CALIFORNIA SEA GRANT

Sea Grant Extension Program Publication

Paralytic Shellfish Poisoning and Red Tides

Red tides

During late spring, summer, or fall, localized patches or streamers of color appear in the ocean or bays along the California Coast. These reddish areas appear suddenly and last from a few days to a few months before disappearing. They are commonly called red tides. The reddish discoloration of the water results from the presence of millions of dinoflagellates, tiny one-celled organisms having both plant and animal characteristics. The color varies from brown to red depending on the density of the mass of dinoflagellates.

Red tides and poisonous shellfish

Many people who gather clams, mussels, scallops, and oysters from California's coastal waters believe that red tides cause these molluscs to be poisonous. In fact, *most red tides are harmless.* Of the hundreds of species of dinoflagellates in California waters, only *Gonyaulax catenella* is known to produce a poison that causes outbreaks of paralytic shellfish poisoning. *Gonyaulax catenella* is not generally involved in California red tides. The dominant dinoflagellate in red tides along the southern California coast is the nontoxic *Gonyaulax polyedra,* which can, however, be responsible for fish kills, because it removes oxygen from the water.

Although the presence of a red tide is a warning that the molluscs may be poisonous, *the absence of a red tide does not mean they are safe to eat.* Bivalve molluscs such as clams, mussels, scallops, and oysters gather their food by filtering dinoflagellates and other planktonic organisms out of the water. Because of their ability to filter large quantities of water, molluscs can consume enough *Gonyaulax catenella* to become poisonous even when not enough of these organisms are present to form a visible red tide.

For reasons not completely understood, molluscs are rarely harmed by the poison produced by *Gonyaulax catenella,* but other animals including man can be poisoned by eating toxic molluscs. The extremely powerful nerve poison can cause temporary paralysis and even death if enough poison has been consumed to paralyze the breathing mechanism.

Any plankton-feeding mollusc may at times become poisonous, and outbreaks of paralytic shellfish poisoning in California have been associated with mussels, scallops, clams, and oysters. Abalone, crab, shrimp, and fish do not feed on plankton and there is no danger of poisoning from them.

California's effort to protect the public

It is impossible for the public to distinguish between poisonous and safe molluscs or to destroy the poison by normal methods of cooking. Because of this, the California State Department of Health Services imposes a quarantine on all sport-harvested mussels from the ocean shore, bays, inlets, and harbors of California from May 1 to October 31, the time of the year when *Gonyaulax catenella* is present off the California coast in greatest numbers and when mussels may become poisonous. If high levels of poison are found in mussels, the quarantine may be extended to include all sport-harvested bivalve molluscs in the area.

The quarantine does not apply to commercial mussel harvesting by a few companies specifically approved by the Department of Health Services. These certified mussel harvesters are allowed only in areas of low risk and are required to participate in a continuous testing program to ensure a safe, toxin-free product.

During the quarantine, mussels can be harvested for fish bait. If sold for bait, they must be broken open and placed in containers labeled as

"MUSSELS MAY CONTAIN POISON—
UNFIT FOR HUMAN FOOD."

Local health officers enforce the quarantine and post signs advising the public of the mussel quarantine. These signs also warn the public that clams may contain poison and should be thoroughly washed and cleaned before being cooked. Because these signs are often mutilated or destroyed, their absence does not alter the quarantine period.

The Department of Health Services also conducts a year-round paralytic shellfish poison surveillance program for all shellfish growing areas in the state. This program enables the Department to detect any changes in toxin levels in both sport and commercial shellfish growing areas, and to alert the public and local health agencies if necessary. If elevated toxin levels are detected in or near commercial oyster beds, an event which occurs only rarely, the Department takes immediate action, including closure of the beds, to protect the consumer.

Elevated toxin levels have occurred during the non-quarantine period, from November 1 to April 30, but no human cases of paralytic shellfish poisoning have been reported. If shellfish toxins appear during the non-quarantine months, the Department of Health Services may establish special quarantines along affected portions of the coast.

