

RESEARCH ARTICLE

Survey of Common Fungal Diseases in Vegetable Crop Plants from Parbhani (M.S.) India

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ABSTRACT

Vegetables are essential components of the human diet, providing vital vitamins, minerals, and dietary fibres necessary for good health. Although India is the second-largest global producer of vegetables, plant diseases significantly threaten agricultural productivity, causing annual harvest losses of up to 40–60%. To evaluate the prevalent pathogens affecting local agriculture, a comprehensive field and laboratory survey of vegetable crops was undertaken in the Parbhani region of Marathwada, Maharashtra. Symptomatic plant tissues were systematically collected from various farms and markets, surface-sterilised using 0.1% mercuric chloride, and cultured on Potato Dextrose Agar (PDA). The isolated pathogens were identified using morphological traits via compound microscopy and validated through host-specific pathogenicity tests. The survey successfully isolated and identified ten distinct pathogens responsible for significant qualitative and quantitative damage across diverse vegetable varieties. Major fungal threats identified included *Colletotrichum* species (Anthracnose), *Sclerotium rolfsii* (Sclerotium rots), and *Fusarium oxysporum* (Fusarium wilts), as well as the devastating Yellow Vein Mosaic Virus (YVMV) affecting okra. The findings underscore the critical impact of these diseases during both active crop growth and post-harvest storage. To mitigate these economic losses for regional farmers, the study emphasises the urgent need for routine surveillance, the adoption of certified disease-free seeds, and the timely deployment of integrated crop protection strategies.

Keywords: Vegetable crops, Fungal diseases, Pathogenicity, Crop protection

FULL PAPER

Introduction

Vegetables are important components of the human diet. Vegetables provide vital vitamins, minerals, antioxidants, fibres, etc necessary for good health. India is the second-largest producer of vegetables in the world (next to China). This high level of production can supply 120 gms of vegetables per capita per day as against the recommended dietary allowance of 200 gms vegetables per capita per day (Shelke *et al.*, 2009). Within Maharashtra, the Marathwada region, and specifically the Parbhani district, are important agricultural zones where vegetables are extensively grown year-round.

Plant diseases are a global concern to agricultural productivity and cause significant losses in vegetable output. Diseases and their insect vectors are the major threats to vegetable production worldwide. Diseases cause losses in vegetable harvests of up to 40-60% annually. Vegetable crops are more susceptible to a wide range of diseases caused by bacteria, viruses, nematodes, phytoplasma, fungi, and viroids. (Tripathi *et al.*, 2024). The main things restricting agricultural output are these diseases. Plant diseases cause around 10% of the losses in plant productivity worldwide. Taking this into consideration, a comprehensive survey of vegetable crops in the Parbhani region of Marathwada (M.S.) was undertaken to study common fungal diseases of vegetables.

Materials and Methods:

- 1. Study Area:** Parbhani, formerly known as “Prabhavatinagar,” is one of the eight districts of the Marathwada region of Maharashtra State. The district is located between 18.45° and 20.10° N latitude and 76.13° and 77.39° E longitude.
- 2. Collection of diseased plant parts:** Infected vegetable crop samples were collected from various parts of Parbhani district in paper bags. Their symptoms were recorded in a field notebook, and the collected samples were taken to the laboratory and preserved for further studies.
- 3. Sterilisation of Samples:** The infected samples were surface sterilised with 0.1% Mercuric Chloride (HgCl₂) for 30 sec and washed 3-4 times with sterilised double-distilled water to remove traces of HgCl₂. The surface-sterilised samples were then placed on Potato Dextrose Agar (PDA) medium containing streptomycin (0.2 g/L) and incubated at 27 °C for 72 hours.

4. Isolation and identification: After incubation, fungal colonies were reisolated and examined. The infected tissues were stained with Cotton blue and Lactophenol, observed under a compound microscope, and identified by comparison with a reference culture (McLean and Ivimey, 1965).

