FOOD OF A KILLER WHALE: EAGLE STING-RAY, *MYLIOBATIS* FOUND IN THE STOMACH OF A STRANDED *ORCINUS ORCA**

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ABSTRACT

The killer whale, *Orcinus orca* feed on a variety of foods including sea mammals, sea birds, fishes and squids. Among fishes, teleosts seem to be more frequently found in the stomach content than elasmobranchs. There are some records where electric ray, skates and sharks are mentioned as preyed by killer whales.

Eagle sting-ray, *Myliobatis* teeth plates were the only remain found in the stomach of a killer whale stranded on the beach of Rio Grande do Sul, Brazil. As in the case of sharks that prey on sting-rays, six broken stings were found embedded on the jaw and snout tegument. By comparison of the teeth plates, the total length of the *Myliobatis* rays was estimated in a range of 65 to 81 cms.

INTRODUCTION

During the first week of November 1976 a killer whale, *Orcinus orca* was stranded 3 km South of Lagoa dos Peixes bar and 120 km North of Rio Grande (R.S., Brasil). During the last week of December two trips were made by the staff of the Museu Oceanografico to the stranding place. During the first trip color slides were obtained and the possibility of retrieving a part of the skeleton was considered. On the second trip, the complete head and the left flipper (M.O.R.G. Cetacean coll. n° 37) were collected, some measurements were taken and the stomach content was preserved and identified.

The 5.60 m long male killer whale was almost dried and partially burried in sand above the high tide line. Through a left lateral cut the liver was reached and under it the stomach was found. Numerous ray teeth, one cartilage, a broken shell and sand were retrieved.

STOMACH CONTENT

The teeth were identified as belonging to the eagle sting-ray, *Myliobatis*, a common venomous ray of the SW Atlantic waters and abundant during the summer along Rio Grande do Sul coasts.

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Teeth plates and venomous spines of the Whip rays, *Dasyatis;* Butterfly rays, *Gymnura;* Cow-nosed rays, *Rhinoptera* and Eagle rays, *Myliobatis* were dissected for comparison with those obtained from the stomach content.

Two kind of *Myliobatis* teeth could easily be recognized, long rectangular ones with slightly curved edges placed at the middle of the teeth plate and small polygonal ones on both sides of the middle series.

VENOMOUS STINGS

The killer whale was carefully inspected. The tegument had been loosing oil and was partially dried. All injuries and scars were opened with scalpels and 6 pieces of broken venomous stings were easily seen and extracted from inside the tegument at the following places:

sting A: 3.5 cm long at 10.5 cm distance, sligthly to the left of the tip of snout, upper jaw
sting B: 1.9 cm long at 4.0 cm distance below the 3rd upper right tooth, lower jaw
sting C: 4.3 cm long at 8.0 cm distance below the 8th lower tooth, lower jaw
sting D: 1.0 cm long at 4.5 cm distance below the 4th lower tooth, lower jaw
sting E: 2.0 cm long at 9.0 cm distance below the 5th upper tooth, upper jaw
sting F: 2.0 cm long at 13.0 cm distamce from the tip of snout, lower jaw

KILLER WHALE FOOD HABITS

The killer whale of the West coast of North America feed on a variety of foods, including four main kinds: sea mammals (whales, dolphins, seals and sea otters); sea birds; fishes (ling cod, *Ophiodon;* salmon, *Oncorhynchus*) and squids (Scheffer and Slipp, 1948).

The different preys of *Orcinus orca* had been carefully listed, including 10 species of cetaceans, 8 pinnipeds, 11 teleosts, 6 other vertebrates and 3 varieties of elasmobranchs (Martinez and Klinghammer, 1969).

It has been reported that a killer whale was observed to be feeding on an electric ray, *Torpedo californica* (Norris and Prescott, 1961) while unidentified skates and sharks are also mentioned among their diet (Tomilin, 1967).

The killer whales from the coastal waters of Japan feed mostly on fishes and cephalopods, but also feed on large numbers of cetaceans and pinnipeds (Nishiwaki and Handa, 1958).

