

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<sup>†</sup>, V. Guarnaccia, G. Martano, D. Spadaro

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

5 <sup>†</sup>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  $\mu\text{m}$  wide mycelium; lobed, solitary hyphal  
16 appressoria; vertically elevated above the mycelium 53 to 82  $\mu\text{m}$  long and 5 to 12  $\mu\text{m}$  wide  
17 conidiophores ( $n = 30$ ); hyaline, ellipsoid, ovoid to doliform conidia, solitary on conidiophores, 21 to  
18 36  $\mu\text{m}$  long, 15 to 21  $\mu\text{m}$  wide (average 28 to 18  $\mu\text{m}$ ) ( $n = 50$ ). Chasmothecia appeared in late  
19 September 2020 and they were spherical, single or in groups, 83 to 138 (average 100)  $\mu\text{m}$  in  
20 diameter ( $n = 50$ ); 7 to 15 aseptate appendages were straight, sometimes flexuous, 55 to 111  
21 (average 73)  $\mu\text{m}$  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  $\mu\text{m}$  and a width of 28 to 56  $\mu\text{m}$  (average 52 to 44  $\mu\text{m}$ ) ( $n = 30$ ). Asci contained  
24 four to eight ascospores, 15 to 26  $\mu\text{m}$  long and 10 to 17  $\mu\text{m}$  wide (average 19 to 12  $\mu\text{m}$ ) ( $n = 50$ ).  
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

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

45

#### 46 Literature cited

- 47 Arzanlou M et al. 2018. Forest Pathology, 48:e12450. <https://doi.org/10.1111/efp.12450>.
- 48 Beenken L et al. 2020. New Disease Reports 41, 11. [http://dx.doi.org/10.5197/j.2044-](http://dx.doi.org/10.5197/j.2044-0588.2020.041.011)  
 49 [0588.2020.041.011](http://dx.doi.org/10.5197/j.2044-0588.2020.041.011).
- 50 Cunnington JH et al. 2003. Australasian Plant Pathology, 32, 421-428.
- 51 Food and Agriculture Organization (FAO). 2018. <http://www.fao.org/faostat/en/#home>
- 52 Heluta V.P. et al.2019. Ukrainian Botanical Journal, 2019, 76(3), 252-259.
- 53 Regione Piemonte SFR & Agrion. 2020.  
 54 [https://www.regione.piemonte.it/web/sites/default/files/media/documenti/2020-](https://www.regione.piemonte.it/web/sites/default/files/media/documenti/2020-10/mal_bianco_nocciolo_da_erysiphe_corylacearum.pdf)  
 55 [10/mal\\_bianco\\_nocciolo\\_da\\_erysiphe\\_corylacearum.pdf](https://www.regione.piemonte.it/web/sites/default/files/media/documenti/2020-10/mal_bianco_nocciolo_da_erysiphe_corylacearum.pdf)
- 56 Sezer AD et al. 2017. Phytoparasitica, 45, 577-581.
- 57 Voglmayr H et al. 2020. New Disease Reports, 42, 14 [http://dx.doi.org/10.5197/j.2044-](http://dx.doi.org/10.5197/j.2044-0588.2020.042.014)  
 58 [0588.2020.042.014](http://dx.doi.org/10.5197/j.2044-0588.2020.042.014)