FY 2011 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 monitoring surveys of agricultural chemicals in golf course drains, which is conducted by local governments and regional environment offices in FY2011.

The monitoring surveys were conducted in accordance with the "Tentative Guideline for the Prevention of Water Pollution by Agricultural Chemicals Used in Golf Courses", hereinafter referred to as "the Guideline". 23,822 samples from 546 golf courses were measured in the survey and no sample of the drains exceeded reference values of concentrations set in the Guideline (Table 1 and Table 2).

The Ministry has established the Guideline in 1990 for local governments to implement prevention measures on water pollution, which are caused by agricultural chemicals used in golf courses. The Guideline provides the methods of measurement of agricultural chemicals used in golf courses as well as the reference values of concentration of agricultural chemicals.

Table 1 Summary of survey results

Prefectures	Number of golf courses surveyed***		Number of agricultural chemicals surveyed***		Total number of samples (*,**and***)		The number of samples surveyed from drains		Number of samples exceeding the reference value	
Hokkaido	53	(2)	75	(75)	523	(138)	60		0	
Aomori	1	(1)	75	(75)	69	(69)	0		-	
Iwate	1	(1)	75	(75)	69	(69)	0		-	
Miyagi	3	(1)	75	(75)	148	(69)	0		-	
Akita	2		6		6		3		0	
Yamagata	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
Fukushima	7		37		231		33		0	
Ibaraki	5		19		27		5		0	
Tochigi	66		75		2,399		819		0	
Gunma	2	(2)	75	(75)	138	(138)	69	(69)	0	(0)
Saitama	30		75		1,437		1,124		0	
Chiba	10		75		479		272		0	
Tokyo	2	(1)	75	(75)	77	(69)	4		0	
Kanagawa	13		29		156		145		0	
Yamanashi	1	(1)	75		69	(69)	0		-	
Nagano	8		75		564		442		0	
Niigata	6		31		206		91		0	
Toyama	8		47		323		323		0	
Ishikawa	1	(1)	75	(75)	69	(69)	0		-	
Fukui	5		33		55		6		0	
Gifu	4	(1)	75	(75)	85	(69)	0		-	
Shizuoka	18		27		432		408		0	
Aichi	26		62		305		103		0	
Mie	6	(1)	75	(75)	99	(69)	0		-	
Shiga	2	(2)	75	(75)	138	(138)	69	(69)	0	(0)
Kyoto	11		49		178		132		0	
Osaka	26		57		537		123		0	
Hyogo	90		75		6,628		385		0	
Nara	24		44		1,373		385		0	
Wakayama	4	(1)	75	(75)	449	(69)	0		-	
Tottori	1	(1)	75	(75)	69	(69)	0		-	
Shimane	5		22		62		0		-	
Okayama	26		66		2,033		580		0	
Hiroshima	8		44		320		320		0	
Yamaguchi	1	(1)	75	(75)	69	(69)	0		-	
Tokushima	1	(1)	75	(75)	69	(69)	0		-	
Kagawa	13		46		546		546		0	
Ehime	1	(1)	75	(75)	69	(69)	0		-	
Kochi	1	(1)	75	(75)	69	(69)	0		-	
Fukuoka	17		75		1,283		690		0	
Saga	6		29		62		0		-	
Nagasaki	7		48		635		129		0	
Kumamoto	8		33		496		0		-	
Oita	3	(1)	75	(75)	171	(69)	69	(69)	0	(0)
Miyazaki	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
Kagoshima	10		65		393		57		0	
Okinawa	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
	546	(24)	-	-	23,822	(1,656)	7,599	(414)	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 total number of samples includes those surveyed by municipalities and reported to their prefectures.

