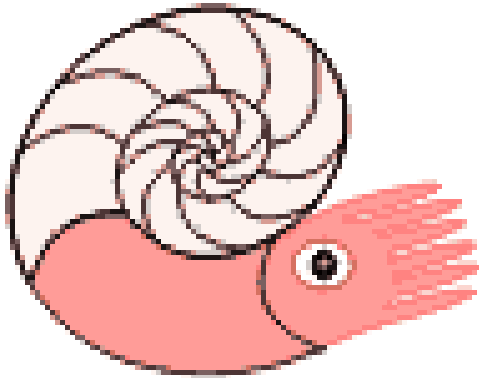


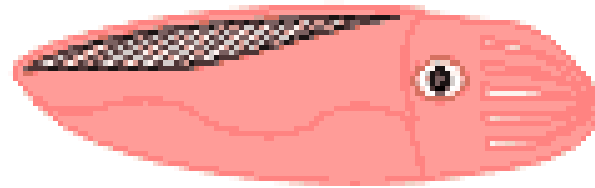
KABUKLU SU ÜRÜNLERİ ve ÜRETİM TEKNİĞİ

Prof. Dr. Hasan Hüseyin ATAR

Cephalopod



1. *Nautilus*



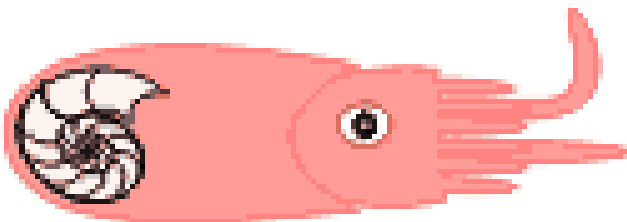
4. The cuttlefish *Sepia*



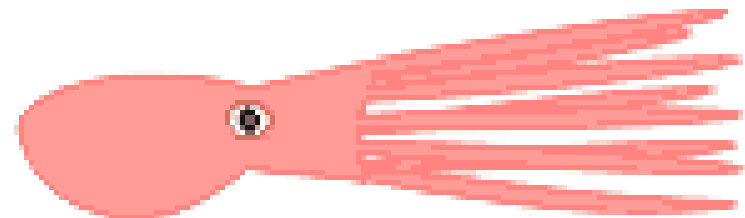
2. A belemnite (extinct)



5. The squid *Loligo*

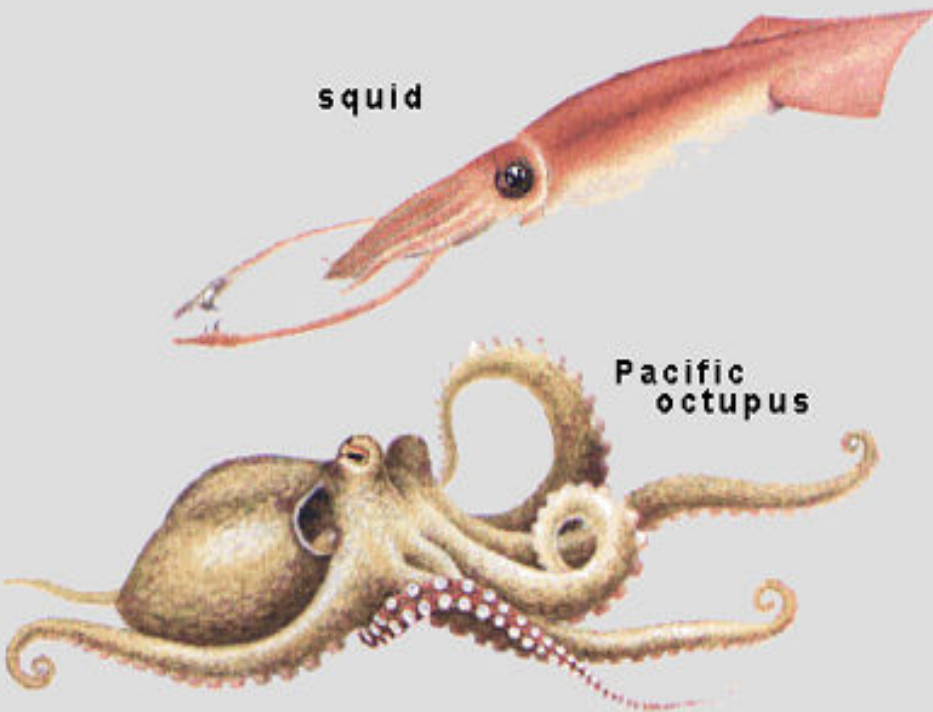
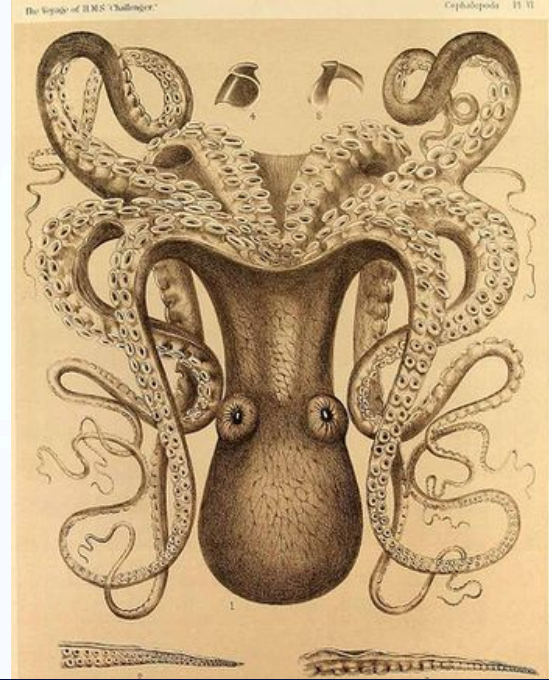


3. The cuttlefish *Sepioida*



6. *Octopus* (shell lost)

Class Cephalopoda– “Head Foot”

