

Red Hake (*Urophycis chuss*)

Common Names: Squirrel hake

Description, Distribution and Biology

Red hake is a demersal (bottom-dwelling) species from the family Phycidae. Its anatomy is similar to white hake (*Urophycis tenuis*), making it difficult to distinguish between the species, particularly during the egg and larval stages. Both species have elongated scaled bodies with fairly rounded bellies and are laterally compressed towards the anus. The head is generally small with a pointed snout, large eyes, and two antenna-like barbels on its chin (Fig.1). It has a large mouth with numerous small teeth on both jaws. The dorsal fin is triangular, the second dorsal and anal fins are long and narrow and the pelvic fins, located near the throat, are generally elongated. Gill rakers are small, slender teeth-like protrusions located on the edge of the gill arches and distinguish the two species. The red hake have three long gill rakers compared to the two shorter found on the white hake. The red hake also has fewer scales along its lateral line and is smaller at the time of maturity. This species is typically red to olive brown on its back fading to a paler colour towards its abdomen and often exhibits dusty spots on its side. The fins are generally darker in colour, except for the elongated pelvic fins, which are similar in colour to the underside of the fish.



Figure 1. Red hake. Source: W.B. Scott and M.G Scott, Atlantic Fishes of Canada, Canadian Bulletin of Fisheries and Aquatic Sciences No. 219.

Red hake is widely distributed in the northwest Atlantic from the south coast of Newfoundland (Placentia Bay), along the Scotian Shelf, into the Bay of Fundy, Gulf of Maine, and George's Bank and extends southward to Cape Hatteras, North Carolina (Fig.2). Seasonal distribution of red hake is influenced by temperature. Off the southeast coast of the United States, red hake migrate inshore during the spring and autumn and move offshore in summer and winter. In the Bay of Fundy, migration occurs inshore during the summer and autumn and moves offshore during the winter and spring. Studies have proven there is no significant inshore migration of red hake population on the Scotian Shelf, likely the result of consistent bottom temperature throughout the year. Adult red hake usually occupy water temperatures between 8 and 10 °C. They prefer soft muddy or sandy substrates rather than rocky or gravel bottoms and can usually be found at depths ranging from a few meters to 500 m or more.

Spawning adults are generally found in conditions where the water temperature is below 10 °C, in depths of 100 meters or less, and where salinity levels are less than 25 parts per thousand (0/00). The actual details of spawning behaviour is limited but it is known that the eggs are 0.63 to 0.97 millimetres (mm) in diameter, buoyant, transparent, and contain an oil droplet which allows them to float freely in the water column (pelagic). After fertilization, embryos hatch within a day and a half to four days or when they reach 1.8 to 2.0 mm in length. The larvae are typically dark in colour and have large pelvic fins and eyes. For the next few months the larvae will remain in water temperatures below 19 °C and at depths of 200 m or less where plankton and other living organisms provide proper food resources. Juveniles will become demersal when they reach 2.5 to 3.0

cm. During the juvenile stage, red hake is known to live in or under scallops (*Placopecten magellanicus*). It remains near scallop beds until it matures. The young enter the cavity of the scallop for 6 to 12 months, emerging only at night to feed on crustaceans. Adult red hake prey on crustaceans and other fish species such as mackerel or herring. This species is prone to predation as a result of its small size, however little is known about the main predators in Canadian waters. This is probably the result of the difficulty to distinguish red and white hake species.

Red hake is considered a fast growing and short-lived species. The female is generally larger and lives longer than the male. Sexual maturity is reached at approximately 30 cm or 2 years. The maximum age and length of a male is approximately 11 years and 53 cm. Females can grow to a maximum length of 63 cm and 12 years respectively.

