

Episode 2: Shellfish 101

In Episode 1, we talked about the basics of shellfish farming. In this episode, we cover shellfish biology and the role that shellfish play in the ecosystem. The episode also features an interview with James Gledhill, a grad student in the Department of Biomolecular Science at the University of Mississippi. James is studying environmental toxicology, and his research is on oyster reefs in the Mississippi Sound.

What are Shellfish?

Despite its name, shellfish are not fish. The dictionary defines shellfish as: "An aquatic animal, such as a mollusk or crustacean, that has a shell or shell-like exoskeleton." Mollusks include species like clams, oysters, mussels, conch, snails, and scallops. Crustaceans include shrimp, crabs, lobsters, and crawfish.

Mollusks, also referred to as molluscan shellfish, include a wide variety of species. One group includes snails and whelks - these species have a single, usually coiled shell, a muscular foot, and a distinct head with eyes and feelers. In our podcast series, we focus on the group of mollusks that have a shell consisting of two hinged valves, known as bivalves.

Bivalve Characteristics

Despite having shells with two hinged valves, not all bivalves look or act the same in the water. Bivalve appearance varies greatly, from teardrop-shaped, grayish oysters to circular, colorful scallops with their deeply grooved shells that you may recognize as the "Shell" gas logo.

Bivalves do share certain biological characteristics, such as reproducing in the same way by releasing their eggs and sperm into the water seasonally. After sperm fertilizes the egg, the egg grows into a larvae that eventually become tiny shellfish that settle on the water bottom.

Some bivalves like oysters and mussels have a gland that produces a thread-like material called a byssus, which is used by tiny shellfish to anchor themselves to hard substrates such as rocks. These bivalves spend the rest of their lives in the same location. Other types of bivalves lack this threadlike structure and use their foot to burrow deep into the seabed. While these shellfish can move, they still spend most of their life in a small area. Of all the bivalves, scallops are the most mobile- in fact, they can even make themselves sea sick!

Ecosystem Services

No one is quite sure how people came to eat shellfish, but they play an important role in our culinary history. That said, shellfish have more importance than just food for people. In addition to their importance to the economy, shellfish can offer a number of important ecosystem services. They provide food for predator animals, and habitat and breeding grounds for others. Some shellfish are also valued for their pearls and shells that can be made into jewelry and other decorations. Due to their lime content, shells can also be used as fertilizer and building materials.

Shellfish are also prodigious filter-feeders. Some species can filter as much as 55 gallons of seawater a day, leading to cleaner water by removing human-added nutrients.

Why are oysters so important?

Oysters are one of the best ecosystem helpers around. They are considered a “keystone” species - a species on which other species in an ecosystem largely depend, such that if it were removed the ecosystem would change drastically. One of the most important ecosystem services that oysters can offer as a keystone species stem from their ability to form oyster reefs, which are important to coastal restoration in many ways. For example, oyster reefs can protect shorelines from storm surges or waves and can help stabilize land. Furthermore, by adding structure to what might otherwise be bare mudflat, they increase an area’s habitat complexity, potentially making it more inviting to juvenile fish in search of refuge from predators, or as a haven for other intertidal invertebrates.

Threats to Oysters

Despite their importance, oyster reefs are currently facing a number of challenges in some areas. The loss of wetlands, erosion, and excessive nutrient pollution all negatively affect oysters. These stressors increase the likelihood of disease and have brought wild oyster populations to historic lows. Outdated harvest methods and unsustainable harvests have also proven to be a challenge for reefs. As oysters oyster reefs decline in health and numbers, their ecosystem services also diminish. Thus, many people are trying to address these threats, before the consequences for ecosystems that depend on oyster reefs become too dire.

Listen to the full episode for more details on the who, what, where, why, and how of shellfish aquaculture!

Keywords: shellfish, mollusks, bivalves, ecosystem services, oyster reefs, coastal restoration

Resources:

- NOAA National Ocean Service- What is a Bivalve Mollusk?: <https://oceanservice.noaa.gov/facts/bivalve.html>
- Food & Agriculture Organization of the United Nations- Ecosystem Services and Biodiversity: <http://www.fao.org/ecosystem-services-biodiversity/en/>
- Florida State University Marine and Coastal Lab- Oyster Facts: <https://marinelab.fsu.edu/outreach/virtual-classroom/fast-facts/oysters/>
- South Carolina Department of Natural Resources- Oyster Biology and Ecology: <http://score.dnr.sc.gov/deep.php?subject=2&topic=15>
- Mississippi-Alabama Sea Grant Legal Program- Researching the Health of Oyster Reefs in Mississippi: <http://www.masglp.olemiss.edu/projects/oysterreefs/index.html>