

Capture of the First Female Megamouth Shark, *Megachasma pelagios*, from Hakata Bay, Fukuoka, Japan

Koji Takada¹, Hisoka Hiruda¹, Seiichiro Wakisaka¹, Tohru Mori¹, and Kazuhito Nakaya²

Key words: female, megamouth shark, capture, Hakata Bay

Abstract A female megamouth shark was found stranded on a tidal flat near Gamnosu, Higashi-ku, Fukuoka City (34° 40' N, 130° 50' E) at around 10:00 A.M. on 29 November 1994. The weather was pleasant; the air temperature on that day ranged from 9.5–17.3°C and the water temperature ranged from 1.5–18°C, respectively. The sea was calm. The stranding spot was a tidal flat located deep inside Hakata Bay, which is semi-closed. Eye-witnesses said a shark was cruising around that area on the previous day. Judging from the situation, the megamouth shark entered the bay and stranded after the ebb tide of the day. Transportation of the specimen was carried out with full attention to the avoidance of damage. It was placed in a freezer at –30°C, 8.5 hrs after its discovery.

A megamouth shark (*Megachasma pelagios*) was captured for the first time near Oahu, Hawaii, at 165m in depth on 15 November 1976 (Taylor et al., 1983). Since then, five additional specimens have been found, mainly along both Pacific Coasts, and reported by Lavenberg and Seigel (1985), Nakaya (1989), Berra and Hutchins (1990), Lavenberg (1991), and Miya et al. (1992). Five were males and the sex of one was not determined. A female megamouth shark has been greatly anticipated.

A long-awaited female megamouth shark was found in extremely good condition in Fukuoka along the Sea of Japan in November, 1994. After this, two additional male specimens have been found, one off Senegal, Africa, in 1995, and the other off Brazil in 1995 (Séret, 1995; Amorim et al., 1995).

Results

Discovery

At about 10:00 A.M. a phone call from Mr. Kazuhisa Oue, a bird watcher, informed us of extremely good news. He said that a big creature that was shaped like a shark was stranded on a tidal flat in Hakata Bay. The site is only 4km from our aquarium. We arrived at the spot within 15 minutes of the phone conversation. The megamouth shark was stranded about 100m from the edge of the water. It was confirmed to be a female megamouth shark, found for the first time in world history (Fig. 1). The exact location was on a tidal flat off Gamnosu (34° 40' N, 130° 50' E), Higashi-ku, Fukuoka. The spot is located deep inside Hakata Bay (Figs. 2 and 3).

Locality and sea condition

The weather was mild with maximum and minimum air temperatures of 17.3 and 9.5°C,

¹Marine World unimo-nakomichi, 18-28 Saitozaki, Higashi-Ku, Fukuoka 811-093, Japan

²Laboratory of Marine Zoology, Faculty of Fisheries, Hokkaido University, 5-1-1, Minato-cho, Hakodate, Hokkaido 041, Japan



Fig. 1. The megamouth shark, *Megachasma pelagios*, that stranded at Gannosu, Hakata Bay, Fukuoka, Japan.

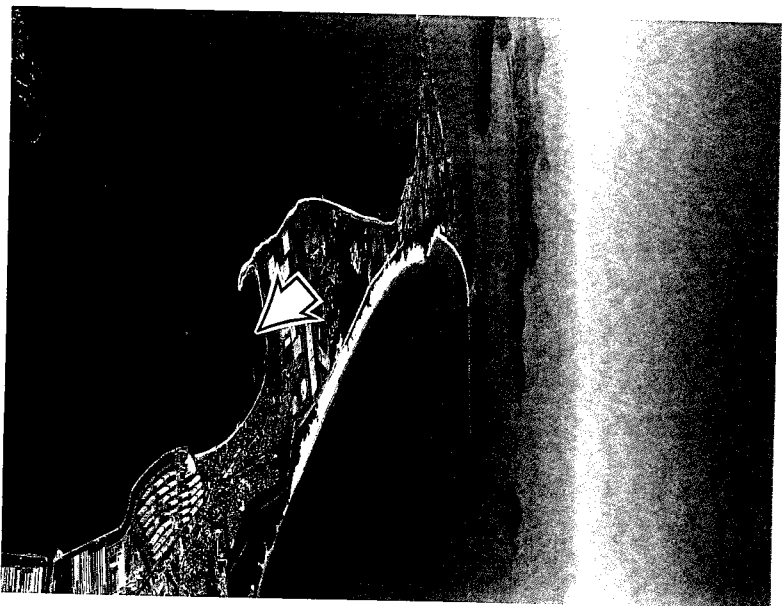


Fig. 2. Aerial photograph of the stranding site (arrow) within Hakata Bay.

