

A New *Fusarium* Wilt of Bitter Gourd in Taiwan

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ABSTRACT

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Fusarium wilt of bitter gourd (*Momordica charantia*) has been reported for the first time in Taiwan. Pathogenicity tests and reisolation from inoculated plants confirmed that a new forma specialis of *Fusarium oxysporum* was the incitant. The authors propose that this new forma specialis be named *F. oxysporum* f. sp. *momordicae* nov. f. Cross-inoculation tests with seven other formae speciales that exist in Taiwan indicated that only the present pathogen was able to incite wilt in bitter gourd.

In June 1981, a wilt disease of bitter gourd (*Momordica charantia* L.), a favorite vegetable of the Chinese people, was observed in Shihu County of Changhua Prefecture of Taiwan. Diseased gourds showed yellowing and wilting (Fig. 1) with internal brownish vascular discoloration in the basal portions of the stems. A species of *Fusarium* was consistently isolated on Nash and Snyder's (2) PCNB medium. Greenhouse inoculations were made after planting surface-sterilized bitter gourd seeds (1% NaOCl, 3 min) in soil that had been sterilized (60 C for 30 min and repeated once the next day) by pouring a conidial suspension from single-conidium isolates of the fungus to be tested over the seedbed. Typical wilt symptoms appeared in about 1 mo. Macroscopic and microscopic examinations of the plants inoculated with the tested single-conidium cultures indicated they belonged to a species of *Fusarium* in the section *Elegans* (3).

Morphological and cultural characteristics of causal agent. Microconidia formed abundantly from short conidiophores on potato-dextrose agar (PDA); one-celled, hyaline, elliptic, long elliptic, or ovoid; $6.25\text{--}22.5 \times 2.5\text{--}5 \mu\text{m}$ (average of 300 conidia) (Fig. 2).

Macroconidia formed rarely on PDA; hyaline, sickle-shaped, slightly to heavily curved, foot cells generally obscure; 1-5 septate: 1 or 2 septate $12.5\text{--}38.75 \times 2.5\text{--}5 \mu\text{m}$, 3-5 septate $27.5\text{--}53.75 \times 3.75\text{--}6.25 \mu\text{m}$ (average of 300 conidia) (Fig. 2). Chlamydospores spherical or elliptic, hyaline to light brown, smooth-surfaced, terminal or intercalary; $6.3\text{--}12.2 \mu\text{m}$ (average $7.65 \mu\text{m}$) diameter (average of 50 chlamydospores) (Fig. 2). The fungus grew profusely on PDA under light (fluorescent light 40W, 12-hr on/off cycle, 28 cm above slants) at a temperature of 22 ± 1 C. Colonies were pink to light purple with a few orange

sporodochia. These characteristics agree with those of *Fusarium oxysporum* Schlecht. emend. Snyder & Hans. (3,4).

Cross-inoculation tests. Cross-inoculation tests were carried out with



Fig. 1. *Fusarium* wilt of bitter gourd in the field, showing yellowing and wilting. Plant on left is wilted.



Fig. 2. Macroconidia, microconidia, and chlamydospores of *Fusarium oxysporum* f. sp. *momordicae* nov. f.

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seven of the formae speciales of *F. oxysporum* existing in Taiwan, eg, f. sp. *niveum* (E. F. Smith) Snyder & Hans., f. sp. *melonis* Snyder & Hans., f. sp. *cucumerinum* Owen, f. sp. *luffae* Kawai, Suzuki & Kawai, f. sp. *batatas* (Wollenw.) Snyder & Hans., f. sp. *raphani* Kendr. & Snyder, and f. sp. *apii* (Nels & Sherb.) Snyder & Hans. (1). Together with the present fungus, these eight forms of *Fusarium* sp. were cultured for 10 days in flasks containing sterilized celery (*Apium graveolens* L.) stems as inocula, which were then mixed with sterilized soil to make an inoculum density of about 10^3 propagules per gram of soil. Sweet potato (*Ipomoea batatas* (L.) Lam.) cuttings and sterilized seeds (1% NaOCl, 3 min) of

watermelon (*Citrullus vulgaris* Schrad.), muskmelon (*Cucumis melo* L.), cucumber (*Cucumis sativus* L.), luffa (*Luffa cylindrica* Roem.), radish (*Raphanus sativus* L.), celery, and bitter gourd were planted in each of these infested soils. Wilting began to appear about 1 mo after planting. Results from soils infested with the bitter gourd fungus revealed that only bitter gourd plants showed yellowing and wilting; the rest of plants tested showed no symptoms. Bitter gourd plants were not susceptible to any of the seven other formae speciales of *F. oxysporum*. The authors propose a new forma specialis for the bitter gourd wilt fungus: *F. oxysporum* f. sp. *momordicae* nov. f.

The fungus has been deposited in the

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