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

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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

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

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