

Morphology and Symptoms Colony of Fungal Pathogen Associated with Post Harvest Deterioration of *Cucumis Sativus L.*

Vaishali. S. Chatage

Department of Botany, Kai. Rasika Mahavidyalaya, Deoni, Tq. Deoni, Dist. Latur, 413519, (M. S.) India

Email: vaishalichatage3[at]gmail.com

Abstract: The present investigation was carried to study the fungal sp. present in Cucumber fruit rot of vegetables. fungi, which caused Cucumber fruit rot in Latur District area, were isolated from various samples of different Cucumber fruit rot in field, Isolated from diseased on PDA media. The isolated fungi were identified as *Macrophomina phaseolina* on the basis of their microscopic characteristics. Finally, the pathogenicity tests showed that all the fungi isolated were pathogenic to all the Cucumber fruit rot.

Keywords: Cucumber fruit rot, Fungi and Potato Dextrose Agar (PDA) media and pathogenicity tests

1. Introduction

Cucumber is a widely cultivated vegetable from the *Cucurbitaceae* family widely cultivated in India for its nutritional value, such as vitamins B and C, water, proteins, fats, carbohydrates, and minerals. With a 96% water content, cucumbers are highly beneficial for human health. India produces over 1.6 million metric tons of cucumbers annually on over 104,000 hectares. In Northeast India, particularly Nagaland, farming cucumber (*Cucumis sativus L.*) is of significant agricultural and economic importance. The region's diverse agro-climatic conditions foster the cultivation of unique cucumber cultivars, highly priced both locally and globally (Jami et al.2021). The state's total production and cucumber area account for 21,617 MT and 714 ha, respectively, with Mokokchung district leading of total output of 18,070 MT and an area of 280 ha from 2016-2017 (Walengpong and Mazhar, 2023). To guarantee its accessibility and enhance commercial revenue, farmers in Nagaland utilize off-season cultivation techniques beginning in January (Jami et al.2021). Thus the present study was aimed to evaluate the Fungal spp. in laboratory conditions identify and isolate pathogenicity tests the fungal associated with their Cucumber fruit rot.

2. Materials and Method

Study Site

The research was carried out in the Botany laboratory of the Kai. Rasika Mahavidyalaya, Deoni, in Latur District.

Collection of Sample

Ten (10) infected cucumber fruits samples were collected from 10 different field Latur District, April 2024.

Preparation of Medium Fungi Isolation

Potato Dextrose Agar was prepared following manufacturer's instructions. After heating to boiling, the medium was sterilized by autoclaving at 121°C for 15 minutes. The medium was allowed to cool, then Gentamycin was introduced aseptically to inhibit bacterial growth, finally the medium was dispensed into sterile petri dishes.

Fungal Isolation

The infected cucumber samples were washed and surface sterilized in 75% ethanol for one minute. Then the 10 different field samples were rinsed using sterile distilled water in three successive changes and blotted dry aseptically. Diseased portion of the samples were picked under aseptic condition and placed in sterile Petri dishes with the aid of a sterile scalpel and forceps initially dipped in a methylated spirit (Al-Sadi, et al.2011). The picked portion were placed on solidified potato dextrose agar (PDA) and incubated at $28 \pm 2^\circ\text{C}$ in the dark for 5 days until visible growth was observed from the plates. The fungal colonies were subcultured until pure culture was obtained (Jidda and Muhammad, 2017).

Identification of Fungi

The fungal mycelia were picked from the sub cultured plates in very small amounts with an inoculating needle and placed on a clean glass slide that already contained lacto-phenol, it was covered with a cover slip and heat fixed by passing it through a naked flame thrice. The prepared glass slide was then placed on the microscope and observed under low and high power objectives using a light microscope before, the macroscopic viewed were compared.

Pathogenicity Test

The isolated fungi were tested for their ability to induce rot in healthy cucumber fruits. Healthy samples of cucumber fruits were washed and surface sterilized with 75% ethanol and then washed distilled water. With the aid of a sterile Cork borer, a 5 mm diameter cylindrical hole was made into the healthy cucumber fruits and the plugs pulled out. In each hole, a 3mm diameter mycelia disc of pure culture of each of the fungal isolates was introduced into the hole. The plug was carefully replaced and the wounded area sealed with petroleum jelly. The inoculated fruits were incubated at room temperature ($28 \pm 2^\circ\text{C}$) for 10 days. (Jidda and Muhammad, 2017).

3. Result

1) Survey of the fungal diseases

Fruits of different sizes were collected from various markets and farmer's fields of Latur Distract (Deoni, Latur, Nilanga, ect.) region of Maharashtra (Plate I). The fruit rot caused by *Macrohomina phaseolina* fungi were observed.

