

Leveillula taurica Powdery Mildew on Greenhouse Cucumbers in Libya

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ABSTRACT

El-Ammari, S. S., and Khan, M. W. 1983. *Leveillula taurica* powdery mildew on greenhouse cucumbers in Libya. *Plant Disease* 67:553-555.

Leveillula taurica powdery mildew on cucumbers (*Cucumis sativus*) is reported for the first time in Libya. A survey of cucurbits in different regions of the country for powdery mildew during March through July 1981 showed the existence of *L. taurica* on cucumber in that country. Powdery mildew was causing serious damage to cucumbers in one greenhouse at El-Khoms in the western region and in another at Derna in the eastern region of the country. Plants were heavily infected and showed typical symptoms of powdery mildew caused by *L. taurica*. Morphological characteristics of the conidial state of the pathogen were those of *L. taurica*. This fungus perhaps should be considered potential causal organism of powdery mildew of cucurbits in addition to *Sphaerotheca fuliginea* and *Erysiphe cichoracearum*.

Six species of the powdery mildew fungi are recorded on cucurbits in different parts of the world (1,13). *Sphaerotheca fuliginea* (Schlecht.) Poll. and *Erysiphe cichoracearum* DC. are commonly recorded on cucurbits (1,7,8). Even more than one species may occur in the same locality (1,7) and on the same plant (1). As the pathogen usually occurs in the conidial state and the conidia of some species have many similarities, it is difficult to separate the species involved. The identity of the causal organism(s) of powdery mildew of cucurbits is not well established in Libya. Earlier records of Pucci (12) and Kranz (10) claimed *E. cichoracearum* as the causal powdery mildew species on several cucurbits in Libya. Khan (9) recently identified *S. fuliginea* causing powdery mildew of cucumber (*Cucumis sativus* L.) in several areas in Libya.

Cucurbits are grown in greenhouses, plastic tunnels, and outdoor field plots in Libya. Powdery mildew regularly appears on most of the cucurbits every year and causes substantial losses to the growers. Therefore, an attempt was made to assess the incidence and intensity of the disease and to identify the causal organism(s) on different cucurbits grown in different regions of the country. Because *Leveillula taurica* (Lev.) Arn. is not commonly found on cucurbits in many parts of the world, our information collected during the survey regarding its occurrence on cucurbits in Libya may be of interest and is presented in this paper.

MATERIALS AND METHODS

During the survey of cucurbits for powdery mildew conducted in March through May 1981, we found cucumbers in two greenhouses at El-Khoms and Derna infected by a powdery mildew fungus but with apparently different symptoms from those caused by *S. fuliginea* or *E. cichoracearum*. The intensity of the disease and the symptoms were noted. In a greenhouse at El-Khoms, a stand of tomatoes (*Lycopersicon esculentum* Mill.) adjacent to infected cucumbers also showed powdery mildew symptoms. Similarly, stands of tomatoes and pepper (*Capsicum annum* L.) adjacent to cucumbers were showing symptoms of powdery mildew in a

greenhouse at Derna. Samples from cucumbers, tomatoes, and peppers were collected and brought to the laboratory for detailed study.

Samples were examined closely and morphological characteristics of the pathogens were studied. Samples were also thoroughly examined for perithecia. In the absence of perithecia, the identity of the pathogen was established on the basis of characteristics of the anamorph or conidial state.

RESULTS AND DISCUSSION

Of several greenhouses, plastic tunnels, and outdoor plots surveyed, *L. taurica* was found on greenhouse cucumbers in only two localities. At El-Khoms, in the western region of the country, cucumbers in a greenhouse were heavily infected. Leaves were in different stages of drooping and drying. The most common symptoms were yellowish spots on the upper leaf surface and a white powdery covering on the corresponding areas on the lower surface. White powdery spots on the lower surface were mostly angular and margined by leaf veins. Spots were not continuous but separated by normal green leaf areas. The white powdery covering on the lower surface was not as luxuriant as observed in *S. fuliginea* or *E. cichoracearum* infections (Figs. 1 and 2).

