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Did We Need Another Phytophthora? Did Mums Need Another Disease?

Phytophthora chrysanthemi causes stunting, purpling, and death of foliage, on one major branch or the whole plant; root rot is apparent as well.

If you asked any mum grower, they would tell you that chrysanthemums already had plenty of diseases and didn't need another one.

But it seems that the flower industry didn't get to make the call on this one.

We have been aware of a new threat to mums for 5 years, since an Ohio report described a *Phytophthora* disease from several cultivars in a large landscape planting (Lin et al., 2017). The pathogen was not one of the *Phytophthoras* that we are more familiar with, e.g. *Phytophthora nicotianae* or *P. cactorum*. Instead, researchers in Ohio worked from root and stem rot symptoms to isolate a *Phytophthora* species not previously known to occur in the United States, named *Phytophthora chrysanthemi*.



Purple coloring and branch dieback, symptoms of infection by *Phytophthora chrysanthemi*. Photo: Francesca Peduto Hand, The Ohio State University

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Purple coloration on mum foliage, one of the symptoms of infection by *P. chrysanthemi*. Photo: Francesca Peduto Hand, The Ohio State University



Healthy mum plant (left) compared to mum plant infected with *P. chrysanthemi* (right). Photo: Francesca Peduto Hand, The Ohio State University

This pathogen appears to be favored by high temperature conditions (30°C/86°F and above) based on its laboratory behavior and the summer timing of the first documented outbreak in the United States. Infection is associated with stunting, purpling, and death of foliage, on one major branch or the whole plant. Root rot is also apparent. Immunostrip® tests (Agdia, Inc., Elkhart, IL) and likely other serological tests for *Phytophthora* can be used on discolored stem tissue to get an initial indication that this pathogen may be responsible for symptoms in production or the landscape. In order to confirm the pathogen, diagnostic labs will find it helpful to culture at 28-30°C, which is warmer than standard practice.

Recently similar symptoms were observed in a 2022 garden mum crop in New York. Various hypotheses were considered, including feeding by the European pepper moth (*Duponchelia fovealis*), Fusarium wilt, Rhizoctonia stem canker, and Pythium root rot—all of which are commonly found on mums. However, Immunostrip® tests were positive for *Phytophthora*, indicating that the newly discovered *P. chrysanthemi* might be the culprit; isolations are underway. Disease caused by *P. chrysanthemi* may be challenging to identify because this pathogen is difficult to isolate and so many other agents can reduce the water supply to the top of the plant and also cause discoloration, wilting and death. Stay alert to the possibility of this new *Phytophthora* disease: do not assume that you know why your mums are wilting. Trials have not been conducted for management of this specific disease but one would expect that fungicides effective against other *Phytophthora* diseases would protect against it when used preventively with appropriate rotation. Effective fungicides include materials with

the active ingredients cyazofamid, dimethomorph, etridiazole, mandipropamid, mefenoxam, oxathiapiprolin and strobilurins. Watch for symptoms of root rot or wilt in cuttings during propagation and identify their cause so that problems do not surprise you during the finishing stages of the mum crop.

References:

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Healthy roots (left) compared to roots infected with *P. chrysanthemi* (right). Photo: Francesca Peduto Hand, The Ohio State University



Discolored stem tissue is one of the symptoms of *P. chrysanthemi* infection. Photo: Francesca Peduto Hand, The Ohio State University



Longitudinal section of infected mum stem. Photo: Francesca Peduto Hand, The Ohio State University



Images of oospores of *P. chrysanthemi* (left and right). Oospores are aplerotic, spherical with a thick wall that may turn golden brown with age; antheridia are barrel- or club-shaped to irregular and are most often terminal and paragynous (Naher, et al., 2011). Photos: Francesca Peduto Hand, The Ohio State University



Sporangium of *P. chrysanthemi*. Sporangia are noncaducous, nonpapillate, usually ellipsoid, ovoid or pyriform and form readily in water culture after growth on V8 agar (Naher, et al., 2011). Photo: Francesca Peduto Hand, The Ohio State University

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