

The Commercial And Game Fishing Industries Of Bermuda

LOUIS S. MOWBRAY

Curator of the Bermuda Government Aquarium and Museum

THE TOTAL REEF area of Bermuda inside the 100-fathom curve is approximately 400 square miles, exclusive of two off-lying banks 10 and 18 miles from shore. The area of each of these 30 fathom banks is about 50 sq. mi. In all, there is a maximum area of 500 square miles from which to keep continuously supplied with sea food the requirements of a resident population of 42,000, and a transient tourist trade of 60,000 a year.

The supply of fish has never been able to meet the demand, though the almost complete lack of coordination between the catch and its distribution is at least partially to blame for this. Other factors, which will be listed later, also have a direct relationship to this deficiency.

To supplement the local catch, 36,500 lbs. of fresh, 377,000 lbs. of salted and 77,000 lbs. of smoked fish were imported during 1948.

The commercial fishing industry of Bermuda is hardly worthy of the name. There are slightly less than 100 men engaged on a full time basis in fishing, and fifty-five boats comprise the entire fleet.

As there is no marketing center, the more enterprising individuals have a contract for their catch direct with one or more hotels or guest houses, a meat market or one of the United States bases. It is in this connection that the Government may well assist the industry.

Fishermen who operate on a very small scale generally dispose of their catch at the dockside, and there is never a lack of customers. The fish is invariably fresh, due mainly to the fact that most boats are fitted with live wells and that nearly all ply their trade within about two hours' run from the docks.

The fish are sold flayed or scaled, and gutted, to both the wholesale and retail trade. The wholesale price averages one shilling and sixpence (21c. U.S.) and the meat markets retail it at around two shillings per pound. The price per pound at the boats is two shillings in the city areas (28c. U.S.) and in the isolated parts it is a sixpence or so less.

It has always been the opinion of the writer that a Government owned and operated quick freezing plant, built primarily for the use of the fishing trade, would be an excellent investment in the economy of the Colony, and in times of emergency would serve as an added place of storage for meats. This would be a great stimulant to the fishing industry, and would enable the fishermen to build up a reserve during the summer months to take care of some of their losses in winter.

Those interested in improving the lot of the fisherman are hoping that the present Legislature will agree to provide adequate quick freezing facilities. The Fisheries Committee of the Board of Trade has already recommended this.

In general, fish in Bermuda fall under two categories. Such species as grouper, rockfish, mangrove and red snapper, hind, porgy, bream, grunts, margate-fish, hogfish, yellowtail, etc., are classified locally as "bottom fish," while the two species of amberjack, mackerel, bonito, tuna, and jacks, etc., are known as "floating fish." The term "floating" indicates that these fish are always caught at or near the surface. The former are invariably caught by fish pot or hand line, while the latter are taken by seine or hand line. Trolling is seldom

indulged in by commercial men as a principal method of making their catch, though many of them hang a line over the stern with an artificial lure while running to and from their pots or fishing spots. Trolling is a phase which could definitely improve the catch seasonally, especially when tuna and wahoo are biting well.

The total annual catch of fish, by all methods, averages about 900,000 pounds in weight each year. The lobster catch is approximately 50,000 lobsters, averaging around 160,000 pounds in weight each year. The estimated total value of the combined catch is £78,000 (\$312,000 before devaluation). In spite of the comparatively small total catch, at least two of the fishermen have been able to average about £2,000 net from their efforts over the past few years.

There is no incentive to encourage anyone to enter the fishing trade in Bermuda. The only concession which is made to the fishermen is one of little consequence, and that is the fact that they are permitted to buy gasoline, of an inferior quality, at sixpence less per gallon than it is sold to the motor vehicle trade at the filling stations. The present price per gallon is two shillings and seven pence (37c U.S.) to the fishing boats.

