

The Ministry of the Environment has collected the results of monitoring surveys of agricultural chemicals in drainage waters of golf courses, conducted by local government in FY 2017.

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 38,927 samples from 1,435 golf courses were measured in the surveys, and three samples of the drains exceeded reference values of concentrations set in the Guideline (Table 1 and Table 2). The values are as of March 22, 2018.

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	O.R
Hokkaido	85	64	918	281	0	0	38
Aomori	15	60	365	194	0	0	
Iwate	24	73	207	40	0	0	
Miyagi	22	38	325	23	0	0	
Akita	17	38	108	13	0	0	
Yamagata	1	5	10	0	—	—	
Fukushima	17	59	633	286	0	0	
Ibaraki	110	129	2,387	1,066	0	0	23
Tochigi	109	132	2,992	1,053	0	0	4
Gunma	64	102	1,139	139	0	0	12
Saitama	82	121	2,276	849	0	0	88
Chiba	7	44	150	62	0	0	
Tokyo	19	88	505	337	0	0	3
Kanagawa	63	101	1,227	403	0	0	2
Yamanashi	0	0	0	0	—	—	
Nagano	66	128	3,096	183	0	0	141
Niigata	46	79	1,406	484	0	0	26
Toyama	15	71	662	662	0	1	41
Ishikawa	24	68	245	45	0	0	
Fukui	2	21	50	5	0	0	
Gifu	43	65	503	56	0	0	5
Shizuoka	15	89	450	342	0	0	
Aichi	26	111	338	77	0	0	
Mie	3	6	16	0	—	—	
Shiga	44	68	782	131	0	0	
Kyoto	29	135	1,273	834	0	0	24
Osaka	38	107	1,603	246	0	0	5
Hyogo	142	150	7,948	535	0	0	
Nara	24	39	779	363	0	0	61
Wakayama	3	40	360	0	—	—	
Tottori	3	29	34	0	—	—	
Shimane	7	34	197	3	0	0	
Okayama	35	94	1,313	177	0	0	8
Hiroshima	8	53	392	392	0	1	
Yamaguchi	1	11	11	0	—	—	
Tokushima	14	21	122	39	0	0	
Kagawa	19	34	260	16	0	0	2
Ehime	26	32	55	0	—	—	
Kochi	11	27	125	3	0	0	
Fukuoka	8	67	163	29	0	0	
Saga	12	78	543	12	0	0	
Nagasaki	21	83	717	33	0	1	
Kumamoto	28	91	891	94	0	0	2
Oita	25	69	388	0	—	—	
Miyazaki	27	51	243	21	0	0	
Kagoshima	27	96	612	211	0	0	
Okinawa	8	37	108	0	—	—	
Total	1,435	174	38,927	9,739	0	3	485

