

## **What is Roundup Ready® wheat?**

Roundup Ready® wheat is a new variety of hard red spring wheat which has been genetically engineered (GE) to be tolerant to glyphosate, the active ingredient in Monsanto's herbicide Roundup®. A request for approval of Roundup Ready wheat was submitted by Monsanto Canada Inc. to Health Canada in July 2002 and to the Canadian Food Inspection Agency (CFIA) in December 2002. Roundup Ready wheat, if approved, would be the first GE variety of wheat grown commercially and used for food and animal feed.

Roundup Ready wheat would be available for western growers since in Canada, spring wheat is grown primarily in the central prairie or great plains area (Alberta, Saskatchewan and Manitoba). Spring wheat, which is planted in the spring and harvested in August or September, is a more popular crop than winter wheat, which is planted in September and harvested the following summer. The principal use of hard red spring wheat grain is the production of flour to make bread dough. The milling of wheat also produces appreciable quantities of by-products for animal feed.

## **How was Roundup Ready wheat produced?**

Roundup Ready wheat was produced by genetic engineering, where the Roundup Ready gene was inserted into the wheat plant. The modified wheat plants were then grown in greenhouses and field trials and monitored for a wide range of performance criteria. Plants that fail to meet the criteria are discarded, but successful plants are developed and entered into further field trials and put forward for government approval. There were 46 field trials of GE wheat conducted by Monsanto in 2002.

## **Why are new varieties of wheat produced?**

Wheat was domesticated from its wild relatives nearly 10,000 years ago. It is estimated that the great genetic variability in the wheat gene pool has been exploited to produce more than 17,000 wheat varieties that are adapted to a variety of environments and conditions.

Researchers create new wheat varieties in order to provide solutions to the challenges involved in wheat production. Goals of wheat breeding programs include increased winter hardiness, resistance to major diseases such as leaf and stem rust, smut, bunt, leaf diseases and scab. Efforts are also focussed on the development of varieties with resistance to insect pests such as wheat midge and sawfly. Increasing the overall yield and the grain quality are also goals in wheat breeding.

Roundup Ready wheat is designed to provide farmers with another weed management tool. The CFIA will be evaluating potential changes in agronomic practices including herbicide usage that would be associated with the cultivation of Roundup Ready wheat.

## **Are there risks of gene flow from Roundup Ready wheat?**

Wheat is primarily a self-pollinating crop. Although wheat generally shows very low rates of cross-pollination with other wheat, there is always some gene movement through pollen between wheat plants that grow near each other and that flower at the same time. Also, genes can move throughout the environment in seeds that are intentionally or unintentionally dispersed.

Wheat is not native to Canada and has no close relatives that grow naturally in Canada. While very low levels of cross-pollination between wheat and wild species have been observed, it is considered unlikely that wheat would cross with wild species in Canada.

The CFIA's environmental safety assessment considers both the consequences of such gene movements and the potential for changes in their frequency, before authorizing a plant with novel trait such as a GE crop for general cultivation.

In Canada, all wheat within a class may be pooled for shipment. Growers have expressed concern that there needs to be a rigorous segregation system put in place to prevent Roundup Ready wheat from contaminating shipments of GE-free wheat to foreign markets.

## **How will the application for Roundup Ready wheat be evaluated?**

The CFIA provides environmental approval for general cultivation. In addition, the CFIA approves the livestock feed safety of the product. Health Canada approves the product for human food safety. In addition to these safety approvals, all commercially-available wheat varieties must meet the CFIA's agronomic and quality merit requirements for variety registration. All of these approvals must be granted prior to commercialization of the product. These governmental bodies are reviewing the application based on scientific criteria alone; market acceptance does not play a role in regulatory decisions. The process usually takes at least one year to complete, however commercialization of the product, if approved, will be a business decision made by Monsanto.

### ***Information Sources:***

Canadian Food Inspection Agency. (1999). *Regulatory Directive Dir1999-01: The Biology of Triticum aestivum L. (Wheat)*. Retrieved March 13, 2003, from <http://www.inspection.gc.ca/english/plaveg/pbo/dir/dir9901e.shtml>

Canadian Food Inspection Agency. (2003). *Submission to CFIA for approvals of Roundup Ready wheat: Questions and answers*. Retrieved March 13, 2003, from <http://www.inspection.gc.ca/english/plaveg/pbo/monsane.shtml>

Fowler, B.D. (2002). Cultivar development and selection. In *Winter Wheat Production Manual*. Retrieved March 13, 2003, from [http://www.usask.ca/agriculture/plantsci/winter\\_cereals/Winter\\_wheat/CHAPT08/cvchpt08.php](http://www.usask.ca/agriculture/plantsci/winter_cereals/Winter_wheat/CHAPT08/cvchpt08.php)

Bell, B. (1997). *Wheat for animal feed*. Retrieved March 13, 2002, from <http://www.gov.on.ca/OMAFRA/english/livestock/beef/facts/wheat.htm>

Van Acker, R. & Entz, M. (2001). *Agronomic benefits and risks of using Roundup Ready wheat in Western Canada*. Retrieved March 13, 2003, from [http://www.umanitoba.ca/afs/agronomists\\_conf/2001/pdf/vanacker.pdf](http://www.umanitoba.ca/afs/agronomists_conf/2001/pdf/vanacker.pdf)

***For more information on GE wheat or other food safety topics, please call the Food Safety Network toll-free at 1-866-50-FSNET or visit our website at [www.foodsafetynetwork.ca](http://www.foodsafetynetwork.ca)***

Although we strive to make the information on this fact sheet helpful and accurate, we make no representation or warranty, express or implied, regarding such information, and disclaim all liability of any kind whatsoever arising out of use of, or failure to use, such information or errors or omissions on this fact sheet.

© Copyright 2003 University of Guelph