

Medical Academy named after S.I. Georgievsky



SPECIES AND ITS CRITERIA

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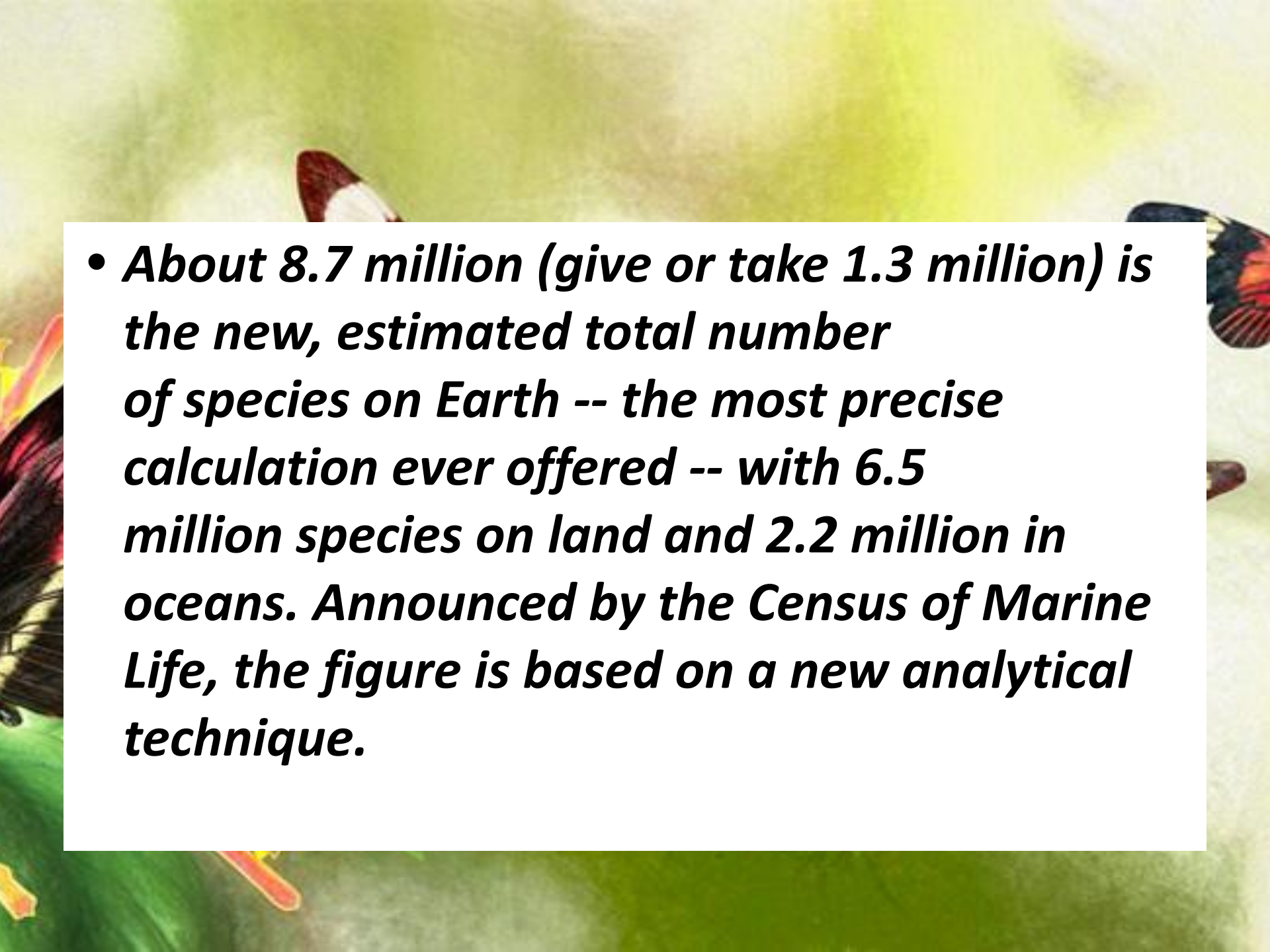
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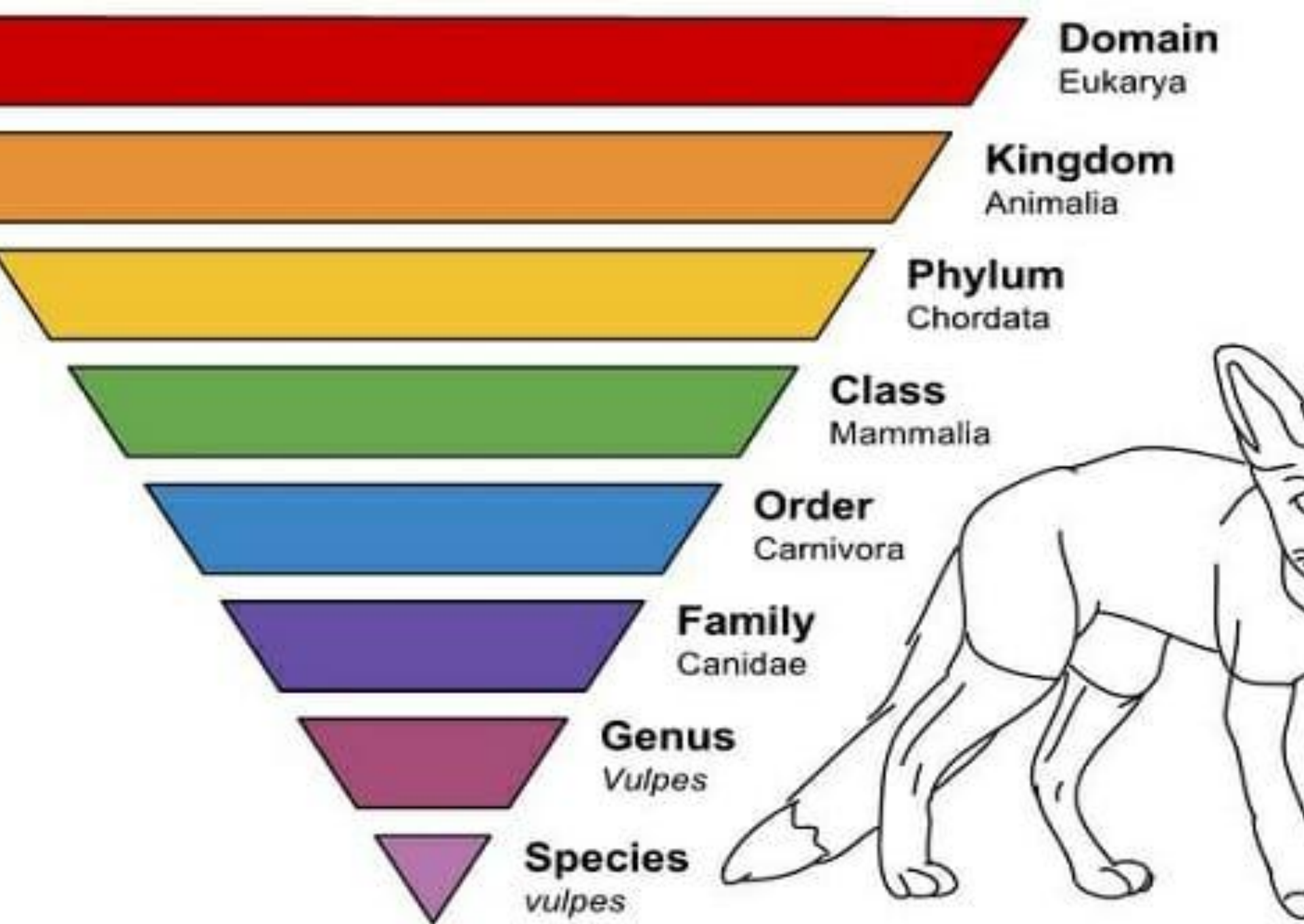
SCIENTIFIC LEADER: SVETLANA SMIRNOVA

The background features several monarch butterflies in flight against a light blue sky. A large green rectangular box is overlaid on the image, containing text. The text 'WHAT IS A' is visible on the left side of the box, and 'P' is visible below it. The main text is a bulleted list defining biology and species.

