NIRS-RSD-31

RADIOACTIVITY SURVEY DATA in Japan

NUMBER 31
MAY. 1971

National Institute of Radiological Sciences
Chiba, Japan

Radioactivity Survey Data in Japan

Number 31

May 1971

Contents

National Institute of Radiological Sciences, Chiba, Japan
Science and Technology Agency, Japan

Meteorological Data

Monthly and Cumulative Deposits of Strontium-90 and Cesium-137

(Meteorological Research Institute, Tokyo)

Since 1954, rain and fallout dust have been collected monthly, in a receiver (collected area $1m^2$) at the Meteorological Research Institute, Tokyo, to determine the content of Strontium-90 and Cesium-137. Other samples collected monthly (receiver collection area, $0.5m^2$) at 6 stations located throughout Japan, have also been analyzed.

Locations of the stations are shown in Figure 1.

The results of observation during the period from January to December 1970 are shown in Table 1 and 2.

Total cumulative deposits of Strontium-90 and Cesium-137 in Tokyo reserched the levels of 73.3 and 193.4 mCi/km^2 respectively, at the end of Dec., 1970.

Table 1: Monthly Deposits of ^{90}Sr and ^{137}Cs–Jan. to Dec. 1970–
by Y. Miyake, K. Saruhashi, Y. Katsuragi and T. Kanazawa
(Meteorological Research Institute, Tokyo)

(Continued from Table 8, Issue No. 28, of this Publication)

	Sapporo		Akita		Sendai	
	^{90}Sr (mCi/km^2)	Precipitation (mm)	^{90}Sr (mCi/km^2)	Precipitation (mm)	^{90}Sr (mCi/km^2)	Precipitation (mm)
Jan. 1970	0.04	74.2	0.11	142.8	0.03	47.6
Feb.	0.08	122.2	0.26	144.5	0.04	38.5
Mar.	0.09	150.9	0.27	93.5	0.03	44.0
Apr.	0.05	82.8	0.10	107.0	0.06	44.5
May	0.14	40.1	0.19	49.5	0.22	148.0
June	0.22	97.2	0.17	53.0	0.12	62.5
July	0.08	74.2	0.12	58.0	0.11	70.5
Aug.	0.05	102.6	0.08	91.0	0.06	83.0
Sept.	0.08	205.7	0.13	185.0	0.06	97.0
Oct.	0.08	80.3	0.20	164.0	0.05	79.5
Nov.	0.10	81.0	0.10	96.5	0.02	125.5
Dec.	0.06	72.0	0.16	143.0	0.02	6.5
Sum	1.062	1153.2	1.88	1327.8	0.81	852.1

* Sapporo (Sapporo District Central Meteorological Observatory)
Location : 43°03'N, 141°20'E (16.9m)

** Akita (Akita District Meteorological Observatory)
Location : 39°03'N, 140°06'E (9.1m)

*** Sendai (Sendai District Central Meteorological Observatory)
Location : 38°16'N, 140°54'E (38.4m)

	Tokyo		Osaka		Fukuoka	
	^{90}Sr (mCi/km^2)	Precipitation (mm)	^{90}Sr (mCi/km^2)	Precipitation (mm)	^{90}Sr (mCi/km^2)	Precipitation (mm)
Jan. 1970	0.02	58.0	0.02	44.8	0.03	36.9
Feb.	0.05	30.5	0.05	58.4	0.05	56.6
Mar.	0.04	50.0	0.05	50.5	—	25.0
Apr.	0.13	94.0	0.10	221.5	0.18	162.3
May	0.21	161.5	0.14	98.6	0.15	192.9
June	0.39	218.0	0.25	322.9	0.21	314.6
July	0.16	118.0	0.05	135.4	0.15	139.9
Aug.	0.03	20.0	0.03	52.3	0.03	137.3
Sept.	0.06	86.0	0.04	205.9	0.06	184.1
Oct.	0.09	98.5	0.05	94.5	0.09	154.3
Nov.	0.05	144.5	0.02	107.0	0.04	60.2
Dec.	0.03	30.5	0.02	45.0	0.08	19.6
Sum	1.23	1109.5	0.81	1436.8	(1.07)	1483.7

* Tokyo (Tokyo District Central Meteorological Observatory)
Location : 35°41'N, 139°46'E (4.1m)

** Osaka (Osaka District Central Meteorological Observatory)
Location : 34°39'N, 135°32'E (6.7m)

*** Fukuoka (Fukuoka District Central Meteorological Observatory)
Location : 33°35'N, 130°23'E (2.1m)

Table 2: Monthly Deposit of ^{90}Sr and ^{137}Cs in Meteorological Research Institue, Tokyo
– Jan. to Dec. 1970 –

by Y. Miyake, K. Saruhashi, Y. Katsuragi and T. Kanazawa
(Meteorological Research Institute, Tokyo)

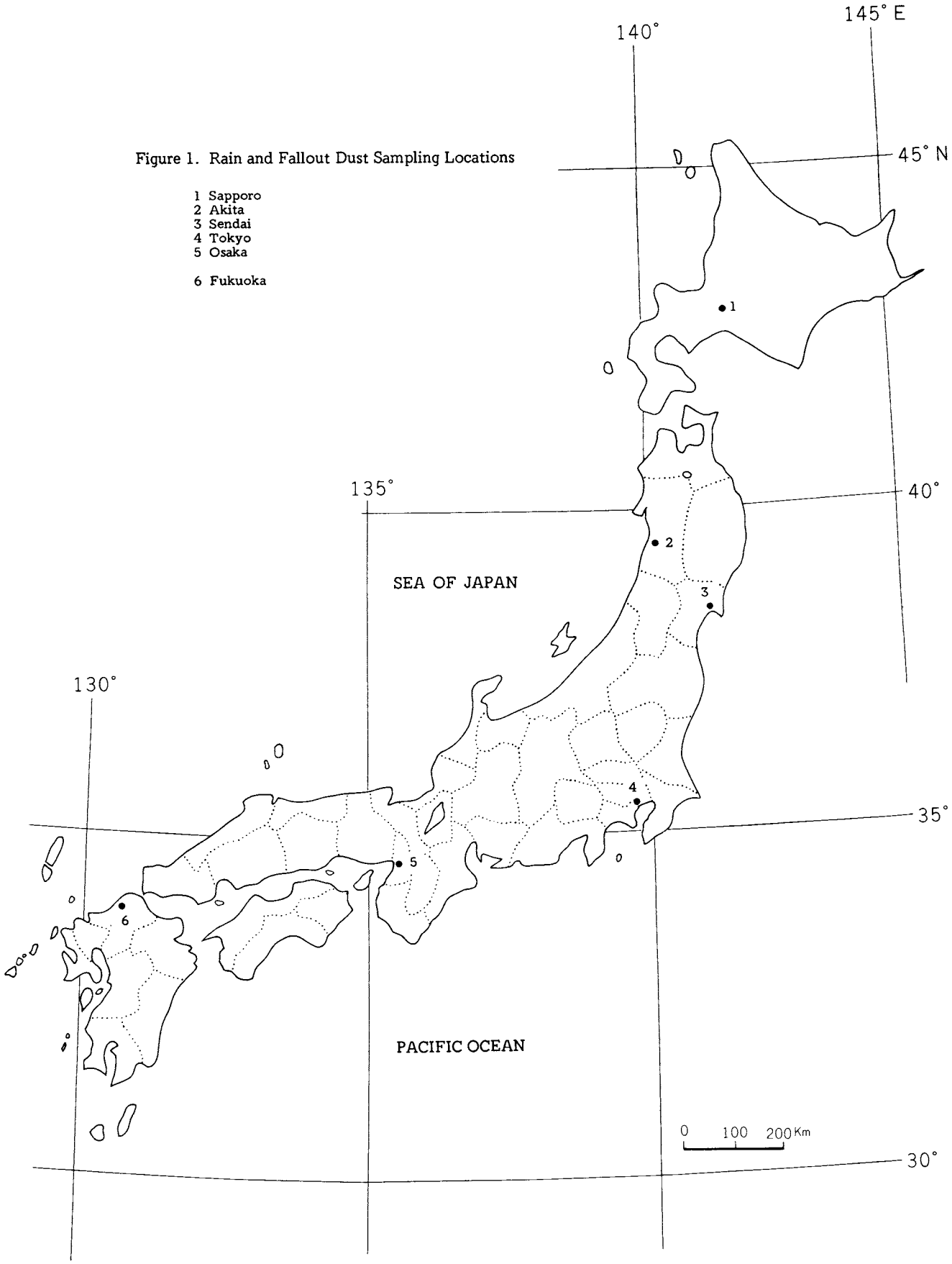
	^{90}Sr (mCi/km^2)	^{137}Cs (mCi/km^2)	$^{137}Cs/^{90}Sr$	$^{89}Sr/^{90}Sr$	Precipitation (mm)
Jan. 1970	0.022	0.073	3.3	5.2	74.6
Feb.	0.035	0.081	2.3	4.6	40.4
Mar.	0.044	0.120	2.7	4.6	51.0
Apr.	0.124	0.318	2.6	5.0	95.4
May	0.236	0.462	2.0	4.6	150.9
June	0.542	0.960	1.8	4.0	209.5
July	0.159	0.303	1.9	2.6	56.3
Aug.	0.041	0.116	2.8	2.4	62.9
Sept.	0.081	0.121	1.5	1.6	84.5
Oct.	0.072	0.102	1.4	0.8	100.9
No.v	0.051	0.084	1.7	1.8	127.2
Dec.	0.026	0.026	1.0	0.4	28.5
Sum	1.433	2.766	1.9		1082.1

