

FY 2023 Survey Results of Agricultural Chemicals in Drainage Waters of Golf Courses

September 24, 2024

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 2023.

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”. A total of 36,244 samples from 1,730 golf courses were measured in the surveys, and 7 samples of the drains exceeded reference values of concentrations set in the Guideline (Table 1 and Table 2). The reference values are as of February 2, 2024.

Table 1 Summary of survey results*

	Prefecture	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***		Number of samples the lower limit of quantification exceeded the reference value****	
						Water Pollution	Aquatic Animals and Plants	Water Pollution	Aquatic Animals and Plants
1	Hokkaido	121	61	992	304	0	0	0	0
2	Aomori	15	57	46	23	0	0	0	0
3	Iwate	22	62	179	35	0	0	0	0
4	Miyagi	31	94	357	173	0	0	0	1
5	Akita	16	27	108	20	0	0	0	0
6	Yamagata	5	36	90	25	0	1	0	0
7	Fukushima	24	98	865	342	0	0	5	5
8	Ibaraki	113	121	3,007	1,264	0	1	0	2
9	Tochigi	104	87	1,314	310	0	0	0	0
10	Gunma	59	91	947	36	0	0	0	1
11	Saitama	80	114	2,199	603	0	0	0	0
12	Chiba	54	126	731	446	0	0	0	0
13	Tokyo	21	77	484	328	0	0	0	0
14	Kanagawa	51	76	1,079	370	0	0	0	6
15	Yamanashi	38	86	471	111	0	0	0	0
16	Nagano	61	131	2,387	253	0	0	0	0
17	Niigata	31	55	743	266	0	0	0	2
18	Toyama	14	56	329	329	0	1	0	0
19	Ishikawa	44	54	239	104	0	0	0	0
20	Fukui	29	49	124	34	0	0	0	0
21	Gifu	40	101	458	80	0	0	0	0
22	Shizuoka	8	77	99	89	0	0	0	0
23	Aichi	18	75	144	45	0	0	0	0
24	Mie	56	73	535	115	0	0	0	0
25	Shiga	88	40	529	103	0	0	0	0
26	Kyoto	30	107	961	573	0	1	0	0
27	Osaka	36	100	776	299	0	0	0	0
28	Hyogo	128	173	6,550	716	0	0	0	0
29	Nara	33	84	1,217	19	0	1	0	0
30	Wakayama	3	35	175	0	-	-	-	-
31	Tottori	3	9	14	0	-	-	-	-
32	Shimane	7	27	176	0	-	-	-	-
33	Okayama	34	81	1,325	226	0	0	0	0
34	Hiroshima	8	117	898	820	0	0	0	0
35	Yamaguchi	15	31	81	64	0	0	0	0
36	Tokushima	13	20	118	34	0	0	0	0
37	Kagawa	18	42	243	9	0	1	0	0
38	Ehime	25	31	53	2	0	1	0	0
39	Kochi	9	25	118	0	-	-	-	-
40	Fukuoka	57	185	1,941	595	0	0	0	17
41	Saga	15	74	596	254	0	0	0	0
42	Nagasaki	29	70	263	13	0	0	0	0
43	Kumamoto	40	93	1,165	64	0	0	0	0
44	Oita	24	61	396	24	0	0	0	0
45	Miyazaki	26	63	317	28	0	0	0	0
46	Kagoshima	26	78	311	192	0	0	0	9
47	Okinawa	8	30	94	0	-	-	-	-
total		1,730		36,244	9,740	0	7	5	43

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*** "-" means no sample in drainage.

Notes**** The number of samples whether to exceed the reference values remains uncertain because the lower limit of quantification exceeded the values.

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

Agricultural chemicals	Number of courses surveyed	Total number of samples*	The number of samples surveyed from drains	Concentration range detected (µg/L)**	detection limits (µg/L)	Number of Detection	Reference Values (µg/L)		Number of samples exceeding the reference value		Number of samples the lower limit of quantification exceeded the reference value***			
							Water Pollution	Aquatic Animals and Plants	Water Pollution	Aquatic Animals and Plants	Water Pollution	Aquatic Animals and Plants		
A ****	1	Asulam-sodium or Asulam	766	2,102	640	N.D. ~ 1,000	0.001 ~ 1,000	249	10,000	90,000	0	0	0	0
	2	Chlorothalonil or TPN	394	905	231	N.D. ~ 5	0.04 ~ 50	12	470	80	0	0	0	0
	3	Cyclosulfamuron	222	480	143	N.D. ~ 2	0.2 ~ 80	8	800	35	0	0	0	2
	4	Pencycuron	569	1,305	373	N.D. ~ 100	0.001 ~ 1,000	78	1,400	1,000	0	0	0	0
	5	Diazinon	183	351	71	N.D. ~ 0.8	0.005 ~ 50	3	20	0.77	0	1	5	16
	6	Pyroxasulfone	275	556	151	N.D. ~ 14	0.05 ~ 50	78	500	7.4	0	4	0	13
Others *****		Cafenstrole	-	-	-	28	0.5	-	70	20	0	1	0	0
		Ziram	-	-	-	26	0.96	-	not determined yet	9.6	-	1	-	0

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

Notes** "N.D." means non-detection.

Notes*** The number of samples whether to exceed the reference values remains uncertain because the lower limit of quantification exceeded the values.

Notes**** These agricultural chemicals require attentional control considering their large amount of usage in golf courses or their relatively large number of samples exceeded the reference values in the past.

Notes***** Other than "A"-group agricultural chemicals exceeded the reference value in the survey (only exceeded samples, not all the results).