



# First report of *Fusarium incarnatum* causing rot disease on lotus in China

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Lots of lotus (*Nelumbo nucifera*) with the typical symptoms of lotus rot disease, i.e. withered leaf edge and lesions of which were irregularly shaped and dark brown, were found in several fields located in Wuhan in 2017. Symptomatic lotus leaves were collected. Leaf tissues on the lesion boundaries were obtained, surface-sterilized with 70% ethanol for 30 s, and 0.1% mercuric chloride solution for 2 min. After rinsing in sterile water, segments were plated on synthetic nutrient-poor agar, cultured at 25 °C. Pure cultures were identified as *Fusarium incarnatum* on the basis of morphological features including the white thick hyphae, multicellular macroconidia that are falcate, 3 to 5 septate produced in monophialide sporodochia, and the chlamydo-spores borned in chains (Leslie and Summerell 2006). The translation elongation factor-1 $\alpha$  (EF-1 $\alpha$ ) and DNA-directed RNA polymerase II subunit 2 (RPB2) of three representative isolates were amplified with primer pairs ef1/ef2 (Geiser et al. 2004) and 5F2/7cR (O'Donnell et al. 2008), and sequenced. BLAST searches revealed that EF-1 $\alpha$  (MK049899) and RPB2 (MK049900) was both 99% identical to *F. incarnatum* (KR003731 and JX885465, respectively) in GenBank, as well as 100% and 99% to *F. incarnatum-equiseti* species complex (NRRL34059 and NRRL26417, respectively) in the Fusarium-ID database, respectively. The pathogenicity of the isolate was assayed on lotus plants which were grown in sterilized soil at

25 °C for 6 days under humid conditions. Lotus plants were inoculated by injecting conidial suspension (200 spores/plant) into the bases of petioles and the rhizomes of lotus, using plants without inoculation as control. After 6 days, typical symptom of withered leaf edge and lesions appeared on inoculated lotus leaves, and *F. incarnatum* was successfully re-isolated from symptomatic tissues. To our knowledge, this is the first report of *F. incarnatum* causing rot disease on lotus in China.

## References

- Geiser DM, Jiménez-Gasco MM, Kang S, Makalowska I, Veeraraghavan N, Ward TJ, Zhang N, Kuldau GA, O'Donnell K (2004) FUSARIUM-ID v. 1.0: A DNA Sequence Database for Identifying *Fusarium*. *Eur J Plant Pathol* 110: 473–479
- Leslie JF, Summerell BA (2006) The *Fusarium* laboratory manual. Blackwell Publishing, Oxford
- O'Donnell K, Sutton DA, Fothergill A, McCarthy D, Rinaldi MG, Brandt ME, Zhang N, Geiser DM (2008) Molecular phylogenetic diversity, multilocus haplotype nomenclature, and *in vitro* antifungal resistance within the *Fusarium solani* species complex. *J Clin Microbiol* 46: 2477–2490

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