Tarpon atlanticus in Colombia: a Big Fish in Trouble

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Abstract

The natural history of *Tarpon atlanticus* (Valenciennes 1846) is reconstructed based on published information. Tarpon is a remarkable fish because of its peculiar larvae, large adult size, migration patterns and its capability to breathe atmospheric air. Destructive fisheries—some using dynamite—have much reduced the population of tarpon along the Caribbean coast of Colombia, and some catch data are presented which document this.

Introduction

This contribution has two objectives: first, to summarize what is known on the biology of a common tropical fish which, although extraordinary in many aspects, has drawn little attention; and second, to illustrate how this same fish is disappearing from the Caribbean coast of Colombia with almost no one noticing it.

The fish we are dealing with is *Tarpon atlanticus* (synonym: *Megalops atlanticus*) known in Spanish (at least in the Caribbean coast of Colombia) as "*sábalo*" (Figs. 1 and 2). Nelson (1984) includes it in the family Megalopidae, along with *Megalops cyprinoides* from the western IndoPacific. The tarpon, on the other hand, ranges from the southern United States to northern Brazil (Whitehead and Vergara 1978).

Tarpon have not been of much interest to industrial fisheries despite the large sizes that they can reach, probably due to their greasy and bony meat (Dahl 1971; Castro-Aguirre 1978). In the United States (Florida), it is rather appreciated as game fish, thanks to its combative behavior (Wade 1962). In Colombia it has also been fished as game fish (Mercado 1971; Martínez 1978). For the small-scale fishery, however, tarpon represent an important resource now in decline; "sábalo" soup is still one of the traditional dishes along the Caribbean coast of Colombia.

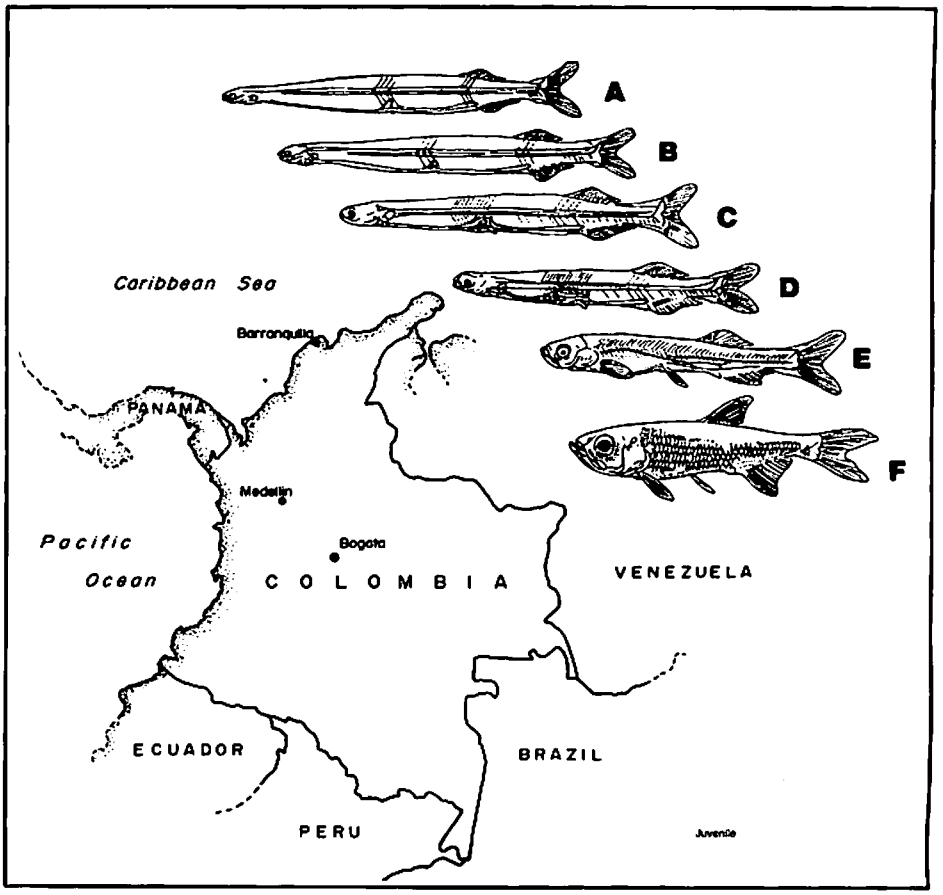

Fig. 1. Sequential development stages (A-F) of **Tarpon atlanticus** *(adapted from Mercado and Ciardelli 1972) superimposed on a map of Colombia.*

