

# Disease Notes

## Diseases Caused by Oomycetes

### First Report of Downy Mildew Caused by *Hyaloperonospora parasitica* on *Matthiola incana* in Italy

D. Bertetti,<sup>1</sup> S. Matic,<sup>1</sup> A. Garibaldi,<sup>1</sup> G. Bozzano,<sup>2</sup> and M. L. Gullino<sup>1,3,†</sup>

<sup>1</sup> Centre of Competence AGROINNOVA, University of Torino, 10095 Grugliasco, Italy

<sup>2</sup> Cooperativa L'Ortofrutticola, 17031 Albenga, Italy

<sup>3</sup> DISAFA, University of Torino, 10095 Grugliasco, Italy

Plant Dis. 105:513, 2021; published online as <https://doi.org/10.1094/PDIS-04-20-0766-PDN>. Accepted for publication 28 August 2020.

Stock (*Matthiola incana*), Brassicaceae family, is an herbaceous ornamental plant producing sweet-smelling colored inflorescences that, in Italy, is grown as potted plant and in borders in gardens. During December 2019, symptoms of downy mildew were observed on about 30% of 800 3-month-old potted plants of *M. incana* growing on a farm located in Albenga (Savona province, northern Italy). The affected leaves showed yellowing and light twisting, and their abaxial surface was covered by whitish-appearing sporulation: conidiophores and conidia. Affected leaves turned necrotic, and plants lost their commercial value. Conidiophores were branched dichotomously (up to five branches), and they ended with curved tips supporting light gray, spheroid conidia. Branches measured 11.3 to 73.7 (average 31.1)  $\mu\text{m}$ , and the final tips were 4.7 to 17.8 (average 11.1)  $\mu\text{m}$  long. Conidia measured 14.5 to 18.0  $\times$  12.3 to 14.7 (average 16.3  $\times$  13.1)  $\mu\text{m}$ . Based on these morphological characteristics, the pathogen was identified as *Peronospora* sp. (Spencer 1981). Mycelium, conidiophores, and conidia of the pathogen were collected from affected leaves, and the DNA of the microorganism was extracted with the E.Z.N.A. Fungal DNA Mini Kit (Omega Bio-Tek, Darmstadt, Germany). Polymerase chain reaction was performed using the internal transcribed spacer (White et al. 1990) primers (ITS1 and ITS4), and a sequence with 834 bp (GenBank

MT275635) was obtained. BLASTn analysis of this sequence showed 99.64% identity with *Hyaloperonospora* (syn. *Peronospora*) *parasitica* voucher GG514 (MA) (GenBank EU049268). The size of conidia reported above is different from that previously reported on the same host (Koike 2000), and it could be due to the existence of different species within *H. parasitica*. In the pathogenicity test, carried out twice, a brush loaded with conidiophores and conidia from an infected leaf was gently pressed onto moistened leaves of three 4-month-old healthy plants of *M. incana*. Three control plants of the same species were treated with a brush dipped in sterile water. All plants were kept at high relative humidity for 5 days and were maintained in a greenhouse at temperatures ranging from 15 to 26°C. After 10 days, the first symptoms of yellowing and light twisting appeared on inoculated leaves. As the disease progressed, whitish sporulation appeared on the abaxial leaf surfaces, and the same conidiophores and conidia described above were observed under the microscope. Control plants remained symptomless. *H. parasitica* has been reported on *M. incana* in several countries (Farr and Rossman 2020) but not in Italy, where instead *Peronospora matthiolae* was reported (Parrini and Rumine 1987). The susceptibility to *H. parasitica* of the most commonly grown *M. incana* cultivars has to be tested in further susceptibility trials. The spread of *H. parasitica* may complicate the management of downy mildew of stock in Italian nurseries, where *P. matthiolae* is already known.

#### References:

- Farr, D. F., and Rossman, A. Y. 2020. Fungal Databases, Syst. Mycol. Microbiol. Lab., ARS, USDA. Retrieved April 7, 2020, from <https://nt.ars-grin.gov/fungaldatabases/>.
- Koike, S. T. 2000. Plant Dis. 84:103.
- Parrini, C., and Rumine, P. 1987. Colt. Prot. 16:81.
- Spencer, D. M. 1981. The Downy Mildews. Academic Press, London, England.
- White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, CA.

The author(s) declare no conflict of interest.

**Keywords:** oomycetes, ornamentals, epidemiology

<sup>†</sup>Indicates the corresponding author.

E-mail: M. L. Gullino; [marialodovica.gullino@unito.it](mailto:marialodovica.gullino@unito.it)