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**NOVEMBER 2003**

**THE JAPANESE SEA URCHIN MARKET**

Sunee C. Sonu

NOAA-TM-NMFS-SWR-040

U.S. DEPARTMENT OF COMMERCE  
National Oceanic and Atmospheric Administration  
National Marine Fisheries Service  
Southwest Region

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**NOAA-TM-NMFS-SWR-040**

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## TABLE OF CONTENTS

	Page
LIST OF TABLES . . . . .	ii
LIST OF FIGURES . . . . .	iii
APPENDIX . . . . .	iii
EXECUTIVE SUMMARY . . . . .	iv
INTRODUCTION . . . . .	1
WORLD FISHERIES . . . . .	1
JAPANESE FISHERY . . . . .	9
IMPORTS . . . . .	13
MARKET . . . . .	28
REFERENCES . . . . .	32
APPENDIX . . . . .	33

## LIST OF TABLES

	Page
1. World sea urchin landings by country, 1950-2001 . . . . .	3
2. World landings of genus <i>Strongylocentrotus</i> and major species of sea urchins, 1950-2001 . . . . .	7
3. World sea urchin landings by FAO fishing area, 1950-2001 . . . . .	8
4. Japan's sea urchin landings by fishing area, 1984-2001 . . . . .	12
5. Landings and peak Japanese fishing seasons for major sea urchin species in Hokkaido and major sea urchin fishing prefectures for 2001 . . . . .	12
6. Japanese annual imports of live sea urchins and sea urchin roe by product and volume, 1975-2002 . . . . .	15
7. Japanese annual imports of live sea urchins and sea urchin roe by product and value, 1975-2002 . . . . .	16
8. Japanese annual imports of live sea urchins and fresh sea urchin roe by country of origin and volume, 1975-2002 . . . . .	17
9. Japanese annual imports of live sea urchins and fresh sea urchin roe by country of origin and value, 1975-2002 . . . . .	19
10. Japanese annual imports of live sea urchins by country of origin and volume, 1998-2002 . . . . .	21
11. Japanese annual imports of live sea urchins by country of origin and value, 1998-2002 . . . . .	21
12. Japanese annual imports of fresh sea urchin roe by country of origin and volume, 1998-2002 . . . . .	22
13. Japanese annual imports of fresh sea urchin roe by country of origin and value, 1998-2002 . . . . .	22
14. Japanese annual imports of frozen sea urchin roe by country of origin and volume, 1988-2002 . . . . .	23
15. Japanese annual imports of frozen sea urchin roe by country of origin and value, 1988-2002 . . . . .	24

**LIST OF TABLES**

	Page
16. Japanese annual imports of salted sea urchin roe by country of origin and volume, 1988-2002 . . . . .	25
17. Japanese annual imports of salted sea urchin roe by country of origin and value, 1988-2002 . . . . .	26
18. Japanese annual imports of prepared sea urchin roe by country of origin and volume, 1995-2002 . . . . .	27
19. Japanese annual imports of prepared sea urchin roe by country of origin and value, 1995-2002 . . . . .	27
20. Annual sales volume and average wholesale prices of fresh sea urchin roe at Tokyo Central Wholesale Market, 1986-2002 . . . . .	30
21. Monthly sales volume and average wholesale prices of fresh sea urchin roe at Tokyo Central Wholesale Market, 2002 . . . . .	30
22. Daily auction prices of imported fresh sea urchin roe by origin at Tokyo Central Wholesale Market, January and July 2003 . . . . .	31

**LIST OF FIGURES**

1. Major FAO statistical fishing areas . . . . .	9
2. Japan's sea urchin landings, 1950-2002 . . . . .	10
3. Japan's fishing regions . . . . .	11

**APPENDIX**

1. Monthly and annual average exchange rate applied to Japanese imports, 1976-2002 . . . . .	33
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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 2002, Japan imported about 18,525 metric tons (mt) of live sea urchins and sea urchin roe valued at about 247 million dollars, an increase of more than ten-fold in volume and 12-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.

Fresh sea urchin roe was the dominant product imported into Japan, representing as much as 49 percent in value in 2002. The United States has become the largest supplier of fresh roe to Japan, providing over 45 percent in value and 39 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.

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 2002 of 13,000 mt was less than half of the record high landings which occurred in 1969. From 1987 to 2001, landings in the United States have exceeded Japanese landings. In 2001, sea urchins were harvested in six states: Alaska (1,166 mt), Washington (344 mt), Oregon (571 mt), California (5,951 mt), Maine (4,491 mt), and Rhode Island (0.1 mt).

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 2002, the highest price for imported roe occurred in January. High prices for Japanese roe occurred in January and September, 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 10 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 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 once the world's largest harvester and still remains the largest 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. In 2002, about 88 percent of domestic consumption was supplied by imports (Minato Shinbun Sha 2003). 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 since 1994 and was the largest supplier of fresh sea urchin roe to Japan in 2002.

Japan is the most important export market for U.S. sea urchins, accounting for 86 percent in volume and 87 percent in value of U.S. exports of sea urchins and sea urchin roe in 2002 (U.S. Department of Commerce 2003).

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 8,000 mt in 1950 to a peak of 117,000 mt in 1995, but has been on a downward trend since then, falling to 87,000 mt in 2001 (Table 1). The decrease in global landings was due to lower harvests in five major harvesting countries- Chile, the United States, Japan, Canada, and Mexico. Combined harvests by these countries declined 26 percent, from 108,130 mt in 1995 to 79,839 mt in 2001.

Of 29 nations that reported sea urchin landings in 2001, Chile ranked highest with 54 percent of the total. The United States was second with 14 percent, while Japan, the world's largest producer during 1950-1984, was in third place. Japan's share of the world catch decreased sharply from over 84 percent during the 1960s to 13 percent in 2001. Canada and Mexico



respectively harvested 8 and 3 percent of the world total. Peru, Russia, and the Republic of Korea each harvested about 2 percent of the world total. The combined catch of other countries accounted for about 2 percent of the total world catch.

Chile's annual harvest of sea urchins reached a high in 1999 at 55,654 mt, but has since declined (Table 1). The catch in 2001 of 46,794 mt was about 84 percent of its record landings.

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 (*Strongylocentrotus 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 2001, sea urchins were harvested in six states: Alaska (1,166 mt), Washington (344 mt), Oregon (571 mt), California (5,951 mt), Maine (4,491 mt), and Rhode Island (0.1 mt; U.S. Department of Commerce 2003).

World landings of sea urchins are dominated by *Loxechinus albus* and *Strongylocentrotus spp.* (Table 2). Between 1991 and 2001 *Loxechinus albus* accounted for 24 to 55 percent of total global landings of sea urchin species, and *Strongylocentrotus spp.*, 38 to 68 percent.

The majority of world landings of sea urchins from 1992 through 2001 occurred in the southeast Pacific Ocean (29 to 57 percent), followed by the northwest Pacific Ocean (16 to 23 percent; Table 3 and Figure 1).

