FY 2016 Survey Results of Agricultural Chemicals in Drainage Waters of Golf Courses

September 12, 2017

The Ministry of the Environment has collected the results of monitoring surveys of agricultural chemicals in drainage waters of courses, conducted by local government in FY 2016.

The monitoring surveys were conducted in accordance with the “Guideline for the Prevention of Water Pollution, and Damage to Aquatic Animals and Plants by Agricultural Chemicals Used in Golf Courses”, hereinafter referred to as “the Guideline”. A total of 27,182 samples from 1,038 golf courses were measured in the surveys and six samples of the drains exceeded reference values of concentrations set in the Guideline (Table 1 and Table 2). The values are as of March 1, 2017.

Following the results in FY 2016, attention was called to the golf course representatives.

Table 1 Summary of survey results*

Prefectures	Number of golf courses surveyed	Number of agricultural chemicals surveyed	Total number of samples**	The number of samples surveyed from drains	Number of samples exceeding the reference value***	
					W.P	D.A
Hokkaido	58	50	455	123	0	0
Aomori	15	52	350	230	0	0
Iwate	25	75	212	24	0	0
Miyagi	16	49	427	24	0	0
Akita	16	37	103	14	0	0
Yamagata	0	0	0	0	—	—
Fukushima	18	53	598	286	0	0
Ibaraki	116	127	3,001	304	0	0
Tochigi	16	108	1,547	332	0	0
Gunma	62	105	1,228	165	0	0
Saitama	82	121	2,247	728	0	1
Chiba	5	44	168	0	—	—
Tokyo	18	82	526	325	0	1
Kanagawa	50	96	1,196	465	0	0
Yamanashi	0	0	0	0	—	—
Nagano	9	71	178	15	0	0
Niigata	6	35	185	59	0	0
Toyama	8	54	411	411	0	0
Ishikawa	24	63	262	0	—	—
Fukui	5	31	51	5	0	0
Gifu	42	98	776	96	0	2
Shizuoka	27	61	840	540	0	1
Aichi	25	75	215	35	0	0
Mie	3	7	10	0	—	—
Shiga	44	56	653	120	0	0
Kyoto	29	112	1,252	704	0	0
Osaka	38	109	875	106	0	0
Hyogo	80	126	3,927	383	0	0
Nara	24	39	779	363	0	0
Wakayama	3	39	350	0	—	—
Tottori	4	71	95	0	—	—
Shimane	3	11	22	0	—	—
Okayama	15	57	693	129	0	0
Hiroshima	8	55	408	408	0	1
Yamaguchi	1	11	11	0	—	—
Tokushima	14	24	119	33	0	0
Kagawa	8	45	312	0	—	—
Ehime	26	37	50	0	—	—
Kochi	7	27	116	0	—	—
Fukuoka	9	51	189	56	0	0
Saga	11	54	341	14	0	0
Nagasaki	19	86	713	42	0	0
Kumamoto	28	82	795	27	0	0
Oita	2	16	74	0	—	—
Miyazaki	0	0	0	0	—	—
Kagoshima	9	78	351	38	0	0
Okinawa	10	40	71	0	—	—
Total	1,038	168	27,182	6,604	0	6

Notes: * The total number of samples includes those surveyed by municipalities and golf courses reported to their prefectures.

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

Notes: *** " - " indicates no samples were collected from drains. W.P: Water Polluiton, D.A: Damage to Aquatic Animals and Plants.

Table 2　Summary of survey results of each chemical in golf course drains

Agricultural chemicals		Number of samples	Concentration range detected (μg/L)	Number of Detection	Reference Value (μg/L)*		Number of samples exceeding the reference value	
					W.P	D.A	W.P	D.A
1	EPN	7	N.D.	0	37	0.5	0	0
2	MCPA-Isopropylamine MCPA-Ethyl MCPA-Sodium	26	N.D.	0	51	81,000	0	0
3	Asulam-sodium or Asulam	408	N.D. ～ 35	37	10,000	90,000	0	0
5	Acetamiprid	45	N.D.	0	1,800	57	0	0
6	Acephate	53	N.D.	0	63	55,000	0	0
7	Azoxystrobin	283	N.D. ～ 230	23	4700	280	0	0
8	Atrazine	1	N.D.	0	U.D	1,500	0	0
9	Amisulbrom	24	N.D.	0	2,000	36	0	0
10	Ametocradin	7	N.D.	0	71,000	64	0	0
11	Alachlor	13	N.D.	0	200	47	0	0
12	Isoxathion	64	N.D.	0	80	U.D	0	0
13	Isoxaben	14	N.D. ～ 3	1	1,300	U.D	0	0
14	Isoprothiolane	74	N.D.	0	2,600	9,200	0	0
15	Iprodione	98	N.D.	0	3,000	1,800	0	0
16	Iprobenfos or IBP	4	N.D.	0	930	2,700	0	0
17	Imidacloprid	103	N.D. ～ 1	4	1,500	85,000	0	0
18	Iminoctadine tris(Albesilate) Iminoctadine-Triacetate	106	N.D. ～ 1	11	60	27	0	0
19	Indaziflam	17	N.D.	0	500	710	0	0
20	Ethoxysulfuron	41	N.D.	0	1,400	3,000	0	0
21	Etofenprox	33	N.D.	0	820	6.7	0	0
22	Etobenzanide	13	N.D.	0	1,100	780	0	0
23	Oxadiargyl	29	N.D. ～ 10	4	200	73	0	0
24	Oxaziclomefone	111	N.D. ～ 1	1	240	8,300	0	0
25	Oxytetracycline	5	N.D.	0	700	840	0	0
26	Oxine-Copper	87	N.D.	0	200	18	0	0
27	Cafenstrole	67	N.D. ～ 13	4	70	20	0	0
28	Carfentrazone-Ethyl	1	N.D.	0	700	130	0	0
29	Quinoclamine or ACN	16	N.D.	0	55	63	0	0
30	Captan	67	N.D.	0	3000	U.D	0	0
31	Cumyluron	4	N.D.	0	200	900	0	0

