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SEA URCHIN SUPPLY, DEMAND, AND MARKET OF
JAPAN

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EXECUTIVE SUMMARY

Sea urchins are harvested worldwide, the majority destined for the Japanese market. Japan is by far the world's largest importer and consumer of sea urchin roe. In 2016, Japan imported about 11,000 metric tons (mt) of live sea urchins and sea urchin roe valued at about 183 million dollars, an increase of more than six-fold in volume and 9-fold in value from 1975. Much of this increase was due to good demand, decreased domestic harvest, and consequent rise in price for sea urchin roe.

Japan was the world's largest harvester of sea urchins until 1984. Since 1987, Japanese harvests have declined steadily due mainly to declining stock abundance. The harvest in 2015 of 8,500 mt was less than 31 percent of the record high landings which occurred in 1969.

From 1987 to 2001, landings in the United States have exceeded Japanese landings. In 2015, sea urchins were harvested in six states: Florida (27 mt), Washington (326 mt), Oregon (203 mt), California (3,677 mt), Maine (805 mt), and Massachusetts (23 mt).

Live sea urchin was the dominant sea urchin product imported into Japan, representing as much as 35 percent in value in 2016. The United States has become the second largest supplier of fresh sea urchin roe to Japan, providing over 27 percent in value and 23 percent in volume of the total. Differences in peak fishing seasons in Japan (spring through summer) and the United States (fall through spring) have benefitted U.S. exporters in marketing sea urchin roe to Japan.

Most fresh sea urchin roe are sold through auction at the Tokyo Central Wholesale Market. Although quality of roe is the most important factor in determining prices, total supply (domestic and imported roe) is also significant. In 2016, the highest price for imported roe occurred in November. High prices for Japanese roe occurred in December, reflecting the low availability of roe during these months.

Japan regulates imports of sea urchin products with import tariffs. As the United States and Japan are signatories to the World Trade Organization (WTO), WTO tariffs apply to U.S. exports of sea urchin products: 7 percent for fresh, frozen, or salted sea urchin roe, and 6.7 percent for prepared or preserved products, including those in airtight containers. There is no tariff for live sea urchins. Tariff rates are calculated as a percentage of total cost, including insurance and freight.

Sea urchin roe shipped from Los Angeles is considered to be the

best in Japan's import market. The future market for sales of U.S. sea urchins to Japan depends to a large extent on Japanese sea urchin harvest. Because Japanese domestic harvest is not likely to increase in the short term, increased export of U.S. sea urchins and sea urchin roe has significant potential.

INTRODUCTION

Sea urchins belong to the phylum Echinodermata, which also includes starfish, sea cucumbers, sea lilies, and brittle stars (Kato and Schroeter 1985). Among this group, sea urchins are the most important commercially, although some sea cucumbers are also utilized for food. Sea urchins have been fished in Japan for their prized roe ever since primitive times (Saito 1992).

Japan was the world's largest harvester and consumer of sea urchin roe. Since 1987, however, the Japanese harvest of sea urchins has declined significantly, and to fill the high demand, Japan has become increasingly dependent on imports. This need should remain because domestic harvest is not likely to increase in the short term (Hokkai Suisan Shinbun Sha 1993).

The United States has been the world's second largest harvesting nation of sea urchins until 2005 and was the second largest supplier of fresh sea urchin roe to Japan in 2016.

Japan is the most important export market for U.S. sea urchins, accounting for 89 percent in volume and 96 percent in value of U.S. exports of sea urchins and sea urchin roe in 2016 (U.S. Department of Commerce 2017).

This report provides a detailed examination of the world sea urchin fisheries, as well as Japan's fishery, imports, and market.

WORLD FISHERIES

The total world harvest of sea urchins increased from 16,000 metric tons (mt) in 1960 to a peak of 65,000 mt in 1992, but has been on a downward trend since then, falling to 39,000 mt in 2015 (Table 1). The decrease in global landings was due to lower harvests in three major harvesting countries: Japan, Russia, and the United States. Combined harvests by these countries declined 57 percent, from 49,654 mt in 1992 to 21,472 mt in 2015.

Of 20 nations that reported sea urchin landings in 2015, Japan ranked highest. Japan's share of the world catch decreased sharply from over 99 percent during the 1960s to 21 percent in 2015. Russia and China respectively harvested 20 and 19 percent of the world total. Canada, the United States, and Mexico respectively harvested 16, 12, and 10 percent of the world total. The combined catch of other countries accounted for about 1 percent of the total world catch.

The U.S. commercial fishery for sea urchins was developed in the early 1970s in California with the goal of providing sea urchin roe for the large seafood market in Japan (Kato 1972). The major commercially valuable sea urchin species in the United States are the red (*Strongylocentrous franciscanus*), purple (*S. purpuratus*), and green (*S. droebachiensis*) sea urchins. Several other species also occur, but they are either too small or too rare to be of economic significance (Kato and Schroeter 1985). On the U.S. Pacific coast, all three species are commercially harvested, but the red sea urchin is by far the most important. On the Atlantic coast, only green sea urchins occur, and are commercially harvested. In 2015, sea urchins were harvested in six states: Florida (27 mt), Washington (326 mt), Oregon (203 mt), California (3,677 mt), Maine (805 mt), and Massachusetts (23 mt); U.S. Department of Commerce 2017).

The majority of world landings of sea urchins from 2005 through 2015 occurred in the Northwest Pacific Ocean (27 to 60 percent), followed by the Eastern Central Pacific Ocean (20 percent; Table 2 and Figure 1).

**Table 1. World sea urchin landings by country, 1960-2015
(metric tons).**

Year	Japan	Russia	China	Canada	USA	Mexico	Philippines
1960	15,900	-*	-	-	50	-	-
1961	15,800	-	-	-	34	-	-
1962	16,500	-	-	-	33	-	-
1963	19,300	-	-	-	38	-	-
1964	20,700	-	-	-	55	-	-
1965	20,700	-	-	-	57	-	-
1966	23,200	-	-	-	65	-	-
1967	23,400	-	-	-	50	-	-
1968	27,000	-	-	-	38	-	-
1969	27,500	-	-	-	37	-	-
1970	27,106	-	-	-	-	-	-
1971	25,061	-	-	-	-	-	-
1972	21,682	-	-	-	-	-	-
1973	21,325	-	-	-	1,700	-	-
1974	18,537	-	-	47	3,245	-	-
1975	16,169	-	-	-	3,452	-	-
1976	14,695	-	-	-	5,755	-	3
1977	19,435	-	-	3	6,594	-	3
1978	20,171	-	-	-	8,409	-	60
1979	21,213	-	-	5	7,522	-	38
1980	18,409	-	-	7	42	-	6
1981	17,075	-	-	-	125	-	315
1982	18,593	-	-	-	7,939	-	88
1983	17,365	-	-	-	7,304	-	48
1984	23,962	-	-	-	6,901	-	101
1985	22,745	-	-	-	8,941	-	38
1986	23,072	-	225	-	14,749	-	62
1987	22,760	-	194	47	23,526	-	29
1988	21,812	4,735	30	2,622	30,589	-	26
1989	20,414	4,770	30	3,298	29,504	-	52
1990	19,398	6,065	30	3,748	28,726	-	48
1991	14,136	5,777	30	7,877	32,722	-	62
1992	13,889	5,917	50	14,640	29,848	-	40
1993	13,713	2,460	100	8,255	32,369	-	74
1994	15,525	2,069	150	8,479	29,167	-	151
1995	13,735	2,344	150	9,833	26,523	-	466
1996	12,996	1,608	200	9,665	20,381	-	452
1997	14,297	1,227	185	9,221	20,216	-	296
1998	13,653	1,590	177	9,867	13,626	-	161
1999	13,530	1,245	173	9,052	15,218	-	143
2000	12,455	1,677	172	8,012	14,014	-	125
2001	11,208	1,763	171	7,063	12,460	-	127
2002	12,733	2,620	170	6,441	10,627	-	112
2003	12,574	2,207	3,512	6,997	7,731	-	104
2004	12,716	2,454	6,724	6,870	9,889	-	98
2005	11,990	3,435	5,873	6,326	7,415	1,967	85
2006	10,820	4,346	9,714	5,382	7,164	1,627	102

2007	11,679	5,962	7,598	4,435	6,226	1,774	108
2008	10,867	8,587	3,193	4,157	6,714	2,046	122
2009	11,061	10,657	6,256	3,876	7,565	2,598	126
2010	10,218	10,731	6,349	4,357	6,424	3,215	145
2011	7,881	12,005	6,936	4,805	6,656	2,964	145
2012	8,251	11,778	6,033	4,068	6,476	3,206	138
2013	8,210	12,668	6,607	4,398	7,224	4,092	142
2014	8,053	11,918	6,971	6,227	6,691	3,670	135
2015	8,500	7,929	7,446	6,388	5,043	4,206	140

Table 1. (continued) World sea urchin landings by country, 1960-2015 (metric tons).