**Table 1. World sea urchin landings by country, 1950-2001  
(metric tons).**

Year	Chile	U.S.A.	Japan	Canada	Mexico	Peru	Russian Fed.	Korea Rep. of
1950	1,600	15	6,000	-*	-	-	-	0**
1951	2,300	25	6,000	-	-	-	-	0
1952	1,700	33	7,000	-	-	-	-	0
1953	1,400	13	7,200	-	-	-	-	0
1954	2,600	25	6,500	-	-	-	-	-
1955	3,700	26	9,100	-	-	-	-	0
1956	3,900	54	14,077	-	-	-	-	0
1957	3,600	46	9,225	-	-	-	-	-
1958	4,000	29	12,288	-	-	-	-	-
1959	3,700	49	13,973	-	-	-	-	-
1960	2,100	50	15,871	-	-	-	-	0
1961	2,200	34	15,865	-	-	-	-	100
1962	2,700	33	16,477	-	-	-	-	100
1963	2,800	38	19,302	-	-	-	-	300
1964	3,300	55	20,655	-	-	-	-	300
1965	2,500	57	20,722	-	-	-	-	200
1966	2,600	65	23,219	-	-	-	-	400
1967	2,900	50	23,362	-	-	-	-	700
1968	3,700	38	26,977	-	-	-	-	600
1969	3,800	37	27,528	-	-	-	-	1,000
1970	3,200	27	27,177	-	-	-	-	3,400
1971	4,200	25	25,434	-	-	-	-	2,000
1972	4,200	58	22,686	-	0	-	-	1,900
1973	2,500	1,698	26,004	-	0	-	-	2,700
1974	1,206	3,245	23,573	47	12	-	-	3,393
1975	2,105	3,452	22,482	-	16	-	-	2,321
1976	9,809	5,754	23,069	-	9	-	-	3,497
1977	8,517	7,527	26,898	3	15	-	-	4,119
1978	6,925	6,290	25,930	-	18	-	-	2,969
1979	13,206	9,781	26,500	5	21	-	-	2,720
1980	13,649	10,090	24,158	7	30	-	-	3,383
1981	15,502	12,114	23,984	-	20	-	-	5,212
1982	12,159	8,910	25,975	-	17	-	-	5,566
1983	11,826	8,241	25,254	-	22	-	-	5,413
1984	16,154	7,056	23,962	-	211	-	-	4,934
1985	30,577	9,426	22,745	-	31	-	-	6,222
1986	25,408	16,616	23,072	-	33	-	-	7,785
1987	24,574	23,753	22,760	47	32	-	-	5,278
1988	22,953	31,898	21,812	2,622	15	-	4,735	4,291
1989	25,527	34,444	20,414	3,298	21	-	4,770	3,633
1990	15,648	32,791	19,398	3,748	4,284	39	6,065	4,325
1991	21,382	33,589	14,136	7,877	2,655	19	5,777	3,749
1992	29,197	30,381	13,889	14,640	2,437	63	5,917	2,476
1993	31,300	34,142	13,713	8,255	2,817	13	2,460	3,944
1994	39,705	30,381	15,525	8,479	3,421	15	2,069	3,714
1995	54,609	27,162	13,735	9,833	2,791	131	2,344	3,707
1996	51,437	21,856	12,996	9,665	3,027	461	1,608	2,802
1997	45,560	20,848	14,297	9,221	2,099	424	1,153	2,771
1998	44,843	13,670	13,653	9,867	1,138	90	1,560	1,410
1999	55,654	15,379	13,530	9,052	2,042	1,204	1,245	1,182
2000	54,096	14,700	12,455	8,012	2,813	1,626	1,677	1,461
2001	46,794	12,522	11,208	7,063	2,252	2,114	1,763	1,454

**Table 1 (continued). World sea urchin landings by country, 1950-2001 (metric tons).**

Year	New Zealand	Spain	China	Philippine	France	Korea, North	Fiji Islands	Taiwan
1950	-	-	-	-	-	-	-	-
1951	-	-	-	-	-	-	-	-
1952	-	-	-	-	-	-	-	-
1953	-	-	-	-	-	-	-	-
1954	-	-	-	-	100	-	-	-
1955	-	-	-	-	100	-	-	-
1956	-	-	-	-	100	-	-	-
1957	-	-	-	-	300	-	-	-
1958	-	-	-	-	100	-	-	-
1959	-	-	-	-	200	-	-	-
1960	-	-	-	-	100	-	-	-
1961	-	-	-	-	100	-	-	-
1962	-	-	-	-	100	-	-	-
1963	-	-	-	-	100	-	-	-
1964	-	-	-	-	300	-	-	-
1965	-	-	-	-	300	-	-	-
1966	-	-	-	-	300	-	-	0
1967	-	-	-	-	200	-	-	300
1968	-	-	-	-	200	-	-	0
1969	-	-	-	-	200	-	-	0
1970	-	-	-	-	200	-	-	58
1971	-	-	-	-	100	-	-	140
1972	-	-	-	-	0	-	-	88
1973	-	-	-	-	0	-	-	74
1974	-	-	-	-	502	-	-	19
1975	83	-	-	-	417	-	-	54
1976	149	-	-	3	335	-	-	19
1977	131	-	-	3	233	-	-	39
1978	209	-	-	60	308	-	-	212
1979	125	-	-	38	312	-	-	45
1980	152	-	-	6	373	-	-	78
1981	77	-	-	315	422	-	1	35
1982	138	-	-	88	445	-	2	-
1983	280	-	-	48	200	-	2	35
1984	325	-	-	101	229	-	4	35
1985	286	-	-	38	454	-	27	-
1986	295	-	225	62	278	239	30	3
1987	314	-	194	29	213	252	8	4
1988	413	-	30	26	248	200	10	12
1989	797	-	30	52	285	100	9	37
1990	583	-	30	48	301	100	12	134
1991	322	-	30	62	218	100	11	123
1992	869	-	50	40	401	100	14	65
1993	848	-	100	74	257	100	55	31
1994	944	-	150	151	159	100	56	51
1995	804	-	150	466	78	140	59	63
1996	277	487	200	452	63	150	40	59
1997	627	590	200	296	48	150	95	61
1998	832	560	200	161	59	100	103	39
1999	643	621	200	143	84	100	100	33
2000	712	309	200	125	198	100	90	41
2001	853	306	200	127	101	100	96	50

**Table 1 (continued). World sea urchin landings by country, 1950-2001 (metric tons).**

Year	Cook Islands	French Polynesia	Portugal	Martinique	Ireland	U.S.S.R.	Iceland	Grenada
1950	-	-	-	-	-	400	-	-
1951	-	-	-	-	-	300	-	-
1952	-	-	-	-	-	-	-	-
1953	-	-	-	-	-	-	-	-
1954	-	-	-	-	-	-	-	-
1955	-	-	-	-	-	200	-	-
1956	-	-	-	-	-	100	-	-
1957	-	-	-	-	-	100	-	-
1958	-	-	-	-	-	100	-	-
1959	-	-	-	-	-	100	-	-
1960	-	-	-	-	-	100	-	-
1961	-	-	-	-	-	200	-	-
1962	-	-	-	-	-	200	-	-
1963	-	-	-	-	-	300	-	-
1964	-	-	-	-	-	-	-	-
1965	-	-	-	-	-	-	-	-
1966	-	-	-	-	-	-	-	-
1967	-	-	-	-	-	-	-	-
1968	-	-	-	-	-	-	-	-
1969	-	-	-	-	-	-	-	-
1970	30	-	-	-	-	-	-	-
1971	30	-	-	-	-	-	-	-
1972	30	-	-	-	-	-	-	-
1973	30	-	-	-	300	-	-	-
1974	30	-	-	-	242	-	-	-
1975	30	-	-	-	209	-	-	-
1976	30	-	-	-	352	-	-	-
1977	30	-	-	-	170	-	-	-
1978	23	-	-	-	114	-	-	-
1979	20	-	-	-	132	-	-	-
1980	21	-	-	-	108	-	-	-
1981	22	-	-	-	102	-	-	-
1982	23	-	-	-	97	337	-	-
1983	24	-	-	-	48	832	-	-
1984	25	0	-	-	113	436	-	-
1985	26	0	-	-	77	514	-	-
1986	27	0	-	-	49	6,328	-	-
1987	28	0	-	22	52	6,030	-	-
1988	28	0	-	22	64	-	-	1
1989	29	0	-	24	62	-	-	-
1990	30	0	1	25	95	-	-	-
1991	28	0	-	13	104	-	-	5
1992	25	0	-	18	89	-	-	1
1993	26	0	-	16	26	-	713	5
1994	25	0	-	15	34	-	1,409	36
1995	25	0	-	15	10	-	923	0
1996	20	0	-	10	2	-	423	0
1997	20	10	-	15	5	-	20	0
1998	20	10	-	15	1	-	-	0
1999	20	10	-	15	2	-	10	0
2000	20	15	-	10	1	-	-	0
2001	20	15	15	10	5	-	-	-

