

likelihood of its riding about in fur of Martens and Red Squirrels.

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## Where do Juvenile Atlantic Wolffish, *Anarhichas lupus*, live?<sup>1</sup>

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A size frequency histogram for Atlantic Wolffish collected on the Avalon Peninsula, Newfoundland is presented. No individuals smaller than 50 cm total length were collected or observed. It is concluded that the juveniles do not inhabit shallow water where adults migrate in spring to spawn. The most likely habitat for juvenile Atlantic Wolffish is offshore in deeper water. It is probable that Atlantic Wolffish only appear in shallow water when they have reached sexual maturity and are ready to spawn.

Key Words: Atlantic Wolffish, *Anarhichas lupus*, Newfoundland.

During the period 1982–1985 we have studied the feeding and behavior of the Atlantic Wolffish (*Anarhichas lupus*) in Newfoundland. All individuals seen while on collecting dives on the Avalon Peninsula were taken using spear guns. In addition to collections, observations were made on dives conducted for other purposes. Although diving was concentrated around the spring-autumn period, at least three dives were made per month during the winter. As part of the study we measured the lengths

of all specimens collected (Figure 1). No specimens smaller than 50 cm were collected or observed. Most specimens were in the range 70 to 90 cm, indicating ages from 9 to 18+ years (Beese and Kandler 1969).

Adult Wolffish are common in inshore waters from the spring until late autumn, and egg masses are deposited during September–October (Keats et al. 1985). We have observed larval wolffish in the water column during the hatching period (October–November), but newly settled juveniles



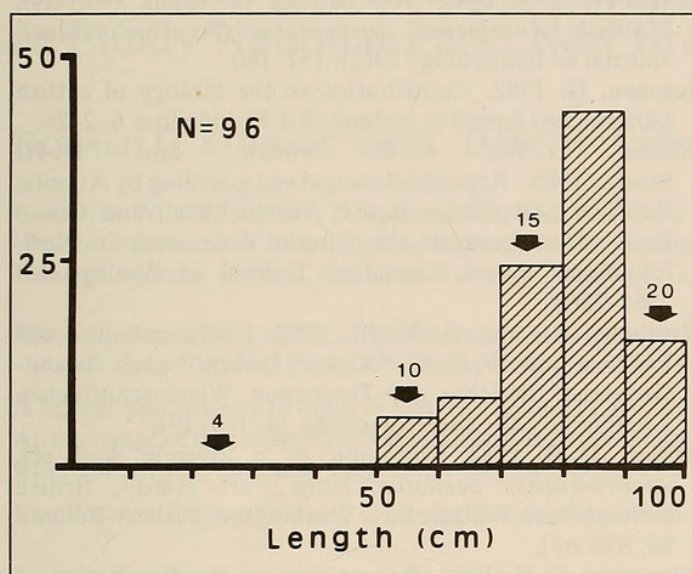


FIGURE 1. Length frequency distribution for the 96 Atlantic Wolffish collected during the present study. Numbers above the histograms are the ages for the particular size class [from Beese and Kandler (1969)].

have never been recorded. Considerable searching under rocks, under scallop shells, and among algae has been conducted on bottom ranging from mud to mainly bedrock, but no small wolffish were observed. It is therefore evident that juvenile wolffish do not occur inshore in shallow water (< 30 m) around Newfoundland.

There are two possible explanations for the observed absence of juvenile fish in shallow water. First, little or no recruitment may have occurred during the last ten years. Second, juveniles may occupy habitats offshore or in deeper water until they attain sexual maturity. The smallest size class collected during the present study was 50 cm. Beese and Kandler (1969) reported that female *A. lupus* mature at 31–46 cm, and males at 42–69 cm. This is close to the size range at which they begin to appear inshore (Figure 1).

Based on dentition, Barsukov (1959) concluded that yearlings (7 cm) feed on molluscs and other hard organisms. We can therefore rule out the possibility of an extended pelagic period for juveniles, such as occurs for *Anarhichas denticulatus* (Grigor'ev 1983) and the Pacific species *Anarrhichthys ocellatus* (Miller 1982; Wakefield 1980). The latter species does not develop adult dentition until 50–60 cm in length (Kanazawa 1952).

Juvenile wolffish have been reported at other locations, but in many cases the habitat or depth range sampled was not given. Barsukov (1959) stated that young wolffish are particularly confined to stony bottom, but gave no localities, depths or specific data.

Beese and Kandler (1969) reported that 24 of 124 specimens taken off Greenland were less than 30 cm in length. Smidt (1981) reported a length frequency distribution for *A. lupus* from trawl and longline catches off Greenland (ICNAF Div 1D). Peak abundance was within the 55–65 cm size range, with no individuals below 35 cm or larger than 80 cm. The lack of small individuals in this case may be a result of sampling gear selectivity. A small percentage of specimens less than 30 cm (7%) were taken in the North Sea using close-mesh herring trawl nets (Beese and Kandler 1969). Depth ranges for sampling were not provided, but were certainly much deeper than the depth range over which the present samples were gathered. Jonsson (1982) reported that wolffish between 15–35 cm (3–6 years) are caught "in considerable numbers" off Iceland in winter, but gave no details of depth or habitat. There is one report of juvenile Atlantic Wolffish in shallow water: Fabricius (1790) observed that juveniles occur in seaweed beds off Greenland.

There is some indication that juvenile Atlantic Wolffish occur in deeper, offshore water. They were present in samples from 65–430 m between Greenland and Iceland (Kotthaus and Krefft 1957). Baranenkova et al. (1960) reported that in the Barents Sea young Atlantic Wolffish (7–19 cm) were found at 100–200 m, where they fed mainly on echinoderms and molluscs. Nizovtsev (1963) reported that when a trawl with a 10 mm cod end was used, juvenile Atlantic Wolffish were common in samples from 95–540 m off Spitsbergen. There are five specimens of *A. lupus*, ranging from 29.5 to 47 cm, in the Ichthyology Collection (Cat. No. 64 760), National Museum of Natural Sciences, National Museums of Canada, Ottawa. They were collected by otter trawl from ca. 200 m depth at 51°23'30"N, 51°00'00"W off Newfoundland.

A number of studies of feeding and morphometrics of *A. lupus* have been conducted in the Newfoundland region (Albikovskaya 1981, 1982, 1983; Templeman 1983, 1984), but they have either not reported length frequency distributions, or have employed highly size-selective sampling gear. We must conclude that the location and habitat of young *A. lupus* in the northwest Atlantic is unknown. To understand the life cycle, ecology, and fishery biology of the species it is necessary to acquire this knowledge. We hypothesize that young Atlantic Wolffish occupy deeper, offshore water, and only migrate inshore to spawn when they attain sexual maturity.

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