Diseases Caused by Bacteria and Phytoplasmas

First Report of *Pectobacterium polaris* Causing Blackleg on Potato in Inner Mongolia and Sichuan Province, China

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Pectobacterium spp. and *Dickeya* spp. cause blackleg on potato worldwide (Charkowski 2018). Potato plants ('Innovator V4' or 'Favorita') with blackleg symptoms (vascular browning of crown stems or curled leaves) were observed in the field in Xilingol League, Inner Mongolia, China in 2018 and in Chengdu, Sichuan Province, China in 2020. The disease incidence was around 10 and 20% in Xilingol League (20 ha) and Chengdu (40 ha), respectively. Diseased plants (five from Xilingol League and two from Chengdu) were collected to isolate the pathogen. Blackleg symptomatic stems were soaked in 75% ethanol for 2 min, rinsed, and ground in sterile distilled water. Serial 10-fold dilutions of the above solution were plated onto the crystal violet pectate agar (CVP) plate (Ge et al. 2018). After 2 to 3 days of incubation at 28°C, the bacterial colonies which digested pectin in the media and developed pits on CVP plates were purified and sequenced for identification using the universal 16S rRNA gene primer set 27F/1492R (Monciardini et al. 2002). Sequences of three colonies that showed more than 99% sequence identity to *Pectobacterium polaris* type strain NIBIO1392 (NR_159086.1) were submitted to the GenBank (accession numbers MT242579, MT242580, and MZ489432).

Additionally, six housekeeping genes—*proA* (MZ39581 to MZ395583), *gyrA* (MZ395569 to MZ395571), *icdA* (MZ395572 to MZ395574), *mdh* (MZ395575 to MZ395577), and *rpoS* (MZ39584 to MZ395586)—of these three isolates were amplified and sequenced (Ma et al. 2007; Waleron et al. 2008). All strains showed 99 to 100% identity with strain NIBIO1392^T. Phylogenetic trees based on 16S rRNA gene sequences and concatenated sequences of the housekeeping genes of the three isolates were constructed using MEGA 6.0 software (Tamura et al. 2013). Koch's postulate was fulfilled by injecting 100 µl of bacterial suspension (10⁷ CFU/ml) or sterile phosphate-buffered solution into the crown area of the stems on potato seedlings (Favorita). The seedlings were then kept at 80% humidity and 21°C for 2 days. Seven days after inoculation, the infected area of the inoculated seedlings rotted and turned black or even lodged, while the controls were symptomless. Bacterial colonies were reisolated from these symptomatic seedlings and identified using the same methods described above. Blackleg on potato plants has been reported to be caused by *P. atrosepticum*, *P. carotovorum* subsp. *carotovorum*, *P. carotovorum* subsp. *brasiliense*, and *P. parmentieri* in Inner Mongolia, China (Cao et al. 2021; Zhao et al. 2018). To our knowledge, this is the first report of blackleg of potato caused by *P. polaris* in Inner Mongolia and Sichuan Province in China. We believe that this report will draw attention to the management of this pathogen in China.

References:

- Cao, Y. N., et al. 2021. Plant Dis. 105:2237.
- Charkowski, A. O. 2018. Annu. Rev. Phytopathol. 56:269.
- Ge, T. L., et al. 2018. Plant Dis. 102:437.
- Ma, B., et al. 2007. Phytopathology 97:1150.
- Monciardini, P., et al. 2002. FEMS Microbiol. Ecol. 42:419.
- Tamura, K., et al. 2013. Mol. Biol. Evol. 30:2725.
- Waleron, M., et al. 2008. Eur. J. Plant Pathol. 121:161.
- Zhao, Y. Q., et al. 2018. Plant Dis. 102:1653.

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