

# Definisi EKOLOGI

- *Oekologie* (Jerman):
- *Oikos-Yunani* (= berarti rumah/tempat tinggal) dan *Logos* (= berarti ilmu tentang, pengetahuan),
- Ekologi secara harfiah berarti *ilmu yang mempelajari lingkungan tempat tinggal suatu makhluk hidup.*

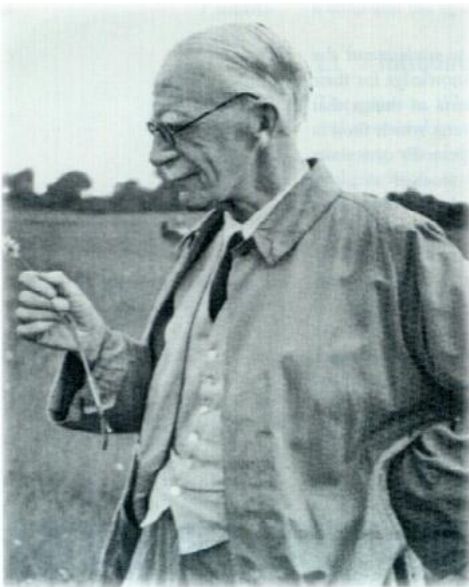
# PRETEST

- Ekologi
- Gen
- Komunitas
- Evolusi
- Poikiloterm
- Koevolusi
- r species
- Aestivasi
- Hymenoptera
- Arrhenotoki
- Diapause

- 0812 110 5362
- 0811199778
- Email: [dami@indo.net.id](mailto:dami@indo.net.id)
- dbuchori@tnc.org

# Berbagai Definisi Ekologi

- **Ernst Haeckel (1866)**, *Ekologi adalah ilmu komprehensif yang mempelajari hubungan antara organisme dan lingkungannya*
- **Burdon–Sanderson (1893)**, *ekologi adalah ilmu yang mempelajari relasi/ hubungan eksternal antara tanaman dan hewan satu sama lain, serta keberadaannya pada masa lampau dan saat ini. Relasi eksternal tersebut untuk membedakan dengan fisiologi (relasi internal) dan morfologi (struktur).*



- a. Tansley
- b. Clements
- c. Elton

- *Tansley, 1904 (pure science): hubungan tanaman dengan lingkungannya dan dengan tanaman lain dimana secara langsung dipengaruhi oleh perbedaan habitat diantara tanaman (struktur dan fungsi)*
- *Elton, 1927 (applied science): ilmu yang mempelajari organisme (hewan) dengan kaca mata sosiologi dan ekonomi, (bukan dilihat dari struktur dan adaptasi saja)*

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- **Andrewartha** (1961) *pengetahuan ilmiah mengenai distribusi dan kelimpahan suatu organisme.*
- **Krebs** (1972) memperjelas definisi ekologi: *pengetahuan ilmiah mengenai interaksi yang menentukan distribusi dan kelimpahan suatu organisme, (ekologi adalah mengenai dimana organisme ditemukan, berapa jumlahnya dan mengapa)*

- **Ricklefs (1973)** dalam buku teksnya mendefinisikan *ekologi sebagai ilmu lingkungan alam, terutama mempelajari hubungan mendalam antara organisme dengan lingkungan sekitarnya*

