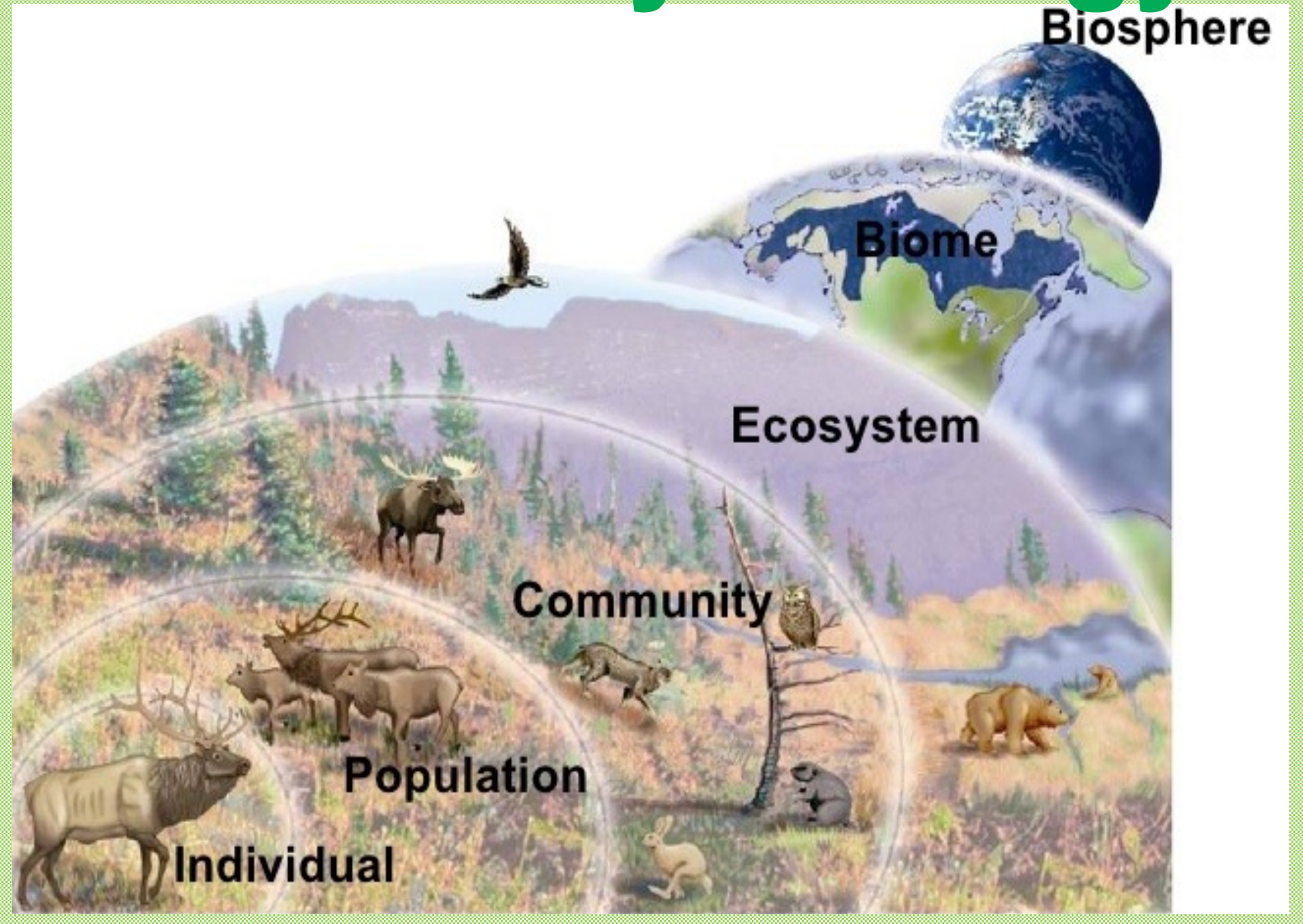
Community Ecology



Learning Objectives

- Understand community structure and attributes.
- Explain the factors influencing the structure of communities.
- Explain the community dynamics.
- Know how to calculate the species diversity.

