BIO 152
Spring 2023
Final Project

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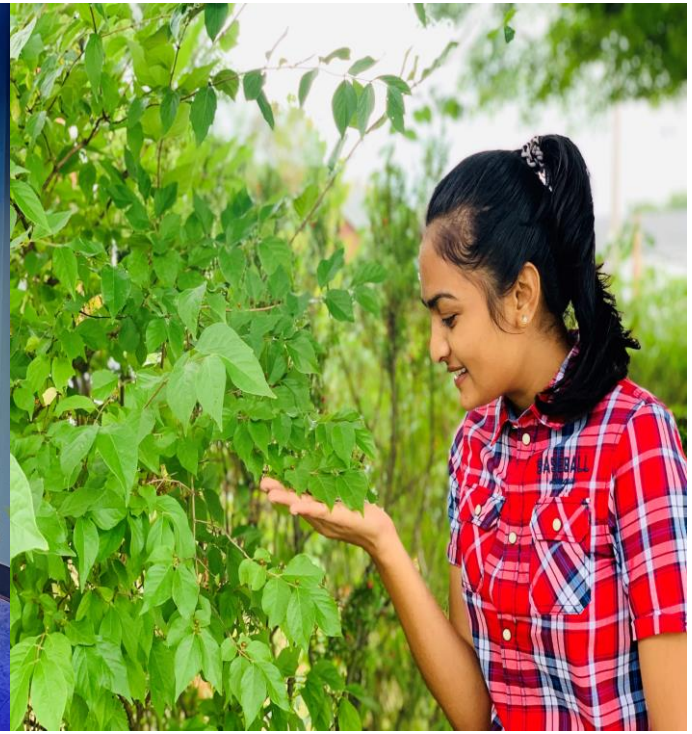
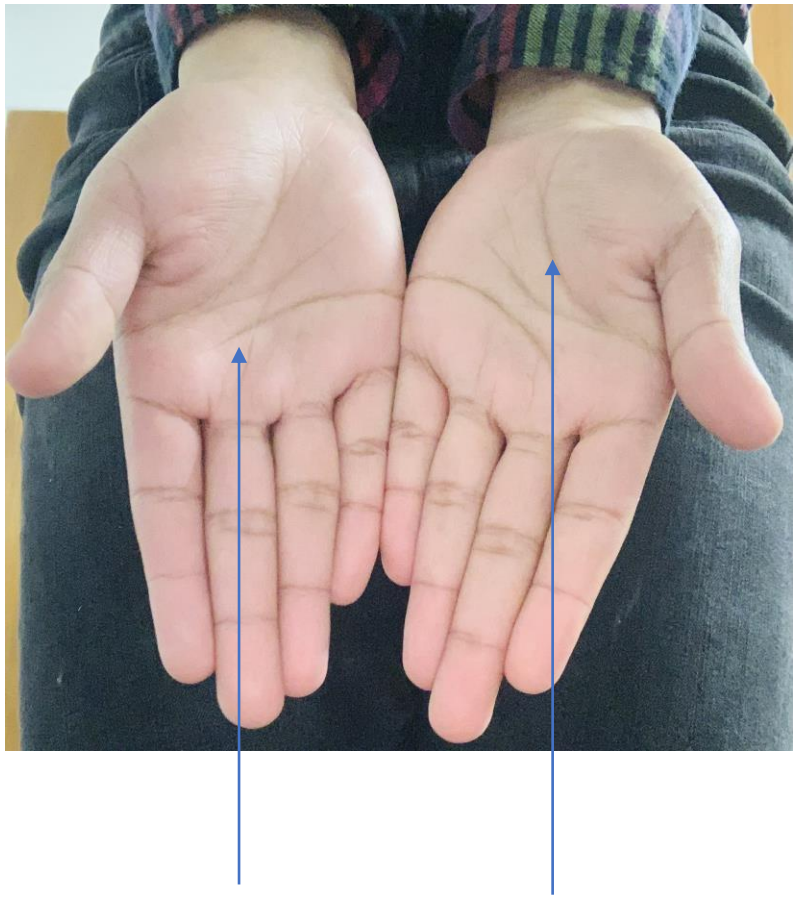


Slide 1 – Prokaryote

Bacterial habitat :

