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Present Status and Aspect on Eel Aquaculture in Japan

Abstract

The production of cultured eel in Japan has decreased in the last six years. The volume of production of cultured eel maintained about 38,000 metric tons (mt) per year from 1985 to 1992, but markedly decreased since 1994. The production of cultured eel in 1998 and 1999 was 21,985 and 22,836 mt, respectively, a reduction of almost 50% compared to that in mature stage. This suggests that the eel aquaculture in Japan has been entering the decline stage. In contrast, the consumption of eel in Japan has steadily increased from 16,730 mt in 1970, 80,000 mt in 1985, to 136,955 mt in 1999. The gap of eel consumption and production in Japan is filled up by imported eels from China and other Asian countries. The volume of imported eel increased from 38,000 mt in 1985, 106,000 mt in 2000, rising about 3 fold, with the bulk of imported eels coming from China. Why is the eel aquaculture industry declining? In this report, the status of eel aquaculture in Japan and the reason for its decline are discussed.

Key words: Eel, Aquaculture, Japan

Ohtsuka[(1)] divided the developmental process of eel aquaculture in Japan into five stages, i.e., established stage, introduction stage, growth stage, competitive stage, and mature stage, which are discussed as follows.

Established stage (1880-1912)

In 1880, the culture of soft-shell turtle and eel emerged in the swampland of eastern part of Tokyo. Eel culture then expanded to other regions from the main place of origin of glass eel, the Hamanako Lake of Shizuoka Prefecture. The eel was feed with pupas, the by-product of silkworm industry.

Introduction stage (1913-1969)

Due to the high income from eel culture, some paddy fields were then transformed into culture ponds. Meanwhile, eel production increased to more than 15,000 mt. Compared to the small amount of eel production (about 3,000 mt) caught in the wild, the cultured eel had been the main force of the Japanese eel industry.

Growth stage (1970-1977)

The volume of eel production per year increased because of the use of formulated feed (Fig. 1). From the main place of origin, eel culture was also introduced to warmer areas such as Kyushu and Shikoku of southern Japan. Eel grows faster in indoor ponds with heaters, and could be reared to the market size within 7-12 months. This reduced the cost of eel

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production.

Competitive stage (1978-1984)

Eel production increased to 35,000 mt because of the advancement in culture techniques (Fig. 1). Meanwhile, the volume of imported eel also increased to 25,000-30,000 mt, which contributed about 50% of total eel consumption. From being a high-grade food, the eel became a popular family food since then.

Mature stage (1985-1992)

The volume of eel import increased from 37,000 mt to 50,000 mt, while the eel production in Japan maintained in the amounts of 36,000-39,000 mt (Fig. 2). The area of eel culture ponds no longer expanded.

