

Field Ecology and Life History Lecture I

A. What is a Scallop?

A scallop is a member of the class **Bivalvia**. In order to be a member of the class bivalvia an organism must be laterally compressed and it must have two valves or shells connected by a dorsal hinge. The two shells completely enclose the body.

Other members of the class **Bivalvia** are clams, oysters and mussels. The class **Bivalvia** falls under a larger classification which contains other classes as well. This is known as a **phylum**. The phylum to which the bivalvia belong is known as **Mollusca**. The phylum **Mollusca** are some of the most well known invertebrates, or organisms without backbones. Members of this phyla are found in the sea, fresh water and on land.

Molluscs have been around since the precambrian era, over 500 hundred million years ago! They are distinguished by the presence of a muscular foot, gills and a calcareous shell secreted by an underlying integument called the mantle. Some well-known members of this phylum include scallops snails, squid and octopods.

All scallops fall within the family **Pectinidae** and there are about 400 known extant species within the family. Only some

scallops are commercially important. All members of the superfamily **Pectinacea** are considered scallops. There have been approximately 7,000 species and subspecies named within the superfamily **Pectinacea**. (This is however, greatly in need of revision).

Scallops are found throughout the marine environment, from the tropics to the poles, from the intertidal zone down to 3,000 meters, though most are found inshore. The **Pectinidae** are believed to have evolved around 230 million years ago!

B. Ecology of the North American Bay Scallop

Kingdom (General)

Animalia

you	<i>Homo sapiens</i>
American oyster	<i>Crassostrea virginica</i>
Octopus	<i>Octopus vulgaris</i>
Rock scallop	<i>Crassostrea gigantea</i>
Bay scallop	<i>Argopecten irradians</i>
Calico scallop	<i>A. Gibbus</i>

Phylum

Mollusca

Octopus	<i>O. Vulgaris</i>
American oyster	<i>C. Virginica</i>
Rock scallop	<i>C. Gigantea</i>
Bay Scallop	<i>A. Irradians</i>
Calico scallop	<i>A. Gibbus</i>

Class

Bivalvia

American Oyster	<i>C. Virginica</i>
Rock scallop	<i>C. Gigantea</i>
Bay scallop	<i>A. Irradians</i>
Calico scallop	<i>A. Gibbus</i>

Family

Pectinidae

Rock scallop	<i>C. Gigantea</i>
Bay scallop	<i>A. Irradians</i>
Calico scallop	<i>A. Gibbus</i>

Genus

Argopectin

Calico scallop	<i>A. Gibbus</i>
Bay scallop	<i>A. Irradians</i>

Species (Most Specific)

