First report of *Geotrichum candidum* causing postharvest sour rot of carrot in Punjab, Pakistan

Akhtar Hameed¹ · Muhammad Waqar Alam² · Abdul Rehman¹ · Khalid Naveed¹ · Muhammad Atiq¹ · Nasir Ahmed Rajput¹ · Sohaib Sarfraz¹ · Nadia Liaquat¹ · Faizan Ahmad Tahir¹

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In December 2017, a severe sour rot of carrot (*Daucus carota* cv. 'Kohinoor') was found on roots of harvested carrots in commercial storage houses of Faisalabad (31°25'15.7620" N; 73°5'21.4584" E) - district of Punjab Province. Initially, water-soaked lesions appeared at the surface of carrots that extended deep into the root tissue. At later stages, the surface of diseased lesions was covered with fluffy, white mycelium and produced a sour odor. On potato dextrose agar, sterilized segments of roots displayed white, flat, and nearly powdery colonies, sometimes feathered at the margins. Mycelium was hyaline and septate. Arthroconidia were hyaline, one-celled, and aerial ($4.4\text{--}12.5 \times 4.1\text{--}7.2 \mu\text{m}$). Cultural and morphological characteristics matched the descriptions of *Geotrichum candidum* (de Hoog et al. 1986). DNA was extracted from multiple isolates and the Internal Transcribed Spacer (ITS) region was amplified using ITS1/ITS4 primers. The sequences were all identical and two representative sequences were submitted to GenBank (accession Nos. MH729185 and MK215811), which had 99% identity to *G. candidum* isolate CBS 11628 (KY103456). The culture was deposited in First Culture Bank of Pakistan. Pathogenicity test was confirmed by inoculation of 10 carrot roots with 20 mL

of a conidial suspension (10^5 conidia/mL) using a glass sprayer. Inoculated carrots were placed on a tray and maintained at 20 °C for one week. Ten control carrots were sprayed with sterilized water only. After three days, all inoculated carrots became infected and displayed the same symptoms as seen for naturally infected carrots, and fungus having morphological characters identical to *G. candidum* was re-isolated. Control carrots remained symptomless. Sour rot of carrot caused by *G. candidum* has been reported previously in Korea (Kim et al. 2011). To our knowledge, this is the first report of *G. candidum* associated with sour rot of carrot in Pakistan.

References

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✉ Muhammad Waqar Alam
waqaralam2009@gmail.com

¹ Department of Plant Pathology, University of Agriculture, Faisalabad 38040, Pakistan

² Institute of Agricultural Sciences, University of the Punjab, Lahore, Pakistan