**Table 1 (continued). World sea urchin landings by country, 1950-2001 (metric tons).**

Year	Equador	St. Pierre & Miquelon	Denmark	Faeroe Islands	United Kingdom	World Total
1950	-	-	-	-	-	8,015
1951	-	-	-	-	-	8,625
1952	-	-	-	-	-	8,733
1953	-	-	-	-	-	8,613
1954	-	-	-	-	-	9,225
1955	-	-	-	-	-	13,126
1956	-	-	-	-	-	18,231
1957	-	-	-	-	-	13,271
1958	-	-	-	-	-	16,517
1959	-	-	-	-	-	18,022
1960	-	-	-	-	-	18,221
1961	-	-	-	-	-	18,499
1962	-	-	-	-	-	19,610
1963	-	-	-	-	-	22,840
1964	-	-	-	-	-	24,610
1965	-	-	-	-	-	23,779
1966	-	-	-	-	-	26,584
1967	-	-	-	-	-	27,512
1968	-	-	-	-	-	31,515
1969	-	-	-	-	-	32,565
1970	-	-	-	-	-	34,092
1971	-	-	-	-	-	31,929
1972	-	-	-	-	-	28,962
1973	-	-	-	-	-	33,306
1974	-	-	-	-	-	32,269
1975	-	-	-	-	-	31,169
1976	-	-	-	-	-	43,026
1977	-	-	-	-	-	47,685
1978	-	-	-	-	-	43,057
1979	-	-	-	-	-	52,905
1980	-	-	-	-	-	52,055
1981	-	-	-	-	-	57,806
1982	-	-	-	-	-	53,757
1983	-	-	-	-	-	52,225
1984	-	0	-	-	-	53,585
1985	-	0	-	-	-	70,423
1986	-	0	0	-	-	80,450
1987	-	0	0	-	-	83,590
1988	-	0	0	-	-	89,380
1989	-	0	0	-	-	93,532
1990	-	0	0	-	-	87,657
1991	1	0	0	-	-	90,201
1992	1	0	-	-	-	100,673
1993	0	0	0	-	-	98,895
1994	0	0	0	14	-	106,453
1995	0	1	0	-	-	117,046
1996	0	1	0	-	1	106,037
1997	0	-	0	-	0	98,510
1998	0	-	0	-	-	88,331
1999	0	-	1	-	-	101,270
2000	0	0	0	-	-	98,661
2001	0	0	0	-	-	87,068

-\*..... magnitude known to be nil or zero

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

Sources: FAO 2003  
U.S. Department of Commerce 2003  
Ministry of Agriculture, Forestry, and Fisheries, 1967-2003

**Table 2. World sea urchin landings of genus *Strongylocentrotus* and major species of sea urchins, 1950-2001 (metric tons).**

	<i>Loxechinus albus</i>	<i>Strongylocentrotus spp.</i>	Others	<i>Paracentrotus lividus</i>	<i>Echinus esculentus</i>
1950	1,600	6,415	<0.5	.*	.
1951	2,300	6,325	<0.5	.	.
1952	1,700	7,033	<0.5	.	.
1953	1,400	7,213	<0.5	.	.
1954	2,600	6,525	-	100	.
1955	3,700	9,326	<0.5	100	.
1956	3,900	14,254	<0.5	100	.
1957	3,600	9,346	-**	300	.
1958	4,000	12,429	-	100	.
1959	3,700	14,149	-	200	.
1960	2,100	16,050	<0.5	100	.
1961	2,200	16,034	100	100	.
1962	2,700	16,733	100	100	.
1963	2,800	19,638	300	100	.
1964	3,300	20,755	300	300	.
1965	2,500	20,757	200	300	.
1966	2,600	23,265	400	300	.
1967	2,900	23,750	700	200	.
1968	3,700	27,038	600	200	.
1969	3,800	27,537	1,000	200	.
1970	3,200	27,194	3,400	200	-
1971	4,200	25,231	2,000	100	-
1972	4,200	21,800	1,900	<0.5	-
1973	2,500	23,129	2,700	<0.5	300
1974	1,206	21,878	3,405	502	242
1975	2,105	19,705	2,420	417	209
1976	9,809	20,502	3,655	335	352
1977	8,517	26,104	4,265	233	170
1978	6,925	28,875	3,196	308	114
1979	13,206	28,843	2,866	312	132
1980	13,649	18,563	3,565	373	108
1981	15,502	17,573	5,309	422	102
1982	12,159	26,982	5,721	445	97
1983	11,826	25,610	5,715	200	48
1984	16,154	31,464	5,470	229	113
1985	30,577	32,291	6,539	454	77
1986	25,408	44,735	8,113	278	49
1987	24,574	52,900	5,624	213	52
1988	22,953	60,087	4,719	248	64
1989	25,527	58,267	4,451	285	62
1990	15,648	58,316	9,232	301	95
1991	21,382	60,885	6,745	218	104
1992	29,197	64,608	5,845	401	89
1993	31,300	57,204	7,622	257	739
1994	39,705	55,838	8,094	159	1,443
1995	54,609	53,354	7,433	78	933
1996	51,437	45,583	7,054	63	425
1997	45,560	45,724	6,521	48	25
1998	44,843	39,344	4,040	59	1
1999	55,654	39,656	5,702	84	13
2000	54,096	36,744	6,936	198	1
2001	46,794	33,097	7,009	101	5

*Loxechinus albus*...Chilean sea urchin  
*Paracentrotus lividus*...Stony sea urchin  
*Echinus esculentus*... European edible sea urchin

.\*....data not available

-\*\*.. magnitude known to be nil or zero

Source: FAO 2003

**Table 3. World sea urchin landings by FAO fishing area, 1950-2001 (metric tons).**

Year	Atlantic ocean			Mediterranean and Black Sea	Pacific Ocean					
	(27)*	(21)	(31)	(37)	(77)	(67)	(61)	(87)	(81)	(71)
1950	. **	15	.	.	.	.	6,400	1,600	.	.
1951	.	25	.	.	.	.	6,300	2,300	.	.
1952	.	33	.	.	.	.	7,000	1,700	.	.
1953	.	13	.	.	.	.	7,200	1,400	.	.
1954	100	25	.	.	.	.	6,500	2,600	.	.
1955	100	26	.	.	.	.	9,300	3,700	.	.
1956	100	54	.	.	.	.	14,200	3,900	.	.
1957	300	46	.	.	.	.	9,300	3,600	.	.
1958	100	29	.	.	.	.	12,400	4,000	.	.
1959	200	49	.	.	.	.	14,100	3,700	.	.
1960	100	50	.	.	.	.	16,000	2,100	.	.
1961	100	34	.	.	.	.	16,100	2,200	.	.
1962	100	33	.	.	.	.	16,800	2,700	.	.
1963	100	38	.	.	.	.	19,900	2,800	.	.
1964	300	55	.	.	.	.	21,000	3,300	.	.
1965	300	57	.	.	.	.	20,900	2,500	.	.
1966	300	65	.	.	.	.	23,600	2,600	.	.
1967	200	50	.	.	.	.	24,400	2,900	.	.
1968	200	38	.	.	.	.	27,600	3,700	.	.
1969	200	37	.	.	.	.	28,500	3,800	.	.
1970	200	<0.5	- ***	-	30	<0.5	30,564	3,200	.	-
1971	100	<0.5	-	-	30	<0.5	27,201	4,200	.	-
1972	<0.5	<0.5	<0.5	-	30	<0.5	23,670	4,200	.	-
1973	300	100	<0.5	-	1,630	<0.5	24,099	2,500	.	-
1974	274	68	1	470	3,258	7	21,949	1,206	.	-
1975	241	19	3	385	3,476	-	18,544	2,105	83	-
1976	376	16	2	311	5,041	735	18,211	9,809	149	3
1977	187	29	1	216	6,225	387	23,593	8,517	131	3
1978	128	4	2	294	7,996	448	23,352	6,925	209	60
1979	141	6	2	303	7,201	359	23,978	13,206	125	38
1980	130	22	2	351	49	27	21,870	13,649	152	6
1981	128	3	-	396	42	122	22,322	15,502	77	316
1982	120	-	-	422	7,871	108	24,496	12,159	138	90
1983	63	-	1	185	7,212	137	23,645	11,826	280	50
1984	133	23	2	209	6,901	211	29,367	16,154	325	105
1985	127	-	2	404	8,644	352	29,481	30,577	286	65
1986	62	5	6	265	13,576	1,222	37,652	25,408	295	92
1987	77	700	23	188	17,981	4,951	34,518	24,574	314	37
1988	123	2,885	26	189	19,220	11,146	31,080	22,953	413	36
1989	110	4,355	25	237	15,093	13,403	28,984	25,527	797	61
1990	144	6,136	29	253	19,457	11,191	30,052	15,687	583	60
1991	121	9,637	18	201	18,230	15,415	23,915	21,402	322	73
1992	100	12,623	26	390	14,677	19,643	22,497	29,261	869	54
1993	756	20,390	29	240	11,919	11,150	20,348	31,313	848	129
1994	1,474	18,763	53	142	12,845	9,482	21,609	39,720	944	207
1995	940	17,726	15	71	12,807	8,640	20,139	54,740	804	525
1996	911	13,851	10	65	12,158	7,085	17,815	51,898	277	492
1997	612	12,201	15	51	10,321	9,044	18,632	45,984	627	391
1998	564	10,720	15	56	5,860	8,081	16,962	44,933	832	264
1999	643	10,794	15	75	8,447	7,101	16,290	56,858	643	243
2000	462	9,131	10	195	8,902	6,841	15,785	55,722	712	215
2001	478	7,274	10	100	8,158	6,378	14,624	48,908	853	223

