



## Studies on the Field Survey on Fusarium Wilt Disease Losses in Cucumber in District Meerut (UP)

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### Abstract

A field survey was conducted to collect the cucumber from different major cucumber growing area such as name-Meerut, Mawana and Sardhana. The farmers used some selected pesticides in combination with plant growth regulators at 2-day intervals. The major pest of cucumber was wasp. The result showed that 21% -24% of the growers used trap to reduce insect attack but Fusarium wilt disease is the most destructive disease as it affects the cucumber production. The causative agent are Fusarium oxysporum. F. oxysporum pathogens are soil borne & transmitted through infested soil & water field study that the disease was highly prevalence in the field with the disease incidence was in the range of 10-22%. The symptoms of Fusarium wilt disease In starting appeared as yellowing of old disease. The infected plant will be wilted and finally died.

**Keywords:** *Cucumber, wilt disease, Fusarium oxysporum f. sp. cucumerium, percent disease incidence*

### Introduction

Cucumber (*Cucumis sativus*) belong to family Cucurbitaceae. The word cucumber comes from the Latin name "cucumis" and this fruit is also popular as name khira in India. Cucumbers are originated in India (South Asia). It is a climber plant which is used as summer vegetable through out in India. The cucumber fruit is eaten raw or is served as a salad as cooked as a vegetable. The seeds of cucumber are used for oil extraction which is good for body and brain. A cucumber contains 96% water which is good in summer season. The plants are large sized, leaves are hairy and are tralngubs in sap and flowers are yellow in colour. Cucumber is an excellent source of molybdenum (Mo) and vitamin K. It is also used cure skin problems, kidney and heart problems and is used as Alkalizes.

In India, Cucumber (*Cucumis sativus*), Cucurbita is another gourd fruit. It is probably indigenous to Southern India. It has reached Europe by the seventeenth century

and now wide spread. The *Cucumis anguria* the special variety with tiny fruits and thin flesh numerous seeds used for pickles in west India (Albert, 1957).

The family Cucurbitaceae which includes crops likes cucumbers, squashes, melons. Cucurbits form is an important and big group of vegetables crops and cultivated in subtropical and tropical countries. The family consists of about 118 genera and 825 species plants. Cucumber (*Cucumis sativus* L.) is monoecious annual crops in the family Cucurbitaceae. It has been cultivated by man power 3000 years regarding the economic importance its rank after the tomatoes, cabbage and onion in Asia (Mariod, *et al.*, 2017).

Cucumber (*Cucumis sativus*) is an annual climber growing up to 2 meters. The fruits of the cucumber are roughly cylindrical, elongated with hard rind. The fruit of typical cultivars of cucumber is roughly cylindrical

but elongated with tapered ends and may be as large 62 cm long and 10 cm in diameter. (Review, 2019)

The seeds of cucumber are good source of protein (33.8%), fat (45.2%), carbohydrates (10.3%) and fiber (2.0%). The seed oil has four main fatty acids as linoleic acid C18:2 (61.6%); oleic acid, C18:1 (15.7%); stearic acid, C18:0 (11.1%); and palmitic acid, C16:0 (10.7%). The oil is used as cooking oil, which can increase HDL and reduce serum cholesterol and LDL levels, hence could help to prevent cardiovascular disease (Valkalounakis, 2016).

*Fusarium oxysporum* is a soil borne fungal pathogen and its spread is mainly facilitated through contact with infected plant parts which can also be seeds. Agriculture tools and machinery contributes to high percentage of pathogen from one field to another especially when the instruments are used in an infected crops field and hygiene of the implements is not checked before using them in another clean field. The pathogen can be dispersed from one area to another through a number of ways for instance infected planting materials and seeds are the most common method of spread and allows long distance spreading of the disease. Air and water also plays a role in the spread of this fungus during floods and irrigation water (Joshi, 2018).