5. Pathogenicity test: Some of the isolated fungi were used to confirm their pathogenicity in their respective hosts. The pathogens were isolated, identified, and cultures were used to confirm their pathogenicity in their respective hosts (Nagarkar, 2021). The inoculated samples and their respective controls were kept under sterile humid conditions at room temperature. The artificially inoculated samples were examined daily, and the extent of damage was recorded. The pathogens were reisolated, and disease symptoms were clearly evident; the cultures and symptoms were compared with the original. The symptomatic study was undertaken to note the life cycle of the pathogen on the host (Bhale, 2011).

Result:

Ten species belonging to ten fungal genera were isolated & identified from diseased vegetables. The list of common fungal/viral diseases of vegetable crops is provided in the table (Table 1) with their typical symptoms.

Sr. No.	Name of Pathogen	Name of Disease	Vegetable crop affected	Symptoms
1	<i>Colletotrichum Species</i>	Anthrachnose	Beans, Cucurbits, Capsicum etc.	Dark, sunken lesions on leaves, stems, and fruits. Initial signs include small water-soaked or yellow spots that enlarge, turn brown or black, and often ooze distinctive pinkish-orange spore masses in humid weather.
2	<i>Rhizoctonia solani</i>	<i>Rhizoctonia</i> Rots	Potato, Beans, Peas, Capsicum,	Range of symptoms depending on the crop being grown but

			Tomato and Cucurbits.	can affect roots, leaves, stems, tubers and fruit; plants wilt and may collapse and die.
3	<i>Albugo candida</i>	White rust	Members of Family Brassicaceae viz. Mustard, Cauliflower and Cabbage	Shows local and systemic symptoms on all aerial plant parts like white blisters, yellow spots, and deformed flowers.
4	<i>Sclerotium rolfsii</i>	<i>Sclerotium</i> rots	Beans, Beets, Carrot, Potato, Tomato, Capsicum, Cucurbits, Onions, Garlic etc.	Dark brown lesions at the soil line, rapid yellowing and wilting of leaves, and sudden plant death. Formation mat of white cottony fungal growth on the stem and soil, dotted with small, round, mustard-seed-like sclerotia is prominent symptom.

5	<i>Podosphaera xanthii</i>	Powdery Mildews	Very common in Cucumber, Pumpkin, Potato, Peas, Bottle gourd, Bitter guard, Tomato, Capsicum and Cabbage.	Small, white, powdery patches on most above-ground surfaces; usually observed first on undersides of leaves but eventually cover both surfaces; affected leaves become yellow, then brown and die off.
6	<i>Fusarium oxysporum</i>	<i>Fusarium</i> Wilts	Cucurbits, Onion, Potato, Ginger Tomato, Peas, Beans etc.	Causes severe wilting diseases by attacking roots and basal stems; cucurbit fruit and potato tubers can be affected in storage. Rhizome of Ginger showing black cottony mass.
7	<i>Puccinia Species</i>	Rusts of Beans	Cowpea, Guar bean, Flat bean etc.	Small, red or reddish- brown pustules that form on the underside of the leaves and sometimes on the pods as well; dusty reddish-brown spores released from pustules

8	<i>Phomopsis vexans</i>	<i>Phomopsis</i> blight	Brinjal	Cause dark sunken spots on fruits and leaf lesions, highly prevalent during humid periods in local markets and farms.
9	<i>Yellow Vein Mosaic Virus (YVMV)</i>	Mosaic Disease	Bhendi	A bright yellow network on leaves, stunted plant growth, and small, tough, yellow fruits
10	<i>Alternaria solani</i>	Early Blight	Tomato, Potato	These spots grow into larger target-like lesions with rings inside, surrounded by yellow halos. It also causes stem lesions and dark, sunken spots on fruit or tubers.

Discussion:

Fungal and viral infections cause substantial quantitative and qualitative losses during active crop growth and post-harvest storage in local vegetable markets. Routine surveillance, use of certified disease-free seeds, and timely deployment of integrated crop protection (ICP) strategies are essential to mitigate economic losses for local farmers.

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