Spiny Dogfish

Squalus acanthias Linnaeus 1758
[Bigelow and Schroeder, 1948, p. 455.]
[Garman, 1913, pl. 14, figs. 1-4.]

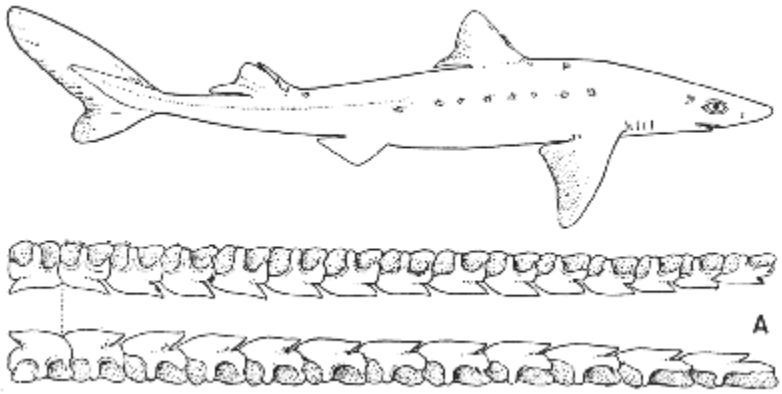

Figure 17- Spiny dogfish (Squalus acanthias), female, 27 inches long; after Garman.

A, upper and lower teeth, mid-point of mouth marked by the dotted line, about 3 times natural size.

From Bigelow and Schroeder. Drawing by E. N. Fischer.

Description

Any little gray or brownish shark, with a large sharp spine lying along the front margin of each dorsal fin, caught within the Gulf, or on the shoaler parts of the offshore fishing banks, is practically sure to be this "dog," of which there are thousands in the Gulf to every one shark of any other kind. One of its relatives, the black dogfish (p. 51), is a regular inhabitant of the deeper slopes of the offshore Banks that front the Gulf, where we also trawled more than 50 specimens of another relative *Etmopterus princeps* Collett 1904 during the summer of 1952. But there is no danger of confusing the common spiny-dog with either of these, for they are velvety black in color, the rear margins of their tail fins are indented near the tip, which is not the case in the spiny-dog, and each of their teeth, at least in the upper jaw (lower jaw as well in the black dogfish) has 3 to 5 sharp points, but only one point in the spiny dog.

This is a slender little shark, with flattened head and snout tapering to a blunt tip. Its first dorsal fin stands between pectorals and pelvics; its second dorsal fin is about two-thirds as large as the first; its pectorals form nearly an equilateral triangle; and its pelvics are well forward of its second dorsal fin. The dorsal fin spines lie close along the front margins of the two dorsals, the first not more than one-half as long, and the second nearly as long as the front margin of their respective fin, and they are very sharp. The spiny-dog has no anal fin, a lack separating it from all smooth-finned sharks known from the Gulf of Maine, except for the Greenland shark (p. 53), Dalatias (p. 55), and the bramble shark (p. 56). There is a low fold of skin on either side of the root of the tail back of the second dorsal fin, so small, however, that there is no danger of confusing it with the caudal keels of the mackerel-shark tribe. The teeth are small, their sharp points bent toward the outer corners of the mouth so that they form a nearly continuous cutting edge along each jaw.

Color

The upper surface is slate colored usually, sometimes tinged brown, with a row of small [page 48] white spots on each side from the pectoral fin to abreast of the anal fin, and with a few other white spots in front of the first dorsal and behind it, also in front of the second dorsal fin. These spots are most conspicuous on small fish up to 12 or 14 inches long and they fade with growth until they disappear altogether in some specimens. The margins of the first and second dorsals, and of the caudal are more or less dusky at birth, but soon fade. The lower surface ranges from pale gray to pure white.

Size

The majority are between 8-2/3 and 13 inches long when born. Most of the adult males are from about 2 feet to a little less than 3 feet long; adult females are from a little less than 2½ feet to almost 3½ feet; maximum length about four feet. Mature females average 7 to 10 pounds, a few reach 15 pounds if very fat, and 20 pounds has been reported.

Habits

Much has been written of the habits of the spiny dogfish, but nothing to recommend it from the standpoint either of the fishermen or of its fellow creatures in the sea. It is one of the more gregarious of our fishes, swimming in schools or packs. Swedish fishermen assert that young dogs school separately from their parents, and it is certain that fish of a size continue to associate together as they grow, the result being that any given school runs very even, consisting as a rule either of the very large mature females, or of medium-sized fish (either mature males or immature females), or of small immature fish of both sexes in about equal numbers.

