

BY **CHUGEY SEPULVEDA, Ph.D.,**  
**AND SCOTT AALBERS, M.S.**

## **MARKET SQUID** *(Loligo opalescens)*

Photo by Phil Zerofski

**The market squid is a relatively short-lived cephalopod that grows rapidly to a maximum total length of around 12 inches. Growth estimates suggest that the lifespan of market squid is completed in less than a year, with most of the harvested squid having an age between four and nine months.**

Although market squid have been shown to spawn several times during a short spawning window, they are considered to be terminal spawners, which means that they die shortly after they finish the spawning cycle. Females may deposit up to 20 egg cases, each containing approximately 200 individual eggs; therefore, an average female has a reproductive potential of around 4,000 offspring. Egg cases hatch approximately one to two months (depending upon water temperature) after being deposited in nests that are loosely anchored to the soft sediment. Nesting sites predominantly occur along the edges of submarine canyons and drop-offs in 60 to 150 feet of water. Few organisms eat squid eggs, though bat stars and sea urchins have been observed doing so.

Like most cephalopods, market squid use jet propulsion as their primary mode of locomotion. Squid force water

through a directional funnel that provides them with a range of swimming speeds and maneuverability. Market squid can also use their fins, which run along their mantle, for swimming and hovering at reduced speeds. Their arms and tentacles are distinctly longer and wider in males than in females of the same size.

They have the ability to rapidly change colors from white to golden-brown or red by rapidly expanding or contracting the chromatophores within their skin. This is an effective tool for confusing potential prey, evading predators, and, likely, communicating their reproductive state to other individuals. To confuse potential predators, market squid can release brown ink when threatened.

### **Fishery**

In the 1860s the Chinese began com-

mercially harvesting market squid, using small rowboats to encircle a net around another boat bearing a torch. The lampara net became the primary gear type in the early 1900s until it became obsolete upon the introduction of the purse seine in the late '70s. Purse seiners typically work in conjunction with a light boat that is responsible for locating and attracting squid aggregations to be encircled by the purse seine net.

Since 1993 market squid landings have exceeded most other California fisheries, with as much as 126,000 tons harvested annually. This fishery has also been the most lucrative in the state of California in recent years, generating as much as \$75 million annually. Similarly to other marine products, market price typically fluctuates with demand and resource availability. In California, the commercial fleet underwent rapid expansion in the 1990s and was limited in 1997 when managers initiated a moratorium on the issuing of any new permits. Currently, the commercial fishery is regulated by a complex set of guidelines that include different gear types (scoop versus purse seine), har-



vest limits, weekend closure periods, as well as designated areas in which fishing activities are limited. The 2010 – 2011 fishing season reached the seasonal harvest quota for the first time since the Fish and Game Commission implemented the harvest cap in 2002.

### Ecology

While market squid support the most economically valuable fishery off of California, they are also extremely important to the coastal ecology of the region, functioning as an integral part of the food web and providing a forage base to a large number of marine species, including fish, sharks, mammals, and birds. Market squid constitute a significant component of the diet for hundreds of species, including many of the coastal game fish species.

Concern has been raised over the ecological impacts of intensive fishing effort for market squid; however, the trophic implications are not well-documented, and studies on the effects of continued harvest of spawning aggregations have yet to be performed.

Currently, we know very little regarding the population size or the many environmental factors that affect inter-annual variations in abundance and recruitment for the market squid. This poses a problem, especially since this species is vitally important to both California's coastal ecosystems and the many families that rely on market squid for their livelihood.


Because the market squid is the primary forage base for over 19 species of fish, 13 bird species, and six mammal species, we must consider the consequences that may result if overexploitation were to occur. Effective, sustainable management is critical for both the fishing industry as well as the millions of predators that we share this resource with because of the immense value of the California market squid fishery.

Most of the information was provided by California Department of Fish and Game's market squid management plan (2005). 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, Billy Seiler, Lorraine Bohnet, and Vicki Wintrode. To read more about PIER research projects, please visit us at [www.pier.org](http://www.pier.org). ■

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