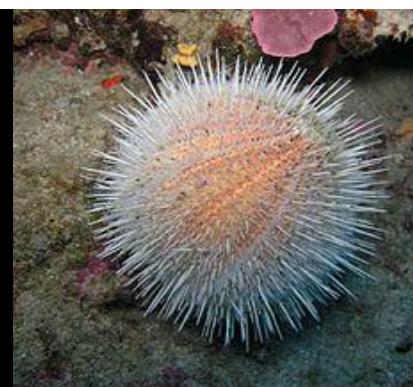


# **Exploration of Invertebrate Animals**

**Ledhyane Ika Harlyan**

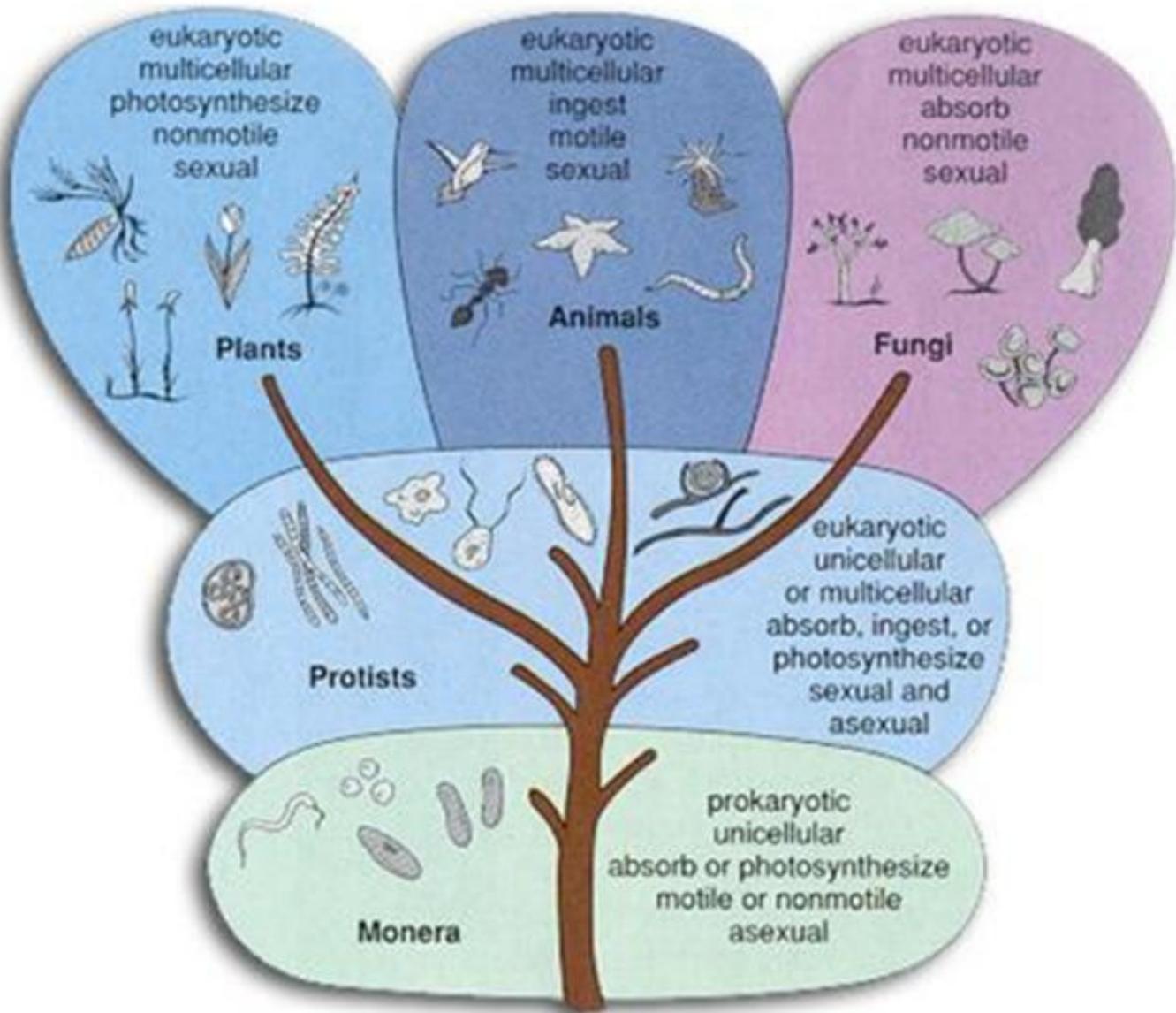


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Brawijaya University  
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# Tujuan Instruksional Khusus