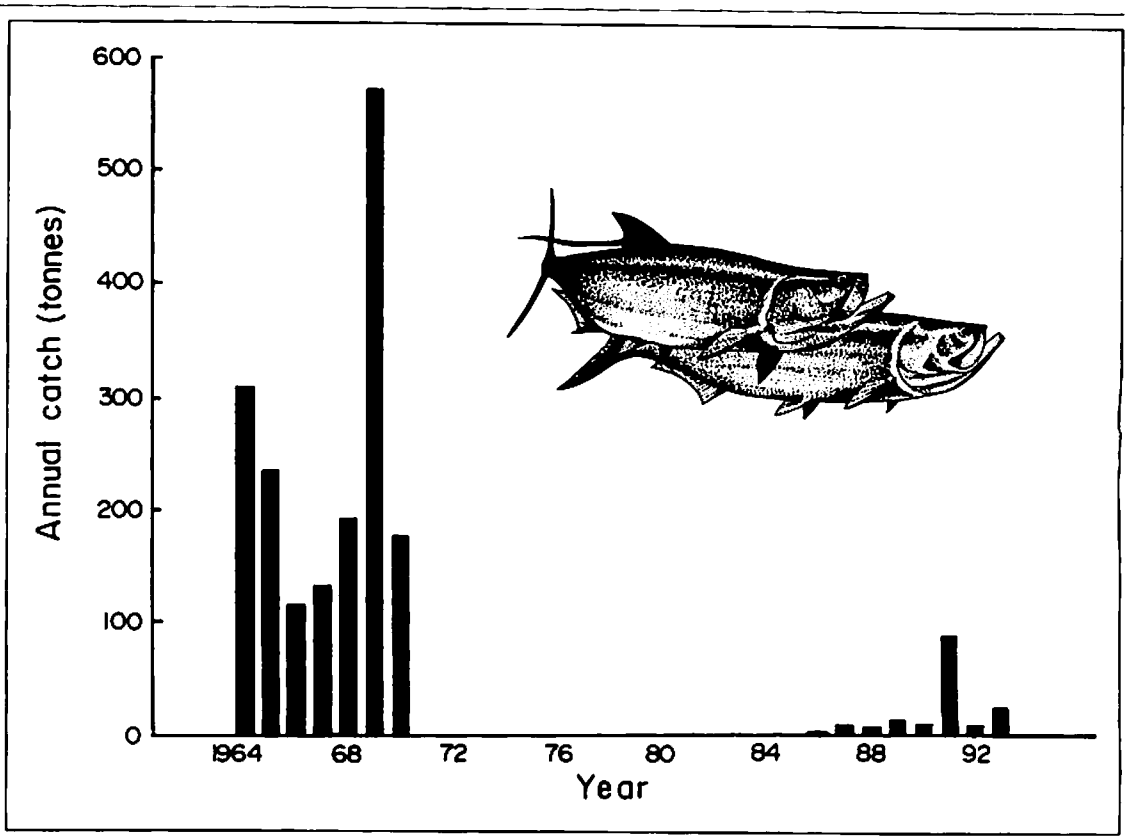

Fig. 2. Annual landings of **Tarpon atlanticus** *in the Colombian Caribbean coast. Landings for the years 1964 to 1970 correspond to the port of Barranquilla only (INDERENA 1971). Landings for the years 1986 to 1993 are cumulated from all ports along the Caribbean coast of Colombia (INPA 1994).*

Natural History

Tarpon atlanticus is remarkable because of its (i) peculiar larval metamorphosis, (ii) large adult size, (iii) capacity to breathe atmospheric air, and (iv) migrations from the sea to inland waters.

The wholly transparent larvae of tarpon go through a first, leptocephalic phase until they reach 28 mm standard length; then, a second stage during which their size *decreases*, down to 13 mm standard length (SL). During the third stage, growth picks up again (Wade 1962), and a size of 71 mm SL is reached. The fourth stage corresponds to juveniles from 71 mm to 1 m, while the fifth stage represents the adult size, which may reach up to 2.5 m (Mercado and Ciardelli 1972; Jones et al. 1978, Fig. 1).

Leptocephalic decrease of size occurs in all Elopomorpha, which includes 3 orders, 25 families and more than 600 species of fishes (Nelson 1984; Cervigon 1991). The adaptive value of this decrease of size, however, is not obvious. In larval ecology, the common opinion is that there is a strong evolutive pressure for rapid growth to avoid predation (e.g., Rice et al. 1993); thus becoming smaller would expose a larva to increased mortalities. Since this phenomenon occurs in fishes occupying a wide range of habitats, it would seem interesting to describe the environmental "windows" which permit the evolution and maintenance of such a feature.