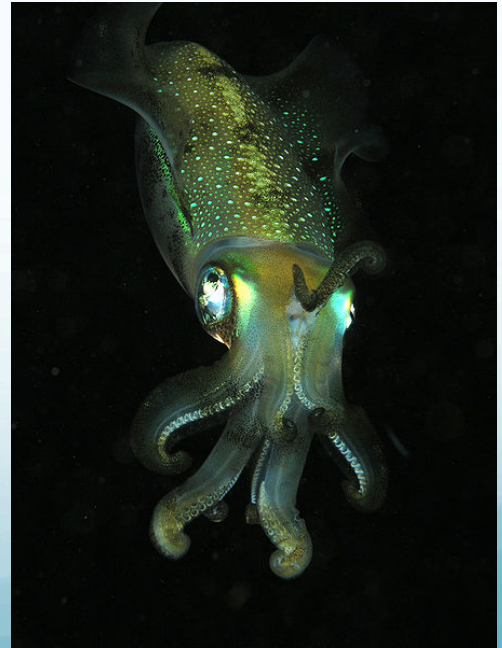
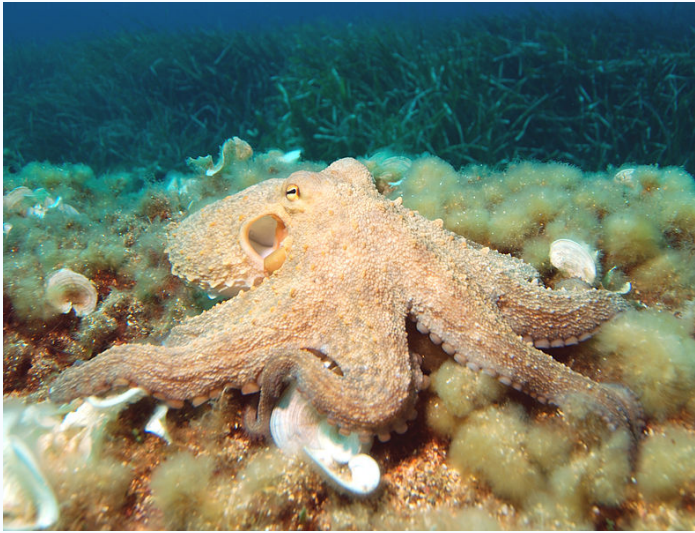




Cephalopod









Dış Görünüş



Photo by Chris Chapman (2017)



Avları-yemleri



Photo by Azchael



Photo by J. Tan



Photo by Bethany Foster



Photo from With Love off Photography

Avları-yemleri



Photo by Chris Crossman 2013



Photo by Jonathan C. Wallis

Düşmanları



Photo by Bill Curstinger

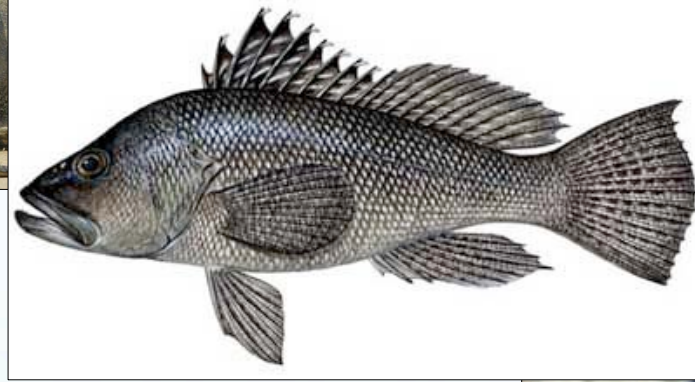


Photo from Rocketswag.com



Photo by Bill Curstinger

Düşmanları



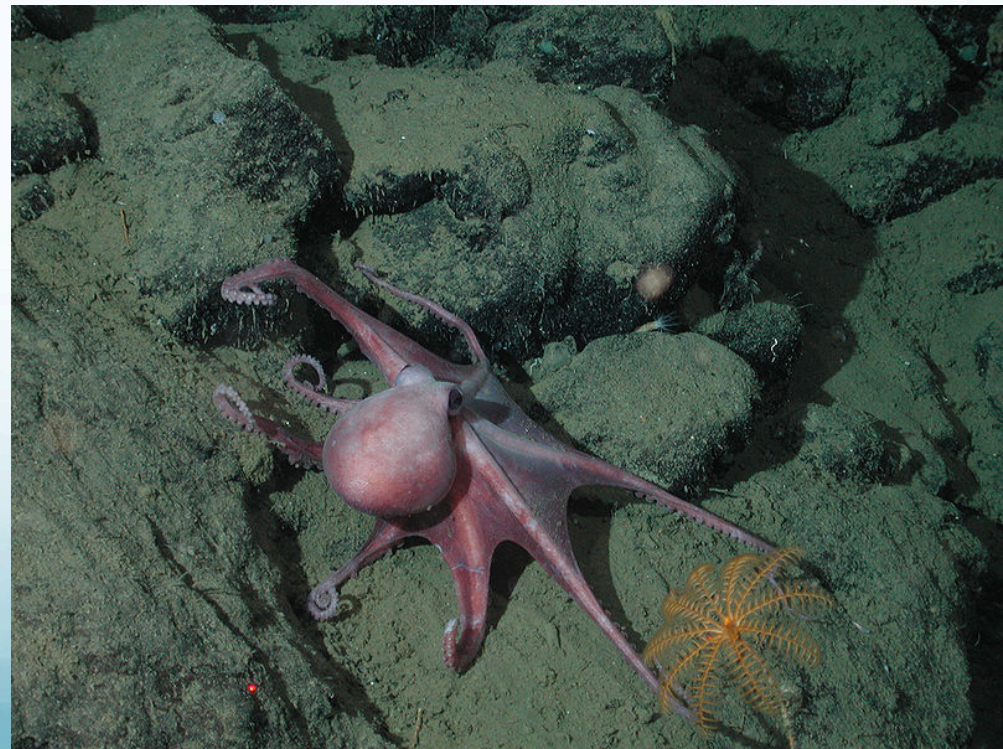
Photo by Erica Simons





Habitat

- Benthic
 - Highly Motile
 - Epifauna –live on seafloor
 - Have adapted to almost every marine environment in the world



Feeding

-Most are predators using arms, tentacles, suckers to capture then **beak** to rip prey apart



Üreme



Photos by Simon Chandra

Cephalopod Üreme



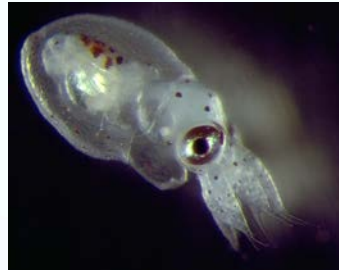
- Separate sexes
- External fertilization and development
- Distinct egg cases
- Most types die after reproduction (many only living 1-2 years)

REPRODUCTION

- ✓ *Production of 50 to 100 eggs*
- ✓ *The female will carry the eggs around her in her brood*
- ✓ *The mother die soon after the babies are hatched*
- ✓ *The babies are born as a plancton*