Mahasiswa yang telah mengikuti perkuliahan ini akan dapat:

1. mengidentifikasi secara singkat beberapa organisme laut baik yang berkulit lunak maupun keras
2. Mengetahui metode estimasi stok udang
3. Mengetahui metode estimasi hasil tangkapan sampingan suatu alat tangkap pada suatu perairan



## Taxonomic Kingdoms of Life

# Phylum Porifera



## 2. Class Demospongiae

Shaped like a rock; habitat: in a deep water, since they can't receive O<sub>2</sub> or food without it; bath sponge; cure cancer (filtering ability)



## 1. Class Hexactinellida (Glass Sponge)

ones die, the skeleton rise the surface.



Venus Flower Basket

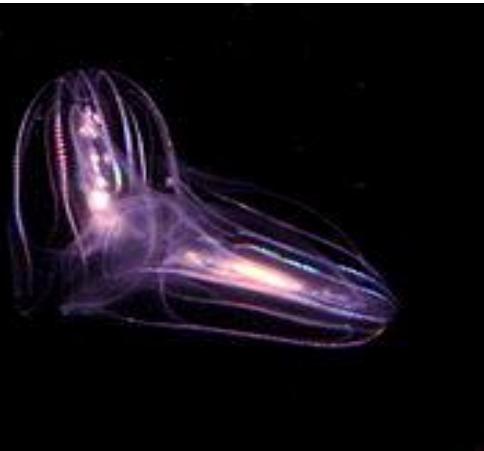
## 3. Class Calcarea

Made from Calcium carbonate; regenerate a piece of an already matured adult into a completely new organism.



# Phylum Coelenterata

*“..have a coulomb (coelenteron) for digest and distribute food for their whole body”*

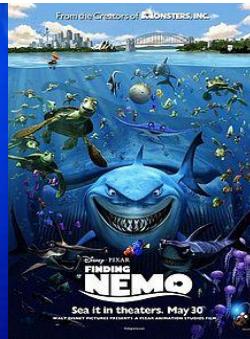


## 1. Class Hydrozoa

Source of bio active compound (hormone, enzyme) → anti cancer, anti infection (blocking ability)

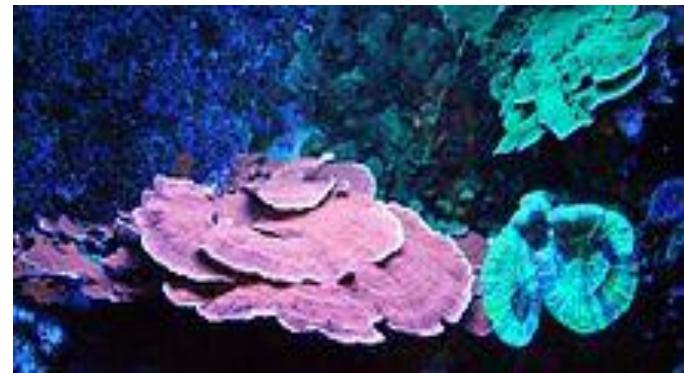
## 2. Class Scyphozoa

Locomotion and predation; culinary, green fluorescent protein (identify which cell express specific gene); toxicity (nematocyst);



## 3. Class Anthozoa (sea anemone)

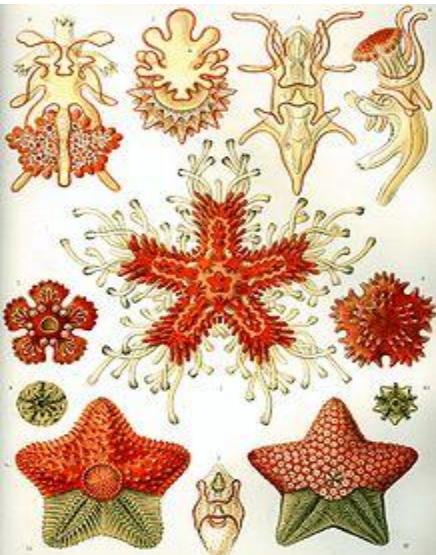
Source of bio active compound (hormone, enzyme) → anti cancer, anti infection (blocking ability)