2) Isolation and pathogenicity of the pathogens

i) Symptomatology of Pathogens

Cucumis Sativus L. fruit rot of pathogens symptoms results indicated in (Table.1).

ii) Isolation of the pathogens

Cucumis Sativus L. fruits of different size were collected from various market places and Latur District of and studied for the association of different fungi. After seven days of

inoculation, growth of fungi were observed such as soft rot and hard rot *Macrohomina phaseolina* (Plate –I)

iii) Pathogenicity of the pathogens

On *Cucumis Sativus L.* different types of symptoms were recorded and isolates of *Macrohomina phaseolina* were compared with original and pathogenicity test was confirmed and gave satisfactory results.

iv) Identification of Fungi

The fungal mycelia were picked from the sub cultured plates in very small amounts with an inoculating needle and placed on a clean glass slide that already contained lacto-phenol, it was covered with a cover slip and heat fixed by passing it through a naked flame thrice. The prepared glass slide was then placed on the microscope and observed under low and high power objectives using a light microscope before, the macroscopic viewed were compared.

Plate I: Healthy Diseased fruit Colony Plate *M. phaseolina*



Figure: Fungal Diseases of Cucumber fruit

Table 1: Symptoms, colony morphology and sporulation of *Macrohomina phaseolina*

Place	Isolates	Symptoms of fruits	Colony characters	Colony Diameter (mm 8th d)
Deoni	Mp1	Black spots	Blackish color colony and irregular gray color mycelium.	90
Walandi	Mp2	Gray black spots	Gray to black color colony and irregular aerial mycelium.	90
Udgir	Mp3	Dark black spots	Black color colony with Concentric ring. Dark	90
Ausa	Mp4	Blackish spots	Blackish color colony concentric ring.	89
Nilanga	Mp5	Whitish black spots	Whitish black color colony with concentric rings and black color mycelium.	87
Latur	Mp6	Light black spots	Black color colony fluffy white color mycelium.	88
Chicholi	Mp7	Blackish Brown spots	Blackish brown color, colony irregular aerial mycelium.	90
Deoni BK	Mp8	Light Brown spots	Light brown color, colony fluffy with whitish color mycelium.	90
Chakur	Mp9	Black spot	Black color colony and fluffy with mycelium.	90
Ahmadpur	Mp10	Dark black spots	Dark black color colony and aerial mycelium	90

4. Discussion

This work was mainly concentrated on the isolation and indication of pathogenic fungi causing fruit rot diseases in Cucumber Latur district from April 2024. Before the development of the fruit the fungal pathogens located in fruit rot parts of the plant. These pathogenic fungi were isolated from fruit parts of Cucumber plant. We could able to isolate pathogenic fungal species from diseased part of Cucumber fruit plant responsible for diseases. Among them fungi spp. Isolated from fruit Had the highest frequency of distribution *Macrohomina phaseolina*, isolated in all samples and is responsible for fruit, highest disease incidence of fruit was recorded in the study area. (Yaji et al., 2016) similarly reported the presence of *Aspergillus spp.* in all their

surveyed locations and concluded that fruits sold in all these locations were contaminated. Isolations from diseased cucumber fruits recorded *A. niger* (percentage occurrence =18.4) as the most occurring fungi among *Aspergillus spp.*, followed by *A. flavus* (14.8%) and *A. ustus* (11.0%). The least encountered fungi were *A. oryzae* and *A. wentii*. Rotten cucumber fruits were similarly reported (Al-Sadi et al., 2011; Chiejina and Onaebi, 2013; Yaji et al., 2016) to be host to *Aspergillus* species. (Jidda and Benjamin 2016) found *Aspergillus* species as the dominant fungal isolates in tomato, orange, onions and other spoiled fruits in Nigeria. All the *Aspergillus spp.* found in the present study was pathogenic to fresh cucumber fruit samples. *A. ustus* was the most pathogenic isolate with the highest rot diameter (47mm) that led to 25% loss in fresh fruit weight. Loss in

fresh fruit weight was due to loss in water content resulting from rots induced by the inoculated pathogens. The findings agreed with the reports of (Akinmusire, 2011) that *Aspergillus* spp. were pathogenic to all their tested fruits.

5. Conclusion

The present study has shown that *Macrophomina phaseolina* were not only associated with diseased cucumber samples but actually caused the spoilage of cucumber. The isolation and identification of the fungal pathogen showed that *Macrophomina phaseolina* had the highest frequency of distribution (70%). The pathogenicity test shows that *Macrophomina phaseolina* is the most pathogenic with rapid lesion development. Based on the results obtained from frequency distribution and pathogenicity, it could be concluded that *Macrophomina phaseolina* even with the highest frequency, is not the most pathogenic. Identifying fungi that cause spoilage to cucumber fruits will help to adopt appropriate preventive and control measures that will help minimize fungi infection on cucumber fruits.

6. Recommendation

Further research should be carried out on the particular effective control for the *Macrophomina phaseolina* pathogens identified in this research.

Acknowledgement

Authors are thankful to Rajiv Gandhi Science and Technology Commission Govt. of Maharashtra and Swami Ramanand Teerth Marathwada University Nanded for the financial support of Minor Research Project.

Also thankful my college Principal Dr. Chandrakant A. Jawale support for my research work time to time guidance.

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