Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Fusarium equiseti* Causing Fusarium Wilt on Potato (*Solanum tuberosum*) in China

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Potato (*Solanum tuberosum*) is one of the most economically important crops in China, containing carbohydrates, protein, fiber, and numerous vitamins and minerals, and it is a heart healthy food (Raidl 2020). Potato infected by *Fusarium* spp. exhibits quality and yield decline and even death. In infected plants, the upper leaves exhibit chlorosis, the lower leaves wither, and the vascular bundles of stems and tubers first turn yellow and then tan to brown. In August 2018, symptomatic potato stems and roots were collected from Zhangye City, Gansu Province, China. Diseased stem tissues were surface sterilized with 75% alcohol for 30 s and then rinsed in sterile water. The tissue pieces were placed on potato dextrose agar (PDA) and incubated at 25°C in darkness. *Fusarium*-like colonies were consistently isolated, and three monoconidial isolates were obtained. Isolate 3SMJ-2 was selected as a representative for morphological characterization, molecular analysis, and pathogenicity tests. 3SMJ-2 was inoculated in PDA liquid medium and was grown on a shaker for 7 days at 25°C to obtain a mixed suspension of hypha fragments and spores (10⁷ spores/ml). Healthy potato plants, named ‘Xin Daping’, were planted in pots (17 cm diameter by 12 cm) filled with 2 liters of sterile soil per pot. After 8 weeks, the plants were inoculated with the inoculum or distilled water. Then they were incubated in growth chambers at 25°C under a 12-h/12-h day/night photoperiod with 90% relative humidity for 24 h. For each treatment, three pots were inoculated. After 50 days, 100% of the inoculated potato plants exhibited wilt symptoms similar to those in the field, but the control plants were symptomless. A *Fusarium* identical to strain 3SMJ-2 was reisolated from symptomatic potato plants to fulfill Koch’s postulates. Morphological characteristics of the reisolated strain were identical to the original isolate, which confirmed

pathogenicity of strain 3SMJ-2 originally isolated from the potatoes. Colonies of 3SMJ-2 were white with short conidiophores, a few microconidia, and sickle-shaped macroconidia (25.2 to 42.9 × 3.1 to 4.6 μm) (*n* = 60) with four to seven septa, and mostly five septa, after being cultivated on PDA in an incubator at 25°C for 14 days. Spherical terminal or intercalary chlamydospores were observed on the mycelium. Strain 3SMJ-2 was identified preliminarily as *Fusarium* sp. based on morphological characteristics (Leslie and Summerell 2006). Genomic DNA was extracted from 3SMJ-2 using the OMEGA Fungal DNA kit according to the manufacturer’s protocol. The internal transcribed spacer (*ITS*), translation elongation factor 1- α (*TEF*), and RNA polymerase II second largest subunit (*RPB2*) were amplified using ITS1/ITS4 (White et al. 1990), Ef728M/Tef1R (Stepień et al. 2012), and 5F2/7cR (O’Donnell et al. 2007), respectively. After sequencing by Beijing TSINGKE Biological Technology Co., Ltd., three fragments of approximately 519, 587, and 1,059 bp from strain 3SMJ-2 were deposited in GenBank as MN420681, MW561963, and MW561964. The *ITS*, *TEF*, and *RPB2* sequences were 100, 100, and 99.8% identical to those of *Fusarium equiseti* (KY365589, KF499577, and MH582110). Based on the pathogenicity tests, morphological characteristics, and molecular analyses, we identified strain 3SMJ-2 as *F. equiseti*, the pathogen causing Fusarium wilt on potato in Zhangye City. Although *F. equiseti* has been reported to cause root rot of cowpea (Li et al. 2017) and sugar beet (Cao et al. 2018) in China, to our knowledge, this is the first report confirming *F. equiseti* causing potato wilt in China. Potato is an economically important crop in Gansu, and the occurrence of the new disease caused by *F. equiseti* on potato needs to be properly managed to reduce yield loss.

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