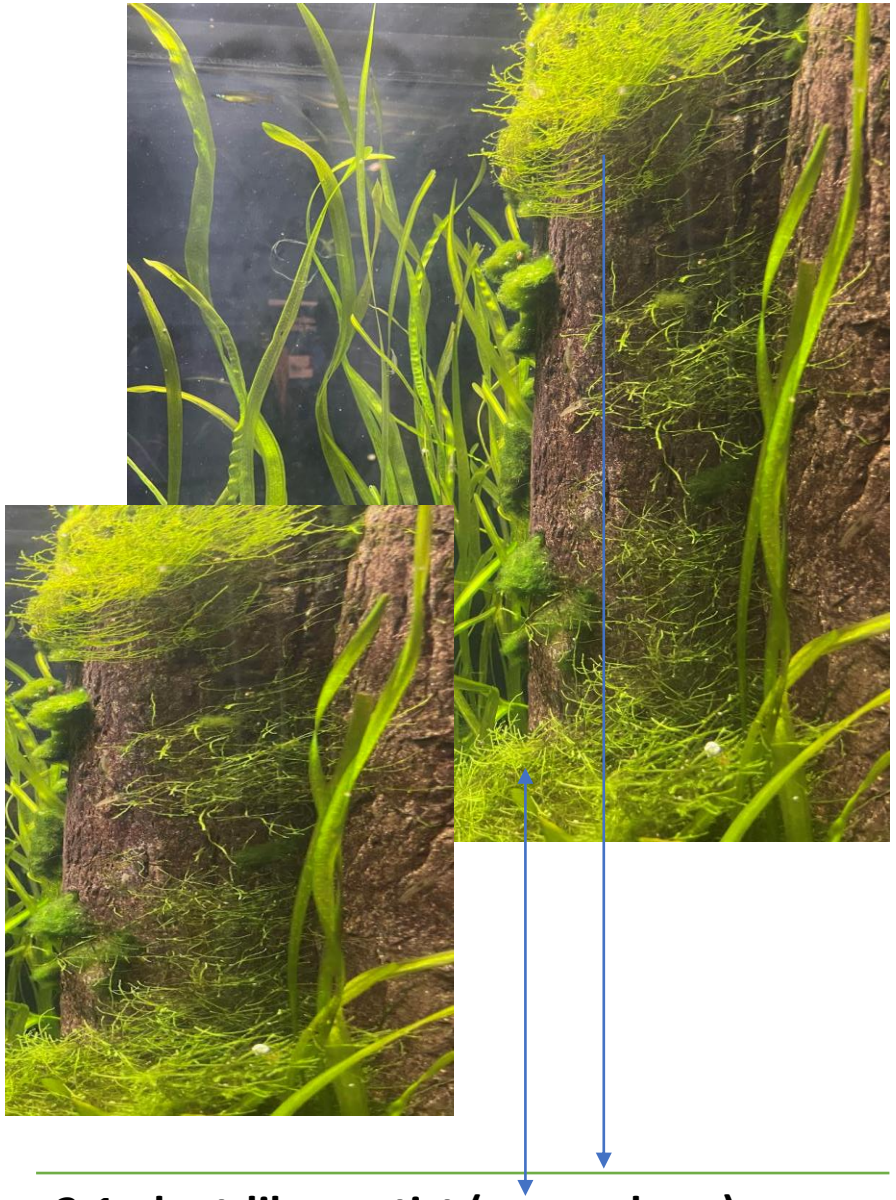
- **Domain**: Bacteria
- **Structural Adaptation**: have a cell wall
  - *It provides protection and helps them maintain their shape.*
- **Ecological Role**: symbiosis (commensalism)
- **Nutritional Mode**: Heterotrophs
  - *Bacteria obtain their nutrient by breaking down organic compounds from external sources. It may be saprophytic.*



1.1 Bacteria present in the hand

Slide 2 - Protist

- **Photosynthetic protist:**
- **Eukaryotic SuperGroup:** Archaeplastida
- **Nutritional Mode**: Photoautotrophs
- **Shared ancestral character:** Chloroplast
- **Structural Adaptation:** have chloroplast
- Chloroplast contains chlorophyll, a pigment that enables the protist to perform **photosynthesis.**
- **Adaptation:** The green algae have **cilia and flagella.(Motility)**
- *These structure helps to navigate through the water (locomotion) and the survival of many protists in water.*



