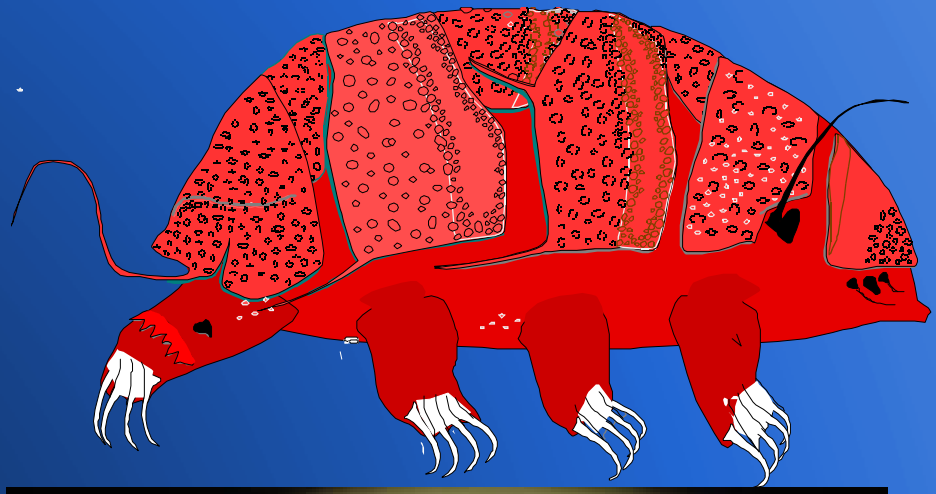
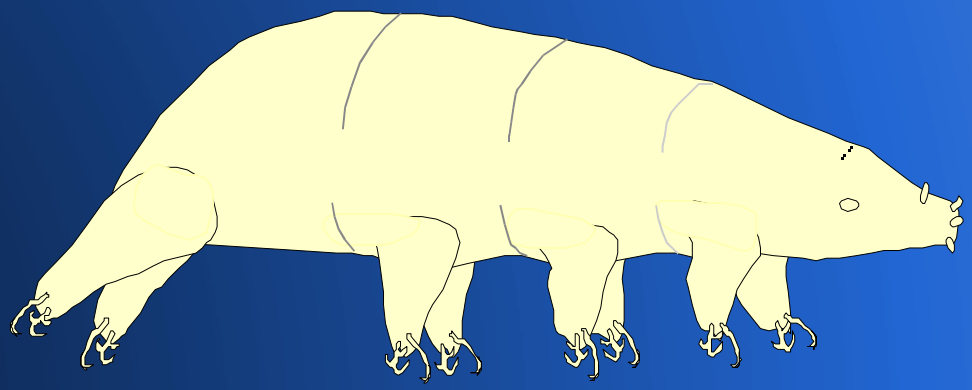
# PHYLUM: TRARDIGARE
# (Water Bears)
# (Moss Piglets)

