

CLEANUP PROGRAM IN JAPAN

Nobuyuki Yagi and Yoshie Otsuka
Division of Fishing Ground Environment Conservation
Fisheries Agency, the Government of Japan
Chiyoda-ku, Tokyo, 100 Japan

ABSTRACT

The amount of marine debris accumulated in Japanese coastal areas has showed an increasing trend from the early 1970's, and this debris has become an obstruction to fisheries operating there, causing destruction of habitats of target species and interfering with fishing operations. In fiscal year 1973, the Fisheries Agency started a program to cope with these issues in coastal areas.

This program consists of two activities. One is the education of local residents including fishermen, and the other is the actual cleanup of the seashore and sea bottom. There are three parts to the cleanup activities: cleaning up the seashore using manpower, cleaning up the fishing grounds using trawl nets, and cleaning up the rocky bottoms using divers.

Cleanup activities were carried out in 137 areas in fiscal year 1987, at a cost to the Japanese Government of ¥342,249,000 (US\$2,738K).

INTRODUCTION

From early times, the Japanese have shown keen interest in various types of drifting objects stranded on beaches. In some places, people even developed habits of worshipping strange-shaped pieces of driftwood as deities. In coastal areas where the Kuroshio passed, people picked up coconuts which drifted ashore on rare occasions and dreamed of islands far to the south.

In recent years, however, great changes have been observed in the types and quantity of debris. Debris items were no longer objects of veneration as in past times but were a nuisance, causing damage to people's livelihood.

PROGRAM BACKGROUND

In the early 1970's, complaints were voiced by fishermen in various parts of Japan that wastes stranded ashore or accumulated on the sea bottom were causing serious damage to fishing activities. Such wastes ranged from man-made objects, including bottles, bottle covers, cans, worn-out tires, plastic bags, and other disposed plastics, to natural objects such as grass, wood, and vegetable garbage carried by rivers after torrential rains. Damage assumed to be caused by debris was varied, according to the fishermen. Some extremists contended that debris not only obstructed fishing operations but even caused a decline in the number of fish as a whole. Fishermen presented these problems in all earnestness because they were experiencing direct economic losses.

The damage seeming to have most apparent causal relations with wastes is summarized as follows:

1. Damage to organisms. Plastic bags attached to rocks on the sea floor (the natural habitat for seashells) make it impossible for the seashells to live there. Nondegradable wastes accumulated in shallow water deprive fish of spawning and nursery grounds. Fishing lines, cut or abandoned at sea or on the beach, break seaweed and entangle seabirds.
2. Damage to ships. Plastic bags obstruct engine cooling water intakes. Lost or discarded nets entangle propellers.
3. Damage to fishing activities. Plastic bags caught in trawl net meshes increase water resistance and thereby damage fishing gear. Increased resistance of gear in the water lessens energy efficiency of fishing vessels and increases fuel cost.

Much time is required to sort out fish from debris caught in trawl nets, cutting down on fishing efficiency. Also, fish taken together with debris frequently bring a lower price.

4. Others. The scenery of beaches is affected, giving an unfavorable impression to visitors who come for sea bathing.

Besides reports on damage, proposed solutions came from various parts of the country. These included requesting the public not to dispose of garbage in the sea and actively collecting debris being accumulated on beaches and the sea floor.

However, several problems complicated the solution. First, there was the difficulty of identifying who actually discarded the wastes. The wide range of potential contaminators included ordinary residents, factories, tourists, ships, and fishermen themselves. Therefore, it was impossible to identify the actual polluters and have

them bear the cost of the damages. Second, the effort of people in any particular area is not sufficient to solve the problem. As marine debris comes from various areas including inland areas and areas hundreds of miles away, a number of municipality offices need to cooperate in efforts against this problem.

ESTABLISHMENT OF THE PROGRAM

In fiscal year 1973, the Fisheries Agency launched a program (hereafter referred to as the "Cleanup Program") aimed at preserving the marine environment and recovering deteriorated fishing grounds. The Fisheries Agency formulated and coordinated the entire program, while regional authorities for each area concerned were responsible for the actual implementation.