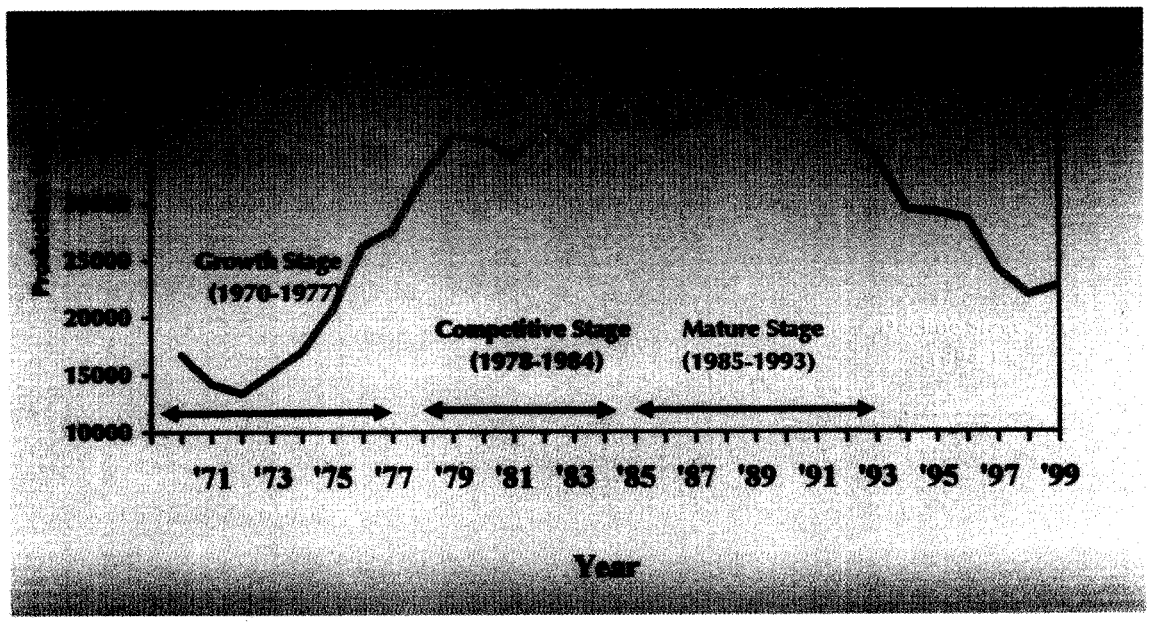

Fig. 1. Eel aquaculture production in Japan.

The analysis of production and consumption of eel

In 1991, from the total of 114,207 mt of eel consumption, 39,013 mt was produced in Japan (Fig. 3), 58,850 mt in Taiwan, and 14,496 mt in China. The volume of eel consumption increased more than 5 fold compared to that of 19,952 mt in 1970. Meanwhile, the production of wild eel contributed only 1,080 mt.

We thought that the eel culture in Japan has entered decline stage since 1992. The volume of eel production rapidly decreased from 38,000 mt in mature stage to 22,836 mt in 1999. Eel production (about 20,000 mt) was comparable to the level in 1975, about 25 years ago.

Although eel production in Japan markedly decreased since 1992, the volume of eel consumption, however, increased. The amounts of eel consumption increased from 66,123 mt in 1980, 104,460 mt in 1990, to 136,955 mt in 1999 (Fig. 3). The average eel consumption per person per year increased to 1 kg in 1999, irrespective of the decrease of eel production in Japan.

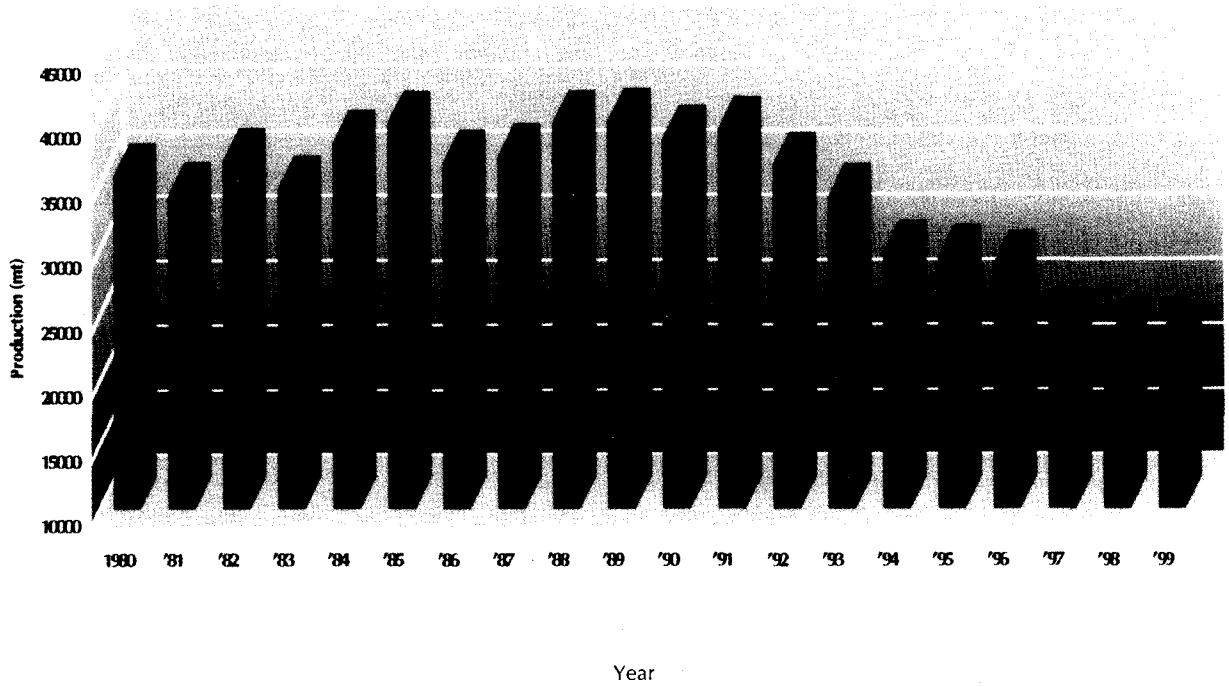

Fig. 2. Eel aquaculture production in Japan.