* Tokyo (Meteorological Research Institute, Tokyo)
Location : 35°42'N, 139°39'E

Figure 1. Rain and Fallout Dust Sampling Locations

1 Sapporo
2 Akita
3 Sendai
4 Tokyo
5 Osaka

6 Fukuoka



Dietary Data

Strontium-90 and Cesium-137 in Vegetables

(Japan Analytical Chemistry Research Institute)

Japan Analytical Chemistry Research Institute has analyzed the strontium-90 and cesium-137 content in vegetables obtained from 12 prefectures. Sampling locations are shown in Figure (3). The samples were taken twice at the same location during the harvest period. At the prefectural public health laboratories, several kgs of the fresh vegetable samples were washed with water, and the inedible parts removed, then only the edible parts ashed at 450°C. These samples were then sent to Japan Analytical Chemistry Research Institute and analyzed for strontium-90 and cesium-137 content, using the method recommended by Science and Technology Agency.

Results obtained during the period from May 1970 to March 1971 are shown in Table (3).

Table 3. ^{90}Sr and ^{137}Cs in Vegtables
– Apr. 1970 to Jan. 1971 –
by T. Asari, M. Chiba and M. Kuroda
(Japan Analytical Chemistry Research Institute)

(Continued from Table 6, Issue No. 27 of this Publication)

Location	Month Harvested	Compornent (% by Weight)			^{90}Sr		^{137}Cs	
		Ash (%)	Ca (%)	K(%)	(pCi/kg)	(pCi/gCa)	(pCi/kg)	(pCi/gK)
(Spinach)								
Toyota AICHI	Apr. '70	1.05	0.05	0.37	8.0	16.0	6.6	1.8
Akabane "	"	1.07	0.06	0.37	21.7	36.1	9.2	2.5
Fukushima FUKUSHIMA	May '70	2.38	0.32	0.73	26.1	8.2	9.5	1.3
Futaba "	"	2.10	0.12	0.70	11.7	9.7	7.9	1.1
Fukui FUKUI	"	1.40	0.09	0.46	17.8	19.8	12.0	2.6
Tzuruga FUKUI	"	1.43	0.12	0.44	38.0	31.7	15.6	3.5
Tottori TOTTORI	"	1.36	0.10	0.44	35.4	35.4	10.6	2.4
Kurayoshi "	"	1.32	0.12	0.46	29.5	24.6	9.0	2.0
Sapporo HOKKAIDO	June '70	1.29	0.08	0.47	12.1	15.1	5.8	1.2
Asahikawa "	"	1.60	0.12	0.59	24.2	20.1	17.5	3.0
Fukuoka FUKUOKA	"	1.13	0.11	0.42	10.1	9.2	7.5	1.8
Shime "	"	1.19	0.14	0.34	13.4	9.6	8.4	2.5
Sapporo HOKKAIDO	Oct. '70	1.42	0.06	0.54	13.5	22.6	6.1	1.1
Asahikawa "	"	1.42	0.03	0.50	13.4	44.6	2.3	0.5
Akabane AICHI	"	1.09	0.05	0.38	17.6	35.2	3.5	0.9
Toyota AICHI	"	0.99	0.03	0.39	11.2	37.3	LTD	LTD
Tokai IBARAKI	Nov. '70	2.18	0.05	0.75	19.5	39.0	4.2	0.6
Mito "	"	1.92	0.07	0.58	15.5	22.1	2.4	0.4
Fujieda SHIZUOKA	"	1.32	0.08	0.43	25.6	32.0	11.4	2.6
Fuji "	"	1.67	0.08	0.62	38.5	48.1	16.5	2.7
Fukui FUKUI	"	0.59	0.03	0.21	9.7	32.3	1.8	0.9
Tsuruga "	"	0.97	0.05	0.35	9.6	19.1	3.0	0.9
Kurayoshi TOTTORI	"	1.22	0.07	0.38	49.3	70.5	6.0	1.6
Tottori "	"	1.70	0.08	0.58	32.3	40.4	14.6	2.5

Location	Month Harvested	Compornent (% by Weight)			^{90}Sr		^{137}Cs	
		Ash(%)	Ca(%)	K(%)	(pCi/kg)	(pCi/gCa)	(pCi/kg)	(pCi/gk)
Fukuoka FUKUOKA	Nov. '70	1.71	0.15	0.51	16.1	10.8	5.6	1.1
Futaba FUKUSHIMA	Dec. '70	1.95	0.09	0.58	10.2	11.4	4.7	0.8
Fukushima FUKUSHIMA	"	2.11	0.10	0.53	20.0	20.0	8.2	1.6
Shime FUKUOKA	"	1.81	0.18	0.49	22.6	7.1	19.0	3.9
Tokai IBARAKI	Jan. '71	1.59	0.06	0.64	8.9	14.9	2.4	0.4
Mito "	"	1.83	0.07	0.62	10.0	14.0	3.0	0.5
Odawara KANAGAWA	"	1.52	0.08	0.39	9.5	11.9	6.5	1.7
Yokohama KANAGAWA	"	1.99	0.09	0.59	14.7	16.3	8.0	1.4
Fuji SHIZUOKA	"	1.33	0.09	0.46	53.3	59.2	17.5	3.8
Fujieda SHIZUOKA	"	0.84	0.05	0.29	20.9	41.8	6.5	2.3
Odawara KANAGAWA	Feb. '71	1.70	0.09	0.58	4.0	4.5	3.9	0.7
Yokohama "	Mar. '71	1.66	0.09	0.64	5.9	6.5	10.9	1.7
(Japanese Radish Whole)								
Toyota AICHI	Apr. '70	0.73	0.04	0.25	8.9	22.3	2.4	0.9
Akabane "	"	0.76	0.03	0.26	27.2	90.8	4.7	1.8
Futaba FUKUSHIMA	May. '70	0.99	0.02	0.41	15.8	70.8	9.7	2.4
Fukushima "	"	0.73	0.03	0.25	6.9	23.0	12.0	4.8
Niigata NIIGATA	June '70	0.72	0.02	0.27	17.3	86.3	4.8	1.8
Miura KANAGAWA	"	0.71	0.03	0.24	5.2	17.3	1.6	0.7
Yokohama KANAGAWA	"	0.51	0.05	0.16	13.1	26.1	3.8	2.4
Shime FUKUOKA	June '70	0.70	0.04	0.26	12.7	31.7	1.6	0.6
Fukuoka "	"	0.57	0.04	0.20	24.5	61.4	2.4	1.2
Kaimon KAGOSHIMA	"	0.57	0.03	0.21	20.2	67.2	5.0	2.4
Sapporo HOKKAITO	July '70	0.63	0.02	0.23	16.9	84.5	1.9	0.8
Asahikawa "	"	0.61	0.02	0.23	37.0	18.5	15.2	6.6
Nishikanbara NIIGATA	July'70	0.56	0.02	0.19	13.3	66.7	4.6	2.4
Futaba FUKUSHIMA	Oct. '70	0.62	0.03	0.21	17.3	57.8	LTD	LTD
Fukushima "	"	0.54	0.04	0.15	11.6	29.1	LTD	LTD
Akabane AICHI	"	0.66	0.02	0.27	12.8	63.9	LTD	LTD
Toyota "	"	0.56	0.02	0.24	18.8	93.9	1.4	0.6
Sapporo HOKKAIDO	Nov. '70	0.41	0.03	0.13	29.9	99.7	2.9	2.2
Asahikawa "	"	0.49	0.02	0.18	48.9	245.0	1.8	1.0
Niigata NIIGATA	"	0.55	0.02	0.18	58.9	29.4	7.3	4.1
Kitakanbara NIIGATA	"	0.51	0.02	0.19	13.3	66.4	3.9	2.1
Fuji SHIZUOKA	"	0.43	0.02	0.16	11.0	55.0	5.1	3.2
Fujieda "	"	0.16	0.01	0.06	11.3	11.3	2.2	3.7
Miura KANAGAWA	Dec. '70	0.56	0.03	0.18	10.9	36.5	1.7	0.9
Yokohama "	"	0.55	0.03	0.17	11.3	37.6	LTD	LTD
Tzuruga FUKUI	"	0.47	0.02	0.16	46.5	233.0	1.7	1.1
" "	"	0.62	0.03	0.23	37.3	124.0	2.9	1.3
Mihama FUKUI	"	0.24	0.01	0.08	31.4	224.0	1.3	1.7
Mihama "	"	0.37	0.02	0.12	8.0	40.2	2.2	1.9
Fukuoka FUKUOKA	"	0.57	0.02	0.20	11.4	56.9	LTD	LTD
Shime "	"	0.53	0.03	0.16	8.4	28.0	2.6	1.6
Kajiki KAGOSHIMA	"	0.53	0.02	0.18	34.7	173.0	3.3	1.8
Kaimon "	"	0.49	0.03	0.07	14.5	48.3	2.1	3.0
Fuji SHIZUOKA	Jan. '71	0.51	0.04	0.19	43.5	109.0	5.7	3.0
Fujieda "	"	0.55	0.04	0.20	24.6	61.4	4.4	2.2