Life Cycle



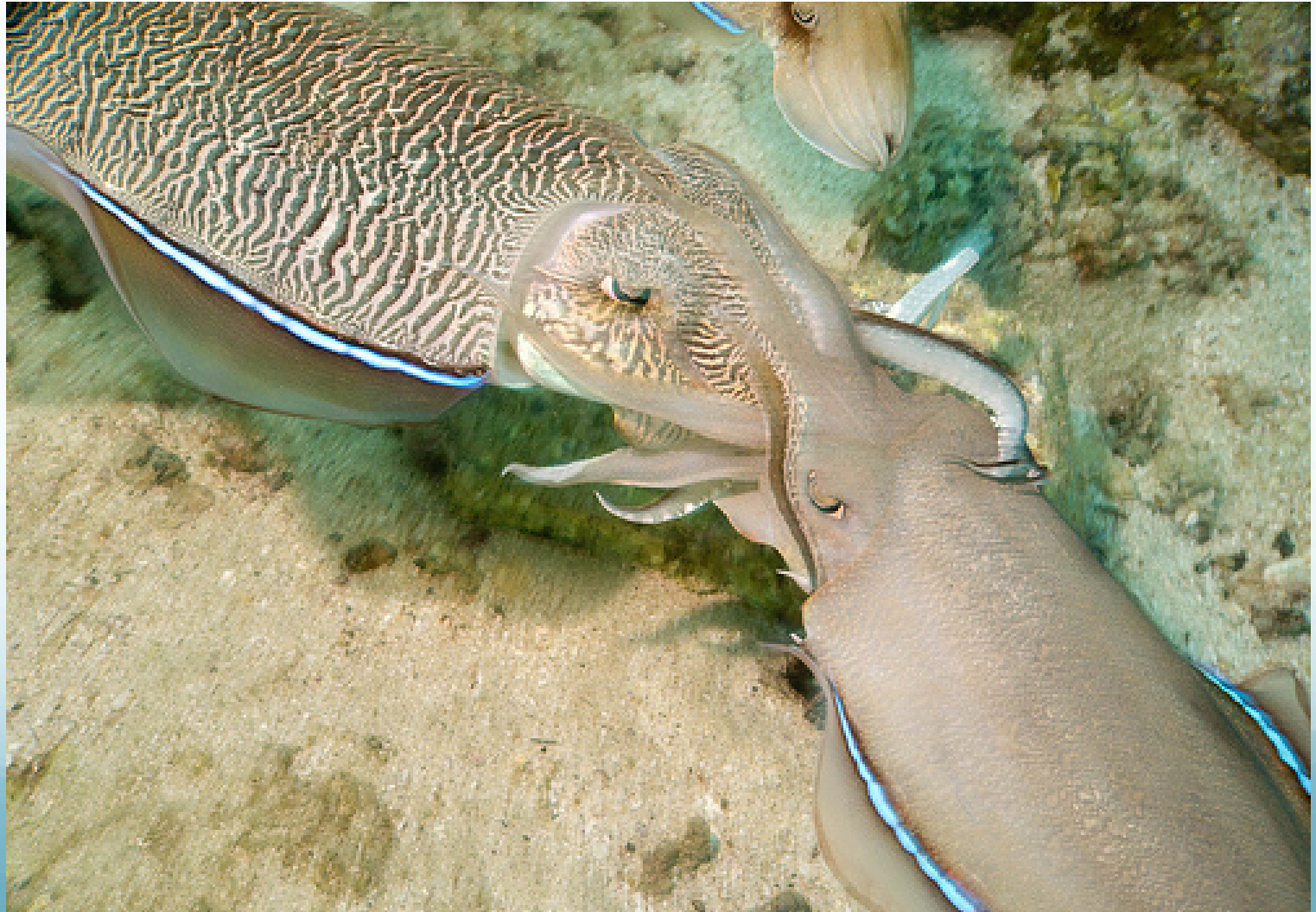
After the common octopus hatches, it lives among the plankton ecosystem for about a month.



The common octopus eggs are carefully cared for.