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

27=Atlantic, Northeast;

21=Atlantic, Northwest;

31=Atlantic, Western Central;

77=Pacific, Eastern Central;

67=Pacific, Northeast;

61=Pacific, Northwest;

87=Pacific, Southeast;

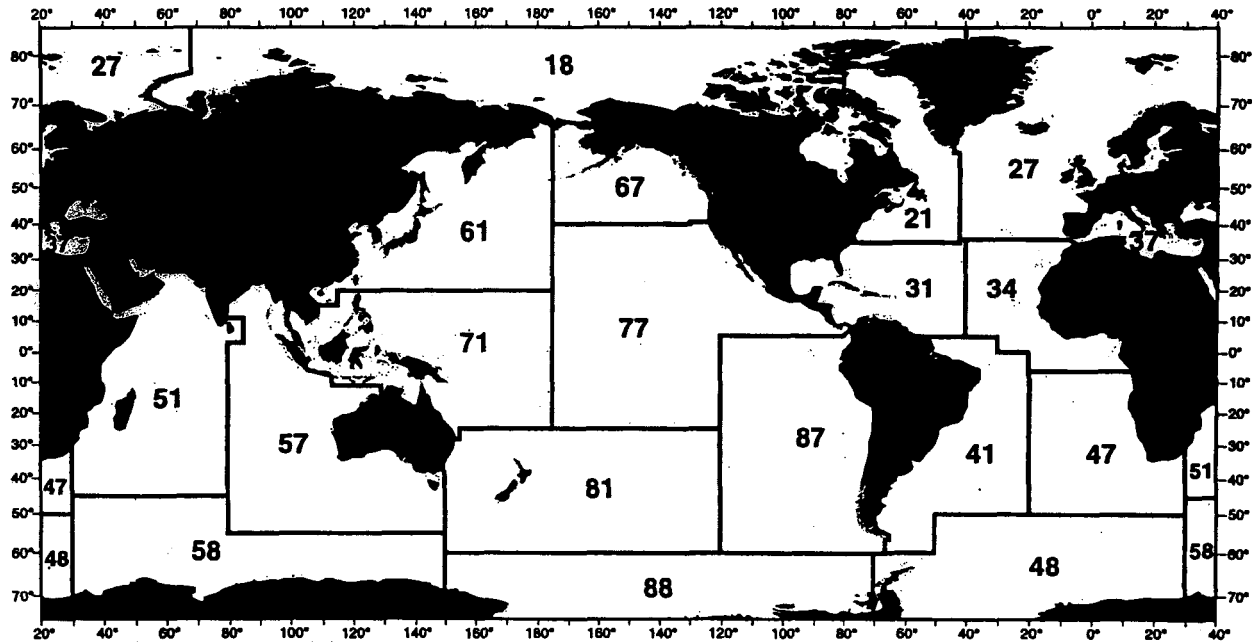
81=Pacific, Southwest;

71=Pacific, Western Central

.\*\*...data not available

-\*\*\*...magnitude known to be nil or zero

Source: FAO 2003



**Figure 1. Major FAO statistical fishing areas.**

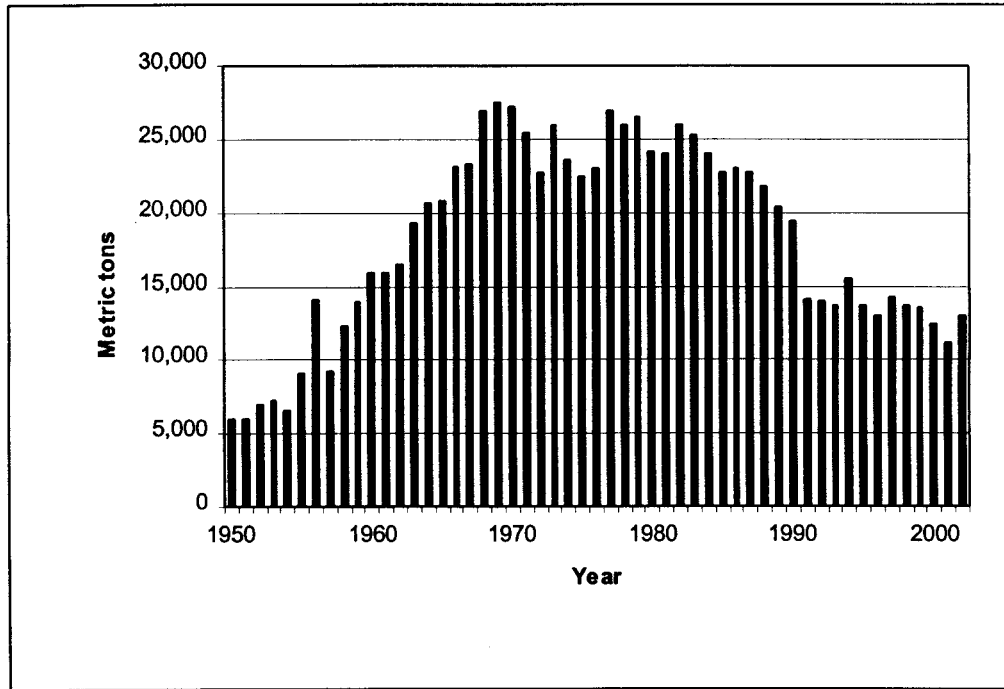
Source: FAO 2002

### **JAPANESE FISHERY**

Japan was the world's largest harvester of sea urchins until 1984, but its share of the world catch has decreased sharply. The peak year of Japanese sea urchin harvest was 1969 when 27,528 mt were harvested (Table 1 and Figure 2). From 1970 through 1986, annual Japanese landings fluctuated between 22,000 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 2002 of 13,000 mt was less than half of the record landings.

From 1984 through 2001, the majority of Japan's harvest of sea urchins occurred in the Hokkaido region (34 to 50 percent; Table 4 and Figure 3), followed by North Pacific Ocean region (16 to 29 percent), and the East China Sea region (16 to 28 percent). Between 84 and 90 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 9,809 mt in 2001, while landings in Hokkaido Island region decreased by 48 percent during the same period. In 2001, about 76 percent of sea urchin landings occurred in Hokkaido Island and four prefectures (Table 5 and Figure 3). Peak fishing seasons in these areas are mainly from spring through summer.





**Figure 2. Japan's sea urchin landings, 1950-2002.**

Sources: FAO 2003  
 Ministry of Agriculture, Forestry, and Fisheries, 1967-2003  
 Suisan Tsushin Sha 2003

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 crassispinata*, *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. Artificial propagation is being carried out, but ongoing resource enhancement efforts relying on mariculture have yet to show visible results in increased landings (Hokkai Suisan Shinbun Sha 1993 and Ministry of Agriculture, Forestry, and Fisheries 2003).