Year	Korea, North	Fiji Islands	Martinique	Cook Islands	Taiwan	USSR	Total
1960	-	-	-	-	-	100	16,050
1961	-	-	-	-	-	100	16,034
1962	-	-	-	-	-	100	16,733
1963	-	-	-	-	-	100	19,638
1964	-	-	-	-	-	-	20,755
1965	-	-	-	-	-	-	20,757
1966	-	-	-	-	-	-	23,265
1967	-	-	-	-	300	-	23,750
1968	-	-	-	-	-	-	27,038
1969	-	-	-	-	-	-	27,537
1970	-	-	-	30	58	-	27,194
1971	-	-	-	30	140	-	25,231
1972	-	-	-	30	88	-	21,800
1973	-	-	-	30	74	-	23,129
1974	-	-	-	30	19	-	21,878
1975	-	-	-	30	54	-	19,705
1976	-	-	-	30	19	-	20,502
1977	-	-	-	30	39	-	26,104
1978	-	-	-	23	212	-	28,875
1979	-	-	-	20	45	-	28,843
1980	-	-	-	20	78	-	18,562
1981	-	1	-	20	35	-	17,571
1982	-	2	-	20	-	337	26,979
1983	-	2	-	20	35	832	25,606
1984	-	4	-	20	35	436	31,459
1985	-	27	-	20	-	514	32,285
1986	239	30	-	20	3	6,328	44,728
1987	252	8	22	20	4	3,030	52,892

Year	Korea, North	Fiji Islands	Martinique	Cook Islands	Taiwan	USSR	Total
1988	200	10	22	20	12	-	60,079
1989	100	9	24	20	37	-	58,258
1990	100	12	25	20	134	-	58,306
1991	100	11	13	20	123	-	60,877
1992	100	14	18	20	65	-	64,603
1993	100	55	16	20	31	-	57,198
1994	100	56	15	20	51	-	55,833
1995	140	59	15	20	63	-	53,349
1996	150	40	10	20	59	-	45,583
1997	150	95	15	17	61	-	45,780
1998	100	103	15	14	39	-	39,345
1999	100	100	15	11	33	-	39,620
2000	100	90	10	8	41	-	36,705
2001	100	96	10	5	50	-	33,054
2002	100	70	10	2	63	-	32,948
2003	100	31	10	0	78	-	33,345
2004	100	100	10	2	71	-	39,034
2005	100	115	10	2	40	-	37,358
2006	100	133	10	1	-45	-	39,447
2007	100	91	10	1	46	-	38,032
2008	100	120	10	1	8	-	35,926
2009	100	35	10	1	7	-	42,292
2010	100	12	8	2	8	-	41,569
2011	100	15	7	5	11	-	41,530
2012	100	15	6	5	9	-	40,086
2013	100	15	6	5	5	-	43,472
2014	110	15	6	5	2	-	43,803
2015	110	15	6	5	-	-	39,788

-..... magnitude known to be nil or zero
Total also includes other countries not listed.

Source: Food and Agricultural Organization of the United Nations (FAO) 2017

Table 2. World sea urchin landings by FAO fishing area, 1950-2015 (metric tons).

Year	Atlantic Ocean			Pacific Ocean				Total
	(27)*	(21)	(31)	(77)	(71)	67)	(61)	
1950	-	15	-	-	-	-	6,400	6,415
1951	-	25	-	-	-	-	6,300	6,325
1952	-	33	-	-	-	-	7,000	7,033
1953	-	13	-	-	-	-	7,200	7,213
1954	-	25	-	-	-	-	6,500	6,525
1955	-	26	-	-	-	-	9,300	9,326
1956	-	54	-	-	-	-	14,200	14,254
1957	-	46	-	-	-	-	9,300	9,346
1958	-	29	-	-	-	-	12,400	12,429
1959	-	49	-	-	-	-	14,100	14,149
1960	-	50	-	-	-	-	16,000	16,050
1961	-	34	-	-	-	-	16,000	16,034
1962	-	33	-	-	-	-	16,700	16,733
1963	-	38	-	-	-	-	19,600	19,638
1964	-	55	-	-	-	-	20,700	20,755
1965	-	57	-	-	-	-	20,700	20,757
1966	-	65	-	-	-	-	23,200	23,265
1967	-	50	-	-	-	-	23,700	23,750
1968	-	38	-	-	-	-	27,000	27,038
1969	-	37	-	-	-	-	27,500	27,537
1970	-	-	-	30	-	-	27,164	27,194
1971	-	-	-	30	-	-	25,201	25,231
1972	-	-	-	30	-	-	21,770	21,800
1973	-	100	-	1,630	-	-	21,399	23,129
1974	-	68	-	3,247	-	7	18,556	21,878
1975	-	19	-	3,463	-	-	16,223	19,705
1976	-	16	-	5,034	3	735	14,714	20,502
1977	-	29	-	6,211	3	387	19,474	26,104
1978	-	4	-	7,980	60	448	20,383	28,875
1979	-	6	-	7,182	38	359	21,258	28,843
1980	-	22	-	20	6	27	18,487	18,562
1981	-	3	-	20	316	122	17,110	17,571
1982	-	-	-	7,851	90	108	18,930	26,979
1983	-	-	-	7,187	50	137	18,232	25,606
1984	-	23	-	6,687	105	211	24,433	31,459
1985	-	-	-	8,609	65	352	23,259	32,285
1986	-	5	-	3,542	92	1,222	29,867	44,728
1987	-	700	22	17,942	37	4,951	29,240	52,892

Table 2 (continued). World sea urchin landings by FAO fishing area, 1950-2015 (metric tons).

Year	Atlantic Ocean			Pacific Ocean				Total
	(27)*	(21)	(31)	(77)	(71)	67)	(61)	
1988	-	2,885	23	19,200	36	11,146	26,789	60,079
1989	-	4,355	24	15,064	61	13,403	25,351	58,258
1990	-	6,136	25	15,167	60	11,191	25,727	58,306
1991	-	9,637	18	15,567	73	15,415	20,166	60,876
1992	-	12,623	19	12,242	54	19,643	20,021	64,602
1993	-	20,390	21	9,104	129	11,150	16,404	57,198
1994	14	18,763	51	9,421	207	9,482	17,895	55,833
1995	-	17,726	15	10,011	525	8,640	16,432	53,349
1996	1	13,851	10	9,131	492	7,085	15,013	45,583
1997	-	12,201	15	8,209	391	9,044	15,920	45,780
1998	-	10,720	15	4,706	264	8,081	15,559	39,345
1999	-	10,794	15	6,386	243	7,101	15,081	39,620
2000	150	9,131	10	6,062	215	6,841	14,296	36,705
2001	152	7,274	10	5,876	223	6,378	13,141	33,054
2002	38	4,707	10	6,164	182	6,199	15,648	32,948
2003	2	5,293	10	4,781	135	4,654	18,470	33,345
2004	-	4,923	10	5,668	198	6,170	22,065	39,034
2005	-	3,800	10	7,356	200	4,554	21,438	37,358
2006	28	3,558	10	6,678	235	3,938	25,000	39,447
2007	6	2,802	10	7,037	199	2,597	25,381	38,032
2008	1	3,510	10	7,067	242	2,341	22,755	35,926
2009	6	3,296	10	8,106	161	2,638	28,075	42,292
2010	7	3,208	8	8,229	157	2,561	27,399	41,569
2011	7	3,365	7	8,161	160	2,904	26,926	41,530
2012	1	3,403	6	8,365	153	1,987	26,171	40,086
2013	-	3,399	6	9,945	157	2,375	27,590	43,472
2014	1	3,293	28	9,037	150	4,241	27,053	43,803
2015	4	3,147	31	7,873	155	4,597	23,981	39,788

*...numbers refer to FAO fishing areas (see Figure 1)

27'Atlantic, Northeast;

21'Atlantic, Northwest;

31'Atlantic, Western Central;

77'Pacific, Eastern Central;

71'Pacific, Western Central

67'Pacific, Northeast;

61'Pacific, Northwest;

