UNIVERSITY OF DELAWARE

CENTER FOR BIOINFORMATICS & COMPUTATIONAL BIOLOGY

CBCB SEMINAR
4/26/2021

3:30 PM
ZOOM: https://udel.zoom.us/j/91240820848 (Passcode: BINF865)

bioinformatics.udel.edu

BIOINFORMATICS SEMINAR

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IMPROVING THE GENOMIC KNOWLEDGE AND ACCESS TO SOYBEAN ROOT-NODULATING BRADYRHIZOBIA

The Soybean *(Glycine max)* is one of the most important crops in the world used mostly for oil and protein sources. Approximately 50-75% of soybean nitrogen requirements are provided through biological nitrogen fixation (BNF) in which symbiotic soybean root-nodulating *Bradyrhizobium* spp. convert atmospheric nitrogen into bioavailable ammonia. The root nodulation and nitrogen fixation abilities of a *Bradyrhizobium* strain contributes to its symbiotic effectiveness, and highly effective strains are often used as field inoculants to increase nitrogen fixation and grain yields in soybeans. *Bradyrhizobium* genomes encode nodulation and nitrogen fixation genes in symbiosis islands, and genomic information on soybean *Bradyrhizobium* can facilitate predictions of symbiotic effectiveness phenotypes to identify new inoculant strains and increase soybean yields. However, genomic representation for *Bradyrhizobium* in GenBank is low with only 21 complete genomes deposited as of March 2021. The University of Delaware *Bradyrhizobium* Culture Collection (UDBCC) has 370 isolates of soybean root-nodulating *Bradyrhizobium* spp. collected from 31 different farms in Delaware. Here, 25 isolates were selected from UDBCC on the basis of genomic 16S rRNA and phenomic analyses, and were sequenced using PacBio RS-II single molecule real time sequencing (SMRT) technology, and assembled obtaining complete to near-complete genome sequences. Assembled genomes were annotated using Prokka. Frameshift errors due to the error profile of PacBio SMRT sequencing were apparent in the genomes. These were quantified and a reference guided approach was used to repair frame-shifted genes. To provide a community resource improving access to phenotypic and genotypic data about soybean-nodulating *Bradyrhizobium spp*., a searchable web resource is being developed which will house data from the UDBCC and other reference strains.

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