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Brown-Spot Needle Blight: An Emerging Threat Causing Loblolly Pine Needle Defoliation in Alabama, USA

Authors : Debit Datta, Jeffrey J. Coleman, Scott A. Enebak, Lori G. Eckhardt

Abstract : Loblolly pine (Pinus taeda) is a leading productive timber species in the southeastern USA. Over the past three years, an emerging threat is expressed by successive needle defoliation followed by stunted growth and tree mortality in loblolly pine plantations. Considering economic significance, it has now become a rising concern among landowners, forest managers, and forest health state cooperators. However, the symptoms of the disease were perplexed somewhat with root disease(s) and recurrently attributed to invasive Phytophthora species due to the similarity of disease nature and devastation. Therefore, the study investigated the potential causal agent of this disease and characterized the fungi associated with loblolly pine needle defoliation in the southeastern USA. Besides, 70 trees were selected at seven long-term monitoring plots at Chatom, Alabama, to monitor and record the annual disease incidence and severity. Based on colony morphology and ITS-rDNA sequence data, a total of 28 species of fungi representing 17 families have been recovered from diseased loblolly pine needles. The native brown-spot pathogen, Lecanosticta acicola, was the species most frequently recovered from unhealthy loblolly pine needles in combination with some other common needle cast and rust pathogen(s). Identification was confirmed using morphological similarity and amplification of translation elongation factor 1-alpha gene region of interest. Tagged trees were consistently found chlorotic and defoliated from 2019 to 2020. The current emergence of the brown-spot pathogen causing loblolly pine mortality necessitates the investigation of the role of changing climatic conditions, which might be associated with increased pathogen pressure to loblolly pines in the southeastern USA.

Keywords : brown-spot needle blight, loblolly pine, needle defoliation, plantation forestry
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