

Recent Movements on GMO Monitoring in Japan

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Safety Assessment

Food Safety Commission

The Cabinet Office

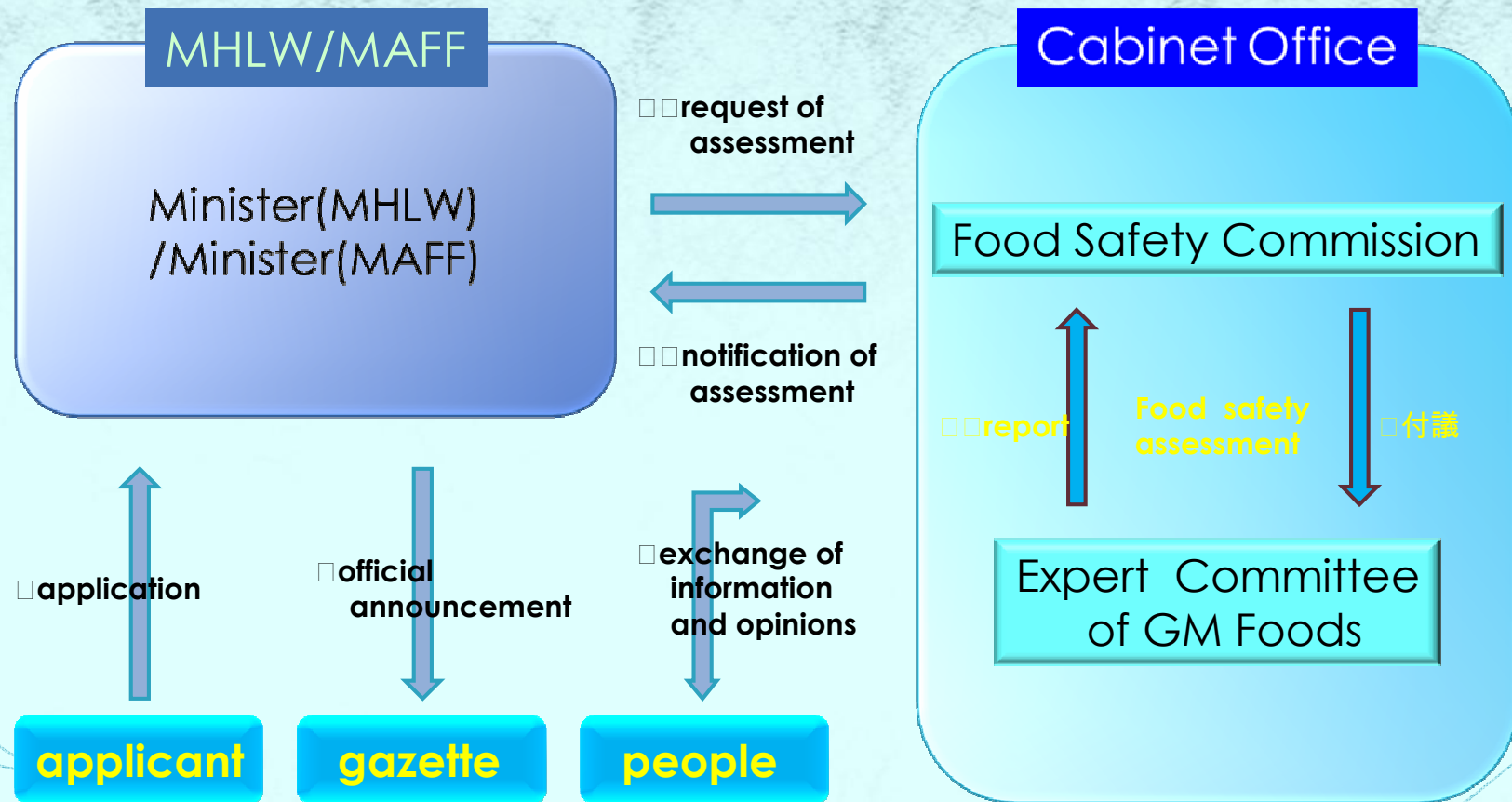
Japanese Government

- The Food Safety Basic Law was enacted in May 2003.
- The Food Safety Commission was established under the Cabinet Office on July 2003.
- It undertakes risk assessments, and is independent from risk management organizations, such as MAFF, and MHLW.
 - ✓ Conducting risk assessments on food in a scientific, independent, and fair manner and making recommendations to relevant ministries based upon the results from the risk assessment.
 - ✓ Responding to food-borne accidents and emergencies.
 - ✓ Implementing risk communication among stakeholders such as consumers and food-related business operators.
- It also undertakes risk communication.