Community

- Number of species
- Relative abundance, diversity, richness, dominance of species
- Nature of species interactions (e.g. food webs)
- Physical structure

Community structure

- Species richness (# of species within community)

Table 1. Avifaunal Species Richness in a Vegetated Area.	
Species	**# of individuals**
Aplonis panayensis	23
Copsychus saularis	13
Muscicapa	8
Erythropitta erythrogaster	20
Hirundo tahitica	30
Nectarinia jugularis	35
6	129

Community structure

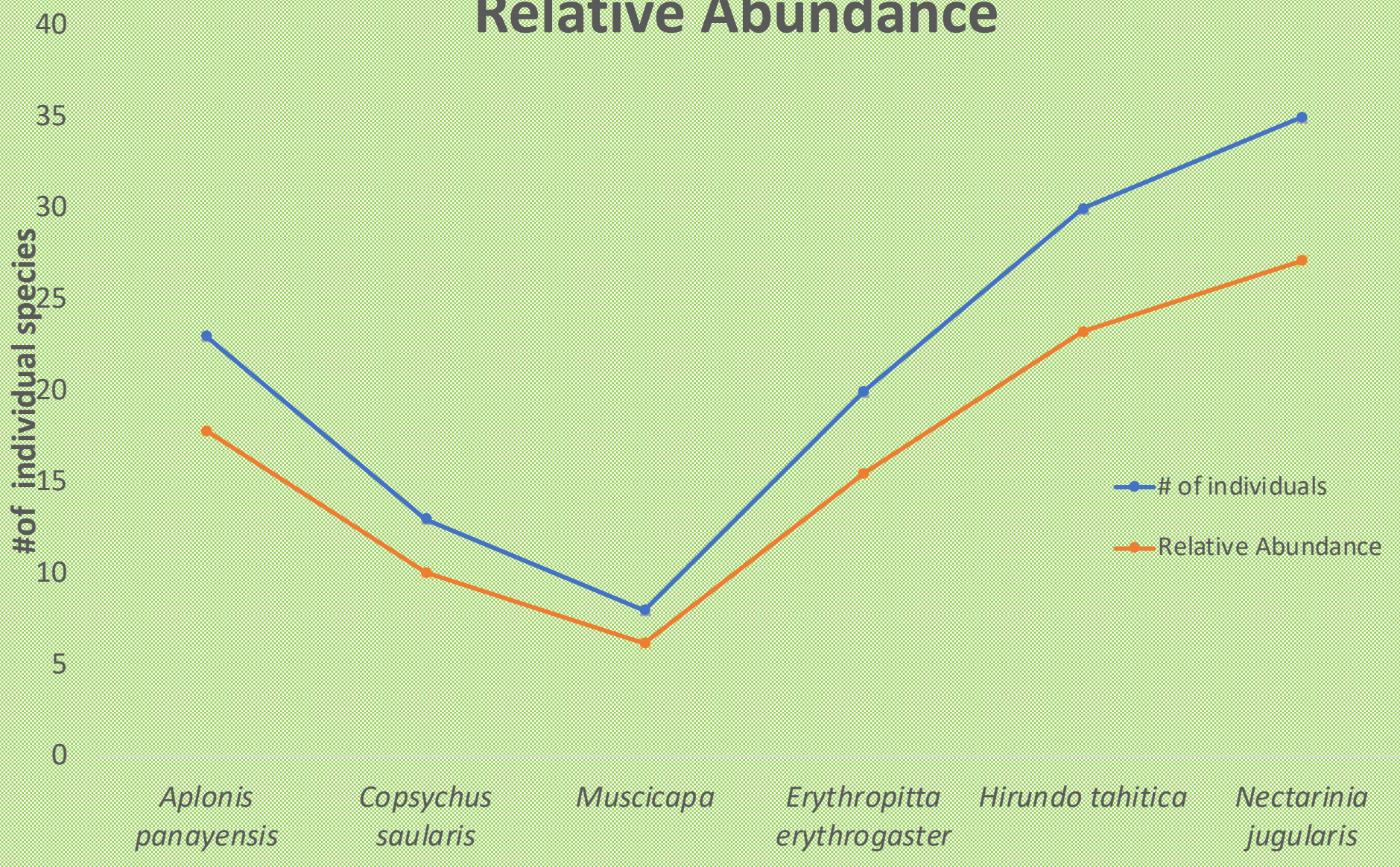
- Relative abundance (% each species contributes to the total number of individuals)

Species	# of individuals	Relative Abundance
Aplonis panayensis	23	17.83
Copsychus saularis	13	10.08
Muscicapa	8	6.20
Erythropitta erythrogaster	20	15.50
Hirundo tahitica	30	23.26
Nectarinia jugularis	35	**27.13**
6	129	100.00

Species diversity

- measure of the diversity within an ecological community that incorporates:
  - **species richness** (the number of species in a community)
  - **evenness of species** (relative abundance)
  - Species diversity is one component of the concept of biodiversity.