Contents of the Program

As for specific program items, local authorities were entitled to select from among the following options, giving due consideration to issues peculiar to their own areas:

1. Alert regional residents including fishermen to the need to preserve the marine environment, conducting appropriate educational activities through television and radio broadcasting and newspapers as well as through calls from aircraft, lectures, public ads, posters, leaflets, calendars, and bathing caps and towels.
2. Cleanup debris accumulated on the sea bottom using trawl vessels.
3. Cleanup debris on the rocky bottom using divers.
4. Eliminate wastes drifting on the sea surface using dipnets.
5. Cleanup the beaches using manpower.
6. Use manpower and machines to cleanup rivers and lakes.
7. Establish councils composed of local authorities, fishermen, and academics to formulate specific cleanup programs.

National Budget for the Program

The cost of implementing the Cleanup Program is covered in part (usually half of project costs) by the National Government, with the remaining amount shouldered by local authorities actually enforcing the program. The government budget for this purpose increased annually, the subsidy for fiscal 1973 (April 1973-March 1974) being ¥96,000,000 (US\$768K), rising to ¥401,126,000 (US\$3,209K) in fiscal 1979. After that the budget remained more or less unchanged (Fig. 1).

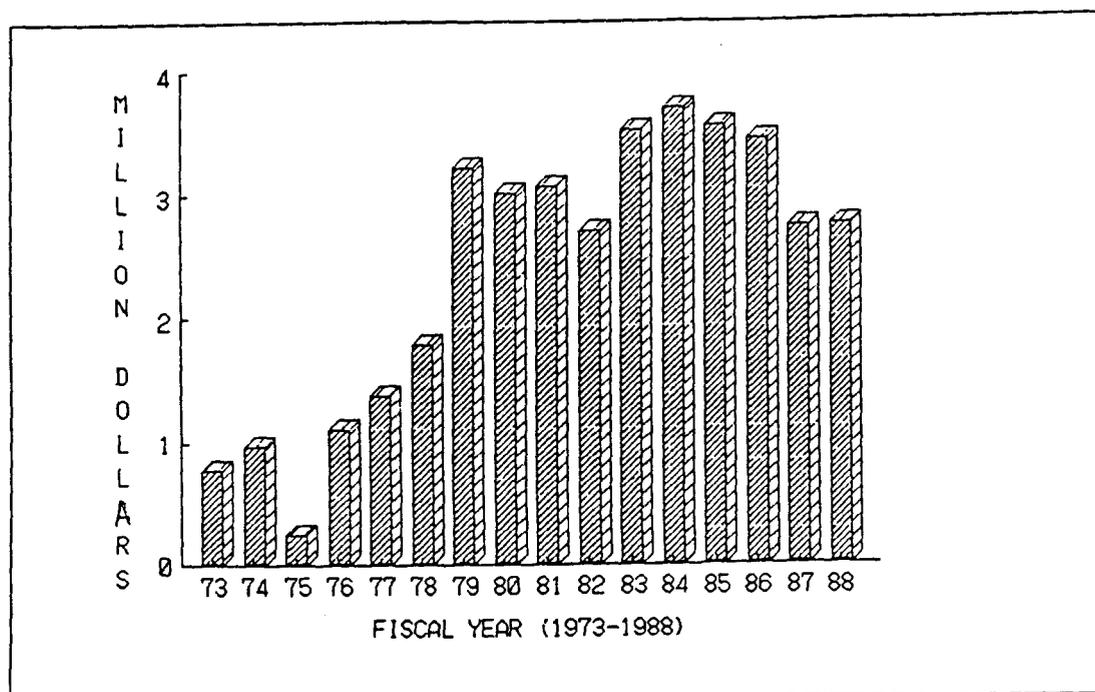


Figure 1.--Annual changes of subsidy under the government budget for the Cleanup Program.

CLEANUP TODAY

At a cost to the national treasury of ¥342,249,000 (US\$2,738K) in fiscal year 1987, the program was conducted in a total of 132 areas throughout Japan. The number of areas differed in different prefectures. Some prefectures conducted the program in as many as 23 areas, while some did not carry out any program (Fig. 2).

Following are actual situations in four areas during fiscal year 1987 and the cleanup programs in each area (Fig. 3).

Mutsu Bay, Aomori Prefecture

Mutsu Bay measures about 1,660 km², with a total coastline extension of 251 km. Fishing is a major industry there, notably the scallop fishery, with production worth about ¥13 billion (US\$104 million) in fiscal year 1987. In 1975, a large number of scallops died of an unidentifiable cause in the bay, which up to then was known for its relative cleanliness. This incident prompted local fishermen to request measures to preserve the fishing ground environment, and a cleanup program was implemented in the same year.