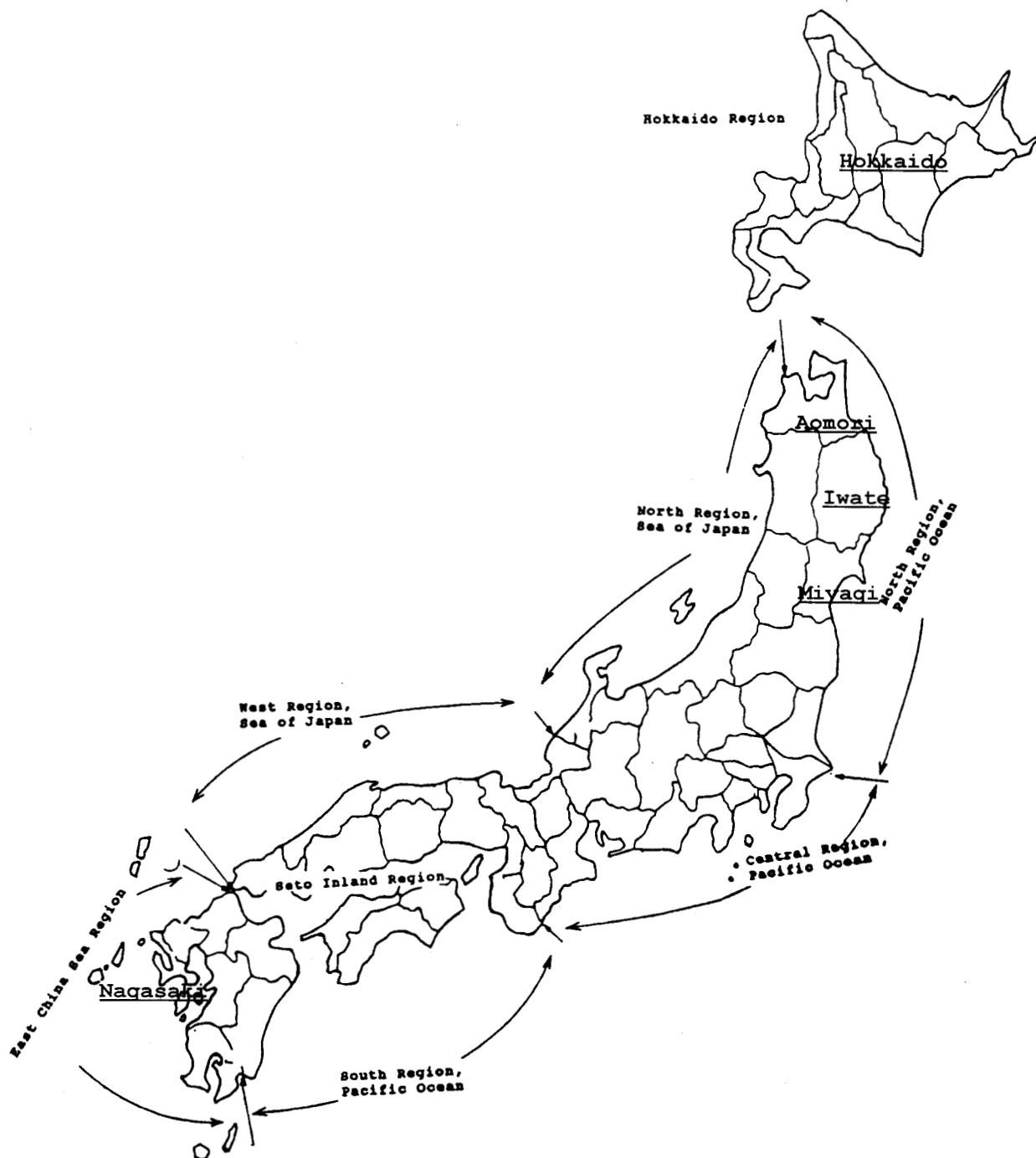


Figure 3. Japan's fishing regions.

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

**Table 4. Japan's sea urchin landings by fishing area, 1984-2001 (metric tons).**

Year	Hokkaido	Pacific Ocean			Sea of Japan		East China Sea	Seto Inland Sea	Total
		North	Central	South	North	West			
1984	10,017	3,875	18	941	106	1,447	6,773	785	23,962
1985	10,094	4,905	19	928	148	985	5,085	581	22,745
1986	10,655	4,600	18	1,092	223	879	5,029	576	23,076
1987	10,753	5,176	21	937	225	679	4,450	519	22,760
1988	10,955	4,234	18	1,318	245	687	3,755	580	21,812
1989	9,430	4,175	8	1,193	298	806	4,032	472	20,414
1990	7,760	4,941	16	1,098	210	689	4,039	665	19,398
1991	5,493	3,396	14	997	132	503	3,138	464	14,136
1992	5,594	3,120	17	1,013	154	576	3,074	343	13,889
1993	5,163	3,216	31	676	138	669	3,455	365	13,713
1994	6,492	4,018	44	720	142	685	3,091	333	15,525
1995	4,686	3,590	33	846	111	620	3,439	410	13,735
1996	4,749	2,951	34	900	103	663	3,162	436	12,996
1997	5,713	3,532	26	845	194	647	2,884	455	14,297
1998	6,541	2,978	30	530	89	624	2,422	438	13,653
1999	5,921	3,885	37	458	151	518	2,198	363	13,530
2000	5,890	3,069	27	494	64	545	2,034	332	12,455
2001	5,233	2,536	29	451	35	574	2,040	309	11,208

Total may not add due to rounding of data

Source: Ministry of Agriculture, Forestry and Fisheries  
1986-2003.

**Table 5. Landings and peak Japanese fishing seasons for major sea urchin species in Hokkaido and major sea urchin fishing prefectures for 2001.**

Area	Landings		Major species	Peak fishing seasons
	(metric tons)	(%)		
Hokkaido	5,233	47	<i>Strongylocentrotus intermedius</i> <i>S. nudus</i>	April-August June-September
Prefectures:				
Iwate	1,062	9	<i>S. intermedius</i> <i>S. nudus</i>	April-August April-August
Nagasaki	843	8	<i>Anthocidaris crassispina</i>	March-May
Aomori	778	7	<i>S. intermedius</i> <i>S. nudus</i>	April-August April-August
Miyagi	642	6	<i>S. nudus</i>	April-August
Others	2,650	24		

Sources: Ministry of Agriculture, Forestry and Fisheries 2003  
Hokkai Suisan Shinbun Sha 1993

## IMPORTS

Japan is the world's largest importer of sea urchins and sea urchin roe. In 2002, Japan's imports of fresh, frozen, salted, and prepared sea urchin roe, and live sea urchins were 18,525 mt valued at about \$247 million (Tables 6 and 7). From 1975 to 2002, imports of sea urchins and sea urchin roe increased more than ten times in volume and 12 times in value. The number of countries supplying sea urchins and sea urchin roe to Japan also increased from 11 in 1975 to 15 in 2002 (Tables 8-19). 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 2002, fresh roe was the dominant sea urchin product imported into Japan, representing as much as 49 percent in value and 16 percent in volume. Live sea urchins accounted for 23 percent in value and 64 percent in volume. Although total tonnage of live sea urchins is greater than fresh roe, it should be noted that the edible roe makes up only about 10-15 percent of the total live weight. Imports of frozen roe were 19 percent in value and 14 percent in volume, followed by prepared roe with 6 percent in value and 4 percent in volume. Imports of salted sea urchin roe were minor, with 3 percent in value and 1 percent in volume in 2002 (Tables 6 and 7).

Japanese imports of live sea urchins increased 80 percent in volume and 43 percent in value from 1998 to 2002. The products came mostly from Russia, with lesser quantities imported from North Korea, the United States, Canada, and China (Tables 10 and 11). Supplies of live sea urchins from Russia increased in 2002 to a record level, while shipments of this product from North Korea, the United States and Canada decreased sharply.

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 12 and 13). The United States has consistently been the leading supplier of fresh roe to Japan, providing over 39 percent in volume and 45 percent in value of the total in 2002.

Imports of frozen sea urchin roe rose from 760 mt in 1988 to 2,535 mt in 2002 (Table 14). Since 1993, Chile has replaced the United States as the leading supplier of this product to Japan (Tables 14 and 15). Japan imported 69 mt of frozen roe from the United States in 2002, while imports from Chile amounted to 2,295 mt.

Imports of salted sea urchin roe have declined steeply since 1988 (Tables 16 and 17). The Republic of Korea and North Korea have been the dominant suppliers of salted products to Japan.

These two nations supplied Japan with as much as 81 percent in volume and 92 percent in value of salted products in 2002.

Imports of prepared sea urchin roe have remained fairly stable since 1996, ranging between 631 and 787 mt (Tables 18). Chile continued to dominate the supplies of prepared sea urchin roe (Tables 18 and 19).

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 10 percent for prepared or preserved products, including those in airtight containers. There is no tariff for live sea urchins (Japan Fish Traders Association 2003). Tariff rates are calculated as a percentage of total cost, including insurance and freight.

