# Concept of Species

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# Concept of Species

- "Species are often defined as a group of individuals with similar characteristics, where they can interbreed to produce fertile offsprings."
- The species, as we know, is the fundamental unit of taxonomic hierarchy. Davis (1978) called them 'Building bricks' in Biological classification.
- It is the lowest category of hierarchy and according to Stebbins (1977) is the basic unit of evolutionary process.

# Concept of Species Types

## 1. Nominalistic Species Concept

- It believes that “Nature produces individuals and nothing more”. (Linneaus species concept).
- These concepts do not have any scientific basis.
- It believes that the species have been invented to be referred to big numbers of individuals jointly. During the 18th century in France, this concept was in demand and even now is used by some botanists.

# Concept of Species Types

## 2. Typological or Taxonomic species concept

- In this concept, there is a fixed number of varieties of living organisms that exist on earth.
- These types do not exhibit any relationship with each other. Such varieties are termed as species.
- This variation is regarded as an insignificant and irrelevant phenomenon.

# Concept of Species Types

## 3. Biological Species Concept

- In the middle of the 18th century, a fresh concept called the biological species concept appeared.
- This concept was acknowledged in the later half of the nineteenth-century once Darwin's "Origin of Species" was published (in 1859).
- This is also known as Newer Species concept.
- Mayr supported this concept. As per this concept, "a species is a group of interbreeding natural population that is reproductively isolated from other such groups".

# Concept of Species Types

## 4. Ecological Species Concept

- It was suggested by L. Van Valen in 1976.
- According to it, species is “A group of individuals maintained ecologically but not reproductively”.
- The species concept kept on changing from time to time.
- Ernst Mayr 1963 stressed that the non-breeding of natural populations rather than the sterility of individuals be taken as the decisive species criterion.

# Concept of Species Types

## 5. Evolutionary Species Concept

- **Simpson (in 1961)** had defined it as “an evolutionary species is a lineage (an ancestral- descendant sequence of populations) evolving separately from others and with its own unitary evolutionary role and tendencies”.
- **Wiley (in 1978)** had provided a revised definition of the evolutionary species concept. He stated that “an evolutionary species are a single lineage of ancestral-descendant population which draws its identity from other such lineages and has its own evolutionary tendencies and historical fate”.

# Concept of Species Types

## Current Species Concepts

### A. Morphological Species Concept:

- Morphologic species or Morphospecies concept is also called as classical phenetic species concept or Linnaean or classical species concept.

**The concept suggests that**

(a) Species are the smallest groups that are consistently and persistently distinct and distinguishable by ordinary means.

(b) Species is easily recognized kind of organisms, and in macroscopic plants and animals their recognition should rest on simple gross observation (May be with hand lens only).

(c) A species is a community of a number or related communities, where distinctive morphological characters are one in the opinion of a competent systematist.

# Types of Species

## (i) Allopatric species

### (Gk. allos = other, patris = native land)

- The two or more related species that have disjunct geographical ranges are called allopatric species.
- Examples of such species are Indian lion (Panthera leo persica) and African lion (Panthera leo leo).

## (ii) Allochronic species

### (Gk. syn = with, time)

- Species belonging to different time period or era

# Types of Species

## (iii) Sympatric species
### (Gk. syn = with, together)

- In biology, two related species or populations are considered sympatric when they exist in the same geographic area and thus frequently encounter one another.
- An initially interbreeding population that splits into two or more distinct species sharing a common range exemplifies sympatric speciation.

## (iv) Synchronic species
### (Gk. syn = with, Time)

- Species belonging to same time period or era

# Types of Species

## (v) Parapatric species

- These are the species which have the geographical ranges with a very narrow region of overlap.
- Example of this type is the flightless Australian grasshoppers, Moraba scurra and M. viatica.

## (vi) Sibling Species

- Sibling species are any of the two or more related species that are morphologically nearly identical but are incapable of producing fertile hybrids.
- Sibling species can only be identified by genetic, biochemical, behavioral, or ecological factors, and are thought to have become divergent very recently.

# Types of Species

## (vii) Cryptic species

- **The species which are identical on the basis of observed features but are genetically and sexually they are different are cryptic species.**
- **There is a confusion between the terms sibling species and cryptic species.**
- **The cryptic species are incapable of interbreeding but the sibling species can interbreed and are incapable of producing fertile hybrids.**

## (viii) Monotypic species

- When a genus includes a single species but does not include any subspecies, e.g., Vampyroteuthis, a vampire squid which is a single monotypic genus and also contains a single species, V. infernalis (monotypic species).
- Blackwelder (1967) states that the species with a single subspecies, called monotypic species.

# Types of Species

## (ix) Polytypic species

- When a species contains two or more subspecies, it is called polytypic species. Examples are tiger, Panthera tigris which has several subspecies; such as—
- (i) Indian tiger, Panthera tigris tigris,
- (ii) the Chinese tiger, P. t. amoyensis,
- (iii) the Siberian tiger, P. t. altaica,
- (iv) the Javan tiger, P. t. sondaica, etc.

# Types of Species

## (x) Endemic species

- The species which are found in a particular region, called endemic species.
- Usually the species of oceanic islands which are found in a limited geographic area are called endemic species.
- The Darwinian finches are the endemic species of Galapagos Islands.
- The lungfish, Neoceratodus forsteri occurs in Mary and Burnett rivers of Queensland in Australia, is an example of endemic species.

## (xi) Transient species

- Species among contemporaneous organisms, fossil or recent, called transient species (Imbrie, 1957). Blackwelder (1967) has defined that the species are the ones existing contemporaneously, as a cross section of the lineages of evolutionary species.