

A Preliminary Study of the Fishery for Cero Mackerel (*Scomberomorus regalis*, Bloch) in Jamaican Waters

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RESUMEN

La mayor parte del pescado desembarcado de aguas jamaicanas es capturado por pescadores artesanales en embarcaciones de fibra de vidrio o labradas o troncos de árboles (dug-out canoes). Las artes de pesca predominantes son, para el arrecife: nasas, calas y fisgas; para los peces nerítico-pelágicos: chinchorros y redes agalleras y para los peces pelágicos-océanicos; pesca de corrida. Incentivos gubernamentales por medio de préstamos para la compra de motores de fuera de borda y subsidios por el combustible, han permitido la explotación de bancos más distantes pero, a la misma vez, han aumentado la presión, hasta niveles indeseables, sobre poblaciones costeras ya altamente pescadas. En años recientes se ha desarrollado una pesquería de *Scomberomorus regalis* en el Banco California, como a 6 millas al sur del puerto de Kingston, la cual provee una alternativa a los pobres rendimientos de los recursos pesqueros ya sobreprecados y a la altamente lucrativa, pero socialmente indeseable y potencialmente peligrosa, pesca en los cayos.

Aunque la carite chinigua se pesca pocas veces durante el año en redes de enmalle y chinchorros, la pesca principal ocurre en el verano en el Banco California y plataforma adyacente. El éxito parece estar asociado al uso de carnada viva y a los métodos de cordel y anzuelo empleados. Reconocimientos previos efectuados en esa área en busca de especies oceánicas, fallaron en identificar la importancia del recurso, tal vez debido a la naturaleza estacional de la pesca, la preferencia de la especie por aguas someras y a la incompatibilidad de los métodos pesqueros empleados.

La mayoría de los peces capturados durante la temporada de verano estaban maduros o desovando y el tamaño en la primera puesta y la relación de fecundidad y talla de los reproductores han sido estimados. Mediante entrevista con los pescadores, se hicieron estimados informales sobre tasa de capturas y pesca incidental en esa temporada. La frecuencia de tamaño y la relación de tamaño y peso en las capturas, han sido determinadas. En las capturas de ese banco y plataforma adyacente, las hembras eran de mayor talla que los machos y había menos ejemplares grandes en las capturas de la plataforma que en las del banco propiamente.

Se continúan los trabajos durante 1981 para tratar de estimar la magnitud del recurso mediante el conteo de larvas y para ver, además, si la chinigua ocurre también en otros bancos del área.

INTRODUCTION

I will relate how and why the Fisheries Ecology Research Project (FERP) of the University of the West Indies (UWI) came to be studying pelagic fish in Jamaica, outline the range of our activities and then describe one of our areas of interest in detail: the fishery for cero mackerel (*Scomberomorus regalis*, Bloch).

FERP is based at the Port Royal Marine Laboratory near Kingston on the south coast of Jamaica. We are funded mainly by the British Government Overseas Development Administration in conjunction with the Government of Jamaica Fisheries Division, and with administrative support from UWI. FERP was formed as an indirect result of several exploratory fishing programs carried out in the Caribbean under the sponsorship of UNDP and FAO, which had generated interest in developing a modern fishing fleet in Jamaica to operate beyond the reach of the mechanized canoe fleet. In its initial phase, from 1969 to 1974, Dr. John Munro and his co-workers studied the traditional line and trap reef fisheries with the object of assessing the maximum sustainable yield for the demersal fish populations, and to establish a valid biological basis for the regulation and management of these fisheries (Munro, 1973). While carrying out this work it became obvious that the inshore reef stock was severely overexploited and that catch rates were very low compared to the relatively unexploited offshore banks (Munro, 1974). The study also cast doubt on the Jamaican origin of the reef stock (Munro, Gaut, Thompson and Reeson, 1973) and in order to clarify this situation, the second phase of FERP from 1974-1977 looked at the distribution of larval and juvenile fish in relation to water currents. This debatable origin of the reef stock also created a natural desire for Jamaica to rely more heavily on the resources immediately under her own control. Considering the exhausted state of the reef stock inshore and what is generally regarded as a lack of open ocean pelagic fish, the nearshore pelagic stocks probably represent the best hope of an alternative artisanal resource. Indeed a re-direction of effort towards gill-net fishing by an increasing number of Jamaican fishermen has already been noted (Grant, 1981), and the present requirements are for an estimate of the size of the resource and of whether the full range of pelagic resources is being used to its maximum effect.