**Table 6. Japanese annual imports of live sea urchins and sea urchin roe by products and volume, 1975-2002 (metric tons).**

Year	Live sea urchins	Fresh roe	Live/fresh Sub-total	Frozen roe	Salted roe	Prepared roe	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
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

.\* not available

-\*\* no imports

Source: Japan Fish Traders Association 1976-2003

**Table 7. Japanese annual imports of live sea urchins and sea urchin roe by products and value, 1975-2002 (U.S. \$1,000).**

Year	Live sea urchins	Fresh roe	Live/fresh Sub-total	Frozen roe	Salted roe	Prepared roe	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 8. Japanese annual imports of live sea urchins and fresh sea urchin roe by country of origin and volume, 1975-2002 (metric tons).**

Country of origin	1975	1976	1977	1978	1979	1980	1981
U.S.S.R.	3	-*	-	2	0**	2	1
U.S.A.	232	357	511	486	759	590	637
Korea, North	358	266	245	193	443	492	322
Chile	9	85	305	248	370	89	238
Canada	5	-	-	0	20	27	15
China	5	13	15	57	35	87	135
Mexico	54	82	36	45	26	14	15
Korea, Rep.	966	985	1,137	1,038	743	807	977
Peru	-	-	-	-	22	16	21
Hong Kong	2	11	10	17	9	15	7
Australia	-	-	0	7	4	0	-
Philippines	3	41	170	111	19	2	3
Norway	-	-	-	1	0	-	-
Taiwan	47	35	28	110	51	66	53
<b>Total</b>	<b>1,684</b>	<b>1,874</b>	<b>2,458</b>	<b>2,315</b>	<b>2,502</b>	<b>2,207</b>	<b>2,426</b>

Country of origin	1982	1983	1984	1985	1986	1987	1988
U.S.S.R./Russia	0	1	2	0	-	-	-
U.S.A.	497	411	539	888	1,243	1,564	1,305
Korea, North	407	243	322	258	239	252	4
Chile	59	85	155	182	263	122	17
Canada	24	69	132	148	176	190	406
China	147	175	158	145	225	194	2
Mexico	5	4	32	19	98	125	4
Korea, Rep.	1,100	1,236	1,219	1,091	1,158	1,110	848
Peru	14	2	-	-	-	-	1
Hong Kong	12	10	15	26	57	44	47
Australia	-	-	-	-	3	14	7
Taiwan	118	60	37	55	61	18	-
Philippines	14	25	23	37	79	65	-
Norway	-	-	-	-	-	-	-
New Zealand	-	-	-	0	-	-	2
Malaysia	-	-	0	0	-	-	-
Turkey	-	-	-	-	0	-	-
Indonesia	-	1	1	8	-	-	-
<b>Total</b>	<b>2,397</b>	<b>2,321</b>	<b>2,636</b>	<b>2,857</b>	<b>3,601</b>	<b>3,696</b>	<b>2,643</b>



**Table 8 (continued). Japanese annual imports of live sea urchins and fresh sea urchin roe by country of origin and volume, 1975-2002 (metric tons).**

Country of origin	1989	1990	1991	1992	1993	1994	1995
Russia	-	-	-	10	3	0	-
U.S.A.	1855	1,745	2,046	2,032	2,587	3,129	3,373
Korea, North	7	12	17	1	-	-	19
Chile	5	11	44	47	147	285	364
Canada	440	351	397	555	367	387	439
China	7	19	60	129	223	258	238
Mexico	80	73	25	13	1	-	-
Korea, Rep.	692	616	513	529	541	440	386
Peru	1	1	-	-	-	3	89
Hong Kong	50	44	42	44	35	38	48
Australia	4	7	6	5	3	3	0
Taiwan	-	-	0	-	1	0	-
Philippines	-	0	-	1	1	1	1
Norway	-	-	1	0	-	0	3
Indonesia	-	-	-	0	-	0	-
New Zealand	2	2	-	1	2	0	3
Iceland	-	-	-	1	44	83	54
Switzerland	-	-	-	-	0	-	-
Guyana	0	-	-	-	-	-	-
Spain	1	-	-	-	-	-	-
Denmark	-	-	-	-	-	0	-
Singapore	-	0	-	-	-	-	-
<b>Total</b>	<b>3,140</b>	<b>2,882</b>	<b>3,151</b>	<b>3,367</b>	<b>3,954</b>	<b>4,630</b>	<b>5,017</b>

Country of origin	1996	1997	1998	1999	2000	2001	2002
Russia	-	-	3,451	4,378	6,190	9,079	10,613
U.S.A.	3,122	2,462	3,114	2,995	2,626	2,223	1,616
Korea, North	8	22	1,446	1,319	740	1,330	917
Chile	459	732	671	787	751	675	693
Canada	441	487	1,035	912	739	676	560
China	209	295	357	389	330	328	267
Mexico	0	-	1	-	-	-	101
Korea, Rep.	365	266	342	230	196	169	100
Peru	80	19	5	15	52	86	64
Hong Kong	50	48	33	32	43	30	25
Australia	1	1	3	3	4	1	2
Philippines	2	3	3	2	2	-	1
S. Africa	-	-	-	-	-	-	1
Norway	1	-	15	11	5	2	-
Indonesia	-	-	0	0	-	-	-
New Zealand	-	0	-	-	-	0	-
Iceland	19	1	-	-	-	-	-
Vietnam	-	-	-	0	-	-	-
Palau	-	-	-	0	-	-	-
Cameroun	-	-	-	-	-	0	-
<b>Total</b>	<b>4,756</b>	<b>4,337</b>	<b>10,474</b>	<b>11,074</b>	<b>11,676</b>	<b>14,599</b>	<b>14,959</b>

\* ...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 1976-2003

**Table 9. Japanese annual imports of live sea urchins and fresh sea urchin roe by country of origin and value, 1975-2002 (U.S. \$1,000).**

Country of origin	1975	1976	1977	1978	1979	1980	1981
U.S.A.	2,528	4,049	5,936	6,276	11,131	9,993	12,088
U.S.S.R.	25	-	-	19	4	38	23
Chile	45	382	1,397	1,279	2,123	674	2,115
Canada	31	-	-	4	262	403	274
Korea, North	998	1,007	1,641	1,435	2,607	2,609	1,593
China	13	36	66	292	215	630	783
Mexico	493	781	375	573	340	191	225
Korea, Rep.	5,907	7,825	10,442	12,878	13,098	13,080	16,321
Peru	-	-	-	-	146	110	175
Hong Kong	28	135	187	329	222	358	230
Australia	-	-	4	86	48	1	-
Taiwan	178	118	128	493	220	297	265
Philippines	8	71	322	254	72	5	12
Norway	-	-	-	-	18	9	-
<b>Total</b>	<b>10,253</b>	<b>14,404</b>	<b>20,496</b>	<b>23,935</b>	<b>30,495</b>	<b>28,390</b>	<b>34,105</b>

Country of origin	1982	1983	1984	1985	1986	1987	1988
U.S.A.	9,426	8,671	10,516	15,917	26,529	40,208	46,697
U.S.S.R./Russia	9	17	42	2	-	-	-
Chile	293	500	921	1,119	1,704	933	229
Canada	442	1,198	2,238	2,337	3,501	4,195	9,841
Korea, North	2,135	1,414	2,086	1,809	1,997	2,368	14
China	827	983	853	838	1,883	1,994	29
Mexico	56	44	376	160	1,532	2,275	110
Korea, Rep	17,951	20,890	25,427	22,352	35,447	45,279	47,575
Peru	95	12	-	-	-	-	7
Hong Kong	338	272	348	418	793	1,266	1,690
Australia	-	-	-	-	95	364	228
Taiwan	636	309	214	347	424	129	-
Philippines	61	107	93	134	345	272	-
Norway	-	-	-	-	18	9	-
New Zealand	-	-	-	2	-	-	30
Malaysia	-	-	8	2	-	-	-
Turkey	-	-	-	-	2	-	-
Indonesia	-	2	3	8	-	-	-
<b>Total</b>	<b>32,268</b>	<b>34,418</b>	<b>43,127</b>	<b>45,448</b>	<b>74,252</b>	<b>99,284</b>	<b>106,450</b>

**Table 9 (continued). Japanese annual imports of live sea urchins and fresh sea urchin roe by country of origin and value, 1975-2002 (U.S. \$1,000).**