-...magnitude known to be nil or zero

Source: FAO 2017

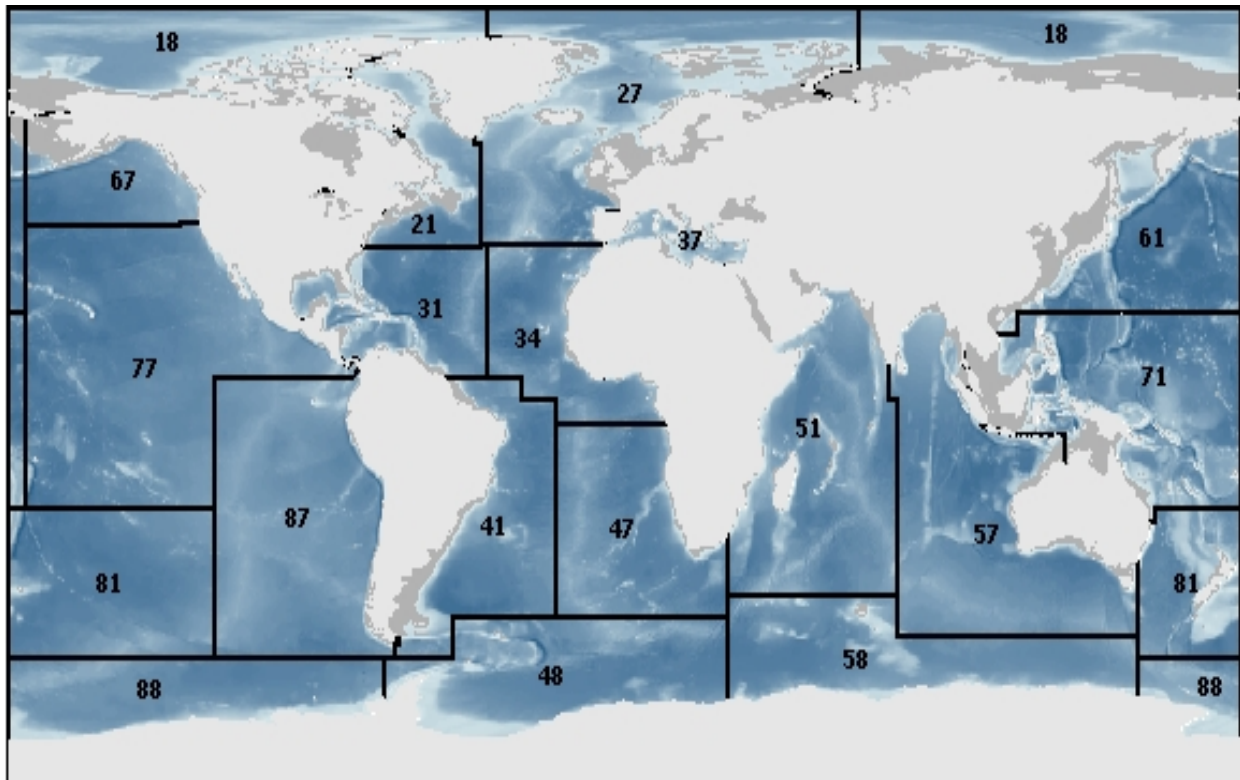


Figure 1. Major FAO statistical fishing areas.

FAO Major Fishing Areas

- 18 Arctic Sea
- 21 Atlantic, Northwest
- 27 Atlantic, Northeast
- 31 Atlantic, Western Central
- 34 Atlantic, Eastern Central
- 37 Mediterranean and Black Sea
- 41 Atlantic, Southwest
- 47 Atlantic, Southeast
- 48 Atlantic, Antarctic
- 51 Indian Ocean, Western
- 57 Indian Ocean, Eastern
- 58 Indian Ocean, Antarctic and Southern
- 61 Pacific, Northwest
- 67 Pacific, Northeast
- 71 Pacific, Western Central
- 77 Pacific, Eastern Central
- 81 Pacific, Southwest
- 87 Pacific, Southeast
- 88 Pacific, Antarctic

JAPANESE FISHERY

Japan was the world's largest harvester of sea urchins until 1986, but its share of the world catch has decreased sharply. The peak year of Japanese sea urchin harvest was 1969 when 27,500 mt were harvested (Table 1 and Figure 2). From 1970 through 1986, annual Japanese landings fluctuated between 14,000 and 27,000 mt. Since 1987, the Japanese harvest has steadily decreased due largely to declining stock abundance (Hokkai Suisan Shinbun Sha 1993). The total harvest in 2015 of 8,500 mt was less than 31 percent of the record landings.

From 1984 through 2015, the majority of Japan's harvest of sea urchins occurred in the Hokkaido region (34 to 64 percent; Table 3 and Figure 3), followed by North Pacific Ocean region (16 to 30 percent), and the East China Sea region (16 to 28 percent). Between 84 and 96 percent of sea urchin landings occurred in these three regions. Landings in these three regions decreased by 53 percent from 20,665 mt in 1984 to 8,226 mt in 2015, while landings in the Hokkaido Island region decreased by 47 percent during the same period.

Six species of sea urchins are commercially harvested in Japan (Hokkai Suisan Shinbun Sha 1993). The two major species, found in northern Japanese waters, are *Strongylocentrotus intermedius* and *S. nudus*. They represent about 80 percent of the total Japanese harvest of sea urchins. Four species harvested in southern Japanese waters are *Strongylocentrotus pulcherrimus*, *Anthocidaris crassispina*, *Pseudocentrotus depressus*, and *Tripneustes gratilla*.

Sea urchin resources in Japan are managed through limits on minimum size, harvest area, and season. The regulations are developed by local fishery cooperatives as well as local governments. Management plans put in place by fishery cooperatives stress economic returns and are usually stricter than those enacted by local governments