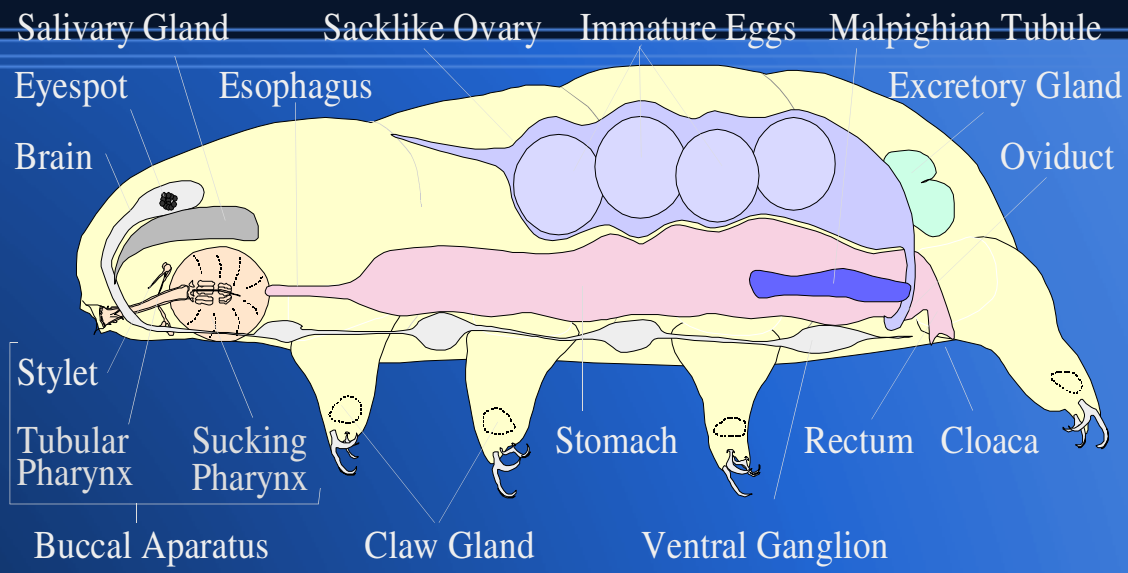
By: Francis Green

# WHAT IS A TARDIGRADE?

- Tardigrade is a microscopic aquatic animal
- Mostly lives in mosses and lichens.
- About 0.5 mm long
- Short and plump
- Extremophiles



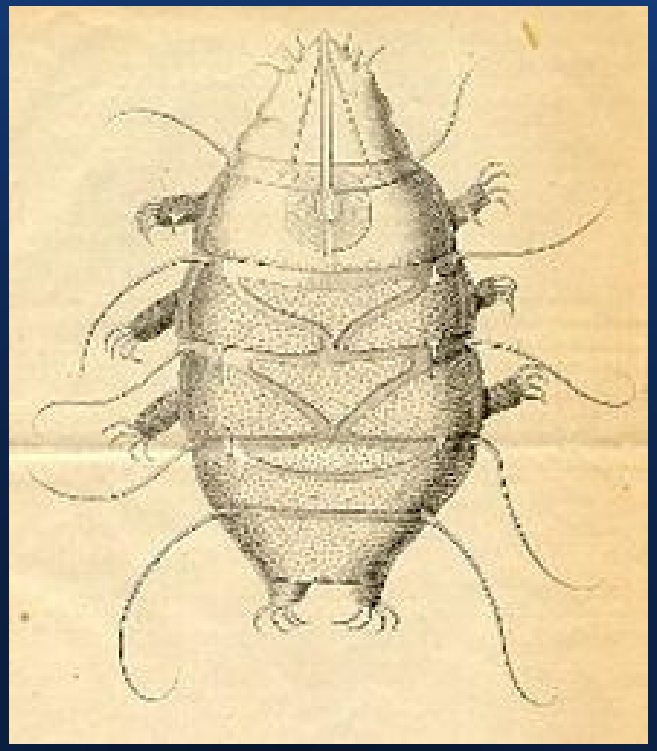
# ANATOMY



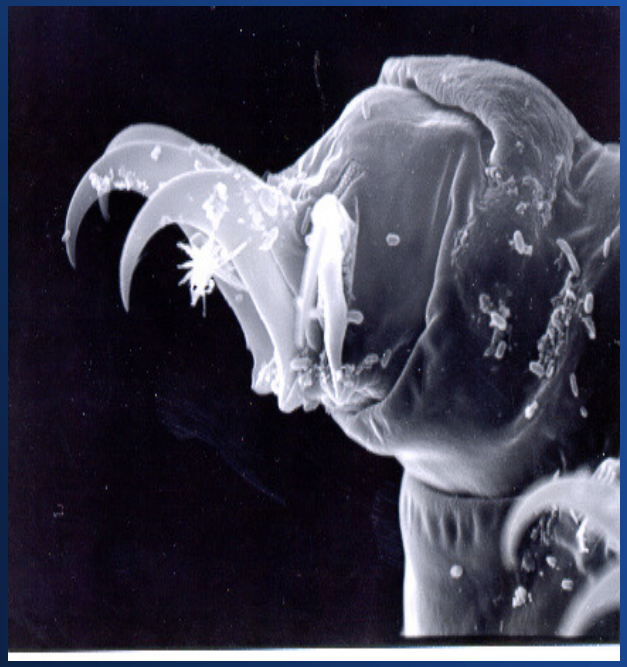

- 5 body segments
- Separate sexes, lays eggs
- 4 pair of legs ending in claws
- Nervous System with light sensitive spots
- Full Digestive & Excretory Systems
- Complex mouth & pharynx System
- Well developed muscles
- NO Respiratory or Circulatory Systems
- Eutelic