The stomach content of 10 killer whales studied in the Eastern North Pacific contained the remains of at least three California sea lions (*Zalophus californianus;* four Steller sea lions (*Eumetopias jubatus*); seven Elephant seals (*Mirounga angustirostris;* two harbor porpoises (*Phocoena phocoena*); two Dall porpoises (*Phocoenoides dalli*); one minke whale (*Balaenoptera acutorostrata*); two Opah fishes (*Lampris regius*); one Pacific halibut (*Hippoglossus stenolepus*); two carcharinid sharks and one squid

(Rice, 1968).

The leatherback sea turtle, *Dermochelys coriacea*, has been added to the known prey of the killer whale from the St. Vincent Island (Lesser Antilles) (Caldwell and Caldwell, 1969).

DISCUSSION

Orcinus orca has been recently included on the list of Rio Grande do Sul cetaceans on the base of eight stranding records (Castello and Gianuca, in press).

The stranding of November 1976 (8th. record) took place along one of the longest sandy beaches of the SW Atlantic coast (from Chui to Torres), where sea lions *Otaria flavescens* and fur seals, *Arctocephalus australis* are seldom seen.

The La Plata dolphin or " Franciscana ", *Pontoporia blainvillei* has been considered as a possible prey of killer whales at Punta del Diablo (Dto. de Rocha, Uruguay) waters (Brownell, 1975), but until now this has not been documented.

It is also known that sharks frequently prey upon sting-rays. Dr Perry Gilbert (1977) from Mote Marine Laboratory, Florida, USA. recalled removing 96 sting ray spines from the mouth and lips of a 4.20 m long Hammerhead shark, *Sphyrna mokarran*. The spines were from the common sting ray, *Dasyatis americana* and the little round sting ray, *Urolophus jamaicensis*. Also from the jaws and neck region of a Hammerhead shark, *Sphyrna zygaena* (3.70 m long) caught in Beaufort North Carolina, USA., 58 stings were dissected. In a second specimen, there were remnants of 17 caudal spines in the stomach and at least 24 spines were in the gums. Stings can also be observed embedded in the tissues covering the jaw of *Carcharinus limbatus* (13 stings) and of the Sharp-nosed shark, *Scoliodon terra-novae* (one sting) (Gudger, 1946).

A Black-tip shark, *Carcharinus limbatus* from North Carolina waters (3.0 m long and 192 kg of weight) contained pieces of the Small Devil-fish, *Mobula* and in three Tiger sharks, *Galeocerdo tigrinus* pieces of *Mobula* and Whip ray (*Dasyatidae*) were found (Bell and Nichols, 1921). A Whip ray spine was imbedded in the muscle at the corner of the mouth of a 1.8 m long *Carcharhinus commersonni* collected at the Bay of Forida (Nichols, 1917).

From the size and number of teeth plates recovered from the stomach content and the size and number of the stings embedded on the jaw and snout of the killer whale, six eagle sting rays, in a range of 65–81 cm of total lenght, were eaten.

Two species of eagle sting rays are mentioned for Rio Grande do Sul waters, *Myliobatis freminvillei* and *M. goodei* (Bigelow and Schroeder, 1953). Unfortunately I am not able by the moment to distinguish both species on the basis of teeth or stings.

A broken shell of the bivalve, *Pitar rostratus* (Koch, 1844) also found in the stomach content was probably eaten by one of the eagle rays.

When caught in the killer whale's mouth each ray had in defense lashed out with its long tail and at least 6 of them had left with the killer whale mementos of their fights. Apparently no vital organ was injured by any of the stings.

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EXPLANATION OF PLATE

PLATE I

Fig. 1. Left middle series teeth of the upper plate (n° 1) of an eagle sting-ray, *Myliobatis* estimated to be 81.5 cm long, eaten by the killer whale. Right-Lower plate of the same specimen.

Fig. 2. Eagle ray teeth in different positions, three first rows are middle teeth, fourth row are lateral ones.

PLATE II

Fig. 1. Dorsal aspect of the lower teeth plate (n° 3) of an eagle sting-ray eaten by the killer whale.

