

Diseases Caused by Fungi and Fungus-Like Organisms

First Report of Brown Rot Caused by *Monilinia polystroma* on Apple in Italy

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Brown rot is a common apple disease in Italy, caused by *Monilinia fructicola*, *M. laxa*, and *M. fructigena* (Martini et al. 2013). In September 2020, in a 'Jeromine' apple orchard under integrated pest management located in Scarnafigi (44°39'N, 7°33'E, north-western Italy), fruits (8.6%) showing brown to blackish firm lesions (6.0 to 8.0 cm diameter) were observed. In some fruits, rots were covered by yellowish stromata. Two isolates (MPI1, MPI2) were obtained from two symptomatic apples and cultured on potato dextrose agar (PDA) for 7 days at 25°C in 12-h light/12-h dark regime. A white-to-greyish mycelium with slightly undulate margins and irregular, black stromata developed on PDA after 12 days incubation. Conidia, observed in branched monilioid chains, were one-celled, globose, limoniiform, hyaline, 38 to 58 (mean: 48) × 20 to 44 (mean: 33) µm. Based on morphology, the isolates were tentatively identified as *Monilinia polystroma* (G.C.M. Leeuwen) Kohn. A polymerase chain reaction with primers ITS1 and ITS4 was performed on internal transcribed spacer (ITS) regions 1 and 2 and 5.8S gene. The sequenced amplicons (435 and 445 bp; GenBank accession nos. MW600854 and MW600855) showed 100% identity to the reference isolate of *M. polystroma* (HQ846944) and to other isolates from

apples (AM937114, JX315717) and plum (GU067539). The ITS region of *M. polystroma* had five nucleotides to distinguish it from the closest species, *M. fructigena* (Zhu et al. 2016; MH862738). The pathogenicity of both isolates was tested on mature Jeromine apples (10.1% total soluble solids). Three replicates of six apples per isolate were surface disinfected with 1% NaClO. A mycelial plug (5 mm) from a colony grown on PDA was inserted using a cork borer into a hole (6 mm) in each fruit (Vasić et al. 2016). Apples inoculated with sterile PDA plugs were used as a control. Fruits were placed at 22 ± 1°C, 85% relative humidity, and 12-h light/12-h dark regime. Lesion size was measured after 3, 6, and 9 days of incubation. All inoculated fruits developed typical brown rot symptoms 6 days after inoculation, and yellowish stromata appeared on the surface; control fruit remained healthy. The virulence of both isolates was statistically similar. *M. polystroma* was reisolated from all inoculated fruits and confirmed by molecular methods. This is the first report of *M. polystroma* on apple in Italy. *M. polystroma* was previously reported on apple in Hungary (Petróczy et al. 2009), on apricot in Switzerland (Hilber-Bodmer et al. 2012), on peach and pear in Italy (Martini et al. 2014, 2015), on plum in China (Zhu et al. 2016), and on apple in Serbia (Vasić et al. 2018). The emergence of this pathogen for pome and stone fruit production in Europe stimulates the study of its biology and epidemiology, and its fitness and management, as compared with the other endemic *Monilinia* species.

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