WHAT IS A

- **BIOLOGY**
- a group of living organisms consisting of similar individuals capable of exchanging genes or interbreeding. The species is the principal natural taxonomic unit, ranking below a genus and denoted by a Latin binomial, e.g. *Homo sapiens*.

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- The background of the slide features a soft-focus image of several butterflies in various colors, including red, black, and white, set against a light green and yellowish background. The butterflies are scattered across the frame, with some appearing more prominently than others.
- ***About 8.7 million (give or take 1.3 million) is the new, estimated total number of species on Earth -- the most precise calculation ever offered -- with 6.5 million species on land and 2.2 million in oceans. Announced by the Census of Marine Life, the figure is based on a new analytical technique.***



Domain
Eukarya

Kingdom
Animalia

Phylum
Chordata

Class
Mammalia

Order
Carnivora

Family
Canidae

Genus
Vulpes

Species
vulpes

Red fox (*Vulpes vulpes*)

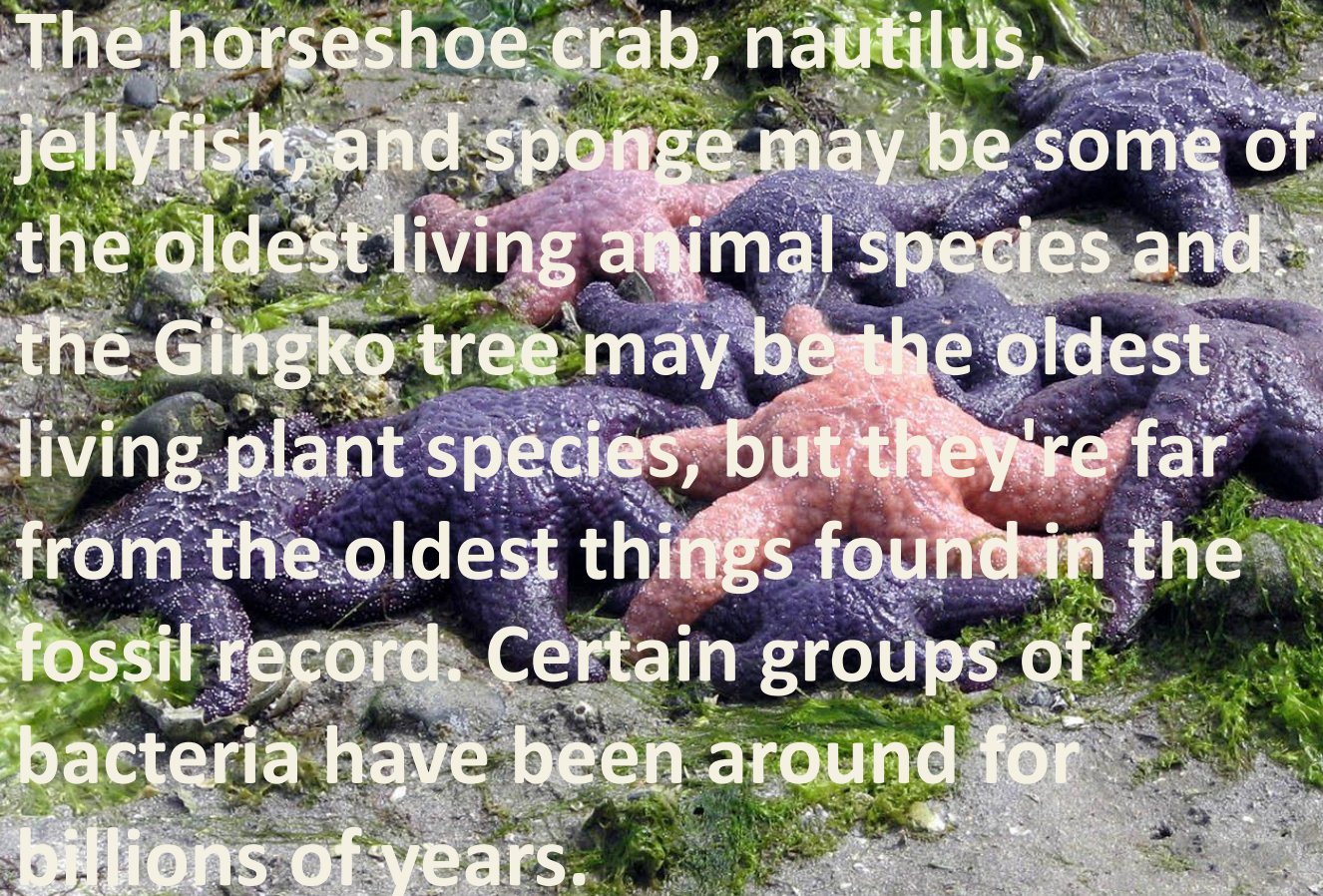
Name of the species concept/criterion	Definition of the species	Major contributor(s)	Refs.
Interbreeding species concept [forms the basis for the General (metapopulation) Lineage Concept]	A group of potentially interbreeding populations	Wright (1940); Mayr (1942); Dobzhansky 1950	175–177
Isolation species concept ^a [often called the biological species concept]	A group of potentially interbreeding populations that is reproductively isolated from other such groups	Poulton (1904); Mayr (1942); Dobzhansky (1970)	177–179
Phenetic species concept	A group that forms a phenetic cluster (quantitative difference)	Sokal and Crovello (1970)	180
Ecological species concept	A group that shares the same niche or adaptive zone	Van Vaalen (1976)	181
Evolutionary species concept ^a [corresponds closely to the General (metapopulation) Lineage Concept]	A lineage (i.e., an ancestral-descendant sequence of populations) evolving separately from others and with its own evolutionary role and tendencies	Simpson (1951); Wiley (1978)	182, 183

