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Research Article

# Field Survey of Fusarium Wilt Disease Incidence of Brinjal in Different Districts of Western Uttar Pradesh

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## Abstract

Brinjal (or Eggplant) is one of the popular vegetable crops usually cultivated worldwide. This vegetable crop faces economic losses due to various diseases which are caused by different pathogens. The Fusarium wilt in eggplant plant is one of the most harmful and devastating disease caused by *Fusarium oxysporum* .f. melongenae. In this investigation, we have focused on fusarium wilt and conduct a survey aimed at assessing percent disease incidence in brinjal in different districts of Western Uttar Pradesh. The survey result revealed that fusarium wilt was noticed in almost all sites which are surveyed and the range of percent disease incidence is 15-32%. The maximum wilt disease incidence was observed in Sikandrabad tehsil (32%) of Bulandsahar district while the least disease incidence in Garhmukteshwar tehsil (15%) of Hapur district and disease incidence also occurs in Mawana tehsil (18.33%) of Meerut district.

**Keywords:** *Eggplant, wilt disease, Fusarium oxysporum f. sp. melongenae, survey, percent disease incidence.*

## Introduction

The Brinjal (*Solanum melongena* L.) is a member of Solanaceae family which is also called nightshade family. Brinjal is usually called eggplant because the fruits of some varieties which are white and show resemble to shape of chicken eggs. In India, it can be grown in almost all seasons and probably all parts of the country except higher altitudes or hilly regions.

The major brinjal cultivating states in India are West Bengal, Orissa, Gujrat, Bihar, Madhya Pradesh, Jharkhand and Assam. While in Uttar Pradesh, brinjal cultivation area is 8.02 thousand hectares with 275.40 thousand metric tons (Horticulture Statistics Division, Department of Agriculture, Coopn & Farmers Welfare, 2018). This crop faces economic losses due to many bacterial, nematodal, phytoplasmal, viral and fungal pathogens. Among fungal pathogen, some important pathogens are *Phomopisvexans* which cause fruit rot, Verticillium wilt caused by *Verticillium dahliae*and Fusarium wilt which is caused by *Fusarium oxysporum.* f. melongenae.

In fungal disease of eggplant, fusarium wilt is one of the most important harmful and devastating diseases caused by *Fusarium oxysporum*. f. sp. melongenae.

## Material and Methods

During the investigation, a random survey was conducted in some selected districts of Western Uttar Pradesh such as Meerut, Hapur, Bulandsahar and Amroha in 2021-2022.

In the field survey, first we selected district and, in each district, select three tehsil and in each tehsil, selects three villages subsequently where the brinjal crop is grown. This selection method applied on all selected districts of west Uttar Pradesh during conducting survey.

The wilt disease caused by *Fusarium oxysporum*. f. melongenae often occur on

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mature brinjal plants after the flowering or at the time of beginning of fruiting. The disease symptoms start with the drooping of leaf petioles and sometimes a single branch of plant may be affected before the rest of the plant. In eggplants, wilting starts with lower leaves and quickly this wilting progressing upto the whole plant. Due to heavy fungal infestation, the wilted leaves often dry up, show yellowing and plants becomes stunted. Finally, the whole plant wilted and killed often it reaches maturity. The wilt affected plants show brown discoloration in the vascular tissue (Agrios, 2005) and can be shown after cutting their stem near soil surface which is a characteristic symptom of fusarium wilt in diseased plant.

For calculating the percent disease incidence in each agricultural field, randomly selected 100 plants which includes both healthy and diseased plants.By using the following formula, we calculate the percent disease incidence:

$$PDI = \frac{\text{Number of wilted plants}}{Total\ plants\ observed} \times 100$$

During the survey, diseased plant specimens are collected in the polythene bags and bring to the laboratory of plant pathology of department of Botany, Meerut College, Meerut for further investigation.

## Result and Discussion

In selected districts of western Uttar Pradesh, survey results revealed that the crop are affected by Fusarium wilt variously and the percent disease incidence differ in villages and as well as in districts.

**Table:** Incidence of Fusarium wilt of brinjal in different districts of Western Uttar Pradesh

| Sr. No. | District | Tehsil | Villages | Wilt % Incidence |
|---|---|---|---|---|
| 1 | Meerut | Sardhana | Lawar | 22 |
| | | | Daurala | 20 |
| | | | Siwaya | 12 |
| | | | **Mean** | **18%** |
| | | Mawana | Kheri Manihar | 22 |
| | | | Mawana | 14 |
| | | | Palda | 19 |
| | | | **Mean** | **18.33%** |
| | | Kharkhoda | Phaphunda | 28 |
| | | | Bhagwanpur | 17 |
| | | | Lalpur | 19 |
| | | | **Mean** | **21.33%** |
| 2 | Hapur | Hapur | Imtori | 13 |
| | | | Sadikpur | 19 |
| | | | Hafizpur | 15 |
| | | | **Mean** | **15.66%** |
| | | Garhmukteshwar | Garh | 20 |
| | | | Dauti | 12 |
| | | | Paudi | 13 |
| | | | **Mean** | **15.00%** |
| | | Dahulana | Dahaulana | 18 |
| | | | Nidhawali | 17 |
| | | | Daulatpur | 11 |
| | | | **Mean** | **15.33%** |
| 3 | Bulandshahr | Siana | Amargarh | 19 |
| | | | Narsena | 12 |
| | | | Amarpur | 19 |
| | | | **Mean** | **16.66%** |

| | | | | |
|---|---|---|---|---|
| | | Anupshahr | Ametha | 23 |
| | | | Bamanpur | 19 |
| | | | Bhopur | 13 |
| | | | **Mean** | **18.33%** |
| | | Sikandrabad | Agwana | 19 |
| | | | Ritoli | 14 |
| | | | Kishanpur | 16 |
| | | | **Mean** | **16.33%** |
| 4 | Amroha | Hasanpur | Abdipur | 35 |
| | | | Adampur | 21 |
| | | | Alauddinpur | 14 |
| | | | **Mean** | **23.33%** |
| | | Amroha | Ameri | 31 |
| | | | Ahari | 17 |
| | | | Adalpur Samdoo | 23 |
| | | | **Mean** | **27%** |
| | | Dhanaura | Basipur | 27 |
| | | | Baseli | 18 |
| | | | Barampur | `13 |
| | | | **Mean** | **19.33%** |

**(a) Brinjal Vegetabel rop field**

**(b) wilted, Brinjal plants along with healthy plants in agricultural field.**

**(c) A plant showing partially wilting symptoms (d) A plant showing complete wilting symptoms**

During survey, plant diseased specimens were collected and pathogen were isolated from these collected diseased specimens and culture in laboratory for experimental work.The findings of this survey revealed that wilt disease incidence occurred in all the selected districts.

Similar observations were done in different crops by many researchers such as survey

conducted by Mahesh, (2016) in tomato, Kunwar Zeeshan Khan, et al., (2016) in tomato and Jayanta, et al., (2018) also done survey for disease incidence in North Eastern Karnataka on tomato.Pandey and Singh, (1990) from Allahabad on chickpea. Jeetendra Kumar Rao, (2014) done surveyed on pea in Eastern Uttar Pradesh.

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