Leaf Spot/Leaf Blotch of Turmeric

Pathogen: *Taphrina maculans*

Taxonomic position of the pathogen: Sub Division: Ascomycotina; Class: Hemiascomycetes; Order: Taphrinales; Family: Taphrinaceae

Distribution & Importance: This disease was first described by Butler (1911) and now it has been observed in all the turmeric growing areas of the country. Leaf spot also called brown leaf spot/Taphrina leaf blotch of turmeric (*Curcuma longa*). The disease causes considerable damage in turmeric-growing areas of Tamil Nadu and Gujarat. In northern India the disease appears quite commonly and in some areas almost 100% leaves of each infected plant are affected during August and September. However, a few other species of *Curcuma* and some of Zingiber are also attacked by the same pathogen.

Symptoms: The infected leaves turn from normal green to finally reddish-brown due to great numbers of spots covering both the surface of the leaves. Individual spots are small; light yellow to dark yellow, 1-2 mm in diameter. The spots are comparatively more prominent on the upper surface of the leaf, fuse with each other farming larger patches causing the drying up of the entire lamina. The leaves turn from green to yellow much sooner than they normally should but are not distorted due to the disease.

Attacked plants are not killed but due to excessive spotting and reduction of the green tissue the functional area of the lamina is reduced resulting in heavy reduction in the yield. The pathogen does not stimulate any outgrowth (hypertrophy and hyperplasia) on the infected host tissue as happens in case of peach leaf curl caused by *Taphrina deformans*.

Causal Organism: The pathogen is a biotroph. Its hyphae spread through the space between the cuticle and the epidermis and are present inside the epidermal cells. Below epidermis, the hyphae invade through intercellular spaces and send branched or lobed haustoria within the host cells but their invasion is limited to few layers of host cells below the epidermis. When the spots are mature, their central portion is occupied by an almost continuous layer of hyphae. The outer cells of this layer act as acrogenous cells and develop into cylindrical or clavate, thin-walled projections, which rupture the epidermis and become asci. Since the acrogenous cells mature at different intervals, the mature asci containing ascospores are evident in little groups. Each ascus possesses a basal cell below it. However, the asci measure 20-30 x 6-10 µm and normally contain eight ascospores. Each ascospore is hyaline, avoid, unicellular measuring 4-7 x 2-3 µm, and multiplies by budding within the ascus to form sprout conidia.

Disease Cycle: The disease cycle is yet not clearly known. How pathogen is transmitted is still speculative. How long the ascospores remain viable in plant debris has not yet been ascertained. The possibility that the mycelium approaches the rhizome and perennates there in and then acts as source of primary inoculum when such rhizomes are planted the following season is remote. It is thought that, most probably, the infected fallen dried leaves in the soil possessing asci might be functioning as the main source of primary inoculum during the subsequent crop season.

Management:

(i) Although no definite measures to manage the disease have so far been developed, some cultural practices are recommended for the purpose. Field sanitation involving destruction of the diseased fallen dried leaves should be adopted.

(ii) Use resistant varieties like CLL 324, Amalapuram, Mydukur, Karhadi local, CLL326, Ochira 24 and Alleppey, China and Jaweli of turmeric show resistance to the disease hence recommended for use. In Assam, cultivars Ca 69 and Shillong are resistant to the leaf spot disease of turmeric.

(iii) With the initiation of the disease, spray the crop with fungicides like carbendazim (0.1%) or thiophanate methyl (0.1%) or mancozeb (0.25%) or propineb (0.25%) and repeat at 10-14 days interval. Timely sprays of Bordeaux mixture (5:5: 50). Fytolon, Perenox and Blitox 50, have also been found effective in reducing the spread of the disease to some extent.