Exploring the Use of Bacteria in Mitigating Fungal Disease

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Pseudogymnoascus Destructans, the fungus that causes White nose syndrome, has killed more than 6.7 million bats in the US since 2006. Local extinction of multiple bat species in the Northern US and Southern Canada has been hypothesized. Although the long-term effects of the epidemic are unknown, it has been estimated that it can cost the agricultural industry $50 billion from reduced insect control and pollination. There is no effective treatment for this infection. Herein, novel probiotic bacteria, Micrococcus luteus, antibiotic bacteria, Bacillus megaterium, and antifungal bacteria, Lactobacillus plantarum, and combinations thereof, are explored to investigate their potential to combat White nose syndrome. Both preventative and responsive approaches were investigated. In the preventative approach the treatment bacteria were inoculated with the fungal infection. In the responsive approach the fungal infection was exposed to the treatment bacteria. Since Pseudogymnoascus Destructans is limited to the northeast and far northwest parts of the United States, it is not directly investigated herein, to avoid any risk of it escaping in Arizona. Instead, Rhizopus stolonifer, commonly known as black bread mold, is used as a model system for Pseudogymnoascus Destructans. Fungal growth rates were qualitatively observed to substantially decline for both the preventative and responsive approaches. Spectroscopy was used to quantify the growth results, with fungal growth rates decreasing by up to 90% for the preventative treatment and up to 50% for the responsive treatment.

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