Diseases Caused by Fungi and Fungus-Like Organisms

First Report of *Rhizoctonia solani* AG 2-1 Causing Crown Rot on *Alcea rosea* in Italy

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Alcea rosea L., also known as hollyhock, is a plant belonging to the Malvaceae family. During the late spring of 2020, symptoms of stunting, withering, and crown rot appeared on 2- to 3-month-old plants of *A. rosea*. The symptoms quickly evolved, causing the death of the plants in 7 days. The alterations were observed on 20% of about 50 plants grown in pots as well as in borders in a private garden near Biella (northern Italy, Piedmont, 45° 36' 00" N, 8° 03' 00" E). The crown of the symptomatic plants was disinfected in 1% hypochlorite and rinsed in sterilized water, and small fragments taken from the margins of the diseased tissues were plated on potato dextrose agar amended with streptomycin sulfate (25 mg/liter). After 3 days at 20 to 24°C, colonies of a fungus with the same characteristics as *Rhizoctonia solani* (Sneh et al. 1991) were isolated with a frequency of 90%. Colonies 21 days old showed a camel-brown mycelium, moderately aerial, characterized by a dark-brown color at the center of the colony. Sclerotia developed after 16 days, very abundant, embedded in the agar, single or confluent, with a wooly surface of the same color as the colony. The DNA of one representative isolate coded 20/05 was extracted, and PCR was carried out with primers ITS1/ITS4 to determine the anastomosis group. The PCR products were sequenced by BMR Genomics Sequencing Service (Padova, Italy), and the sequence (GenBank no. MT815908), analyzed with BLASTn (Altschul et al. 1997), showed 100% identity with

R. solani AG 2-1 (GenBank no. MT380166). For the pathogenicity test, a pure culture of the isolate 20/05 was grown on sterilized wheat kernels for 7 days. The infected kernels were mixed, at 2 g/liter, with a steam-disinfested peat substrate. Three healthy 2-month-old plants of *A. rosea* were transplanted in 2-liter pots (one plant per pot) containing the infested substrate. Three plants grown in a substrate with noninfested wheat kernels added were used as controls. Plants were maintained in a greenhouse at 20 to 25°C, and 3 days after the inoculation symptoms of withering and crown rot appeared on the inoculated plants, which died 2 days later, whereas controls remained healthy. *R. solani* was reisolated from the infected tissues with a frequency of 90%. The pathogenicity test was repeated three times 15 days apart, obtaining the same results. *R. solani* is a pathogen of several ornamental plants; recently, characteristic symptoms of *R. solani* were detected on 30 ornamental species cultivated in different nurseries located in southern Italy (eastern Sicily) (Aiello et al. 2017). According to the USDA-ARS Fungal Database (Farr and Rossman 2020) and to our knowledge, this is the first report of *R. solani*, in particular *R. solani* AG 2-1, on *A. rosea* in Italy as well as worldwide. *A. rosea* is commonly used to decorate public and private gardens in Southern Europe and Turkey (Mert et al. 2010), and the possible spread of *R. solani* as a new pathogen could represent a serious problem for the commercial production of this ornamental, causing severe economic losses.

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