# Phylum Echinodermata

*“...recognized easily by their (usually five points) radial symmetry..*

*Non-freshwater and terrestrial living..”*



## 1. Class Asteroidea (starfish)

Feeding on benthic invertebrate; water vascular system  
→ vulnerable to water pollution; consume coral polyps



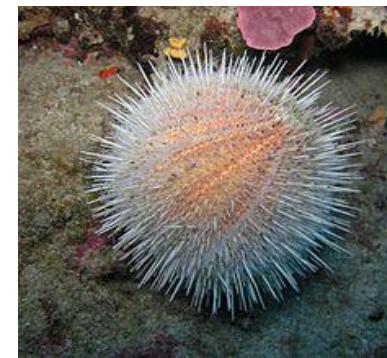
## 2. Class Ophiuroidea (brittle star)

Regenerate lost arms (escaping from predators); friendly to coral; fish keeping



## 3. Class Echinoidea (sea urchin)

innate immunity study (blocking system); culinary (raw food, fish sauce)



# Phylum Echinodermata

*“...recognized easily by their (usually five points) radial symmetry..*

*Non-freshwater and terrestrial living..”*

## 4. Class Holothuroidea (sea cucumbers)



## 5. Class Crinoidea (sea lilies)



Communicate by sending hormone signal through water; culinary; poisonous sea cucumbers can inhibit cancer growth

# Phylum Mollusca

*..are the largest marine phylum*



## 1. Class Gastrophoda (sea snail)



## 2. Class Bivalvia



A source of contamination

Dinoflagellates → red tide → shell fish

(carrier) → human consumption

Use as food; bio-indicator for water pollution; jewellery

## 3. Class Cephalopoda

(Octopus, squid, cuttle fish, nautilus)