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, and O.R indicates number of samples the detection limit exceeded the reference value. W.P: Water Pollution, 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 ($\mu\text{g/L}$)	Number of Detection	Reference Value ($\mu\text{g/L}$)*		Number of samples exceeding the reference value**		
					W.P	D.A	W.P	D.A	O.R
1	EPN	7	N.D.	0	37	0.50	0	0	
2	MCPA-Isopropylamine MCPA-Ethyl MCPA-Sodium	35	N.D.~12	2	51	81,000	0	0	
3	Asulam-sodium or Asulam	608	N.D.~26	55	10,000	90,000	0	0	
4	Acequinocyl	5	N.D.~ 0.07	2	580	3.9	0	0	
5	Acetamiprid	51	N.D.~ 1	1	1,800	57	0	0	3
6	Acephate	77	N.D.	0	63	55,000	0	0	
7	Azoxystrobin	494	N.D.~12	20	4,700	280	0	0	45
8	Atrazine	20	N.D.~ 3	5	U.D.	1,500	0	0	
9	Amisulbrom	24	N.D.	0	2,000	36	0	0	
10	Ametocradin	4	N.D.	0	71,000	64	0	0	
11	Alachlor	13	N.D.~ 1	1	200	47	0	0	
12	Alanycarb	4	N.D.	0	U.D.	18	0	0	
13	Isoxathion	78	N.D.	0	50	U.D.	0	0	
14	Isoxaben	39	N.D.~ 1	1	1,300	1,300	0	0	
15	Isoprothiolane	83	N.D.~ 2	1	2,600	9,200	0	0	
16	Ipfencarbazone	4	N.D.	0	26	210	0	0	
17	Iprodione	149	N.D.	0	3,000	1,800	0	0	
18	Iprobenfos or IBP	7	N.D.	0	930	2,700	0	0	
19	Imazosulfuron	12	N.D.~ 0.0099	4	U.D.	6,900	0	0	
20	Imidacloprid	107	N.D.~ 5	4	1,500	19	0	0	22
21	Iminoctadine tris(Albesilate) Iminoctadine-Triacetate"	129	N.D.~ 0.021	3	60	27	0	0	
22	Imibenconazole	5	N.D.	0	260	180	0	0	
23	Indaziflam	41	N.D.	0	500	710	0	0	
24	Ethephon	2	N.D.	0	U.D.	71,000	0	0	
25	Ethoxysulfuron	46	N.D.~ 2	2	1,400	3,000	0	0	
26	Etofenprox	47	N.D.	0	820	6.7	0	0	8
27	Ethofumesate	4	N.D.	0	7,900	27,000	0	0	
28	Etobenzanide	21	N.D.	1	1,100	780	0	0	
29	Enamectin benzoate	4	N.D.	0	U.D.	0.96	0	0	
30	Oxadiargyl	55	N.D.	0	200	73	0	0	
31	Oxaziclomefone	154	N.D.~ 1	1	240	8,300	0	0	
32	Oxathiapiprolin	4	N.D.	0	90,000	650	0	0	
33	Oxamyl	2	N.D.	0	U.D.	320	0	0	
34	Oxytetracycline	4	N.D.	0	700	840	0	0	
35	Oxine-Copper	103	N.D.	0	200	18	0	0	13