Apart from their general seasonal migratory movements, dogfish are governed by the movements of the fishes on which they prey. And recent marking experiments have shown that some of them cover long distances in their wanderings, for two tagged near St. Johns, Newfoundland, in mid-July 1942 were recaught off Cape Ann, [23] one on November 23, 1943, the other on December 4 of that year, [24] while others from the same tagging experiment were caught within the Gulf of St. Lawrence. [25] Fortunately they seldom stay long in one place, but there is seldom, if ever, a time during the summer when they are not common on some part of the Gulf of Maine coast. So erratic are their appearances and disappearances that where one has good fishing today he may catch only dogfish tomorrow and nothing at all the day after, the better fish having fled these sea wolves and the latter departing in pursuit.

The dogfish use their back spines for defense, curling around in a bow and striking, which makes them hard to handle on the hook. It is probable, too, that the spines are slightly poisonous, general report to this effect being corroborated by the fact that the concave surfaces are lined with a glandular tissue resembling the poison glands of the venomous "weever" (*Trachinus draco*) [26] of Europe.

Voracious almost beyond belief, the dogfish entirely deserves its bad reputation. Not only does it harry and drive off mackerel, herring, and even fish as large as cod and haddock, but it destroys vast numbers of them. Again and again fishermen have described packs of dogs dashing among schools of mackerel, and even attacking them within the seines, biting through the net, and releasing such of the catch as escapes them. At one time or another they prey on practically all species of Gulf of Maine fish smaller than themselves, and squid are also a regular article of diet whenever they are found. Dogfish are also known to take worms, shrimps, and crabs. And when they first arrive at Woods Hole in May they are often found full of Ctenophores, being one of the few fish that eat these watery organisms. Often, too, they bite groundfish from the hooks of long lines, or take the baits and make it futile to fish with hook and line where they abound.

Fishermen are familiar with the fact that the female spiny dog bears "living" young (this has been known since the days of Aristotle). The eggs are large, well stored with yolk, and during early stages those in each oviduct (so-called "uterus") are contained in a horny capsule that breaks down later, leaving the embryos free in the "uterus," to which they have no placental attachment. The number in a litter is commonly 4 to 6; sometimes as many as 8 to 11, or as few as 2.

According to recent studies, the females carry their young for 18 to 22 months. Accordingly, the adult females caught in our Gulf contain either very early embryos, averaging only about three-fourths of an inch in length by September, or [page 49] much larger ones, 7 to 11 inches long by that month; i. e., nearly ready for birth. Similarly, we have taken females with embryos 9 to 10¼ inches long in November, on the Cholera Bank near New York Harbor. And it now seems established that most of the young are born on the offshore wintering grounds. [27] But dogfish so small as evidently to have been newborn are occasionally taken along southern New England and in the Gulf in early summer; also on Nantucket Shoals where the *Albatross II* trawled some of 10½ to 13 inches in August, showing that the season of production extends through the spring, or even into the summer as in 1905 when females taken off Gloucester in July gave birth to young on capture. [28]

General Range

Both sides of the North Atlantic, chiefly in the temperate and subarctic belt; also both sides of the northern Pacific; [29] and represented in the corresponding thermal belt of the southern hemisphere by a relative (or relatives) so close that it is doubtful whether they differ in any recognizable way from the spiny-dog of the north.

Occurrence in the Gulf of Maine

The spiny dogfish ("dogfish" or "dog" in common parlance) makes up for the comparative rarity of other sharks in the Gulf of Maine by its obnoxious abundance. To mention all the localities from which it has been reported there would be simply to list every seaside village and fishing ground from Cape Cod to Cape Sable. It is as familiar, too, on the offshore banks as it is along the coast; also along outer Nova Scotia, in the Gulf of St. Lawrence, on the Grand Banks, and along the east coast of Newfoundland to southeastern Labrador. There is no record of it from the North American coast north of Hamilton Inlet, but stray specimens have been taken along the southwest coast of Greenland. [30] To the southward, fishermen are familiar with it in season as far as Cape Lookout, N. C., and a few stray even to southern Florida and to Cuba. [31]

Dogfish are seasonal visitors on the coast, striking in about as early along New Jersey (March), and even on Georges Bank (March-April), as along North Carolina. In the inner parts of the Gulf of Maine the date of the first heavy run of dogfish varies widely from year to year and from place to place. We have not heard of them there before May. But the period of freedom may close as early as the last half of the month, in some years.