Country of origin	1989	1990	1991	1992	1993	1994	1995
U.S.A.	61,361	66,972	92,135	91,658	119,832	153,297	181,351
Russia	-	-	-	294	144	3	-
Chile	110	240	987	1,210	3,093	6,888	10,744
Canada	11,013	8,820	12,932	20,371	14,174	17,085	21,298
Korea, North	132	160	91	43	-	-	145
China	183	744	2,594	5,099	9,945	10,819	12,601
Mexico	2,405	2,331	878	901	51	-	-
Korea, Rep.	35,428	31,883	30,036	32,284	34,173	30,146	30,225
Peru	9	8	-	-	-	72	2,754
Hong Kong	1,596	1,855	2,450	2,795	2,271	2,676	3,558
Australia	122	321	422	469	252	268	33
Taiwan	-	-	20	-	35	6	-
Philippines	-	12	-	14	13	24	36
Norway	-	-	23	9	-	6	90
Indonesia	-	-	-	7	-	17	-
New Zealand	53	30	-	34	50	7	142
Iceland	-	-	-	39	1,763	3,404	2,473
Switzerland	-	-	-	-	18	-	-
Guyana	5	-	-	-	-	-	-
Spain	72	-	-	-	-	-	-
Denmark	-	-	-	-	-	11	-
Singapore	-	4	-	-	-	-	-
<b>Total</b>	<b>112,488</b>	<b>113,380</b>	<b>142,566</b>	<b>155,229</b>	<b>185,814</b>	<b>224,729</b>	<b>265,450</b>

Country of origin	1996	1997	1998	1999	2000	2001	2002
U.S.A.	156,236	120,449	99,092	110,511	107,059	85,395	58,544
Russia	-	-	19,172	22,657	33,164	43,022	47,306
Chile	14,004	23,761	21,412	27,255	26,325	22,804	22,216
Canada	21,311	20,953	23,606	22,678	22,399	19,692	16,961
Korea, North	202	357	7,492	8,897	9,511	15,391	12,406
China	9,672	12,618	13,636	15,018	12,088	10,128	7,414
Mexico	3	-	83	-	-	-	5,602
Korea, Rep.	23,946	14,514	15,731	11,140	9,299	6,979	4,166
Peru	2,363	591	135	413	1,621	2,519	2,113
Hong Kong	3,467	2,908	1,917	2,010	2,642	1,630	1,024
Australia	47	24	123	190	180	73	115
Philippines	57	80	72	48	58	-	43
S. Africa	-	-	-	-	-	-	12
Norway	32	-	95	118	59	19	-
Indonesia	-	-	4	4	-	-	-
New Zealand	-	11	-	-	-	2	-
Iceland	830	19	-	-	-	-	-
Vietnam	-	-	-	5	-	-	-
Palau	-	-	-	6	-	-	-
Cameroun	-	-	-	-	-	2	-
<b>Total</b>	<b>232,168</b>	<b>196,286</b>	<b>202,573</b>	<b>220,949</b>	<b>224,404</b>	<b>207,659</b>	<b>177,921</b>

-\* ...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 1976-2003

**Table 10. 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
U.S.A.	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	-
<b>Total</b>	<b>6,630</b>	<b>7,077</b>	<b>7,897</b>	<b>11,155</b>	<b>11,926</b>

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 11. 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
U.S.A.	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	-
<b>Total</b>	<b>39,524</b>	<b>41,278</b>	<b>48,009</b>	<b>57,657</b>	<b>56,618</b>

-\* ...no imports

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 volume, 1998-2002 (metric tons).**

Country of origin	1998	1999	2000	2001	2002
U.S.A.	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	-
<b>Total</b>	<b>3,844</b>	<b>3,997</b>	<b>3,779</b>	<b>3,444</b>	<b>3,033</b>

-\* ...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 13. 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	-
<b>Total</b>	<b>163,049</b>	<b>179,671</b>	<b>176,395</b>	<b>150,002</b>	<b>121,303</b>

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

Source: Japan Fish Traders Association 1999-2003

**Table 14. 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
U.S.A.	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
<b>Total</b>	<b>760</b>	<b>716</b>	<b>653</b>	<b>832</b>	<b>876</b>	<b>948</b>	<b>716</b>	<b>1,122</b>

Country of Origin	1996	1997	1998	1999	2000	2001	2002
Chile	750	790	1,124	1,304	1,442	1,483	2,295
U.S.A.	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	-	-	-	-	-
<b>Total</b>	<b>1,005</b>	<b>1,028</b>	<b>1,421</b>	<b>1,526</b>	<b>1,652</b>	<b>1,690</b>	<b>2,535</b>

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 15 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
U.S.A.	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
<b>Total</b>	<b>10,867</b>	<b>9,291</b>	<b>8,713</b>	<b>12,190</b>	<b>11,033</b>	<b>15,564</b>	<b>10,780</b>	<b>21,747</b>

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
U.S.A.	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	-	-	-	-	-
<b>Total</b>	<b>18,553</b>	<b>17,633</b>	<b>22,338</b>	<b>24,647</b>	<b>30,091</b>	<b>27,908</b>	<b>45,857</b>

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

Source: Japan Fish Traders Association 1989-2003

**Table 16. Japanese annual imports of salted sea urchin roe by country of origin and volume, 1988-2002 (metric tons).**

Country of origin	1988	1989	1990	1991	1992	1993	1994	1995
Korea, Rep.	444	316	252	260	300	254	286	231
Korea, North	430	378	574	198	205	228	298	249
Chile	27	19	-	19	28	50	34	34
Philippines	56	60	72	50	62	61	37	36
China	210	147	135	148	113	127	93	99
Taiwan	27	30	28	24	28	18	3	1
Hong Kong	32	12	6	2	11	2	0	-
Vietnam	-*	-	-	-	-	22	11	32
Indonesia	-	-	-	2	3	-	-	-
Iceland	-	-	-	-	-	-	2	5
Norway	-	-	-	-	-	-	-	1
Russia	-	-	6	5	0	1	1	-
Canada	10	9	-	-	-	1	1	3
U.S.A.	13	16	2	1	-	25	17	6
Mexico	-	1	0	1	-	-	-	-
Australia	-	0**	-	-	-	-	-	-
New Zealand	-	-	0	-	-	-	-	-
<b>Total</b>	<b>1,248</b>	<b>989</b>	<b>1,075</b>	<b>709</b>	<b>750</b>	<b>789</b>	<b>784</b>	<b>696</b>

Country of origin	1996	1997	1998	1999	2000	2001	2002
Korea, Rep.	229	197	203	181	192	152	149
Korea, North	228	138	229	164	186	109	57
Chile	13	72	22	1	-	46	23
Philippines	16	35	36	13	21	1	18
China	16	12	1	10	13	3	5
Taiwan	4	-	-	-	4	1	3
Hong Kong	-	2	2	0	0	1	0
Vietnam	22	-	20	-	24	-	-
Iceland	13	-	-	-	-	-	-
Russia	0	-	-	1	4	6	-
U.S.A.	-	0	1	-	-	-	-
Australia	-	-	-	0	-	-	-
Peru	-	-	-	-	-	1	-
<b>Total</b>	<b>542</b>	<b>455</b>	<b>514</b>	<b>371</b>	<b>446</b>	<b>319</b>	<b>255</b>

-\*... 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 1989-2003



**Table 17. Japanese annual imports of salted 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
Korea, Rep.	14,209	8,995	8,003	9,521	11,771	9,152	10,191	9,711
Korea, North	5,152	4,113	5,392	2,273	2,814	2,463	2,947	2,620
Chile	211	147	-	368	330	735	244	306
Philippines	273	324	382	269	354	371	227	245
China	2,133	1,535	1,519	1,810	1,771	1,589	1,211	1,444
Taiwan	194	276	254	204	246	194	39	7
Hong Kong	589	169	192	40	288	40	14	-
Vietnam	-*	-	-	-	-	163	57	85
Indonesia	-	-	-	10	18	-	-	-
Iceland	-	-	-	-	-	-	21	62
Norway	-	-	-	-	-	-	-	39
Russia	-	-	124	98	2	25	11	-
Canada	208	104	-	-	-	7	24	122
U.S.A.	172	134	40	8	-	332	248	245
Mexico	-	16	6	3	-	-	-	-
Australia	-	2	-	-	-	-	-	-
New Zealand	-	-	2	-	-	-	-	-
<b>Total</b>	<b>23,141</b>	<b>15,816</b>	<b>15,914</b>	<b>14,603</b>	<b>17,593</b>	<b>15,071</b>	<b>15,235</b>	<b>14,885</b>

-\*... 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 1989-2003

Country of origin	1996	1997	1998	1999	2000	2001	2002
Korea, Rep.	9,497	7,970	8,068	7,753	9,056	6,321	5,990
Korea, North	2,484	1,168	1,663	1,858	2,692	1,497	726
Chile	82	465	160	4	-	1,035	324
Philippines	120	237	230	82	180	5	119
China	349	188	46	255	192	93	96
Taiwan	23	-	-	-	27	6	18
Hong Kong	-	81	103	18	18	30	18
Vietnam	184	-	100	-	105	-	-
Iceland	252	-	-	-	-	-	-
Russia	7	-	-	20	162	213	-
U.S.A.	-	5	17	-	-	-	-
Australia	-	-	-	7	-	-	-
Peru	-	-	-	-	-	16	-
<b>Total</b>	<b>12,997</b>	<b>10,114</b>	<b>10,386</b>	<b>9,997</b>	<b>12,433</b>	<b>9,217</b>	<b>7,292</b>

-\* ...no imports

Total may not add due to rounding

Source: Japan Fish Traders Association 1989-2003

**Table 18. 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	-	-	-	-	-
U.S.A.	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 19. 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	-	-	-	-	-
U.S.A.	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, consuming about 92 percent of the world's harvest in 2001 (Minato Shinbun Sha August 7, 2003). About 88 percent of the domestic consumption of sea urchin roe was supplied by imports in 2002.