# Pendekatan

- Proximate : How
- Ultimate : Why

## TUJUAN MEMPELAJARI EKOLOGI:

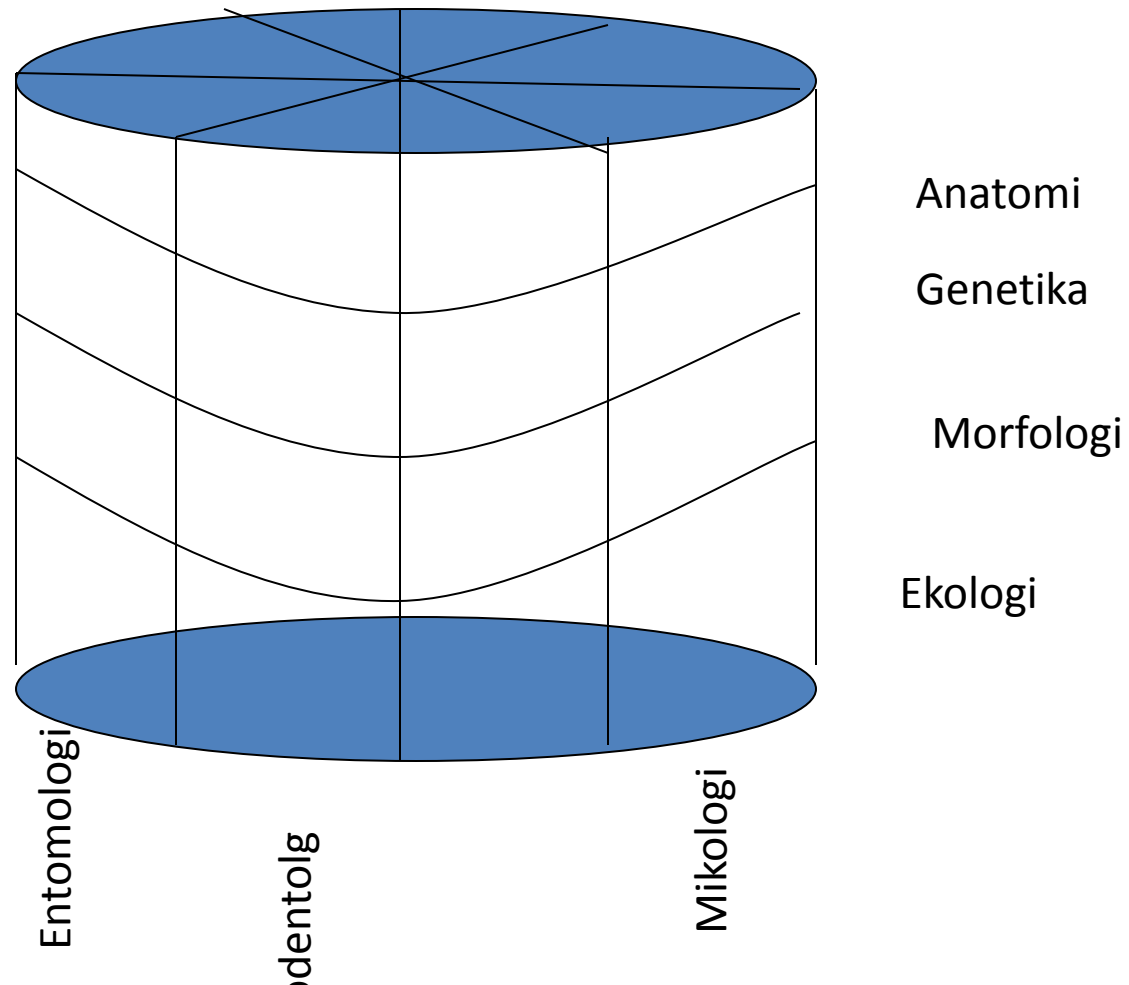
1. Mengapa suatu organisme ada disuatu tempat/tidak ada ditempat lain?
2. Mengapa: banyak vs sedikit



# EKOLOGI

- Ingin mengerti dan menerangkan distribusi dan kelimpahan suatu organisme –serta:
- Menjelaskan mengapa hal tersebut dapat terjadi (sejarah)

# Cakupan (scope) dan Ranah (domain) Ekologi



# JENJANG KEHIDUPAN YANG KOMPLEKS



# Different ways of approaching the study of Ecology

- Concept/Perspective:
  - Landscape
  - Ecosystem
  - Physiological
  - Population
  - Behavioural
  - Community
  - Others
- Skala ruang:
  - Distribusi
- Skala waktu:
  - Evolusi



# Approaches (Con't)

- Organism:
  - Plant
  - Animal
  - Microbe
  - Zooplankton
  - Human
  - Deer
  - Etc
- Application:
  - Theoretical
  - Conservation
  - Agriculture
  - Public Policy
  - Academic
  - Management
  - Restoration