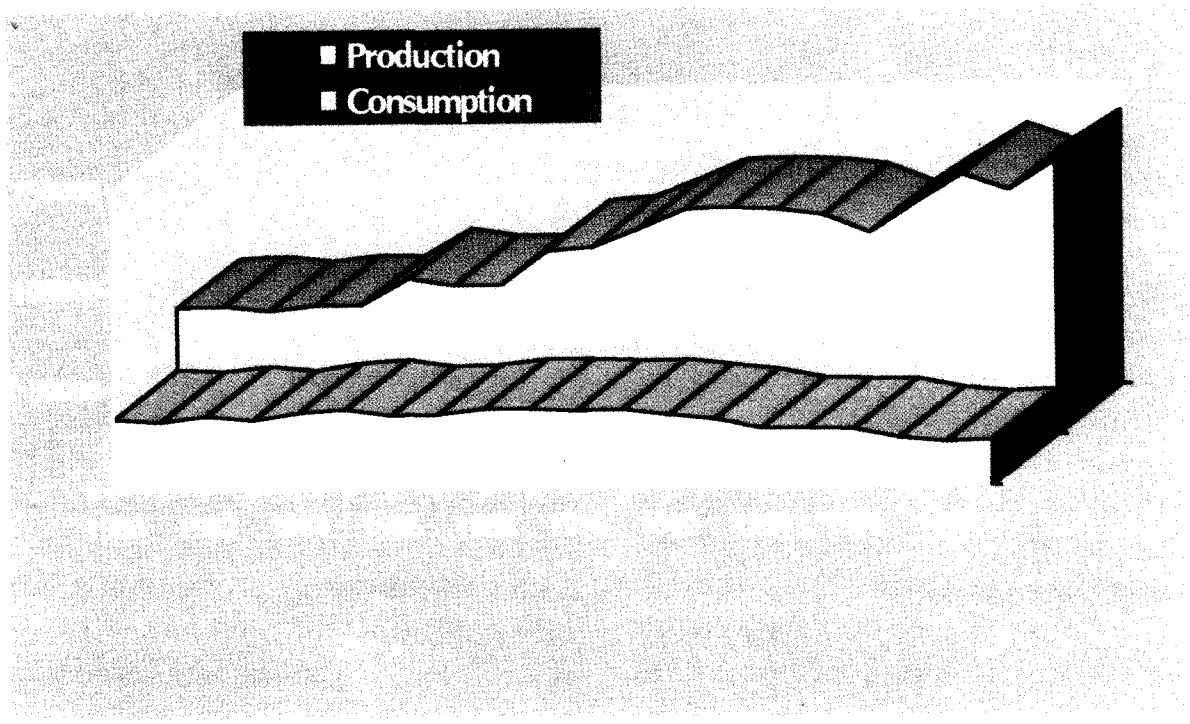

Fig. 3. Eel production and consumption in Japan.

The eel consumption and production gap in Japan is filled up by imported eels. Live eel is imported to Japan by air transportation, and is processed as Kabayaki in the locality and directly sold to consumers. The eel has become a popular food because of the reduced transportation cost.

