Antifungal Activity of Bacteria Isolated from the Endangered Green Salamander, Aneides aeneus

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The green salamander, Aneides aeneus, is an endangered species that inhabits moist, rock crevices in the Appalachian mountains. Microflora found on the skin of amphibians have coevolved, forming a unique relationship including a possible defense mechanism against harmful pathogens found in their environment. Previous field observations documented brooding female salamanders rubbing their heads on egg nests, possibly coating them with bacteria producing antifungal compounds. In this study, fungi (Mucor nidicola, Trichoderma viride, and a novel Mortierella species) and bacteria (two Pseudomonas sp.) were isolated from an abandoned green salamander egg nest in Dupont State Forest, North Carolina. Eighteen different cutaneous bacteria were isolated from three green salamanders, also from Dupont State Forest. Well-diffusion and disk diffusion assays were performed to assess antifungal properties of the bacterial samples against the fungi isolated from the abandoned egg mass. In well-diffusion assays, the spent culture supernatant from five bacterial isolates exhibited zones of inhibition against at least one fungal target organism with Pseudomonas syringae being the most effective, inhibiting all three fungal target organisms. Ethyl acetate culture extracts showed only slight inhibition in disk diffusion assays, suggesting that inhibitory compounds are only slightly soluble in ethyl acetate. The data collected from both assays supports the hypothesis that cutaneous bacteria isolated from Aneides aeneus inhibit fungi found on abandoned egg masses. More research is necessary to fully characterize the antimicrobial compounds produced by the bacterial isolates and to investigate the new Mortierella species found on the abandoned egg nest in this study.

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