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GENETICALLY MODIFIED WHEAT

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INTRODUCTION

Currently, no variety of genetically modified[1] wheat has been authorized for commercial production anywhere in the world. In December 2002, however, the multinational firm Monsanto submitted an application for approval to Canada and the United States for a transgenic wheat variety resistant to the herbicide Roundup®.

The possible introduction of transgenic wheat in Canada in the near future provoked strong reactions. Some farm organizations do not want transgenic wheat to be marketed as long as the product is not accepted in the marketplace and unless a segregation system has been introduced to keep traditional varieties separate from transgenic varieties.

Consumer and environmental protection groups have opposed the use of genetically modified organisms (GMOs)[2] for some time, but this is the first time the Canadian agriculture industry has expressed such strong reservations about introducing a genetically modified variety. This paper briefly describes transgenic wheat and details the concerns related to its introduction in Canada. It also describes the solutions proposed by the various industry stakeholders.

ROUNDUP READY® WHEAT

The first genetically modified wheat variety that could be introduced in Canada is a variety resistant to glyphosate, a herbicide sold by Monsanto under the trade name Roundup. Transgenic varieties of non-wheat crops resistant to glyphosate or to glufonisate, another

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(1) In this text, the term "genetically modified" refers solely to transgenic organisms. A transgenic plant has had a foreign gene incorporated into its genome to cause the appearance of a new trait.

(2) For more information on GMOs and related issues, see F. Forge and H. Lambert, *Genetically Modified Organisms* (TIPS-2E), Parliamentary Research Branch, Library of Parliament, Ottawa, 25 September 2002.

herbicide, marketed by Bayer CropScience under the trade name Liberty®,(3) are already marketed in Canada. Both of these herbicides are non-selective, meaning that they eliminate all plants except those having the resistant gene. A farmer can therefore use a single herbicide to control weeds at almost all stages of the plant's development. Varieties resistant to non-selective herbicides are fairly popular among farmers, since they allow easier and more flexible weed control. They are marketed in Canada under the trade names Roundup Ready® and Liberty Link®.

THE AGRICULTURE INDUSTRY'S CONCERNS ABOUT ROUNDUP READY WHEAT

Many people in the industry feel there is a significant risk that, at least over the next few years, transgenic wheat varieties will have difficulty entering export markets and that they will be far less accepted than transgenic corn, soybeans and canola.(4) The Canadian Wheat Board (CWB) has stated that 82% of the markets for Canadian western red spring wheat have indicated that they would not accept genetically modified wheat.(5) Introducing a transgenic variety too quickly could lead to the loss of export markets and force wheat normally sold for human consumption into the North American feed market at lower prices.(6)

Certain markets would be more willing to accept transgenic wheat if the industry were able to keep the traditional varieties separate from the transgenic varieties throughout the supply chain (from the farm to the consumer). At present, an economical and efficient segregation system does not seem to exist.(7) For example, there is no standardized and quick test that could tell transgenic wheat varieties apart from traditional varieties. Moreover, for all product streams(8) to coexist, acceptable thresholds must be in place for the contamination of

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(3) Plants resistant to certain herbicides have been obtained through traditional plant breeding methods; in this case, the plant is not considered to be transgenic.

(4) Robert N. Wisner, *Roundup Ready Wheat: Will International Markets Accept It? Summary of testimony at the North Dakota Legislative Hearing in Bismarck, North Dakota, 10 July 2002*.

(5) Canadian Wheat Board, House of Commons Standing Committee on Agriculture and Agri-Food, Meeting 24, 2nd session, 37th Parliament, 3 April 2003.

(6) Wisner (2002).

(7) Canadian Federation of Agriculture, House of Commons Standing Committee on Agriculture and Agri-Food, Meeting 38, 2nd session, 37th Parliament, 12 June 2003.

(8) There are three types of product streams: transgenic (or genetically modified), traditional and organic.

seeds and non-transgenic wheat supplies. Many markets have not yet established such thresholds.(9)

The introduction of a second glyphosate-resistant crop (in addition to canola) in the Prairies could also have an impact on crop-production practices. Currently, no-till practices (or direct seeding) use a glyphosate such as Roundup to control weeds (adventives). In the case of glyphosate-resistant canola, this single herbicide can eliminate all adventives, including volunteer(10) wheat. For other crops, glyphosate (which controls all types of weeds except for resistant canola) is used with another herbicide to eliminate resistant volunteer canola. If Roundup Ready (RR) wheat were introduced, volunteer wheat would already be glyphosate-resistant, and this resistance could be transferred to other grass species such as quack grass.(11) Losing glyphosate as a means of control for grass weeds such as quack grass and volunteer wheat would make crop management more complex and, therefore, increase the risk of reduced crop yields.(12) Without an alternative means of controlling volunteer wheat,(13) the only option left to farmers would be to use tillage to eliminate volunteer plants, which would have a detrimental effect on soil conservation in the Prairies.(14)

SOLUTIONS: THE DEVELOPER'S POINT OF VIEW

Monsanto has acknowledged that the introduction of RR wheat could negatively affect the agriculture sector. In early 2001, the company agreed to meet a number of conditions before introducing RR wheat into commercial markets, among them:

- obtaining regulatory approval in the United States, Canada and Japan to demonstrate that RR wheat is safe for human and animal consumption and for the environment;

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(9) Canadian Wheat Board (2003).