Relative Abundance



Shannon-Weiner Diversity Index

- Shannon-Wiener Index denoted by

$H' = -\text{SUM}[(p_i) \times \ln(p_i)]$ where

- SUM = summation
- p_i = proportion of total sample represented by species i (Divide no. of individuals of species i by total number of samples)
- S = number of species, = species richness
- Hmax = ln(S) Maximum diversity possible
- E = Evenness = H/Hmax

$$H' = -\sum_{i=1}^{s} (p_i)(\ln p_i)$$

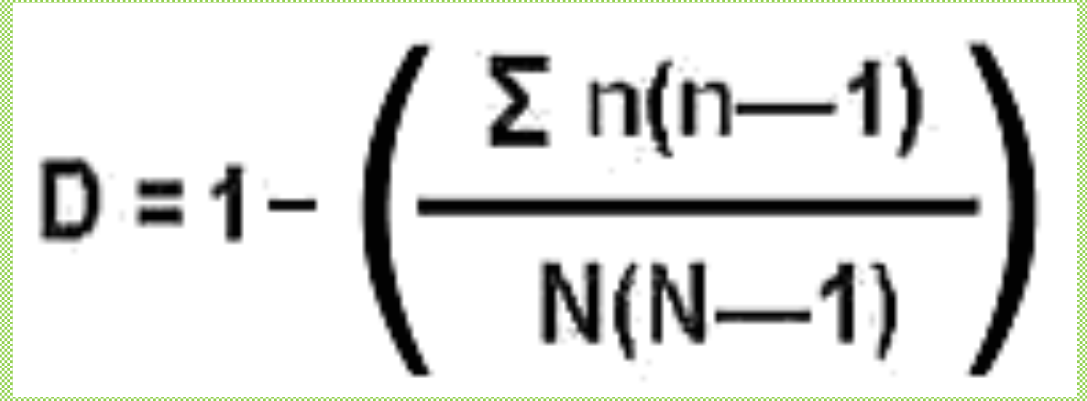
Interpretation: “Varies from zero (0) for communities with only a single species to one (1) for communities with many species, each with few individuals."

Shannon-Weiner Diversity Index

- sensitive to change in status of rare species
- High values of ***H***-representative of more diverse communities.
- 2.5 – 3.0 is the generally accepted range of good biodiversity in the community
- community with only 1 species would have an **H value of 0** because **pi** would equal 1 and be multiplied by **ln pi** which would **equal zero**
- If the species **are evenly distributed then the H value would be high**.
- ***H value*** **-**know not only the number of species but how the abundance of the species is distributed among all the species in the community

Simpson’s Diversity Index

- A community dominated by one or two species
  - to be less diverse than one in which several different species have a similar abundance



Interpretation of SI Data

- Simpson's Index:
  - Ranges from zero (0) (*all species are equally present*) to one (1) (one species dominates the community completely)

Simpson’s diversity index

Table 2. Avifaunal Simpson's Diversity Index in a Vegetated Area.		
Species	**# of individuals (n)**	**n(n-1)**
Aplonis panayensis	23	506
Copsychus saularis	13	156
Muscicapa	8	56
Erythropitta erythrogaster	20	380
Hirundo tahitica	30	870
Nectarinia jugularis	35	1190
6	**129**	**16512**

End of Presentation

Philippine Biodiversity

- Choose a flora/fauna species present in the Philippines and create an infographic about it.
- Format
  - Introduction
  - Population rate
  - Habitat
  - Ecological uses
  - Threats
  - Conservation Status
  - Conservation program
  - References
  - Maximum of 2 pages only
  - Submit in a pdf copy

Note: Your group will present the output on October 9, 2023 (Monday)

Midterm Coverage: October 16,2023

- Environmental Education
- Ecosystem
- Energy Flow in an Ecosystem
- Biogeochemical Cycles
- Population Ecology
- Community Ecosystem
- Biomes of the Earth
- Philippine Biodiversity