# TYPES OF TARDIGRADES:

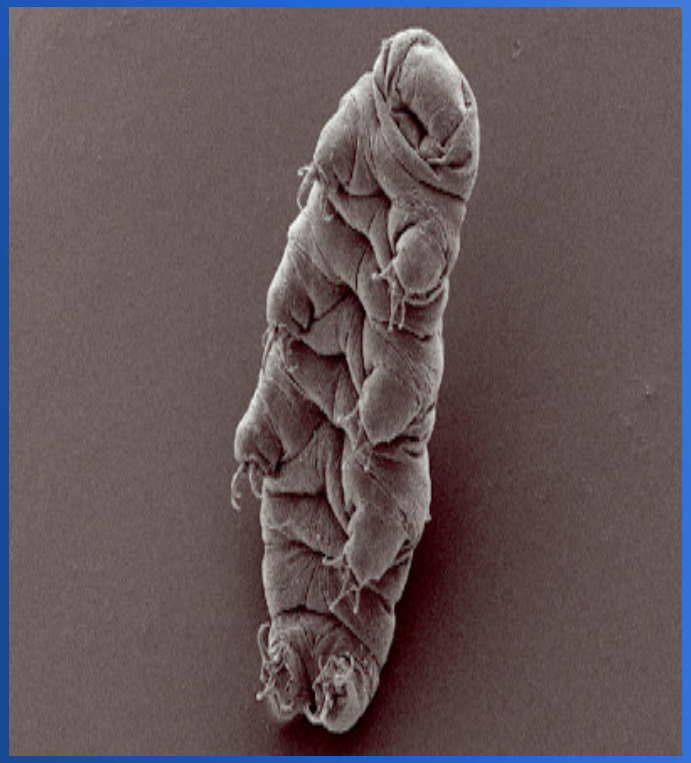
Heterotardigrada



Mesotardigrada

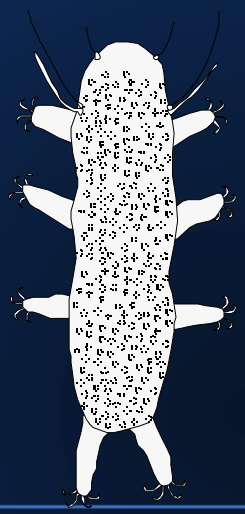


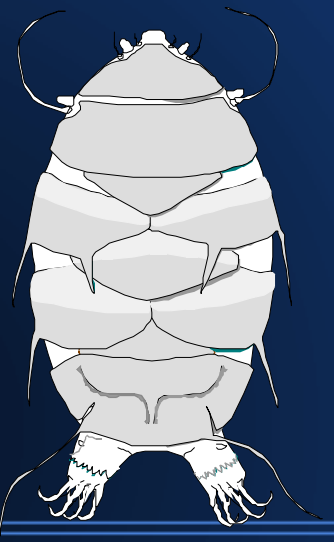
Eutardigrade

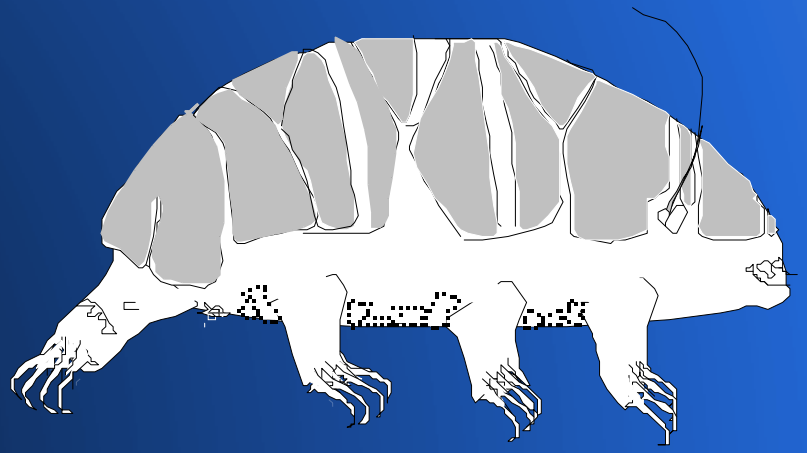


# CLASS: HETEROTARDIGRADA

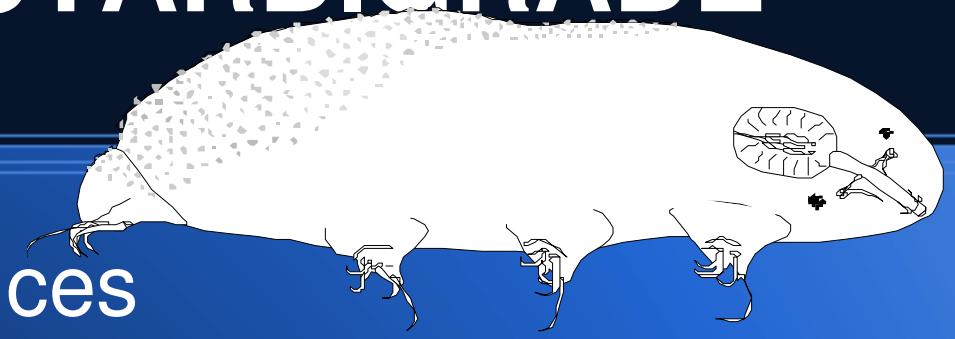
- Cephalic appendages and legs with four separate but similar digits or claws on each
- Gonoducts that open to the outside through a preanal gonopore

