Biodiversity Seminar Series

The Biodiversity Seminar Series is pleased to announce

Dr. Hanan Shehata

from the Centre of Biodiversity Genomics

presenting a talk

Molecular and physiological mechanisms underlying antifungal and nutrient acquisition activities of beneficial microbes

Abstract:

Endophytes are microbes that inhabit host plants without causing disease. Wild and ancient relatives of modern crops are grown without fungicides or synthetic fertilizers. It was hypothesized that these genotypes possess beneficial endophytes that help their hosts to combat fungal pathogens and/or acquire nutrients. Testing 190 bacterial endophytes isolated from wild, ancient and modern genotypes of *Zea* (corn grass family) for their ability to combat the fungal pathogens *Sclerotinia homoeocarpa* showed that three endophyte strains (3A12, 3C11 and 5C9, all *Burkholderia gladioli*) were found to combat *S. homoeocarpa*. The three antifungal *Burkholderia* endophytes originated from wild or ancient maize, which supports the hypothesis that wild and ancient maize genotypes host microbes with antifungal activity. *B. gladioli* strain 3A12 was selected for isolation of the underlying antifungal genes. Tn5-mutagenesis combined with whole genome sequencing revealed that the antifungal genes encode: YajQ (a c-di-GMP receptor), fatty acid desaturase, lysine-tRNA synthetase, tolR, arginine/ornithine/lysine decarboxylase and succinate dehydrogenase. The candidate mutants showed similar phenotypes (reduced motility, biofilm formation, attachment and microcolony formation around target fungi), suggesting they may belong to the same genetic network. Testing 73 endophytes for growth promotion ability of plants grown on rock-phosphate as the sole P source showed that one endophyte (3E10, *Enterobacter asburiae*) was able to promote root growth. This endophyte was found to secrete acids to help solubilize rock P *in vitro,* and synthesize auxin and promote lateral root and root hair growth, presumably to increase P-scavenging. The endophyte can localize to epidermal root surfaces including on root hairs, and remarkably, also near lateral root primordia. Endophyte 3E10 was isolated from a wild maize genotype, *Zea nicaraguensis*, which supports the hypothesis that wild plants may be a reservoir of microbes that assist their hosts with nutrient acquisition.

Brief Bio:

Dr. Hanan Shehata is a postdoctoral fellow at CBG. Hanan has recently completed her PhD in Plant-Microbe Interaction from the University of Guelph. Her PhD research was focused on studying plant beneficial microbes (endophytes), particularly their antifungal activity and the molecular mechanisms underlying this activity. She is currently working with Dr. Hanner on developing protocols for viral screening in plant propagative material and for monitoring plant pests and pathogens.

When: Thursday May 26th 2016 at 12:00 pm

Where: Visualization Theatre, Room 1009
Biodiversity Institute of Ontario

For scheduling and more information on the seminars, please visit:
http://biodiversitygenomics.net/resources/seminar-series/