FY 2010 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 FY2010.

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". 22,727 samples from 563 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	44	(2)	75	(75)	525	(138)	60		0	
Aomori	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
Iwate	1	(1)	75	(75)	69	(69)	0		-	
Miyagi	2		43		86		0		-	
Akita	1		6		6		3		0	
Yamagata	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
Fukushima	16		43		588		86		0	
Ibaraki	5		14		30		22		0	
Tochigi	50		52		1,802		1,005		0	
Gunma	2	(2)	75	(75)	138	(138)	69	(69)	0	(0)
Saitama	33		52		1,087		740		0	
Chiba	24		43		980		198		0	
Tokyo	2	(1)	75	(75)	95	(69)	13		0	
Kanagawa	13		25		168		151		0	
Yamanashi	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
Shizuoka	20		24		480		168		0	
Niigata	6		26		195		88		0	
Toyama	8		42		324		324		0	
Ishikawa	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
Fukui	5		44		135		6		0	
Nagano	8		50		392		310		0	
Gifu	4	(1)	75	(75)	85		0		-	
Aichi	25		43		263		78		0	
Mie	6	(1)	75	(75)	95		0		-	
Shiga	2	(2)	75	(75)	138	(138)	0		-	
Kyoto	14		49		207		161		0	
Osaka	29		37		516		80		0	
Hyogo	87		65		6,115		346		0	
Nara	35		39		1,736		748		0	
Wakayama	4	(1)	75	(75)	449	(69)	0		-	
Tottori	1	(1)	75	(75)	69		0		-	
Shimane	5		18		53		0		-	
Okayama	30		43		1,624		532		0	
Hiroshima	9		42		392		392		0	
Yamaguchi	1	(1)	75	(75)	69		0		-	
Tokushima	1	(1)	75	(75)	138	(138)	0		-	
Kagawa	9		37		333		333		0	
Ehime	1	(1)	75	(75)	138	(138)	0		-	
Kochi	1	(1)	75	(75)	69		0		-	
Fukuoka	15		46		862		398		0	
Saga	5		25		61		12		0	
Nagasaki	10		45		724		88		0	
Kumamoto	8		31		496		31		0	
Oita	4	(1)	75	(75)	235		43		0	
Miyazaki	1	(1)	75	(75)	69		0		-	
Kagoshima	11		45		346		51		0	
Okinawa	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
	563	(23)	-		22,727	(1,725)	6,881	(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	6
Acephate	0.063	N.D.	0	136
Isoxathion	0.08	N.D.	0	151
Imidacloprid	1.5	N.D.	0	18
Ethofenprox	0.82	N.D.	0	119
Clothianidin	2.5	N.D.～0.004	0	33
Chlorpyrihos	0.02	N.D.	0	143
Diazinon	0.05	N.D.～0.003	0	187
Thiamethoxam	0.47	N.D.～0.004	0	10
Thiodicarb	0.8	N.D.	0	135
Tebufenozide	0.42	N.D.	0	13
Trichlorfon(DEP)	0.05	N.D.	0	104
Pyridaphenthion	0.02	N.D.	0	136
Fenitrothion (MEP)	0.03	N.D.	0	177
Permethrin	1	N.D.	0	21
Bensultap	0.9	N.D.	0	10
(Fungicide)				
Azoxystrobin	4.7	N.D.～0.0061	0	203
Isoprothiolane	2.6	N.D.	0	152
Iprodione	3	N.D.	0	172
Iminoctadine tris(Albesilate) and Iminoctadine-triacetate**	0.06 (as in Iminoctadine)	N.D.	0	118
Etridiazol	0.04	N.D.	0	116
Oxine-copper	0.4	N.D.	0	150
Captan	3	N.D.	0	116
Chlorotalonil (TPN)	0.4	N.D.	0	174
Chloroneb	0.5	N.D.	0	150
Difenoconazole	0.3	N.D.	0	11
Sipconazole	0.3	N.D.	0	7
Simeconazole	0.22	N.D.	0	8
Thiram	0.2	N.D.	0	167
Thiophanate-methyl	3	N.D.～	0	36
Thifluzamide	0.5	N.D.～0.001	0	15
Tetraconazole	0.1	N.D.	0	6
Tebuconazole	0.77	N.D.～0.002	0	22
Triflumizole	0.5	N.D.	0	6
Tolclofos-methyl	2	N.D.～0.004	0	166
Validamycin	12	N.D.	0	6
Hydroxyisoxazole（Hymexazol）	1	N.D.	0	14
Flutoranil	2.3	N.D.～0.005	0	168
Propiconazole	0.5	N.D.～0.0001	0	179
Benomyl	0.2	N.D.	0	8
Pencycuron	1.4	N.D.～0.015	0	200
Boscalid	1.1	N.D.	0	11
Phosethyl	23	N.D.～0.0101	0	131
Polycarbamate	0.3	N.D.～<0.002	0	115

Metalaxyl and Metalaxyl-M**	0.58 (as in Methalaxyl)	N.D.～0.0002	0	183
Mepronil	1	N.D.～0.0008	0	161
(Herbicide)				
Asulam	2	N.D.～0.033	0	228
Ethoxysulfuron	1	N.D.	0	6
Oxadiargyl	0.2	N.D.	0	6
Oxaziclomefone	0.24	N.D.～0.0001	0	11
Cafenstrole	0.07	N.D.	0	6
Cyclosulfamuron	0.8	N.D.	0	12
Dithiopyr	0.095	N.D.	0	157
Siduron	3	N.D.～0.0045	0	163
Simazine	0.03	N.D.	0	152
Terbucarb (MBPMC)	0.2	N.D.～0.003	0	133
Triclopyr	0.06	N.D.～0.0007	0	157
Napropamide	0.3	N.D.～0.001	0	139
Halosulfuron-methyl	2.6	N.D.～0.006	0	154
Pyributicarb	0.23	N.D.	0	138
Butamifos	0.2	N.D.	0	137
Flazasulfuron	0.3	N.D.	0	137
Propyzamide	0.5	N.D.～0.0045	0	163
Bensulide (SAP)	1	N.D.	0	111
Pendimethalin	1	N.D.～0.0003	0	163
Benfluralin	0.8	N.D.～0.001	0	142
Mecoprop-Potassium, Mecoprop-Dimethylamine , Mecoprop-P- -Isopropylamine, and Mecoprop-P-Potassiumum**	0.47 (as in Mecoprop)	N.D.～0.003	0	172
MCPA-Isopropylamine and MCPA-Sodium**	0.05 (as in MCPA)	N.D.	0	17
(Plant growth regulator)				
Trinexapac-Ethyl	0.15	N.D.	0	7
Total		－	0	6,881

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”.