Agricultural chemicals		Number of samples	Concentration range detected (μg/L)	Number of Detection	Reference Value (μg/L)*		Number of samples exceeding the reference value	
					W.P	D.A	W.P	D.A
32	Glyphosate-Ammonium Glyphosate-Isopropylammonium Glyphosate-Potassium Gyphosate-Sodium	8	N.D.	0	U.D	62,000	0	0
33	Kresoxim-Methyl	16	N.D.	0	9,500	160	0	0
34	Clothianidin	268	N.D. ～ 8	23	2,500	28	0	0
35	Clomeprop	1	N.D.	0	160	360	0	0
36	Chlorantraniliprole	110	N.D.	0	6,900	29	0	0
37	Chlorimuron-Ethyl	30	N.D. ～ 1	5	2,000	37	0	0
38	Chlorpyrifos	44	N.D.	0	20	0.46	0	0
39	Chlorphthalim	1	N.D.	0	69	150	0	0
40	Chlorothalonil or TPN	133	N.D.	0	400	80	0	0
41	Cyazofamid	39	N.D. ～ 1	1	4,500	88	0	0
42	Cyanazine	11	N.D. ～ 6	8	U.D	290	0	0
43	Cyantraniliprole	3	N.D.	0	250	18	0	0
44	Dicamba (MDBA) Dicamba-Potassium or MDBA-Potassium Dicamba-Dimethylammonium or MDBA-Dimethylammonium	13	N.D.	0	9,300	88,000	0	0
45	Cyclosulfamuron	101	N.D. ～ 0.037	1	800	35	0	0
46	Diquat-Dibromide or Diquat	1	N.D	0	U.D	130	0	0
47	Dithianon	3	N.D.	0	200	59	0	0
48	Dithiopyr	110	N.D. ～ 1	2	95	560	0	0
49	Dinotefuran	4	N.D.	0	5,800	240,000	0	0
50	Cyhalothrin	1	N.D.	0	U.D	0.081	0	0
51	Difenoconazole	91	N.D.	0	250	750	0	0
52	Cyproconazole	86	N.D. ～ 20	3	300	U.D	0	0
53	Simazine or CAT	67	N.D.	0	30	1,700	0	0
54	Simeconazole	48	N.D. ～ 3	1	220	14,000	0	0
55	Silafluofen	2	N.D.	0	2,900	0.67	0	0
56	Ziram	31	N.D.	0	U.D	9.6	0	0
57	Streptomycin-Sulfate or Streptomycin	3	N.D.	0	U.D	4,100	0	0
58	Spinetoram	11	N.D.	0	630	3,100	0	0
59	Diazinon	153	N.D. ～ 3.6	2	50	0.77	0	2

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					W.P	D.A	W.P	D.A
60	Thiacloprid	18	N.D.	0	U.D	8,400	0	0
61	Thiamethoxam	68	N.D. ~ 0.8	2	470	35	0	0
62	Thiram or Thiuram	110	N.D.	0	200	100	0	0
63	Thiodicarb	116	N.D. ~ 1	1	800	27	0	0
64	Thiophanate-Methyl	92	N.D. ~ 6.2	6	3,000	1,000	0	0
65	Thiobencarb or Benthiocarb	9	N.D.	0	200	260	0	0
66	Thifluzamide	129	N.D. ~ 20	29	370	1,400	0	0
67	Tetraconazole	53	N.D.	0	100	2,800	0	0
67	Tebuconazole	150	N.D. ~ 6.1	7	770	2,600	0	0
68	Tebufenozide	42	N.D.	0	420	830	0	0
69	Triaziflam	26	N.D.	0	230	2,500	0	0
70	Triclopyr	85	N.D.	0	60	U.D	0	0
71	Trichlorfon or DEP	35	N.D.	0	50	1.1	0	0
72	Trinexapac-Ethyl	22	N.D.	0	150	U.D	0	0
73	Triflumizole	45	N.D.	0	390	860	0	0
74	Trifloxystrobin	30	N.D.	0	1,000	15	0	0
75	Trifloxysulfuron-Sodium	9	N.D.	0	U.D	280	0	0
76	Tolclofos-Methyl	94	N.D. ~ 10	1	2,000	U.D	0	0
77	Napropamide	45	N.D.	0	300	U.D	0	0
78	Paclobutrazol	11	N.D.	0	530	25,000	0	0
79	Validamycin A or Validamycin	11	N.D.	0	12,000	100,000	0	0
80	Halosulfuron-Methyl	79	N.D. ~ 2	2	2,600	50	0	0
81	Bifenthrin	12	N.D.	0	260	0.058	0	0
82	Hymexazol or Hydroxyisoxazole	37	N.D. ~ 3	1	1,000	28,000	0	0
83	Pyrazosulfuron-Ethyl	4	N.D.	0	200	8.7	0	0
84	Pyraflufen-Ethyl	1	N.D.	0	4,500	8.2	0	0
85	Pyributicarb	58	N.D.	0	230	100	0	0
86	Pyribencarb	15	N.D.	0	1,000	600	0	0
87	Pyroxasulfone	28	N.D. ~ 50	5	500	7.4	0	3
88	Fenitrothion or MEP	116	N.D. ~ 2.9	2	30	U.D	0	0
89	Fenoxasulfone	6	N.D.	0	4,500	9.3	0	0

