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Identification of pathogen causing wilt disease in coriander (*Coriandrum sativum* L.) genotypes

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Abstract
In the present investigation, the pathogen causing *Fusarium wilt* was identified through cultural evaluation and microscopic analysis. *Fusarium* spp. displayed mycelial growth in varying of white, pink, and brown on artificial media. It produced both macroconidia and microconidia, two different forms of conidia. Hyaline, oval, ellipsoid, and reniform microconidia were observed. However, macroconidia exhibited a sickle shape.

Keywords: Pathogen causing wilt disease, coriander (*Coriandrum sativum* L.) genotypes, *Fusarium*

Introduction
Coriander (*Coriandrum sativu*m. L) is an annual herb, also known as Cilantro (English) and Dhania (Hindi) belongs to the Apiaceae family and has the chromosome number 2n = 2x = 22. It is an annual herb that is native to Southern Europe and the Eastern Mediterranean. India, Egypt, Morocco, the USSR, the USA, Hungary, Poland, Romania, Mexico, Czechoslovakia, and Guatemala all cultivate it commercially. Rajasthan, Madhya Pradesh, Andhra Pradesh, Gujarat, Uttar Pradesh, and scattered regions of Tamil Nadu, Karnataka, Orissa, and Haryana are the majority of coriander-growing states in India. (Singh *et al.* 2013) [6].
India is widely recognized for its diverse culture and delicious traditional cuisine. Coriander's stems, leaves, and fruits have a pleasant aroma and provide flavour to soups and curries in other parts of the world. According to Gauhar *et al*. (2018) [9].
The yield of this crop is being constrained by a number of problems, with lack of knowledge about disease management being the main barrier. Crops of coriander may also have major disease-related problems. Wilt was caused by the fungus Fusarium oxysporum (Narhla and Joshi 1963; Srivastava 1972) [5, 7]; stem gall from *Protomyces macrosporus* (Das 1971); powdery mildew from *Erysiphe polygoni*, among various serious diseases.
Coriander wilt is a severe problem among these, as damaged plants developed slowly and were stunted. Root infection causes terminal shoots to drop, resulting in the withering and drying of the leaves. As the disease advanced, plants with partial infection displayed yellow to pink leaves. Certain aspects of the disease, particularly ecology and pathogen variability, as well as effective management, has little attention.
This study aimed to find the pathogen responsible for the coriander Fusarium wilt disease. It was designed and carried out in 2022–2023 at Horticultural Research Station, Lam, Guntur, with the aforementioned factors in mind.

Materials and Methods
Wilt-infected samples were collected from Horticultural Research Station, Lam, Guntur, during 2022-23. Pathogen isolation was done with the infected samples. After being surface sterilized for 30 seconds with 0.1% mercuric chloride, the infected root sections underwent three washes with sterile distilled water. They were then placed on sterile Petri dishes that contained Potato dextrose agar (PDA) media using the half-plate technique, was incubated at laboratory conditions at 25± 2 °C. Hyphal tips of fungi developing from these areas were aseptically transferred to slants of PDA for maintenance. The isolate of Fusarium spp. was grown on Potato dextrose agar medium to examine colony growth and variation in features. Each sterile Petri dish (90 mm in diameter) contained 15 ml of sterilized and solidified PDA, and five mm discs of the fungus were cut from the three-day-old growth plates using a sterilized cork borer. The plates were incubated for three days at 28 2 °C room temperature. The mycelial growth, colony characters, and spore characters were observed after three days of inoculation (DAI).

Pathogenicity

On a mixture of crushed maize seeds and sand, the isolated fungus grew 19:1. Water was used to moisten the entire mixture before sterilization for a period of two hours at 121 degrees Celsius and 15 pressure. At room temperature (28 °C, +2 °C), the fungus was inserted into a sand-maize medium and subjected to development for 15 days. Red soil, sand, and cow dung manure were combined in a 3:1 ratio to produce the potting soil that was autoclaved at 121 °C and 15 pressure for two hours, two days. Fungi cultured on a sand-maize medium were transferred to sterilized soil at a rate of 5% (w/w).

Result and Discussion

The pathogen's spores were taken from affected roots, and lacto phenol was used to make temporary slide mounts. Then, they were examined under a 40x microscope for indications of fungi's characteristics. It produced both micro and macro conidia

Microconidia

The fungus produced small microconidia, which were widely dispersed.

Macroconidia

Macroconidia was multicelled with two to three septa, pedicellate with rostrate apex, robust, fusiform, falcate, gradually tapering at both ends, and sickle-shaped.

Pathogenicity

The pathogenicity test was performed while taking Koch's hypotheses into account *Fusarium* spp. from diseased coriander plants was isolated and kept in sand maize medium and utilized as an inoculum source for the pathogenicity experiment. On the fifteenth day, the pathogen-inoculated plants displayed symptoms such as girdling, seedling toppling, and reddish brown lesions in the collar region. The pathogens were once again isolated from purposely contaminated coriander plants. The pathogenicity of the re-isolated pathogens was established since they resembled the original culture.

According to several reports (Massey, 1926; Mc Culloch, 1944; Vavre *et al*., 2021) [3, 4, 8], the fungus produced a visible, branching, septate and cottony aerial mycelium that appeared hyaline. Additionally, the fungus also generated a significant amount of micro- and macroconidia.

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