FY 2012 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 FY 2012.

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". 23,205 samples from 555 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	48	(2)	75	(75)	540	(138)	97		0	
Aomori	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
Iwate	1	(1)	75	(75)	69	(69)	0		0	
Miyagi	3	(1)	75	(75)	207	(69)	0		0	
Akita	2		6		6		0		0	
Yamagata	1	(1)	75	(75)	69	(69)	0		0	
Fukushima	7		37		231		33		0	
Ibaraki	5		21		24		8		0	
Tochigi	68		75		2,199		1,021		0	
Gunma	2	(2)	75	(75)	138	(138)	0		0	
Saitama	25		75		1,398		1,106		0	
Chiba	14		75		792		139		0	
Tokyo	4	(1)	75	(75)	98	(69)	69	(69)	0	(0)
Kanagawa	13		28		154		144		0	
Yamanashi	1	(1)	75	(75)	69	(69)	0		0	
Nagano	9		74		545		423		0	
Niigata	6		30		160		48		0	
Toyama	8		65		471		471		0	
Ishikawa	1	(1)	75	(75)	69	(69)	0		0	
Fukui	5		37		58		6		0	
Gifu	4	(1)	75	(75)	85	(69)	0		0	
Shizuoka	19		45		779		328		0	
Aichi	26		62		201		51		0	
Mie	6	(1)	75	(75)	102	(69)	0		0	
Shiga	4	(2)	75	(75)	162	(138)	0		0	
Kyoto	11		59		201		158		0	
Osaka	26		61		554		146		0	
Hyogo	91		75		5,658		231		0	
Nara	24		44		1,399		385		0	
Wakayama	4	(1)	75	(75)	449	(69)	0		0	
Tottori	2	(1)	75	(75)	207	(69)	0		0	
Shimane	5		23		60		0		0	
Okayama	29		63		2,063		767		0	
Hiroshima	8		44		320		320		0	
Yamaguchi	2	(1)	75	(75)	73	(69)	0		0	
Tokushima	1	(1)	75	(75)	69	(69)	0		0	
Kagawa	9		47		387		387		0	
Ehime	1	(1)	75	(75)	69	(69)	0		0	
Kochi	1	(1)	75	(75)	69	(69)	0		0	
Fukuoka	17		75		1,007		373		0	
Saga	6		22		53		0		0	
Nagasaki	11		69		689		39		0	
Kumamoto	9		33		558		31		0	
Oita	3	(1)	75	(75)	164	(69)	69	(69)	0	(0)
Miyazaki	1	(1)	75	(75)	69	(69)	0		0	
Kagoshima	10		55		323		42		0	
Okinawa	1	(1)	75	(75)	69	(69)	69	(69)	0	(0)
	555	(24)	-	-	23,205	(1,656)	7,030	(276)	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	72
Acephate	0.063	N.D.	0	93
Isoxathion	0.08	N.D.	0	113
Imidacloprid	1.5	N.D.	0	84
Ethofenprox	0.82	N.D.	0	90
Clothianidin	2.5	N.D.- 0.023	0	124
Chlorpyrihos	0.02	N.D.	0	107
Diazinon	0.05	N.D.- 0.0008	0	137
Thiamethoxam	0.47	N.D.- 0.001	0	98
Thiodicarb	0.8	N.D.	0	113
Tebufenozide	0.42	N.D.	0	86
Trichlorfon (DEP)	0.05	N.D.	0	78
Pyridaphenthion	0.02	N.D.	0	100
Fenitrothion (MEP)	0.03	N.D.- 0.0048	0	130
Permethrin	1	N.D.	0	95
Bensultap	0.9	N.D.	0	60
(Fungicide)				
Azoxystrobin	4.7	N.D.- 0.4	0	150
Isoprothiolane	2.6	N.D.- 0.0006	0	116
Iprodione	3	N.D.- 0.003	0	135
Iminoctadine tris(Albesilate) and Iminoctadine-triacetate**	0.06 (as in Iminoctadine)	N.D.- 0.00016	0	86
Etridiazol (Echlomezol)	0.04	N.D.	0	85
Oxine-copper	0.4	N.D.- 0.04	0	110
Captan	3	N.D.- 0.0004	0	93
Chlorotalonil (TPN)	0.4	N.D.	0	118
Chloroneb	0.5	N.D.	0	100
Difenoconazole	0.3	N.D.	0	95
Sipconazole	0.3	N.D.	0	90
Simeconazole	0.22	N.D.- 0.011	0	84
Thiram	0.2	N.D.	0	130
Thiophanate-methyl	3	N.D.	0	77
Thifluzamide	0.5	N.D.- 0.0075	0	114
Tetraconazole	0.1	N.D.	0	93
Tebuconazole	0.77	N.D.- 0.031	0	114
Triflumizole	0.5	N.D.	0	72
Tolclofos-methyl	2	N.D.- 0.2	0	140
Validamycin	12	N.D.	0	48
Hydroxyisoxazole（Hymexazol）	1	N.D.	0	73
Flutoranil	2.3	N.D.- 0.0008	0	136
Propiconazole	0.5	N.D.	0	129
Benomyl	0.2	N.D.	0	56
Pencycuron	1.4	N.D.- 0.0044	0	147
Boscalid	1.1	N.D.	0	95
Phosethyl	23	N.D.	0	79

Polycarbamate	0.3	N.D.	0	66
Metalaxyl and Metalaxyl-M**	0.58 (as in Methalaxyl)	N.D.- 0.002	0	143
Mepronil	1	N.D.- 0.0001	0	133
(Herbicide)				
Asulam	2	N.D.- 0.011	0	167
Ethoxysulfuron	1	N.D.	0	74
Oxadiargyl	0.2	N.D.	0	48
Oxaziclomefone	0.24	N.D.- 0.0006	0	91
Cafenstrole	0.07	N.D.- 0.009	0	87
Cyclosulfamuron	0.8	N.D.- 0.005	0	79
Dithiopyr	0.095	N.D.- 0.0001	0	118
Siduron	3	N.D.- 0.004	0	113
Simazine(CAT)	0.03	N.D.- 0.0003	0	121
Terbucarb (MBPMC)	0.2	N.D.- 0.0004	0	108
Triclopyr	0.06	N.D.- 0.01	0	115
Napropamide	0.3	N.D.	0	100
Halosulfuron-methyl	2.6	N.D.	0	117
Pyributicarb	0.23	N.D.	0	119
Butamifos	0.2	N.D.	0	114
Flazasulfuron	0.3	N.D.	0	110
Propyzamide	0.5	N.D.- 0.0031	0	123
Bensulide (SAP)	1	N.D.	0	95
Pendimethalin	1	N.D.- 0.0005	0	124
Benfluralin(Bethrodine)	0.8	N.D.	0	104
Mecoprop-Potassium, Mecoprop-Dimethylammonium , Mecoprop-P- Isopropylammonium, and Mecoprop-P-Potassium**	0.47 (as in Mecoprop)	N.D.- 0.0018	0	115
MCPA-Isopropylammonium and MCPA-Sodium**	0.05 (as in MCPA)	N.D.	0	46
(Plant growth regulator)				
Trinexapac-Ethyl	0.15	N.D.	0	55
Total		—	0	7,030

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”.