IS6-407

Wild viruses in the High Arctic

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The most abundant and diverse group of biological entities in aquatic environments are the protists, prokaryotes, and viruses that comprise the microbial community. Microbes play a critical role in the cycling of nutrients and energy, and therefore understanding the dynamics and interactions of this group is vital to understanding the ecology of aquatic ecosystems as a whole. An important, but relatively understudied, component of the microbial community is the viruses. As well as being the most abundant and diverse biological entities on Earth, viruses influence the community structure and evolution of their hosts, and ultimately the productivity of the entire biota. The overarching theme of my research is the study of aquatic viral ecology in a changing climate. The Arctic is a model environment to pursue this theme because the region is experiencing some of the most dramatic changes due to climate change on Earth and harbors a wide diversity of aquatic habitats whose viral communities are largely uncharacterized. As an example of the ongoing research in our laboratory, I will focus on the characterization of the wild viruses from Lake A, a highly stratified, ice-dependent lake located on the northern coast of Ellesmere Island, that embodies the dramatic perturbations that are occurring in this region.

SS6-5

Biotechnological potential of endophytic and rhizospheric bacteria for plant growth promotion in *Paspalum* species

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Paspalum is a large grass genus of the Poaceae family, comprising several important forage species which occur in the Tropics and warm temperate regions, mainly in the American continent, especially abundant in Brazil. The forage-based production has been intensified due to a greater demand for livestock production in the past decades and thus increasing the use of chemical fertilizers and pesticides, causing serious negative environmental impacts. Therefore, there is an urgent need to create new solutions for sustainable agricultural practices. Endophytic and rhizospheric microorganisms associated with these plants play a fundamental role in this process since they are able to promote plant growth and protection against pathogens, so they may be employed as biofertilizers and biopesticides. Bacterial endophytes colonize the internal tissues of plants while rhizospheric bacteria are typically found around plant roots. They can benefit host plants directly by facilitating the acquisition of essential nutrients such as nitrogen and phosphorus or by modulating phytohormones levels like auxin, cytokinin, and gibberellin. The indirect plant health promotion occurs when the bacteria inhibit phytopathogens with antibiotics, hydrolytic enzymes, nutrient limitation, and by priming plant defenses. Thus,

the aim of this study was to isolate and analyze the plant growth-promoting bacteria potential associated with *Paspalum rojasii* (BGP 272), *P. lenticulare* (BGP 281) and *P. compressifolium* (BGP 380), which are used as bridge species in forage plant breeding programs. The samples were collected from the Germplasm Bank (GB) of *Paspalum*, maintained by Embrapa Pecuária Sudeste - São Carlos, São Paulo, Brazil. The culturable bacteria from leaves, roots, and rhizospheres were isolated in Tryptic Soy Agar + Benomyl medium and their potential for three functional traits were evaluated: phosphate solubilization (PS), synthesis of indole 3-acetic acid (IAA) and biological nitrogen fixation (BNF). The PS assay was performed in a solid medium containing $CaHPO_4$, IAA synthesis was performed in Tryptic Soy Broth + L-tryptophan, and the BNF assay was carried out in semi-solid medium without nitrogen. Out of 107 bacterial isolates obtained, 40 isolates were from *P. lenticulare* (11 rhizospheric and 29 endophytes), 35 were from *P. rojasii* (7 rhizospheric and 28 endophytes), and 32 were from *P. compressifolium* (14 rhizospheric and 18 endophytes). Among all the 107 isolates tested, 53% solubilized phosphorus, 35% fixed nitrogen and 47% produced more than 100 ug/ul of indole 3-acetic acid. A total of 20 bacterial isolates showed potential to promote plant growth (11 endophytic and 9 rhizospheric). The next steps of this study will be to identify these bacterial isolates by sequencing the 16S rDNA gene, perform antibiosis test against *Paspalum* phytopathogens, and verify *in vivo* the bacterial potential for plant growth promotion in *Paspalum* species.

Keywords: Biofertilization. Plant growth-promoting bacteria. Indole 3-acetic acid. Nitrogen fixation. Phosphate solubilization. Forage grasses.

SS6-8

□eveloping and testing the efficacy of a topical probiotic on captive bats to prevent White □ose Syndrome

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Wildlife diseases can have drastic consequences for species at an unprecedented rate. Without proper intervention, diseases can threaten population viability and result in species extinction. The delicate balance of an ecosystem is associated with individual species' niche's and can quickly become unstable upon the introduction of an invasive disease. Managing these diseases is often quite challenging and typically requires immediate action to prevent further ecological loss. The psychrophilic fungus, *Pseudogymnoascus destructans*, *Pd*, is known to cause devastation to several North American bat species throughout hibernation. White Nose Syndrome (WNS) is a deadly disease that indirectly causes hibernating bat mortality by growing on the cutaneous surfaces of the bat and causing more frequent arousal periods. In addition to physiological imbalances caused by the degradation of wing tissue, the decreased torpor length and associated increased metabolic rate will burn precious fat stores, cause rapid dehydration, and lead to bat mortality. Reducing the severity of the Pd infection could result in lower mortality rates. In this study, we are conducting captive bat experiments to alter native wing microflora found on *Myotis yumanensis*, using a prophylactic topical probiotic cocktail. The probiotic contains *Pseudomonas* bacterial species that were isolated from wings of healthy British Columbia bats and were found to inhibit *Pd*. The three main objectives of this study are, (1) to develop a technique of applying the anti-*Pd* microbes to high risk Myotis bats; (2) to test whether an altered microbiome can be sustained on their wings with persistent anti-*Pd* microbes during and after probiotic applications; (3) and to test whether the altered wing skin can better resist the growth of *Pd* than wings that do not receive the prophylaxis. A preliminary captive bat trial was conducted at the B.C. Wildlife Park and the results suggest that application of a concentrated prophylactic aerosol to bat wings successfully shifted the wing microflora. We will continue to work on the above objectives with a second captive trial in spring 2019; pending outcomes of these tests, our next step will be