

## Donald L. Smith

James McGill Professor  
 Department of Plant Science

During his 34 years at McGill **Donald L. Smith** has conducted research in the production and physiology of crop plants, with an emphasis on plant-microbe interactions, most recently, within the context of biofuel feedstock production. He has generated eleven patents, started a spin-off company (Bios Agriculture Inc.), and commercialized technologies that are now applied to 10s of millions of ha of crop land per year. He has been principal investigator on research grants totaling >\$65 million. He currently leads the AAFC Biomass Canada Agri-Research Cluster Canada (\$10.1 million over 5 years). He is a James McGill Professor a member of Clean50 and was awarded the Queen Elizabeth II Diamond Jubilee Medal recognizing his contributions to intelligent agriculture.



### Research and Scientific Expertise

**Agronomy:** Dr. Smith has conducted field agronomic studies on crop nutrition, use of plant growth regulators, biochar addition to soils, use of microbial inoculants and effects of climate change conditions. Dr. Smith has developed technologies that are now included in widely used crop inoculants.

**Symbiotic nitrogen fixation:** Legumes are able to enter into symbiotic relationships with specific soil bacteria (rhizobia), that enable them to use nitrogen in the atmosphere, resulting in higher plant protein levels. Dr. Smith discovered that soybean growing under Canadian conditions has trouble nodulating due to low spring soil temperatures, and developed a technology to overcome this.

**Plant-microbe interactions:** Plants live in symbiosis with microbes, the phytomicrobiome. The microbes allow the plants to better deal with various environmental challenges. The members of the phytomicrobiome exchange signals (signal compounds) that affect each other's activities. Dr. Smith has isolated crop growth promoting signals (such as thuricin 17) from members of the phytomicrobiome. His current research includes applications of phytomicrobiome-plant interactions to cannabis culture.

**Climate change and crop productivity:** As climate change conditions continue to develop crop plants will be faced with increasingly extreme conditions, resulting in greater stress more often. This will have effects on crop productivity and global food security. Some of the microbial signals identified by Dr. Smith's research group promote plant growth most when the plant is stressed.

