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First Report of Powdery mildew caused by *Golovinomyces orontii* Heluta on *Hibiscus manihot* L. in Italy. A. Garibaldi, D. Bertetti, and S. Matic, Centre of Competence AGROINNOVA, University of Torino, Largo Braccini 2, 10095 Grugliasco, Italy; and M. L. Gullino, Centre of Competence AGROINNOVA and DISAFA, University of Torino, Largo Braccini 2, 10095 Grugliasco, Italy.

Hibiscus manihot L. (Syn.: *Abelmoschus manihot* L.) is a herbaceous plant belonging to the Malvaceae family, appreciated for its large and showy yellow flowers and cultivated in gardens in mixed borders. During the winter 2018, 3-5-month-old seed-borne potted plants of *H. manihot* growing in a greenhouse of the Centre of Competence Agroinnova, University of Torino, located in Grugliasco (Torino province, northern Italy) showed symptoms and signs of a powdery mildew. The white mycelium caused by the fungal pathogen colonised in particular the adaxial surface of leaves, causing slightly brown necrosis on the affected tissues. As the disease progressed, the affected leaves yellowed, then they dried and fell prematurely. Conidiophores were erect with cylindrical, sometimes curved at the base, foot-cells that measured $40\text{-}76 \times 7\text{-}11$ (average: 55×10) μm . Foot-cells were followed by 2-3 shorter cells that measured $13\text{-}30 \times 8\text{-}13$ (average: 20×10) μm . Conidia were elliptical, formed short chains (up to 3 conidia per chain) and measured $27\text{-}39 \times 14\text{-}23$ (average: 31×19) ($n = 50$) μm , with length/width (l/w) ratio between 1.2-2.3 (average: 1.7). They germinated apically and were lacking of fibrosin bodies. The perfect stage of the pathogen was not observed. Mycelium, conidiophores and conidia were collected from affected leaves and the DNA of the microorganism was extracted using the E.Z.N.A. Fungal DNA Mini Kit (Omega Bio-Tek, Darmstadt, Germany). Either primers ITS1/ITS4 (White et al. 1990) or ITS1/PM6 (Takamatsu and Kano 2001) were used for a PCR reaction to amplify the Internal Transcribed Spacer (ITS) region of rDNA. The NCBI blast analysis of 446 and 409 bp sequences (Genbank accession numbers MH414543 and MH414544 respectively) showed 99 and 100% identity with *Golovinomyces orontii* (KX396590 from *Galium aparine*) and with *G. orontii* (AB769465 from *Arabidopsis thaliana*). Therefore, the causal agent of the powdery mildew on *H. manihot* was identified as *G. orontii* Heluta (Syn.: *Erysiphe orontii* Cast.), accordingly with the features described for this pathogen by Braun (1987). Three 2-month-old healthy plants of *H. manihot* were inoculated gently pressing their leaves onto leaves of the same host affected by *G. orontii*. Inoculated plants were maintained at daily average temperatures ranging from 12.4 to 21.7°C. Three healthy non-inoculated plants were grown separately as controls. Fifteen days later, first symptoms and signs of powdery mildew developed, on inoculated plants only. Controls remained healthy. On *H. manihot* was reported *Erysiphe abelmoschicola* in Japan (Braun and Cook 2012),

Sphaerotheca fuliginea in China and Japan, *Oidium* sp. in New Guinea. To our knowledge this is the first report of *G. orontii* on *H. manihot* in Italy, as well as worldwide. The economic importance of this disease is at present limited in Italy, and further research is needed to understand the susceptibility of *Hibiscus* spp. to *G. orontii*, in particular for *H. syriacus*, widely diffused in hedges.

References

- Braun, U. 1987. A monograph of the Erysiphales (Powdery Mildews). J. Cramer, Berlin-Stuttgart, German Democratic Republic.
- Braun, U., and Cook, R. T. A. 2012. Taxonomic Manual of the Erysiphales (Powdery Mildews). CBS Biodiversity Series No. 11. CBS Utrecht, The Netherlands.
- Takamatsu, S., and Kano, Y. 2001. Mycoscience 42:135-139.
- White, T. J., et al. 1990. Page 315. In: PCR Protocols: A Guide to Methods and Applications. M. A. Innis et al., eds. Academic Press Inc., New York.