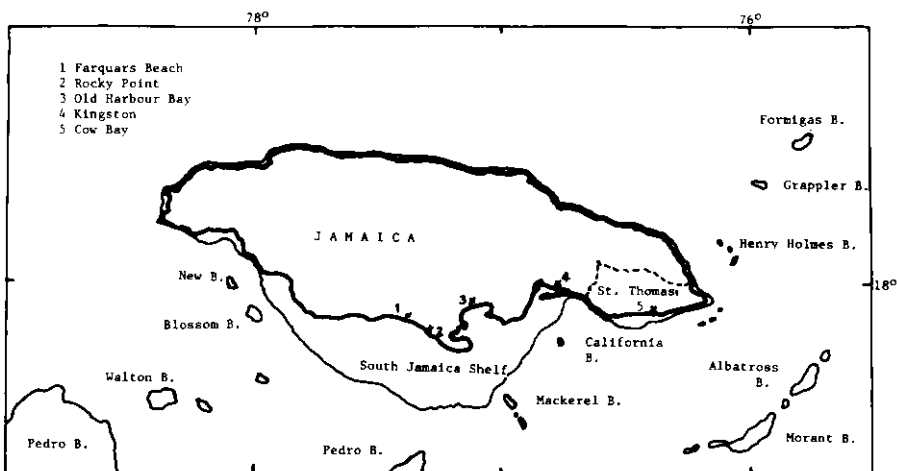


Figure 1. Map of Jamaica showing inshore oceanic banks and place names mentioned in the text.

The survey as originally planned could be divided into two parts: an inshore element consisting of stocks which could be investigated with small boats using techniques already developed by local fishermen (mainly gill-nets, cast nets, lift nets and beach seines) and an offshore element, to be investigated using R.V. CARANX, the Project's 17m ferro-cement research vessel. This was to be converted for mid-water trawling with facilities for trolling, gill-netting and hand-lining. Three stocks which were known to exist were to be investigated as a first priority: clupeids and engraulids on the south Jamaican shelf and big-eye scad (*Selar crumenophthalmus*) at the western end of the island. Unfortunately, due to engine problems with the R.V. CARANX, the offshore program has been restricted to sampling the commercial catch. Our work has, of necessity, concentrated on identifying the various pelagic resources and investigating the accessible inshore ones in detail. The more abundant pelagic stocks which we have so far identified include: *Cetengraulis edentulus*, *Opisthonema oglinum*, *Harengula humeralis*, *Harengula jaguana*, *Sardinella aurita*, *Hemiramphus brasiliensis*, *Selar crumenophthalmus* and *Scomberomorus regalis*.

THE FISHERY FOR CERO MACKEREL

Our interest in cero mackerel began in 1979 when large numbers were being landed in Port Royal and at a number of fishing beaches in St. Thomas (Fig. 1). The species has been recorded from New England to southeast Brazil (Böhlke and Chaplin, 1968) including the Gulf of Mexico, although it is not common north of Florida (Hildebrand and Schroeder, 1928). Ceros are common over reefs, typically solitary but may be found in small groups (Randall, 1968). Although there are no reports hitherto of commercial fisheries for cero mackerel it appears to be fairly common inshore, is a good food fish and is eaten whenever caught (FAO, 1978).

Method Of Capture

In most areas ceros are captured by trolling although catches are frequently small (Wagner and Wolf, 1974; Cooper, 1981). Beach seines and chinee nets (monofilament gill nets) also capture small numbers of cero mackerel (pers. obs.) but in Jamaican waters at least these are usually juveniles or small adults. Griffiths (1971) reports that *Scomberomorus* spp. are caught using baited hooks and gill nets in eastern Venezuela, although the two most abundant species were *S. maculatus* and *S. cavalla*. Exploratory fishing cruises have failed to identify this resource, probably for two reasons: (1) the method of capture; (2) the seasonal nature of the fishery. The UNDP/FAO Caribbean Fishing Development Project relied quite heavily on sightings of fish schools for pole and line fishing or trolling for investigating the larger pelagic fish. Both of these methods are less likely to capture *S. regalis*, which frequently occurs at depth. Also the CFDP used artificial lures to avoid losing valuable fishing time looking for bait. Although some fishermen at Port Royal troll for ceros they use fairly specialized lures, consisting of the posterior third of a "piper" (*Hemiramphus brasiliensis*) (Fig. 2) surrounded by colored nylon "feathers" made from off-cuts of nylon rope.

