



First record of *Basidiophora simplex* causing downy mildew on *Symphiotrichum novae-angliae* in Switzerland and Europe

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The New England aster, *Symphiotrichum novae-angliae* (syn. *Aster novae-angliae*), is a perennial plant native to North America. Cultivars of the species are very popular ornamental plants (Chmielewski & Semple, 2003). *Basidiophora simplex* is a species separated from *Basidiophora entospora* and host specific to *S. novae-angliae* (Sökücü & Thines 2014). It was only known from North America up to now (Farr & Rossman 2020).

In October 2019, and again in August and September 2020, *B. simplex* was found causing downy mildew on leaves of *S. novae-angliae* in public parks and private gardens in Basel, Bern, Rafz, St. Gallen, Winterthur and Zurich, Switzerland (a continuously updated distribution map will be available from <https://swissfungi.wsl.ch/en/distribution-data/distribution-atlas.html>).

Voucher specimens are deposited in the fungal herbarium of ETH Zurich (ZTMYC 64442 - ZTMYC 64447). Yellow to brownish red, angular leaf spots limited by veins, with a white lawn of sporangiophores on the abaxial leaf surface are the typical symptoms. The sporangiophores emerging from stomata singly or in small clusters, hyaline, unbranched, rarely with one septum, straight, club-shaped, becoming gradually bulbous to head shaped at the apex, 50-260 µm long, 7-16 µm wide, apex up to 25 µm in diameter, bearing up to c. 20 cylindric pedicels, 7-15 × 2-2.5 µm. Sporangia singly on the pedicels, globose to sub-globose, hyaline, 20-40 µm in diameter, wall smooth, c. 1 µm thick, with apical papilla. Oogonia and oospores were not observed. These symptoms and morphological features fit well to the characteristics of the genus *Basidiophora* (Barreto & Dick 1991) and to the description and illustrations of *B. simplex* by Wallace *et al.* (2018).

For molecular identification, the mitochondrial cytochrome oxidase subunit II (cox2) gene region was amplified by PCR and sequenced using oomycete specific cox2 primers (forward: 3'-GGCAAATGGGTTTCAAGATC-5' and reverse: 3'-CCATGATTAATACCACAAATTT-5') (Telle & Thines 2008). All resulting sequences of the Swiss samples (Genbank Accession Nos. MW272548-MW272553) show 100% identity to the corresponding *B. simplex* sequences (KM087767- KM087770) deposited in GenBank by Sökücü & Thines (2014), and 99.83% identity (601/602 bp) to the sequence of Wallace *et al.* (2018) (MH187901).

Thus, *Basidiophora simplex* is documented here for the first time in Europe. It is likely that this downy mildew is much more widespread in Switzerland and Europe. It is possible that it has been overlooked so far or confused with the aster powdery mildew, *Golovinomyces asterum* (syn. *G. cichoracearum* p.p.), which is very common on *Symphiotrichum* spp.

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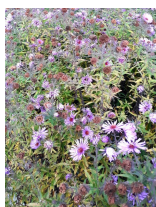


Figure 1



Figure 2



Figure 3

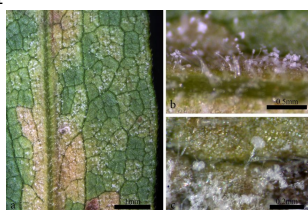


Figure 4

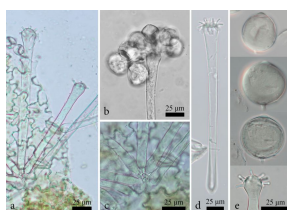


Figure 5

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