

# Monitoring Feral Genetically Modified Oilseed Rape Outside of Cultivated Areas

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Escaler et al. [1] have described the challenges in harmonizing regulations for Genetically modified (GM) crops across mixed groups of countries, such as Parties vs. non-Parties to the Cartagena Protocol on Biosafety, GM crop producers vs. non-GM producers, or GM crop-exporting countries vs. GM crop-importing countries. Not only APEC member countries but also EU member states have a range of views on the potential risks of GM crops, which leads to bans on their import [2]. One good example of the difficulty in this harmonization is the perception about those potential risks from feral GM oilseed rape. Devos et al. [3] recently provided an up-to-date extensive review of GM herbicide-tolerant oilseed rape that becomes feral, and argued that those concerns and the ban on its import by some EU member states are not scientifically justified.

Interestingly, the occurrence of feral GM oilseed rape has drawn considerable attention in Japan, a country that does not cultivate any GM crops. As a major GM crop-importing nation, Japan has been bringing in such products since 1996 [4]. In 2003, local citizens groups plus the Ministry of Environment and the Ministry of Agriculture, Forestry and Fisheries of Japan launched investigations into the unintended release of imported GM oilseed rape that results from seed spillage at ports receiving these oilseeds. Using a GM detection strip kit, they have found some feral GM oilseed rape containing either the *bar* or *CP4 EPSPS* gene in those areas [4].

The detection of transgenes in feral oilseed rape has certainly raised an alarm there. Both Ministries in Japan announced that “even if spilled GE seeds grow wild and cross with local varieties, such plants will have low fertility, and therefore there is no possibility that spilled GE seeds will spread and interfere with the native species” [4]. Nevertheless, the citizens groups and both ministries continue to monitor for feral GM oilseed rape and have reported the results from their investigations in peer-reviewed journals [5-8]. Thus far, no hybrids between GM oilseed rape and non-GM or wild relatives have been found in Japan, but this feral GM population persists.

The occurrence of feral GM oilseed rape outside of cultivated fields has also been reported in major GM oilseed-producing countries. In Canada, researchers found oilseed rapes resistant to both glufosinate and glyphosate that resulted from outcrossings between escaped GM populations [9]. Furthermore, Schafer et al. [10] conducted a survey along roadsides in 2010 to investigate the establishment of feral oilseed rape outside of cultivation in North Dakota (USA). Out of 634 study sites, oilseed rapes were present at 45% of the sites. Of those, 80% showed tolerance to either glyphosate or glufosinate. GM oilseed rapes tolerant to both herbicides were also found at two sites.

Herbicide tolerance is considered a neutral trait that does not change the fitness of a plant in an environment where a specific herbicide is not sprayed. However, as shown by Londo et al. [11], the drift of herbicides, even in amounts much lower than the field application rate, can alter the fitness of herbicide-tolerant GM oilseed rapes. Therefore, the land area that can affect the fitness of those crops

may be larger than the areas that were sprayed because the effect of those herbicides can extend beyond the cultivated areas.

None of these studies conducted in Japan, Canada and USA seem to indicate that production of GM herbicide-tolerant oilseed rape has caused adverse effects on ecosystems. However, these investigations are valuable because they demonstrate that much more must be learned about the persistence and gene flow of feral GM oilseed rape outside of cultivated areas, not only in countries that produce GM crops but also in those that import them.

Attempts at global coordination of regulations for GM crops are influenced by the broad range of opinions on their potential risks to human health and the environment. Increasing our knowledge on their biosafety should be the sole key to decision-making by each country and would further the reconciliation of regulations on these crops throughout the world.

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