FY 2013 Survey Results of Water Pollution by Agricultural Chemicals Used at Golf Courses

September 25, 2014

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 2013.

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". 22,279 samples from 547 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).

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	50	(2)	86	(83)	563	(146)	254	(146)	0	(0)
Aomori	1	(1)	79	(79)	70	(70)	0	(0)	0	(0)
Iwate	1	(1)	79	(79)	70	(70)	70	(70)	0	(0)
Miyagi	3	(1)	91	(79)	182	(70)	0	(0)	0	(0)
Akita	2		6		6		0	(0)	0	
Yamagata	1	(1)	79	(79)	70	(70)	70	(70)	0	(0)
Fukushima	16		41		496		217		0	
Ibaraki	6	(1)	81	(79)	99	(70)	5	(0)	0	(0)
Tochigi	67		73		2,597		727		0	
Gunma	2	(2)	79	(79)	140	(140)	0	(0)	0	(0)
Saitama	25		74		1,305		1,056		0	
Chiba	14		84		578		256		0	
Tokyo	3	(1)	82	(79)	106	(70)	93	(70)	0	(0)
Kanagawa	13		39		180		160		0	
Yamanashi	1	(1)	79	(79)	70	(70)	0	(0)	0	(0)
Nagano	8		75		745		627		0	
Niigata	6		33		231		61		0	
Toyama	8		63		451		451		0	
Ishikawa	1	(1)	79	(79)	70	(70)	70	(70)	0	(0)
Fukui	5		24		34		6		0	
Gifu	3	(1)	79	(79)	81	(70)	0	(0)	0	(0)
Shizuoka	24		61		837		426		0	
Aichi	26		66		235		53		0	
Mie	6	(1)	80	(79)	101	(70)	0	(0)	0	(0)
Shiga	4	(2)	84	(79)	168	(140)	70	(70)	0	(0)
Kyoto	12		67		255		196		0	
Osaka	26		69		751		175		0	
Hyogo	86		108		5,557		325		0	
Nara	24		41		831		363		0	
Wakayama	5		42		380		0		0	
Tottori	2	(1)	100	(79)	201	(70)	0	(0)	0	(0)
Shimane	5		26		70		0		0	
Okayama	16		55		794		0		0	
Hiroshima	8		41		296		296		0	
Yamaguchi	2	(1)	79	(79)	74	(70)	70	(70)	0	(0)
Tokushima	1	(1)	80	(80)	71	(71)	0	(0)	0	(0)
Kagawa	12		44		480		480		0	
Ehime	1	(1)	79	(79)	70	(70)	0	(0)	0	(0)
Kochi	1	(1)	79	(79)	70	(70)	0	(0)	0	(0)
Fukuoka	16		75		1,120		477		0	
Saga	6		31		93		0	(0)	0	(0)
Nagasaki	5		58		540		0		0	
Kumamoto	9		33		527		186		0	
Oita	3	(1)	85	(81)	177	(72)	72	(72	0	(0)
Miyazaki	1	(1)	81	(81)	72	(72)	0	(0)	0	(0)
Kagoshima	9		54		295		39		0	
Okinawa	1	(1)	79	(79)	70	(70)	0	(0)	0	(0)
	547	(24)			22,279	(1,691)	7,351	(638)	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 *
EPN	0.037	N.D.	0	3
MCPA-Isopropyl and MCPA-Sodium **	0.051 (as in MCPA)	N.D.	0	53
Asulam	2	N.D.-0.039	0	172
Acetamiprid	1.8	N.D.	0	59
Acephate	0.063	N.D.	0	91
Azoxystrobin	4.7	N.D.-0.011	0	169
Amisulbrom	2	N.D.	0	13
Isoxathion	0.08	N.D.	0	118
Isoprothiolane	2.6	N.D.-0.003	0	135
Iprodione	3	N.D.-0.003	0	129
Imidacloprid	1.5	N.D.	0	83
Iminoctadine tris(Albesilate) and Iminoctadine-triacetate **	0.06 (as in Iminoctadine)	N.D.-0.052	0	122
Imibenconazole	0.26	N.D.	0	12
Indanofan	0.093	N.D.	0	10
Indoxacarb and IndoxacarbMP **	0.13 (as in Indoxacarb)	N.D.	0	11
Ethoxysulfuron	1	N.D.	0	59
Etofenprox	0.82	N.D.	0	90
Etridiazole	0.04	N.D.	0	76
Oxadiargyl	0.2	N.D.	0	40
Oxaziclomefone	0.24	N.D.	0	82
Oxine-Copper	0.4	N.D.	0	120
Cafenstrole	0.07	N.D.-0.006	0	96
Captan	3	N.D.	0	108
Cumyluron	0.2	N.D.	0	11
Kresoxim-Methyl	9.5	N.D.	0	6
Clothianidin	2.5	N.D.-0.01	0	140
Chlorantraniliprole	6.9	N.D.	0	28
Chlorimuron-Ethyl	2	N.D.	0	12
Chlorpyrifos	0.02	N.D.	0	90
Chlorothalonil	0.4	N.D.	0	138
Chloroneb	0.5	N.D.	0	92
Cyazofamid	4.5	N.D.	0	16