Bioluminescence → communication, impress mate, entice prey, startle predators

# Phylum Arthropoda

*..having an exoskeleton, a segmented body, and jointed appendages*



## 1. Class Brachiura



## 2. Xiphosura



# Phylum Arthropoda

*..having an exoskeleton, a segmented body, and jointed appendages*

## 3. Class Crustacea



**Udang Barong**  
(*Panulirus* spp)  
(hard spiny lobster)



**Udang werus**  
*Metapenaeus*  
Pink prawn

# Phylum Arthropoda

*..having an exoskeleton, a segmented body, and jointed appendages*



**Udang Windu**  
(*Penaeus monodon*)  
(Tiger shrimp)  
Originally from Indonesia



**Udang Putih**  
(*Vannamei*)  
*Litopenaeus vannamei*



**Udang krosok**  
(*Parapenaeopsis sculptilis*)  
Coral prawn

# Estimation on shrimp density

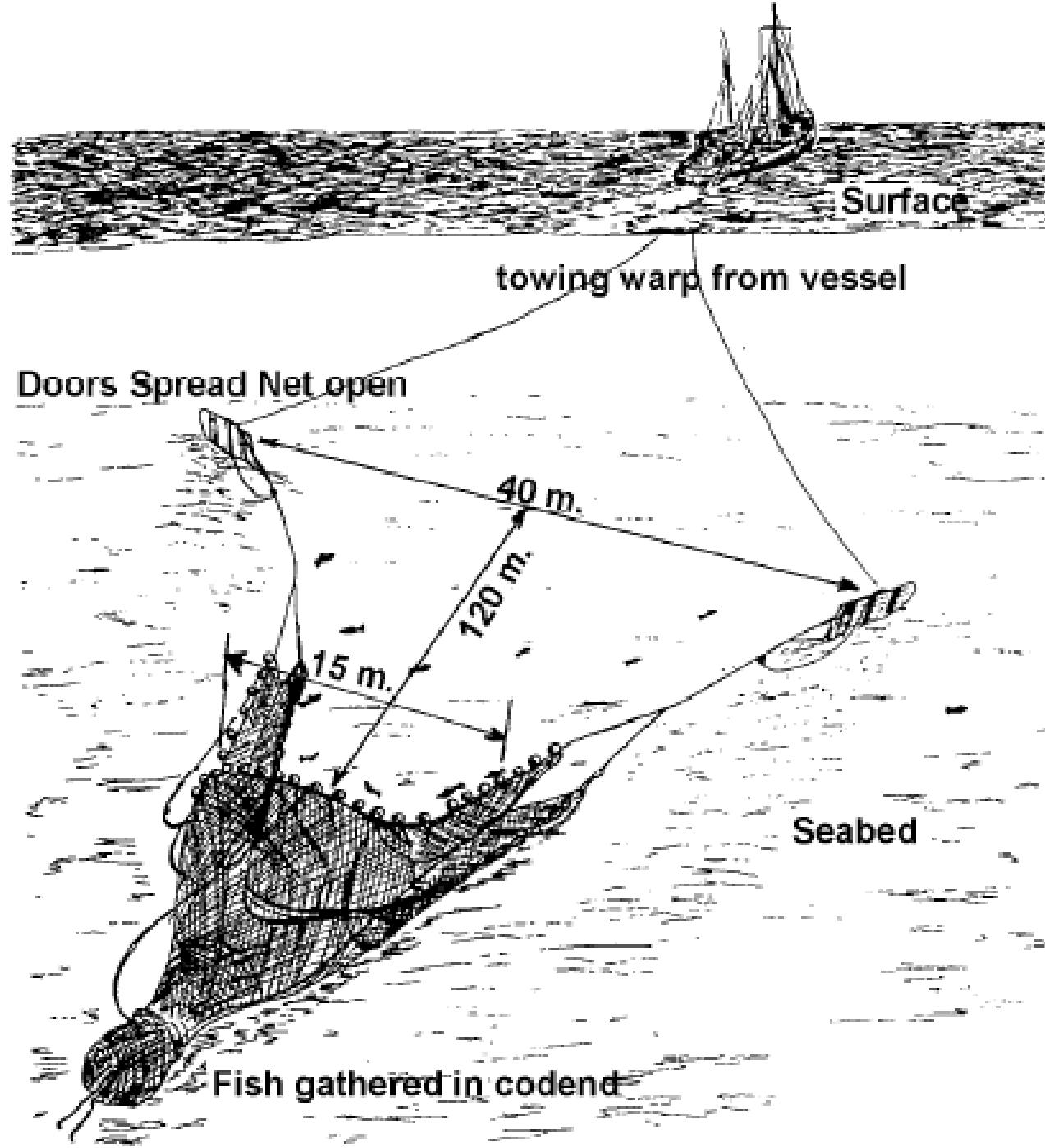
- Absolute abundance= the actual number of shrimp in an area (shrimp stock)
- Density = number of shrimp per unit area
- It comes from swept area sampling method (trawling)
- It's based on the density (the number or the weight of the shrimp caught per unit area covered by an experimental gear (trawl) → potential yield

$$\text{Area swept (a) m}^2 \rightarrow W * TV * D$$

W (effective width of trawl) m

TV (towing velocity) ms<sup>-1</sup>

D (duration of the tow) s



# Estimation on shrimp density

## Note:

- trawling is not totally efficient →  $C_n$  or  $C_w$  is less than the actual number of shrimp
- It should take into account the vulnerability of the species ( $v$ )  
→ so then the actual number of shrimp biomass in the trawl  
 $(C_n/v)$  or  $(C_w/v)$

*The total biomass of shrimp in an area:*

$$N = (C_n/v) * (A/a) \text{ or } B = (C_w/v) * (A/a)$$

A : total area occupied by the shrimp stock

# Contoh soal

Sebuah penelitian dilakukan untuk mengestimasi absolute abundance dengan menggunakan metode swept area. Diketahui untuk setiap hauling, jaring trawl ditarik selama 20 menit dengan kecepatan 2m/dtk. Sampling dilakukan pada sebuah danau dengan luas 100,000 ha. Vulnerability spesies diasumsikan 0.7. Hitunglah kepadatan rata-rata dari 2 spesies (number) dengan selang kepercayaan 95%. Luas bukaan trawl=15m

# Estimation on by-catch:

## case study of mini trawl

- To estimate the total by-catch of mini trawl, we need:
  1. Total operating vessel
  2. Number of observation (10% of the total operating vessel)
  3. Species composition on observation n=1,2,3,...n

$$JHTS = \frac{N}{n} \sum_{i=1}^n X_i$$

JHTS = Estimasi jumlah hasil tangkapan sampingan untuk suatu wilayah perairan

N = Jumlah armada penangkapan trawl yang beroperasi

n = Jumlah observasi sampel

$X_i$  = Jumlah hasil tangkapan sampingan dari armada jaring trawl ke- $i$  ( $i = 1, 2, 3, \dots, n$ )

**Thank you.. 😊**

**When you KNOW better...you DO better  
...FOR OUR FUTURE..**