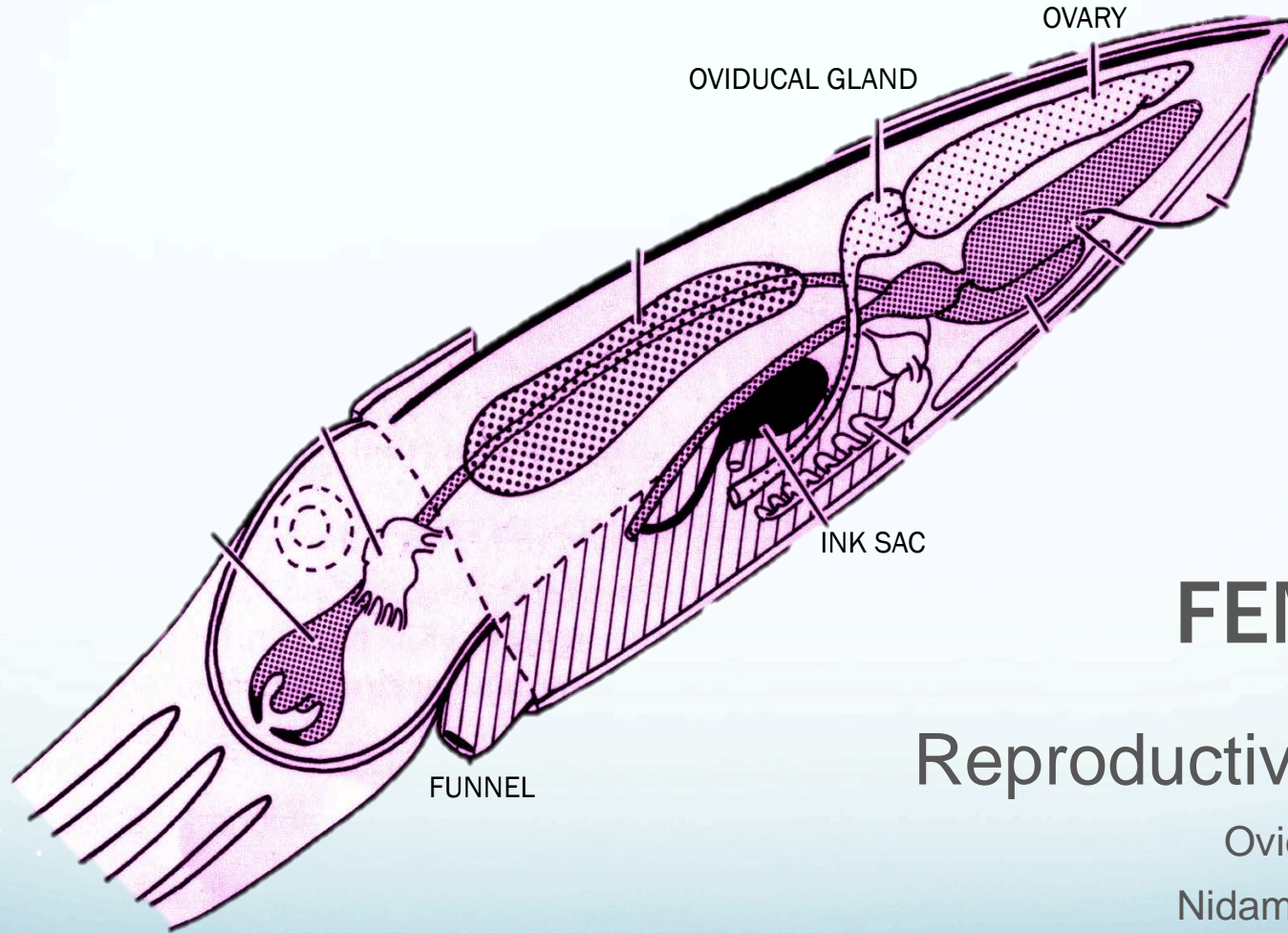


The adult common octopus lays about 500,000 eggs





ANATOMY AND PHYSIOLOGY



FEMALE

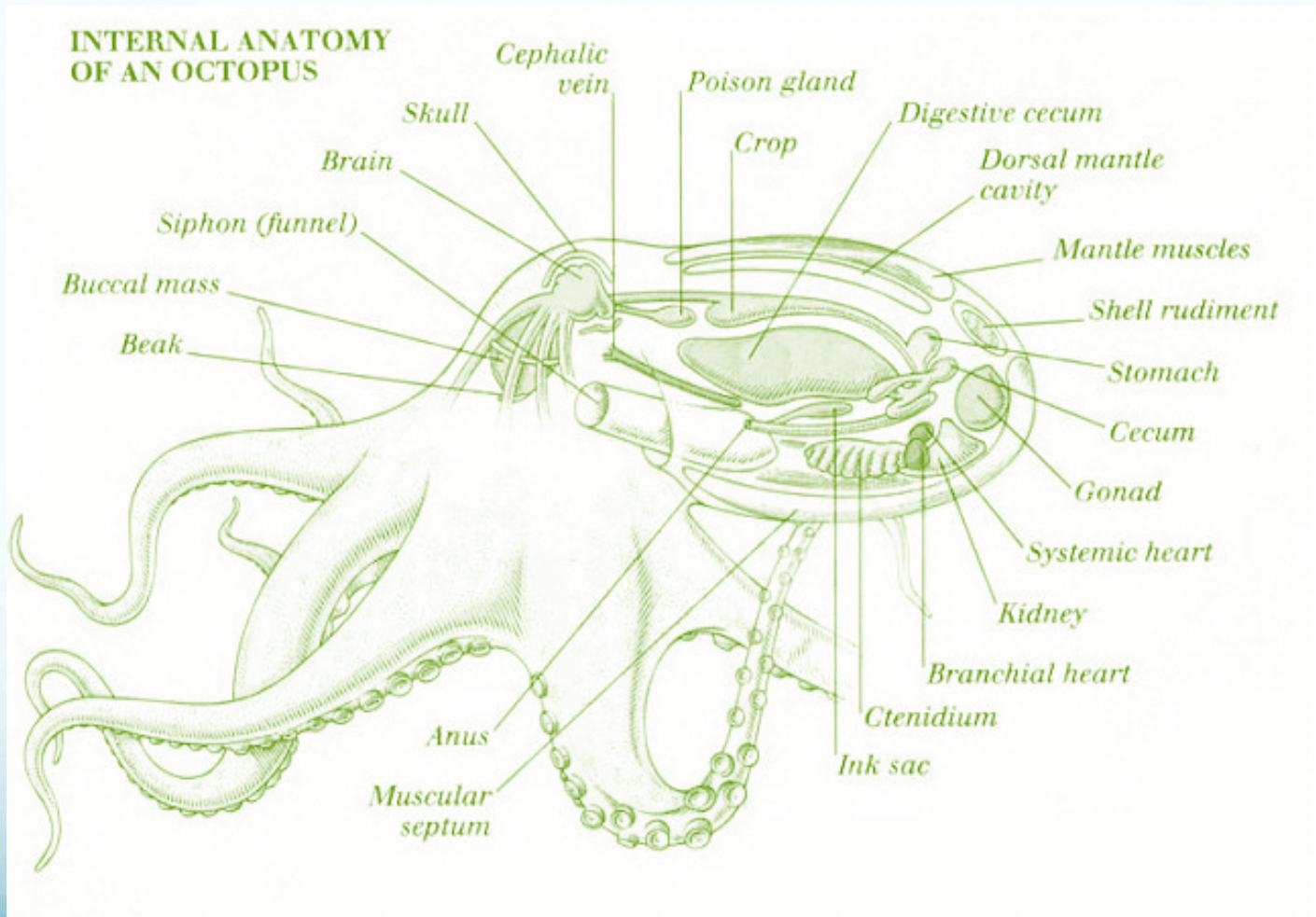
Reproductive tract

Oviducal gland

Nidamental gland

Egg mass/egg capsule

ANATOMY AND PHYSIOLOGY



OCTOPUS

Male

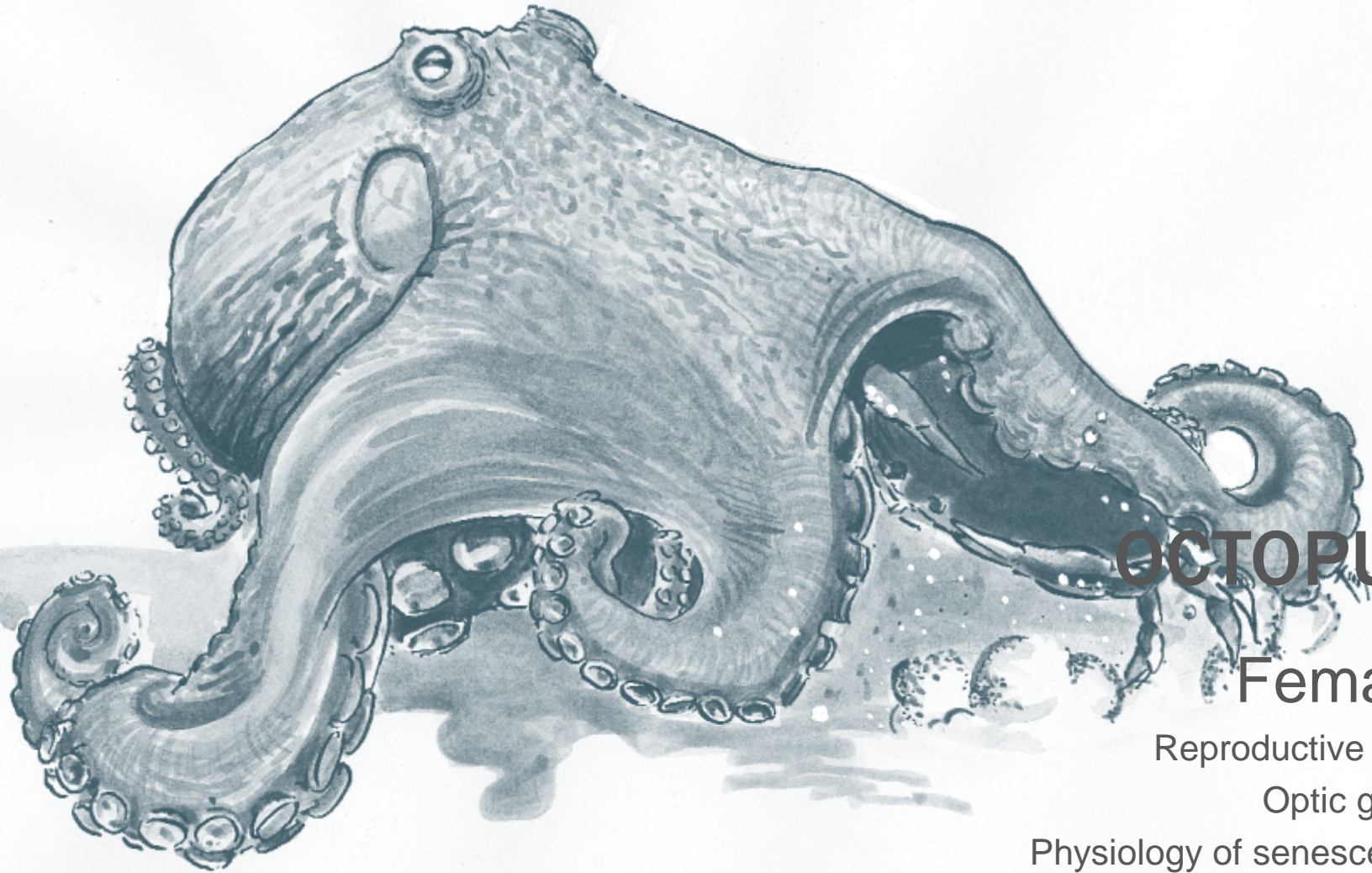
