

First Report of Powdery Mildew Caused by *Golovinomyces neosalviae* on *Salvia fruticosa* in Turkey

S. Soylu, E. M. Soylu, M. Kara, Ş. Kurt, A. Uysal, S. H. Hong, H. D. Shin

Affiliations

Published Online: 13 Sep 2019 <https://doi.org/10.1094/PDIS-01-19-0002-PDN>

Salvia fruticosa Mill., called Anatolian sage, is a perennial herb of Lamiaceae that is native to the eastern Mediterranean. In May 2017, hundreds of *S. fruticosa* planted in an outdoor herb garden in Hatay (36°18'28"N, 36°12'39"E), Turkey, were found infected by a powdery mildew. Symptoms first appeared as thin white colonies but subsequently extended on both sides of the leaves and stems. Severe infections often caused premature senescence and early defoliation. A representative specimen was used for identification and deposited in the Korea University herbarium (KUS-F30415). Appressoria on the hyphae were nipple-shaped. Conidiophores were 160 to 360 × 9 to 11 µm and produced two to six catenate conidia in chains with a sinuate outline. Foot cells of the conidiophores were straight, cylindrical, and 80 to 200 µm long. Conidia ($n = 30$) were hyaline, ellipsoid to barrel-shaped, 30 to 42 × 16 to 22 µm (length/width ratio ranged from 1.7 to 2.4), and devoid of distinct fibrosin bodies. Primary conidia were rounded to conical at the apex and subtruncate at the base. Germ tubes were produced at the perihilar position of conidia. Chasmothecia were scattered to gregarious, dark brown, spherical, and 100 to 130 µm in diameter. Each chasmothecium contained five to 10 asci. Appendages were not exceeding the chasmothecial diameter, numerous, septate, hyaline to pale brown, becoming paler toward the tip, and thin-walled throughout. Asci were short-stalked, two-spored or occasionally four-spored, and 50 to 74 × 30 to 44 µm. Ascospores ($n = 30$) were ellipsoid-ovoid and 16 to 24 × 12 to 16 µm. The morphological characteristics were in agreement with those of *Golovinomyces neosalviae* M. Scholler, U. Braun & Anke Schmidt ([Scholler et al. 2016](#)). Sequence analysis of the internal transcribed spacer (ITS) rDNA for the isolate KUS-F30415 was performed. The complete ITS region was amplified and sequenced using primers ITS1/ITS4. The resulting 643-bp sequence was deposited in GenBank (accession no. MH676079). A GenBank BLAST search of the sequence showed >99% identity with the ITS sequences of *G. neosalviae* on *Salvia* spp. (e.g., AB307673, LC076838, LC076819, and LC076813). Pathogenicity was confirmed by gently pressing a symptomatic leaf onto healthy leaves of pot-grown young *S. fruticosa*. Five noninoculated plants served as controls. Plants were maintained in a greenhouse at room temperature. Inoculated plants developed powdery mildew symptoms after 7 to 10 days, whereas the control plants remained symptomless. The fungus present on inoculated plants was morphologically identical to that observed on the originally diseased plants. Although powdery mildew infections of *Salvia* spp. associated with *G. biocellatus* (now *G. salviae* and *G. neosalviae*) have been known globally ([Farr and Rossman 2019](#)), Anatolian sage powdery mildew has been recorded only from Israel and Germany ([Scholler et al. 2016](#); [Voytyuk et al. 2009](#)). To our knowledge, this is the first report of *G. neosalviae* on *S. fruticosa* in Turkey. Because Anatolian sage is cultivated on a small scale in Turkey, the powdery mildew poses a serious risk to production and marketability of the herb.