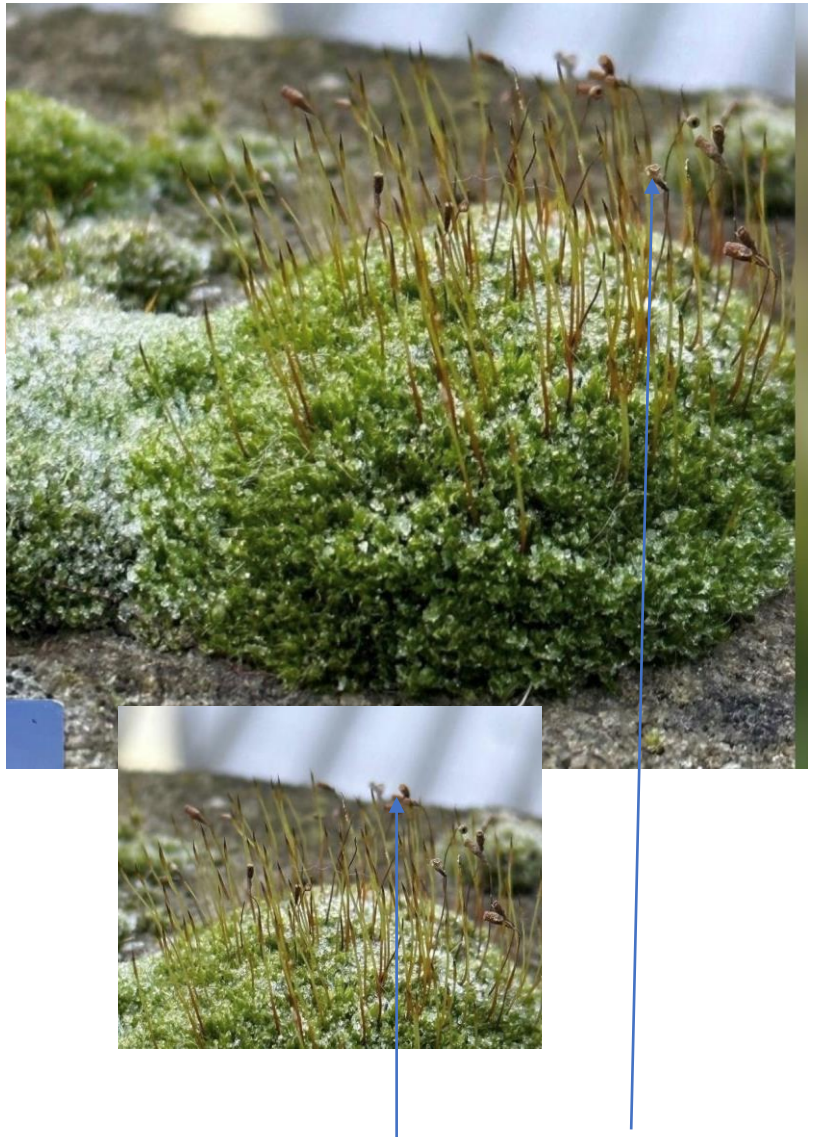
2.1 plant-like protist (green algae)

Slide 3 – Nonvascular or Seedless Vascular Plant

Sporophyte of a non - vascular plant :

Nutritional mode: photoautotrophs

- **From water to land -#1**
- **Challenge:** reproduction without water
- **Adaptation:** It has stomata for gas exchange. Grow out of Gametophyte archegonia.
- **From Water to Land - #2**
- **Challenge:** Exposure to UV radiation
- **Adaptation:** Its single-cell and multicellular rhizoids resemble root hairs.



3.1 Sporophyte of the plant

Slide 4 – Seed Plant

- A modified angiosperm sporophyll
- **Reproduction Adaption**: *Pollination*
  - *Solidago sempervirens have **bright yellow flowers** that are attractive to **insect Pollinators.***
- **Dispersal Adaption:** seed dispersal
- *Pollination by flowers and transport of seeds by butterflies or any animals are two important relationships. Animal attracts due to colorful petals and transfers the pollen grain and leading to Pollination.*
- *All seed plants are **heterosporous**, which produces **megaspores and microspores.***

