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# Disease Notes

## Diseases Caused by Fungi and Fungus-Like Organisms

### First Report of Powdery Mildew on *Physocarpus opulifolius* Caused by *Podosphaera physocarp* in Tennessee

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Eastern ninebark (*Physocarpus opulifolius* [L.] Maxim.) is a popular native perennial plant used in landscapes because of its colorful foliage and spring flower display. Powdery mildew symptoms were observed on container-grown eastern ninebark 'Mindia' Coppertina plants in a commercial nursery in DeKalb County, TN, in May 2016. The disease severity was nearly 40%, and the disease incidence was nearly 60% of 1,000 plants. Affected plants displayed witches' brooms with cream to white colored, thickened shoots with stunted, curly leaves as well as patches of white powdery fungal growth on the surface of young and old leaves, inflorescences, infructescences, and stems. Microscopic observation revealed masses of conidia and mycelium covering symptomatic tissues. Conidiophore foot cells measured 19.2 to 66.7  $\mu\text{m}$  (mean = 38.3  $\mu\text{m}$ )  $\times$  5.4 to 15.1  $\mu\text{m}$  (mean = 9.7  $\mu\text{m}$ ) ( $n = 30$ ). Conidia were ovoid and measured 11.4 to 28.5  $\mu\text{m}$  (mean = 20.9  $\mu\text{m}$ ) ( $n = 30$ ) in length and 8.2 to 14.8  $\mu\text{m}$  (mean = 11.7  $\mu\text{m}$ ) ( $n = 30$ ) in width. Conidiophores produced two to six conidia in chains. Fibrosin bodies were observed after treating conidia with a 3% KOH solution. Chasmothecia were numerous, 60.0 to 85.0  $\mu\text{m}$  (mean = 74.2  $\mu\text{m}$ ) ( $n = 30$ ) in size and contained one ascus (60.0 to 82.0  $\times$  52.0 to 69.0  $\mu\text{m}$ ; mean = 73.4  $\times$  59.4  $\mu\text{m}$  [ $n = 30$ ]) with eight ascospores (25.2 to 28.0  $\times$  14.8 to 16.0  $\mu\text{m}$ ; mean = 26.5  $\times$  15.5  $\mu\text{m}$  [ $n = 30$ ]). To confirm pathogen identity, total DNA was extracted directly from plant tissue with

the UltraClean Microbial DNA Isolation Kit (MO BIO Laboratories, Carlsbad, CA) following the manufacturer's instructions. The internal transcribed spacer region of the ribosomal DNA was amplified by polymerase chain reaction (PCR) using primer pair ITS1 and ITS4 (White et al. 1990). The sequence (GenBank accession no. MT605142) of the amplicon had 100% coverage and 100% identity to that of *Podosphaera physocarp* (U. Braun) U. Braun (= *Podosphaera aphanis* var. *physocarp* [U. Braun] U. Braun & S. Takam.) (GenBank accession no. MT106654). Pathogenicity was confirmed three times by inoculating leaf surfaces of five eastern ninebark Mindia Coppertina plants by tapping fungal spores from infected eastern ninebark leaves onto the surfaces of healthy leaves. Inoculated plants were maintained in a greenhouse (21 to 23°C) using a drip irrigation system until symptoms developed. Five noninoculated control plants were maintained in the same greenhouse. After 2 weeks, typical symptoms of powdery mildew developed on the inoculated plants, and microscopic examination revealed the same pathogen morphology as the original isolate. All noninoculated control plants remained disease-free. To our knowledge, this is the first report of powdery mildew caused by *P. physocarp* on *P. opulifolius* in Tennessee. Powdery mildew is known to be a disease problem on eastern ninebark grown in its native range in landscape plantings. Lubell et al. (2011) reported varying levels of powdery mildew resistance among eastern ninebark cultivars. Timely application of fungicides with no phytotoxic effect will be necessary to manage this disease on susceptible eastern ninebark cultivars in affected nurseries.

#### References:

- Lubell, J. D., et al. 2011. J. Environ. Hortic. 29:105.  
White, T. J., et al. 1990. Page 315 in: PCR Protocols: A Guide to Methods and Applications. Academic Press, San Diego, CA.

The author(s) declare no conflict of interest.

#### e-Xtra

**Keywords:** *Physocarpus opulifolius*, *Podosphaera physocarp*, eastern ninebark

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