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species specifics

BY CHUGEY SEPULVEDA, Ph.D.,
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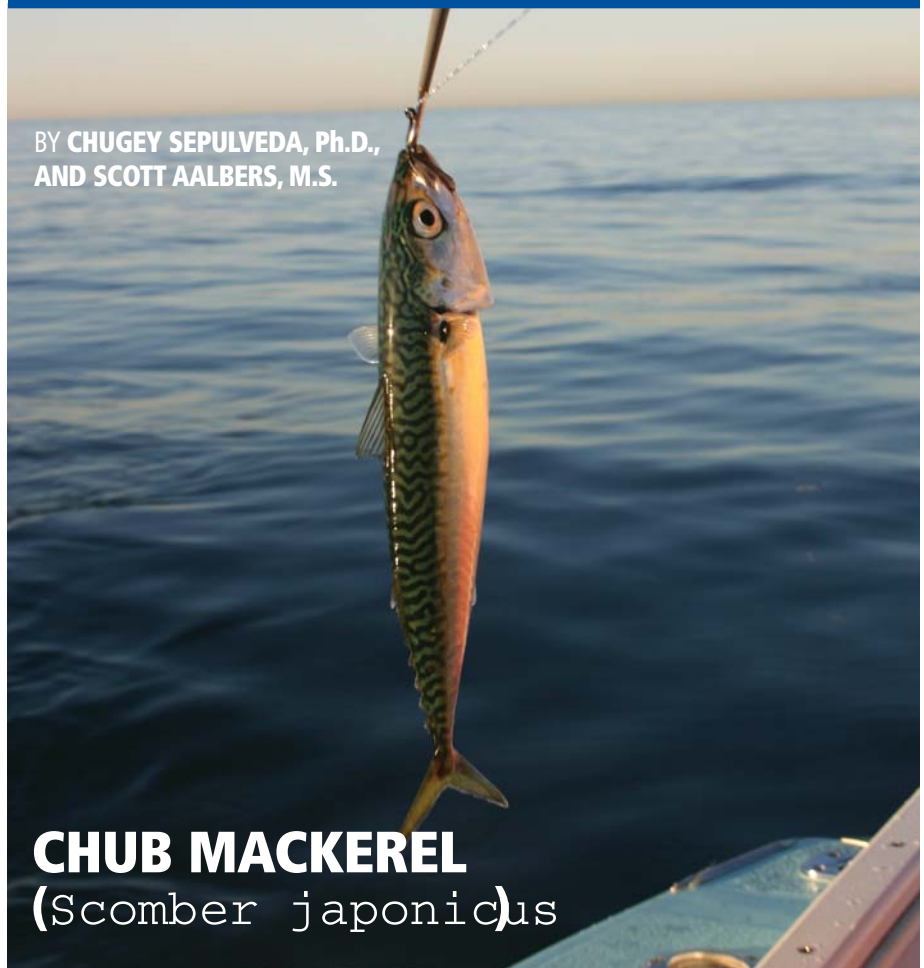


Photo by Bob Hoose

CHUB MACKEREL (*Scomber japonicus*)

Chub mackerel, also known as Pacific mackerel, is a prolific coastal pelagic species that occurs throughout temperate regions around the globe. Belonging to the tuna family (*Scombridae*), a group of fishes with several adaptations for increased swimming performance (i.e., high degree of streamlining, deeply forked caudal fin, finlets), this species is a valuable resource for several nations, including the U.S., and plays a key role in Southern California as an important forage species for higher trophic levels.

BIOLOGY

In the eastern Pacific, chub mackerel range from Chile to the Gulf of Alaska, where they provide an important link in marine food webs between planktonic organisms and predatory fishes, marine mammals, and sea birds. They are opportunistic feeders, particularly during the larval and juvenile stages, when they feed upon a wide variety of zooplankton. Juvenile chub mackerel are voracious feeders and grow rapidly, particularly during the spring and summer months. Adult mackerel also have

a highly varied diet that includes copepods, euphausiids (krill), small fishes, and squid.