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	O.R
36	Cafenstrole	72	N.D.~ 6	8	70	20	0	0	
37	Carbaryl or NAC	4	N.D.	0	U.D.	16	0	0	
38	Quinoclamine or ACN	24	N.D.	0	55	63	0	0	2
39	Captan	85	N.D.	0	3,000	U.D.	0	0	
40	Cumyluron	14	N.D.	0	200	900	0	0	
41	Glyphosate-Ammonium Glyphosate-Isopropylammonium Glyphosate-Potassium Gyphosate-Sodium	25	N.D.~ 6	1	26,600	62,000	0	0	
42	Kresoxim-Methyl	16	N.D.	0	9,500	160	0	0	
43	Clothianidin	477	N.D.~19	46	2,500	28	0	0	55
44	Chlorantraniliprole	197	N.D.	2	6,900	29	0	0	27
45	Chlorimuron-Ethyl	42	N.D.	3	2,000	37	0	0	1
46	Chlorpyrifos	55	N.D.~ 0.001	0	20	0.46	0	0	43
47	Chlorfluazuron	25	N.D.~ 2	0	U.D.	0.29	0	0	24
48	Chlorothalonil or TPN	185	N.D.~ 8	1	400	80	0	0	
49	Cyazofamid	61	N.D.	0	4,500	88	0	0	7
50	Cyanazine	19	N.D.~ 8	1	14	290	0	0	
51	Cyantraniliprole	7	N.D.~ 1	1	250	18	0	0	
52	Dicamba (MDBA) Dicamba-Potassium or MDBA-Potassium Dicamba-Dimethylammonium or MDBA-Dimethylammonium	24	N.D.	0	9,300	88,000	0	0	
53	Cyclosulfamuron	160	N.D.~ 1	2	800	35	0	0	14
54	Dichlobenil or DBN	1	N.D.	0	200	1,500	0	0	
55	Dithiopyr	113	N.D.~ 1.6	2	95	560	0	0	
56	Dinotefuran	7	N.D.~ 0.035	1	5,800	120	0	0	
57	Cyhalothrin	8	N.D.	0	U.D.	0.081	0	0	3
58	Difenoconazole	110	N.D.~ 4	1	250	750	0	0	
59	Cyproconazole	130	N.D.~ 2	5	300	U.D.	0	0	
60	Simazine or CAT	71	N.D.	0	30	1,700	0	0	
61	Simeconazole	60	N.D.~ 3	1	220	14,000	0	0	
62	Silafluofen	10	N.D.	0	2,900	0.67	0	0	
63	Ziram	48	N.D.	0	U.D.	9.6	0	0	
64	Streptomycin Sulfate or Streptomycin	4	N.D.	0	U.D.	4,100	0	0	
65	Spinetoram	23	N.D.	0	630	3,100	0	1	
66	Diazinon	145	N.D.~ 7.5	2	50	0.77	0	0	72
67	Daimuron	2	N.D.	0	7,900	420	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	O.R
68	Thiacloprid	21	N.D.~ 1	2	U.D.	36	0	0	
69	Thiamethoxam	132	N.D.~ 3	19	470	35	0	0	23
70	Thiuram or Thiram	155	N.D.~ 2.4	2	200	100	0	0	
71	Thiodicarb	146	N.D.	0	800	27	0	0	19
72	Thiophanate-Methyl	106	N.D.~ 1	2	3,000	1,000	0	0	
73	Thiobencarb or Benthocarb	13	N.D.	0	200	260	0	0	
74	Thifluzamide	177	N.D.~12	35	370	1,400	0	0	
75	Tetraconazole	82	N.D.~ 0.036	1	100	2,800	0	0	
76	Tebuconazole	237	N.D.~ 1.4	8	770	2,600	0	0	
77	Tebufenozide	55	N.D.	0	420	830	0	0	
78	Triaziflam	52	N.D.~ 1	1	230	2,500	0	0	
79	Triclopyr	109	N.D.	0	60	U.D.	0	0	
80	Trichlorfon or DEP	36	N.D.	0	50	1.1	0	0	14
81	Trinexapac-Ethyl	42	N.D.	0	150	57,000	0	0	
82	Triflumizole	46	N.D.	0	390	860	0	0	
83	Trifloxystrobin	37	N.D.	0	1,000	15	0	0	1
84	Trifloxysulfuron-Sodium	11	N.D.	0	U.D.	280	0	0	
85	Triforine	1	N.D.	0	610	9,100	0	0	
86	Tolclofos-Methyl	148	N.D.~20	1	2,000	U.D.	0	0	
87	Napropamide	61	N.D.~ 2	2	300	U.D.	0	0	
88	Nicosulfuron	1	N.D.	0	U.D.	98,000	0	0	
89	Paclbutrazol	6	N.D.	0	530	25,000	0	0	
90	Validamycin A or Validamycin	20	N.D.	0	12,000	100,000	0	0	
91	Halosulfuron-Methyl	91	N.D.~14	3	2,600	50	0	0	
92	Picoxystrobin	1	N.D.	0	1,200	22	0	0	1
93	Bispyribac-Sodium	7	N.D.	0	U.D.	12,000	0	0	
94	Bifenthrin	37	N.D.	0	260	0.058	0	0	16
95	Hymexazol or Hydroxyisoxazole	57	N.D.	0	1,000	28,000	0	0	
96	Pyrazosulfuron-Ethyl	21	N.D.	0	200	8.7	0	0	
97	Pyraflufen-Ethyl	6	N.D.	0	4,500	8.2	0	0	5
98	Pyributicarb	62	N.D.	0	230	100	0	0	
99	Pyribencarb	25	N.D.	0	1,000	600	0	0	
100	Pirimiphos-Methyl	3	N.D.	0	U.D.	0.31	0	0	1
101	Pyroxasulfone	81	N.D.~21	23	500	7.4	0	2	4
102	Fenarimol	8	N.D.	0	U.D.	6,000	0	0	
103	Fenitrothion or MEP	135	N.D.~21	11	30	U.D.	0	0	
104	Fenoxasulfone	40	N.D.~ 2	6	4,500	9.3	0	0	
105	Fenoxanil	2	N.D.	0	180	6,000	0	0	