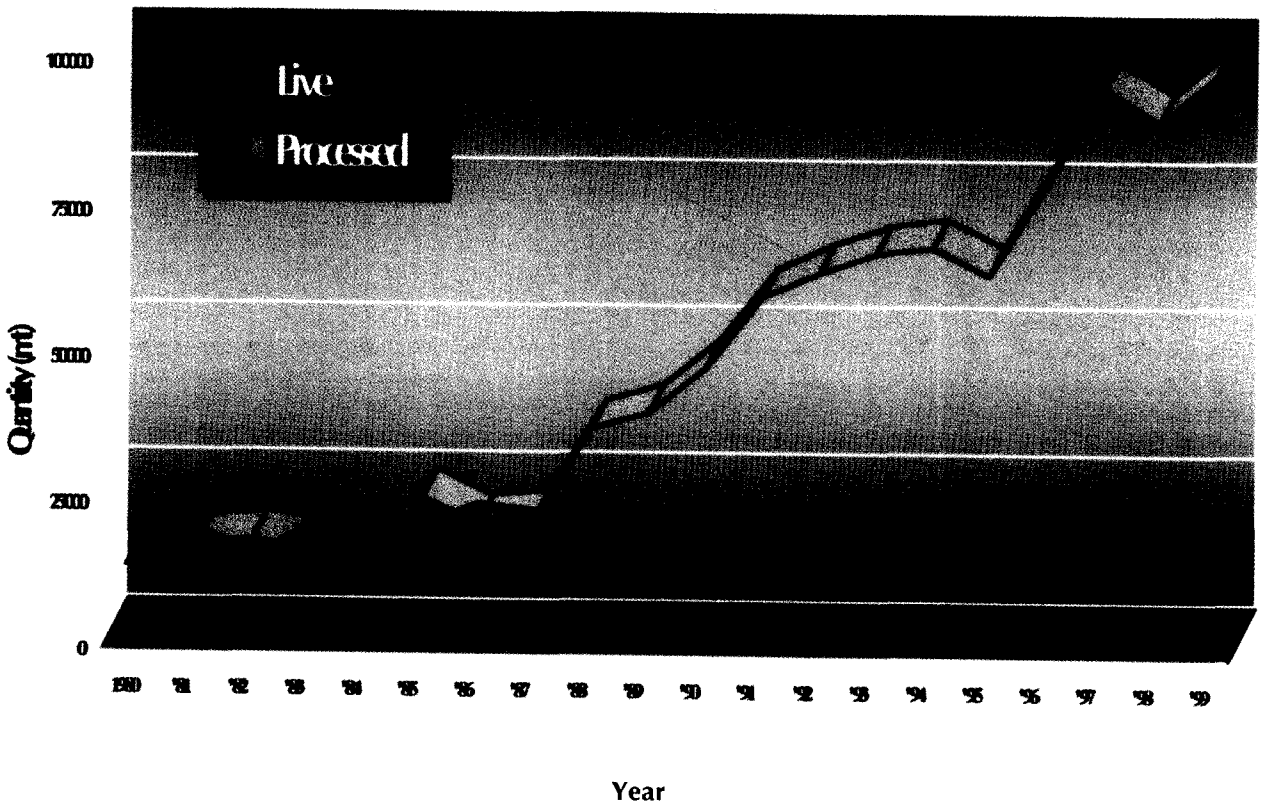

Fig. 4. Imports of live and processed eel.

The volume of processed eel imported from China had increased since 1990, resulting in significant increase in the volume of eel consumption. This made the eel become a popular, cheap, and convenient food in Japan.

For the Japanese, the eel can help the people to effectively recover from exhaustion in the summertime. The eel used to be a high-grade food. People could enjoy eel only once a year in the restaurant. However, the imported processed eel has changed the habit of consumers. People can easily buy the Kabayaki from the supermarket all year around. The eel has thus become a popular food in the family. The popularized eel resultsed in marked increase in the volume of consumption.

Of the volume of imported eel in Japan in 1999, the live eel contributed to 11,625 mt while the processed one 94,530 mt (Fig. 4). The processed eel has become the main product. Eel processing needs an outstanding workforce, and that the abundant and cheap labor in China made it possible. The increase in eel consumption is due to the increase of imported processed eel, which shifted eel from a high-grade food to a popular one. The cheap price and convenience of enjoying eel resulted in increases in the volume of consumption. Thus, Japan shifted from being an eel producer to that of being an eel importer.

An analysis of eel culture

Eel culture production in Japan decreased primarily because of two reasons. One is the limitation of temperature. The Japanese eel is considered a temperate to subtropical species, which would enter hibernation in the winter season in the low - temperature rivers. The eel does not feed in the cold winter. In the past, the cultured eel grows mainly in the seasons from spring to autumn, and is not fed in the winter. By this way, it takes about one and a half years for the cultured eel to reach the market size of 160 -180 g. In Taiwan and southern part of China, the eel grows faster and all year around, and it can reach market size within 10 months. In order to improve the growth of eel in the winter in Japan, heaters and special greenhouse facilities are required to maintain the optimal culture temperature, which, however, significantly add to the cost of production compared to the eel culture in China.

The other reason is the difference in labor cost between Japan and China. Labor cost in China is only about 1/30 of that in Japan. In addition to eel culture in ponds, eel processing factories also need a lot of laborers. Workforce is lacking in both Japan and Taiwan. In China, in contrast, the abundant and cheap labor lowers down the price of processed eel which results in the increase in consumption of processed eels. However, the initial cause of the decline of eel culture in Japan was due to the expensive price of elvers in 1999. Eel culture is totally dependent on wild elvers, but the volume of elver production dramatically decreased since 1994. The price of elvers increased from about 200,000 Japanese dollars per kg in the past to 500,000-1,000,000 Japanese dollars per kg at present. The high price of elvers suddenly interrupted the eel culture.

