

Success Stories From the Fields of the Central Experimental Farm

"The CEF with its cropping fields and plots has played an essential part in many research and development successes for Canada ... (it) is a critical part of our national network of research facilities."

Dr. Marc Fortin, former Assistant Deputy Minister (Research),
Agriculture and Agri-Food Canada, 2011

Here are a few of the success stories from the more than 125 years of research in the fields of the Central Experimental Farm:

- Introduction around 1900 of brome grass as feed for livestock. This type of grass produced more forage per acre, supporting more cattle per acre
- 'Marquis' wheat, which ripened earlier and produced high-quality flour, was introduced in 1910. This was a huge success for Canadian agriculture and spurred development of the Prairie provinces. It represented 90 percent of the wheat grown on the Prairies in the early 20th century
- Canada's first frozen foods were produced at the Farm in 1932, using fruit grown in the Farm's orchards
- A new breed of winter wheat called 'Frederick' was introduced in 1973 that not only increased yields by 1-2 bushels an acre but also was of higher quality. It occupied more than 90 percent of the wheat acreage in Eastern Canada
- The *Fusarium* head blight epidemic of 1981 drastically reduced the yield and quality of the wheat, barley, and corn crops in Eastern Canada. The first winter wheat variety that was resistant to *Fusarium* was bred at the Farm
- In recent years, 28 new milling oat varieties have been developed and about 50 lines of much-improved completely hull-less or "naked" oats, including the variety named 'AC Gehl'. This was the world's first truly hull-less oat and has found many uses in new products and new markets, including the production of pure oats for celiacs, the source of ingredients for anti-itch and personal care skin products, and as a replacement for rice in, for example, 'AVENA NUDA: Rice of the Prairies' and precooked meals by Campbell Canada
- Discovery of the anti-inflammatory compounds in oats called avenanthramides; understanding their structures and therapeutic properties; and development of patented methods to produce oats with extremely high levels of avenanthramides for use in the manufacture of food, drugs and cosmetics
- Since 1986, 260 corn varieties bred at the Farm have been released to industry, most of them with improved resistance to infection, disease and insect pests

- Development of internationally recognized rapid screening techniques for corn diseases such as northern corn leaf blight, rust, eyespot, smut, *Fusarium* stalk rot, and anthracnose stalk rot
- New soybean varieties developed at the Farm for short growing seasons, and with high protein content and pest resistance, have significantly expanded soybean acreage in eastern Ontario, Quebec and Manitoba
- Research on the use of nitrogen fertilizer has contributed to steadily increasing corn yields with reduced fertilizer consumption
- Scientists at the Farm have countless patents and licenses. The latter generates royalties to AAFC and revenues for the companies using the methods
- When breeders at the Farm register a new crop variety, it is made available to seed companies, who pay a royalty to AAFC. Those companies then sell the seed to farmers who grow the crop for their own livelihood while helping to feed the world. Everybody wins.

Future success stories?

In the preface to his history of the first 100 years of agriculture research in Canada, Tom Anstey wrote: “Eventually another book will chronicle the second century; can we begin to imagine what its pages may say?”

If the Farm fields remain intact, current research programs at the Farm offer a glimpse into where future success stories might come from. There are three main areas of research:

- Assessment of long-term environmental effect of agricultural practices. For example, scientists are seeking environmentally sustainable ways to manage land for field crop production in eastern Canada. They are evaluating the impact of agriculture on levels of carbon in the soil and greenhouse gas emissions, as well as assessing techniques to enhance net returns to producers (e.g., conversion to no till)
- Crop genetic enhancement and genomics. One example is the research to improving the genetic makeup of corn for the short-season areas of Canada
- Biodiversity of vascular plants, fungi and bacteria, and invertebrates. Here, for example, researchers are developing novel pest management strategies that exploit natural enemies and that can be integrated with current agricultural practices. They are 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.

For more information, see T. H. Anstey’s history of the first 100 years of the Research Branch, entitled *One Hundred Harvests*, published by Agriculture Canada, 1986, and *The Innovators: Rooted in Science*, a history of the subsequent 25 years of the Research Branch from 1986 to 2011, available online from Government of Canada Publications at <http://publications.gc.ca/site/eng/454740/publication.html>.