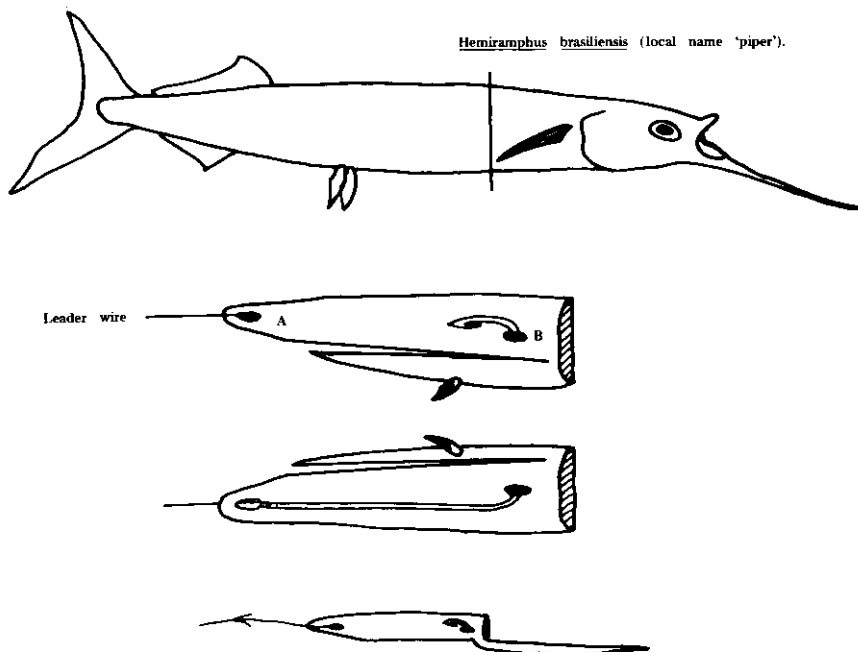


Figure 2. Mackerel lure prepared by Port Royal fishermen: (1) remove the scales and take the posterior 2/3 of the piper; (2) fillet one side as close to the backbone as possible; (3) cut a small hole (A) in posterior end of fillet; (4) slice lower quarter of fillet along its length, leaving slice attached at anterior end, this acts as a tail for lure; (5) pass hook through hole A and insert through anterior end of fillet at B. The lure is now firmly attached at hole A by the shank of the hook and point B by the hook curve.

This fishing method seems, subjectively, to be less successful than that used by most St. Thomas fishermen who pre-bait the area around their stationary boat with live bait. When there are a reasonable number of ceros in the area, the fishermen attach live bait to their hooks and catch them. They also claim to be able to vary the depth of fishing by attaching the hook through the anterior or posterior part of the bait fish. This is quite important since the ceros frequently occur close to the bottom and are therefore inaccessible to trolling lines. Pilchards (*Harengula* spp.) are normally used as bait and these are caught in lift nets the previous night or in cast nets early in the morning.

Local Distribution

From our own catch records and by visiting other fishing beaches on the south coast (mainly St. Thomas beaches, Old Harbour Bay, Rocky Point and Farquars Beach) it has been possible to build up a picture of the local distribution of the species. Juveniles have been taken in June close to shore in lift nets, cast nets and beach seines along the south coast and in Kingston

Harbour. Young adults are caught throughout the year in small numbers over the shelf in gill nets, chinee nets and beach seines although no fishery is based on them exclusively. In 1980 at least, the main fishery for ceros began in late April on the edge of the shelf by the Port Royal Cays (Fig. 1). By May most fishermen travelled to the California Bank, although ceros were still present on the shelf-edge. The California Bank is located 12 nautical miles south of Kingston, has an area of 2.5 nautical miles², is 35–45 m deep and separated from the shelf by depths of over 700 m. Large catches were taken at California Bank at least until October. Most of the ceros caught during the main fishery were ripe or spawning and during the rest of the year were spent, resting or developing.

Fishermen try to arrive at the California Bank by dawn and usually return to shore at about noon. By late morning the seas are normally quite rough and fishing is less successful.

Fishing Boats

Most fishermen use glass fiber canoes about 10 m long fitted with 20 to 40 h.p. outboard engines. Up to four men may fish from each canoe, usually with one line per man, although this may increase when there are few bites.

Catch Rates

Twenty-five boat days were monitored from Cow Bay fishing beach in St. Thomas in May 1980 to determine catch rates. These figures should be treated with caution since fishermen are very reticent about their earnings and sometimes deliberately mislead. The average catch of ceros was 70 lb/boat/day, which at a selling price of Ja\$2.50/lb was equivalent to Ja\$175/boat/day (US\$1 = Ja\$1.8). There was usually a by-catch obtained while fishing on the bank or by trolling en route to the bank which could include *Sphyraena barracuda*, *Coryphaena hippurus*, *Scomberomorus cavalla*, *Euthynnus alletteratus*, *Acanthocybium solanderi* and *Elagatis bipinnulata*. This compares with average catches of variable quality fish of 80 lb/trip pot fishing (Hamblyn, 1976) or 77 lb/trip chinee net fishing (Cooper, 1980) from Old Harbour Bay. Fishing on the California Bank is very dependant on calm seas and several boats carry on other types of fishing close to shore, e.g. pot fishing, which may also require attention during long periods of calm weather. Some boats also service pots set on the Bank and this may continue outside the mackerel fishery.

Marketing System

As with the rest of the domestic catch, mackerel are distributed and marketed by the "higgler" system. Several vendors buy fish in small quantities at the fishing beach and distribute it, usually over a limited area. This is singularly unsuited to a fishery for large fish which are difficult to retail whole (a requirement of the Jamaican consumer) and therefore represent a cash flow problem to the higgler. Fishermen therefore have difficulty disposing of large catches at remote fishing beaches.

Further Work

In 1981 we had planned an egg and larval survey of California Bank which was to be used in conjunction with a fecundity estimation carried out in 1980, to estimate stock size. Unfortunately engine problems with our research vessel have prevented this but it remains an aim for the future.

Cero mackerel may also occur on other Jamaican banks. They have been landed at Old Harbour Bay fishing beach, at times in large quantities (Cooper, 1980) but whether these were caught on the shelf, the California Bank or the Mackerel Bank (Fig. 1) is unknown. Small catches of cero mackerel have been made on Pedro Bank by trolling with artificial lures (Cooper, 1981) but it remains to be seen if this stock is as abundant as on the California Bank and as susceptible to specialized methods of fishing.

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