A modified angiosperm

4.1 Solidago sempervirens

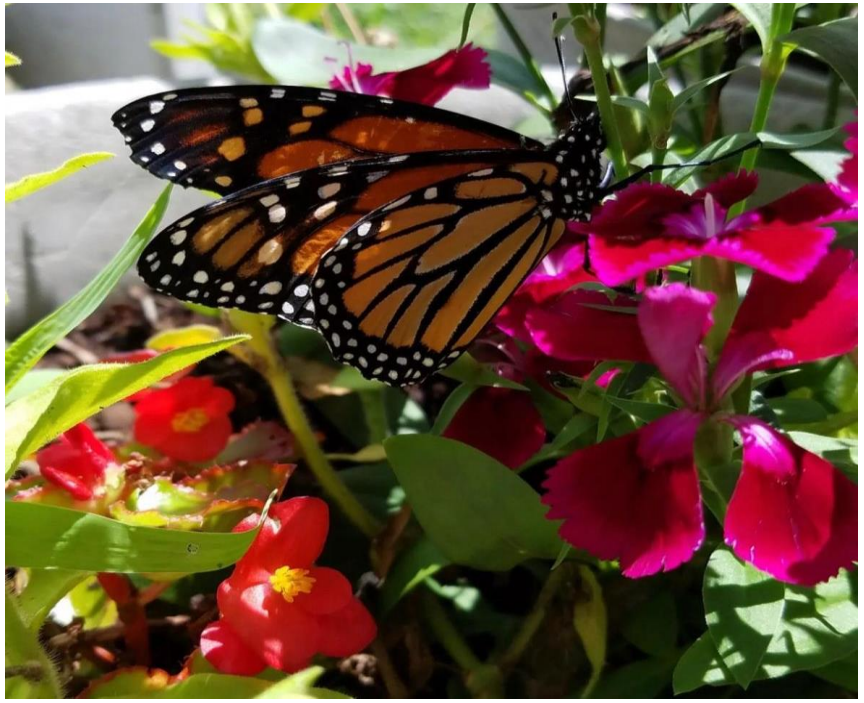
Slide 5 - Fungi

- **A unicellular fungi :**
- **Nutritional Mode:** Decomposers
- Fungus obtain nutrients from dead wood and plant materials, and, in this process, plays a vital role in **recycling organic matter** and returning nutrients to the soil.
- **Structural Adaptation: thicker cell wall**(made of the **Chitin**).
- *It's **circular and flat**, the cap is **reddish–brown**, and the gills are white to cream-colored.*
- **Strangest/Most Interesting Adaptation**: The fungus's (Basidiomycetes) ability to **create more spores**. Secondly, the surface area of the gills on the fungus allowed them to adapt.

5.1 Basidiomycetes (Club fungi)

Slide 6 - Invertebrate

- Insect Larvae that undergo complete metamorphosis
- Phylum: Arthropoda
- Nutritional Mode: Heterotrophic
- Adaptation: Monarch butterfly air sacs are an adaptation that gives them extra energy for activities with high metabolic needs, including flights.
- *The butterfly's air sacs enable It to inhale more air.*
- Adaptation: *The monarch butterfly has an **anterior antenna**. The **wing has both posterior and anterior yellow, black,** and white stripes that scare its predator away.*
- *The antenna helps to **sense odor.** The wings of a butterfly allow it to fly away from its predator and travel a long distance when migrating.*



6.1 Butterfly

Slide 7 - Vertebrate

- **A deuterostome :**
- **Phylum**: chordate
- **Shared Derived Character**: Muscular post-anal tail

- **Adaptation 1**: Maintaining homeostasis
- The kidneys excrete excess salt, allowing it to **maintain osmotic balance** in a semi-aquatic environment.
- **Adaptation 2**: Maintaining homeostasis
- The lungs allow them to extract oxygen from both water and air. When submerged, they can **extract oxygen** from the water using their **specialized lungs**, and when on land, they can breathe air.

7.1 Brackish water turtle

Slide 8 – Student Choice *(from Biodiversity List)*

- **A cordate with scales :**
- **Domain**: Eukaryote
- **Phylum:** Chordata
- **Shared ancestral character:** Triploblastic
- **Shared derived character:** Muscular, post-anal tail and a notochord
- **Adaptation:** Behavioral adaptation
- *The Gray squirrel shows behavioral adaptations in which squirrels avoid high sun temperatures by hiding under a shady place to avoid energy loss.*

Adaptation: Physical adaptation

- *Squirrels have sharp claws and teeth that help them climb trees and defend themselves against predators, and thick coats of fur that keep them warm in cold weather.*

8.1 Eastern Gray Squirrel

Slide 9: Darwin

Adaptation to the environment and natural selection :

- **Explanation:** Diamondback turtles have been allowed to survive in harsh conditions, which enhances the **chances of offspring**. This includes its flattened shell with diamond-shaped edges, a gland in its eyes, and natural selection The color changes observed in diamondbacks can be related to Darwin's concept of **natural selection** and provide a mechanism for the **development of new characteristics in a population.**