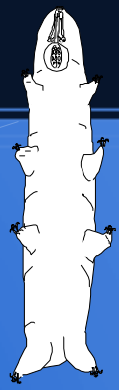




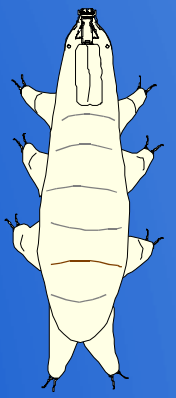


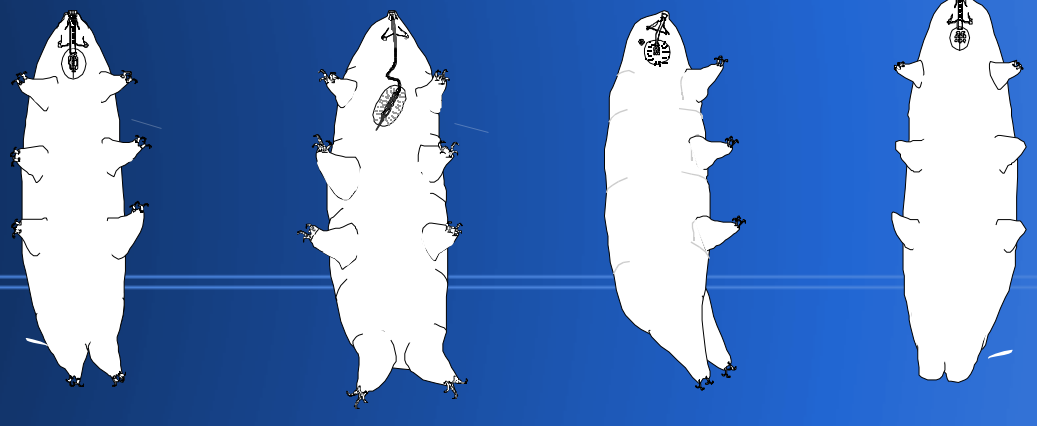
# CLASS: EUTARDIGRADE





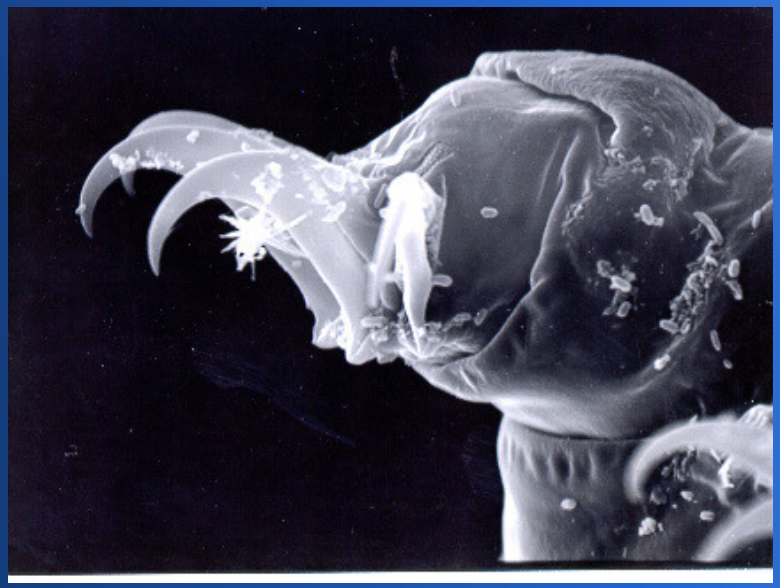
- Without lateral appendices
- Primarily freshwater bound, some species have secondarily gained the ability to live in marine environments
- Gonoducts that open to the outside through the rectum





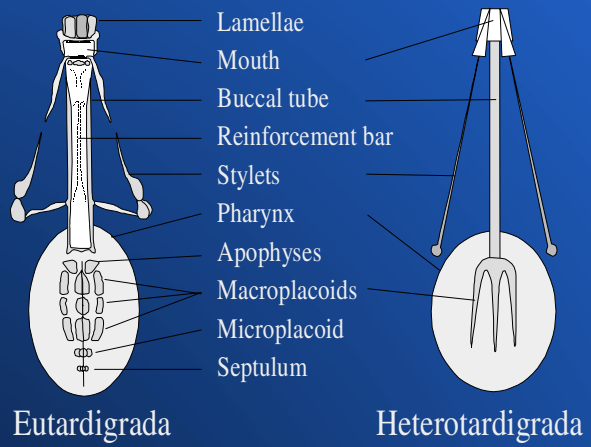
# CLASS: MESOTARDIGRADA

- Thermozodium esakii is the only species in the class
- Has six claws of equivalent length on each leg
- Found in hot spring near Nagasaki(Japan)
- Location is destroyed