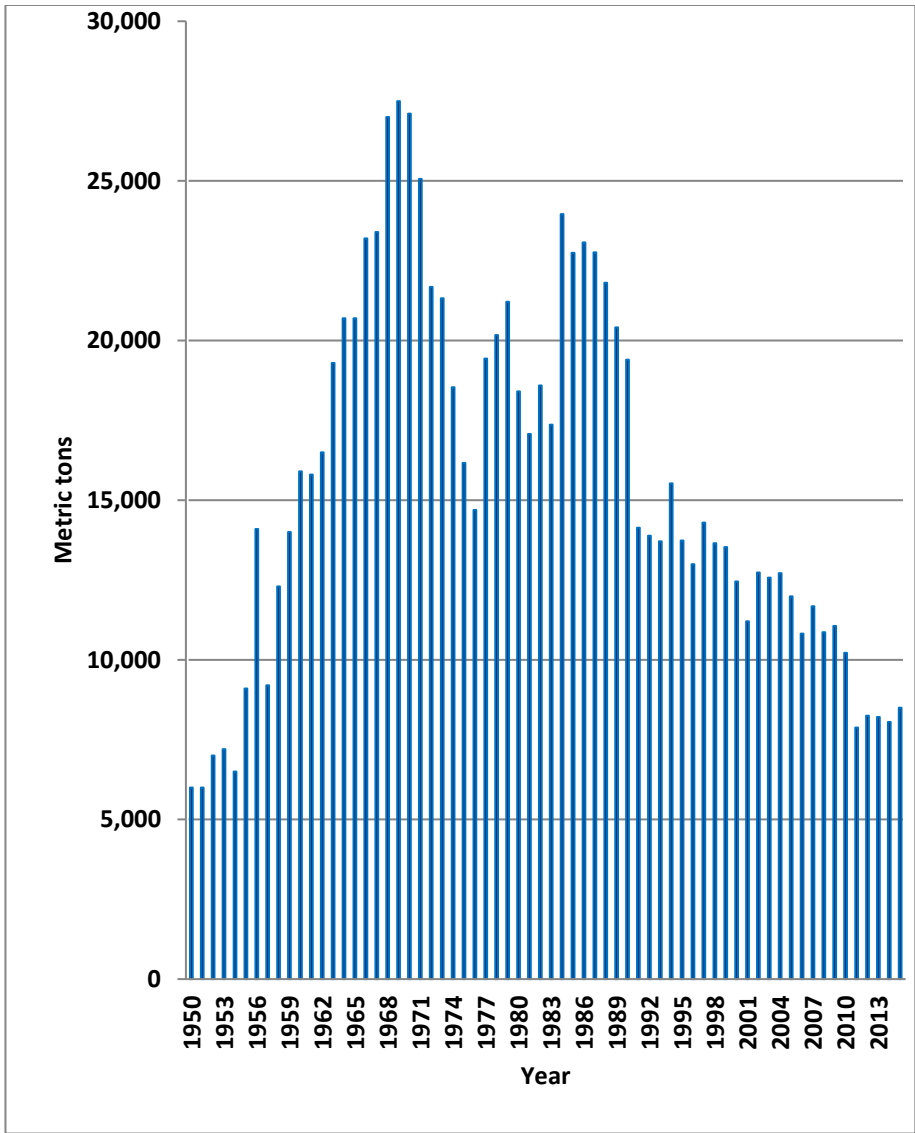


Figure 2. Japan's sea urchin landings, 1950-2015

Source: FAO 2017

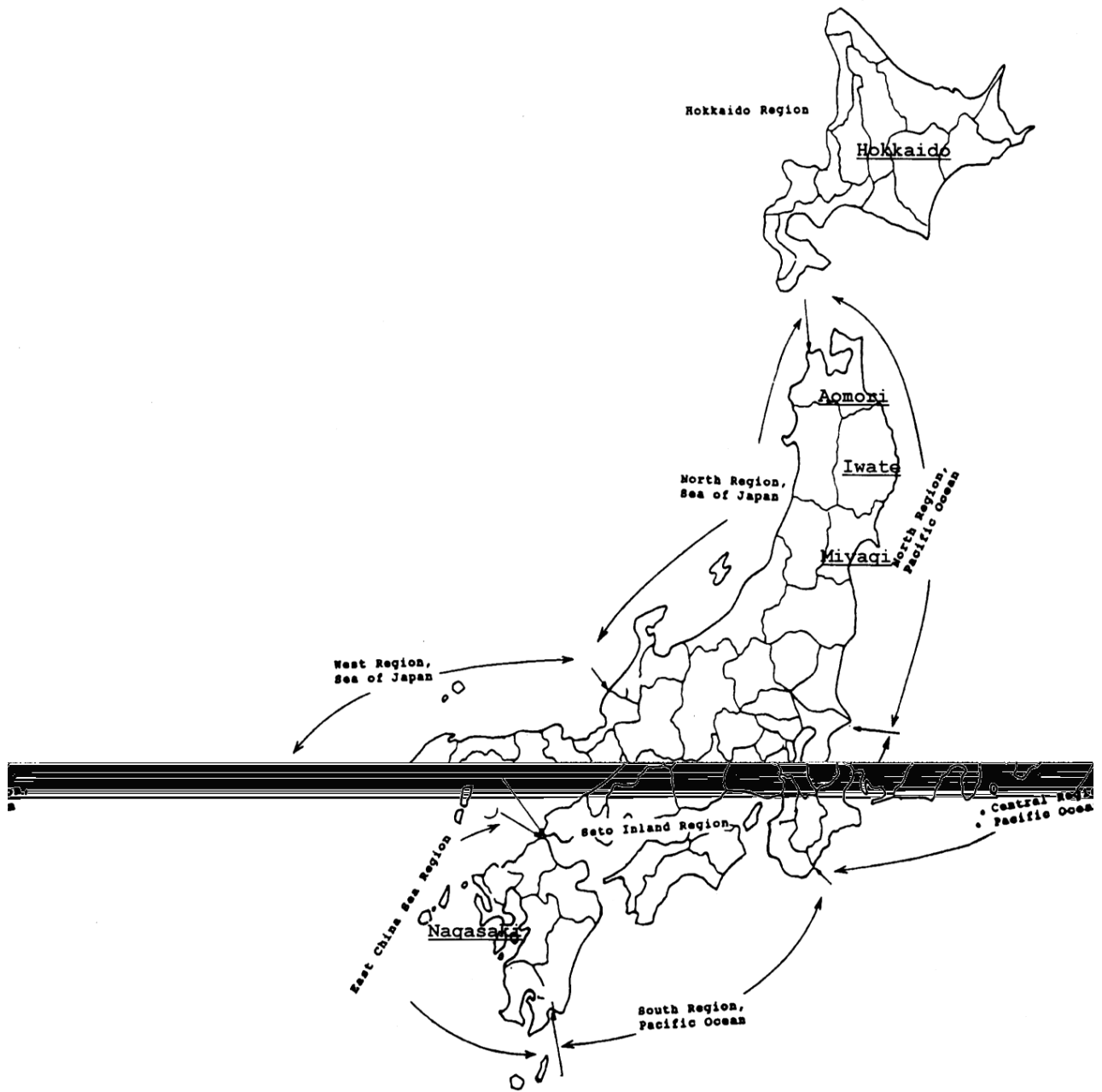


Figure 3. Japan's Fishing regions

Source: Ministry of Agriculture, Forestry, and Fisheries, 2003

Table 3. Japan's sea urchin landings by fishing area, 1984-2015 (metric tons).

Year	Hokkaido	Pacific Ocean			Sea of Japan		East China Sea	Seto Inland Sea
		North	Central	South	North	West		
1984	10,017	3,875	18	941	106	1,447	6,773	785
1985	10,094	4,905	19	928	148	985	5,085	581
1986	10,655	4,600	18	1,092	223	879	5,029	576
1987	10,753	5,176	21	937	225	679	4,450	519
1988	10,955	4,234	18	1,318	245	687	3,755	580
1989	9,430	4,175	8	1,193	298	806	4,032	472
1990	7,760	4,941	16	1,098	210	689	4,039	665
1991	5,493	3,396	14	997	132	503	3,138	464
1992	5,594	3,120	17	1,013	154	576	3,074	343
1993	5,163	3,216	31	676	138	669	3,455	365
1994	6,492	4,018	44	720	142	685	3,091	333
1995	4,686	3,590	33	846	111	620	3,439	410
1996	4,749	2,951	34	900	103	663	3,162	436
1997	5,713	3,532	26	845	194	647	2,884	455
1998	6,541	2,978	30	530	89	624	2,422	438
1999	5,921	3,885	37	458	151	518	2,198	363
2000	5,890	3,069	27	494	64	545	2,034	332
2001	5,233	2,536	29	451	35	574	2,040	309
2002	5,584	3,077	24	421	168	163	2,378	282
2003	6,060	3,799	19	368	132	159	2,388	238
2004	5,612	3,799	19	368	132	159	2,388	238
2005	5,339	3,799	19	368	132	159	2,388	238
2006	4,881	2,813	12	238	165	159	2,248	302
2007	5,455	3,340	16	287	143	160	1,938	340
2008	5,348	2,557	14	256	102	169	2,068	353
2009	5,348	2,908	11	290	95	107	2,001	301
2010	5,006	2,894	6	235	79	144	1,634	220
2011	5,117	735	12	179	114	112	1,445	166
2012	5,299	1,102	19	168	53	76	1,345	189
2013	4,770	1,801	22	178	59	65	1,218	96
2014	4,514	1,886	21	160	30	70	1,287	85
2015	4,666	2,224	29	136	26	59	1,336	85

Source: Ministry of Agriculture, Forestry and Fisheries 1986-2017

IMPORTS

Japan is the world's largest importer of sea urchins and sea urchin roe. In 2016, Japan's imports of fresh, frozen, and prepared sea urchin roe, and live sea urchins were 10,940 mt valued at about \$183 million (Tables 4 and 6). From 1975 to 2016, imports of sea urchins and sea urchin roe increased more than six times in volume and 9 times in value. Much of this increase was due to good demand, a strong yen (Appendix 1), decreased domestic harvest, and consequent rise in price for sea urchin roe.

In 2016, live sea urchin was the dominant sea urchin product imported into Japan, representing as much as 35 percent in value and 75 percent in volume. Frozen roe accounted for 32 percent in value and 17 percent in volume. Although total tonnage of live sea urchins is greater than frozen roe, it should be noted that the edible roe makes up only about 10-15 percent of the total live weight. Imports of fresh roe were 30 percent in value and 7 percent in volume, followed by prepared roe with 3 percent in value and 1 percent in volume in 2016 (Tables 4 and 6).

Japanese imports of live sea urchins increased 25 percent in volume and 62 percent in value from 1998 to 2016. The products came mostly from Russia, with lesser quantities imported from Canada and the United States (Tables 9 and 10). Supplies of live sea urchins from Canada and the United States increased in 2016, while shipments of this product from Russia decreased in volume.

Imports of fresh sea urchin roe increased somewhat from 3,844 mt in 1998 to 3,997 mt in 1999, but have since shown a downward trend (Tables 11 and 12). Canada has been the leading supplier of fresh roe to Japan, providing over 35 percent in volume and 35 percent in value of the total in 2016 (Table 13 and 14).

Imports of frozen sea urchin roe rose from 760 mt in 1988 to 1,806 mt in 2016 (Tables 17, 18, 19, 20, 21, 22). Since 1993, Chile has replaced the United States as the leading supplier of this product to Japan (Tables 19, 20, 21, and 22). Japan imported 3 mt of frozen roe from the United States in 2016, while imports from Chile amounted to 1,680 mt.

Imports of prepared sea urchin roe have declined steeply since 1992 (Table 4). The Republic of Korea has dominated the supplies of prepared sea urchin roe since 2012, providing over 59 percent in volume and 74 percent in value of prepared products in 2016 (Tables 23 and 24).

Japan regulates imports of fishery products with import quotas (IQ) and tariffs. Over the years, Japan has relaxed its IQ, and reduced trade barriers through multilateral and bilateral negotiations. Tariffs have been gradually cut by about one-third from those of 1995 on a number of fishery products.

Sea urchin products imported into Japan are subject to tariffs, but not IQ. As the United States and Japan are signatories to the World Trade Organization (WTO), WTO tariffs apply to U.S. exports of sea urchin products: 7 percent for fresh, frozen, or salted sea urchin roe, and 6.7 percent for prepared or preserved products, including those in airtight containers. There is no tariff for live sea urchins (Ministry of Finance 2017). Tariff rates are calculated as a percentage of total cost, including insurance and freight.

Table 4. Japanese annual imports of live sea urchins and sea urchin roe by products and volume, 1975-2016 (metric tons).