Figure 2. Vegetable Sampling Location

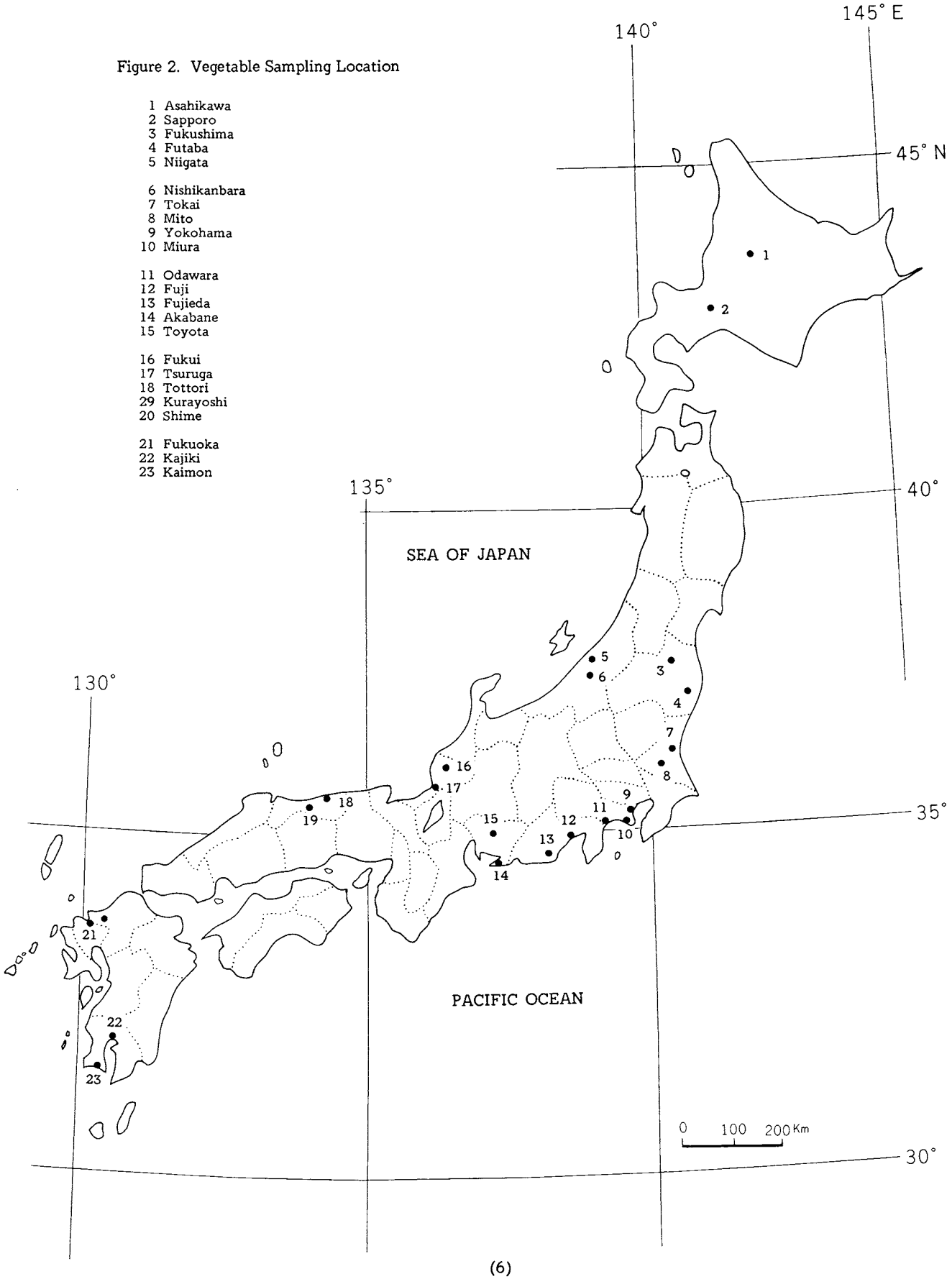
1 Asahikawa
2 Sapporo
3 Fukushima
4 Futaba
5 Niigata

6 Nishikanbara
7 Tokai
8 Mito
9 Yokohama
10 Miura

11 Odawara
12 Fuji
13 Fujieda
14 Akabane
15 Toyota

16 Fukui
17 Tsuruga
18 Tottori
29 Kurayoshi
20 Shime

21 Fukuoka
22 Kajiki
23 Kaimon



Strontium-90 and Cesium-137 in Tea

(Japan Analytical Chemistry Research Institute)

Since 1963, Japan Analytical Chemistry Research Institute has analyzed the strontium-90 and cesium-137 content in processed-tea.

Tea samples were sent by the prefectural public health laboratories of Saitama, Shizuoka and Kyoto.

Sampling locations are shown in Figure 3. The samples were ashed between 400°C to 500°C, and analyzed by the method recommended by Science and Technology Agency.

Results obtained druing the period from May to August 1970 are shown in Table 4.