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

Table 2　Summary of survey results of each chemical

Agricultural chemicals	Reference value (mg/L)	Concentration range detected * (mg/L)	Number of samples exceeding the reference value	Number of samples *
(Insecticides)				
Acetamiprid	1.8	N.D.	0	54
Acephate	0.063	N.D.	0	108
Isoxathion	0.08	N.D.	0	135
Imidacloprid	1.5	N.D.	0	67
Ethofenprox	0.82	N.D.	0	109
Clothianidin	2.5	N.D.-0.007	0	87
Chlorpyrihos	0.02	N.D.	0	118
Diazinon	0.05	N.D.- 0.0008	0	164
Thiamethoxam	0.47	N.D.- 0.01	0	68
Thiodicarb	0.8	N.D.- 0.0011	0	143
Tebufenozide	0.42	N.D.	0	72
Trichlorfon(DEP)	0.05	N.D.- 0.001	0	91
Pyridaphenthion	0.02	N.D.	0	115
Fenitrothion (MEP)	0.03	N.D.- 0.0026	0	163
Permethrin	1	N.D.	0	89
Bensultap	0.9	N.D.	0	50
(Fungicide)				
Azoxystrobin	4.7	N.D.- 0.018	0	187
Isoprothiolane	2.6	N.D.- 0.001	0	149
Iprodione	3	N.D.- 0.25	0	158
Iminoctadine tris(Albesilate) and Iminoctadine-triacetate**	0.06 (as in Iminoctadine)	N.D.	0	102
Etridiazol	0.04	N.D.	0	102
Oxine-copper	0.4	N.D.- 0.011	0	148
Captan	3	N.D.	0	111
Chlorotalonil (TPN)	0.4	N.D.	0	156
Chloroneb	0.5	N.D.	0	140
Difenoconazole	0.3	N.D.	0	68
Sipconazole	0.3	N.D.- 0.0063	0	64
Simeconazole	0.22	N.D.	0	61
Thiram	0.2	N.D.	0	166
Thiophanate-methyl	3	N.D.- 0.004	0	69
Thifluzamide	0.5	N.D.- 0.013	0	94
Tetraconazole	0.1	N.D.	0	71
Tebuconazole	0.77	N.D.- 0.03	0	102
Triflumizole	0.5	N.D.	0	56
Tolclofos-methyl	2	N.D.- 0.004	0	160
Validamycin	12	N.D.	0	46
Hydroxyisoxazole（Hymexazol）	1	N.D.	0	51
Flutoranil	2.3	N.D.- 0.0015	0	166
Propiconazole	0.5	N.D.- 0.001	0	162
Benomyl	0.2	N.D.- 0.0008	0	44
Pencycuron	1.4	N.D.- 0.008	0	172
Boscalid	1.1	N.D.	0	67
Phosethyl	23	N.D.	0	93

Polycarbamate	0.3	N.D.	0	82
Metalaxyl and Metalaxyl-M**	0.58 (as in Methalaxyl)	N.D.	0	160
Mepronil	1	N.D.	0	144
(Herbicide)				
Asulam	2	N.D.- 0.078	0	207
Ethoxysulfuron	1	N.D.	0	57
Oxadiargyl	0.2	N.D.	0	44
Oxaziclomefone	0.24	N.D.- 0.0011	0	61
Cafenstrole	0.07	N.D.- 0.0079	0	76
Cyclosulfamuron	0.8	N.D.- 0.0064	0	60
Dithiopyr	0.095	N.D.- 0.0001	0	135
Siduron	3	N.D.- 0.0007	0	143
Simazine	0.03	N.D.- 0.0018	0	144
Terbucarb (MBPMC)	0.2	N.D.- 0.0001	0	116
Triclopyr	0.06	N.D.- 0.001	0	141
Napropamide	0.3	N.D.	0	115
Halosulfuron-methyl	2.6	N.D.- 0.0005	0	144
Pyributicarb	0.23	N.D.	0	123
Butamifos	0.2	N.D.	0	121
Flazasulfuron	0.3	N.D.- 0.0006	0	134
Propyzamide	0.5	N.D.- 0.012	0	152
Bensulide (SAP)	1	N.D.	0	101
Pendimethalin	1	N.D.- 0.001	0	158
Benfluralin	0.8	N.D.	0	123
Mecoprop-Potassium, Mecoprop-Dimethylamine , Mecoprop-P- -Isopropylamine, and Mecoprop-P-Potassiumum**	0.47 (as in Mecoprop)	N.D.- 0.11	0	155
MCPA-Isopropylamine and MCPA-Sodium**	0.05 (as in MCPA)	N.D.- 0.002	0	55
(Plant growth regulator)				
Trinexapac-Ethyl	0.15	N.D.	0	50
Total		—	0	7,599

Notes: * The number includes those data collected at drain outlets of golf courses.
Notes:** For the sake of evaluation against the reference value, agricultural chemicals were measured in terms of the chemical shown in the column of “reference value”.