## Materials and Methods

### Survey of cucumber grown fields in Meerut (Uttar Pradesh) for assessing the disease incidence

During the investigation, a random survey was conducted in some selected districts of Meerut. In the field survey, first was selected districts and three Tehsil subsequently where the cucumber grown. The wilt disease caused by *Fusarium oxysporum* occur on cucumber plants. The disease symptoms start with

drooping of leaf .and some times a single branch of plant may be affected before the rest of the plant. In cucumber plant, wilting starts with lower leaves and quickly this wilting progressing up to the whole plant. Due to heavy fungal infestation, the wilted leaves often dry up, show yellowing and plants becomes stunted. The wilt affected plants show brown discoloration in the vascular tissue (Agrios, 2005) 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:

$$PDI = \frac{\text{No. of Wilted Plant}}{\text{Total plant observed}} \times 100$$

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.

## Results and Discussions

### Survey of cucumber grown fields in Meerut (Uttar Pradesh) for assessing the disease incidence

*Fusarium* wilt disease symptoms were observed in infected surveyed areas during the respective period. From the survey data, typical *Fusarium* wilt symptoms i.e. leaf yellowing and severe wilting were recorded at all surveyed areas. Field data of disease incidence and disease symptoms were summarised. Findings revealed that field disease incidence was in the range of 10%-22%. The areas with the highest disease incidence was Meerut, Mawana and Sardhana.

**Table-1:** Type of field disease symptoms and disease incidence at the surveyed district in Meerut

| Sr No.          | District       | Tehsils        | Blocks       | Villages'     | Symptoms       | Disease incidence(%) |        |
|-----------------|----------------|----------------|--------------|---------------|----------------|----------------------|--------|
| 1-              | Meerut         | Meerut         | Kharkhoda    | Phaphuda      | Yellowing leaf | 25                   |        |
|                 |                |                |              | Kharkhoda     | Wilt           | 22                   |        |
|                 |                |                |              | Lalpur        | Wilt           | 19                   |        |
|                 |                |                |              | Mean          |                | 22%                  |        |
|                 |                |                | Meerut       | Abdullapur    | Wilt           | 26                   |        |
|                 |                |                |              | Jailchungi    | Wilt           | 14                   |        |
|                 |                |                |              | Shastinagar   | Wilt           | 13                   |        |
|                 |                |                |              | Mean          |                | 17.66%               |        |
|                 |                |                | Rajpura      | Bhagwanpur    | Wilt           | 10                   |        |
|                 |                |                |              | Kamalpur      | Wilt           | 13                   |        |
|                 |                |                |              | Rajpura       | Yellowing leaf | 19                   |        |
|                 |                |                |              | Mean          |                | 14%                  |        |
|                 |                | Mawana         | Mawana       | Kheri Manihar | Wilt           | 18                   |        |
|                 |                |                |              | Mawana        | Wilt           | 19                   |        |
|                 |                |                |              | Palda         | Wilt           | 12                   |        |
|                 |                |                |              | Mean          |                | 16.33%               |        |
|                 |                |                | Hastinapur   | Bhandora      | Yellowing leaf | 10                   |        |
|                 |                |                |              | Akbarpur garh | Yellowing leaf | 16                   |        |
|                 |                |                |              | Hastinapur    | Wilt           | 21                   |        |
|                 |                |                |              | Mean          |                | 15.66%               |        |
|                 |                |                | Parishitgarh | Bali          | Wilt           | 12                   |        |
|                 |                |                |              | Agwanpur      | Yellowing leaf | 15                   |        |
|                 |                |                |              | parikshitgarh | Wilt           | 13                   |        |
|                 |                |                |              | Mean          |                | 10.33%               |        |
|                 |                |                | Sardhana     | Daurala       | Andawali       | Wilt                 | 18     |
|                 |                |                |              |               | Baparsa        | Wilt                 | 22     |
|                 |                |                |              |               | Daurala        | Yellowing leaf       | 10     |
|                 |                |                |              |               | Mean           |                      | 16.66% |
|                 |                | Sardhana       |              | Bahadur pur   | Wilt           | 20                   |        |
|                 |                |                |              | Sardhana      | Yellowing leaf | 19                   |        |
|                 |                |                |              | Bubakpur      | Yellowing leaf | 14                   |        |
|                 |                |                |              | Mean          |                | 17.66%               |        |
| Saroorpur khurd | Dahar          | Wilt           |              | 10            |                |                      |        |
|                 | Bhuni          | Yellowing leaf |              | 13            |                |                      |        |
|                 | Saroorpurkhurd | Yellowing leaf |              | 18            |                |                      |        |
|                 | Mean           |                |              | 13.66%        |                |                      |        |



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