Table 4. ^{90}Sr and ^{137}Cs in Tea
– May to Aug., 1970 –
by T. Asari, M. Chiba and M. Kuroda
(Japan Analytical Chemistry Research Institute)

(Continued from Table 7, Issue No. 27 of this Publication)

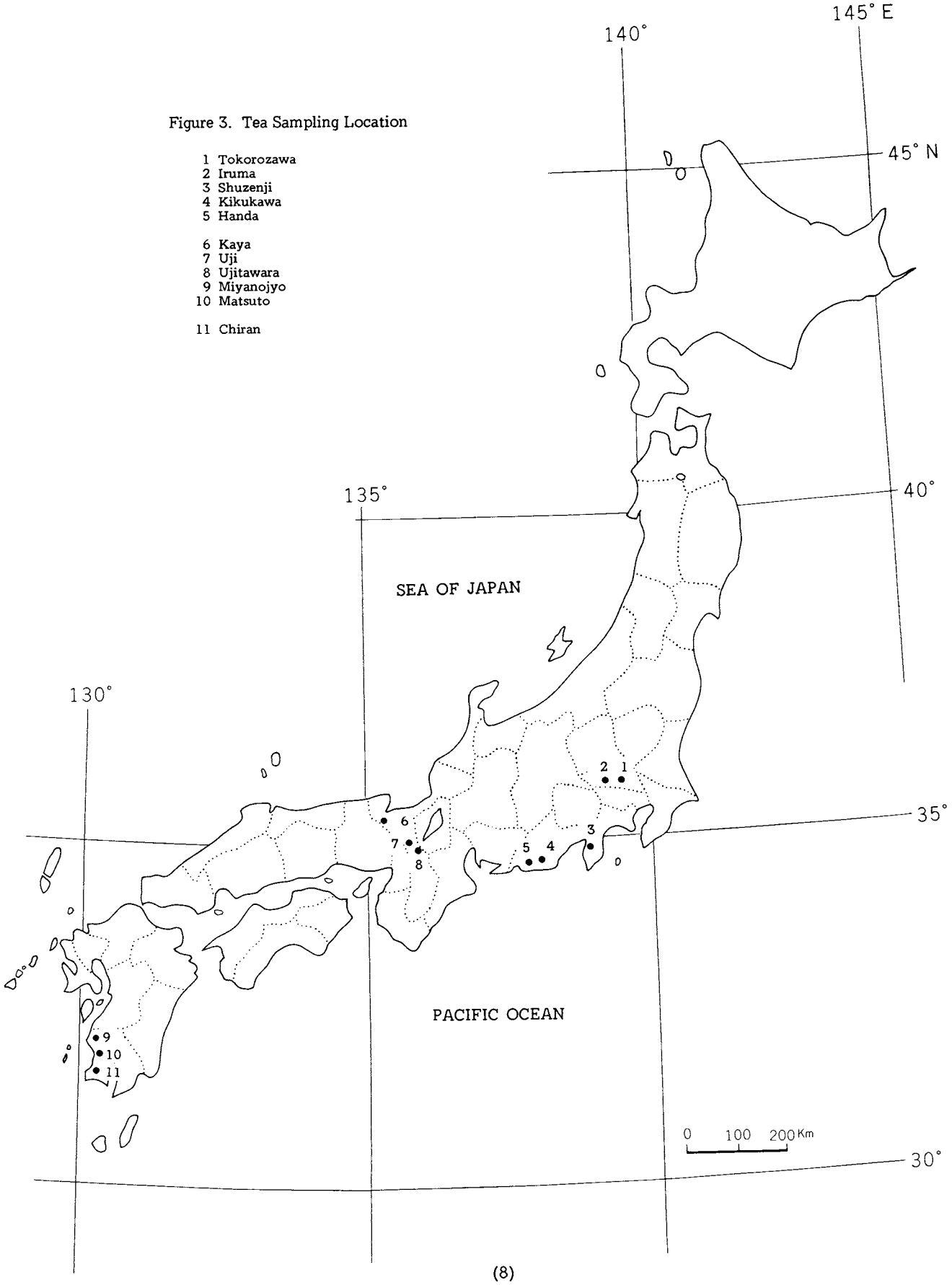
Location	Pick	Date of Sampling	Component (% by Weight)			^{90}Sr		^{137}Cs	
			Ash(%)	Ca(%)	K(%)	(pCi/kg)	(pCi/gCa)	(pCi/kg)	(pCi/gK)
Iruma SAITAMA	1st	May '70	5.65	0.23	1.43	242	105	249	17.4
Tokorozawa SAITAMA	〃	〃	5.85	0.50	1.52	320	64.0	276	18.2
Kikukawa SHIZUOKA	Zairai	〃	4.88	0.29	1.49	259	89.3	332	22.3
Handa 〃	〃	〃	6.34	0.56	1.58	336	60.0	266	16.8
Shuzenji 〃	〃	〃	5.40	0.51	1.70	542	106	462	37.2
Ujitawara KYOTO	〃	〃	5.70	0.54	1.68	215	39.8	311	18.5
Uji 〃	〃	〃	5.88	0.46	1.86	170	37.0	155	8.3
Matsumoto KAGOSHIMA	1st	〃	5.84	0.41	1.87	220	53.7	421	22.5
Chiran 〃	〃	〃	5.30	0.33	1.80	323	97.9	394	21.9
Miyanojyo 〃	〃	〃	6.10	0.24	2.10	431	180	343	16.3
Kaya KYOTO	Zairai	June '70	5.50	0.57	1.71	785	138	335	19.6
Miyanojyo KAGOSHIMA	2nd	〃	6.60	0.43	1.85	778	181	425	23.0
Uji KYOTO 〃	Zairai	July '70	5.14	0.31	1.55	289	93.2	275	17.7
Tawara KYOTO	Yabukita	〃	5.76	0.25	1.74	159	63.6	386	22.2
Matsumoto KAGOSHIMA	2nd	〃	6.40	0.44	1.75	341	77.5	324	18.6
Chiran KAGOSHIMA	〃	〃	4.90	0.30	1.52	445	148	594	39.1
Iruma SAITAMA	〃	Aug. '70	5.96	0.62	1.57	313	50.5	313	19.9
Tokorozawa SAITAMA	〃	〃	6.02	0.76	1.42	303	39.9	287	20.2
Kikukawa SHIZUOKA	Zairai	〃	5.98	0.48	2.00	430	89.6	491	24.6
Handa 〃	〃	〃	7.34	0.42	1.72	250	59.5	350	20.3
Shuzenji 〃	〃	〃	5.46	0.59	1.63	271	45.9	365	22.4
Kaya KYOTO	〃	〃	7.40	0.54	1.89	542	100	474	25.1

Figure 3. Tea Sampling Location

1 Tokorozawa
2 Iruma
3 Shuzenji
4 Kikukawa
5 Handa

6 Kaya
7 Uji
8 Ujitawara
9 Miyanojyo
10 Matsuto

11 Chiran



Water Data

Strontium-90 and Cesium-137 in Source Water

(Japan Analytical Chemistry Research Institute)

Since May 1963, Japan Analytical Chemistry Research Institute has analyzed the strontium-90 and cesium-137 content in source water from (25) locations in Japan.

Sampling locations are shown in Figure 4. Sampling procedures and treatment method of the samples for strontium-90 and cesium 137 analyses are the same as those mentioned in the explanation of page 16, Issue No. 19 of this publication.

Results obtained during the period April 1970 to March 1971 are shown in Table 5.

Table 5. ^{90}Sr and ^{137}Cs in Source Water
– Apr. 1970 to Mar. 1971 –
by T. Asari, M. Chiba and M. Kuroda
(Japan Analytical Chemistry Research Institute)

(Continued from Table 3, Issue No. 27 of this Publication)

Location	Source	^{90}Sr (pCi/ℓ)	^{137}Cs (pCi/ℓ)	pH	Nature of Water Appearance
Arp. 1970					
Sapporo HOKKAIDO	Water Purrification Station	0.16	0.06	6.9	slight muddy (white, yellow)
Aomori AOMORI		0.16	0.04	7.3	clear
Sendai MIYAGI	"	0.18	0.45	6.7	clear
Kanamachi TOKYO	"	0.09	0.03		slight muddy (yellow)
" "	Station Intake	0.10	0.03		clear
Odawara KANAGAWA	Station Intake	0.04	LTD	6.8	slight muddy
Niiszu NIIGATA	Water Purification Station	0.02	LTD	6.2	clear
" "	"	0.18	0.09	6.8	clear
Kanazawa ISHIKAWA	"	0.28	0.05	7.0	slight muddy
Shizuoka SHIZULKA	Reservoir	0.15	0.20		slight muddy
Inuyama AICHI	Station Intake	0.16	LTD	7.0	clear
Kyoto KYOTO	Station Intake	0.12	0.03	7.6	slight muddy
Moriguchi OSAKA	"	0.56	0.03	6.6	
Osaka OSAKA		0.52	0.03	6.8	
Kobe HYOGO	Reservoir	0.13	LTD	7.4	
Tottori TOTTORU	"	0.19	0.04	6.8	slight muddy
Okayama OKATAMA	Station Intake	0.16	0.04	6.7	slight muddy (yellow, gray)
Hiroshima HIROSHIMA	"	0.14	0.03	6.9	clear
Kochi KOCHI		0.12	LTD	7.1	clear
Fukuoka FUKUOKA	Water Purification Station	0.16	0.04	6.8	clear
Nagasaki NAGASAKI	Reservoir	0.19	0.09	7.0	slight muddy (yellow)
Kagoshima KAGOSHIMA	Station Intake	0.10	0.09	7.1	slight muddy (yellow)