A vibrant underwater scene featuring a large school of colorful fish, including various species of cichlids, swimming over a rocky seabed. The water is clear and blue, with sunlight filtering through, creating a bright and lively atmosphere. The fish display a variety of colors, including blues, yellows, and oranges, with some having distinct patterns and stripes.

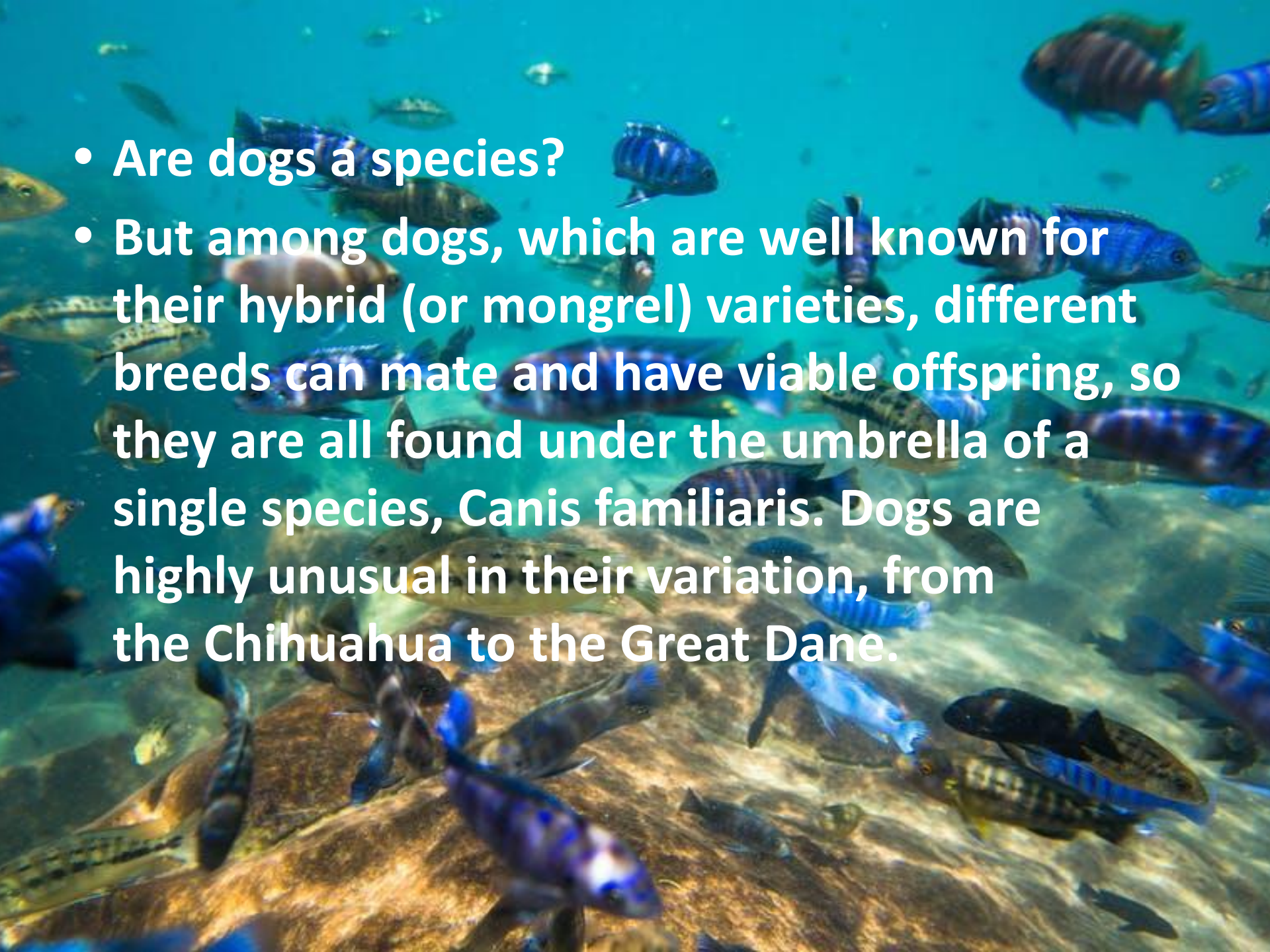
FOR EXAMPLE:

- Humans (*Homo sapiens*), moose (*Alces alces*), black bears (*Ursus americanus*), jack pines (*Pinus banksiana*) are all examples of different species.

OLDEST LIVING SPECIES:

A photograph of several sea stars on a rocky shore. The sea stars are in various colors, including purple, pink, and orange. They are surrounded by green seaweed and rocks. The text is overlaid on the image.

The horseshoe crab, nautilus, jellyfish, and sponge may be some of the oldest living animal species and the Ginkgo tree may be the oldest living plant species, but they're far from the oldest things found in the fossil record. Certain groups of bacteria have been around for billions of years.