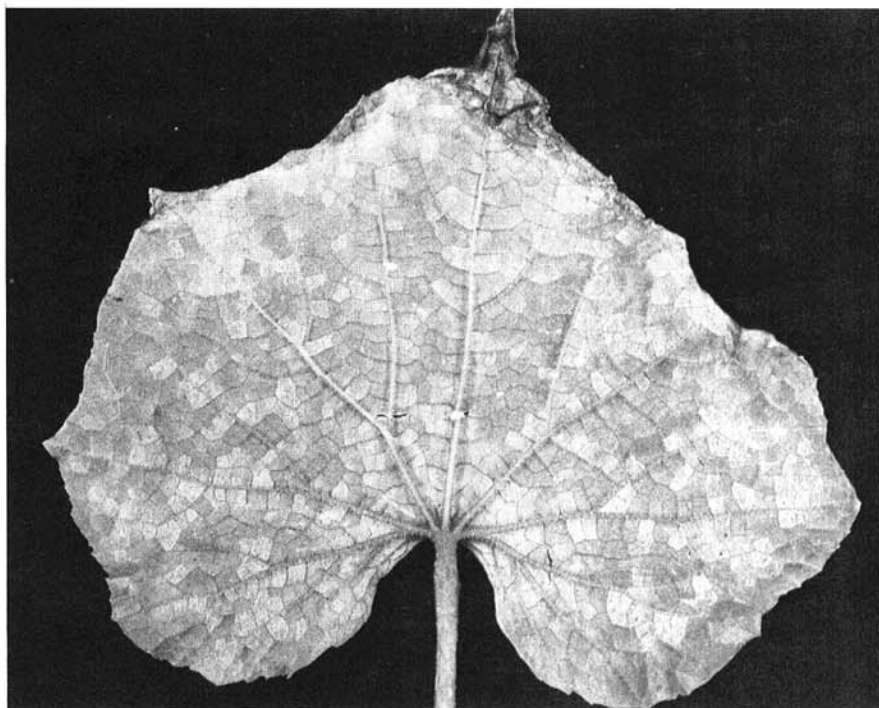


Fig. 1. Cucumber leaf infected with *Leveillula taurica*.

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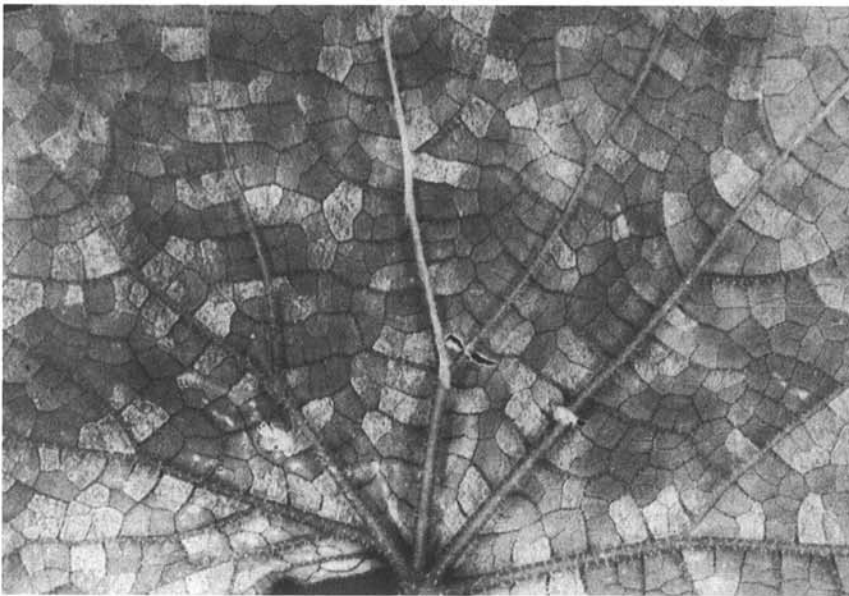


Fig. 2. Close-up of an infected cucumber leaf showing characteristic symptoms of powdery mildew caused by *Leveillula taurica*.

