Physiological Response of Naturally Regenerated Pinus taeda L. Saplings to Four Levels of Stem Inoculation with Leptographium terebrantis

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Abstract: Leptographium terebrantis is an opportunistic root pathogen commonly associated with loblolly pine (Pinus taeda L.) stands that are undergoing a loss of vigor in the southeastern US. In order to understand the relationship between L. terebrantis inoculum density and host physiology, an artificial inoculation study was conducted in a five-year-old naturally regenerated loblolly pine stand over a 24 week period in a completely randomized design. L. terebrantis caused sapwood occlusions that increased in severity as inoculum density increased. The occlusions significantly reduced water transport through the stem but did not interfere with fascicle-level stomatal conductance or induce moisture stress in the saplings. The resilience of stomatal conductance among pathogen-infested saplings is attributed to the growth and hydraulic function of new sapwood that developed after artificial inoculation. Results demonstrate that faster-growing families of loblolly pine may be capable of tolerating the vascular root disease when the formation of new sapwood is supported by sustained crown health.

Keywords: hydraulic conductance, inoculum density, Leptographium terebrantis, Pinus taeda, sapwood occlusion

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