Year	Live	Fresh	Live/fresh	Frozen	Salted	Prepared	Total	
1975	.	*	.	1,684	-	* *	95	1,779
1976	.	.	.	1,874	-	-	171	2,045
1977	.	.	.	2,458	-	-	68	2,526
1978	.	.	.	2,315	-	-	192	2,507
1979	.	.	.	2,502	-	-	328	2,830
1980	.	.	.	2,207	-	-	279	2,486
1981	.	.	.	2,426	-	-	415	2,841
1982	.	.	.	2,397	-	-	329	2,726
1983	.	.	.	2,321	-	-	430	2,751
1984	.	.	.	2,636	-	-	496	3,132
1985	.	.	.	2,857	-	-	714	3,571
1986	.	.	.	3,601	-	-	675	4,276
1987	.	.	.	3,696	-	-	458	4,154
1988	.	.	.	2,643	760	1,248	882	5,533
1989	.	.	.	3,140	716	989	956	5,801
1990	.	.	.	2,882	653	1,075	625	5,235
1991	.	.	.	3,151	832	709	730	5,422
1992	.	.	.	3,367	876	750	994	5,987
1993	.	.	.	3,954	948	789	837	6,528
1994	.	.	.	4,630	716	784	875	7,005

Table 4 (continued). Japanese annual imports of live sea urchins and sea urchin roe by products and volume, 1975-2016 (metric tons).

Year	Live	Fresh	Live/fresh	Frozen	Salted	Prepared	Total
1995	.	.	5,017	1,122	696	903	7,738
1996	.	.	4,756	1,005	542	787	7,090
1997	.	.	4,337	1,028	455	702	6,522
1998	6,630	3,844	10,474	1,421	514	631	13,040
1999	7,077	3,997	11,074	1,526	371	729	13,700
2000	7,897	3,779	11,676	1,652	446	767	14,541
2001	11,155	3,444	14,599	1,690	319	720	17,328
2002	11,926	3,033	14,959	2,535	255	776	18,525
2003	11,822	2,637	14,459	1,801	*	233	16,493
2004	13,147	2,465	15,612	2,404	*	318	18,335
2005	14,788	2,196	16,984	2,236	*	276	19,496
2006	16,225	1,902	18,127	1,862	*	220	20,210
2007	14,225	1,580	15,805	1,957	*	118	17,879
2008	11,908	1,453	13,361	2,148	*	174	15,683
2009	9,890	1,451	11,341	2,209	*	140	13,690
2010	9,739	1,341	11,080	1,687	*	128	12,895
2011	9,734	1,299	11,033	2,092	*	92	13,216
2012	9,042	1,196	10,238	1,848	*	74	12,160
2013	9,217	1,103	10,320	1,838	*	111	12,269
2014	8,230	987	9,217	2,028	*	105	11,350
2015	8,138	853	8,991	1,899	*	91	10,981
2016	8,271	747	9,018	1,806	*	116	10,940

.* not available

-** no imports

**Sources: Japan Fish Traders Association 1976-2003
Ministry of Finance 2017**

Table 5. Japanese annual imports of live sea urchins and sea urchin roe by products and value, 1975-2002 (U.S. \$1,000).

Year	Live	Fresh	Live/fresh	Frozen	Salted	Prepared	Total
1975	.*	.	10,253	-**	-	9,964	20,217
1976	.	.	14,404	-	-	1,484	15,888
1977	.	.	20,496	-	-	665	21,161
1978	.	.	23,935	-	-	1,362	25,297
1979	.	.	30,495	-	-	2,304	32,799
1980	.	.	28,390	-	-	1,996	30,386
1981	.	.	34,105	-	-	2,919	37,024
1982	.	.	32,268	-	-	2,364	34,632
1983	.	.	34,418	-	-	2,988	37,406
1984	.	.	43,127	-	-	3,350	46,477
1985	.	.	45,448	-	-	5,151	50,599
1986	.	.	74,252	-	-	6,079	80,331
1987	.	.	99,284	-	-	4,623	103,907
1988	.	.	106,450	10,867	23,141	10,310	150,768
1989	.	.	112,488	9,291	15,816	12,812	150,407
1990	.	.	113,380	8,713	15,914	7,721	145,728
1991	.	.	142,566	12,190	14,603	9,541	178,900
1992	.	.	155,229	11,033	17,593	14,422	198,277
1993	.	.	185,814	15,564	15,071	13,060	229,509
1994	.	.	224,729	10,780	15,235	14,497	265,241
1995	.	.	265,450	21,747	14,885	17,536	319,618
1996	.	.	232,168	18,553	12,997	15,568	279,286
1997	.	.	196,286	17,633	10,114	14,257	238,290
1998	39,524	163,049	202,573	22,338	10,386	9,427	244,724
1999	41,278	179,671	220,949	24,647	9,997	11,518	267,111
2000	48,009	176,395	224,404	30,091	12,433	14,055	280,983
2001	57,657	150,002	207,659	27,908	9,217	11,144	255,928
2002	56,618	121,303	177,921	45,857	7,292	15,398	246,468

.* not available

-** no imports

Source: Japan Fish Traders Association 1976-2003

Table 6. Japanese annual imports of live sea urchins and sea urchin roe by products and value, 2012-2016 (million yen)

Year	Live	Fresh	Frozen	Prepared	Total
2012	5,158	6,097	4,685	382	16,322
2013	5,697	6,858	4,384	533	17,472
2014	5,877	6,917	7,799	479	21,072
2015	6,193	6,779	7,587	507	21,066
2016	6,953	5,977	6,269	660	19,859

Source: Ministry of Finance 2017

Table 7. Japanese annual imports of live sea urchins by country of origin and volume, 1998-2002 (metric tons).

Country of origin	1998	1999	2000	2001	2002
Russia	3,451	4,376	6,186	9,076	10,597
Korea, North	1,389	1,255	666	1,156	735
USA	1,223	961	772	654	431
Canada	557	467	268	254	158
China	4	7	1	14	6
Norway	7	10	4	1	-
Indonesia	0 *	0	-	-	-
U.K.	0	-	-	-	-
New Zealand	-**	-	-	0	-
Total	6,630	7,077	7,897	11,155	11,926

0*.....more than zero but less than 0.5 metric tons

-** ...no imports

Total may not add due to rounding

Source: Japan Fish Traders Association 1999-2003

Table 8. Japanese annual imports of live sea urchins by country of origin and value, 1998-2002 (U.S. \$1,000).

Country of origin	1998	1999	2000	2001	2002
Russia	19,172	22,606	33,051	42,931	46,828
Korea, North	6,161	6,770	5,942	6,895	5,075
USA	9,672	7,919	6,657	5,526	3,405
Canada	4,410	3,816	2,332	2,138	1,254
China	47	94	4	159	56
Norway	55	69	23	5	-
Indonesia	4	4	-	-	-
U.K.	3	-	-	-	-
New Zealand	-*	-	-	2	-
Total	39,524	41,278	48,009	57,657	56,618

-* ...no imports

Total may not add due to rounding

Source: Japan Fish Traders Association 1999-2003

**Table 9. Japanese annual imports of live sea urchins
(*Strongylocentrotus spp.*, *Paracentrotus lividus*,
Loxechinus albus, *Echichinus esculentus*)
by Country of origin and volume, 2007-2016
(metric tons).**

Country of origin	2007	2008	2009	2010	2011
Iceland	-*	-	2	-	-
Norway	-	-	2	-	-
Korea, Rep. of	-	-	-	9	84
China	0**	-	-	-	3
Russia	14,051	11,756	9,670	9,555	9,524
Canada	67	51	96	95	74
USA	107	101	120	79	49
Total	14,225	11,908	9,890	9,739	9,734

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	-	49	-	-	-
Iceland	-	-	-	-	9
Russia	9,002	9,054	8,098	7,977	7,978
Canada	32	76	97	137	211
USA	9	39	35	30	73
Total	9,042	9,217	8,230	8,138	8,271

-* ...no imports

0**.....more than zero but less than 0.5 metric tons

Total may not add due to rounding

Source: Ministry of Finance 2017

**Table 10. Japanese annual imports of live sea urchins
(*Strongylocentrotus* spp., *Paracentrotus lividus*,
Loxechinus albus, *Echinus esculentus*)
by country of origin and value, 2007-2016
(million yen).**

Country of origin	2007	2008	2009	2010	2011
Iceland		-*	2	-	-
Norway	-*	-	3	-	-
Korea, Rep. of	-	-	-	5	35
China	9	-	-	-	3
Russia	6,918	6,590	5,416	5,432	5,127
Canada	78	60	96	94	69
USA	100	93	93	64	40
Total	7,104	6,743	5,610	5,595	5,275

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	-	25	-	-	-
Iceland	-	-	-	-	11
Russia	5,118	5,534	5,696	5,988	6,597
Canada	34	89	134	167	259
USA	7	48	47	38	85
Total	5,158	5,697	5,877	6,193	6,953
-* ...no imports					

-* ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 11. Japanese annual imports of fresh sea urchin roe by country of origin and volume, 1998-2002 (metric tons).