- Ensuring the highest food safety -

Safety assessment of GM foods and feeds



(◆ : provision of information to the public)

Source : MHLW

Current status of commercialization of transgenic crop plants in Japan (May 2012)

185 kinds of GM crops are available for market

Potato	8	
Soybean	10	
Beet	3	
Maize	118	
Canola	18	
Cotton	24	
Alfalfa	3	
Papaya	1	→ 55-1
event		



GM crop-containing foods have to be labeled for the consumers' information.

Labeling system of GM foods

Under the jurisdiction of ...

Ministry of Agriculture, Forestry and Fisheries (MAFF):
Act on Standardization and Proper Labeling of Agricultural
and Forest Products (JAS Law)
(農林物資の規格化及び品質表示の適正化に関する法律)

Ministry of Health, Labour and Welfare (MHLW):
Food Sanitation Act
(食品衛生法)



Consumer Affairs Agency (2009 ~)



Labeling policy on GM products

- Foods and food ingredients derived from eight GM crops(soy, maize, potato, canola, cotton, alfalfa, sugar beet and papaya) approved by MHLW shall be labeled.
- There are 33 processed foods subject to the labeling with the exception of;
 1. DNA and protein are removed or highly degraded.
 2. It is not one of the three major ingredients in terms of weight or its proportion is not 5% or more by weight.



Statistical data of Papaya import I

Import of fresh fruits (ton)

country	2005	2006	2007	2008	2009
Philippines	2,340 (56.6%)	2,646 (62.9%)	2,780 (69.1%)	2,942 (75.7%)	2,510 (78.5%)
USA(Hawaii)	1,750 (42.3%)	1,513 (36.0%)	1,227 (30.5%)	927 (23.8%)	674 (21.1%)
Taiwan	18 (0.4%)	36 (0.9%)	4 (0.1%)	16 (0.4%)	11 (0.3%)
Fiji	28 (0.7%)	11 (0.3%)	9 (0.2%)	2 (0.1%)	0 (0.0%)
Others	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	1 (0.0%)
Total	4,136	4,207	4,021	3,887	3,196

Plant Protection Station (MAFF)

Statistical data of Papaya import II

Import of seeds (kg)

country	2005	2006	2007	2008	2009
Taiwan	55 (85.9%)	15 (100%)	0	0.1 (100%)	0
Thailand	6 (9.4%)	0	0	0	1 (100%)
Malaysia	0	0	2 (100%)	0	0
USA (Hawaii)	3 (4.7%)	0	0	0	0
Total	64	15	2	0.1	1

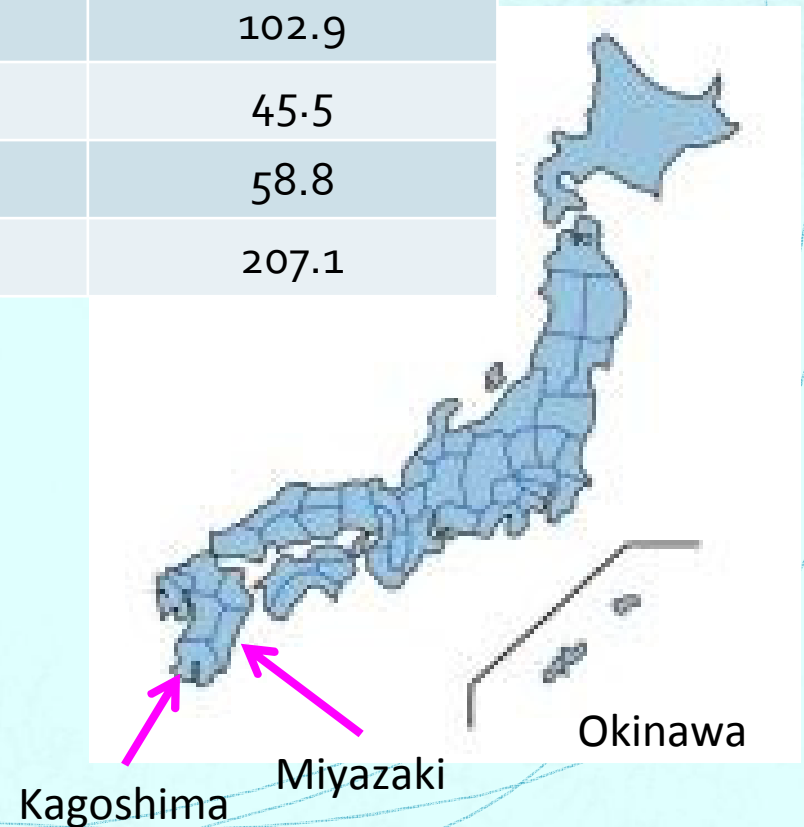
Import of seedling (number)

