

## **BRE1714: Development of Adapted High Yielding Faba Bean for Saskatchewan**

The population and early stages of appropriate germplasm development are completed for all objectives. We have screened and selected faba bean genetic materials for drought adaptation, vicine-convicine, micronutrient profile, chocolate spot resistance, and crop architecture. We expect some of this to continue within the breeding program in future, especially disease and drought tolerance.

*Objective 1* (develop adapted faba bean germplasm and breeding lines with improved drought tolerance for use in the southern and western regions of SK): we investigated the nature and size of genetic control of morpho-physiological traits related to drought adaptation in faba bean. Field experiments were used to select and shape segregating germplasm, including recombinant inbred line populations.

*Objective 2* (develop commercially acceptable faba bean germplasm and breeding lines with low anti-nutritional properties) a rapid mass spectroscopy method and a molecular marker method were developed for determining vicine-convicine – these were tested and found to be robust. This aided our NORFAB collaborating team to elucidate the vicine-convicine biosynthetic pathway. We are now able accurately and quickly identify faba bean plants, greatly assisting the effort to breed faba bean varieties with LVC content. *Objective 3* (develop low phytate faba bean/improve the micronutrient bioavailability): a reliable KASP marker was developed and validated for the *zt2* (white flower) gene based on available EST sequences and a genetic map. The quality and repeatability of the marker was validated. We are working toward a modified translational genomic approach that will allow us, eventually, to develop molecular markers for low phytate genes in faba bean. *Objective 4* (improving resistance to chocolate spot): the field screening for chocolate spot has indicated that we have reliable and rich sources of resistance. These sources tend to have late maturity but this can be overcome through breeding for earliness. *Objective 5* (develop ideotype faba bean germplasm for use in the northern and eastern regions of SK): we have developed a solid understanding on the genetics of branching and dwarfing – this will allow us to develop germplasm for specific cropping systems, for example, intercropping compatibility in organic systems.