In 1903, for example, they had appeared as far north as Penobscot Bay by the middle of May. And while it is not until June that they usually arrive in numbers in the Massachusetts Bay region, it is sometimes impossible to set gill or drift nets anywhere between Cape Cod and Cape Elizabeth after the first days of that month, so numerous are they. In 1913 the first heavy run of dogfish struck Ipswich Bay on June 14, and they appeared there at about the same date in 1905, but there is much local variation in this respect. In 1903, for example, they did not appear until early July at Provincetown, though swarming a month earlier in Massachusetts Bay, in Ipswich Bay, and off Penobscot Bay. But in 1920 they appeared at Provincetown by May 25 to 26 when one set of mackerel traps caught 23 barrels of them, and another 21 barrels. They usually strike in all along the northern Maine and west Nova Scotia coasts by the end of June; but few are seen until late in July in Passamoquoddy Bay. They have been recorded as early as July 1 near Raleigh, on the Newfoundland side of the Strait of Belle Isle, but they are not caught in any numbers in the inner parts of the Gulf of St. Lawrence until well into July, and they have not been reported from southeastern Labrador until early in September. [32]

In the southern part of its range, from North Carolina to New York, the spiny dogfish is a spring and autumn transient only. West of Cape Cod (at Woods Hole, that is, and along Long Island) [page 50] they are transients mostly, passing north in spring and south in autumn, though some summer there; even considerable numbers in some years. [33] And it seems that most of them withdraw from Massachusetts Bay also during the warmest period, for few are taken there between June and September. But they continue present all summer along outer Cape Cod, and here and there throughout the northern and eastern parts of the Gulf, in varying abundance.

Most of the dogfish take their autumnal departure from the inner parts of the Gulf during October, few being caught on the coast north of Massachusetts Bay after November 1. But they sometimes stay later, as in 1903 (a big dogfish year), and again in 1942, when they were abundant along the outer shore of Cape Cod as late as the first week of November. Ordinarily none are caught within the Gulf of Maine north of Georges Bank in winter, but this has its exceptions. In 1913, for example, a few were caught 20 miles off Cape Ann on November 19 to 24, many near Boon Island from December 5 to 13, and on Jeffreys Ledge on December 11 and 12.

In 1882, schools were reported off Portsmouth, N. H., even as late as February, an exceptional event.

Dogfish appear earlier in spring and linger later into the winter on Georges Bank (fig. 18) than in the inner parts of the Gulf. It is safe to say that there are few there in March, the earliest definite record (obtained during the investigations of 1913, only year of record), being of 25 fish caught on the "winter cod ground" east of the shoals (long. about 67°, lat. about 41°40') between the 20th and the 22nd, and of 46 from the same general region from the 27th to the 30th, while some are trawled there all summer. In 1913, a few were taken in November and in December; a few also on the southern part of the Bank (lat. about 41°, long. about 67°30') on January 20 to 22 in 1914.

Apparently dogfish reach Browns Bank later than they do Georges, for none was taken there on April 14 in 1913, though they are only too plentiful there in summer. It is also likely that they depart earlier, although a few lingered as late as December 3 to 12 on Western Bank off Halifax in that year.