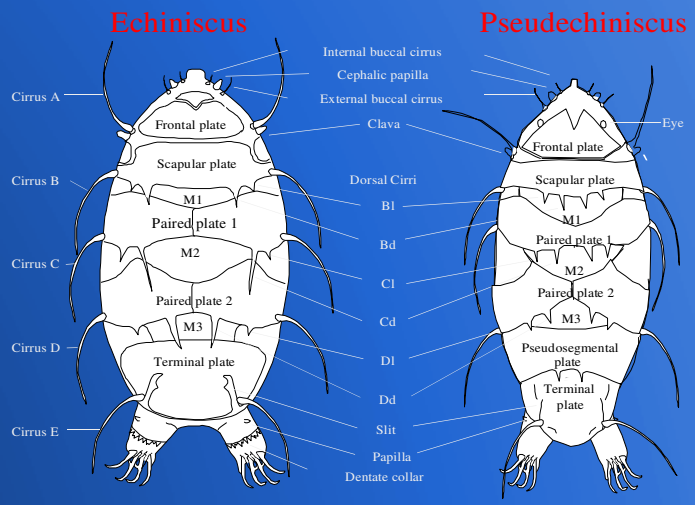


# IDENTIFICATION METHODS:

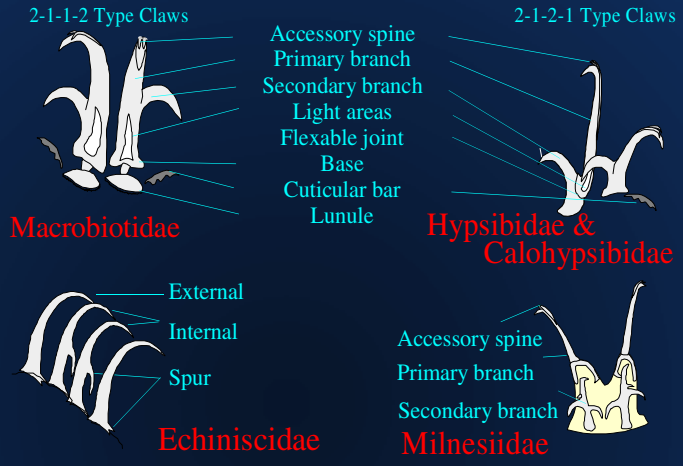
## Buccal apparatus



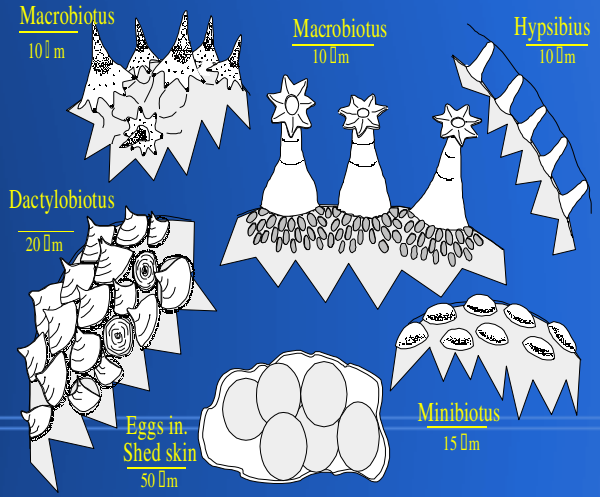

## Dorsal plates




## Claws




## Eggs fragments



# FEEDING

- The mouth of this predator has a wide opening, so the animal can eat rotifers and larger protists
- The tubular mouth is armed with stylets, which are used to pierce the plant cells, algae, or small invertebrates
