

THE ECOLOGY OF ROOT DISEASE FUNGI IN MISSOURI FORESTS

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ABSTRACT

I surveyed a variety of managed Missouri forest landscapes for two common, high-impact fungal genera that cause root diseases of both conifers and hardwoods throughout the northern hemisphere, *Heterobasidion* and *Armillaria*. *Heterobasidion irregulare* infects shortleaf pine and had not been actively surveyed in the state since the 1960s. I found it to be widely distributed throughout the Ozarks region, despite the great reduction in shortleaf pine cover that took place early in the twentieth century. This pathogen apparently depends on the presence of shortleaf pine to survive and persist: in general I found it within 100 m of mature overstory pines, and I did not find it in limited surveys of hardwood forests outside the historic range of shortleaf pine.

I examined young (20 years post-clearcut) and mature (~100-year-old) oak-hickory forest stands in central Missouri for the distribution of *Armillaria* spp. within the soil using woody baits, soil moisture measurements, and an inventory of living and dead tree stems. Models used to describe the relationships between *Armillaria*, soil moisture, competition, and tree mortality showed that tree species and diameter were strongly associated with mortality and survival, whereas the effects of the other variables were smaller and varied from plot to plot. *A. gallica*, the main species detected, was more widely distributed in young, dense stands in comparison to other saprophytic fungi found on the baits, which were more widely distributed in mature stands.

I examined sprouting stumps after clearcuts conducted 7 and 50 years before in the Ozarks and found high and increasing levels of infection by *Armillaria* species in the younger clearcut, with an apparent reduction in infection in the 50-year-old one. The examination showed that despite these high infection levels, there was a complex interplay between stump vigor and invading *Armillaria* such that stump infection may not lead invariably to swift stump death.