

## 2014 Empire Producers EXPO Berry Session Presentation Summaries

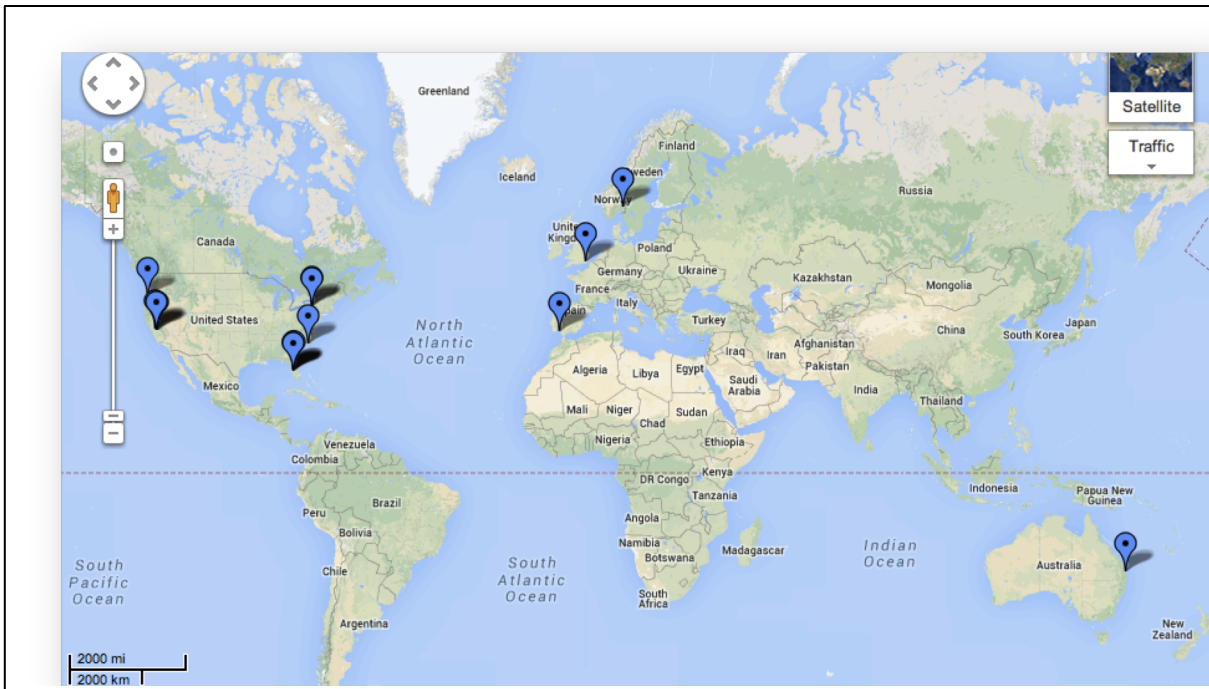
**Strawberry Powdery Mildew: An Update** - David M. Gadoury, Department of Plant Pathology and Plant-Microbe Biology, Cornell University, Geneva, NY 14456 USA. Email: [dmg4@cornell.edu](mailto:dmg4@cornell.edu)

The fungal pathogen that causes strawberry powdery mildew (*Podosphaera aphanis*) can survive on senescent green leaves of overwintering plants in perennial production systems, as cryptic infection on nursery stock deployed in annual or perennial production systems, and as small spherical fruiting structures called chasmothecia that normally function as overwintering structures. Although *P. aphanis* occurs commonly throughout the range of strawberry production, chasmothecia are irregularly reported - particularly from relatively warm climates. Strawberry leaves with mildew colonies representing populations of *P. aphanis* were collected across a climatic temperature gradient of the continental U.S., Europe, and Australia (Fig. 1). Extracted DNA was then subjected to a PCR-based assay to detect the MAT1-1 and MAT1-2 mating types. Isolates representing each mating type were detected among nearly all samples. In parallel work, temperatures above 60°F strongly suppressed ascocarp initiation when compatible isolates were paired on strawberry leaves. Absence of chasmothecia across the range of strawberry production does not appear to be due to the absence or unequal distribution of mating types of the pathogen, but to suppression of ascocarp initiation by high temperatures in warm climates, in glasshouses, or in high-tunnel production systems. Ascocarps can be expected to form rapidly in such environments if and when temperatures fall below 60°F. In parallel studies, strawberry plants that had been allowed to enter dormancy, and were then forced to regrow in isolation chambers developed powdery mildew if senescent green leaves were left attached, but not if these leaves were removed before the plants were placed in isolation for regrowth. Thus, *P. aphanis* appears to survive on senescent green leaf overwinter, but not within crown tissue. In the absence of chasmothecia or colonies on senescent leaves, cryptic colonies on nursery plants remain a poorly understood source of infection, but one that could introduce the pathogen to new plantings. Field plantings started from certified disease-free plants derived from tissue culture remained disease-free for one growing season in New York and Norway, despite the lack of any seasonal use of fungicides to protect the plants, while plants located approximately 100 to 300 m away developed mild to severe disease depending upon the initial level of powdery mildew in the planting (Fig. 2). Exclusion of the pathogen at planting has a substantial impact on minimizing the risk of disease. The possibility of cryptic colonies of *P. aphanis* entering plantings through the nursery system should be further investigated (Fig. 3). Although the environment of high tunnel and glasshouse production is generally more favorable for development and spread of the pathogen, it may prove to be very unfavorable for production of chasmothecia if temperatures are maintained above the threshold for their initiation.

### References

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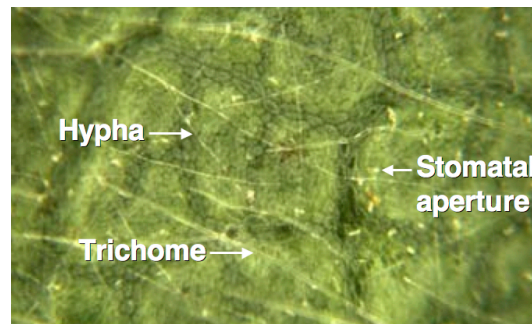
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**Fig. 1.** Isolates of *Podosphaera aphanis* were collected from 14 locations in 5 countries representing 3 continents for assessment of the distribution of mating types of the pathogen and potential for the formation of chasmothecia.



**Fig. 2.** Isolated strawberry plots started from certified mildew-free plants remained free of powdery mildew for one growing season without fungicidal protection.



**Fig. 3.** Microscopic (50X) view of a cryptic non-sporulating colony of *P. aphanis* on the underside of a mature strawberry leaf that appeared otherwise disease-free.