Antimicrobial Activity of Endophytes Isolated from Transylvania County Spray Cliff Plants

Rideout, Nicole (School: Brevard Senior High School)
Bailey, Matthew (School: Brevard Senior High School)
Nguyen, John (School: Brevard Senior High School)

Spray cliffs (areas in the basin of a waterfall) are populated by plants that thrive in dark, moist environments. Such environments are typically conducive to plant diseases and thus select for plants that exhibit antimicrobial properties. Endophytes are symbiotic microorganisms found within plants. Some endophytes produce compounds that inhibit the growth of bacteria and fungi, and were targeted in this study. Plant samples were taken from the base of Lower Bearwallow Falls in Gorges State Park using a sterilized tool, placed on a water agar plate and incubated. After sufficient growth, endophyte hyphae were isolated and re-plated on potato dextrose agar. Broth cultures were inoculated with endophytes, incubated, and then centrifuged to remove the fungi. To assess antimicrobial activity of the endophytes, strains of Candida albicans, Escherichia coli, Bacillus cereus, and Cryphonectria parasitica were used as test organisms. A well diffusion assay was used to measure inhibition of test organisms by endophyte broth culture supernatant. To enhance detection limits, a spectrophotometric assay was used to measure turbidity of test organism growth in endophyte broth culture supernatant. Twenty-nine out of forty-three endophytes isolated from spray cliff mosses, liverworts and herbaceous plants inhibited the growth of at least one test organism, suggesting that further exploration of endophytes from spray cliff plants is warranted as a source of antimicrobials. Ninety-two percent of antimicrobial endophytes were identified through DNA-analysis as one of six different species in the genus Colletrotrichum, indicating a strong presence of this genus in the Lower Bearwallow Falls spray cliff community.

Awards Won:
Fourth Award of $500