Bay scallop	<i>A. irradians</i>
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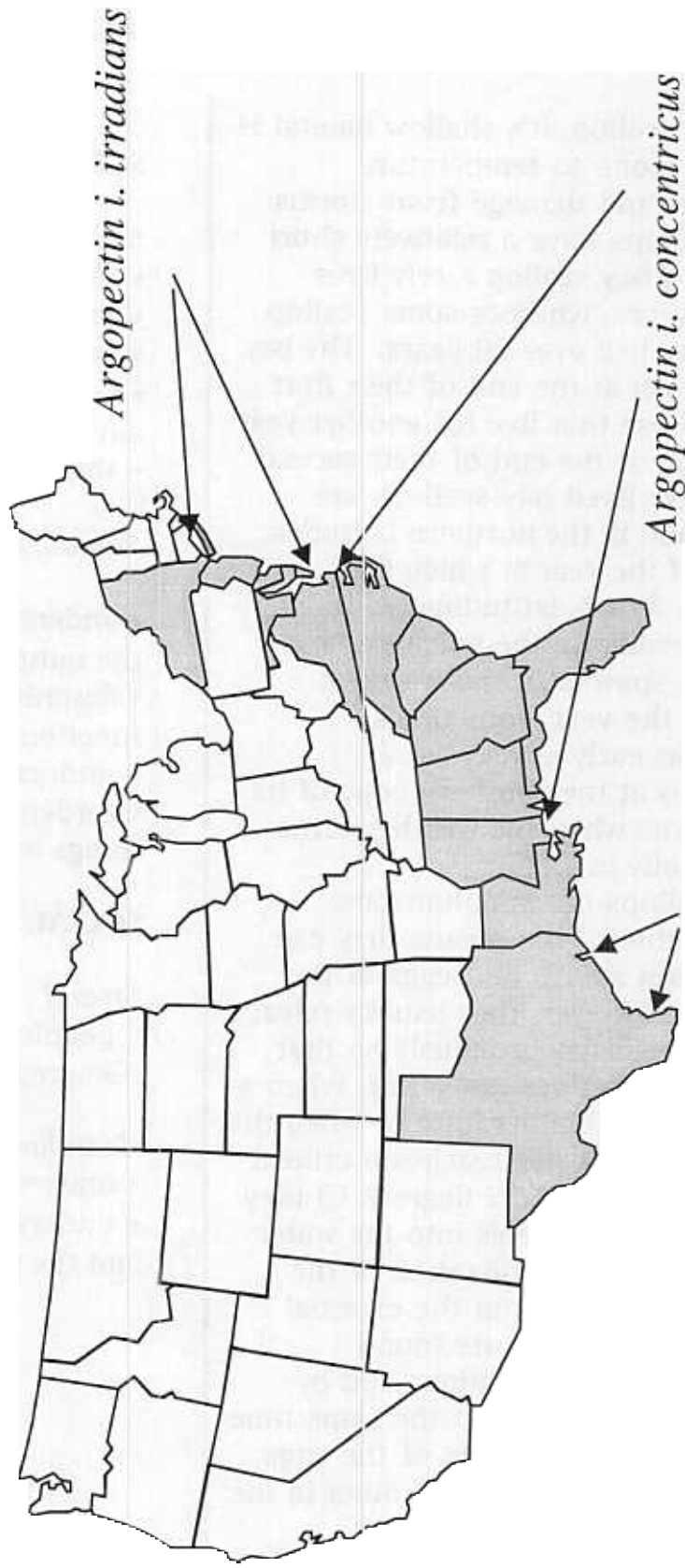
There are 3 species of scallops which are commercially harvested on the eastern coast of the United States; these are: *Argopecten irradians* (the Atlantic bay scallop), *A. gibbus* (the calico scallop), and *Placopecten magellanicus* (the sea scallop). *P. magellanicus* is the most important in terms of commercial fisheries. It had a dockside value of about 128 million dollars in 1988. The bay scallop is probably the most important for recreational fisheries. It will be the focus of much of this section.

The Atlantic Bay scallop is found in bays and estuaries from Massachusetts to the Florida Peninsula, it then follows the coastline along the Gulf of Mexico to Southern Texas. They are usually found on sand-mud bottoms, associated with eel grass patches.

Three subspecies are currently recognized: *Argopectin irradians irradians* is found from Cape Cod south to New Jersey, *A.i. concentricus* is found from New Jersey and follows the coastline south and along the Gulf of Mexico until the Mississippi Delta which apparently serves as a barrier between this and the third subspecies. The third subspecies, *A.i. amplicostatus* is found only in Texas.

All are found in relatively shallow waters. They have been reported in depths down to 20 meters but generally they are found in water less than 12 meters. This shallow depth makes them an easy species for man to harvest and at the same time it makes them more

Argopectin irradians. Approximate geographic distribution of the subspecies along the eastern coast of the United States. Adapted from Broom, 1976



Argopectin i. amplicostatus

on the bay scallop; it's shallow habitat is also more prone to temperature fluctuations and damage from storms.

Bay Scallops have a relatively short life span. A bay scallop rarely lives beyond 2 years, whereas some scallop species may live over 20 years. The bay scallop spawn at the end of their first year and those that live for another year spawn again at the end of their second. These longer lived bay scallops are usually found in the northern latitudes. The time of the year at which they spawn also differs latitudinally. *A. irradians irradians*, the northernmost subspecies spawns in the warmest months of the year, sometimes beginning as early as May. *A. I. concentricus* at the southern edge of its range spawns when the weather turns cooler, usually in fall.

Bay Scallops are simultaneous hermaphrodites. That means they can produce both sperm and eggs at the same time. However, they usually release their gametes asynchronously so that self-fertilization does not occur. When a critical ambient temperature or when the surrounding seawater reaches a critical temperature (approx. 25 degrees C) they all release their gametes into the water at the same time. Fertilization of the eggs therefore occurs in the external environment. Scallops are found together in large populations and by releasing their gametes at the same time this increases the chances of the eggs and sperm running into each other in the water!

SCIENCE

Strand

- the nature of matter and energy
- processes that shape the earth
- processes of life
- how living things interact with their environment
- the nature of science

Standards

- understands the need for protection of the natural systems on Earth
- describes patterns of structure and function in living things
- understands the competitive, interdependent, cyclic nature of living things in the environment.

SOCIAL STUDIES

Strand

- people, places, and environments (Geography)

Standards

- understands the world in spatial terms
- understands the interactions of people and the physical environment