Country of origin	1998	1999	2000	2001	2002
USA	1,891	2,034	1,854	1,569	1,185
Chile	671	787	751	675	693
Canada	478	445	471	422	402
China	353	382	329	314	261
Korea, North	57	64	74	174	182
Mexico	1	-	-	-	101
Korea, Rep.	342	230	196	169	100
Peru	5	15	52	86	64
Hong Kong	33	32	43	30	25
Russia	-*	2	4	3	16
Australia	3	3	4	1	2
Philippines	3	2	2	-	1
S. Africa	-	-	-	-	1
Norway	8	1	1	1	-
Vietnam	-	0**	-	-	-
Palau	-	0	-	-	-
Cameroun	-	-	-	0	-
Total	3,844	3,997	3,779	3,444	3,033

-* ...no imports

0**...more than zero but less than 0.5 metric tons

Total may not add due to rounding

Source: Japan Fish Traders Association 1999-2003

Table 12. Japanese annual imports of fresh sea urchin roe by country of origin and value, 1998-2002 (U.S. \$1,000).

Country of origin	1998	1999	2000	2001	2002
USA	89,420	102,592	100,402	79,869	55,139
Chile	21,412	27,255	26,325	22,804	22,216
Canada	19,196	18,862	20,067	17,554	15,707
China	13,589	14,924	12,084	9,969	7,358
Korea, North	1,331	2,127	3,569	8,496	7,331
Mexico	83	-	-	-	5,602
Korea, Rep.	15,731	11,140	9,299	6,979	4,166
Peru	135	413	1,621	2,519	2,113
Hong Kong	1,917	2,010	2,642	1,630	1,024
Russia	-*	51	113	91	478
Australia	123	190	180	73	115
Philippines	72	48	58	-	43
S. Africa	-	-	-	-	12
Norway	40	49	36	14	-
Vietnam	-	5	-	-	-
Palau	-	6	-	-	-
Cameroun	-	-	-	2	-
Total	163,049	179,671	176,395	150,002	121,303

-* ...no imports
Total may not add due to rounding

Source: Japan Fish Traders Association 1999-2003

Table 13. Japanese annual imports of fresh sea urchin roe (*Strongylocentrotus spp.*, *Paracentrotus lividus*, *Loxechinus albus*, *Echinus esculentus*) by country of origin and volume, 2012-2016 (metric tons).

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	0*	6	5	3	3
China	180	128	163	152	136
Russia	0	1	-**	-	-
Canada	278	280	306	284	257
USA	262	288	207	159	152
Mexico	78	77	56	54	25
Peru	-	-	-	0	10
Chile	73	49	32	41	66
Total	872	829	770	693	649

0*...more than zero but less than 0.5 metric tons

-* ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 14. Japanese annual imports of fresh sea urchin roe (*Strongylocentrotus spp.*, *Paracentrotus lividus*, *Loxechinus albus*, *Echinus esculentus*) by country of origin and value, 2012-2016 (million yen).

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	1	29	25	16	17
China	816	724	1,046	1,151	1,002
Russia	1	6	-*	-	-
Canada	1,474	1,827	2,275	2,297	2,105
USA	1,412	1,889	1,582	1,442	1,501
Mexico	457	439	317	347	150
Peru	-	-	-	1	54
Chile	291	269	174	245	369
Total	4,451	5,181	5,419	5,500	5,199

-* ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 15. Japanese annual imports of fresh sea urchin roe (other) by country of origin and volume, 2012-2016 (metric tons).

Country of origin	2012	2013	2014	2015	2016
Mexico	86	131	113	70	35
China	74	25	41	34	32
USA	87	70	49	33	19
Korea, Rep. of	30	13	10	11	10
Chile	2	0*	0	9	0
Canada	45	33	4	4	2
Peru	-**	-	-	-	0
Australia	-	0	-	-	-
Total	324	274	217	160	98

0*...more than zero but less than 0.5 metric tons

-* ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 16. Japanese annual imports of fresh sea urchin roe (other) country of origin and value, 2012-2016 (million yen)

Country of origin	2012	2013	2014	2015	2016
Mexico	451	804	843	615	292
USA	462	400	258	199	136
China	305	145	294	273	245
Canada	269	237	23	22	8
Korea, Rep. of	151	91	79	104	94
Chile	7	1	1	66	2
Peru	-*	-	-	-	0
Australia	-	0**	-	-	-
Total	1,646	1,677	1,498	1,279	778

-* ...no imports

0**...more than zero but less than 0.5 metric tons

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 17. Japanese annual imports of frozen sea urchin roe by country of origin and volume, 1988-2002 (metric tons).

Country of origin	1988	1989	1990	1991	1992	1993	1994	1995
Chile	179	83	41	143	242	465	429	830
USA	432	446	341	344	254	229	98	101
Canada	37	47	66	158	227	137	147	118
Korea, North	2	3	19	85	70	27	18	24
Korea, Rep.	0*	0	-	2	2	5	-	-
China	30	51	36	58	51	33	2	7
Peru	**	-	-	-	1	-	10	22
Australia	-	0	0	1	2	-	-	1
Hong Kong	-	1	-	-	0	-	-	-
Taiwan	6	-	-	-	-	-	-	-
Vietnam	-	-	-	-	0	21	-	-
Philippines	2	0	0	1	0	2	0	6
Portugal	-	0	-	-	-	-	-	-
Iceland	-	-	-	-	0	-	3	4
Russia	-	-	6	-	2	1	-	-
Mexico	71	84	142	40	23	28	6	7
New Zealand	-	1	1	-	1	2	2	3
Total	760	716	653	832	876	948	716	1,122

Country of Origin	1996	1997	1998	1999	2000	2001	2002
Chile	750	790	1,124	1,304	1,442	1,483	2,295
USA	88	43	32	51	42	55	69
Canada	83	120	106	83	79	68	65
Korea, North	26	43	152	63	75	73	41
Korea, Rep.	9	7	4	2	1	4	37
China	15	6	-	2	6	3	16
Peru	10	3	2	19	2	-	5
Cook Is.	3	-	-	-	-	-	4
Australia	-	-	-	1	3	2	2
Vietnam	-	-	0	-	-	-	-
Philippines	0	3	1	-	-	2	-
Iceland	3	0	-	-	-	-	-
Denmark	-	0	-	-	-	-	-
Russia	-	-	-	-	-	1	-
India	-	-	-	-	1	-	-
Mexico	18	14	-	-	-	-	-
Total	1,005	1,028	1,421	1,526	1,652	1,690	2,535

0*....more than zero but less than 0.5 metric tons

**...no imports

Total may not add due to rounding

Source: Japan Fish Traders Association 1989-2003

Table 18. Japanese annual imports of frozen sea urchin roe by country of origin and value, 1988-2002 (U.S. \$1,000).

Country of origin	1988	1989	1990	1991	1992	1993	1994	1995
Chile	1,453	762	290	1,955	3,676	8,731	7,336	17,653
Korea, Rep.	6	2	-	76	112	76	-	-
Korea, North	17	61	138	751	663	408	299	405
Canada	434	372	744	1,839	1,836	1,070	1,201	1,058
USA	6,836	5,942	4,163	5,743	3,136	3,977	1,456	1,285
China	469	601	559	768	739	485	47	160
Peru	-*	-	-	-	16	-	181	660
Australia	-	10	5	8	68	-	-	23
Hong Kong	-	20	-	-	4	-	-	-
Taiwan	124	-	-	-	-	-	-	-
Vietnam	-	-	-	-	2	134	-	-
Philippines	15	4	5	25	2	34	5	38
Portugal	-	6	-	-	-	-	-	-
Iceland	-	-	-	-	5	-	19	61
Russia	-	-	111	-	4	9	-	-
Mexico	1,513	1,495	2,682	1,024	742	584	195	277
New Zealand	-	16	16	-	26	57	42	127
Total	10,867	9,291	8,713	12,190	11,033	15,564	10,780	21,747

Country of Origin	1996	1997	1998	1999	2000	2001	2002
Chile	15,029	15,167	19,522	22,436	27,710	25,699	43,213
Korea, Rep.	559	377	248	82	26	69	647
Korea, North	296	591	1,455	802	1,377	1,161	631
Canada	833	953	839	593	571	623	496
USA	763	309	184	272	217	274	376
China	233	68	-	18	140	17	277
Cook Is.	13	-	-	-	-	-	104
Peru	295	26	49	417	12	-	101
Australia	-	-	-	29	35	9	12
Vietnam	-	-	3	-	-	-	-
Philippines	9	67	36	-	-	48	-
Iceland	79	5	-	-	-	-	-
Denmark	-	2	-	-	-	-	-
Russia	-	-	-	-	-	8	-
India	-	-	-	2	-	-	-
Mexico	444	68	-	-	-	-	-
Total	18,553	17,633	22,338	24,647	30,091	27,908	45,857

-* ...no imports

Total may not add due to rounding

Source: Japan Fish Traders Association 1989-2003

Table 19. Japanese annual imports of frozen sea urchin roe (*Strongylocentrotus spp.*, *Paracentrotus lividus*, *Loxechinus albus*, *Echinus esculentus*) by country of origin and volume, 2012-2016 (metric tons).

