

FY 2022 Survey Results of Agricultural Chemicals in Drainage Waters of Golf Courses

October 20, 2023

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 2022.

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 34,999 samples from 1,904 golf courses were measured in the surveys, and 8 samples of the drains exceeded reference values of concentrations set in the Guideline (Table 1 and Table 2). The reference values are as of March 9, 2023.

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	114	60	1,039	358	0	0	0	0
2	Aomori	15	51	67	27	0	0	0	0
3	Iwate	22	109	186	51	0	0	0	0
4	Miyagi	33	105	381	197	0	0	0	0
5	Akita	16	39	107	24	0	0	0	0
6	Yamagata	5	28	68	3	0	0	0	0
7	Fukushima	24	98	790	223	0	0	0	1
8	Ibaraki	107	118	2,862	903	0	2	0	0
9	Tochigi	103	81	829	285	0	2	0	0
10	Gunma	55	84	974	54	0	0	0	0
11	Saitama	80	118	2,284	522	0	0	0	0
12	Chiba	57	118	754	280	0	0	0	8
13	Tokyo	38	75	462	310	0	1	0	0
14	Kanagawa	51	81	1,076	377	0	0	0	5
15	Yamanashi	40	89	490	113	0	0	0	0
16	Nagano	61	131	2,409	269	0	0	3	0
17	Niigata	38	62	844	362	0	0	0	11
18	Toyama	15	63	346	346	0	0	0	0
19	Ishikawa	46	54	240	92	0	0	0	0
20	Fukui	27	39	105	33	0	0	0	0
21	Gifu	38	114	447	76	0	0	0	0
22	Shizuoka	6	77	158	103	0	0	0	0
23	Aichi	19	110	279	85	0	0	0	0
24	Mie	32	55	379	140	0	0	0	0
25	Shiga	95	46	541	102	0	3	0	0
26	Kyoto	31	106	972	559	0	0	0	0
27	Osaka	40	98	915	351	0	0	0	0
28	Hyogo	319	165	7,032	1,004	0	0	0	0
29	Nara	26	91	1,304	33	0	0	0	0
30	Wakayama	3	35	175	0	-	-	-	-
31	Tottori	3	8	17	0	-	-	-	-
32	Shimane	5	20	55	0	-	-	-	-
33	Okayama	34	81	1,327	226	0	0	0	0
34	Hiroshima	8	116	874	804	0	0	0	0
35	Yamaguchi	18	66	159	125	0	0	0	0
36	Tokushima	12	18	106	29	0	0	0	0
37	Kagawa	18	40	224	6	0	0	0	0
38	Ehime	24	32	52	0	-	-	-	-
39	Kochi	9	26	146	0	-	-	-	-
40	Fukuoka	59	104	469	123	0	0	0	0
41	Saga	15	73	526	189	0	0	0	5
42	Nagasaki	25	62	267	9	0	0	0	0
43	Kumamoto	36	93	1,165	53	0	0	0	2
44	Oita	25	59	408	17	0	0	0	0
45	Miyazaki	26	64	341	37	0	0	0	0
46	Kagoshima	26	71	261	183	0	0	0	9
47	Okinawa	5	29	87	0	-	-	-	-
total		1,904		34,999	9,083	0	8	3	41

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		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	768	2,150	636	N.D. - 1,000	0.001 - 10,000	172	10,000	90,000				
	2	Chlorothalonil or TPN	370	868	208	N.D. - 47	0.001 - 40	3	470	80				
	3	Cyclosulfamuron	238	477	141	N.D. - 5	0.001 - 80	11	800	35				1
	4	Pencyuron	552	1,348	342	N.D. - 11	0.001 - 500	63	1,400	1,000				
	5	Diazinon	198	393	73	N.D. - 0.77	0.001 - 5	6	20	0.77				23
	6	Pyroxasulfone	275	584	153	N.D. - 42	0.0005 - 5	89	500	7.4		6		
Other *****		Bifenthrin	-	-	-	1.3, 1.6	0.0025	-	260	0.058		2		

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 chemical exceeded the reference value in the survey (only exceeded samples, not all the results)