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					W.P	D.A	W.P	D.A	O.R
106	Fenobucarb or BPMC	20	N.D.	0	340	19	0	0	2
107	Ferimzone	6	N.D.	0	500	6,200	0	0	
108	Butamifos	61	N.D.	0	200	620	0	0	
109	Flazasulfuron	71	N.D.	0	300	170	0	0	
110	Furametpyr	31	N.D.~ 9	6	100	1,400	0	0	
111	Fluoxastrobin	6	N.D.	0	390	470	0	0	
112	Fluxapyroxad	64	N.D.~ 5	11	550	290	0	0	
113	Flu.D.ioxonil	27	N.D.	0	8,700	770	0	0	
114	Flucetosulfuron	10	N.D.	0	1,000	79,000	0	0	
115	Flutolanil	99	N.D.~ 4	4	2,300	3,100	0	0	
116	Flubendiamide	71	N.D.~ 2.8	3	450	58	0	0	
117	Flupoxam	108	N.D.~ 2.3	10	210	2,300	0	0	
118	Flurprimidol	2	N.D.	0	390	11,000	0	0	
119	Prodiamine	80	N.D.	0	1,700	4.6	0	0	17
120	Procymidone	16	N.D.	0	U.D.	4,200	0	0	
121	Propamocarb Hydrochloride	47	N.D.	0	7,700	100,000	0	0	
122	Propiconazole	145	N.D.	0	500	5,600	0	0	
123	Propyzamide	157	N.D.~21	15	500	U.D.	0	0	
124	Propineb	69	N.D.	0	U.D.	210	0	0	
125	Prohexadione-Calcium	3	N.D.	0	5,300	93,000	0	0	
126	Prometryn	2	N.D.	0	700	350	0	0	
127	Bromobutide	2	N.D.	0	1,000	4,800	0	0	
128	Hexaconazole	79	N.D.~ 1	2	120	2,900	0	0	
129	Benomyl	16	N.D.	0	200	U.D.	0	0	
130	Permethrin	92	N.D.	0	1,000	1.7	0	0	33
131	Pencycuron	356	N.D.~ 4.3	26	1,400	1,000	0	0	
132	Benzyladenine or Benzylaminopurine	2	N.D.	0	1,600	19,000	0	0	
133	Bensultap	11	N.D.	0	900	U.D.	0	0	
134	Bentazon-Sodium or Bentazon	5	N.D.	0	U.D.	88,000	0	0	
135	Penthiopyrad	34	N.D.	0	2,000	560	0	0	
136	Pendimethalin	180	N.D.	0	3,100	140	0	0	10
137	Benfuracarb	1	N.D.	0	U.D.	9.9	0	0	
138	Penflufen	72	N.D.~13	7	530	100	0	0	
139	Benfluralin or Bethrodine	50	N.D.	0	100	29	0	0	
140	Boscalid	86	N.D.~ 0.071	3	1,100	5,000	0	0	
141	Phosethyl-Aluminium or Phosethyl	77	N.D.~ 1	1	23,000	28,000	0	0	

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					W.P	D.A	W.P	D.A	O.R
142	Foramsulfuron	53	N.D.	0	13,000	97,000	0	0	
143	Manzeb	18	N.D.	0	U.D.	120	0	0	
144	Mandestrobin	5	N.D.	0	5,000	1,200	0	0	
145	Myclobutanil	11	N.D.~ 1	1	630	9,700	0	0	
146	Mecoprop-Potassium Mecoprop-Dimethylammonium Mecoprop-P-Isopropylammonium Mecoprop-P-Potassium	158	N.D.~24	8	470	81,000	0	0	
147	Mesotrione	5	N.D.	0	70	43,000	0	0	
148	Metamifop	7	N.D.	0	110	280	0	0	
149	Metalaxyl Metalaxyl-M	175	N.D.~ 0.15	1	580	95,000	0	0	
150	Methoxyfenozide	3	N.D.	0	2,600	3,700	0	0	
151	Metconazole	59	N.D.	0	500	2,100	0	0	
152	Metolachlor S-Metolachlor	24	N.D.~ 4	3	2,500	230	0	0	
153	Mepronil	89	N.D.~ 7	2	1,000	4,200	0	0	
154	Iodosulfuron-Methyl-Sodium	14	N.D.	0	U.D.	610	0	0	
155	Rimsulfuron	15	N.D.	0	U.D.	9,800	0	0	
156	Lenacil	4	N.D.~ 8	2	U.D.	150	0	0	
157	Dicopper chloride trihydroxide Copper (II) hydroxide sulfate Copper (II) hydroxide Copper (II) sulfate Copper (II) sulfate pentahydrate	5	N.D.~ 2	5	U.D.	3.8	0	0	
Total		9,739	-	406	-	-	0	3	485

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

Notes:** O.R indicates number of samples the detection limit exceeded the reference value.