

# Three Postharvest Diseases of *Zizyphus mauritiana* Fruits from India

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## ABSTRACT

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Alternaria rot, dry rot, and black rot caused by *Alternaria alternata*, *Fusarium decemcellulare*, and *Cladosporium cladosporioides*, respectively, have been found on *Zizyphus mauritiana* fruits in Hyderabad, A.P., India. These three postharvest diseases were not previously reported from the Indian subcontinent.

Ber (*Zizyphus mauritiana*) is a fruit tree grown throughout the Indian subcontinent, and the fruit is subject to a number of diseases described earlier by Srivastava (10) and Gupta and Madaan (3). During 1977 and 1978, we observed three additional postharvest diseases of Ber fruits, and this article describes the symptoms and causal organisms.

Infected fruits were collected from local markets and placed in fresh polythene bags. Within 24 hr, 25 isolations were made from the juncture of healthy and diseased regions, under aseptic conditions as suggested by Riker and Riker (8). Subculturing and purification of pathogens were done, and monospore cultures were grown and maintained on potato-dextrose agar.

The causal organisms were identified by studying their morphology under natural conditions and in cultures. Pathogenicity tests were conducted at  $26 \pm 2$  C on injured and uninjured healthy fruits that were surface treated with 0.1% mercuric chloride solution and washed twice with sterile distilled water. Fruits injured by scalpel or pinprick were inoculated by inserting mycelium under the skin. The uninjured fruit surface was inoculated with a mycelial mass. Symptoms produced by artificial inoculation and incubation for 4-7 days were compared with symptoms occurring naturally in fields.

The approximate size of Ber fruit is  $3.5 \times 2.0$  cm to  $5.5 \times 3.0$  cm.

## ALTERNARIA ROT

**Symptoms.** The fruits had depressed, dark brown to black lesions 1.2-2.0 cm in diameter. The smaller lesions coalesced rapidly to form larger spots; the infection extended to the seed. Scrapings from

diseased tissue and repeated isolations yielded *Alternaria alternata* (Fr.) Keissler, which infected wounded healthy fruit by artificial inoculation (Fig. 1). A culture has been deposited at the Commonwealth Mycological Institute, Kew, England (IMI 230386).

This fungus species is a common saprophyte and also a parasite on several substrates (1,5,6,11). Wound inoculation with the present isolate failed to infect *Vitis vinifera* and *Punica granatum*, although Goyal et al (2) and Kanwar and Thakur (4) established the pathogenicity of *A. alternata* to these fruits. This fungus might have entered the fruit through injuries incidental to harvest, processing, packing, storage, or transportation. *A. alternata* may be regarded as a wound pathogen, though further attention is

needed to determine the specific type that causes postharvest disease.

## DRY ROT

**Symptoms.** Infected fruits had rotted, brittle, blackish zones 0.6-1.5 cm in diameter, and a white mass of mycelium and conidia covered a large area within a few days of infection. Infected areas were characteristically dry and became concave with shrinkage of underlying tissues. Isolations from rotted tissue and scrapings from diseased tissue displayed *Fusarium decemcellulare* Brick. A



Fig. 1. Symptoms of *Alternaria* rot on *Zizyphus mauritiana* fruit.

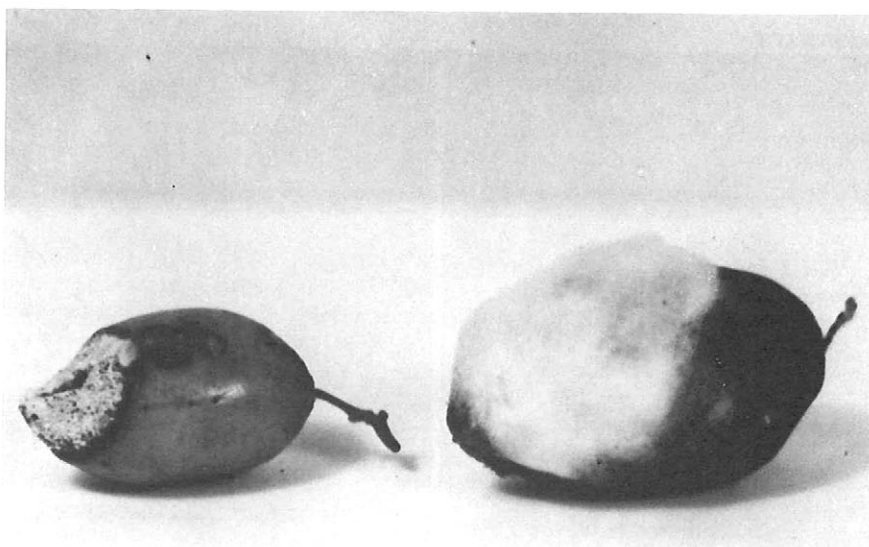


Fig. 2. Dry rot on *Zizyphus mauritiana* fruit collected from market (left) and profuse mycelial growth on artificially inoculated fruit (right).

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Fig. 3. Symptoms of black rot on *Zizyphus mauritiana* fruit.

culture has been deposited at the Commonwealth Mycological Institute (IMI 230385). Symptoms on artificially inoculated fruit and infected fruits collected from the market were identical, except that under humid conditions, dense mycelial growth occurred on the surface of inoculated fruits (Fig. 2).

Singh and Singh (9) observed white to brownish fungal growth of *F. decemcellulare* on insect galls on twigs of *Z. mauritiana*. This long chain of microconidia and reddish pigmentation of the

medium are characteristic of the fungus in culture. Earlier, Rao reported *Fusarium oxysporum* Schl. as a cause of a fruit rot of *Z. mauritiana* in storage (7).

#### BLACK ROT

**Symptoms.** Initially the disease appears on the surface of fruits as circular brown spots that coalesce and form black irregular lesions 1.5–3.0 cm in diameter. The lesions are superficial, but the disease spreads rapidly. Isolations from diseased tissue yielded *Cladosporium cladosporioides* (Fres) de Vries, which was pathogenic on healthy fruits inoculated artificially (Fig. 3). The culture has been deposited at the Mycology and Plant Pathology Laboratory, Science College, Saifabad, O.U. (OUF-1003).

Species of *Cladosporium* occur frequently in air, soil, and other substrates. As a causal agent of postharvest disease, *Cladosporium* reduces the market value of fruit by destroying its appearance and quality.

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