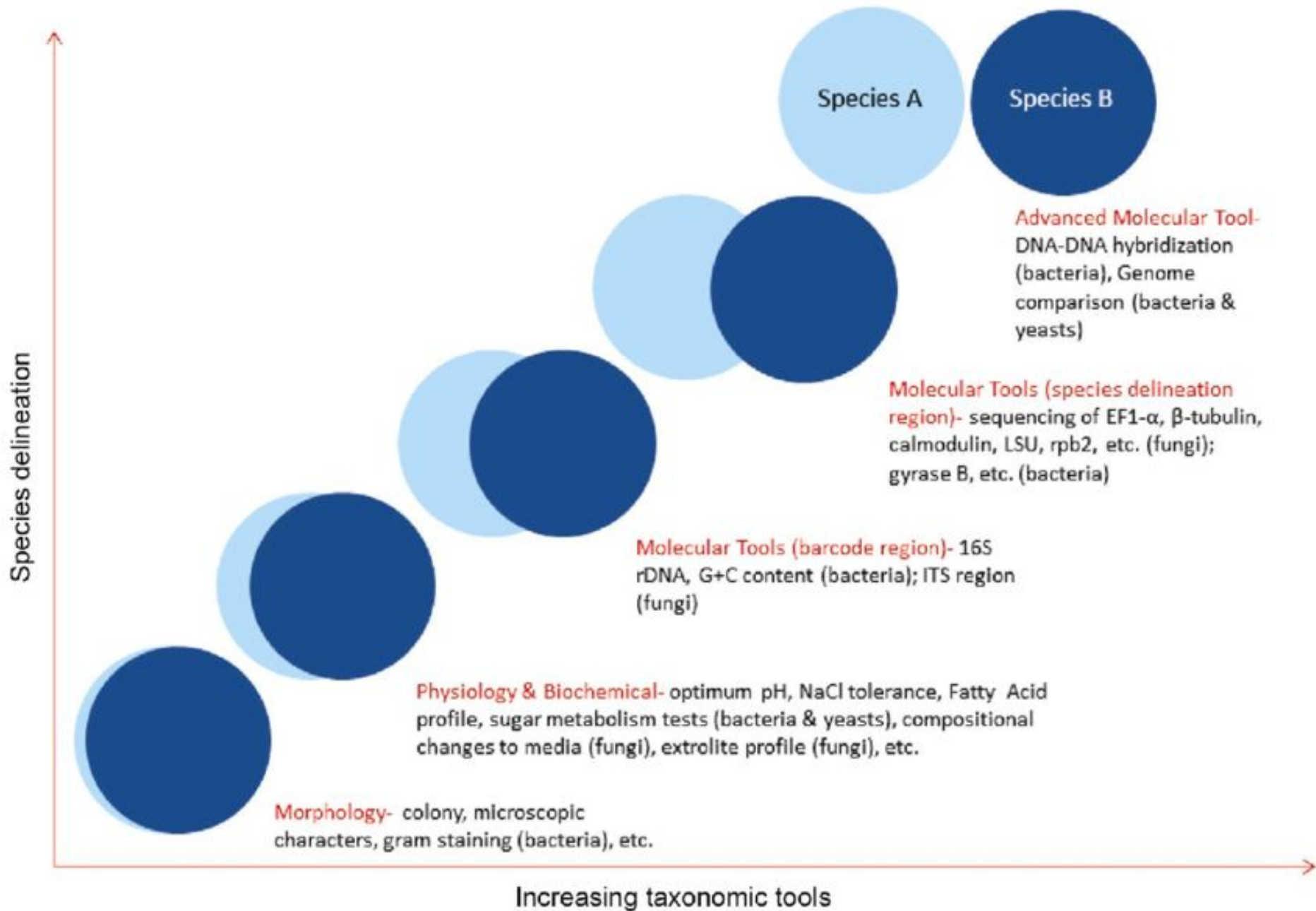
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- Are dogs a species?
 - But among dogs, which are well known for their hybrid (or mongrel) varieties, different breeds can mate and have viable offspring, so they are all found under the umbrella of a single species, *Canis familiaris*. Dogs are highly unusual in their variation, from the Chihuahua to the Great Dane.

