

# CANOLA BREEDING CENTRE OF INNOVATION



## FACTS & FIGURES

**TOTAL LAND SIZE:** Over 560 acres

**TOTAL SQ. FT.:** Over 50,000 sq. ft. facility

**EMPLOYEES:** Over 40 positions

### UNIQUE DISCIPLINES:

- Plant Breeding
- Molecular Breeding
- Breeding Agronomists
- Plant Pathology
- Variety Registration
- Seed Chemistry
- Laboratory and Greenhouse Technicians
- Quality Assurance and Quality Control

 Bayer CropScience

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As evidence of our on-going and long-standing commitment to innovation and science, Bayer CropScience's recent investment of over \$15 million in state-of-the-art technology now brings all aspects of our canola breeding program into one facility.

Located northeast of Saskatoon, Saskatchewan, the Bayer CropScience Canola Breeding Centre of Innovation now includes all elements for successful breeding and trait development on one site: fields for breeding and evaluation, greenhouses, phytotrons with growth chambers, and laboratory facilities for key breeding and seed production needs. By bringing together the best in technology and expertise, we are focused on supporting Canada's canola industry by developing and delivering InVigor canola hybrids that meet the specific requirements for growers and food processors in Canada.





Bayer CropScience

## CANOLA BREEDING CENTRE OF INNOVATION

### Pathology Laboratory

#### CONTROLLING DISEASE WITH NEW HYBRIDS

Blackleg, sclerotinia, club root, fusarium wilt and white rust are all diseases that affect canola in Western Canada. Our pathology laboratory is where we focus on germplasm screening, variety testing, and resistance breeding so we can develop resistant parental lines and monitor the changes in strains of specific pathogens.

We use a variety of approaches to increase disease screening efficiency and to find resistance genes, allowing us to create hybrids with multiple resistant genes. The result is greater resistance stability against pathogens that change over time. By using molecular markers for disease resistance, we are able to more efficiently stack disease resistance genes in elite parent lines to develop high yielding InVigor® hybrids with durable resistance to multiple diseases.

### Doubled Haploid Laboratory

#### ACCELERATING THE BREEDING PROCESS

Double haploids are a product of modern technology which uses microspores to achieve a uniform parent line (homozygous) from very early generations of breeding material. This technique eliminates the need for several generations of breeding crosses. Double haploids are also used to efficiently develop molecular mapping populations and ensure traits are uniformly expressed in a plant. This one step process replaces previous methods which could take up to six generations of plant growth.

### Greenhouses

#### BREEDING & DEVELOPING FUTURE GENERATIONS OF INVIGOR

Over 8,000 square feet of greenhouse space is dedicated to breeding and developing the next InVigor hybrid products. The greenhouse is used in the breeding program for the development of germplasm and parents, incorporation of traits and the purification of parental lines. We can grow up to four generations of canola plants in one year, which means we can be four times more efficient by growing one canola crop each year. There are two greenhouses, each with numerous specialized compartments that have the ability to control pollen flow to suit different project goals.

### Phytotron

#### DELIVERING THE HIGHEST QUALITY

Our new facility features multiple phytotron rooms, each one specially designed and built to serve specific purposes in the breeding process. Each phytotron consists of a number of plant growth chambers, which allow us to carefully control pollen flow. We currently use our growth chambers to purify parental lines in order to produce and sell canola seed with high hybridity. We also use these growth chambers to incorporate new valuable traits into InVigor hybrids.

### Analytical Laboratory

#### ENSURING QUALITY CONTROL

The analytical laboratory consists of two main functions – the molecular analysis lab and the seed chemistry lab.

The molecular analysis lab serves the important purpose of quality control check for product quality assurance. The lab checks for the presence and absence of known genes to ensure the highest purity of our seed. Advanced molecular and biochemical techniques are used to test seed and plant material at the gene level. They assist the breeding program to efficiently select for genes of interest and are essential in our seed production process.

The seed chemistry lab analyzes the quality parameters contained inside the seed, which includes quality traits such as oil and protein content, fatty acid profile, and glucosinolate content, among others. Data gathered from this lab is used as selection criteria by the breeders to select and advance potential parental lines for InVigor hybrid development. This lab also provides the information to demonstrate that new potential lines meet the criteria required for variety registration.

### Molecular Breeding Laboratory

#### SUPPORTING CORE BREEDING ACTIVITIES

Molecular breeding can be described as using detailed information at the individual gene level to assist breeding decisions. Marker assisted backcrossing and marker assisted recurrent selection helps reduce field testing of lines without desired traits and increases the predictability and speed of variety development.

The molecular breeding lab allows us to routinely select for simple qualitative traits and improve the success frequency when working on more complex polygenic traits, like yield or oil content. Molecular breeding also allows us to select based on genotype rather than phenotype which results in faster, more precise and predictable development of superior hybrids.

### Field Breeding & Evaluation

#### PROVIDING IN-CROP DATA

Our main field station for Canadian breeding is in Saskatoon at the Canola Breeding Centre of Innovation. Additional evaluation trials are conducted throughout Canada and the Northern USA.

Field activities consist of:

- Germplasm adaptation and maintenance
- Recurrent selection and germplasm development
- Parental line testing and selection
- Test hybrid production and parental increases
- Hybrid performance evaluation
- New trait development and evaluation
- Breeding research projects
- Variety testing, registration and protection