Location	Source	^{90}Sr (pCi/ℓ)	^{137}Cs (pCi/ℓ)	pH	Nature of Water Appearance
May. 1970					
Wakkanai HOKKAIDO		0.45	0.10		slight muddy (yellow)
Hamada SHIMANE	Water Purification Station	0.13	LTD		clear
Wakayama WAKAYAMA		0.10	0.08	6.5	slight muddy
Matsue SHIMANE	Otani dam	0.35	0.11	5.6	
Sept. 1970					
Wakkanai HOKKAIDO		0.18	0.08		slight muddy
Sapporo "	Water Purification Station	0.54	0.07	7.1	muddy
Aomori AOMORI	"	0.07	0.04	7.2	clear
Sendai MIYAGI	"	0.17	0.04	6.6	clear
Katsushika TOKYO	"	0.19	0.05		slight muddy (yellow)
Odawara KANAGAWA	Station Intake	0.02	LTD	6.9	
Niitsu NIIGATA	Water Purification Station	0.33	0.06	6.8	slight muddy (brown)
Kanazawa ISHIKAWA	"	0.90	0.12	8.1	slight muddy (yellow)
Kyoto KYOTO	Station Intake	0.63	0.06	7.5	
Kobe HYOGO	Water Purification Station	0.20	0.04	7.5	slight muddy (white, yellow)
Osaka OSAKA		0.33	LTD	6.8	
Moriguchi OSAKA	Water Purification Station	0.43	0.07	6.4	slight muddy
Wakayama WAKAYAMA		0.07	0.06	6.5	slight muddy
Tottori TOTTORI	Water Purification Station	0.19	0.03	6.8	slight muddy
Okayama OKAYAMA	Station Intake	0.20	0.03	6.0	slight muddy (white)
Hiroshima HIROSHIMA	"	0.15	0.03	7.5	clear
Kochi KOCHI		0.11	LTD	7.2	clear
Fukuoka FUKUOKA	Water Purification Station	0.17	0.03	6.8	clear
Nagasaki NAGASAKI	"	0.17	0.15	8.1	slight muddy (brown)
Kagoshima KAGOSHIMA	Station Intake	0.13	0.05	6.8	slight muddy (yellow)
Shimizu SHIZUOKA	Water Purification Station	0.13	0.32	7.0	
Oct. 1970					
Hmada SHIMANE	Water Purification Station	0.06	LTD	5.4	clear
Matsue "	Otani dam	0.38	0.07	6.8	slight muddy (brown)
Dec. 1970					
Sapporo HOKKAIDO	Water Purification Station	0.14	0.04	7.1	slight muddy
Wakkanai HOKKAIDO		0.45	0.11	6.5	slight muddy (brown, yellow)
Aomori AOMORI	Water Purification Station	0.07	0.04	7.2	clear
Sendai MIYAGI	"	0.15	0.03	6.9	slight muddy
Kanamachi TOKYO	"	0.16	0.05		slight muddy (yellow)
Kanamachi TOKYO	Water Purification Station	0.14	0.05		clear
Odawara KANAGAWA	Station Intake	0.02	LTD	6.9	
Niitsu NIIGATA	Water Purification Station	0.32	0.05	6.5	slight muddy (brown)
" "	"	0.34	LTD	8.4	clear
Kanazawa ISHIKAWA	"	0.30	0.07	8.1	clear
Shimizu SHIZUOKA	Reservoir	0.08	0.23	7.0[	
Inuyama AICHI	Station Intake	0.14	LTD	6.9	slight muddy
Kyoto KYOTO	"	0.35	0.03	7.3	slight muddy
Moriguchi OSAKA	Water Purification Station	0.41	0.04	6.6	slight muddy
Osaka OSAKA		0.21	LTD	6.4	
Kobe HYOGO	Water Purification Station	0.15	0.03	7.3	slight muddy (yellow white)
Wakayama WAKAYAMA	"	0.06	0.04	6.8	slight muddy
Tottori TOTTORI	Reservoir	0.17	0.09	6.9	slight muddy
Hamada SHIMANE	Water Purification Station	0.05	0.03	6.8	clear

Location	Source	^{90}Sr (pCi/ℓ)	^{137}Cs (pCi/ℓ)	PH	Nature of Water Appearance
Matsue SHIMANA	Otani dam	0.29	0.05	6.9	slight muddy (brown)
Okayama OKAYAMA	Station Intake	0.15	LTD	6.8	slight muddy (white)
Hiroshima HIROSHIMA	"	0.13	LTD	7.4	clear
Kochi KOCHI		0.12	LTD	7.2	clear
Fukuoka FUKUOKA	Water Purification Station	0.11	LTD	6.8	clear
Nagasaki NAGASAKI	Reservoir	0.36	0.07	7.0	slight muddy (brown)
Kagoshima KAGOSHIMA	Station Intake	0.05	0.04	6.7	clear
Mar. 1971					
Wakkanai HOKKAIDO	Station Intake	0.75	0.04	6.6	
Aomori AOMORI	Water Purification Station	0.10	0.03	7.3	clear
Sendai MIYAGI	"	0.14	LTD	6.8	clear
Kanamachi TOKYO	Water Purification Station	0.15	0.05		clear
" "	"	0.14	0.04		slight muddy (brown)
Odawara KANAGAWA	Station Intake	0.02	LTD	7.2	
Niitsu NIIGATA	Water Purification Station	0.28	0.04	7.2	clear
Kanazawa ISHIKAWA	"	0.32	0.10	7.1	slight muddy
Shimizu SHIZUOKA	Station Intake	0.08	0.03	7.0	
Inuyama AICHI	Station Intake	0.12	LTD	6.7	clear
Kyoto KYOTO	Staiton Intake	0.48	0.03	7.2	clear
Osaka OSAKA		0.28	LTD	6.8	
Kobe HYOGO	Water Purification Station	0.13	0.04	7.3	slight muddy (yellow)
Wakayama WAKAYAMA	"	0.07	0.03	6.8	slight muddy
Tottori TOTTORI	Reservoir	0.13	0.05	6.7	slight muddy (white)
Matsue SHIMANE	Otani dam	0.30	0.05	6.9	muddy
Okayama OKAYAMA	Station Intake	0.13	LTD	6.7	slight muddy (brown)
Hiroshima HIROSHIMA	"	0.15	LTD	7.2	clear
Kochi KOCHI		0.11	LTD	7.2	clear
Fukuoka FUKUOKA	Water Purification Station	0.14	LTD	6.8	clear
Nagasaki NAGASAKI	Reservoir	0.14	0.08	8.2	slight muddy (hellow, brown)
Kagoshima KAGOSHIMA	Water Purification Station	0.06	LTD	7.2	slight muddy