In 1987, cleanup activities were conducted in 10 towns and villages covering more or less the entire coast of the bay at an overall cost of ¥11,640,000 (US\$93,120). The scale of the program has been about the

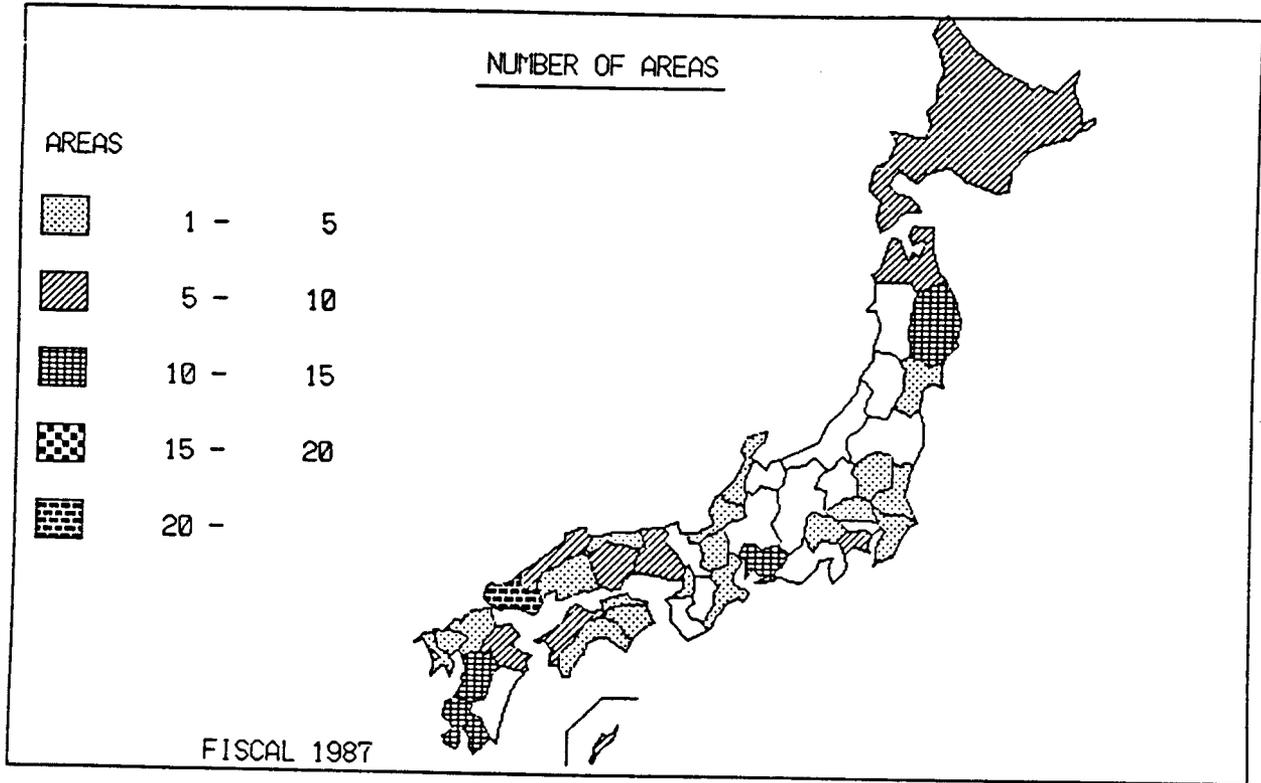


Figure 2.--Distribution of prefectures taking part in the program, shown by number of areas in which the program was conducted in 1987.

