

# Collaboration and Technology Drives Plant Breeding Success



If there's a human gene that produces plant breeders, Dr. Janice Cuthbert likely has it.

As a "city kid" growing up in Winnipeg, Cuthbert and her siblings were greatly influenced by their parents' interest in plants and biology.

The topic was on the table at most family gatherings. "I knew pretty early on in high school that I wanted to be a plant breeder," says Cuthbert who earned her PhD in 2008 from the University of Manitoba.

Cuthbert is not the only family member to inherit the plant breeding gene. Both her brother and sister have also completed PhDs. Cuthbert's brother is a wheat breeder and her sister is an agri-genetics specialist with the Manitoba government.

Today, Cuthbert is Senior Canola Breeder for DL Seeds Inc., based in Morden, Manitoba. Established in 2008, DL Seeds and its breeding team have quickly established a reputation for developing cutting-edge canola hybrids for the Roundup Ready and Clearfield markets. "We're a great little company and we've been able to achieve a lot in a short period of time."

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And there's more to come. In 2013, DL Seeds, in collaboration with University of Manitoba and oilseed processor, Bunge, will register the first-ever Roundup Ready High Erucic Acid Rapeseed (HEAR) canola hybrid.

Cuthbert explains that the goal of the DL Seeds breeding program is to develop superior hybrids that are profitable for North American growers as well as their distributor. As a plant breeder, she plays a key role in identifying traits that can deliver higher yields and increased profitability.

"There is still genetic gain to be realized in yield and that will be accomplished in a couple of ways," she

explains. One trait that is going to be of particular importance is lodging resistance. "As you strive for higher yields, standability of the crop is one thing you have to keep in mind. It provides the canola plant the ability to stand in the field and it also allows for direct combining and more importantly reduces swathing issues."

Plant breeders like Cuthbert have set the bar high and modern breeding techniques are helping them reach their goals. When she started her plant breeding education, a technique such as using molecular markers to identify desirable traits was in its infancy, but now it propels the process.

"I don't think we know where we could be in ten years," she says. "Molecular breeding is offering great efficiencies to a breeding program. From the time you make your first cross to the time you have a hybrid on the market, it could be eight to ten years. But with some of the molecular marker and breeding tools we have within our company, we can speed that up to five to seven years."

Cuthbert is really excited about the prospects for genome wide selection, which would allow breeders to employ all available molecular markers simultaneously when assessing available breeding material. But she is quick to point out that plant breeding will never be done in the lab alone. Evaluating how different traits perform in different agronomic environments is vitally important to identifying improved varieties.

Creating the right business environment to encourage investment in breeding is also important. "Without investment and a commitment to intellectual property protection, the science is going to be slow and our ability to progress will not be efficient."

As she waits for the next wave of breeding technology to take root, Cuthbert will continue to collaborate with her DL Seeds breeding team to drive canola performance. She notes that one of the real strengths of DL Seeds is the fact that they actually have three canola breeding programs -- a Canadian spring breeding program; a European spring and winter program; and an Australian breeding program based on spring canola.

"We really see the collaboration and synergies of our three breeding programs leading to new products," explains Cuthbert. "It allows us to incorporate winter genes from elite European lines or to make improvements in oil quality. We feel that is going to be very important for the grower and DL Seeds down the road."

The road that Cuthbert travels as a plant breeder has taken her from her family's dinner table in Winnipeg to DL Seeds' breeding locations where she collaborates with colleagues on three continents.

"I have a pretty fantastic job," she says.

*This article is brought to you by the Canadian Seed Trade Association.*