Reproductive tract

Spermatophore

Ligula

Optic gland

ANATOMY AND PHYSIOLOGY



OCTOPUS

Female

Reproductive tract

Optic gland

Physiology of senescence





REPRODUCTIVE STRATEGY



MATING

Mating in deep water

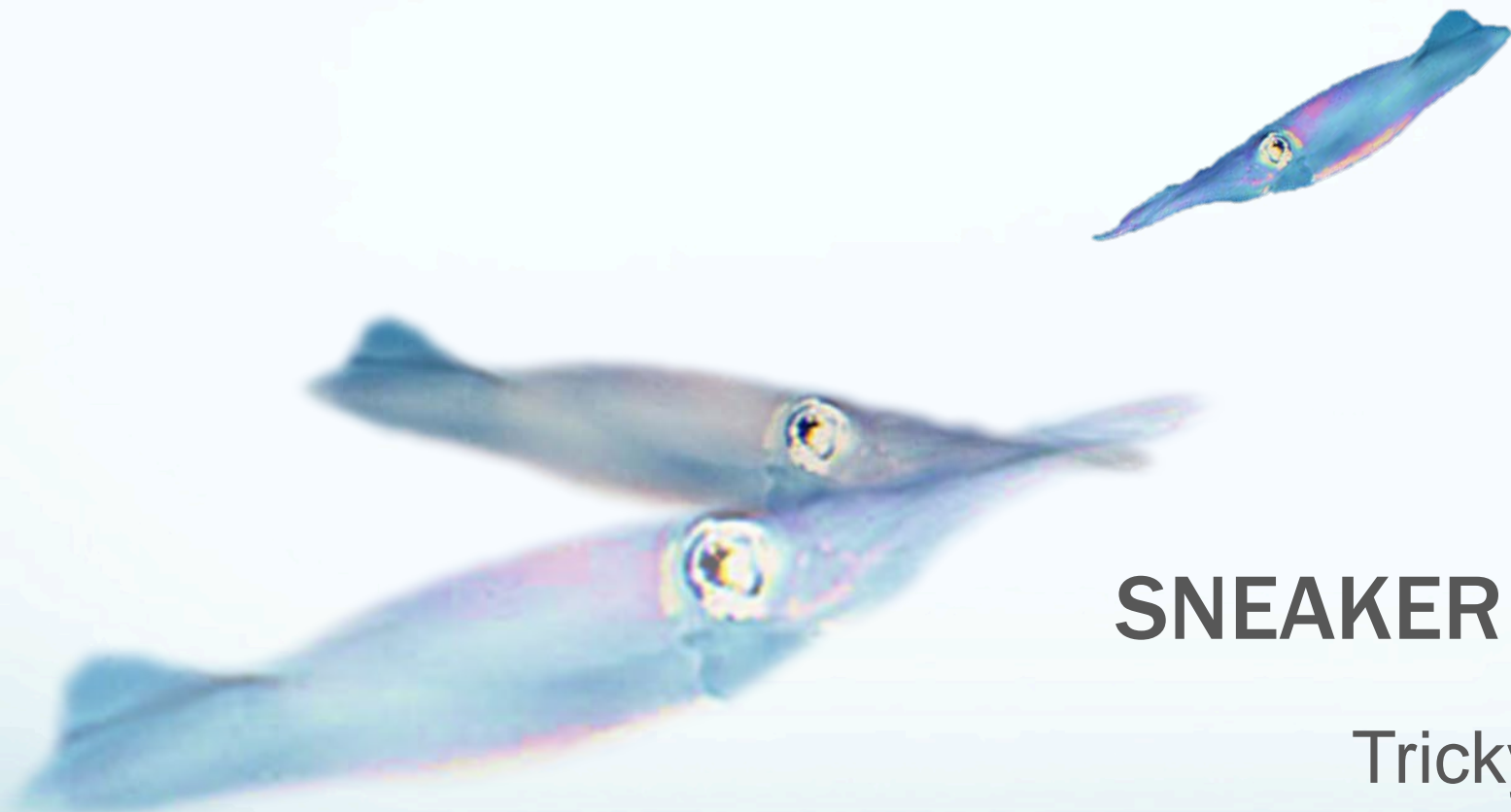
Male interactions with females

Egg fertilization

[Image in action](#)



