

## Diseases of cumin (*Cuminum cyminum* L.) and their management

S R S DANGE

College of Agriculture

Gujarat Agricultural University

Sardar Krushinagar - 385 506, Gujarat, India.

### ABSTRACT

Cumin (*Cuminum cyminum* L.) is affected by wilt, blight and powdery mildew diseases which are responsible for heavy yield losses. Witches - broom, probably caused by MLO, has also been reported from Rajasthan. The symptoms of these diseases and management schedules to be adopted are discussed.

Key words: cumin, *Cuminum cyminum*, diseases, management.

### Introduction

Cumin (*Cuminum cyminum* L.) seeds are used as spice in Indian culinary for flavouring soups, sauces, pickles and for seasoning breads and cakes. Cumin seeds contain 2.5 to 4.0% volatile oil and aldehyde or cuminol which attributes for the aroma and special medicinal properties (Aiyer & Narayan 1950). Cultivation of cumin is mostly confined to Gujarat and Rajasthan and occupies about 1.1 lakh ha with an annual production of about 50,000 t.

Cumin crop is affected by many diseases, the important among them being wilt, blight and powdery mildew which are responsible for heavy yield losses.

### Wilt (*Fusarium oxysporum* f. sp. *cumini*)

Preliminary surveys revealed losses of

about 5 to 25 per cent in North Gujarat and 5 to 60 per cent in Rajasthan (Patel *et al.* 1957). Mathur, Shukla & Mathur (1967) and Champawat & Pathak (1989) reported morphologically and physiologically distinct pathogenic isolates. Patel (1968) studied various sources of perennation of the pathogen and emphasized the possibility of fungus to be internally seed borne. However, he could not prove the pathogenicity of *Fusarium* culture obtained from the internal parts of the seeds. Plants are affected at all growth stages from seedling to maturity, and the severity of the disease increased with age. Patel *et al.* (1957) observed that the disease generally appears when the crop is about 1 month old.

The conspicuous symptoms of the disease are drooping of leaf tips leading to mortality of plants. The plants can be

easily pulled out of the soil. In older plants the colour of leaves changes from green to yellow, beginning from the oldest leaf and extending upward to the younger leaves. These symptoms are quickly followed by wilting of the entire plant which ultimately dries up. Usually the entire plant wilts/dries before the youngest leaf turn pale. Sometimes only a part of the stem is affected and partial wilting is observed. When plants are infected at flowering stage, generally no seed is formed; if formed they are thin, small and shrivelled. In partially wilted plants, growth is arrested and the leaves become pinkish yellow.

Reduction in wilt incidence was observed by application of castor cake, mustard cake and poultry manure before sowing @ 2,500 kg/ha. Application of NPK fertilizer influenced cumin wilt incidence. Increased application of K decreased wilt incidence (Champawat & Pathak 1988). Two or three summer ploughings decreased wilt incidence significantly (Champawat & Pathak 1990). However, crop rotation with bajra, mustard, sorghum, castor, guar, wheat and green manure increased wilt incidence (Mehta & Solanki 1990). A combination of seed treatment with Bavistin @ 3g/kg seed and spray with Bavistin (0.02%) or Benlate (0.05%) was effective in reducing wilt incidence in the field (Agnihotri & Sharma 1987). Screening of germplasm revealed no resistance in cumin under field conditions (Sharma *et al.* 1984).

### **Blight (*Alternaria burnsii*)**

Blight of cumin was recorded from Kaira district of Gujarat (Uppal, Patel & Kamat 1938). It is widespread in all cumin growing areas. Cloudy and humid weather aggravates the severity of blight. A temperature range of 23-28°C

is optimum for development of blight (Gemawat & Prasad 1972). Infection in early stages of plants show minute necrotic areas on all the above ground plant parts which turn purple in advanced stages and later brown to black; the affected parts get blighted (Uppal, Patel & Kamat 1938; Gaur 1949; Joshi 1955). Severely affected plants bear no seeds. However, shrivelled, dark coloured and light weight seeds could be obtained from less affected plants. Germination and volatile oil contents are reduced considerably.

The pathogen is seed borne and also survives in crop debris (Patel & Desai 1971). Seed borne inoculum was completely eliminated by seed treatment with Aureofungin, Sandoz 6334, Tofasan, Cuman (0.15%), Captan (0.2%) and Difolatan (0.15%).

Different fungicides have been tried by many workers (Gemawat & Prasad 1969; Sankhla, Sankhla & Mathur 1973; Solanki, Singh & Dalela 1973; Lakhataria 1978; Patil 1980; Mehta & Solanki 1990). Among these, Cuman, Captan, Dithane M - 45, Vitavax, Miltox, Plantavax and Blitox were effective (Solanki, Singh & Dalela 1973). Four sprays of Dithane M - 45 (0.25%) has been recommended for effective control of blight of cumin in Gujarat (Mehta & Solanki 1990). Four sprays of Dithane Z - 78 (0.25%) was also effective and gave net ICBR of 1:3 (Patil 1980). Available germplasm have been screened but none was found resistant.

### **Powdery mildew (*Erysiphe polygoni*)**

The disease is widespread in most of the cumin growing areas and may cause up to 50 per cent yield loss under epiphytotic conditions and reduces the

market value of seeds considerably (Chattopadhyay 1967). The disease appears at the time of flowering and flourishes at 26.7 to 35°C. The conidial state of the pathogen has been reported in India. The disease appears as greyish specks on the lower leaves. These specks rapidly enlarge and cover the leaf surface. Stems, flowers, umbels and fruits are also covered with fungal growth. Such infected plants bear few, shrivelled, light weight seeds. None of the cumin germplasm is resistant to the disease.

The disease can be controlled effectively by spraying Karathane (0.1%), Bavistin (0.1%), wettable sulphur (0.3%), Calixin (0.05%) or by dusting 300 mesh sulphur @ 25 kg/ha at 15 days interval. In North Gujarat, three dustings of sulphur each @ 15 kg/ha are recommended as economical control measures of powdery mildew. Mathur, Masi & Sankhta (1971); Gohil, Patel & Jain (1985); Mehta & Solanki (1990) found three sprays of Calixin (0.04%) are more effective. In Rajasthan three sprays of Bavistin (0.1%) was effective in reducing powdery mildew (Sharma, Champawat & Bhatnagar 1981).

### Witches broom

Witches broom of cumin probably caused by MLO, was first observed in Rajasthan and caused 7.1 to 30.6 per cent yield losses. Tetracycline hydrochloride was effective in suppressing the disease (Jai Narayan 1987).

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