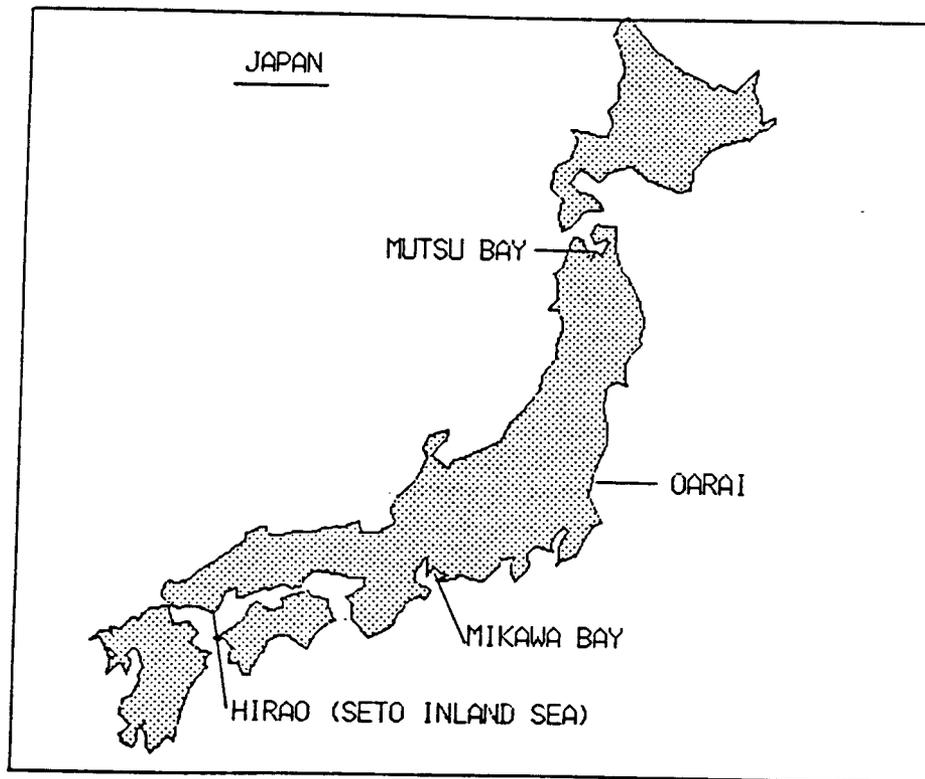


Figure 3.--Location of the four areas: Mutsu Bay, Oarai, Mikawa Bay, and Hirao.

same ever since. The program consisted of three major parts: cleaning up the beach, cleaning up the sea bottom, and conducting educational activities.

Beach cleaning was carried out for several days in July and August, with a total of 5,872 residents taking part, including fishermen, housewives, and students. Each participant was supplied with a pair of cotton gloves and a garbage bag, and wastes gathered totaled 356.2 metric tons (MT). Major components were wood fragments and seaweed. Combustible wastes were incinerated at the beaches, and incombustible items were transported by truck to garbage storage areas of local authorities to be used as landfill.

Sea bottom cleaning was conducted for several days mainly in July, with a total of 2,089 small-sized beam trawlers participating. Fishermen used their own nets for collection of wastes. Debris collected amounted to 163.8 MT, and consisted mainly of used cans and seaweed. There was a larger percentage of seashells and used cans than other wastes on the beaches. All the debris was transported to local authorities' garbage storage areas and landfills.

Educational activities were mainly targeted at elementary school pupils and junior high school students with a view to achieving long-term effects. Guidance on the importance of preserving the marine environment was extended in the course of ordinary school curriculums, and pupils and students were encouraged to make posters and catchphrases contributing to environmental preservation. A total of 1,146 posters and 1,904 catchphrases on marine environmental preservation were collected from the children at 37 schools from July to September 1987. Excellent works were publicly commended with commemorative awards worth ¥3,000-5,000 (US\$24-25) (including a book of gift coupons and a painting set). These were distributed for public presentation in the towns and villages concerned. This program has been established as an annual event in the area.

Oarai, Ibaraki Prefecture

Oarai is a Pacific coast town with a population of 21,000, and its major industries are tourism and a coastal fishery. Located relatively close to the Tokyo metropolitan area, Oarai has seen rapid urbanization during the past few years. The amount of wastes has been rising, making their disposal increasingly difficult despite the municipal authorities' effort. The town is situated at the mouth of a big river (Nakagawa River), and it has been pointed out that a great amount of debris flows into the sea from the river. Fishermen are worried that sardine fry, caught with trawl nets, can be easily damaged by garbage netted simultaneously. In the summer, about 8 million people visit this town for sea bathing. The municipal authorities have a hard time disposing of used cans and bottles generated by these seagoers.