The first feeding larvae consume mainly protozoans and rotifers (Dahl 1971). From the third stage on, the diet of tarpon changes to crustaceans and other invertebrates, then to fishes such as mugilids (Mercado 1975; Alvarez and Blanco 1985). Mercado (1975) considers tarpon to be "voraciously ichthyophagous".

Scattered information is available on the reproductive patterns of tarpon, and there seems to be consensus in that it spawns offshore. This occurs between June and August according to Crabtree et al. (1992), who found 3 to 6 days old larvae 250 km off Florida, and according to Smith (1980) who found very young larvae, during these same months, along the continental shelf edge in the Gulf of Mexico. In contrast, Dahl (1971) states that, along the Caribbean coast of Colombia, reproduction occurs in April-May. Crabtree et al. (1992) observed reproductive aggregations in form of rotating rings, or "daisy chains" made of 25 to over 250 individuals. We wonder whether the members of such rings migrated together to the place where the larvae were found. Tarpon seems to be abundant in the Gulf of Mexico, and a 1989 aerial survey yielded 33 of these "daisy chains" at distances of 25 km offshore (Crabtree et al. 1992). In Colombia, there are reports of reproductive aggregations (Martinez 1978), but not from recent times.

Tarpon has a high fecundity. Nichols (in Martinez 1978) estimated over 12 million eggs in a female of 203 cm. According to Dahl (1971) and Jones et al. (1978), tarpon reach first maturity at sizes ranging from 1.1 to 1.2 m (SL).

There are, to our knowledge, no comprehensive study of the population dynamics of tarpon. Available information is fragmentary, and sometimes contradictory. Thus, Dahl (1971) suggested that young tarpon grow to 60 cm in 18 months, while Harrington (1966) reports an annual growth (in ponds) of only 10 cm. As mentioned above, tarpon grows to 2.5 m standard length and may reach a weight of 150 kilos (Dahl 1971). On the other hand, Martinez (1978) mentions 12 year-old specimens with weights of up to 35 kg and states that individuals between 13 and 16 years will have an average weight of 50 kilos.

In summary, tarpon seem to exhibit a "nontropical" life history style: they grow to huge sizes and live for a long time, which implies

a low growth rate, late reproduction, and low natural mortality. These features suggest that tarpon populations are easy to overfish (see also Parrish, p. 9, this issue). To our knowledge, however, there are no estimates of natural or fishing mortality for this species.

Among the most interesting features of the life history of tarpon are its migrations. The leptocephali migrate to the coast where they enter estuarine waters and develop into juveniles. Many of the references we consulted state or imply that on reaching maturity, tarpon then migrate back to the sea. What is remarkable though is the fact that adults undertake long excursions into continental waters. To our knowledge there is no systematic monitoring of this behavior: when in tarpon life cycles do these migrations take place, are they regular, are (were) they massive (in Colombia)? At any rate, these observations are more than anecdotes. Reports of individuals in continental waters span the distributional range of tarpon. Thus, Castro-Aguirre (1978) states that specimens have been captured 100 miles from the coast in Mexico. Cervigón (1985) mentions captures 300 km from the coast in Venezuela, and Martinez (1978) states that tarpon have been fished 500 km from the coast in Colombia. According to Martinez (1978), tarpon is distributed in the basins of the rivers Atrato, Sinú, San Jorge, and in the lower Magdalena and lower Cauca rivers and their associated marshes and floodplains.

The presence of tarpon where oxygen availability is low, such as in marshes, can be explained by its capacity of breathing atmospheric air. To our knowledge, the competitive advantage of this feature has not been considered in the literature.

Fisheries in Colombia

Already in the sixties there was alarm about the fishing pressure on tarpon in Colombia. According to Restrepo (1968) and Dahl (1971), tarpon was ferociously dynamited: due to its size and epipelagic habit, it was easy to spot. Nowadays, the tarpon populations about which references exist in the literature consist of immature individuals less than 90 cm (Gonzalez 1981; Santos 1989).

Fig. 2 summarizes the key fishery statistics available in Colombia for this species: the landings at one single port in the period from 1964 to 1970 are much higher than landing for all the Colombian ports in the period 1986-1993.

Conclusion

This exercise of reconstructing the natural history of *Tarpon atlanticus* was frustrating, but educative. Frustrating because information is incomplete, and sometimes anecdotal. It does not seem to be an exaggeration to think that this situation is typical for most tropical fishes, at least in Colombia, including for fish of great economic interest. It was educational because this situation clearly shows the need of starting systematic studies on the biology of our species, or they will just disappear with us not even knowing what we have lost.

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