Following is a list of the fish of greatest commercial value in Bermuda waters. Common names are followed by their scientific designation in order that there will be no confusion as to the actual species referred to:

Grouper or Hamlet	Whale Jack
<i>Epinephelus striatus</i>	<i>Caranx latus</i>
Rockfish	Turbot Trigger-fish
<i>Mycteroperca bonaci</i>	<i>Balistes carolinus</i>
Hind	Blue Angel-fish
<i>Epinephelus maculosus</i>	<i>Angelichthys isabelita</i>
Red Grouper	Gag
<i>Epinephelus morio</i>	<i>Mycteroperca tigris</i>
Amberfish	Monkey
<i>Seriola lalandi</i>	<i>Mycteroperca falcata</i>
Madregal Bonito	Red Rockfish
<i>Seriola falcata</i>	<i>Mycteroperca venenosa apua</i>
Horse-eye Bonito	Black Grouper
<i>Seriola dumerili</i>	<i>Garrupa nigriua</i>
Yellowtail	Guinea Chick Grouper
<i>Ocyurus chrysurus</i>	<i>Epinephelus drummondhayi</i>
Gray Snapper	Porgy
<i>Lutianus griseus</i>	<i>Calamus bajonado</i>
Red Snapper	Mackerel
<i>Lutianus aya, buccanella,</i>	<i>Euthynnus alleteratus</i>
<i>campechanus, etc.</i>	Mackerel
Spot Snappers	<i>Auxis thazard</i>
<i>Lutianus synagris</i>	Big-eyed Tuna
Hog Fish	<i>Parathunnus atlanticus</i>
<i>Lachnolaimus maximus</i>	Yellow-fin or Allison Tuna
Margate-fish	<i>Neothunnus allisoni</i>
<i>Haemulon album</i>	Oceanic Bonito
Blue-striped Grunt	<i>Katsuwonus pelamis</i>
<i>Haemulon sciurus</i>	Wahoo
Bream	<i>Acanthocybium solandri</i>
<i>Diplodus argenteus</i>	Pompano
Barracuda	<i>Trachinotus palometa</i>
<i>Sphyræna barracuda</i>	Gar-fish
Sennet	<i>Hemiramphus brasiliensis</i>
<i>Sphyræna picudilla</i>	Bermuda Chub
Gwelly	<i>Kyphosus sectatrix</i>
<i>Caranx guará</i>	Mullet
Blue Runner	<i>Mugil cephalus</i>
<i>Caranx crysos</i>	Parrot-fish
	<i>Sparisoma scarus, pseudoscarus</i>

Besides the foregoing there are several other species occasionally brought in by the commercial fishermen. Dolphin, jewfish and tapioca or oil-fish are not infrequently found. The two latter are almost invariably caught at

night, and in deep water while fishing for red snappers. Dolphin are purely surface fish and are usually only caught when trolling, a form of fishing seldom indulged in by the commercial industry. The jewfish is the same as that taken in Florida and along the coastline of the Gulf of Mexico, where it is usually found in very shallow water.

Following are some statistics concerning the annual catch. The figures are estimates only, as there are no regulations requiring an annual catch return being filed by the fishermen. The method of arriving at the estimate is purely one of average, but it is believed to be within 10 per cent of the actual catch. As few of the men keep within records, the estimate is based on average number of trips per week in both summer and winter months, and the average catch per trip in pounds weight.

Number of men employed full time in fishing	100
Number of boats employed full time in fishing	55
Estimated catch of fish 1948 (an average year)	900,000 lbs.
Estimated catch of lobster 1948 (an average year)	160,000 "
Estimated total value to the industry of the combined catch of fish and lobster	£78,000
Average value of annual turtle catch	£ 250
Average wholesale price of fish	1/6 per lb.
Average wholesale price of lobster	1/3 " "
Price of turtle, retail, dressed	3/6 " "

Sea food imported into Bermuda in the year 1948 to supplement the annual catch. Figures supplied through the courtesy of the Collector of Customs, Bermuda.