Sea bottom 15-30 m deep and totaling 7.84 km² was cleaned on 18 January and again on 20 February 1988 using 57 small (5-ton) trawlers. Fuel expenses of ¥5,400 (US\$43) and ship depreciation expenses of ¥22,000

(US\$176) per day were provided to each vessel. Fishermen used their own trawl nets for cleaning activities. The program was conducted during off seasons of the coastal trawl fishery to avoid an unnecessary by-catch of fish. As a result of the cleanup, 15.5 MT of debris, mostly used cans and plastic bags, were collected and removed to a landfill.

Since the Cleanup Program was launched in 1974, fishermen have seen a decrease in the amount of debris caught in their nets, and they have become increasingly active in many areas in this region.

Mikawa Bay, Aichi Prefecture

Mikawa Bay, with an area of 604 km² and an average depth of 9 m, is a closed area with poor tidal interchange. At the back are located industrial and urban areas, and many rivers which run through these areas flow into the bay. Major industries of the bay area are fishing and tourism, with a resort business targeted at sea bathers.

In cleanup activities implemented in fiscal 1987, a total of 464 residents in 8 areas cleaned up the 30.9 km coastline along the bay, collecting 5,810 kg of wastes from 120,000 m² covered. Principal debris was wood fragments, cans, and bottles (Fig. 4). All the debris collected was either taken to a landfill or incinerated. A total subsidy of ¥1,000,000 (US\$8K) was granted, and was used for purchasing commemorative items, gloves, polyethylene bags, and fuel for incinerating waste.

Hirao, Yamaguchi Prefecture

Hirao is an agricultural and fishing town with a population of 15,000, facing the Seto Inland Sea. The Seto Inland Sea is the largest of its kind in the country, with a latitudinal extension of 445 km, a longitudinal extension of 15-18 km, and a total area of 2,200 km². The average depth is relatively shallow at 37.3 m. This is an area of serious concern when it comes to marine environmental pollution, as it is a closed area and has a population of 29,359,000 along the coast.

Impressive educational activities are being carried out in Hirao. With the collaboration of residents, an experiment was conducted to find out how the garbage arrived at the town by way of sea currents and winds, and where the garbage originating in the town goes. This experiment is known among the residents as "Coconut Strategy," with the capsules used in the experiments being thought of as coconuts. In July 1987, 25 plastic capsules 10 cm in diameter and 40 cm long were set adrift from 25 points along the coast within a radius of 50 km from the center of the town. Posters were placed in the town and surrounding areas in order to draw the attention of residents and ensure that reports would be made when the capsules were found on beaches. So far, a total of 15 capsules have been recovered. Around the areas where capsules were released, the results were publicized using posters saying, "The capsule released from your town arrived at such-and-such an area. This means if you discard garbage into the sea, it will possibly drift to that area and cause trouble. The sea does not belong only to you. Please take heed not to contaminate the sea."