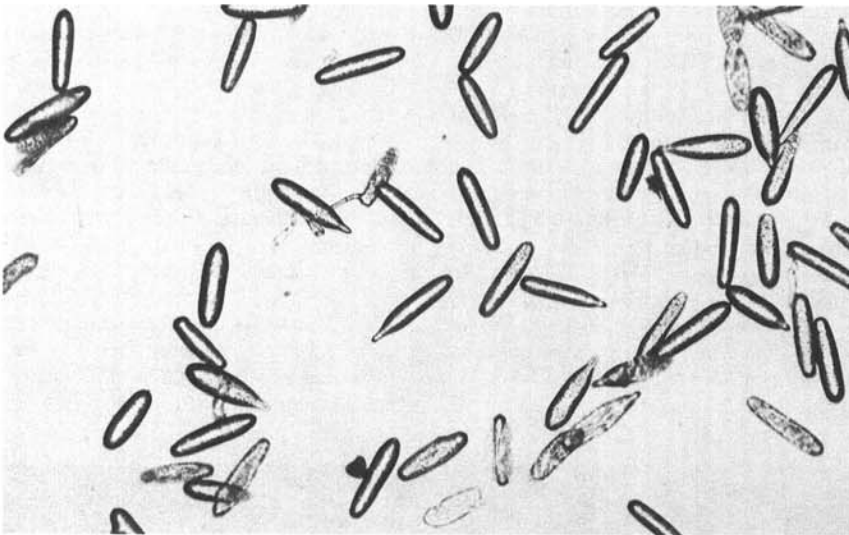


Fig. 3. Conidia of *Leveillula taurica* obtained from cucumber. 1 cm = 63 μ m.

Similar symptoms on cucumbers in a greenhouse were also observed at Derna, in the eastern region of the country. Plants showed moderate to heavy infection. Samples of tomatoes from El-Khoms and of tomatoes and peppers from Derna showed well-characterized symptoms of powdery mildew caused by *L. taurica*.

Microscopic examination of the pathogen on cucumber leaves from both locations showed the presence of the conidial state of *L. taurica*. None of the samples from cucumbers, tomatoes, or peppers revealed perithecia. The fungus was identified on the basis of its partial endophytic habit with mycelium penetrating and ramifying within the leaf mesophyll and the typical conidiophores of the *L. taurica* anamorph, an *Ovulariopsis* sp., that were emerging through stomata. Conidia in general were of two distinct

shapes—cylindrical and navicular—and were variable in size (Fig. 3), from 54 to 73 μ m long and 1.5 to 2 μ m wide. Similar characteristics were also observed in the pathogen from tomatoes and peppers.

Existence of *L. taurica* on cucurbits in the USSR, Sudan, Bulgaria, Romania, and India is on record (3–6,14,15). Tarr (14) recorded *L. taurica* on *C. maxima* Dcne. in Sudan. Golovin (5) observed *L. taurica* on cucumber, and on vegetable marrow (*Cucurbita pepo* L.), and other *Cucurbita* sp. in the USSR. She erected a new species, *L. cucurbitacearum* Golovin, for the *L. taurica* on the cucurbits in an attempt to split *L. taurica* into separate species for each host family. This differentiation, however, is not recognized (1). *L. taurica* is known to occur on solanaceous vegetables in Libya (10,12). In the USSR, Godreeva (6) listed *L. taurica* on cucurbits together with *E.*

cichoracearum and *S. fuliginea*. It was further recorded on vegetable marrow by Nasyrov (11). In Bulgaria, Elenkov et al (4) found *L. taurica* on greenhouse-grown cucumbers in addition to *E. cichoracearum* and *S. fuliginea*. Recently, Docea and Fratila (3) observed *L. taurica* on cucumber in Romania. In India, *L. taurica* was found recently along with *S. fuliginea* on squash (*Cucurbita pepo* var. *meloepo* (L.) Alef.) (15). In Libya, *S. fuliginea* (9) and *E. cichoracearum* (10,12) have been claimed to cause powdery mildew of cucumbers, but this is the first record of *L. taurica* on a cucurbit in Libya.

L. taurica infects many plant species in central Asia and the Mediterranean region (2). The presence of *L. taurica* on cucurbits in Sudan and Libya in Africa, in the USSR, Bulgaria, and Romania in Eastern Europe, and also in India establishes it as a pathogen of cucurbits. In recent years, *S. fuliginea* has been over emphasized as the sole causal organism of powdery mildew diseases of cucurbits (1,7,8,13). In view of the established records of *E. cichoracearum* (1,8) and *L. taurica* (4–6,11,14,15) on cucurbits in many parts of the world, however, powdery mildew of cucurbits still remains a disease caused by several different species of Erysiphaceae. The present record of occurrence of *L. taurica* on a cucurbit in Libya in North Africa, in addition to its earlier record in Sudan, adds importance to this pathogen occurring in the region. *L. taurica* may be a major pathogen causing powdery mildew of cucurbits in this relatively unexplored region. This, however, needs further investigation.

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