First report of botrytis prunorum causing fruit rot on kiwifruit in Chile


Abstract

Kiwifruit (Actinidia delicosa) is a high-value crop in Chile, the second major kiwifruit producer in the Southern Hemisphere, with over 9,700 ha planted at present. Kiwifruit cv. Hayward, harvested in the Central Valley of Chile, stored for 120 days at 0°C in 2% O2 and 5% CO2 controlled atmosphere (CA) chambers, were infected with Botrytis fruit rot at 3 to 7% in 2015. Symptoms consisted of a light to dark brown soft watery decay that often started from the stem end and affected the pericarp and then the whole fruit. At room temperature (20 to 22°C), decayed fruits developed a white to gray fungal growth. Fungal isolations were performed from surface disinfected (1 min in 75% ethanol) diseased fruits (n = 30). Small pieces (5 mm length) of internal tissues, taken at the margin of diseased and healthy tissues, were placed on potato dextrose agar (PDA) acidified with 0.5 ml liter–1 92% lactic acid (APDA) incubated for 7 days at 20 to 22°C. High (HS)- and low-sporulating (LS) isolates of Botrytis were obtained and were morphologically identified as Botrytis cinerea Pers. and B. prunorum E. Ferrada & Latorre, respectively (Ferrada et al. 2016). The LS isolates produced white to yellowish, cottony, floccose, tufted aerial mycelium, with scarce conidial production on PDA. On pea agar medium, LS isolates produced unicellular conidia, hyaline; ovoid to ellipsoidal of 10.2 ± 1.4 μm × 7.3 ± 1.0 μm (n = 40) with a prominent hilum. Conidiophores were septate, slightly constricted at the base, irregularly branched toward the apex, and 569.5 ± 187.6 μm in length (n = 10). B. prunorum was further identified by amplification of genes glyceraldehyde-3-phosphate dehydrogenase (G3PDH), heat-shock protein 60 (HSP60), and DNA-dependent RNA polymerase subunit II (RPB2), using PCR and primers G3PDHfor/G3PDHrev, HSP60for/HSP60rev, and RPB2for/RPB2rev, respectively (Staats et al. 2005). A BLAST search using the sequences for isolates KW 2.2.2 and KW 4.1.2 (GenBank accession nos. KX196311 to KX196316) indicated a 99 to 100% identity with B. prunorum (KP339979, KP339986, KP339996). B. prunorum isolate KW 2.2.2 was deposited in the Colección Chilena de Recursos Genéticos Microbianos – INIA, Chillán Chile, accession RGM2296. ‘Hayward’ kiwifruits (n = 5 per isolate) with a mean of 5.2% total soluble solids and 1.5% titratable acidity, were surface disinfected (75% ethanol, 5 min), injured with a sterile cork borer, and inoculated with a 5 mm diameter mycelial plug or 15 μl of conidial suspension (106 conidia/ml) obtained from isolates KW 2.2.2 and KW 4.1.2. An equal number of wounded but noninoculated fruits were left as control. After 10 days at 25°C of incubation in a humid chamber, all inoculated fruit developed a light to dark brown, watery soft decay with lesions of 15.3 to 27.0 mm in diameter. Noninoculated fruit remained healthy. B. prunorum was reisolated from 100% of the inoculated fruits. This is the first report of B. prunorum causing fruit rot on Hayward kiwifruits during CA storage. The frequency of B. prunorum was low (12.5%) and it was always found with B. cinerea. Previously, B. prunorum was identified on flowers of Japanese plums (Prunus salicina) in Chile (Ferrada et al. 2016).