(10) A "volunteer" plant is one that grows from seed dropped by a previous crop, rather than from seed deliberately sown.

(11) Agricultural Producers Association of Saskatchewan, Standing Senate Committee on Agriculture and Forestry, Issue 20, 1st session, 37th Parliament, 8 November 2001.

(12) Canadian Wheat Board (2003).

(13) Currently, farmers have a wide range of options for controlling broadleaves (such as canola), but not grasses.

(14) Agricultural Producers Association of Saskatchewan (2001).

- developing and implementing, in partnership with the grain handling industry, an efficient segregation system that would include grain handling protocols and testing and detection methods consistent with current international standards and thresholds;
- developing quality standards and acceptable thresholds for the contamination of seeds and non-transgenic wheat supplies by RR wheat. These standards and thresholds must be recognized worldwide; and
- developing detailed programs for crop management and providing recommendations on how best to use this technology. These programs must include efficient and economical means of controlling Roundup-resistant volunteer plants.

Early in 2004, Monsanto decided against having its transgenic wheat variety registered for the 2004 agricultural season. The registration process is separate from regulatory approval. Given this decision, Monsanto cannot market its RR wheat variety for the 2004 crop year, even if the variety is approved by Health Canada and the Canadian Food Inspection Agency (CFIA). Monsanto's actions show that it intends to meet the conditions described above before marketing its transgenic wheat, and that it will have its variety registered once the problem of market acceptance has been solved.

SOLUTIONS: THE AGRICULTURE INDUSTRY'S POINT OF VIEW

As the sole exporter of Canadian wheat, the CWB wants to work with Monsanto to resolve the various problems in question before RR wheat is introduced. However, the CWB feels that it cannot simply rely on Monsanto's goodwill and commitments, since, according to the CWB, Monsanto's interests as the technology developer do not necessarily correspond to those of the rest of the industry. To support this opinion, the CWB appeared before the House of Commons Standing Committee on Agriculture and Agri-Food and cited cost-benefit studies carried out at the University of Saskatchewan. The studies found that introducing RR wheat in the near future would result in losses not only for farmers who used the variety but also for those who did not. However, the technology developer's profits would increase.(15)

In December 2001, the CWB created the Canadian Grain Industry Working Group on Genetically Modified Wheat to develop a set of conditions that would have to be met before a transgenic wheat variety could be marketed in Canada. In February 2003, the Working

(15) Canadian Wheat Board (2003).

Group published a document outlining the results of its discussions to date on the conditions to be met for transgenic wheat approval, including market acceptance, segregation systems, crop-management advantages and a cost-benefit analysis incorporating the three previous conditions.

The CWB hopes these conditions, which are supported by a number of organizations,[16] will be included in the regulations governing the approval of new transgenic varieties. Currently, approval is based solely on the assessment of grain quality and human health and environmental risks.

In a letter to the CWB, the Grain Growers of Canada (GGC) expressed concerns about the proposals in the Working Group's document and indicated its support of the current system for approving new transgenic varieties. The GGC fears that introducing non-scientific factors, such as market acceptance, would weaken Canada's position on the international market and prevent it from maintaining its position with regard to health-related trade rules, which are based on scientific criteria. Moreover, the GGC contends that most of the transgenic corn and canola varieties being used successfully by Canadian farmers today would not have met the conditions developed by the Working Group when these varieties were first introduced in Canada.

The GGC proposes that an advanced stakeholder review committee examine the issues related to market acceptance and to the segregation of transgenic varieties, rather than including these factors in the regulations. The committee members (including the technology developers) would agree to delay the marketing of transgenic varieties until the committee had completed its evaluation.

CONCLUSION

The Canadian agriculture industry has accepted the many varieties of genetically modified canola, soybeans and corn that have been approved in Canada since the mid-1990s. RR wheat is, in itself, not all that different from other GMOs used in agriculture. However, while the debate on the possible effects of GMOs on health and the environment has mainly been

(16) For example, the Canadian National Millers Association, Keystone Agricultural Producers, and the Agricultural Producers Association of Saskatchewan.

the preserve of consumer and environmental protection groups, the issue of transgenic wheat has caused the agriculture industry to change its attitude.

In large part because of the place of wheat in the human food supply (in terms of worldwide grain production, wheat is second only to rice), this change has led to new thinking on how to incorporate consumers' demands into the regulatory process. The introduction of new foods, traditionally based on scientific principles and studies, now involves other aspects (social, economic, ethical) that are not always adequately considered, according to a growing number of consumers. The eventual decision on how to introduce a transgenic wheat variety could suggest measures the government might want to implement so that consumers could play a larger role in the approval process.