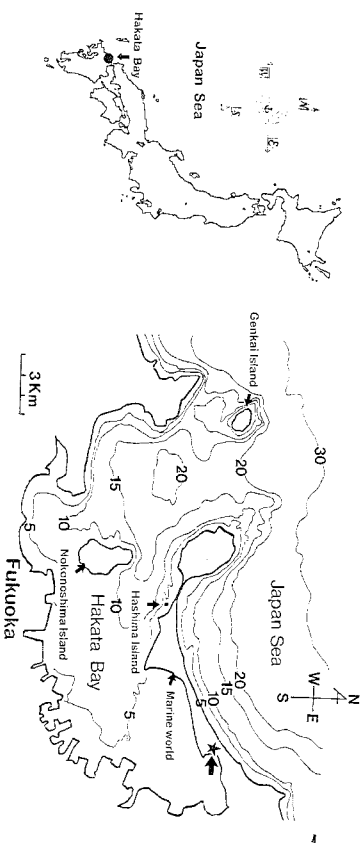


Fig. 3. The location of Hakata Bay (●), and the stranding site (★) in Hakata Bay, Fukuoka, Japan



Fig. 4. Photograph of entire body, as viewed from the left side, of the megamouth shark, *Megachasma pelagios*, at the stranding site.

respectively, on the day of discovery. Waves were small and the sea-water temperature in the mouth of the Hakata Bay (Genkai Island) varied between 18°C and 15°C in the deeper area of the Bay (Hashijima Island) according to data recorded by Fukuoka Marine and Ocean Technical Center. On the day of discovery, high tide was at 6:24A.M. (150cm high) and low tide (61cm) was at 12:09P.M.

The composition of the sediment at the site of discovery was a mixture of crushed shells. The depth of the sea around the mouth of the bay is about 20m and the sea floor beyond Nokonoshima Island is generally shallow. The dredged navigation route is 10m deep, but the shallow (the depth is only one meter at high tide), a significant portion of which is exposed to



Fig. 5. Photograph of the head, anterior view, of the megamouth shark, *Megachasma pelagios*, at the stranding site.

air at ebb tide (Figs. 1, 4, and 5).

The mouth of the bay is divided in two by Nokonosshima Island. The navigation route to the north of Nokonosshima Island has a width of about 2km. Sea water in the bay remains still during severe weather conditions and brings very limited volumes of plankton and other sorts of prey into the bay.

The megamouth shark at the site of discovery

The megamouth shark was found lying on its right side. It was dead when found (i.e., it had no branchial respiration, no heartbeat, no muscle contractions, and no reaction to its eyeballs being touched). Freshness of the body surface was extremely good and parasites on its body surface were still alive. There was no damage by birds and, as a whole, no visible external injuries, except a minor graze of the right nostril above the jaw and another on the lower part of the caudal fin. The appearance of the edge of its upper jaw and its abdomen suggested the possibility of internal bleeding, perhaps due to its own weight and pressure exerted by its own desperate movements. The intestine was prolapsed by abdominal pressure, but no feces were seen near the specimen (Fig. 4).

Its large mouth was closed and the area around its jaws was silver in color. The eyeballs were not protruded, although the right one seemed to be slightly off-center. The muscles and skeleton seemed weak. In particular, the pectoral fins were thin and soft. The body itself looked fairly flat, as if it was almost crushed by its own weight (Fig. 5).

Transportation

11:30A.M. Because the stranded megamouth shark was fresh with minimal external injuries, we discussed the method of transportation that would prevent any damage to it. Unfortunately, the sandy mud bottom at the stranding site was very soft and the specimen was about 100m from the water's edge. This made it quite difficult to bring heavy machinery near the megamouth shark. Therefore, we decided to transport the shark with manpower.

01:00 P.M. Previous records of stranding caused us to presume that the shark weighed more



Fig. 6. The stretcher designed for use with false killer whales, *Pseudorca crassidens*.



Fig. 7. Conveyance of the megamouth shark, *Megachasma pelagios*, by manpower.

than 700kg. We have several transporting units and a lot of experience transporting large marine animals. After careful consideration, we decided to utilize a transporting stretcher designed for false killer whales, *Pseudorca crassidens*, to carry the female megamouth. The stretcher was 370cm \times 160 cm and was hung from pipes that were 460cm in length and 48mm in diameter. Its maximum capacity was 500kg and it was made of canvas sown with blankets (Fig. 6).

02:00 P.M. The transporting unit was carried to the stranding spot. First, we spread the stretcher sheet out on the ground and rolled the shark onto it. After setting the pipes in the sleeves, the sheet was reinforced with two logs placed crosswise. Twelve people lifted the shark (Fig. 7). Its head was heavy and difficult to lift with good balance. We set some concrete panels and plastic sheets on the sand and moved carefully over them in an attempt to avoid any damage to the shark. Upon arrival at more solid ground, we lifted the shark and stretcher onto the platform of a crane-equipped truck and delivered it to our aquarium carefully. Transfer time was about 20min.