Fig. 2. Ventral aspect.

PLATE III

Fig. 1. Labial cartilage of an eagle-sting ray found in the stomach content.

Fig. 2. Rests of a *Pitar rostratus* bivalve shell, probably eaten by one of the sting rays.

PLATE IV

Six pieces of eagle ray stings that were embedded on the jaw and snout of the killer whale.

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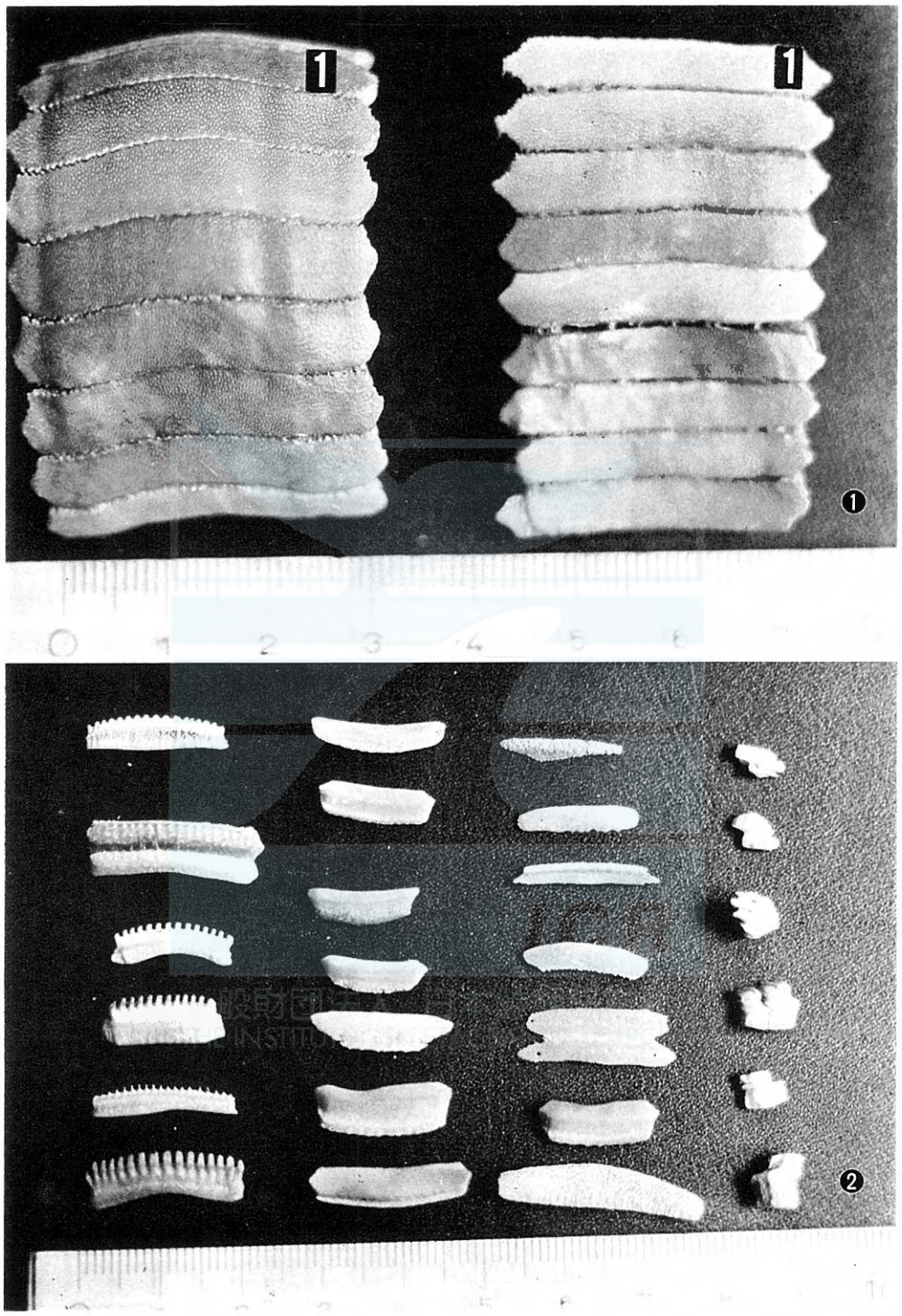