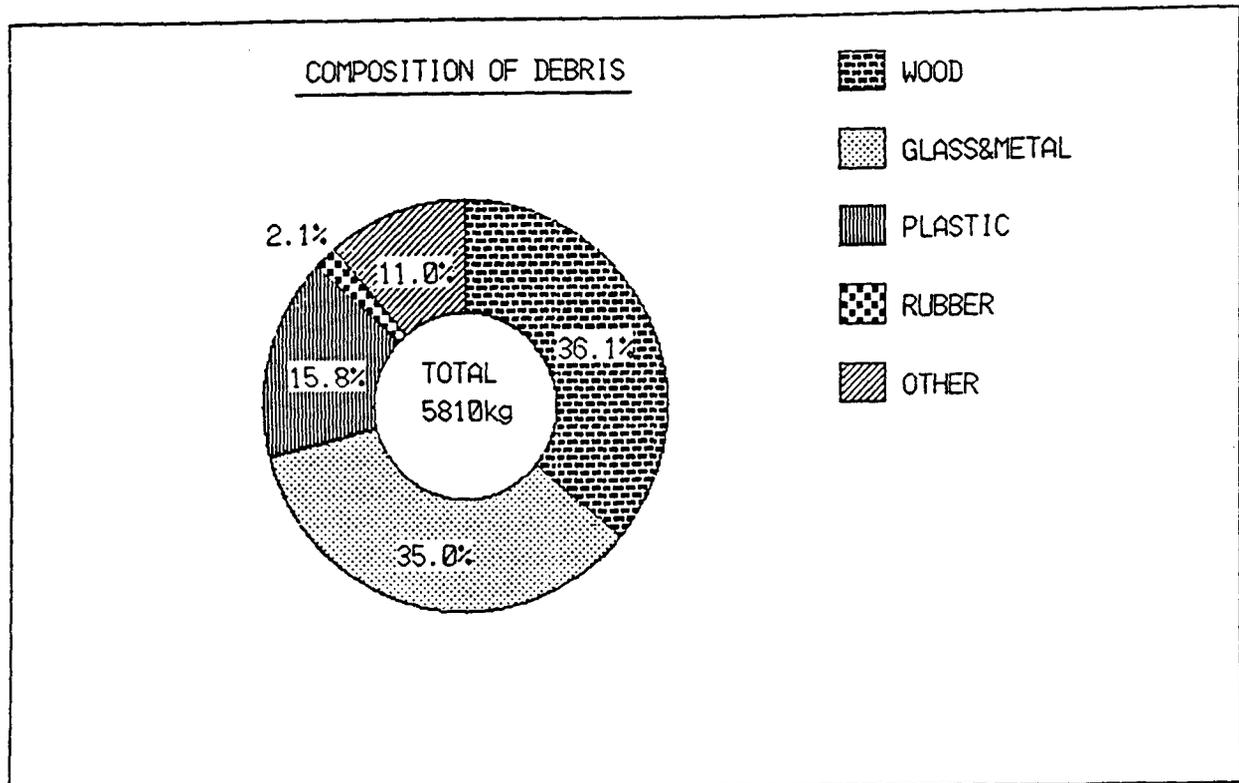


Figure 4.--Composition of debris collected from beaches during the cleanup of Mikawa Bay in July 1987.

A total of ¥322,000 (US\$2,576) was used for producing capsules and posters and for other purposes.

The campaign has grown as town residents have begun to realize the need to raise public ethical standards, and an increasing number of people are participating.

DISCUSSION

Effects of the Program

The Cleanup Program was initiated under the leadership of the administrative authorities, but in many cases, programs were taken over willingly by local residents as years passed.

People's interest has grown as the educational programs have continued, and many people hope that the programs will carry on. Some communities have even formulated their own new and voluntary initiatives, in addition to the basic guidelines. One such example is the establishment of "Fishing Ground Preservation Month," during which stepped-up publicity is conducted.

There have been two different views concerning the effects of the Cleanup Program. One recognizes the effectiveness of the program based on

the fact that the amount of garbage has been steadily declining since the program was launched. The other questions the effectiveness of the Cleanup Program, pointing out that the garbage amount has not decreased substantially even after several years. These differences are due to the fact that the pace of waste accumulation differs from area to area, that amounts collected are subject to weather and sea conditions, and that it is difficult to assess the effects of the program quantitatively. However, even people taking the latter position believe that implementation of the Cleanup Program contributes to an increase in public awareness of environmental preservation. It is therefore concluded that the program as a whole has been significant.

Future Themes

Some future tasks have been pointed out that will improve the effectiveness of the program. First is the need to conduct the program in a comprehensive manner covering a larger area than at present. In many cases, cooperation in the present program has been limited to the level of municipalities along a bay area. In order to cope with environmental problems covering the vast ocean, it will be necessary to step up and expand collaboration. Further, it will be no less important to expand the scope of the program to inland areas. A considerable amount of wastes generated by the people in those areas is transported through rivers to the sea. Garbage originating inland can accumulate on the beaches.

Second, it is necessary to hunt for new ways to promote a voluntary environmental preservation campaign. One potential method is to install garbage processing facilities in areas where individuals voluntarily collect wastes. Such support is expected to further increase the local communities' awareness of the need for environmental preservation. Lastly, some technological problems need to be solved. Although the program does not require any special technology, some problems have arisen as a result of its actual implementation. These include the disposal of incombustible objects containing large amounts of sand and seawater (salt water) and the elimination of wastes accumulated around complex bottoms or man-made structures such as artificial and natural reefs.

ACKNOWLEDGMENTS

We express our gratitude to all those who are striving to promote the Cleanup Program. Special appreciation is due to Messrs. Nagatsu of Aomori Prefecture, Chinone of Ibaraki Prefecture, Matsui of Aichi Prefecture, and Asaka of Yamaguchi Prefecture, who collaborated in collecting materials.