

Early Blight of Potato

Pathogen. *Alternaria solani* (Ell. & Mart.) Jones & Groul.

Systematic position of pathogen. Class-Deuteromycetes; Order-Monilliales; Dematiaceae.

The early blight of potato is one of the most destructive fungal diseases, in India. **Distribution.** This disease seems to have originated in the United States of America. This disease is world-wide in distribution, and has been recorded from Canada to New Zealand and from Japan to South Africa. In India, it occurs in the Indo-Gangetic plain and the hills.

Symptoms. The disease appears first as yellowish spots on leaflets of potato. Later the spots become dark brown to black. Some of the spots are small in size while some are bigger. They remain scattered on the surface of the leaflets. Usually the spots are rounded

but the spots formed in the vicinity of the stout veins, become somewhat angular, because of the arrest of the fungal growth across such veins. In severe state of disease the whole surface of the leaflets is being covered with such spots or lesions. Sometimes the spots are merged with each other forming bigger lesions. If we study the lesions with the help of hand lens, the concentric ridges may be seen on each such spot, producing a characteristic 'target-board effect'. There is usually a narrow chlorotic zone around the spot, which fades into the normal green. The lower leaves are affected first, as a rule, and the disease progresses upward. The leaves of potato dry up and droop.

In severe conditions of the disease the other parts of the plant such as petioles, stems and tubers are also affected. The skin of infected tuber becomes dark brown, and the irregular rounded spots develop on it. These spots are slightly sunken, and vary in size upto 2 cm diameter. The pulp of the tuber just below the infected skin becomes rusty or brown in appearance. Lesions may develop in mature lesions.

The pathogen. The early blight of potato is caused by *Alternaria solani* (Ell. & Mart.) Jones & Groul. The pathogen was first described by Ellis and Martin in 1882. The mycelium is branched and becomes dark coloured with age. The conidiophores, rising from the diseased host tissues are short and dark-coloured. Conidia are beaked, muriform, dark-coloured borne singly or in chains of two (in pure culture). The conidia measure 145 to 370 μ and are divided by 5 to 10 transverse septa, some of the broader compartments being sometimes further divided by a longitudinal wall. The lower part of the conidium is brown, the beak almost colourless. Germination can take place from any cell of conidium, the germ-tubes enter the leaf both through the stomata and directly into the epidermal cells.

Nature and recurrence of disease. This is a soil-borne disease. The mycelium remains viable in dry infected leaves for a year or more, and the conidia remain viable for seventeen months. Hence the disease is readily perpetuated from season to season.

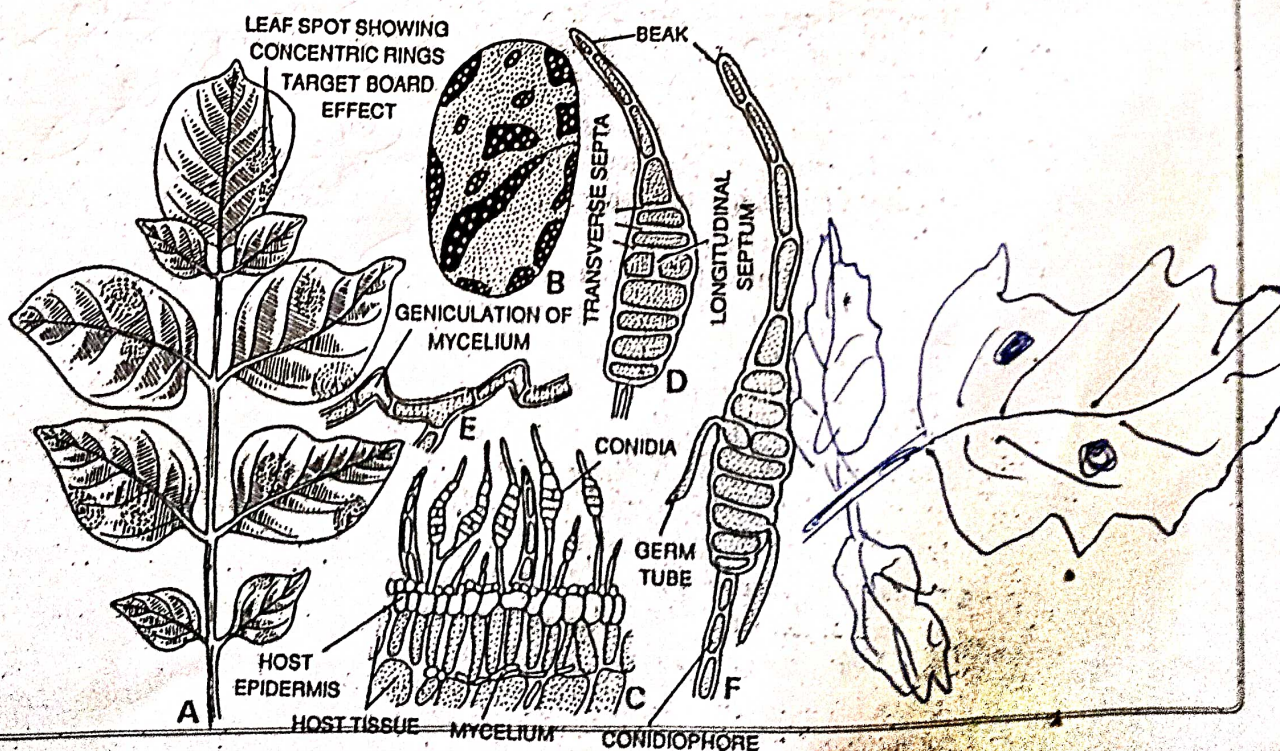


Fig. 19.2. Early blight of potato (*Alternaria solani*). A, affected leaf; B, affected tuber; C, host epidermis and tissue with mycelium; D, conidium; E, germinating conidium; F, conidiophore.

Predisposing factors. The optimum temperature for germination of conidia is 28-30°C. Heavy dews with frequent rains are essential for abundant production of conidia. In moist weather conidia germinate readily. The disease becomes serious when the season begins with abundant moisture followed by high temperatures.

Control measures. *Crop rotation.* Crop rotation has been proved successful measure to avoid primary infection from conidia that have over-wintered or over-summered in the soil.

Sanitation. The plant debris and dead haulms should be collected and burned immediately after harvest.

Spraying of fungicides. Timely and thorough spraying with copper fungicides or Zinc at 15-day intervals have given successful results. Weekly spraying of Bordeaux mixture (5 : 5 : 50) has been proved quite effective. The spraying should be done throughout the growing period of the crop.