9.1 The diamondback terrapin turtle (Malaclemys terrapin)

Slide 10: Species Interaction –

Type of Interaction – *mutualism (+,+)* ***(Yucca Plants):***

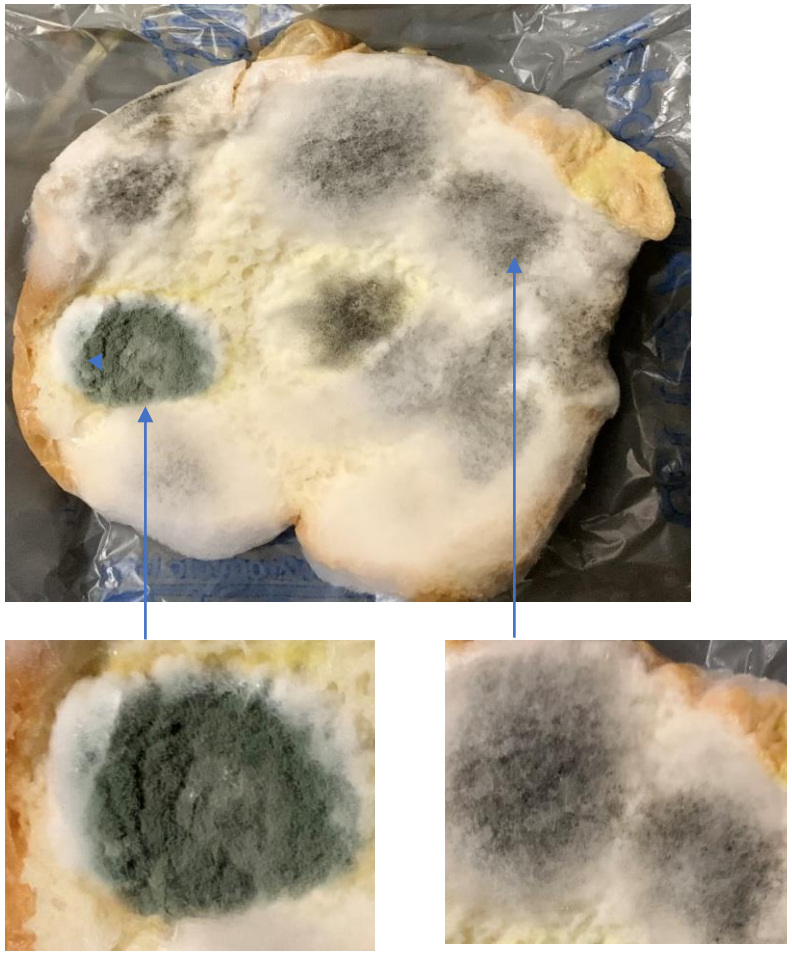
- The life of the yucca plant depends on yucca moths.
- Affect on species 1 – The yuca plant gets benefits from moth species from **pollination**, which helps with the reproduction of plants.
- Affect on species 2 – *The moth species benefitted from the yuca plant because the yuca plant serves as a **food source** for the moth, and the plant provides a suitable habitat for the moths to **lay their eggs**.*
- *If one species were going **to extinct**, the other one can be **affected.** If the yucca plant were going to extinct, the moth species would **lose an important food source**, and the habitat available for **laying their egg** would also be reduced. Also, if the moth species were going to extinct, the **yuca plant** would **lose important pollinators**.*

10.1 Interaction of moth and yucca plant

Slide 11: Ecological Role – *choose 1*

Decomposer :

- *It breaks down the large particle and then absorbs it.*
- **This organism's nutrition mode- chemo - heterotropic**
- **This organism's trophic level** – *decomposer*
- *One adaption that specifically allows penicillium mold to carry out its role as a **decomposer** is its ability to produce and secrete enzymes that **break down complex organic compounds into simple forms**. Sporangia bulbs that can aim and shoots spores.*



11.1 Mucoromycetes :Black Bread mold(Rhizopus stolonifera)

Slide 12: Student Choice

Sporophyte of a vascular plant :Ferns

- **Course Content** – The nutritional mode of the fern plant is a **photoautotroph**. Ferns are **homosporous**, which produces one type of sore from the bisexual gametophyte. They are getting challenges while moving on land, which are,
- ***A.*** Reproduction without water
- ***B.*** Exposure to UV radiation
- **Explanation**-On land, ferns develop specialized structures such as **spores and gametophytes** to allow them to reproduce and disperse their offspring. The male and female gametophyte fuse and then produce **sporophytes (2n)**, which grows into a mature fern plant.

12.1 ferns