

## MYLIOBATIFORM RAYS FISHED IN THE SOUTHERN GULF OF CALIFORNIA (BAJA CALIFORNIA SUR, MEXICO) (CHONDRICHTHYES: MYLIOBATIFORMES).

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### ABSTRACT

Several species of rays are caught for human consumption by land-based fishermen off the southeastern coast of Baja California, Mexico. An account of the catch of myliobatiform rays at fishing camps in the vicinity of La Paz between 1981 and 1984 is given. The greatest fraction of the catch (94.1%) consisted of five species of rays of the family Mobulidae, but Rhinopteridae (2.2%), Myliobatidae (1.8%) and Dasyatidae (1.8%) were also represented. Available data on species, numbers, sizes, seasonal occurrences and sex ratios are presented. Records are included of *Myliobatis californica* and *M. longirostris*, hitherto unreported from the southern Gulf of California. The validity of the name *Manta hamiltoni* on the basis of coloration is questioned. Future implications of sustained fishing of immature individuals of the genus *Mobula* are discussed.

### INTRODUCTION

Rays (Superorder Batoidea) are well represented among the ichthyofauna of the productive waters of the Gulf of California. However, detailed information about their biology and ecology is lacking. The records is particularly poor with respect to rays belonging to the families Myliobatidae, Rhinopteridae and Mobulidae. Partial accounts of batoid species occurring in the Gulf of California are found in Ulrey (1929), Cuesta Terron (1932), Hiyama (1937), Castro-Aguirre (1965), Anonymous (1976) and Thomson *et al.* (1977). Beebe and Tee-Van (1941), in a more comprehensive species check-list and key to the batoid families found in the tropical eastern Pacific, include several species which they believed may occur in the Gulf of California. Walker (1960), in the first published account of *Myliobatis californica* from the Gulf, considered that it was restricted to its northern section.

Castro-Aguirre *et al.* (1970) confirmed the occurrence of *M. californica* in the upper Gulf, and gave the first record of *M. longirostris* for the Gulf of California.

Rays belonging to the family Mobulidae are among the least known batoids; due to their large size which makes them difficult to handle, and their negligible market value, they are seldom available to scientific investigation. Knowledge of a regular land-based mobulid fishery in the southern Gulf of California therefore prompted me to conduct a three-year investigation, designed to monitor the catch of rays belonging to the genus *Mobula*, and gather information on their general biology and systematics (Notarbartolo di Sciara, in prep.) In the course of the study, data were also collected concerning the other myliobatiform species encountered, i.e., the genus *Manta* and the families Rhinopteridae, Myliobatidae and Dasyatidae.

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A detailed account of the distribution, occurrence and natural history of the mentioned species is beyond the scope of the present note. The purposes of this paper are: 1) to report on the land-based batoid fishery in the vicinity of La Paz, and 2) to summarize the knowledge gathered on myliobatiform rays in the course of the study of the genus *Mobula*. Batoids are a not negligible resource for many fishing cooperatives in the Gulf of California, and extensive information of several aspects of their biology, including what species are fished, their life histories, their population dynamics, and ecology is desirable for effective management of the fishery.

## MATERIALS AND METHODS

Material for the present study was obtained from the catch of fishing communities located along the south shore of Baja California, in the vicinity of La Paz (fig. 1). Fishing cooperatives at Punta Arena de la Ventana, Ensenada de los Muertos, Los Frailes and Isla El Pardito were intermittently monitored during six trips to that area, five of which were short-term (24 January-8 February 1981, 25 November 1981, 16-21 December 1981, 20-23 December 1982, and 19-26

January 1948), and one lasted almost six months (26 January-15 July 1983). An extensive period was spent at the fishing camp based near Punta Arena de la Ventana, where rays were most consistently caught. Specimens examined also included rays captured by the crew of the research vessel Juan de Dios Batiz (Centro Interdisciplinario de Ciencias Marinas, La Paz), during a coastal cruise within the study area (24 Jan.-8 Feb. 1981).

Batoids in the catch identified, weighed, and measured before the fishermen processed them. Stomach contents and reproductive organs were examined later. Spring scales, previously calibrated with known weights, were used to weigh the rays. Rays weighing less than 20 kg were weighed to the nearest pound with a 50-pound scale, and the weight was subsequently converted to kilograms. Larger rays were weighed to the nearest kilogram with a 150-kg scale. Rays in excess of 150 kg were weighed in pieces, and 10% was then added to the sum to compensate for the loss of fluids. Linear measurements were taken to the nearest millimeter with a brass caliper mounted on a 2-m wooden ruler. A detailed description of the methods used in the study of feeding habits and life history of mobulid rays is given in Notarbartolo di Sciara (in preparation).

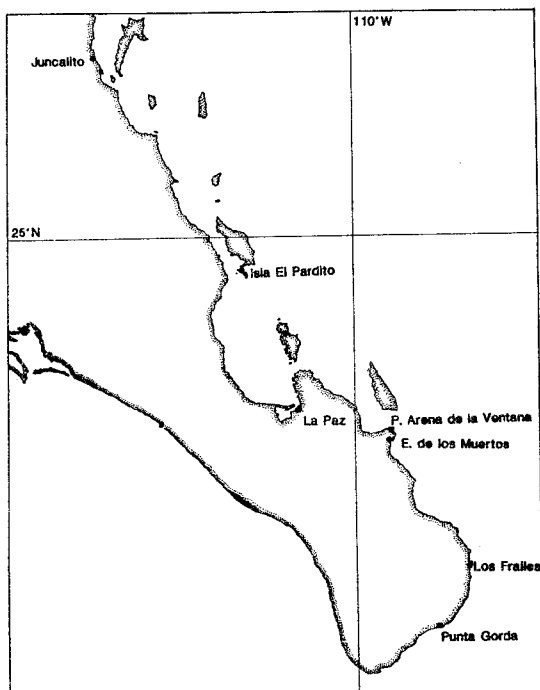


Fig. 1. The study area.

## RESULTS

Rays were captured with gillnets, harpoon, or baited hook. The boats used for fishing are 7 m long fiberglass launches called "pangas", powered by outboard engines; they afford a mean working radius of approximately 15 km from the camp. Gillnets are either set on the bottom, at depths between 10 and 200 m, or strung under the surface ("cornudera" and "caguamera" nets). Nets are checked once a day, in the early morning hours, to minimize spoilage of the catch, as it appears that most of the fish get entangled during the night.

During the month of June 1983, when the monthly abundance of mobulid rays in the catch was at its peak, 5,800 kg of rays were landed by the fishing cooperative of Punta Arena de la Ventana; at that time, the cooperative's work force consisted of 20 active "pangas", each with a crew of two.

Only approximately 25% of the total body weight of each ray is used. Meat carved out of the pectoral fins is utilized for human consumption