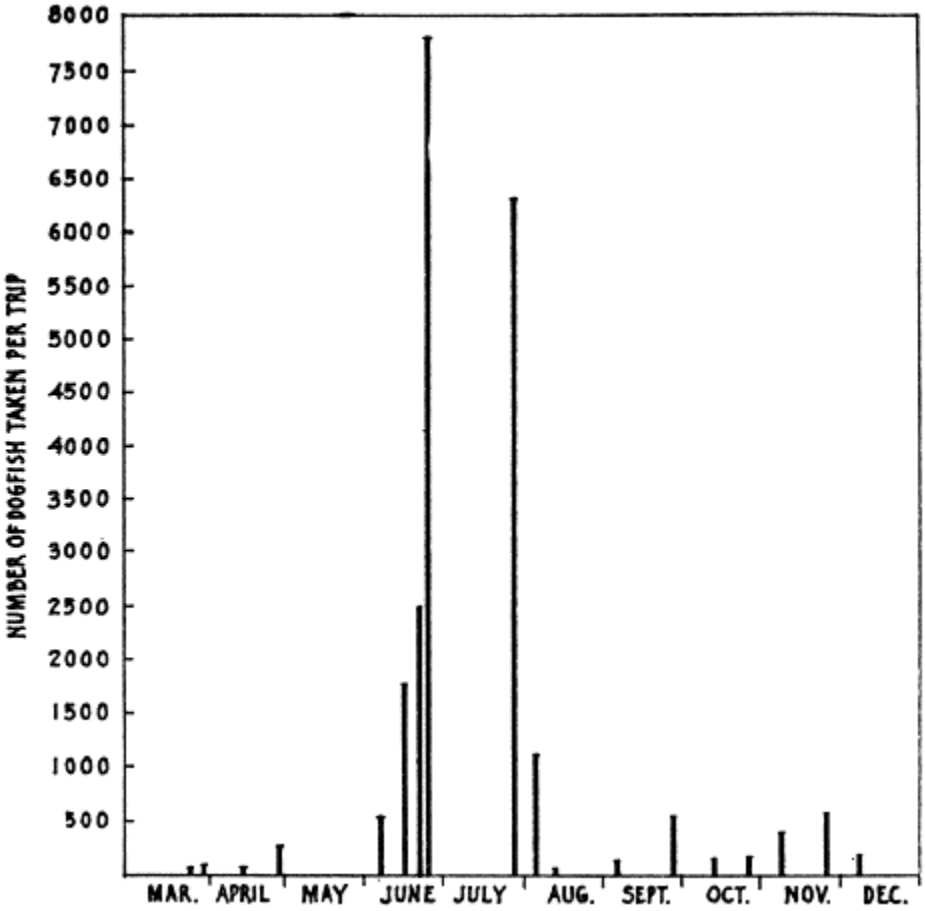

Figure 18.- Numbers of spiny dogfish caught on certain otter trawilng trips to Georges Bank, during the different months of 1913.

It now seems certain that the spiny dogfish winter chiefly in deeper water offshore, for considerable numbers have been trawled at that season on the outer part of the continental shelf off Block Island, in 50 to 65 fathoms, where we saw several hundred (200 in one haul) trawled during the last week of January 1950; off New York in November and January; [34] also in February off the Middle Atlantic coast in 16 to 70 fathoms, south as far as the offing of Cape Hatteras. On the other hand, the fact that numbers of them have been found washed on shore in January on the southwest coast of Newfoundland suggests that some of those that summer in that general region may survive the winter in the deep trough of the Gulf of St. Lawrence. They are usually so thin when they reappear on the coast in spring as to suggest that they feed but little during the winter.

This is the only Gulf of Maine shark that even remotely rivals the important food fishes in numbers. Unfortunately, the statistics of the commercial landings for American waters do not afford any information in this regard. But spiny dogs must be plentiful indeed in our waters when they can sometimes be caught as fast as they can [page 51] be hauled in; when a long line, with 1,500 hooks, has been known to bring in a dogfish on nearly every hook; and when an average trawl catch of 6,000 to 8,000 per trip was made on Georges Bank in 1913 during their season of abundance. At the time of the 1904 to 1905 peak it was estimated from recorded catches that at least 27,000,000 were being taken yearly off the coast of Massachusetts. [35]

More precise information from waters farther north is that 10,391,000 pounds, or 2 to 3 million individual dogfish, were caught in 1938, in Placentia Bay, Newfoundland, with no apparent effect on

their numbers. [36] In short, they may be as plentiful in our Gulf as they are on the Cornish coast, where the record catch of 20,000 in a single haul was made many years ago.

Spiny dogfish appear to have been more numerous in the Massachusetts Bay region during the last quarter of the past century and during the early nineteen hundreds than they had been previously. At Woods Hole, on the contrary, they are said to have been much more plentiful before 1887 than they have been at any time since. To a certain extent, of course, reports of fluctuations in abundance from year to year must be discounted as reflecting the movements of the great schools that may visit one part of the coast one summer and another part the next, not a general alteration of the stock. But the many fishermen who reported to the Massachusetts Commissioners in 1905 were unanimously of the opinion that dogfish had multiplied steadily for 20 to 30 years past, and reports from British coasts were to the same effect. Perhaps the years 1904-1905 marked the apex of this wave of multiplication; at any rate dogfish were reported as distinctly less troublesome to the mackerel netters in 1913 than they had been previously. And little complaint has been made of them in late years.

But it is not safe to conclude from this that the stock is at a low ebb at present, for it was the hand and long-line fishermen that suffered most from them; and it is only as they increase the amounts of trash fish dumped overboard that the dogfish bother the otter-trawlers.

Importance

During the years when the ground fishery was chiefly by hook and line, fishing often was actually prevented by dogfish in Massachusetts and Ipswich Bays, unless cockles (Polynices) were used for bait, for dogfish do not take these. The general replacement of hook and line fishing by the otter trawl has put an end to widespread complaints on this score. But when schools of dogfish get into a net or seine, they so snarl the twine that disentanglement and repair may be the work of days. And it has been estimated that they may do some $400,000 worth of damage annually to fishing gear, and to fish caught by such gear, off the coast of Massachusetts alone, during their peaks of abundance there.