Precautions to take when gathering shellfish

- Be familiar with the California Department of Fish and Game sport fishing regulations. These regulations give open seasons, minimum size limits, and bag and possession limits for shellfish gathered in California. These regulations are published annually and are available in sporting goods stores.
- Gather clams, mussels, and scallops only in areas known to be free from sewage contamination. If in doubt, contact local health authorities—county health officer or sanitarian—to determine if shellfish are safe to eat.
- *Do not gather mussels for food during the quarantine period.* Mussels containing paralytic shellfish poison are particularly dangerous because the entire mussel, including the viscera, is eaten.
- During the mussel quarantine period, thoroughly clean and wash all other bivalve molluscs before cooking or eating them. Discard the dark digestive gland of all clams.
- In scallops, paralytic shellfish poison accumulates primarily in the viscera, and the viscera can remain toxic year-round. Because of this, scallop viscera should not be eaten at any time.
- When an outbreak of paralytic shellfish poisoning occurs, or when high levels of the poison have been found, no bivalve molluscs should be eaten if harvested in the affected area.
- Following an outbreak of paralytic shellfish poisoning, the necks or siphons of Washington clams, *Saxidomus nuttalli,* may retain the toxin for periods of up to 2 years. If this should occur, the Department of Health Services will establish and publicize a special quarantine on Washington clams in the affected area.
- Forget the old saying that shellfish should be eaten only during the months with an "R" in them. Many people think the saying means that shellfish are always safe to eat during the "R" months, but poisonous shellfish occasionally occur in California in the "R" months of September and October. This saying originated in Europe and was based on factors connected with the reproductive events of oysters, not with paralytic poisioning.

Commercially harvested shellfish

Although oysters are the major bivalve molluscs harvested commercially from California coastal waters, clams, mussels, scallops, and oysters are all available in California retail stores and restaurants throughout the year. These products come from both local and out-of-state sources. All commercially grown shellfish in the United States are subject to federal and state regulations designed to ensure that only safe, wholesome, and nontoxic shellfish are available to the consumer.

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MARINE ADVISORY PROGRAM

LA PARALISIS POR ENVENENAMIENTO CON MARISCOS Y LA MAREAS ROJAS

Esta publicación fue revisada en 1988 para distinguir y aclarar la diferencia entre la pesca deportiva y la pesca comercial de mejillones durante el período de cuarentena.

Estos tres párrafos reemplazan el primer párrafo de la sección PROTECCION AL PUBLICO DE CALIFORNIA.

El público no puede distinguir los moluscos envenenados de los demás ni eliminar el veneno por métodos normales de cocción. Por este motivo, el Departamento de Servicios para la Salud del Estado de California impone una cuarentena para la pesca deportiva de mejillones en las costas, bahías, caletas y puertos oceánicos de California desde el 1° de mayo al 31 de octubre. Durante este período del año, las aguas contienen grandes cantidades de Gonyaulax catenella que pueden contaminar los mejillones. Si se encuentran grandes cantidades de veneno en los mejillones, la cuarentena puede extenderse a la pesca deportiva de todos los moluscos bivalvos de la zona.

La cuarentena no se aplica a la pesca comercial de mejillones por algunas compañías que reciben la aprobación específica del Departamento de Servicios para la Salud. Dichas compañías certificadas pueden pescar mejillones en areas de poco riesgo y deben participar en un programa de pruebas continuas para asegurar la producción de productos libres de toxina.

Durante la cuarentena los mejillones pueden pescarse para carnada. Si se venden como carnada, deben abrirse y colocarse en recipientes con la etiqueta:

ESTOS MEJILLONES SON INAPTOS PARA EL CONSUMO
HUMANO PORQUE PUEDEN CONTENER VENENO.

PARALYTIC SHELLFISH POISONING AND RED TIDES

In 1988, this publication was revised to distinguish and clarify the difference between sport-harvested and commercially harvested mussels during the quarantine period.

These three paragraphs should be substituted for the first paragraph under, "PROTECCION AL PUBLICO DE CALIFORNIA."

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