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					W.P	D.A	W.P	D.A
90	Fenobucarb or BPMC	13	N.D.	0	U.D	19	0	0
91	Ferimzone	4	N.D. ～ 1	1	500	6,200	0	0
92	Butamifos	57	N.D.	0	200	620	0	0
93	Flazasulfuron	58	N.D.	0	300	170	0	0
94	Furametpyr	13	N.D. ～ 1	1	100	1,400	0	0
95	Fluxapyroxad	50	N.D. ～ 9	7	550	290	0	0
96	Fludioxonil	31	N.D.	0	8,700	770	0	0
97	Flucetosulfuron	5	N.D.	0	1,000	79,000	0	0
98	Flutolanil	77	N.D.	0	2,300	3,100	0	0
99	Flubendiamide	49	N.D.	0	450	58	0	0
100	Flupoxam	67	N.D. ～ 3	19	210	2,300	0	0
101	Prodiamine	46	N.D. ～ 1	1	1700	4.6	0	0
102	Procymidone	2	N.D.	0	U.D	4,200	0	0
103	Propamocarb Hydrochloride	20	N.D.	0	7,700	100,000	0	0
104	Propiconazole	111	N.D. ～ 1	1	500	5,600	0	0
105	Propyzamide	133	N.D. ～ 41	17	500	U.D	0	0
106	Propineb	32	N.D.	0	U.D	210	0	0
107	Hexaconazole	17	N.D.	0	U.D	2,900	0	0
108	Benomyl	8	N.D.	0	200	U.D	0	0
109	Permethrin	55	N.D. ～ 10	1	1,000	1.7	0	1
110	Pencycuron	194	N.D. ～ 25	9	1,400	1,000	0	0
111	Benzyladenine or Benzylaminopurine	2	N.D.	0	1,600	19,000	0	0
112	Bensultap	7	N.D.	0	900	U.D	0	0
113	Benzobisikuron	1	N.D.	0	900	340	0	0
114	Penthiopyrad	30	N.D.	0	2,000	560	0	0
115	Pendimethalin	123	N.D. ～ 8	2	3,100	140	0	0
116	Penflufen	46	N.D. ～ 12	9	530	100	0	0
117	Benfluralin or Bethrodine	46	N.D.	0	100	29	0	0
118	Boscalid	52	N.D.	0	1,100	5,000	0	0
119	Phosethyl	62	N.D.	0	23,000	U.D	0	0
120	Foramsulfuron	52	N.D. ～ 3	2	13,000	97,000	0	0
121	Myclobutanil	1	N.D. ～ 1	1	630	9,700	0	0

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					W.P	D.A	W.P	D.A
122	Mecoprop-Potassium Mecoprop-Dimethylammonium Mecoprop-P-Isopropylammonium Mecoprop-P-Potassium"	95	N.D. ～ 16	1	470	81,000	0	0
123	Mesotrione	1	N.D.	0	70	43,000	0	0
124	Methomyl	1	N.D.	0	U.D	15	0	0
125	Metamifop	9	N.D.	0	110	280	0	0
126	Metalaxyl Metalaxyl-M	130	N.D. ～ 0.5	2	580	95,000	0	0
127	Methoxyfenozide	2	N.D.	0	2,600	3,700	0	0
128	Metconazole	31	N.D. ～ 2	1	500	2,100	0	0
129	Metolachlor S-Metolachlor	14	N.D. ～ 12	5	2,500	230	0	0
130	Mepronil	76	N.D.	0	1,000	4,200	0	0
131	Iodosulfuron-Methyl-Sodium	7	N.D.	0	U.D	610	0	0
132	Rimsulfuron	7	N.D.	0	U.D	9,800	0	0
133	Lenacil	1	N.D. ～ 1	1	U.D	150	0	0
Total		6,604	-	268	-		0	6

Notes: * The code “U.D” means the reference value is not determined yet.