

FY 2009 Survey Results of Water Pollution by Agricultural Chemicals Used at Golf Courses

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The Ministry of the Environment has collected the results of a monitoring survey of agricultural chemicals in golf course drains conducted by local governments and regional environment offices in FY2009.

The monitoring survey was conducted according to the "Tentative Guideline for the Prevention of Water Pollution by Agricultural Chemicals Used in Golf Courses", hereinafter referred to as "the Guideline". 23,810 samples from 635 golf courses were measured in the survey, and no sample exceeding reference values of concentrations set in the Guideline was detected (Table 1 & 2).

The Ministry developed the Guideline in 1990 for local governments to prevent water pollution caused by agricultural chemicals used in golf courses. The Guideline provides the methods of measurement of agricultural chemicals used in the golf courses and the reference values of concentration of agricultural chemicals.

Table 1 Summary of survey results of each prefecture

Prefectures	Number of golf courses surveyed		Number of agricultural chemicals surveyed		Total number of samples *		Number of samples **		Number of samples exceeding the guideline target	
Hokkaido	54	(2)***	45	(45)	672	(90)	108	(45)	0	(0)
Aomori	1	(1)	45	(45)	45	(45)	45	(45)	0	(0)
Iwate	1	(1)	45	(45)	45	(45)	0	(0)	-	(-)
Miyagi	2		45		90		0		-	
Akita	2		6		6		0		-	
Yamagata	1	(1)	45	(45)	45	(45)	0	(0)	-	(-)
Fukushima	19		45		767		90		0	
Ibaraki	5		15		29		6		0	
Tochigi	83		45		2,575		1,473		0	
Gunma	1	(1)	45	(45)	45	(45)	0	(0)	-	(-)
Saitama	32		45		1,024		742		0	
Chiba	24		45		888		390		0	
Tokyo	3	(1)	45	(45)	69	(45)	12	(0)	0	(-)
Kanagawa	15		43		285		271		0	
Niigata	6		16		120		51		0	
Toyama	16		42		672		672		0	
Ishikawa	1	(1)	45	(45)	45	(45)	0	(0)	-	(-)
Fukui	5		45		141		6		0	
Yamanashi	1	(1)	45	(45)	45	(45)	0	(0)	-	(-)
Nagano	9		45		460		293		0	
Gifu	4	(1)	45	(45)	61	(45)	0	(0)	-	(-)
Shizuoka	18		24		432		432		0	
Aichi	44		41		363		149		0	
Mie	4	(1)	45	(45)	58	(45)	0	(0)	-	(-)
Shiga	1	(1)	45	(45)	45	(45)	0	(0)	-	(-)
Kyoto	15		33		155		131		0	
Osaka	25		31		504		50		0	
Hyogo	87		45		5843		448		0	
Nara	35		41		1,810		770		0	
Wakayama	2	(2)	45	(45)	90	(90)	0	(0)	-	(-)
Tottori	1	(1)	45	(45)	45	(90)	0	(0)	-	(-)
Shimane	5		22		84		0		-	
Okayama	35		45		1,874		520		0	
Hiroshima	9		44		408		408		0	
Yamaguchi	1	(1)	45	(45)	45	(45)	0	(0)	-	(-)
Tokushima	1	(1)	45	(45)	45	(45)	45	(45)	0	(0)
Kagawa	13		38		494		494		0	
Ehime	1	(1)	45	(45)	45	(45)	0	(0)	-	(-)
Kochi	1	(1)	45	(45)	45	(45)	0	(0)	-	(-)
Fukuoka	18		45		876		406		0	
Saga	1		17		34		0		-	
Nagasaki	10		45		1,405		270		0	
Kumamoto	9		25		450		200		0	
Oita	1	(1)	45	(45)	45	(45)	45	(45)	0	(0)
Miyazaki	1	(1)	45	(45)	45	(45)	45	(45)	0	(0)
Kagoshima	10		45		351		54		0	
Okinawa	2	(1)	45	(45)	90	(45)	0	(0)	-	(-)
	635	(22)	-		23,810	(990)	8,626	(225)	0	(0)

Notes: * The total number of samples includes those collected from drain, pond in golf courses, and water outside of golf courses.

Notes: ** The number includes those data collected at drain outlets of golf courses.

Notes: *** Figures in brackets are results measured by regional environment offices

Table 2 Summary of survey results of each chemical

Agricultural chemicals	Guideline target (mg/L)	Concentration range detected * (mg/L)	Number of samples exceeding the guideline target	Number of samples *
(Insecticides)				
Acephate	0.8	n.d. to 0.002	0	165
Isoxathion	0.08	n.d.	0	194
Isofenphos	0.01	n.d.	0	141
Ethofenprox	0.8	n.d.	0	141
Chlorpyrifos	0.04	n.d.	0	171
Diazinon	0.05	n.d. to 0.0026	0	236
Thiodicarb	0.8	n.d. to 0.0015	0	197
Trichlorfon(DEP)	0.3	n.d.	0	129
Pyridaphenthion	0.02	n.d.	0	165
Fenitrothion (MEP)	0.03	n.d. to 0.009	0	244
(Fungicides)				
Azoxystrobin	5	n.d. to 0.043	0	248
Isoprothiolane	0.4	n.d. to 0.0007	0	197
Iprodione	3	n.d. to 0.003	0	221
Iminoctadine-triacetate	0.06	n.d. to 0.018	0	122
Etridiazol	0.04	n.d.	0	142
Oxine-copper	0.4	n.d.	0	200
Captan	3	n.d.	0	156
Chlorotalonil (TPN)	0.4	n.d.	0	224
Chloroneb	0.5	n.d.	0	186
Thiram	0.06	n.d.	0	220
Tolclofos-methyl	0.8	n.d. to 0.005	0	217
Flutoranil	2	n.d. to 0.0051	0	218
Propiconazole	0.5	n.d.	0	219
Pencycuron	0.4	n.d. to 0.0226	0	250
Phosethyl	23	n.d. to 0.36	0	176
Polycarbamate	0.3	n.d.	0	130
Metalaxyl	0.5	n.d. to 0.0026	0	231
Mepronil	1	n.d. to 0.0004	0	206
(Herbicides)				
Asulam	2	n.d. to 0.0241	0	275
Dithiopyr	0.08	n.d. to 0.0012	0	195
Siduron	3	n.d.	0	214
Simazine	0.03	n.d. to 0.017	0	193
Terbucarb (MBPMC)	0.2	n.d. to 0.0024	0	164
Triclopyr	0.06	n.d. to 0.0054	0	209
Napropamide	0.3	n.d.	0	182
Halosulfuron-methyl	0.3	n.d. to 0.0006	0	222
Pyributicarb	0.2	n.d.	0	167
Butamifos	0.04	n.d. to 0.0009	0	171
Flazasulfuron	0.3	n.d.	0	179
Propyzamide	0.08	n.d. to 0.0543	0	210
Bensulide (SAP)	1	n.d.	0	141
Pendimethalin	0.5	n.d. to 0.0007	0	216
Benfluralin	0.8	n.d.	0	173
Mecoprop (MCP)	0.05	n.d. to 0.0315	0	206
Methyldymron	0.3	n.d.	0	163
Total		—	0	8,626

Notes: * The number includes those data collected at drain outlets of golf courses.