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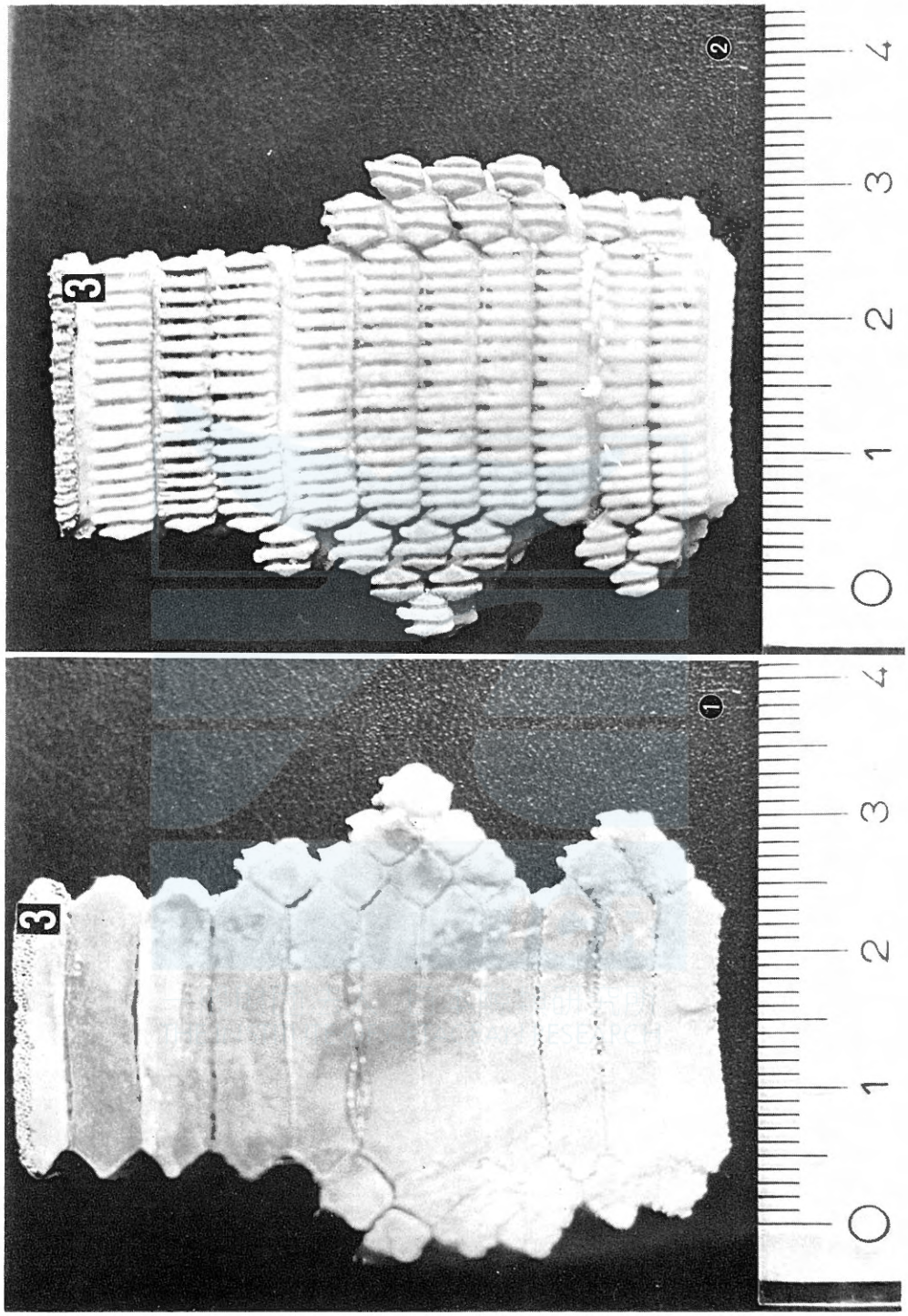
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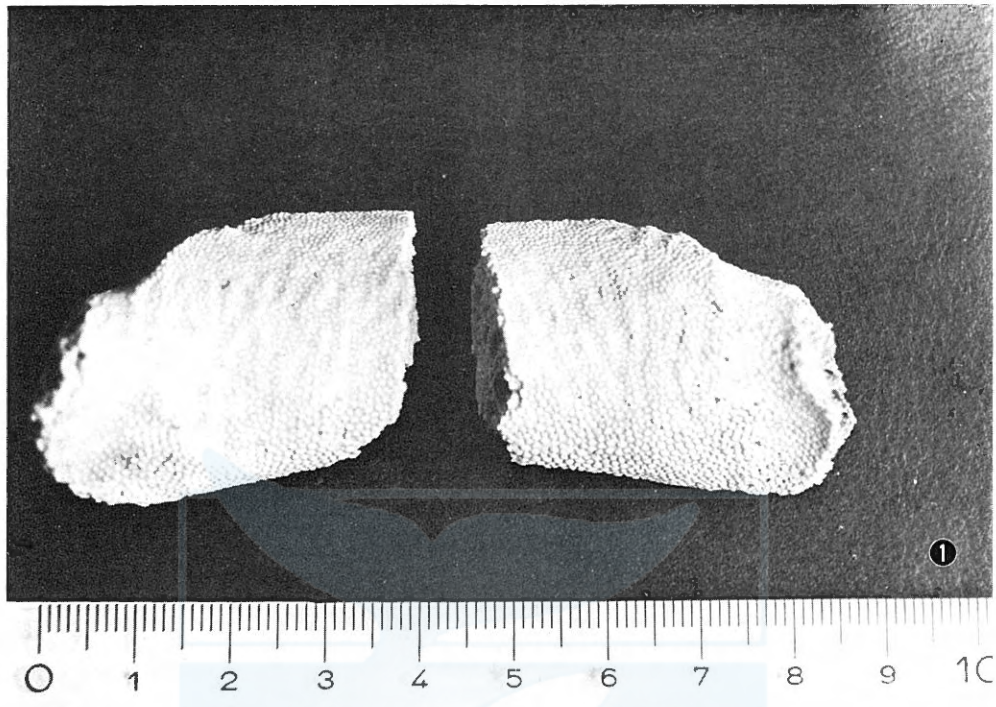
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