POSTER ABSTRACTS

Forest Fires and the Spread of *Armillaria ostoyae* in a Ponderosa Pine Forest

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Forest tree diseases are the most pervasive of all disturbances in western coniferous forests, yet they are among the least understood and perhaps most underestimated components of these ecosystems. Diseases, for example, influence forest fires by changing stand structure and generating fuels. Conversely, fires influence the abundance and distribution of fuel-generating diseases, but few studies have examined these relationships.

The Black Hills in South Dakota has been the focus of much attention following recent severe fires. Armillaria root disease, caused by *Armillaria ostoyae*, is arguably the most common disease in this forest. This field study examines the effects of fire on *A. ostoyae* in ponderosa pine (*Pinus ponderosa*), and tests methods of quantifying and detecting this pathogen (1,2).

Five plots were established in the Black Hills National Forest where fires occurred 3 years previously. Each plot consisted of four subplots varying in fire damage intensity (low, medium, high, and unburned). Wood blocks (ponderosa pine and aspen [*Populustremuloides*]) were buried north and south of 15 ponderosa pine trees in each subplot (1,200 total blocks).

After 2 years the wood blocks were examined for colonization by *A. ostoyae*. Results were compared with an associated study 2 years earlier (1) where the abundance of *Armillaria* rhizomorphs was ranked for each quarter of the same 15 trees per subplot as follows: 0 = no rhizomorphs; 1 = low; 2 = moderate; 3 = high; 4 = very high; and 5 = extremely high abundance.

The proportion of blocks colonized by *A. ostoyae* increased as fire intensity increased ($P < 0.001$). Ponderosa pine was more heavily colonized than aspen (e.g., 77% vs. 63%, in high intensity plots). Rhizomorph presence was significantly correlated with wood block colonization for both ponderosa pine ($P = 0.007$, $R = 0.586$) and aspen ($P < 0.001$, $R = 0.695$). Host condition worsened with increasing fire intensity ($P < 0.001$). Mortality was 0% for unburned and low fire intensity, 59% for medium, and 100% for high.

The wood block trap method offers a simple and relatively inexpensive means of detecting and quantifying Armillaria. Armillaria can survive intense fires and can readily increase its inoculum potential presumably by colonizing roots of fire-killed trees. Wildfires can influence the frequency of Armillaria. Seedling mortality due to Armillaria might be a limiting factor to successful regeneration on burned sites. The health of a site may be impacted over the long term by fire-induced increases in Armillaria.

References

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