With the dogfish so plentiful and destructive, it is no wonder that serious efforts have been made to make them a source of revenue instead of a dead loss. And the dog is a far better food fish when fresh than is generally appreciated, as is evident by the large amounts landed in the fishing ports of northwestern Europe. But it has never been in any demand for the table, on our coasts, though it would offer a large supply of cheap food were a satisfactory method found for canning it. During their more recent periods of plenty various efforts have been made to utilize them on a large scale for fertilizer, and for liver oil (it compares favorably with cod for vitamin A, though it is much poorer in vitamin D), on the Atlantic coasts of the United States and Canada; however such developments have been short-lived. And dogfish have not been of sufficient value up to the present to compensate for a hundredth part of the damage they do. [37]

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[23] About 14 miles offshore.

[24] On Middle Ground about 25 miles off Cape Ann.

[25] Templeman, Fish. Res. Bull., Newfoundland Dept. Nat. Res., No. 15, 1944, pp. 67-69.

[26] Evans (Philos. Trans. Royal Soc., London, Ser. B, vol. 212, 1923, pp. 8, 27) describes the spines and gives clinical records of the effects of wounds inflicted by them.

[27] Females that we saw trawled off Block Island in 60-65 fathoms in late January 1950, gave birth to young on the deck of the vessel.

[28] McIntire, Rept. Comm. Fish. Game Massachusetts, (1905) 1906, p. 108.

[29] We have found no consistent differences between North Atlantic and North Pacific specimens. For further discussion of this point, and further details as to the occurrence of the spiny-dog in the two sides of the North Atlantic, see Bigelow and Schroeder (Fishes of the Western North Atlantic, Pt. 1, 1948, pp. 453, 463).

[30] Jensen (Selachians of Greenland, Mindeskr. Japetus Steenstrup, Pt. 2, No. 30, 1914, p. 7) lists several definite records of this species at Sukkertoppen and near Holsteinborg, West Greenland.

[31] Repeated reports of it as plentiful along eastern Florida seem to have referred to some other shark; the basis for similar reports from Cuba and Trinidad doubtless was the Cuban dogfish, Squalus cubensis Rivero.

[32] See Templeman (Res. Bull. 15, Newfoundland Dept. Nat. Res., 1941, pp. 56, 64) for dates of arrival around the coast of Newfoundland in different years.

[33] For details, see Bigelow and Schroeder, Fishes of the Western North Atlantic, Pt. 1, 1948, p. 464.

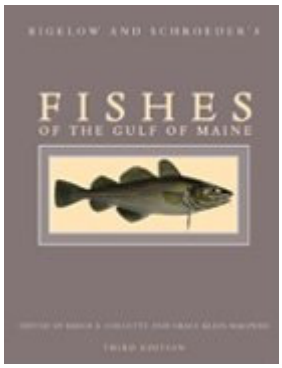
[34] Mr. Thomas Quast informs us that many were taken from the schooner *Victor* , long-lining for tile fish, on the outer edge of the continental shelf, off New York, during the second week of January 1928.

[35] Report, Comm. Fish and Game, Mass., (1906), 1907, p. 20.

[36] Templeman, Newfoundland Fish. Res. Bull., 15, 1944, p. 72.

[37] For further discussion of the damage done by dogfish and of their commercial possibilities, see Ann. Rept., Comm. Fish. Game Mass. (1905), 1906, pp. 97-169; Rept. U. S. Comm. Fish. (1902) 1904, pp. 228-229; Field, Doc. 622, Rept. U. S. Comm. Fish. (1906) 1907, pp. 21-23; Field, Bull. U.S. Bur. Fish., vol. 28, 1910, pp. 243-257; Mayor, Contr. Canad. Biol. (1918-1920) 1921, pp. 125-135; and Templeman, Newfoundland Fish Res. Bull. 15, 1944.

Fishes of the Gulf of Maine by Bigelow & Schroeder is the seminal work on North Atlantic fishes. It was originally published in 1925 with William Welsh, a Bureau of Fisheries scientist who often accompanied Henry Bigelow on his research cruises. In the late 1920's, Bigelow began a long association with William C. Schroeder, publishing a number of papers and reports on fishes of the North Atlantic, including the first revision of Fishes of the Gulf of Maine. This excerpt is from that 1953 edition.



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