REPRODUCTIVE STRATEGY



SNEAKER SQUID

Tricky Mating

Large male Bleeker's squid mates with female

Two sperm storage sites

Sperm size difference

REPRODUCTIVE STRATEGY



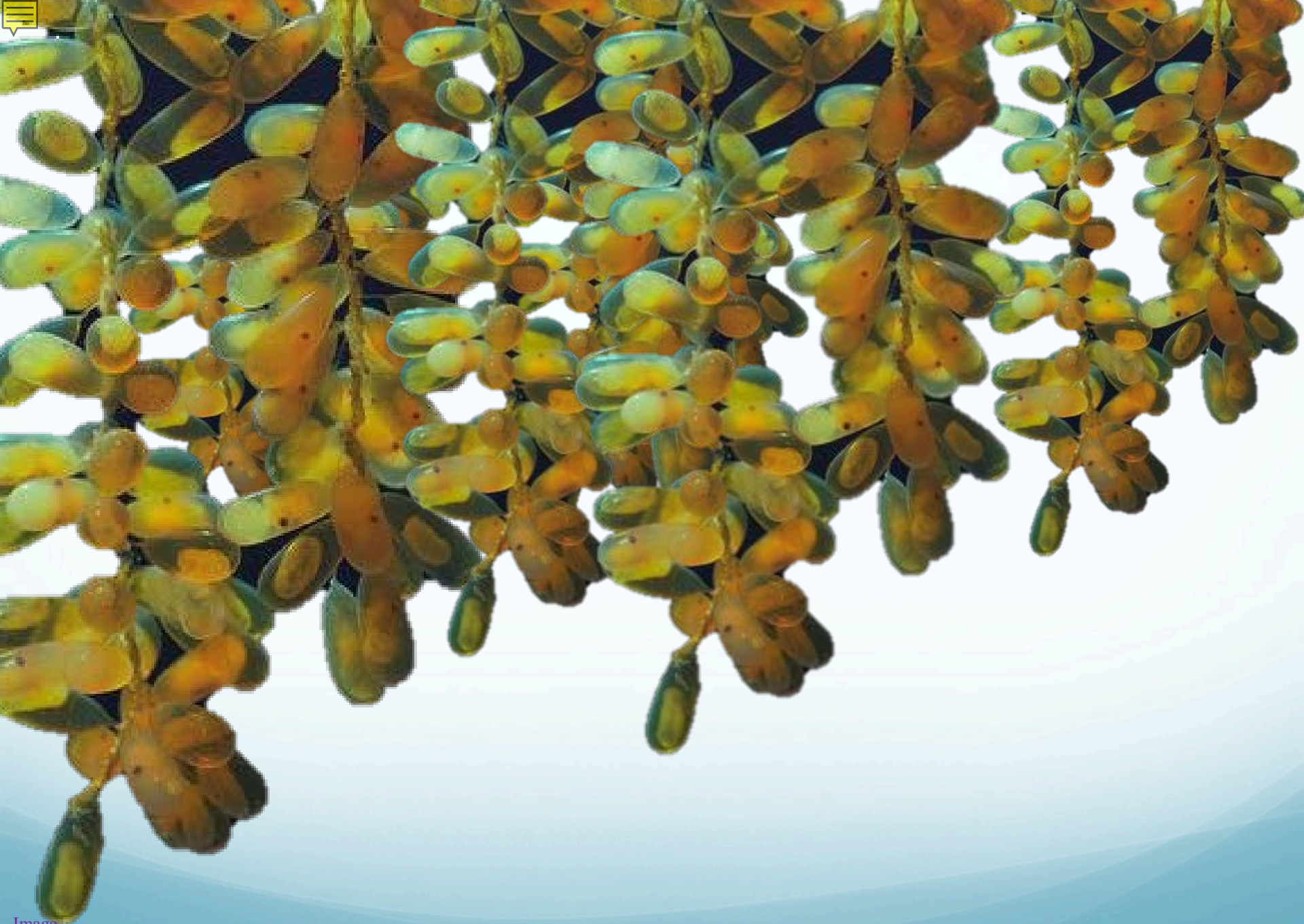


CHROMATOPHORE SKIN

Different patterns have different meanings

Different patterns can be seen simultaneously

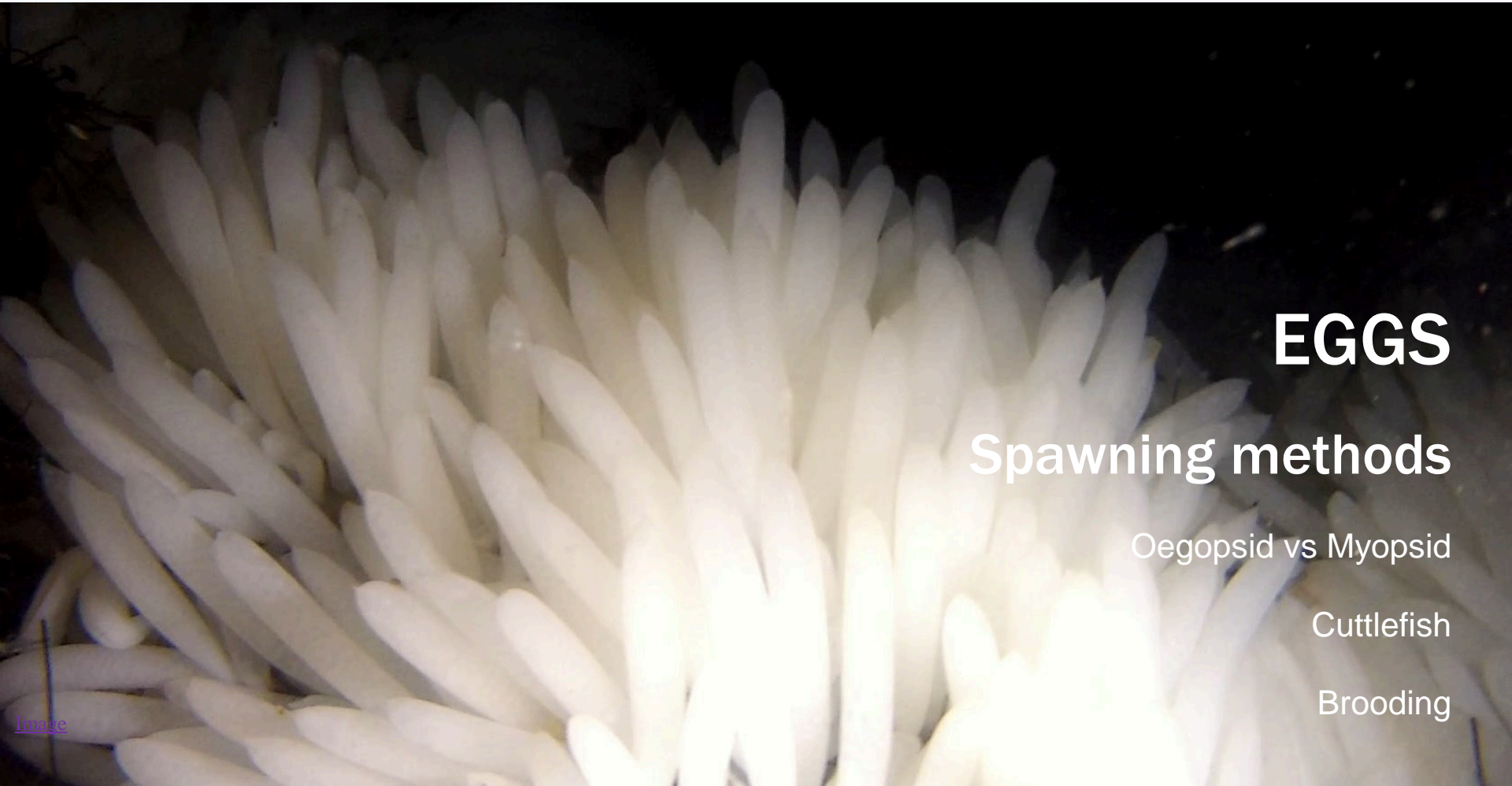
[Color flashing](#)







ENVIRONMENTAL CHALLENGES



EGGS

Spawning methods

Oegopsid vs Myopsid

Cuttlefish

Brooding



ENVIRONMENTAL CHALLENGES



COMMUNICATION

Bioluminescence

Deep sea

Light organs

Can avoid detection with polarized light

[Firefly squid](#)



Photo from outinthewoods.com

Amphitretidae

Scientific Name Amphitretus pelagicus
Location Central North Pacific



A single genus and two species are recognized in this family.