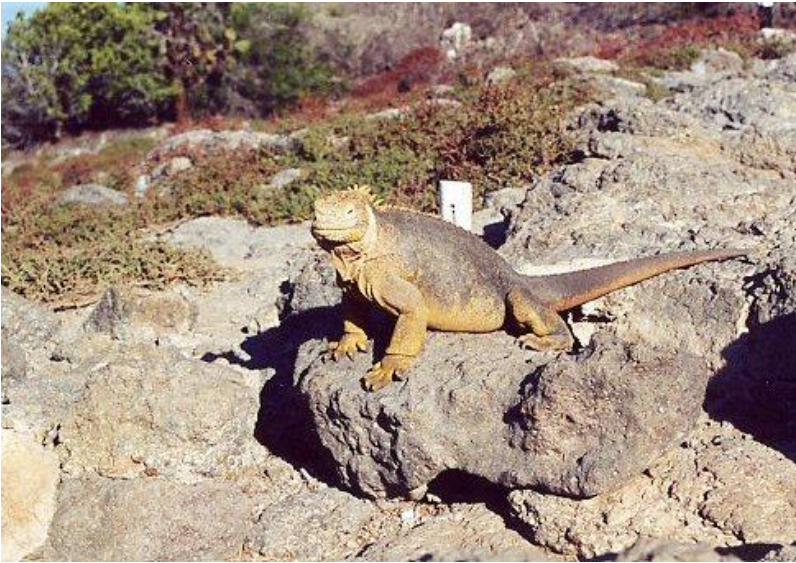
# Approaches (con't)

- Habitat
  - Terrestrial
  - Limnology
  - Marine/oceanography
  - Arctic
  - Rainforest
  - Urban
  - others

# Dalam Kuliah ini:

- Ecosystem Ecology
- Physiological Ecology
- Behavior Ecology
- Population Ecology
- Community Ecology
- Landscape Ecology
- Applied Ecology

Different kinds of Ecology are Different ways of looking at organisms in an environment



Different kinds of ecologists ask different questions about this scene.



- Landscape ecologist: how does the two dimensional pattern of forest, field, and farm buildings affect the ability of deer to move from one forest patch to another?
- Ecosystem ecologist: In this watershed, how much phosphorus is stored in the soil of the forest and fields, how much is applied to the fields each year, and how much moves annually into the stream?
- Physiological ecologist: Is the local climate optimal for the genetic strain of the corn growing in the fields?

- Behavioural ecologist: How does the size, condition and age of male redwing blackbirds affect their ability to defend breeding territories along the stream bank, and how in turn does this impact their breeding success?
- Population ecologist: What factors control the size of the trout population in the stream?
- Community ecologist: How many species of native plants and insects live in the woodlot, and are there enough pollinators to maintain the plant diversity?

# Serangga

- Diversity: 29 Orders (excluding Collembola, Diplura, Protura):  
1,004,808
- Ecological Role:
  - Biological foundation of terrestrial ecosystems
  - Cycle nutrients
  - Pollinate plants
  - Disperse seed
- Maintain soil structure and fertility
- Control populations
- Food source for other taxa
- Vectors of disease

# Effects on natural Resources, agriculture and human health

- Less than 1-2% OF phytophages insects that are potential pests ever achieve the status of minor pests
- However, those that do: have devastating effect: wereng coklat, penggerek, kutu kebul
- Vectors of plant disease
- Vectors of human disease:
  - demam berdarah,
  - malaria, (1-3 jt/thn deaths)
  - sleeping sickness
- Ecological services (annual value \$57 billion)

# INSECTS and ADVANCES in SCIENCE

Provide insights in

- Biomechanics
- Climate Change
- Developmental Biology
- Ecology
- Evolution
- Genetics
- Paleolimnology
- Physiology

- **Biomechanics:**

- Insect cuticle, with its plywood structure, is a laminated composite material,
- Mata:optik
- Gerakan tungkai: robotic