- To eating the fluids or cell contents inside

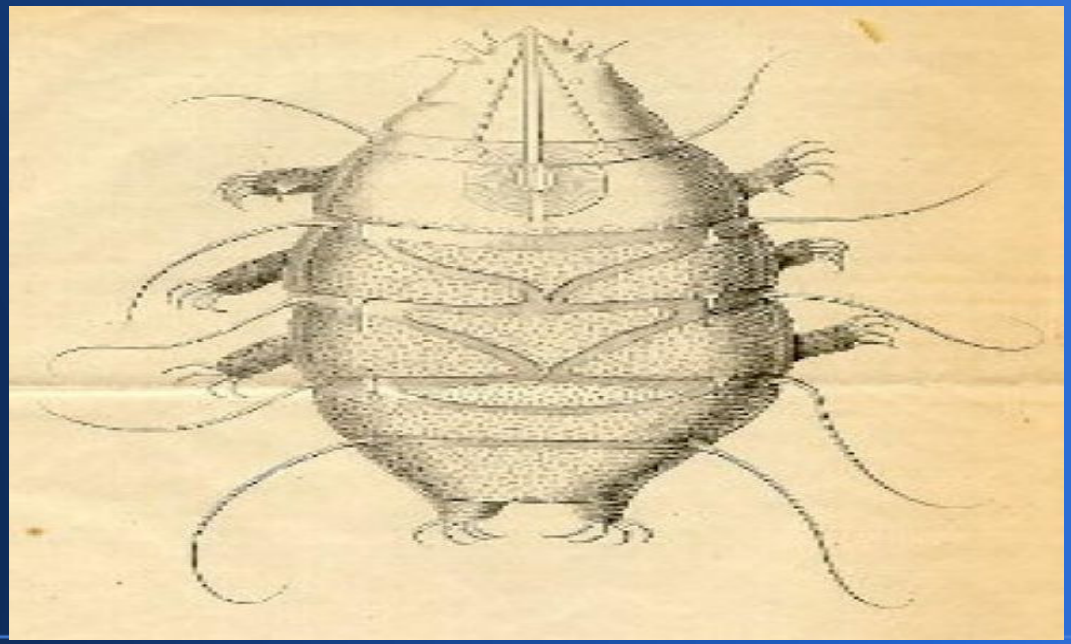
# REPRODUCTION

## Sexual:

- Males and females are usually present, each with a single gonad located above the intestine
- Tardigrades are oviparous, and fertilization is usually external.
- Mating occurs during the molt
- The eggs hatch after no more than 14 days

