangladesh. Pp.101-103.
- [2] Buyaa B, Kumari S.G., Akkaya A., Erskine W, Makkouk K.M., Turk Z.O. and Zberk I. (1998) *Phytopathology Meditterrean*, 37(2), 88-95.
- [3] Chavan S.C., Y.R. Hegde and S.K. Prashanthi (2009) *Journal of Mycology Plant Pathology*, 39,32-34.
- [4] Choudhary R.G. Vishwa-Dhar and Singh R.K. (2009) *Archives Phytopathology Plant protection*, 42 (4), 340-343.
- [5] Erskine W. and Buyaa B. (1996) *Phytopathology Meditterrean*, 35(1), 24-32.
- [6] Kashem M.A., Islam F., Sarker S., Puteh A.B. and Mondal M.M.A. (2014) *Legume Research*, 37 (6), 665-669.
- [7] Mondal M.M.A., Puteh A.B., Malek M.A., Kabir A.K.M.R. (2013) *Legume Research*, 36 :153-157.
- [8] Murumkar C.V. and P.D. Chavan (1985) *Bioivgyanam*, 11(1),118-120.
- [9] Sharma B.L. Gupta R.N. and Gupta J.S. (1983) *Indian phytopathology*, 36 (1), 82-84
- [10] Vasudeva R.S. and Shrinivasan K.V. (1952) *Indian Phytopathology*, (v), 23-32.