First report of *Fusarium verticillioides* causing damping-off of corn in Taiwan

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Corn seedlings (*Zea mays* cv. Bright Jean) showing damping-off symptoms with the disease incidence of 40% were observed in the nursery in Chiayi City, Taiwan in 2018. The infected seedlings showed weak, stunting growth and finally died. A fungus was consistently isolated from the blighted seedlings, and two representative isolates, CF1 and CF2, were obtained. The isolates formed salmon-orange colonies on potato dextrose agar. The microconidia were oval or fusiform with zero to two septate and measured 6.9 ± 0.8 (5.0 – 8.3) $\times$ 2.9 ± 0.4 (2.2 – 3.8) μm . The isolates were further identified by sequencing of the internal transcribed spacer (ITS) region of rDNA and partial sequences of the translation elongation factor 1-alpha (*TEF1*) (O'Donnell et al. 1998). The sequences were deposited in GenBank (MK649932–MK649933 and MK654901–MK654902). In BLASTn searches, the ITS sequences of the isolates showed 100% identity with *Fusarium verticillioides* CBS 218.76 (X94166). The *TEF1* sequences of the isolates showed 99.8% and 99.5% identity with that of *F. verticillioides* CBS 218.76 (KF499582), indicating that both isolates are *F. verticillioides*. The isolate CF1 was deposited as BCRC FU31195 in Bioresource Collection and Research Center, Taiwan. To fulfill Koch's postulates, surface sterilized corn seeds (cv. Bright Jean) were immersed in a conidial suspension of the isolate CF1 (2.5×10^5 conidia/ml) or sterile water (control) for 48 h at 25 °C. Inoculated seeds were dried, planted in sterile potting mix in plastic pots and grown for two weeks. The artificially inoculated seedlings showed damping-off symptoms, which were indistinguishable from the natural infections, whilst the control seedlings

remained symptomless. The same fungus was repeatedly isolated from the symptomatic seedlings. Before this study, seed-borne *F. moniliforme* was once reported to be associated with poor growth of corn in Taiwan, but its pathogenicity was not proven (Li and Wu 1986). Since former *F. moniliforme* includes, in addition to *F. verticillioides*, several current fungal species, being at least three common in maize (Seifert et al. 2003), this is the first report confirming *F. verticillioides* as the causal agent of corn damping-off in Taiwan.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Research involving human participants and/or animals The authors declare that no human participants and animals were involved in this study.

Informed consent This manuscript is new and not being considered elsewhere. All authors have approved the submission of this manuscript.

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