Diagnosis

An incirrate ...

- with tubular eyes.
- with funnel fused ventrally to mantle.

Characteristics

1.Arms

- a. Arm suckers in single series proximally, double series distally (see below).
- b. Right arm III of male hectoctoylized.

The arm suckers are more closely spaced near the arm tips and appear to be arranged in two series.

2.Head

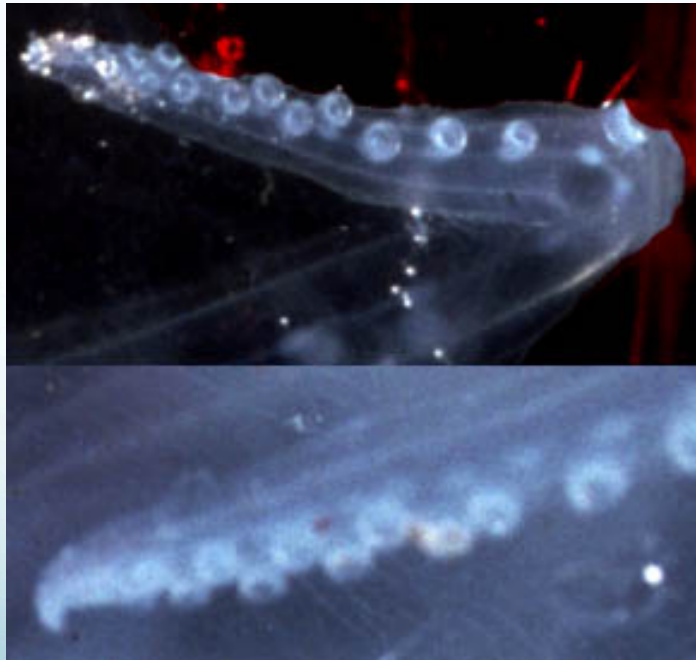
- a. Eyes tubular in shape.

3.Funnel

- a. Funnel fused to mantle ventrally; mantle opening reduced to broad pores lateral to funnel.



a. Figure. Side view of an **A. pelagicus** emphasizing the funnel-mantle fusion and the mantle opening just ventral to the eye. Drawing by R. Young.



a.

Figure. Two views of the arm tips of a living **A. pelagicus** in a shipboard aquarium with suckers apparently in a double series. Photographs by R. Young.

Bolitaenidae Chun, 1911

Scientific Name *Japetella diaphana*

Location off Hawaii

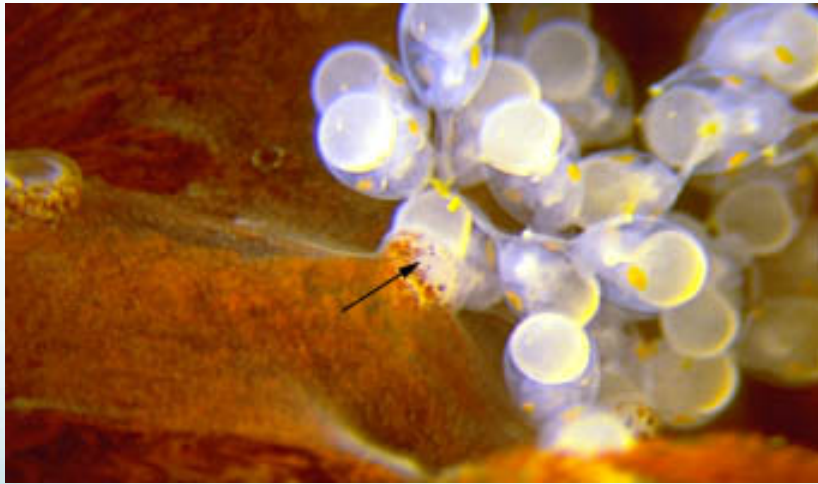
Life history



A large light organ develops around the mouth in females at maturity. Presumably it functions in attracting a male in dark waters at a depth of 1000m or more (Robison and Young, 1981). This is the only luminescent organ known in incirrate octopods.

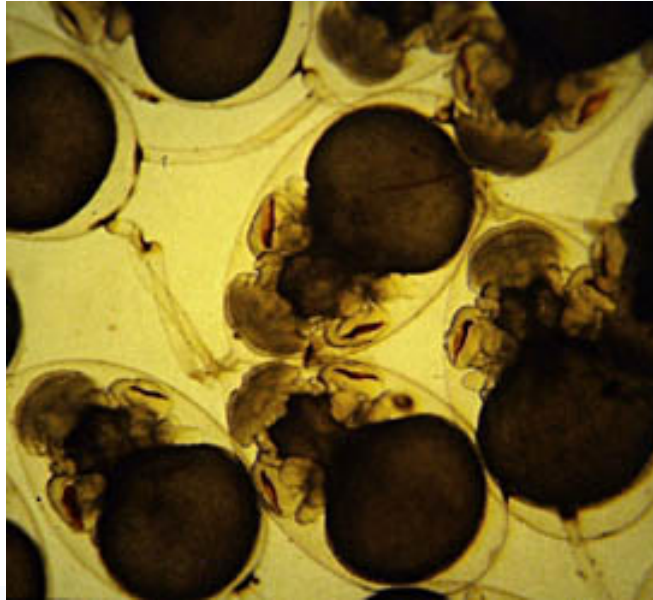


Two, probably monotypic, genera are present in this family.



Bolitaenids brood their embryos until hatching. During brooding, the eggs are held by suckers near the mouth (see arrow in photograph on the right that points to a sucker holding one of the eggs) where they are well covered by the arms and web.