Figure 4. Source Water Sampling Location

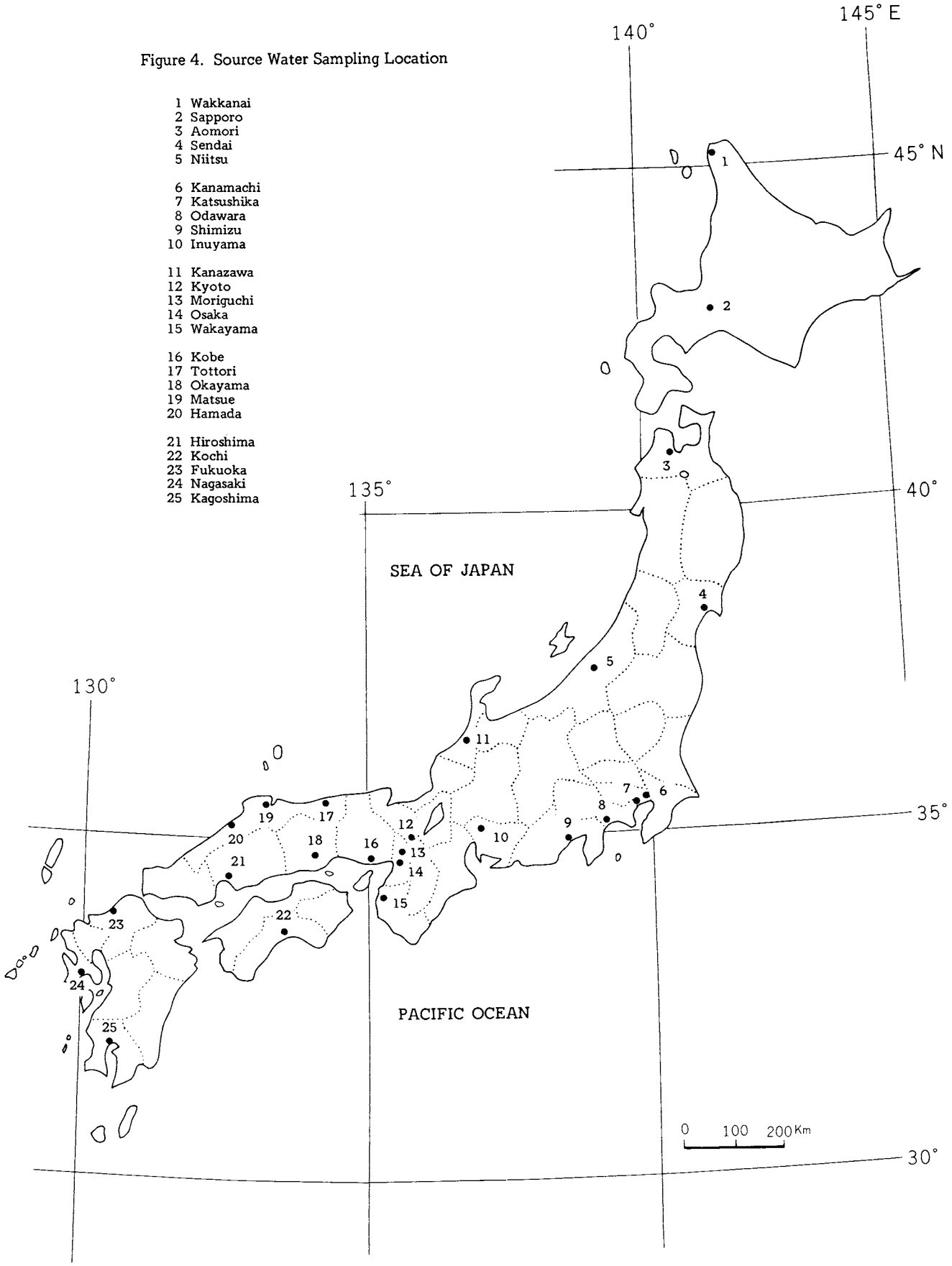
1 Wakkanai
2 Sapporo
3 Aomori
4 Sendai
5 Niitsu

6 Kanamachi
7 Katsushika
8 Odawara
9 Shimizu
10 Inuyama

11 Kanazawa
12 Kyoto
13 Moriguchi
14 Osaka
15 Wakayama

16 Kobe
17 Tottori
18 Okayama
19 Matsue
20 Hamada

21 Hiroshima
22 Kochi
23 Fukuoka
24 Nagasaki
25 Kagoshima



Strontium-90 and Cesium-137 in Potable Rain Water used by Lighthouses

(Japan Analytical Chemistry Research Institute)

Since April 1964, potable rain water used for residents of beacon lighthouses has been analyzed for strontium-90 and cesium-137 content by Japan Analytical Chemistry Research Institute.

Samples of potable rain water were collected in polyethylene bottles at 7 lighthouses and also ten liter samples, with and without filtration through sand and charcoal, were sent from each lighthouse.

Sampling locations are shown in Figure 5. The analytical procedure applied was the method recommended by the Science and Technology Agency.

Results obtained during the period from May 1970 to January 1971 are shown in Table 6.

Table 6. ^{90}Sr and ^{137}Cs in Potable Rain Water used by Lighthouses
– May 1970 to Jan. 1971 –
by T. Asari, M. Chiba and M. Kuroda
(Japan Analytical Chemistry Research Institute)

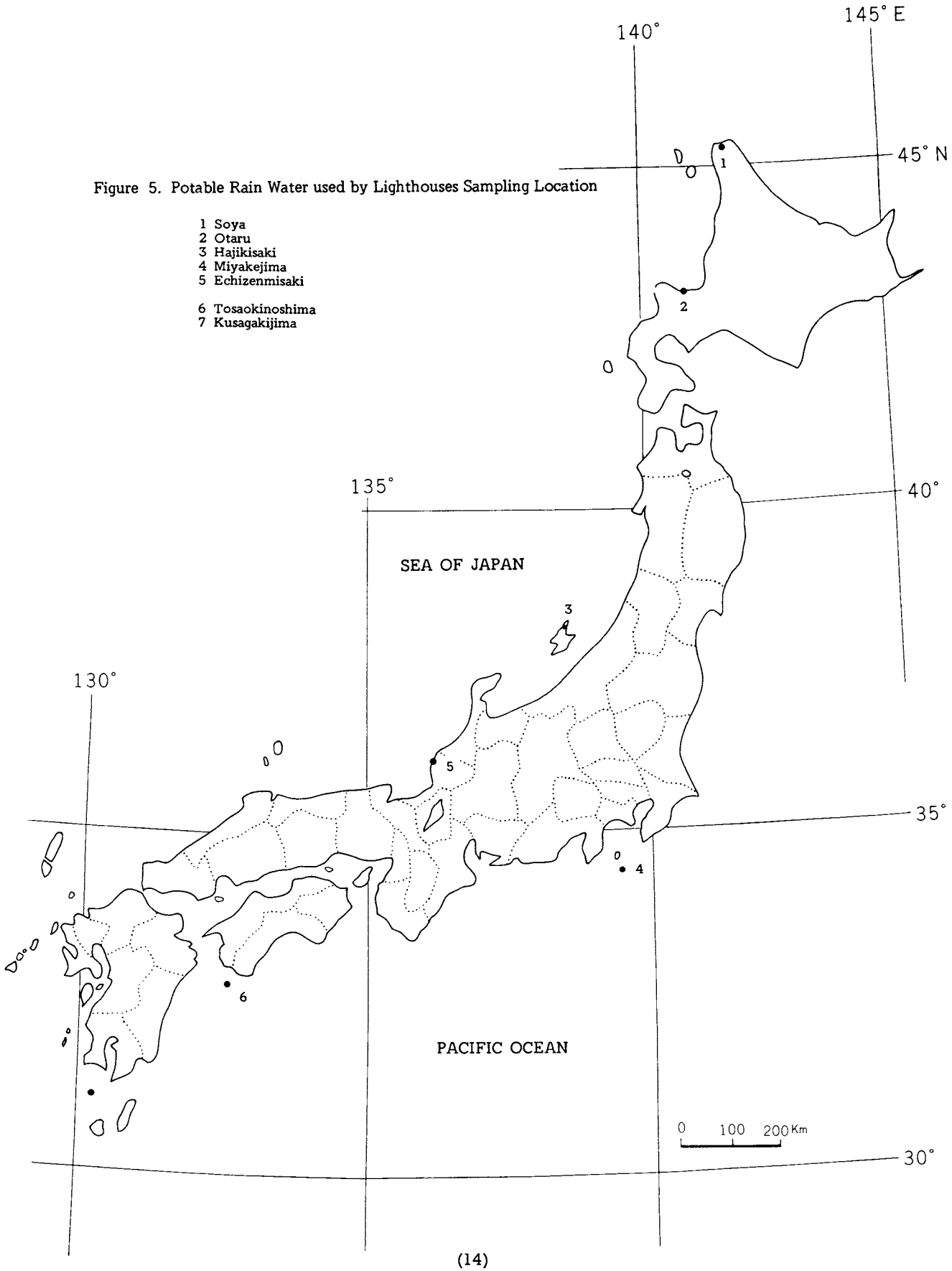
(Continued from Table 5, Issue No. 27 of this Publication)

