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Popular Article

## Fusarium Wilt of Lentil and Its Management

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### Introduction

Lentil (*Lens culinaris* Medikus) is a cool season, major edible legume crop after chickpea with genome size of approximately 4 Gbp. It is commonly known as masoor or poor man's meat. Cultivated lentil is thought to have been originated and first domesticated in western Asia and then introduced into the Indo-Genetic Plain around 10,000 years ago. Lentil is recognized as one of the most nutritious pulse crops ranking next to chickpea amongst *rabi* pulses. Lentil seed contain 28.3% protein, 55.34% carbohydrate, 2.14% total lipids, 8.5% fiber, 5.37% ash and different minerals including K, P, Fe, and Zn. Lentil is a bushy annual plant of the legume family which includes two physio-morphological cultivated lentil types: small seeded (Microsperma) and large seeded (Macrosperma).

Lentil production is challenged by a wide range of Pathogens. Among the different diseases of lentil viz., Fusarium wilt, Collar Rot, Root Rot, Alternaria blight, Aphanomyces Root Rot, Anthracnose, Rust, Ascochyta Blight, Botrytis gray mold and Sclerotinia stem rot, wilt is major limiting factor in its production and productivity.

### Lentil Wilt: *Fusarium oxysporum* f. sp. *lentis*

*Fusarium oxysporum* as soil borne in nature and commonly found in all crop growing areas in the world. The wilt disease appeared in the field as patches at both seedling and adult stages. Seedling wilt was characterized by sudden drooping, followed by drying of leaves and seedling death.





**Figure 1.** Field view of Lentil

The roots appeared healthy, with reduced proliferation and nodulation and usually no internal discoloration of the vascular system.



**Figure 2.** Wilt Infected Plants of Lentil

Adult plants showed typical wilt symptoms of drooping of petioles, rachis and leaflets. The root of the wilting plants did not show any external rotting but when split vertically, dark brown discoloration of internal xylem can be seen.

### **Spore produced by Fusarium wilt**

The Pathogen is known to produce three kinds of asexual spores; microconidia, macroconidia and chlamydospores.

1. Microconidia are usually single celled, ovoid or kidney-shaped and hyaline.



2. Macroconidia are usually two to seven celled, long with pointed apical cell and notched basal cell.
  3. Chlamydospores are single celled, oval or spherical shaped and thick walled, formed singly in macroconidia or apical or intercalary in the hyphae.
- *Fusarium oxysporum* f. sp. *lentis* grows well on Potato dextrose agar (PDA) media at the temperature between 27-30°C, optimum being 25°C, with no growth at 9°C and 35°C. However, 4.6 to 5.8 pH has been reported optimum for its growth.
  - A culture of Fol display hyaline, septate and much branched mycelium. On media the growth pattern varies from fluffy to appressed and also vary in color from no color to pink.

### Host range and Losses due to lentil wilt

- The *Fusarium oxysporum* f. sp. *lentis* host range was investigated by inoculating it on plants that became infected, such as red gram, cowpea, pea, soybean, French bean, lathyrus, Bengal gram, urdbean, and Mungbean (Cucurbitaceae).
- Recent investigations into the host range of tomatoes, chickpeas, and soybeans did not lead to infection.
- This disease causes severe yield losses in the countries where the pathogen is found. Fusarium wilt causes yield loss up to 60% may occur under the favorable conditions.

### Survival and spread

Chlamydospores of the pathogen can survive in the soil for many years in the absence of a host plant. The pathogen can also survive within infected plant material in the field. This indicates that the pathogen is well adapted to survive adverse conditions.

### Management of Lentil wilt

1. Deep summer ploughing
2. Avoid late sowing
3. Use of clean seed for sowing.
4. Grow resistant varieties such as Panth-4, Panth-6, Panth-639, and Shekhar Masoor 2, 3 etc.
5. Follow 4-year crop rotations.
6. Soil application of *T. harzianum* and *T. viride* (1 kg) + 25 kg FYM/ acre are spread one week before sowing.
7. Seed Treatment with Carbendazim + Mancozeb @ 2 g/kg seed before sowing.



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