Most fresh sea urchin roe is sold through auction at the Tokyo Central Wholesale Market in Tsukiji. 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 20 and 21 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 21).

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 (Table 22).

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. Auction prices at the Tokyo Central Wholesale Market in Tsukiji on August 2, 2003, for example, were 200-800 yen (\$1.68-6.72) for 100 grams in net weight of roe in plastic cups, as compared to 700-3,200 yen (\$5.88-26.89) for 120-150 grams in net weight of roe in wood trays (Minato Shinbun Sha August 4, 2003).

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 20. Annual sales volume and average wholesale prices of fresh sea urchin roe at Tokyo Central Wholesale Market, 1986-2002.**

Year	Domestic roe		Imported roe		Total sales volume
	Sales volume	Prices	Sales volume	Prices	
	Metric tons	Yen/kg	Metric tons	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

Source: Tokyo Metropolitan Government 1987-2003

**Table 21. Monthly sales volume and average wholesale prices of fresh sea urchin roe at Tokyo Central Wholesale Market, 2002.**

Month	Domestic roe		Imported roe		Total sales volume
	Sales volume	Prices	Sales volume	Prices	
	Metric tons	Yen/kg	Metric tons	Yen/kg	
January	42	10,509	94	6,124	136
February	72	6,764	74	5,277	146
March	108	6,171	90	4,556	198
April	108	7,424	58	5,254	166
May	149	5,765	58	3,992	207
June	106	7,289	46	4,506	152
July	97	8,191	64	5,050	161
August	77	9,481	80	5,011	157
September	59	10,263	66	5,402	125
October	69	6,693	91	5,769	160
November	78	6,375	85	5,407	163
December	105	8,338	112	5,896	217
Total	1,070	7,471	918	5,278	1988

Source: Tokyo Metropolitan Government 2003

**Table 22. Daily auction prices of imported fresh sea urchin roe by origin at Tokyo Central Wholesale Market, January and July 2003 (yen/tray).**

**January 2003**

Date	China	Los Angeles	Canada	Boston	Alaska	San Francisco
5	2300-300	7800- 600	2200- 200	- **	-	-
6	2500-600	9500-2400	2200-1800	-	-	-
7	1800-700	7800- 700	2000- 800	-	-	-
9	1800-700	6500-2500	1800- 700	-	-	-
11	1700-800	4300-1900	1500- 350	-	-	-
14	1600-600	6800- 900	1400- 500	4500-1600	-	-
15	1700-300	3500-2200	1300- 700	-	-	-
16	1500-500	5300-2800	1200- 700	4700-1600	-	-
20	1500-500	2300- 700	1000- 500	-	-	-
21	1500-150	4800- 600	850- 600	-	-	-
23	1800-650	8300-1100	1000- 500	-	-	-
25	1400-600	4200- 700	1300- 400	3400-1400	1200-1000	-
27	2000-550	8000-1000	1700- 550	-	-	-
28	2000-650	4600- 900	2000- 800	-	-	-
29	-	-	2000- 950	3900-1500	1600-1200	1800-1500
30	2000-950	9000-1400	3700-1800	-	-	-

**July, 2003**

Date	China	Los Angeles	Chile	North Korea	Russia	Mexico	Alaska
1	2600- 500	3500- 500	1000- 900	- **	-	-	-
3	2500- 300	3500- 800	800	-	-	-	-
4	2500- 400	-	-	800-600	700- 200	-	-
7	2400-1000	3600-1200	-	-	1100-1000	-	-
8	2500- 500	2800-1300	-	-	1000- 750	-	-
9	2600- 500	-	1000- 900	-	900- 500	-	-
10	2600- 600	-	1300- 900	-	-	-	-
12	3700- 300	-	1800-1000	-	-	-	-
14	4300- 500	4300-1200	1700-1000	-	1800-1200	-	-
15	4500- 600	-	2000- 900	-	1500-1000	-	-
17	4900- 700	4500-2500	2000-1000	-	-	-	-
18	5100-1000	-	1800-1200	-	-	-	-
22	3800- 400	-	1500- 800	-	800- 500	1500- 800	-
23	3200- 800	-	-	-	-	-	-
24	3700- 800	-	-	-	1200-1100	-	1400-1200
26	4000-1400	4400-3000	-	-	1300-1000	2800-1800	-
29	3700- 350	-	-	-	-	-	-
30	3500- 850	-	-	-	-	-	-
31	3300- 700	-	-	-	-	-	-

Tray\*...280-350 grams in net weight of roe  
 -\*\* ...no supply

Source: Minato Shinbun Sha 2003

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**Appendix 1. Monthly and annual average exchange rate applied to Japanese imports, 1976-2002 (yen/U.S. \$1.00).**

Month	1976	1977	1978	1979	1980	1981	1982
January	305.50	292.64	240.73	195.98	237.68	203.99	221.36
February	302.84	288.41	241.46	199.16	240.35	203.44	231.15
March	301.50	282.49	236.94	203.39	247.44	207.80	237.03
April	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
August	292.81	265.70	191.18	216.13	224.85	236.35	257.18
September	288.18	267.14	190.94	220.54	219.10	230.26	258.60
October	288.43	261.78	187.76	225.41	210.18	229.15	268.14
November.	294.12	249.13	184.41	238.48	211.28	230.56	272.81
December	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
January	232.89	233.83	252.04	202.07	159.01	126.01	125.64
February	237.03	233.98	256.66	193.53	152.70	128.57	128.49
March	235.99	228.79	260.53	180.21	153.47	128.72	128.00
April	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
August	242.70	243.69	237.92	155.04	150.83	133.12	140.29
September	244.80	243.02	239.20	154.66	143.02	134.21	145.10
October	236.15	246.68	221.43	154.23	144.59	132.58	142.58
November	234.22	244.08	209.32	160.34	138.52	125.36	142.67
December	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, 1976-2002 (yen/U.S. \$1.00).**

Month	1990	1991	1992	1993	1994	1995	1996
January	144.36	135.27	126.21	124.66	111.79	100.25	104.49
February	144.93	130.97	125.47	123.98	109.23	99.19	106.38
March	148.61	134.02	130.46	117.95	105.04	94.49	105.32
April	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
August	148.90	137.00	126.99	105.38	99.57	90.73	107.84
September	142.96	136.24	124.36	104.37	99.25	98.48	108.78
October	133.82	131.72	121.03	105.79	98.97	100.88	110.99
November	128.31	130.47	122.71	107.80	97.41	101.56	112.86
December	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
January	115.60	130.98	114.09	103.76	115.37	131.11
February	121.26	125.90	115.02	107.05	116.56	133.32
March	122.38	127.35	119.88	108.29	118.10	132.04
April	124.29	130.84	119.55	106.02	123.97	132.09
May	123.99	132.33	120.21	107.38	122.56	128.74
June	114.98	138.65	121.52	108.36	120.93	124.84
July	114.08	140.47	121.56	106.34	124.40	120.17
August	117.18	143.44	115.95	108.70	123.50	118.39
September	119.44	138.58	110.21	106.71	119.97	118.93
October	121.18	129.32	106.34	107.88	119.40	123.23
November	122.27	118.14	105.21	108.14	121.73	122.40
December	127.90	120.26	103.73	110.67	124.35	122.83
Jan.-Dec.	120.38	131.36	114.44	107.44	120.90	125.67

Sources: Japan Fish Traders Association 1977-2003