country	2005	2006	2007	2008	2009
Taiwan	6,310 (95.5%)	0	23	3,025	4,560
Thailand	300 (4.5%)	0	0	0	0
Total	6,610	0	23	3,025	4,560

Cultivation of papaya in Japan

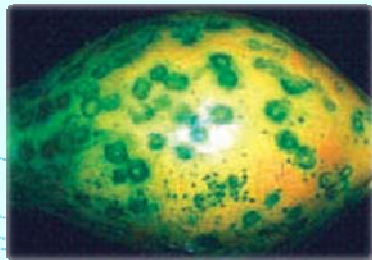
Prefecture	Cultivation area (ha)	Yield (ton)
Okinawa	11.3	102.9
Kagoshima	10.5	45.5
Miyazaki	2.3	58.8
Total	24.1	207.1

- Tropical to sub-tropical regions are suitable for the cultivation of papaya.
- Papaya farming is a rather small industry in Japan.



Unapproved papaya found in domestic products

- Unapproved GM papaya was found in domestically grown papaya, which is a violation of the “Food Sanitation Act” and the “Law Concerning the Conservation and Sustainable Use of Biological Diversity through Regulation on the Use of Living modified Organisms (Cartagena Protocol Domestic Law)”.



Papaya ringspot is a destructive disease characterized by a yellowing and stunting of the crown of papaya trees, a mottling of the foliage, shoe-stringing of younger leaves, water-soaked streaking of the petioles (stalks), and small darkened rings on the surface of fruit.



OkinawaTimes(2011.2.23)

Construct of GM papaya

Place of origin	Name	PRSV CP cassette		Virus strain (GenBank No.)
		Promoter	Terminator	
Hawaii	55-1	CaMV 35S	CaMV 35S	HA5-1 (S46722)
Hawaii	63-1	CaMV 35S	CaMV 35S	HA5-1 (S46722)
Florida	X17-2	CaMV 35S	NOS	H1K (AF196839.1)
Taiwan	PRSV-YK	CaMV 35S	NOS	YK (X97251)
China	Huanong No.1	CaMV 35S	NOS	Vb (AF243496.1)

- A part of the transgenic vector construct found in papaya processed products was identical to **PRSV-YK**.
- PRSV-YK has not been approved in any countries.



Detection method for PRSV-YK

Qualitative real-time PCR method

Target	Name	Sequence
PRSV-YK	YK-2F	5'-ACA CGG GGG ACT CTA GAG-3'
	YK-2R	5'-ACC GGT ATC CAC AGC TTC-3'
	YK-2P	-FAM-TCC CTT CCA TGG CGT C- TAMRA-3'
CaMV P _{35S}	35S-F	5'-GCC TCT GCC GAC AGT GGT-3'
	35S-R	5'-AAG ACG TGG TTG GAA CGT CTT C-3'
	35S-P	-FAM-CAA AGA TGG ACC CCC ACC CAC G-TAMRA-3'
Chymopapain	Q-Chy-1F ₂	5'-CCT TGC GAT CCT CCC A-3'
	Q-Chy-2R	5'-CAT CGT AGC CAT TGT AAC ACT AGC TAA-3'
	Q-Chy-P	-FAM-TTC CCT TCA T(BHQ ₁)CC ATT CCC ACT CTT GAG A-3'

Nakamura, K., et al (2011) Biol. Pharm. Bull. 34(10) 1648-51

Monitoring

- MAFF has been monitoring papaya seeds and seedlings available in Japan.

	positive	negative
Seed	1	28
Seedling	0	4

- The GM positive seeds were sold by the name of 台農5号.
- 台農5号 was developed as a non-GM papaya by crossbreeding in 1987.