To defend against the wide variety of predators that rely on mackerel as part of their diet, juvenile mackerel begin to form structured schools at just over one inch in size. In southern California many of our coastal game fishes, such as white seabass, yellowtail, giant seabass, tunas, dorado, striped marlin, and pelagic sharks, rely heavily on the chub mackerel resource. As juveniles, chub mackerel often develop multi-species schools

with other coastal pelagic species, such as Pacific sardines, jack mackerel, and sometimes eastern Pacific bonito.

Under optimal oceanic conditions, chub mackerel can reach 12 inches and over a pound in size during their second year of life. At this size most males are already mature, while the majority of females reach maturity in their third year of life. Growth slows considerably in mature individuals, as much of their energy stores are allocated towards reproduction. Spawning can occur throughout the entire year in some regions (i.e. Peru), though along the California coast chub mackerel mostly spawn from April through August when water temperatures range from 60 to 70 degrees Fahrenheit. Females typically spawn multiple times during the same season, producing thousands of eggs, depending on fish size and nutritional condition. Although chub mackerel are capable of spawning every night (under optimal nutritional and oceanic conditions), females typically spawn, on average, every 10 days. The oldest aged chub mackerel off California was 12 years old with a maximum size of 25 inches and over six pounds.

MOVEMENTS

In the eastern north Pacific, chub mackerel are most abundant from Point Conception down to Cabo San Lucas, Mexico, in water temperatures ranging from 50 to 72 degrees Fahrenheit. Seasonal migrations have not been confirmed with tagging studies, but fisheries data for this region suggests that mackerel schools tend to move towards the north as water temperatures increase during summer months and southwards during the winter. Similarly, reported catches of chub mackerel tend to occur farther north during warm-water years or El Niño conditions. Primarily found over the continental shelf, chub mackerel also occur offshore, from the surface to around 1,000 feet in depth.

FISHERIES

Although chub mackerel are harvested with a variety of fishing gears, purse seine nets are the primary gear used to capture this coastal resource. Purse seine fisheries mainly harvest two- to four-year-old fish, most of which is canned and sold to international markets. With the onset of purse seining, chub mack-

erel supported one of California's most lucrative fisheries during the 1930s and 1940s, with up to 75,000 tons landed annually. During this time, the chub mackerel ranked second to Pacific sardines in California landings; however, by 1970 managers considered the stock severely depleted, and the purse-seine fishery was shut down until stocks rebounded in 1977. Furthermore, during this period, purse seine vessels shifted towards targeting anchovies, sardines, jack mackerel, and bonito. Since the commercial fishery reopened in 1977, mackerel harvest off of California has been strictly monitored under a quota-based system, with several additional fishery regulations in place. During the commercial moratorium, recreational catches of mackerel far exceeded commercial take, with over one million fish harvested annually. Mackerel continue to rank among the top 10 species caught in Southern California recreational fisheries, although catches have declined since the early 1980s.

On a global scale, California fisheries harvest only a small fraction of the total chub mackerel landings. World landings of chub mackerel peaked at more than three million tons in 1978 and have since fluctuated around two million tons annually. Areas with the largest reported catches of chub mackerel include the coast of Peru, northwestern Africa, northeastern Russia, and China. Although the chub mackerel fishery is closely monitored in the U.S., international management is critical.

Despite the economic and ecological importance of the chub mackerel resource, we still lack information on the factors that affect recruitment, the precise nature of the movements of this species, and how the stock is influenced by various oceanic conditions.

Information provided by the California Department of Fish and Game, California's Living Marine Resources (2001). PIER is a non-profit 501(c)3 research institute dedicated to scientific research, education, and the sustainable management of the marine environment. Special thanks are offered to Mr. Thomas Pflieger and Family, the George T. Pflieger Foundation, the Harris Foundation, Tommy Fullam, Cindy Jonasson, and Vicki Wintrade. To read more about PIER research projects, please visit www.pier.org. ■

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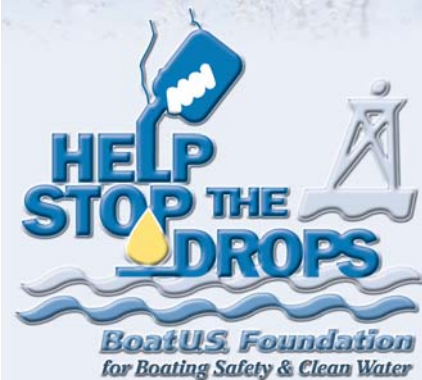
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