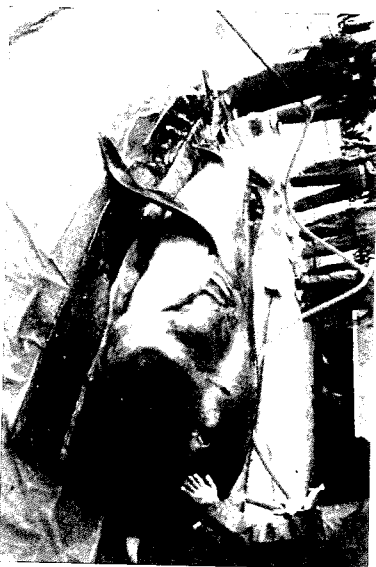


Fig. 8. The external measuring work for the megamouth shark, *Megachasma pelagios*, at Marine World umino-nakamichi.



Fig. 9. Carrying the megamouth shark, *Megachasma pelagios*, into the freezing facility.

03:30 P.M. After its arrival at Marine World, the shark was measured, its parasites were sampled, its body surface was cleaned with sea-water, and it was photographed. The shark weighed 790 kg (Fig. 8).

05:30 P.M. We loaded the megamouth shark on the truck again and carried it to a warehouse with freezing spaces available.

06:30 P.M. For ease of transfer into the warehouse, we used two water tanks (volume = one cubic meter) connected to each other by a concrete panel. We put the body on it and placed it in the freezer at a temperature of -30°C . It took us about one hour to get from Marine World to the warehouse. The total elapsed time from the discovery of the shark to its arrival at the warehouse was about 8.5 hrs (Fig. 9).

Discussion

The female megamouth shark that was found in Fukuoka was in almost perfect condition

without any substantial external injuries. A witness told us that, "The megamouth shark had succeeded in getting herself back into the water once, but she was trapped again on the tidal flat at the next ebb tide." Neighboring residents and fishermen said that a large shark was seen cruising near the aquarium (Marine World umino-nakamichi). Judging from this vivid information, the megamouth shark probably was alive just before it was found.

Hakata Bay is generally shallow and geographically semi-closed. The site of discovery is located deep inside the bay. We are not certain how she reached such an area far from the open sea. A summary of the information supplied by witnesses suggested to us that she entered the bay for uncertain reasons and reached the spot deep inside the bay after desperate efforts to locate the mouth of the bay. Hakata Bay is polluted by both industrial and residential waste water and scarce amounts of plankton are available in the bay. Hence, conditions within the bay are poor for her to survive for a long time.

Acknowledgments

We thank Mr. Kazuhisa Oue for reporting his discovery of the specimen to us. Deep gratitude goes to Dr. Yoshitaka Yabumoto of the Kitakyushu Museum and Institute of Natural History, to Dr. Kazunari Yano of Seikai National Fisheries Research Institute, Ishigaki Tropical Station, and to Dr. John F. Morrissey of Hofstra University for their valuable cooperation during this study and invaluable advice and critical reading of the manuscript. We thank the Green Park Maintenance Office for their full cooperation in transportation and Yokohama Keito Co., Ltd, for their significant contribution to the preservation of the specimen.

Literature Cited

- Amorim, A. F., L. Fagundes, C. A. Artelli, and F. E. S. Costa. 1995. Occurrence of megamouth shark, *Megachasma pelagios* Taylor, Compagno & Struhsaker, 1983, in the Atlantic. *Wetenschappelijke Bijdragen van het Instituut voor Wetenschappelijke Onderzoek en Ontwikkeling van de Visserij van de Staat van Rio de Janeiro* 19: 651-656.
- Berra, T. M. and B. Hutchins. 1990. A specimen of megamouth shark, *Megachasma pelagios* (Megachasmidae) from Western Australia. *Rec. West. Mus.*, 14: 651-656.
- Lavender, R. J. 1991. Megamania - the continuing saga of megamouth sharks. *Terra*, 30: 30-39.
- Lavender, R. J. and J. A. Seigel. 1985. The Pacific's megamystery - Megamouth. *Terra*, 23: 30-31.
- Miya, M., M. Hirosewa, and K. Mochizuki. 1992. Occurrence of a megachasmid shark in Suruga Bay: photographic evidence. *J. Nat. Hist. Mus. Inst., Chiba*, 2: 41-44.
- Nakaya, K. 1989. Discovery of a megamouth shark from Japan. *Japan. J. Ichthyol.*, 36: 144-146.
- Séret, B. 1995. Première Capture d'un requin grande gueule (Chondrichthyes Megachasmidae) dans l'Atlantique, au large du Sénégal. *Cybium*, 19: 425-427.
- Taylor, L. R., L. J. V. Compagno, and P. J. Struhsaker. 1983. Megamouth - A new species, genus and family of lamnid shark (*Megachasma pelagios*, family Megachasmidae) from the Hawaiian Islands. *Proc. Calif. Acad. Sci.*, 43: 87-110.