Developing Genetic and Genomic Resources in Black Raspberry

Over the last 75 years, the black raspberry industry in the United States has steadily declined due to lack of adapted and disease resistant cultivars. The high anthocyanin content of black raspberry and associated health benefits have revived interest in production and breeding new cultivars. The United States Department of Agriculture (USDA) Agricultural Research Service, National Clonal Germplasm Repository manages black raspberry germplasm and maintains a collection of over 175 accessions. Wild black raspberries collected in their native range from more than 130 locations across 27 US states and two Canadian provinces were recently added to this collection. Evaluation of this wild germplasm led to the identification of four sources of aphid resistance, two of which were introgressed into the elite breeding pool in two mapping populations. Funding was recently obtained from the USDA’s Specialty Crops Research Initiative (SCRI) to develop the genomic infrastructure for breeding improved black raspberries. A major focus of this project is to develop, and make available, genomic tools including linkage and physical maps, a draft genome assembly, ESTs, SNP and SSR markers for use in black and red raspberry breeding. We will study genotype by environment interactions in this black raspberry germplasm in four different production regions across North America and apply the genomic tools to the identification of QTLs important for breeding objectives. These tools will inform decisions regarding germplasm value and usage, crossing, and selection through marker-assisted breeding, and will be useful for breeding programs across the U.S.