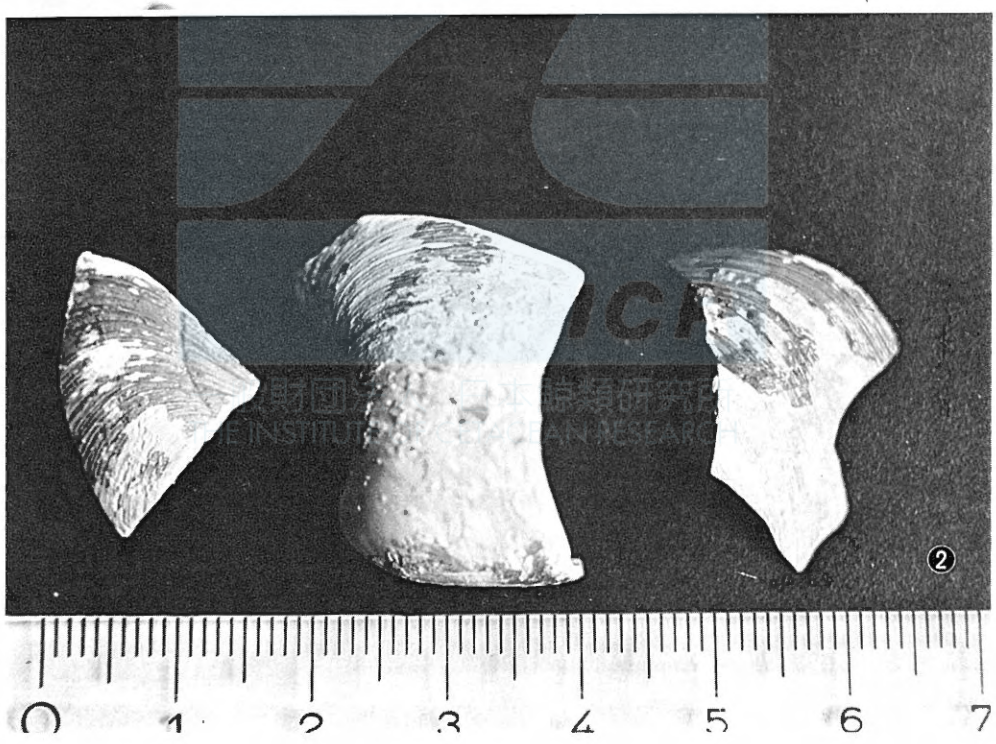
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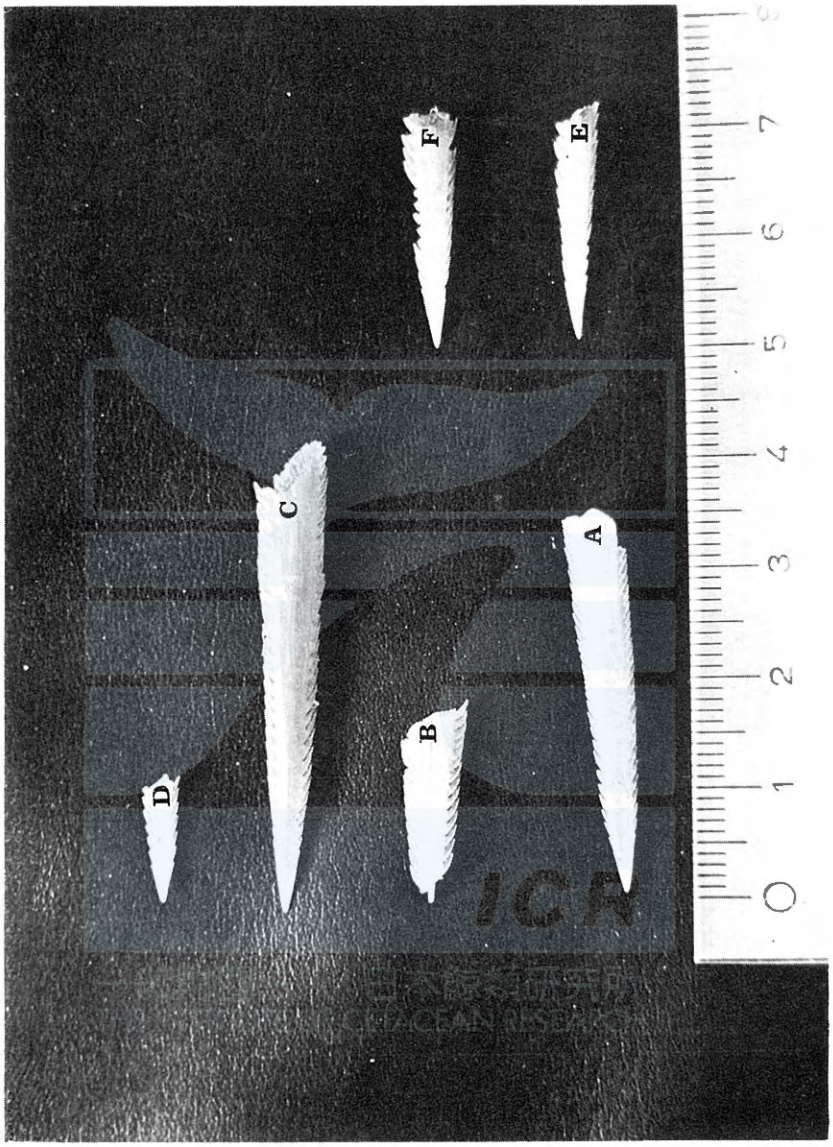
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