Effect of Ceratocystis Species A and B Isolate Mutations on Disease Aggressiveness in Metrosideros polymorpha

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Rapid ‘Ohi‘a Death (ROD) is caused by two plant pathogenic fungi in the Ceratocystis fimbriata species complex, commonly referred to as Ceratocystis species A and B. ROD has devastated native ‘o¯hi‘a forests across the island of Hawai‘i, resulting in a loss of critical habitat for other native flora and fauna species and the degredation of Hawai‘i’s watershed. Symptoms of ROD, first discovered on M. polymorpha in 2014, include rapid wilting of the canopy and dark discoloration of the sapwood. Since then, researchers have been hard at work trying to find solutions. However, there is still much to learn about the organism itself. When fungal cultures from ROD killed trees are isolated, purified, and grown in the laboratory, they have been observed to have physically different growth sections– a phenomenon known as sectoring. The purpose of this study was to determine if sectoring cultures of both Ceratocystis species A and B could be isolated into stable cultures of varying growth types, and determine if these isolate mutations have varying effects on disease aggressiveness in seedlings of M. polymorpha. The methodology consisted of isolating these growth types, gathering data on their spore concentrations, percentages of perithecia, and the presence of alleurioconidia, and finally inoculating ‘ohi‘a seedlings with these isolates and taking observations. From this, six stable phenotype isolates of species A and four of species B were produced. The aggressiveness with which the isolates caused disease was correlated with higher densities of perithecia producing ascospores. The results of this work will provide a stronger foundation for future research dealing with Ceratocystis species A and B, and contribute to a better understanding of ROD as a whole.

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