Fish (canned or bottled)		£20,212
Fish, Cod (salted)	377,076 lbs.	16,770
Fish, fresh	36,367 "	3,449
Fish (shell)	24,053 "	4,666
Fish (smoked or pickled)	76,870 "	4,857
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	514,366 lbs.	£49,914

Oysters, clams, conchs and crabs are not found in commercial quantities in Bermuda, and, therefore, have no bearing on the trade. Perhaps half a dozen individuals make a part time living from the gathering of mussels (*Arca occidentalis*) which fetch a current price of four shillings per quart removed from the shell. Until twenty years ago the scallop (*Pecten ziczac*) played an important part in the sea food trade, but for some undetermined reason they have become almost extinct. Rigid protective laws, in force before any undue shortage was noted, failed to have any effect on their preservation. They are so rare on the market at present that they command a price of ten shillings a dozen when available. The almost complete lack of mangroves makes the cultivation of the mangrove oyster impracticable.

GAME FISHING

Game fishing in Bermuda has had many set-backs since its commencement in 1934. The trade was just about getting in its stride in the summer of 1939 when the advent of World War II terminated all sport fishing activity abruptly.

Following is a list of fish which are considered to be of importance to the sport fishing industry of Bermuda. The common names are those used locally. The fish called amberfish is the same as amberjack elsewhere, and one known here as bonito has no relation to the bonito of the U.S., it being a species of amberjack—the madregal. The common bonito is known locally as mackerel.

Blue Marlin
Makaira ampla
White marlin
Makaira albida

Black marlin
Makaira bermudae
Wahoo
Acanthocybium solandri

Oceanic bonito
Katsuwonus pelamis
 Mackerel or Little tunny
Euthynnus alletteratus
 Big-eyed tuna
Parathunnus atlanticus
 Allison tuna
Neothunnus allisoni
 Yellow-fin
Neothunnus albacora
 Albacore (rare)
Germo alalunga
 Bonito
Sarda sarda
 Hogfish
Lachnolaimus maximus
 Bream
Diplodus argenteus
 Amberfish
Seriola lalandi
 Horse-eye
Seriola dumerili
 Madregal
Seriola falcata

Chub
Kyphosus sectatrix
 Bonefish
Albula vulpes
 Pompano
Trachinotus palometta
 Dolphin
Coryphaena hippurus
 Barracuda
Sphyaena barracuda
 Sennet
Sphyaena picudilla
 Jacks
Caranx sp. 4
 Yellowtail
Ocyurus chrysurus
 Gray Snapper
Lutianus griseus
 Porgy
Calamus bajonado
 Rockfish
Mycteroperca bonaci

Specimens of amberjack have been caught weighing over 170 lbs., and rockfish up to 180 lbs.

Repetition of Egg-Laying and Number of Eggs of the Bermuda Spiny Lobster¹

EDWIN P. CREASER

Biology Department, Hofstra College, Long Island

DURING THE SUMMER MONTHS of 1949 the writer at the Bermuda Biological Station engaged in a study of the egg laying habits of the Bermuda Spiny Lobster, *Panulirus argus* (Latreille) 1804. This study has revealed some interesting features in numbers of eggs and repetition of laying which have not been recorded for this species in other locations.

Female specimens were tagged with a wire and lead plate fastened to a joint of the antennae. Others were tagged with a plastic tag thrust between the abdominal segments.

Considerable evidence was obtained by these tagging methods on the repetition of laying eggs in this species.

This evidence may be summarized as follows:

1. Tagged specimens known to have laid once in the laboratory tanks repeated the egg laying performance.
2. Females with pleopods recently shed of eggs (as shown by the condition of the pleopods and egg shell fragments) were tagged and released and later recaptured with a new batch of eggs.
3. Females which had laid eggs at least once, in the laboratory showed a condition in which either the ovaries were completely filled with eggs or were entirely spent.
4. A female known to have laid eggs twice, had the ovary entirely spent.
5. The second laying of eggs (at least the second) is considerably reduced in amount and the posterior pleopods are not completely filled.

1. This study has been made possible by the writer's affiliation with the Bermuda Biological Station as summer resident biologist, and with the Biology Department of Hofstra College, Hempstead, Long Island, N. Y.