Dicamba (MDBA) Dicamba-Potassium (MDBA-Potassium) and Dicamba-Dimethylammonium (MDBA-Dimethylammonium) **	9.3 (as in MDBA)	N.D.	0	12
Cyclosulfamuron	0.8	N.D.	0	87
Dithiopyr	0.095	N.D.	0	133
Siduron	3	N.D.	0	108
Difenoconazole	0.25	N.D.	0	89
Cyproconazole	0.3	N.D.	0	91
Simazine	0.03	N.D.	0	110
Simeconazole	0.22	N.D.	0	79
Spinetoram	0.63	N.D.	0	10
Diazinon	0.05	N.D.	0	152
Daimuron	7.9	N.D.	0	1
Thiamethoxam	0.47	N.D.-0.002	0	103
Thiuram (Thiram)	0.2	N.D.	0	150
Thiodicarb	0.8	N.D.-0.002	0	123
Thiophanate-Methyl	3	N.D.	0	88
Thiobencarb	0.2	N.D.	0	8
Thifluzamide	0.37	N.D.-0.015	0	122
Tetraconazole	0.1	N.D.	0	94
Tebuconazole	0.77	N.D.-0.002	0	143
Tebufenozide	0.42	N.D.	0	71
Triaziflam	0.23	N.D.	0	13
Triclopyr	0.06	N.D.-0.002	0	135
Trichlorfon (DEP)	0.05	N.D.	0	65
Trinexapac-Ethyl	0.15	N.D.	0	54
Triflumizole	0.5	N.D.	0	64
Trifloxystrobin	1	N.D.	0	6
Tolclofos-Methyl	2	N.D.	0	156
Napropamide	0.3	N.D.	0	107
Validamycin	12	N.D.	0	48
Halosulfuron-Methyl	2.6	N.D.	0	129
Hydroxyisoxazole	1	N.D.	0	65
Pyraflufen-Ethyl	4.5	N.D.	0	10
Pyributicarb	0.23	N.D.	0	111
Pyribencarb	1	N.D.	0	2
Fenitrothion (MEP)	0.03	N.D.	0	134
Ferimzone	0.5	N.D.	0	10
Butamifos	0.2	N.D.	0	104
Flazasulfuron	0.3	N.D.	0	118

Furametpyr	0.1	N.D.	0	2
Fludioxonil	8.7	N.D.	0	14
Flucetosulfuron	1	N.D.	0	10
Flutolanil	2.3	N.D.-0.003	0	148
Flubendiamide	0.45	N.D.	0	20
Flupoxam	0.21	N.D.-0.002	0	21
Flurprimidol	0.39	N.D.	0	1
Prodiamine	1.7	N.D.	0	28
Propamocarb Hydrochloride	7.7	N.D.	0	16
Propiconazole	0.5	N.D.	0	149
Propyzamide	0.5	N.D.-0.018	0	143
Benomyl	0.2	N.D.-0.001	0	62
Permethrin	1	N.D.	0	90
Pencycuron	1.4	N.D.-0.002	0	167
Bensultap	0.9	N.D.	0	48
Penthiopyrad	2	N.D.	0	12
Pendimethalin	3.1	N.D.	0	129
Benfluralin	0.1	N.D.	0	97
Boscalid	1.1	N.D.	0	69
Phosethyl	23	N.D.	0	99
Foramsulfuron	13	N.D.	0	11
Polycarbamate	0.3	N.D.-0.01	0	72
Myclobutanil	0.63	N.D.	0	10
Mecoprop-Potassium, Mecoprop-Dimethylammonium, Mecoprop-P-Isopropylammonium, and Mecoprop-P-Potassium **	0.47 (as in Mecoprop)	N.D.-0.0012	0	122
Metamifop	0.11	N.D.	0	10
Metalaxyl and Metalaxyl-M **	0.58 (as in Metalaxyl)	N.D.-0.001	0	161
Methoxyfenozide	2.6	N.D.	0	11
Metconazole	1	N.D.	0	22
Mepronil	1	N.D.-0.0007	0	118
Total			0	7,351

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”.