

Table 2

Case studies on the unintentional release of GM rapeseed in the environment.

Nation	Year of Study	Region	Escaped Transgene	Hybridization	Comments	References
	2004	Kashima, Kobe, Kanto R51 Kanto R124	PAT, EPSPS	N/A	First published example of feral, transgenic populations occurring in a nation where the transgenic crop has not been cultivated commercially	[46]
		Chiba, Nagoya Yokkaichi	EPSPS			
Japan	2005	Kashima, Chiba, Yokohama, Shimizu, Nagoya, Yokkaichi, Sakai-senboku, Kobe, Uno, Mizushima, Kita-Kyushu, Hakata	PAT, EPSPS	Inter-Specific Hybridization with <i>B. rapa</i> , <i>B. juncea</i>	First report identifying the outcrossing between different Brassica species.	[47]
	2004–2007	Fukushima, Mizushima Kashima, Chiba, Nagoya, Yokkaichi, Hakata	EPSPS PAT, EPSPS	N/A	Seed spillage during transportation is the main cause for the gene transfer	[48]

Nation	Year of Study	Region	Escaped Transgene	Hybridization	Comments	References
		Yokohama, Shimizu, Ooita, Nagasaki	PAT			
	2005–2007	Kanto Route 51	EPSPS (2005~2007) PAT(2005)	N/A	Detailed report on seed spillage during transportation as the main cause for the gene transfer	[49]
	2004–2005	19 sites around Kashima sea port	PAT, EPSPS	N/A	Found GM rapeseed in only 2 sites	[50]
	2005–2008	Kashima, Chiba, Yokohama, Shimizu, Nagoya, Yokkaichi, Sakai-senboku, Kobe, Uno, Mizushima, Kita-Kyushu, Hakata	EPSPS	Inter-Specific Hybridization with <i>B. rapa</i>	Origin of double resistance unclear	[51]
	2006–2011	Kashima, Chiba, Yokohama, Shimizu, Nagoya, Yokkaichi, Sakai-senboku, Kobe, Uno, Mizushima,	EPSPS	N/A	Chiba, Yokkaichi, and Hakata were the hotspots for the feral rapeseed populations	[40]

Nation	Year of Study	Region	Escaped Transgene	Hybridization	Comments	References
		Tobato, Hakata				
	2005–2014	Kanto Route 51	EPSPS, PAT	N/A	Ten years of seed spillage during transportation is the main cause for the gene transfer	[52]
	1996–1998	Alberta	EPSPS	N/A	Neighboring field, multiple herbicide resistance	[53]
	2002	Saskatchewan	PAT, EPSPS	N/A	Neighboring field, multiple herbicide resistance, double resistance in seed lots	[33]
	2002	Western Canada	PAT, EPSPS	N/A	Double-resistant seed lots	[54]
Canada	2000	Québec	EPSPS	Inter-Specific Hybridization with <i>B. rapa</i>	Commercial fields, no escape to <i>Raphanus raphanistrum</i> , <i>Sinapis arvensis</i> , or <i>Erucastrum gallicum</i>	[22]
	2005	Vancouver	EPSPS	Inter-Specific Hybridization with <i>B. rapa</i>	High probability of hybridization between these two Brassica species	[30]
	2003	Québec	PAT, EPSPS	Inter-Specific Hybridization with <i>B. rapa</i>	Double resistance by transgene flow in escaped populations	[20]

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USA	2005	Québec	EPSPS	Inter-Specific Hybridization with <i>B. rapa</i>	Persistence over 6 years	[55]
	2004–2006	Manitoba	PAT, EPSPS	N/A	Double resistance by transgene flow in escaped populations	[56]
	2005–2007	Manitoba	PAT, EPSPS	N/A	Agricultural transport and landscape-scale cropping pattern are the key determinants.	[17]
	2008–2009	North Dakota	PAT, EPSPS	N/A	Double resistance in feral rapeseed at the roadways	[57]
	2007–2011	Butte county farm (California)	EPSPS	N/A	Glyphosate-resistant rapeseed in the fields	[58]
Switzerland	2011	Swiss railway station, Basel, Liechtenstein	EPSPS	N/A	Four GM rapeseed were identified in 2 sites	[59]
	2012	Basel's Rhine port	PAT, EPSPS	N/A	Discovered glufosinate-resistant GM events MS8xRF3, MS8, and RF3	[60]
	2010–2012	Rail roads along the country (Basel)	PAT, EPSPS	N/A	Strain GT73 carrying the glyphosate resistance transgene, gox, and CP4-EPSPS were detected	[61]

Nation	Year of Study	Region	Escaped Transgene	Hybridization	Comments	References
Argentina	2012	Southeast of Buenos Aires province	EPSPS	N/A	Transgenic rapeseed (GT73) was identified	[62]