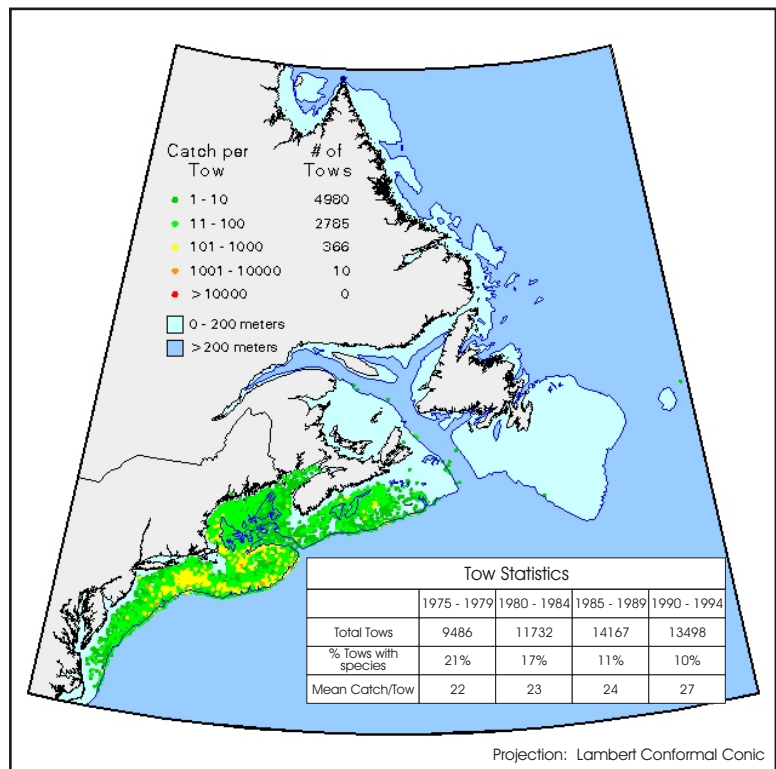


Figure 2. East Coast of North America Strategic Assessment Project. Distribution of Red hake. Source: Science Sector, Department of Fisheries and Oceans, Canada Office of Ocean Resources Conservation and Assessment, National Oceanic and Atmospheric Administration, USA

The Fishery

Red and white hake were traditionally harvested for fishmeal. During the 1960s and 70s, large Soviet trawlers harvested red hake off Georges Bank but by the 1980s most foreign fishing for this species halted. In recent years, with the decline in traditional groundfish resources, hake has been introduced into fresh fish markets, particularly in the United States. Fishing technology used in harvesting hake species varies between trawls and hook and line gear. Although commercial fishers do not commonly target red hake, an unintentional capture fishery exists. Commercial landings of red hake in the Atlantic region of Canada increased from 15,185 metric tonnes (mt) in 1990 to 22,957 mt in 2001, with the majority being harvested in Nova Scotia.

The main products of red hake include fresh, frozen and dried/salted fillets. Marketing problems for this species include a lack of awareness regarding its name and texture, problems associated with processing techniques and the flesh quality of this fish deteriorates quickly and often develops a rubbery texture even at normal storage temperatures.

Management plans do not exist for this species in Newfoundland and Labrador. As a result of the physical similarities between red and white hake, the majority of landings are not separated by species. Future development of a fishery will require extensive research into identification techniques to determine biomass and harvesting rates. Improvements in processing methods are required to extend the shelf life of fresh fillets and the creation of value added products such as fish sticks and portions. Extensive research is required on potential markets, consumer specification and the promotion of red hake products.

Recent studies indicate the culture of red hake could provide fisheries managers with a tool for the basis of a new sustainable commercial industry. These studies have found a relationship between scallop harvesting and declines in hake populations. It has been suggested that small juvenile hake could be removed from recently harvested scallops, cultured into a larger size in a protected environment and released into wild populations. The cultured red hake could also be retained in captivity, grown to market size, and then used for commercial distribution. The number of juveniles collected from scallop beds would provide fishery managers with an early estimate of year class strength.

ADDITIONAL READINGS:

Buttner, J.K, and M.S Miller. (2001). Red Hake: An Alternative Species for Mariculture. *Aquaculture magazine*, Mar/Apr 2001, Vol. 27, No. 1.

Dery, L.M. *Red Hake, Urophycis chuss*. Retrieved from the World Wide Web {Aug 21/02}:
<http://www.nefsc.noaa.gov/fbi/age-man/rdhk/rdhktext.htm>.

DFO. (1993). *Inshore/offshore Fisheries Development, Red Hake*. Communications Directorate, Department of Fisheries and Oceans, Ottawa, Ontario, Canada. Retrieved from the World Wide Web {August 27/02}:
<http://www.mi.mun.ca/mi-net/fishdeve/redhake.htm>.

Markle, D.F. (1989). *Red Hake Underwater World Fact Sheet*. Communications Directorate, Department of Fisheries and Oceans, Minister of Supply and Services, Catalogue Number Fs 41-33/8-1989E ISBN 0-662-17301-5.

Scott, W.B, and M.G Scott. (1988). Atlantic Fishes of Canada. *Can. Bull. Fish. Aquat. Sci.*, 219: 731 p.

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