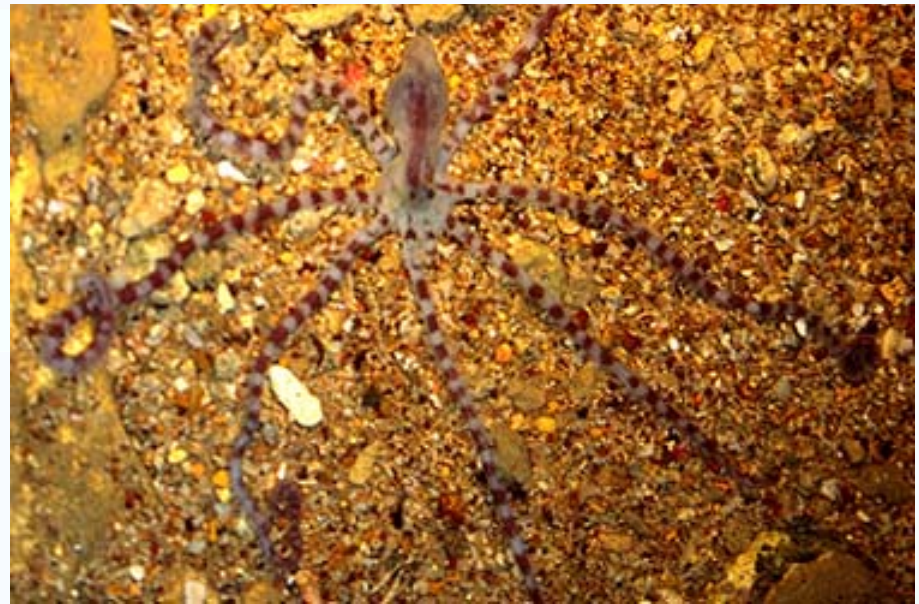
The chorion of each egg has a long stalk that attaches to the chorion of an adjacent egg. Some eggs will have several stalks attached to them. (Note the egg in the upper left corner of the photograph on the left has two stalks attached to the chorion opposite the large yolk sac). As a result the egg cluster is a matrix of eggs attached to one another in a rather haphazard way.



Off Hawaii female bolitaenids apparently release their young at a depth near 800m. The young, free-swimming octopods are found at depths around 150 - 250 m. As they grow they descend, at first abruptly then more gradually, to depths of 800 - 1400 m. Gravid females are found at the lower end of the range where mating presumably occurs (Young, 1978). More details of this pattern are presented under each genus.



e
a



Scientific Name Hapalochlaena maculosa

Location Victoria, southern Australia

Scientific Name Amelocotopus litoralis

Location Darwin, northern Australia

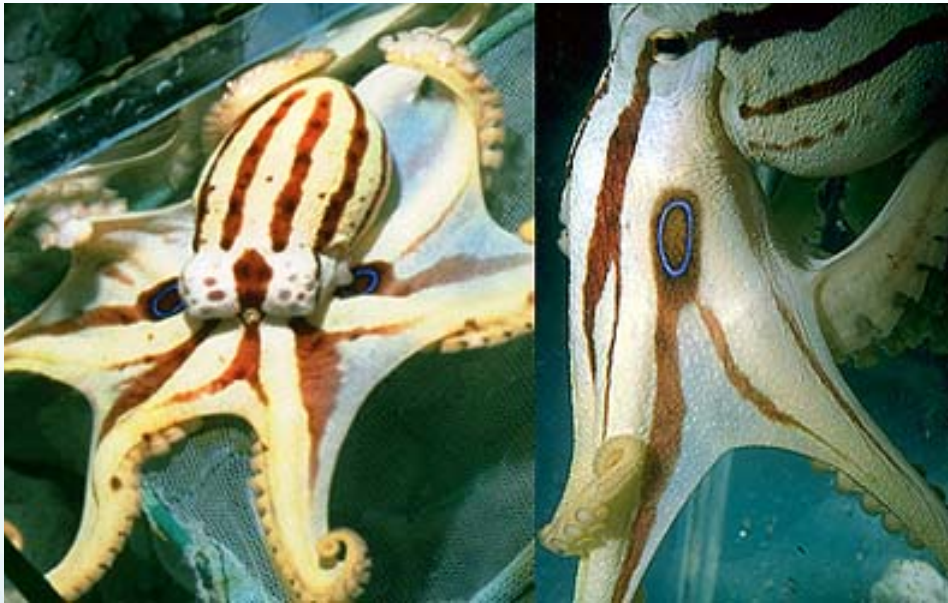
This family is made up of the familiar bottom-living octopuses and contains the majority of the genera and species which make up the Order Incirrata. The taxonomy of the family is poor with more than 30 genera coined, of which the following 24 are generally accepted as valid. There are over 200 species worldwide with the majority lacking detailed descriptions



The Octopoda contains about 200 species placed in two very different groups.

Behaviour





Vitreledonellidae Robson, 1932



The family contains one species.

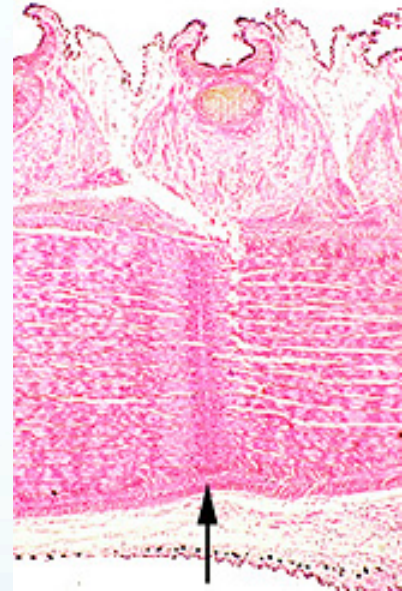


The optic lobes have unusually long optic nerve stalks. The broad separation of the optic lobes is clearly seen in the photograph on the left.

Ameloctopus Norman 1992



- **Ameloctopus litoralis** Norman, 1992



Pareledone Robson 1932



Scientific Name Pareledone framensis

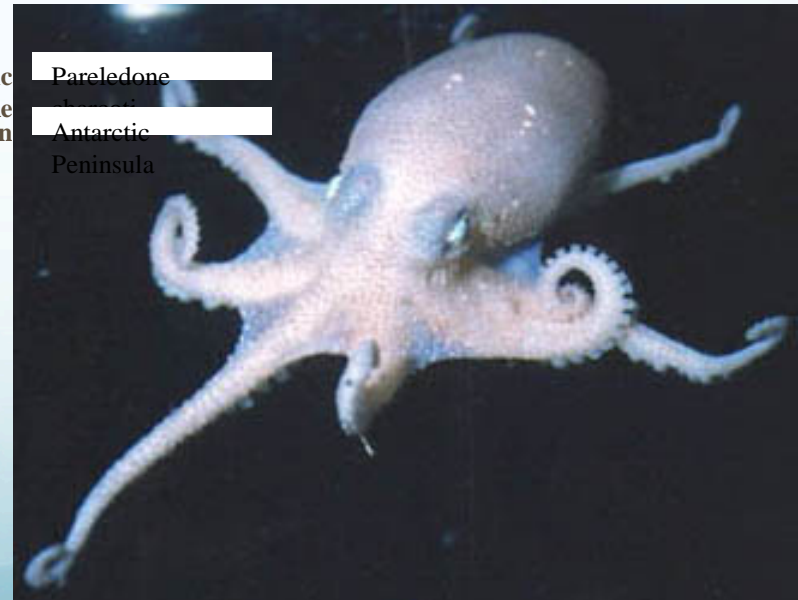
Location Eastern Antarctica



Scientific Name Pareledone antarctica
Location Antarctic Peninsula



Scientific Name Pareledone
Location Antarctic Peninsula





Scientific Name Pareledone framensis

Location Eastern Antarctica