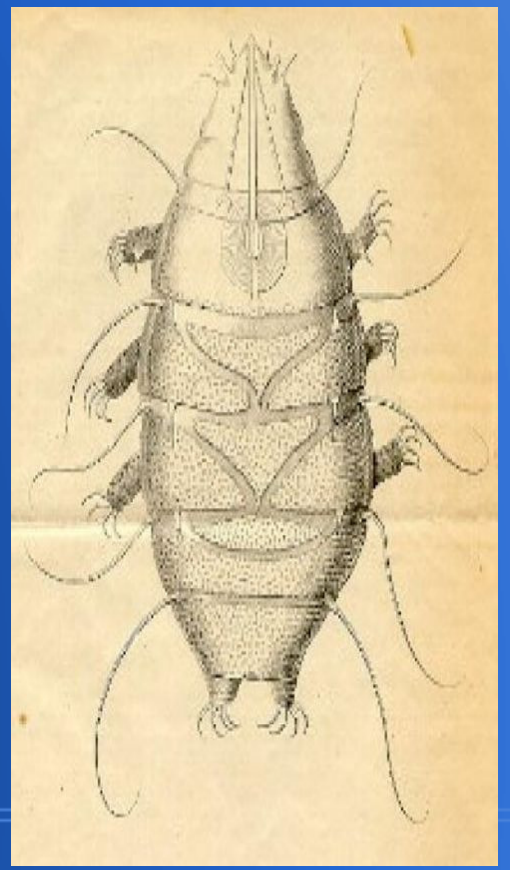
# EVOLUTON

- Relationship of tardigrades to other lineages of ecdysozoan animals.
- tardigrades most closely related to Arthropoda ± Onychophora and also nematodes.



# FOSSIL HISTORY

- Their fossilization is both difficult to detect and highly unlikely. The only known fossil specimens comprise some from mid-Cambrian deposits in Siberia and a few rare specimens from Cretaceous amber.



<u>Siberian tardigrades differ:</u>

- They have three pairs of legs rather than four
- have no posterior head appendages
- have a simplified head morphology

# LOCATION

## Normal

Moss

Lichen

Soil

Leaf Litter

Beach Sand

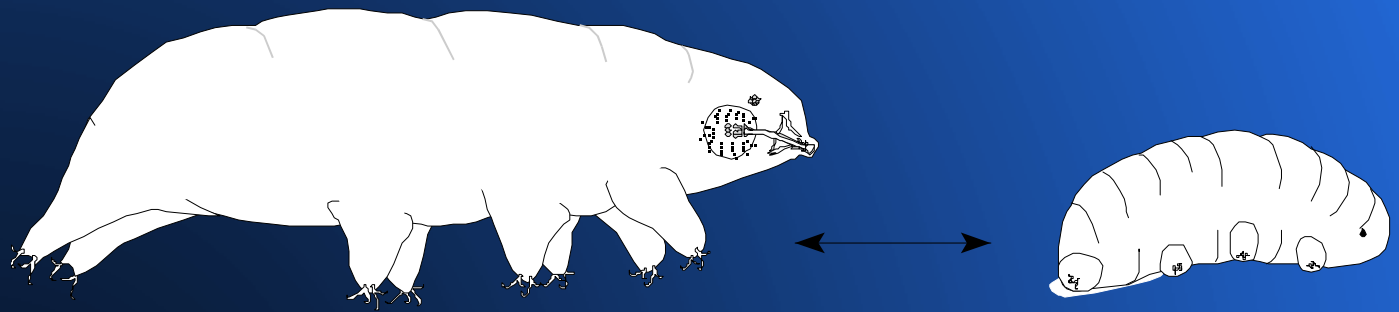
Marine Sediment

Fresh Water Algae

# EXTREMOPHILES

## CRYPTOBIOSIS:

Desiccation as environment dries Animal shrivels into a “Tun” Waits for moisture to return



# CONDITIONS

- Temperatures as high as 151 degrees Celsius (303.8℉) and as low as a few degrees from absolute zero (-272.8℃).
- Radiation 1000x that could kill a elephant
- Atmospheres of Pressure
- Excessive concentrations: $CO$, $CO_2$, $N_2$, $H_2S$
- Pure Vacuum (space)

# SPACE TRAVEL:

- In 2007 they sent tardigrades in space
- 10 days
- 2008 the European space agency did this and called it Tardis

# WHY?

- We just want to understand how they work (survive these environments)
- Test the panspermia hypothesis