The monthly change on the price of market-size eels in the last three years (1998 -2000) is shown in Fig. 5. The price of eel per kg shifted from 2,500-2,200 Japanese dollars in the past to 1,300-1,200 Japanese dollars at present.

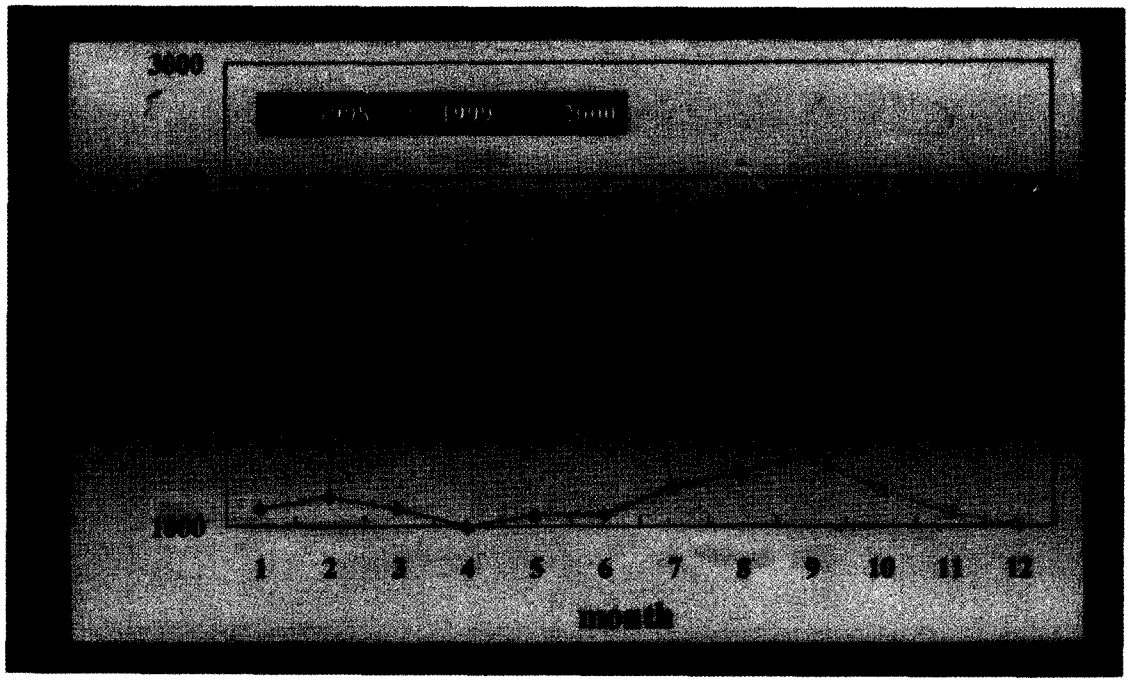

Fig. 5. Monthly changes of price of eel.

Since 1999, however, the production of elvers is unusually abundant, which has not been seen for about 10 years. The price of elvers decreased to the level comparable to that of 10 years ago. Thus, the volume of eel production increased in China, resulting in the sharp drop in the price of live eel because of the surplus of production. Although eel production in China increased with the drop of elver price, the volume of eel culture has not increased in both Japan and Taiwan. The reason is due to the high cost of eel production that eel farmers suffer losses in business for the low price of live eel. Therefore, the eel market is occupied by the processed eel from China. The once interrupted eel culture ponds have never recovered again.

Nevertheless, eel culture in Japan still continues. The difference is only on the volume of production, which shifted from 39,000 mt per year in the prosperous stage to about 20,000 mt per year at present.

The eel aquaculture tends to have two poles now, i. e., the eel is produced in Japan or imported live from Taiwan, and then sold directly to the consumers in the Kabayaki restaurants. On the other hand, the eel imported from China is sold generously in the processed form at supermarkets or the grocery section of department stores as a convenient food.

Conclusion

In the near future, the validation of larval rearing techniques of eel would make it possible for the cheap and stable supply of elvers. However, the status of two-pole developments in eel culture might not be changed, that is, the live eel is produced mainly in Japan, and the processed eel is imported generously from China. The eel aquaculture in Japan has been entering the decline stage, and the volume of eel production seems impossible to increase in the future.

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