Lighthouse Location	^{90}Sr		^{137}Cs	
	Original	Filtrate	Original	Filtrate
May 1970				
Soya HOKKAIDO	1.3	0.4	0.7	1.6
Otaru "	3.4	0.5	4.0	LTD
Miyakejima TOKYO	1.9	1.8	LTD	1.7
Hajikizaki NIIGATA	1.3	1.8	1.1	LTD
Kusagakijima KAGOSHIMA	0.9	0.9	0.4	LTD
June 1970				
Echizenmisaki FUKUI	1.1	1.4	0.4	0.5
Tosaokinoshima KOCHI	1.3	1.3	0.4	0.6
Sept. 1970				
Soya HOKKAIDO	0.6	0.2	0.6	LTD
Otaru HOKKAIDO	0.9	0.6	0.3	LTD
Hajikizaki NIIGATA	0.6	0.8	0.3	0.4
Miyakejima TOKYO	2.4	0.7	3.8	0.7
Echizenmisaki FUKUI	0.8	1.2	LTD	0.6
Tosaokinoshima KOCHI	1.3	1.2	2.0	0.4
Kusagakijima KAGOSHIMA	1.2	1.3	1.2	0.3
Jan. 1971				
Soya HOKKAIDO	0.5	LTD	0.9	LTD
Otaru HOKKAIDO	0.8	0.5	0.5	LTD
Miyakejima TOKYO	1.0	0.8	1.1	0.6
Hajikizaki NIIGATA	1.9	1.7	0.9	LTD
Echizenmisaki FUKUI	4.3	1.5	0.6	0.3
Kusagakijima KAGOSHIMA	0.7	0.6	0.5	0.3

Figure 5. Potable Rain Water used by Lighthouses Sampling Location

1 Soya
2 Otaru
3 Hajikisaki
4 Miyakejima
5 Echizenmisaki

6 Tosaokinoshima
7 Kusagakijima



Fish Data

The Concentrations of Strontium-90 and Cesium-137 in Marine Fish

(National Institute of Radiological Sciences)

Since November 1963, Radiochemical analysis of ^{90}Sr and ^{137}Cs in marine fish have been carried out at National Institute of Radiological Sciences.

Sample fish used were collected from adjacent sea of Japan through several prefectural public health laboratories once or twice a year, and ashed at 450°C in electric muffle furnace.

^{90}Sr was analysed by fuming nitric acid method and ^{137}Cs was separated by use of AMP, measured in form of chloroplatinate. The range of chemical recovery of both radionuclides was approximately 65 ~ 80%.

The results obtained during the period from November 1966 to 1970 were shown in Table 6, 7, 8, 9 and 10.

The data from November 1963 to May 1966 had been reported in "Radio-activity Survey Data in Japan No. 15, (May, 1967).

Table 6: The Concentration of ^{90}Sr in Marine Fish (Whole body) (pCi/g Ca)
– Nov., 1966 to Nov., 1970 –

By Y. Suzuki, T. Ueda, R. Nakamura and M. Saiki
(National Institute of Radiological Sciences)

Location	Species (Scientific name)	1966	1967		1968		1969		1970	
		Nov.	May	Nov.	May	Nov.	May	Nov.	May	Nov.
Fukushima	Gray mullet *(Mugil cephalus)*	—	—	—	1.6	2.0	0.4	0.6	0.2	0.2
	Sea bass *(Lateolabrax japonicus)*	—	—	—	0.7	0.7	1.5	0.2	0.3	0.3
	Black rock-fish *(sebastodes güntherii)*	—	0.5	—	0.6	0.4	0.1	0.1	0.1	0.1⟩
Ibaraki	Sea bass *(Lateolabrax japonicus)*	—	—	—	0.9	—	—	0.9	0.3	0.3
	Black rock-fish *(Sebastodes güntherii)*	—	—	—	0.13	0.3	0.1⟩	0.1	—	—
	Rock trout *(Hexagrammos otakii)*	—	—	—	—	0.2	—	—	—	—
	Yellow tail *(Seriola quinqueradiata)*	—	—	—	—	0.4	0.2	0.1	0.2	0.2
	Flat fish *(Limanda irrdorum)*	—	—	—	—	0.3	—	—	0.2	0.2
	Japanese needle-fish *(Hemiramphus sajori)*	—	—	—	—	0.1	—	—	—	—
Niigata	Gray mullet *(Mugil cephalus)*	—	—	—	7.3	—	—	—	—	0.4
	Flat fish *(Limanda irrdorum)*	—	—	0.3	—	—	—	—	—	0.1⟩
	Japanese horse mackerel *(Trachurus japonicus)*	—	0.2	—	0.2	—	0.2	—	0.1⟩	—
	Mackerel *(Scomber japonicus)*	—	0.2	—	0.3	—	0.5	—	—	—
	Sea bass *(Lateolabrax japonicus)*	—	—	—	—	—	—	—	0.2	—
	Sand smelt *(Sillago sihama)*	—	—	—	—	—	—	—	0.1	0.1
Fukui	Gray mullet *(Mugil cephalus)*	—	—	—	1.9	1.8	0.2	3.1	—	—
	Flat fish *(Limanda irrdorum)*	0.2	—	0.2	0.2	0.2	0.1⟩	—	0.1⟩	0.1⟩
	Japanese horse macherel *(Trachurus japonicus)*	0.2	0.2	0.3	0.4	0.4	0.1	—	0.2	0.1
Ishikawa	Japanese horse mackerel *(Trachurus japonicus)*	—	—	—	—	—	0.2	0.2	0.1⟩	0.1⟩
	Mackerel *(Scomber japonicus)*	—	—	—	—	—	0.1	0.4	0.1⟩	0.1⟩
	Flat fish *(Limanda irrodorum)*	—	—	—	—	—	0.3	0.3	0.1	0.2
Hiroshima	Gray mullet *(Mugil cephalus)*	—	9.4	—	0.7	—	1.9	—	0.3	0.2
	Flat fish *(Limanda irrdorum)*	0.2	0.1	—	—	—	0.3	—	0.1	0.1⟩
	Black porgy *(Mylio macrocephalus)*	—	0.4	—	0.1	—	0.1	—	0.2	0.2
	Sandgurnard *(Platycephalus indicus)*	—	—	—	0.3	—	—	—	—	—
	Sea chub *(Ditrema temmincki)*	0.2	—	—	—	—	—	—	—	—

Table 7: The Concentration of ^{137}Cs in Marine Fish (Whole body) (pCi/kg flesh)
– Nov., 1966 to Nov., 1970 –

By Y. Suzuki, T. Ueda, R. Nakamura and M. Saiki
(National Institute of Radiological Sciences)