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	0*	0	-**	-	-
China	8	24	6	8	10
Vietnam	-	-	0	-	-
Philippines	-	-	17	22	-
Canada	45	37	46	56	20
USA	-	10	18	10	3
Mexico	-	20	28	28	5
Peru	-	-	7	10	-
Chile	1,585	1,578	1,698	1,588	1,645
Austral	-	1	-	-	-
Total	1,638	1,670	1,820	1,723	1,682

0*...more than zero but less than 0.5 metric tons

-** ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 20. Japanese annual imports of frozen sea urchin roe (*Strongylocentrotus spp.*, *Paracentrotus lividus*, *Loxechinus albus*, *Echinus esculentus*) by country of origin and value, 2012-2016 (million yen).

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	0	1	-	-	-
China	25	59	16	35	38
Vietnam	-	-	1	-	-
Philippines	-	-	18	36	-
Canada	28	36	63	85	22
USA	-	11	17	16	2
Mexico	-	51	94	125	8
Peru	-	-	13	29	-
Chile	4,087	5681	6863	6418	5668
Austral	-	1	-	-	-
Total	4,140	5,839	7,084	6,745	5,737

0*...more than zero but less than 0.5 metric tons

-** ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 21. Japanese annual imports of frozen sea urchin roe (other) by country of origin and volume, 2012-2016 (metric tons).

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	3	6	4	4	0*
China	85	62	65	17	27
Vietnam	-**	2	5	8	2
Philippines	1	18	35	16	3
Russia	-	5	1	-	-
Canada	51	35	38	32	22
USA	19	14	-	-	-
Mexico	14	1	2	2	1
Peru	18	24	35	41	33
Chile	18	-	19	56	35
Australia	0	-	3	1	-
Total	210	168	208	176	124

0*...more than zero but less than 0.5 metric tons

-** ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 22. Japanese annual imports of frozen sea urchin roe (other) by country of origin and value, 2012-2016 (million yen).

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	26	23	39	38	2
China	233	210	257	81	119
Vietnam	-**	3	18	34	8
Philippines	1	16	49	26	4
Russia	-	10	4	-	-
Canada	178	158	124	169	95
USA	11	10	-	-	-
Mexico	8	1	4	2	1
Peru	62	115	172	215	153
Chile	26	-	46	276	149
Australia	0*	-	3	1	-
Total	545	545	715	842	532

0*...more than zero but less than 0.5 metric tons

-** ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 23. Japanese annual imports of prepared sea urchin roe (other) by country of origin and volume, 2012-2016 (metric tons).

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	72	79	66	58	68
China	-	-	1	5	5
Philippines	1	27	36	25	34
Russia	1	5	1	36	10
Canada	-	-	-	-	0
Peru	-	-	-	-	0
USA	-	-	1	-	0
TOTAL	74	112	105	91	116

0*...more than zero but less than 0.5 metric tons

-* ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 24. Japanese annual imports of prepared sea urchin roe (other) by country of origin and value, 2012-2016 (million yen).

Country of origin	2012	2013	2014	2015	2016
Korea, Rep. of	380	499	431	434	485
China	-	-	5	25	25
Philippines	0	28	39	29	37
Russia	1	6	4	19	111
Canada	-	-	-	-	1
Peru	-	-	-	-	1
USA	-	-	0	-	0
TOTAL	382	533	479	507	660

0*...more than zero but less than 0.5 metric tons

-* ...no imports

Total may not add due to rounding

Source: Ministry of Finance 2017

Table 25. Japanese annual imports of prepared sea urchin roe by country of origin and volume, 1995-2002 (metric tons).

Country of origin	1995	1996	1997	1998	1999	2000	2001	2002
Chile	806	687	586	564	674	688	647	677
Russia	9	2	6	0	1	19	26	57
Korea, North	78	71	103	66	32	56	38	38
Korea, Rep.	0*	0	-	-	-	-	4	2
China	3	5	1	-	16	3	-	1
Philippines	-**	-	-	0	-	-	-	1
Taiwan	4	2	1	-	5	1	-	-
Vietnam	1	-	-	-	-	-	-	-
Iceland	-	0	-	-	0	-	-	-
Canada	-	-	3	-	-	-	-	-
USA	2	20	1	0	-	-	6	-
Morocco	-	-	-	-	-	1	-	-
Total	903	787	702	631	729	767	720	776

0*... more than zero but less than 0.5 metric tons

-**.. no imports

Total may not add due to rounding

Source: Japan Fish Traders Association 1996-2003

Table 26. Japanese annual imports of prepared sea urchin roe by country of origin and value, 1995-2002 (U.S. \$1,000).

Country of origin	1995	1996	1997	1998	1999	2000	2001	2002
Chile	15,672	13,956	12,281	8,724	10,596	12,451	10,019	12,821
Russia	248	54	94	12	25	293	426	1,674
Korea, North	1,367	1,212	1,712	669	532	1,141	608	817
Korea, Rep.	8	12	-	-	-	-	88	49
China	127	115	13	-	292	82	-	30
Philippines	-*	-	-	2	-	-	-	8
Taiwan	93	74	91	-	62	70	-	-
Vietnam	9	-	-	-	-	-	-	-
Iceland	-	2	-	-	11	-	-	-
Canada	-	-	47	-	-	-	-	-
USA	12	143	18	20	-	-	3	-
Morocco	-	-	-	-	-	20	-	-
Total	17,536	15,568	14,257	9,427	11,518	14,055	11,144	15,399

-*... no imports

Total may not add due to rounding

Source: Japan Fish Traders Association 1996-2003

MARKET

Japan is the world's largest market for sea urchins. Most fresh sea urchin roe is sold through auction at the Tokyo Central Wholesale Market. Fresh sea urchin roe is also sold through central wholesale markets in other cities either through auction or directly without auction. It is also sold directly to supermarket chains. Frozen and salted roe are usually sold directly to processors specializing in preserved products.

Live sea urchins are not sold through central wholesale markets. They are primarily shipped to northern Japan, where the roe is extracted and packed for shipment to central wholesale markets in various cities, and to supermarket chains.

Wholesale prices for fresh roe vary widely, depending on quality, origin, species, supply and demand, and other factors. Highest prices are paid for roe which is bright yellow or orange, firm, unbroken, and packed neatly in traditional wood trays. Roe color is exceedingly important in marketing. Bright yellow roe is considered the highest quality in the Tokyo area, although consumers in the Osaka area often prefer bright orange roe (Minato Shinbun Sha August 7, 2003).

Tables 27 and 28 show average annual and monthly wholesale prices and sales volume of fresh sea urchin roe at the Tokyo Central Wholesale Market. The prices for both domestic and imported roe showed fluctuations which were influenced mainly by amount of total supply (domestic and imported roe), usually, the lower the supply, the higher the price.

The demand for sea urchin roe is seasonal, with the largest amount being consumed in December. Total sales volume (domestic and imported) of fresh sea urchin roe at the Tokyo Central Wholesale Market is high in December as consumption increases over the Japanese holidays (Table 28).

Sea urchin roe shipped from Los Angeles is considered to be the best in Japan's import market, followed by roe from Boston, China, Canada, Chile, San Francisco, Mexico, Alaska, Russia and North Korea (Minato shinbun sha 2003).

Labor costs for packing roe in traditional wood trays are high because of the skill and time required. Plastic cups are receiving attention as an economic alternative because of lower costs for labor, materials, and shipping. Roe packed in small plastic cups holding about 100 grams are gaining in popularity at supermarkets because of their lower cost.

The future market for sales of U.S. sea urchins to Japan depends to a large extent on Japanese sea urchin harvest. Because domestic harvest is not likely to increase in the short term, increased export of U.S. sea urchins and sea urchin roe has significant potential.

Table 27. Annual sales volume and average wholesale prices of fresh sea urchin roe at Tokyo Central Wholesale Market, 1986-2016.

