

AperTO - Archivio Istituzionale Open Access dell'Università di Torino

Presence of Powdery Mildew Caused by *Erysiphe corylacearum* on Hazelnut (*Corylus avellana*) in Italy

This is the author's manuscript

Original Citation:

Availability:

This version is available <http://hdl.handle.net/2318/1770301> since 2023-02-06T16:13:06Z

Published version:

DOI:10.1094/PDIS-10-20-2281-PDN

Terms of use:

Open Access

Anyone can freely access the full text of works made available as "Open Access". Works made available under a Creative Commons license can be used according to the terms and conditions of said license. Use of all other works requires consent of the right holder (author or publisher) if not exempted from copyright protection by the applicable law.

(Article begins on next page)

1 **Presence of Powdery Mildew Caused by *Erysiphe corylacearum* on Hazelnut (*Corylus avellana*) in** 2 **Italy**

3 M. Mezzalama[†], V. Guarnaccia, G. Martano, D. Spadaro

4 DISAFA, University of Torino, Largo Paolo Braccini 2, 10095 Grugliasco (TO), Italy

5 [†]monica.mezzalama@unito.it

6 Hazelnut (*Corylus avellana*) is widely grown in Italy, which is the second largest producer worldwide
 7 with 132,700 tonnes harvested from 78,593 hectares (FAOSTAT, 2018). Powdery mildew caused by
 8 *Phyllactinia guttata* has been reported in Italy and in other European countries, but recently in
 9 Austria, Switzerland and in central Europe a new species was discovered (Voglmayr et al., 2020;
 10 Beenken, 2020). During summer 2020, in Villar Fioccardo (Torino province, Piedmont, Italy) on
 11 hazelnut (cv. 'Tonda Gentile') growing on the edges of private gardens and parks, an extensive
 12 colonization of the adaxial side of the leaves with white powdery mycelium covering more than
 13 80% of the surface was observed. Also, the abaxial side of the leaves showed the scattered presence
 14 of powdery, white, and thin mycelium. The powdery fungal pathogen collected from leaves had
 15 amphigenous, hyaline, branched, septate 1.5 to 3.7 µm wide mycelium; lobed, solitary hyphal
 16 appressoria; vertically elevated above the mycelium 53 to 82 µm long and 5 to 12 µm wide
 17 conidiophores ($n = 30$); hyaline, ellipsoid, ovoid to doliform conidia, solitary on conidiophores, 21 to
 18 36 µm long, 15 to 21 µm wide (average 28 to 18 µm) ($n = 50$). Chasmothecia appeared in late
 19 September 2020 and they were spherical, single or in groups, 83 to 138 (average 100) µm in
 20 diameter ($n = 50$); 7 to 15 aseptate appendages were straight, sometimes flexuous, 55 to 111
 21 (average 73) µm long ($n = 50$), with four to five times dichotomous branched apexes and recurved
 22 tips. In each chasmothecium, there were three to five ellipsoid, ovoid to subglobose asci with a
 23 length of 41 to 60 µm and a width of 28 to 56 µm (average 52 to 44 µm) ($n = 30$). Asci contained
 24 four to eight ascospores, 15 to 26 µm long and 10 to 17 µm wide (average 19 to 12 µm) ($n = 50$).
 25 Mycelia were carefully scraped from the leaves with a scalpel and DNA was extracted by using the
 26 E.Z.N.A. Fungal DNA Mini Kit (Omega Bio-Tek, Darmstadt, Germany). Partial rDNA internal
 27 transcribed spacer region (ITS) of two isolates (DB20SET01, DB20SET01) was amplified using specific
 28 primers PMITS1/PMITS2 (Cunnington et al. 2003) and sequenced. Obtained sequences were
 29 deposited in GenBank (Accession Nos. MW045425, MW045426). BLAST analysis of the obtained
 30 749-bp fragments showed 100% identity to ITS rDNA sequences of *Erysiphe corylacearum* from
 31 Switzerland (MN822721) and Azerbaijan (LC270863). One-year-old plants of *C. avellane* cv. Tonda
 32 Gentile were artificially inoculated by dusting conidia from infected leaves. Inoculated plants were

incubated under controlled conditions at $23^{\circ}\text{C} \pm 1$ and 70 to 80% relative humidity. Typical symptoms (white bloom) appeared on the upper surface of the leaves at 8 to 10 days after inoculation. No symptoms were found on control plants treated with sterile water. The fungus isolated from inoculated leaves was morphologically identical to the original isolates from diseased plants collected from Villar Fioccardo. *Erysiphe corylacearum* causes a new and aggressive form of powdery mildew. Since the first observation in north-eastern Turkey in 2013, it has spread rapidly throughout the Black Sea region, causing significant economic losses (Sezer et al., 2017). It has also been reported in Iran, Azerbaijan, and Ukraine (Arzanlou et al. 2018; Heluta et al., 2018). The disease has been observed sporadically in Piedmont, Italy, during summer 2020 (Regione Piemonte & Agrion, 2020) in some hazelnut growing areas, but presently, doesn't appear to impact yield. This is the first report of *E. corylacearum*, causing an aggressive powdery mildew on hazelnut in Italy, and as such, may more severely affect hazelnut groves in Italy and cause considerable yield losses.

Literature cited

- Arzanlou M et al. 2018. Forest Pathology, 48:e12450. <https://doi.org/10.1111/efp.12450>.
- Beenken L et al. 2020. New Disease Reports 41, 11. <http://dx.doi.org/10.5197/j.2044-0588.2020.041.011>.
- Cunnington JH et al. 2003. Australasian Plant Pathology, 32, 421-428.
- Food and Agriculture Organization (FAO). 2018. <http://www.fao.org/faostat/en/#home>
- Heluta V.P. et al. 2019. Ukrainian Botanical Journal, 2019, 76(3), 252-259.
- Regione Piemonte SFR & Agrion. 2020.
- https://www.regione.piemonte.it/web/sites/default/files/media/documenti/2020-10/mal_bianco_nocciolo_da_erysiphe_corylacearum.pdf
- Sezer AD et al. 2017. Phytoparasitica, 45, 577-581.
- Voglmayr H et al. 2020. New Disease Reports, 42, 14 <http://dx.doi.org/10.5197/j.2044-0588.2020.042.014>