Location	Species (Scientific name)	1966	1967		1968		1969		1970	
		Nov.	May	Nov.	May	Nov.	May	Nov.	May	Nov.
Fukushima	Gray mullet *(Mugil cephalus)*	—	—	—	48.3	20.4	10.8	3.1	—	2.7
	Sea bass *(Lateolabrax japonicus)*	—	—	—	16.0	14.9	7.9	4.9	1.1	—
	Black rock-fish *(Sebastodes güntherii)*	—	11.6	—	32.6	20.1	10.8	11.9	—	—
Ibaraki	Sea bass *(Lateolabrax japonicus)*	—	—	—	24.2	—	—	14.9	—	8.2
	Black rock-fish *(Sebastodes güntherii)*	—	—	—	10.4	20.2	10.8	10.3	—	—
	Rock trout *(Hexagrammos otakii)*	—	—	—	—	16.9	—	—	—	—
	Yellow tail *(Seriola quinqueradiata)*	—	—	—	—	24.2	11.9	4.8	—	—
	Flat fish *(Limanda irrdorum)*	—	—	—	—	19.5	7.2	—	—	—
	Japanese needle-fish *(Hemiramphus sajori)*	—	—	—	—	35.7	—	—	—	—
Niigata	Gray mullet *(Mugil cephalus)*	—	13.7	—	63.5	—	—	—	—	—
	Flat sifh *(Limanda irrdorum)*	—	—	11.1	—	—	—	—	—	—
	Japanese horse mackerel *(Trachurus japonicus)*	—	14.2	—	18.2	—	9.9	—	9.3	—
	Mackerel *(Scomber japonicus)*	—	—	—	16.5	—	0.9	—	—	—
	Sand smelt *(Sillago sihama)*	—	—	—	—	—	—	—	11.7	6.0
Fukui	Gray mullet *(Mugil cephalus)*	—	—	—	44.3	20.4	7.6	13.6	—	—
	Flat fish *(Limanda irrdorum)*	11.3	12.2	5.8	31.1	26.0	3.2	—	10.6	6.9
	Japanese horse macherel *(Trachurus japonicus)*	4.0	15.6	9.7	28.1	28.1	3.1	12.0	—	—
Ishikawa	Flat fish *(Limanda irrdorum)*	—	—	—	—	—	2.7	8.1	4.2	—
	Japanese horse mackerel *(Trachurus japonicus)*	—	—	—	—	—	11.7	11.7	6.7	—
	Mackerel *(Scomber japonicus)*	—	—	—	—	—	3.6	7.2	9.0	—
Hiroshima	Gray mullet *(Mugil cephalus)*	—	4.3	—	21.8	—	9.1	—	6.8	—
	Flat fish *(Limanda irrdorum)*	8.3	9.7	—	—	—	6.8	—	—	—
	Black porgy *(Mylio macrocephalus)*	—	—	—	11.8	—	12.6	—	—	—
	Sea chub *(Ditrema temmincki)*	6.3	—	—	—	—	—	—	—	—

Table 8: The Concentration of ^{90}Sr in Marine Fish Bone (pCi/g Ca)
– Nov., 1966 to Nov., 1970 –

By Y. Suzuki, T. Ueda, R. Nakamura and M. Saiki
(National Institute of Radiological Sciences)

Location	Species (Scientific name)	1966	1967		1968		1969		1970	
		Nov.	May	Nov.	May	Nov.	May	Nov.	May	Nov.
Fukushima	Gray mullet *(Mugil cephalus)*	2.5	—	0.8	1.8	—	0.8	1.2	0.3	0.2
	Sea bass *(Lateolabrax japonicus)*	1.2	1.9	0.5	0.8	0.6	1.6	0.2	0.2	0.3
	Black rock-fish *(Sebastodes güntherii)*	0.2	—	1.4	0.8	0.2	0.4	0.2	—	—
Ibaraki	Sea bass *(Lateolabrax japonicus)*	—	0.7	1.1	1.3	—	—	—	0.2	0.2
	Black rock-fish *(Sebastodes güntherii)*	—	—	0.1	—	—	0.2	0.1	—	—
	Genuin porgy *(Chrysophrys major)*	—	—	0.3	—	—	—	—	—	—
	Yellow tail *(Seriola quinqueradiata)*	—	—	—	—	0.2	0.3	0.2	—	0.2
	Flat fish *(Limanda irrdorum)*	—	—	—	—	—	—	—	—	0.2
Niigata	Gray mullet *(Mugil cephalus)*	2.5	8.1	—	—	—	—	—	—	—
	Flat fish *(Limanda irrdorum)*	—	—	—	—	—	—	—	—	0.1
	Japanese horse mackerel *(Trachurus japonicus)*	0.3	—	—	—	—	0.2	—	0.1	0.2
	Mackerel *(Scomber japonicus)*	0.3	—	—	—	—	0.4	—	—	—
	Sea bass *(Lateolabrax japonicus)*	—	—	—	—	—	—	—	0.3	—
	Sand smelt *(Sillago sihama)*	—	—	—	—	—	—	—	—	0.1

Location	Species (Scientific name)	1966	1967		1968			1969	
		Nov.	May	Nov.	May	No.v	May		Nov.
Fukui	Gray mullet *(Mugil cephalus)*	—	4.0	6.0	—	—	—	—	—
	Flat fish *(Limanda irrdorum)*	—	—	—	—	—	—	0.1	0.1
	Japanese horse macherel *(Trachurus japonicus)*	—	—	—	—	—	—	0.3	0.1
Ishikawa	Japanese horse mackerel *(Trachurus japonicus)*	—	—	—	—	—	—	0.1	0.1
	Macherel *(Scomber japonicus)*	—	—	—	—	—	—	0.1	—
	Flat fish *(Limanda irrdorum)*	—	—	—	—	—	—	0.1	0.1
Hiroshima	Gray mullet *(Mugil cephalus)*	0.7	—	—	—	—	—	0.4	0.2
	Flat fish *(Limanda irrdorum)*	0.3	—	—	—	—	—	0.1	0.1
	Black porgy *(Mylio macrocephalus)*	—	—	—	—	—	—	0.3	0.3

Table 9: The Concentration of ^{137}Cs in Muscle of Marine Fish (pCi/kg flesh)
– Nov., 1966 to Nov., 1970 –

By Y. Suzuki, T. Ueda, R. Nakamura and M. Saiki
(National Institute of Radiological Sciences)

Location	Species (Scientific name)	1966	1967		1968		1969	
		Nov.	May	Nov.	May	Nov.	May	Nov.
Fukushima	Gray mullet *(Mugil cephalus)*	12.5	22.8	16.7	12.4	—	3.4	5.2
	Sea bass *(Lateolabrax japonicus)*	13.8	10.7	6.8	17.7	21.2	17.6	4.5
	Black rock-fish *(Sebastodes güntherii)*	15.2	—	5.5	20.8	15.2	3.8	7.2
Ibaraki	Sea bass *(Lateolabrax japonicus)*	—	5.2	14.0	34.3	—	—	—
	Black rock-fish *(Sebstodes güntherii)*	—	—	8.6	—	—	8.9	12.8
	Genuin porgy *(Chrysophrys major)*	—	—	11.2	—	—	—	—
	Yellow tail *(Seriola quinqueradiata)*	—	—	—	—	36.8	12.0	6.9
Niigata	Gray mullet *(Mugil cephalus)*	24.8	—	—	—	—	—	—
	Japanese horse mackerel *(Trachurus japonicus)*	18.5	—	—	—	—	9.3	—
	Mackerel *(Scomber japonicus)*	3.3	—	—	—	—	11.9	—
Fukui	Gray mullet *(Mugil cephalus)*	—	89.6	13.5	—	—	—	—

Table 10: The Concentration of ^{137}Cs in Visceral Organ of Marine Fish (pCi/kg flesh)
– Nov., 1966 to Nov., 1970 –

By Y. Suzuki, T. Ueda, R. Nakamura and M. Saiki
(National Institute of Radiological Sciences)

Location	Species (Scientific name)	1966	1967		1968		1969	
		Nov.	May	Nov.	May	Nov.	May	Nov.
Fukushima	Gray mullet *(Mugil cephalus)*	28.0	6.9	5.5	—	—	1.1	1.2
	Sea bass *(Lateolabrax japonicus)*	19.2	7.0	12.9	—	—	8.9	7.7
	Black rock-fish *(Sebastodes güntherii)*	12.8	—	13.3	—	—	10.1	5.5
Ibaraki	Sea bass *(Latcolabrax japonicus)*	—	9.4	17.5	—	—	—	—
	Black rock-fish *(Sebstodes güntherii)*	—	—	7.1	—	—	12.4	12.0
	Genuin porgy *(Chrysophrys major)*	—	—	9.1	—	—	—	—
	Yellow tail *(Seriola quinqueradiata)*	—	—	—	—	29.4	16.3	7.1
Niigata	Gray mullet *(Mugil cephalus)*	21.5	—	—	—	—	—	—
	Japanese horse mackerel *(Trachurus japonicus)*	10.2	—	—	—	—	15.7	—
	Mackerel *(Scomber japonicus)*	5.8	—	—	—	—	—	—
Fukui	Gray mullet *(Mugil cephalus)*	—	100.0	94.7	—	—	—	—