Year	Domestic roe		Imported roe		Total sales volume
	Sales volume Metric tons	Prices Yen/kg	Sales volume Metric tons	Prices Yen/kg	
1986	844	7,835	766	5,578	1,610
1987	880	7,681	968	5,660	1,848
1988	943	7,486	1,614	4,463	2,557
1989	845	7,863	1,894	4,868	2,739
1990	638	9,952	1,741	6,056	2,379
1991	494	10,283	2,552	4,689	3,046
1992	405	12,973	1,731	6,259	2,136
1993	465	12,209	1,503	6,704	1,968
1994	528	10,551	1,635	6,237	2,163
1995	535	10,553	1,582	6,388	2,117
1996	542	10,133	1,551	6,117	2,093
1997	632	9,630	1,651	6,598	2,283
1998	670	10,270	1,274	6,334	1,944
1999	645	9,854	1,287	5,845	1,932
2000	692	9,629	1,193	5,950	1,885
2001	852	8,714	1,091	5,838	1,943
2002	1,070	7,471	918	5,278	1,988
2003	898	8,088	926	4,708	1,824
2004	978	7,374	777	5,224	1,755
2005	809	7,933	936	5,278	1,745
2006	632	7,942	993	6,110	1,625
2007	656	8,473	802	7,121	1,458
2008	633	8,300	674	6,517	1,307
2009	564	8,292	794	5,461	1,358
2010	582	8,287	749	5,278	1,331
2011	561	8,282	589	5,188	1,150
2012	516	9,690	719	5,805	1,235
2013	528	10,092	632	7,389	1,160
2014	529	10,247	589	9,400	1,118
2015	532	11,947	529	11,202	1,061
2016	519	12,793	496	12,694	1,015

Source: Tokyo Metropolitan Government 1987-2017

Table 28. Monthly sales volume and average wholesale prices of fresh sea urchin roe at Tokyo Central Wholesale Market, 2016.

Month	Domestic roe		Imported roe		Total sales volume
	Sales volume Metric tons	Prices Yen/kg	Sales volume Metric tons	Prices Yen/kg	
January	24	14,789	40	13,346	64
February	27	14,569	40	14,224	67
March	34	13,646	45	12,885	79
April	41	10,607	52	10,916	93
May	55	9,601	37	11,966	91
June	67	9,065	33	11,470	99
July	88	8,527	33	9,840	121
August	59	13,596	33	11,620	92
September	36	18,675	35	11,649	71
October	24	17,369	47	12,724	71
November	25	17,480	40	15,061	65
December	39	19,919	62	14,845	101
Total	519	12,793	496	12,694	1,015

Source: Tokyo Metropolitan Government 2017

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- U.S. Forex Foreign Exchange. 2017. Monthly Average Exchange

Appendix 1. Monthly and annual average exchange rate applied to Japanese imports, 1976-2016 (yen/U.S. \$1.00).

Month	1976	1977	1978	1979	1980	1981	1982
Jan.	305.50	292.64	240.73	195.98	237.68	203.99	221.36
Feb.	302.84	288.41	241.46	199.16	240.35	203.44	231.15
Mar.	301.50	282.49	236.94	203.39	247.44	207.80	237.03
Apr.	299.30	275.91	222.99	210.87	252.39	211.99	246.01
May	299.00	277.66	225.36	217.81	238.71	217.18	237.25
June	299.83	275.79	222.54	219.83	221.44	223.89	243.66
July	296.89	267.78	205.17	217.24	217.95	226.55	256.07
Aug.	292.81	265.70	191.18	216.13	224.85	236.35	257.18
Sept.	288.18	267.14	190.94	220.54	219.10	230.26	258.60
Oct.	288.43	261.78	187.76	225.41	210.18	229.15	268.14
Nov.	294.12	249.13	184.41	238.48	211.28	230.56	272.81
Dec.	295.68	241.87	196.54	244.62	212.85	218.15	250.33
Jan.-Dec.	296.92	270.53	212.17	217.46	227.85	219.94	248.30

Month	1983	1984	1985	1986	1987	1988	1989
Jan.	232.89	233.83	252.04	202.07	159.01	126.01	125.64
Feb.	237.03	233.98	256.66	193.53	152.70	128.57	128.49
Mar.	235.99	228.79	260.53	180.21	153.47	128.72	128.00
Apr.	238.61	225.10	254.49	178.62	146.97	125.64	132.12
May	235.43	227.48	251.36	167.08	139.91	124.76	133.78
June	238.48	231.56	250.26	169.29	142.58	125.23	143.06
July	239.93	238.69	246.22	163.17	147.81	131.40	141.60
Aug.	242.70	243.69	237.92	155.04	150.83	133.12	140.29
Sept.	244.80	243.02	239.20	154.66	143.02	134.21	145.10
Oct.	236.15	246.68	221.43	154.23	144.59	132.58	142.58
Nov.	234.22	244.08	209.32	160.34	138.52	125.36	142.67
Dec.	234.81	246.07	202.60	162.73	132.65	122.21	143.83
Jan.-Dec.	237.59	236.91	240.17	170.08	146.01	128.15	137.26

Appendix 1 (continued). Monthly and annual average exchange rate applied to Japanese imports, 1976-2016 (yen/U.S. \$1.00).

Month	1990	1991	1992	1993	1994	1995	1996
Jan.	144.36	135.27	126.21	124.66	111.79	100.25	104.49
Feb.	144.93	130.97	125.47	123.98	109.23	99.19	106.38
Mar.	148.61	134.02	130.46	117.95	105.04	94.49	105.32
Apr.	156.99	137.68	133.37	115.05	104.47	86.99	107.07
May	157.09	137.71	132.77	110.81	103.07	83.75	106.02
June	159.28	139.05	128.15	107.97	104.29	84.96	108.19
July	151.95	138.85	125.61	108.16	99.55	85.46	109.55
Aug.	148.90	137.00	126.99	105.38	99.57	90.73	107.84
Sept.	142.96	136.24	124.36	104.37	99.25	98.48	108.78
Oct.	133.82	131.72	121.03	105.79	98.97	100.88	110.99
Nov.	128.31	130.47	122.71	107.80	97.41	101.56	112.86
Dec.	130.86	129.14	124.11	108.35	99.22	101.51	112.70
Jan.-Dec.	145.67	134.84	126.77	111.69	102.66	94.02	108.35

Month	1997	1998	1999	2000	2001	2002	2003
Jan.	115.60	130.98	114.09	103.76	115.37	131.00	119.73
Feb.	121.26	125.90	115.02	107.05	116.56	133.31	119.26
Mar.	122.38	127.35	119.88	108.29	118.10	131.90	118.09
Apr.	124.29	130.84	119.55	106.02	123.97	132.07	119.62
May	123.99	132.33	120.21	107.38	122.56	128.73	118.54
June	114.98	138.65	121.52	108.36	120.93	124.86	117.74
July	114.08	140.47	121.56	106.34	124.40	120.11	118.34
Aug.	117.18	143.44	115.95	108.70	123.50	118.45	119.32
Sept.	119.44	138.58	110.21	106.71	119.97	118.99	117.28
Oct.	121.18	129.32	106.34	107.88	119.40	123.20	111.41
Nov.	122.27	118.14	105.21	108.14	121.73	122.52	109.18
Dec.	127.90	120.26	103.73	110.67	124.35	122.81	108.63
Jan. - Dec.	120.38	131.36	114.44	107.80	121.57	125.61	116.41

Appendix 1 (continued). Monthly and annual average exchange rate applied to Japanese imports, 1976-2016 (yen/U.S. \$1.00).

Month	2004	2005	2006	2007	2008	2009	2010
Jan.	106.93	103.68	116.08	119.16	110.68	90.65	91.55
Feb.	106.03	103.89	116.98	120.95	106.90	90.03	90.18
Mar.	109.08	104.83	117.45	118.49	104.50	96.38	90.09
Apr.	106.23	107.11	117.58	118.27	100.69	98.89	92.55
May	110.38	106.10	113.60	119.57	103.90	97.83	92.98
June	111.07	107.91	112.68	121.62	105.22	96.22	91.31
July	108.74	110.58	115.33	122.97	106.96	95.19	89.09
Aug.	110.46	111.53	115.83	119.01	108.23	94.97	86.37
Sept.	109.72	110.22	116.76	115.14	108.33	93.01	84.66
Oct.	110.25	113.25	117.99	116.00	103.87	90.00	83.42
Nov.	106.61	116.66	118.13	113.73	97.97	90.56	81.39
Dec.	103.68	119.49	116.62	110.50	93.53	88.35	83.61
Jan.-Dec.	108.28	109.64	116.25	117.93	104.23	93.52	88.09

Month	2011	2012	2013	2014	2015	2016
Jan.	82.91	76.96	89.06	103.96	118.27	118.48
Feb.	82.33	78.47	93.00	102.14	118.70	114.83
Mar.	82.35	82.47	94.77	102.29	120.34	112.96
April	82.93	81.25	97.76	102.47	119.47	109.80
May	81.51	79.66	100.96	101.83	120.68	108.80
June	80.94	79.32	97.24	102.07	123.83	105.53
July	77.88	78.93	99.67	101.69	123.27	103.81
Aug.	80.40	78.69	97.81	102.89	123.21	101.28
Sept.	76.95	78.14	99.21	107.23	120.14	102.05
Oct.	78.70	79.01	97.77	107.95	120.14	103.60
Nov.	77.29	81.03	100.07	115.98	122.56	108.26
Dec.	77.59	83.79	103.46	119.57	121.62	116.04
Jan.-Dec.	79.97	79.82	97.6	105.84	121.02	108.79

**Sources: Japan Marine Products Importers Association 1977-2000.
Ministry of Finance, Japan 2014.
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