Science and Innovation

Eastern Cereal and Oilseed Research Centre

Ottawa, Ontario

The Eastern Cereal and Oilseed Research Centre (ECORC) is located on the historical Central Experimental Farm which was established in Ottawa in 1886 by an act of Parliament. The Centre leads Eastern Canada (Manitoba to Prince Edward Island) in crop development, targeting corn, soy, spring wheat, winter wheat, oats and barley.

ECORC also has a national mandate for assessing and utilizing biodiversity and environmental resources for Canadian agriculture.

The Centre has been at the forefront of pioneering gene isolation, gene transfer, and studying gene expression in crop plants for the last 25 years. It has a unique mandate to lead biosystematics research of vascular plants (botany), fungi, bacteria, and invertebrates (insects, arachnids and nematodes), relevant to agriculture.

It also supports research conducted at other Research Centres in the areas of food safety, mycotoxins, and biocontrol.

Four biological collections of national importance are located at ECORC: the Vascular Plant Collection, the National Mycology Herbarium, the Canadian National Collection of Insects, Arachnids and Nematodes, and the Canadian Collection of Fungal Cultures.

The Centre is also one of nine national sites in the AAFC Watershed Evaluation of Beneficial Management Practices project.

The Centre's main research focus lies in three areas:

- Crop genetic enhancement and genomics
- Biodiversity of vascular plant, fungi and bacteria, and invertebrates
- Integrated assessment of long-term environmental effect of agricultural practices

Areas of Research

At the Eastern Cereal and Oilseed Research Centre the number of research disciplines represented at the site facilitates working in multi-disciplinary teams. The Centre's areas of core research are aligned with national priorities to help the sector adapt and remain competitive in domestic and global markets. Greater participation in research networks and industry-led partnerships expands the Centre's innovation capacity.

Enhancing Environmental Performance

- Establishing environmentally sustainable ways to develop and use land for field crop production in eastern Ontario and western Quebéc
- Formulating methods and models to evaluate the impact of agriculture on levels of carbon in the soil, as well as greenhouse gas emissions
- Evaluating and modeling the dynamics of agriculture-based contaminants in soil and water, and studying best management practices to reduce movements of contaminants into the environment
- Creating resource databases for land use and environmental assessments

Innovation and Advancing Knowledge

- Identifying and characterizing Canada's flora and fauna to define economically important fungi, insects, crops and weeds

- Studying ways to detect, measure and monitor biodiversity change, and biodiversity assessments to support conservation and sustainable use of Canadian biological resources
- Using systems such as molecular diagnostics to identify economically important fungi
- Using molecular techniques to determine the genetic diversity of crops and weeds
- Developing knowledge on the classifications and relationships of important insect groups

New Knowledge for Future Applications

- Diagnosing and identifying tools to facilitate border protection against the introduction of pests and invasive species
- Developing novel pest management strategies that exploit natural enemies and that can be integrated with current agricultural practices

Better Products for Stronger Markets

- Improving the genetic makeup of corn and corn populations that have been bred for desirable traits for the short-season areas of Canada
- Developing new varieties of soybeans for short-season areas of eastern Canada and Manitoba
- Developing winter and spring wheats, oats and barley for eastern Canada. Traits of importance are resistance to disease and insects, improved quality, early maturity and tolerance for cold and drought
- Developing methods to control *Fusarium* (a fungus disease of corn, wheat, barley and oats, which also causes white mould in soybeans)

Investing in Healthier Crops

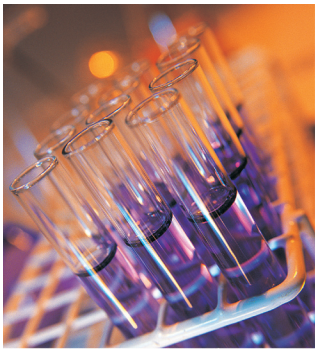
- Determining the best methods to produce crops by less frequent tilling of the soil, and making better use of organic nitrogen sources. Characterizing nitrogen and fertilizer needs and their use by crops; the interactions between crop yield and environment; optimal crop rotations, as well as methods of cultivating crops to reduce soil erosion
- Studying the interaction between plants and the bacteria or fungi that infect them, the effects of agricultural practices on crop diseases, and cereal seed fungi and treatments

Delivering Value through Science

- Isolating, characterizing and manipulating useful plant genes and the elements that control or regulate them to allow research to add product value, reduce environmental impacts on crops and increase resistance to insects and disease
- Identifying the molecular markers associated with important crop traits to facilitate the genetic enhancement of crops
- Evaluating and documenting the genetic profiles for corn, small grain cereals, canola and the fungi *Fusarium* and *Trichoderma*
- Evaluating the resistance of new cereals to the *Fusarium* fungus
- Developing inventive technologies to isolate new compounds from plants and other organisms
- Identifying those seed components that have high value, and methods for isolating, purifying and characterizing them

Facts, Figures and Facilities

- World-class national biological collections. These working collections include:
  - Canadian National Collection of Insects, Arachnids and Nematodes (CNC) containing 17 million specimens;
  - Glomeromycota *in vitro* Collection (GINCO) with 94 specimens with 14 available for distribution;
  - National Mycology Herbarium (DAOM) containing 350 thousand specimens; and
  - National Vascular Plant Herbarium (DAO) with 1.6 million specimens.
- 425 hectares of experimental fields and plots on the historic Central Experimental Farm in downtown Ottawa; 27000 m^2 of laboratory space; and 2300 m^2 of greenhouses (integrated growth facility)
- More than 25 superior cultivars of wheat, oats, barley and soybeans developed in the past 5 years
- National mycotoxin analysis laboratory serving Departmental cereal breeders and *Fusarium* resistance research projects
- Electronics laboratory and machine shop
- National Arthropod Containment Facility providing a single entry point for exotic insects with beneficial biocontrol potential
- National Identification Services for insects, fungi, nematodes and plants
- National Soil Databases containing soil, climate, land use, crop yield and socioeconomic information for the agri-food sector and other Canadian industries.
- National bioinformatics network with capacity for functional and structural genomics including a 32 CPU high performance computing cluster
- Central genomics facility performing global gene expression profiling for a variety of organisms (plant, fungal, animal) using an extensive DNA sequence database, a DNA microarray printer and scanner, and robotic equipment
- Electronic microscopy and nuclear magnetic resonance centre for use by AAFC scientists



Contact us

960 Carling Avenue
Central Experimental Farm
Ottawa, Ontario
K1A 0C6
Tel.: 613-759-1858
Fax: 613-759-1970

Associate Director, Research, Development, and Technology (RDT):
Michèle Marcotte
Tel.: 613-759-1525
Email: michele.marcotte@agr.gc.ca

Director, Research, Development, and Technology (RDT):
Marc Savard
Tel.: 613-759-1683
Email: marc.savard@agr.gc.ca

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For more information
reach us at www.agr.gc.ca
or call us toll-free 1-855-773-0241