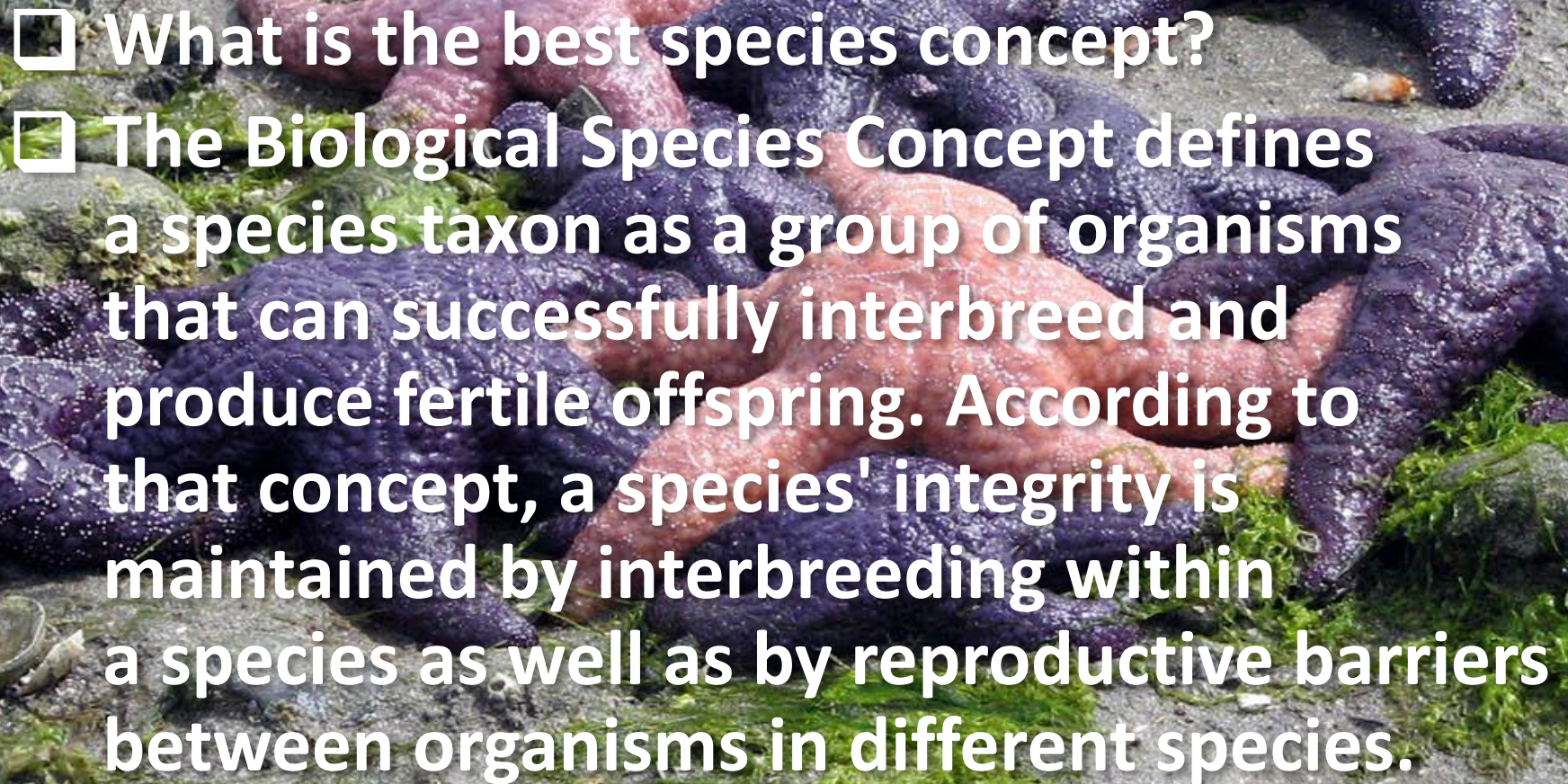
What are the 4 species concepts?

The important species concept are:

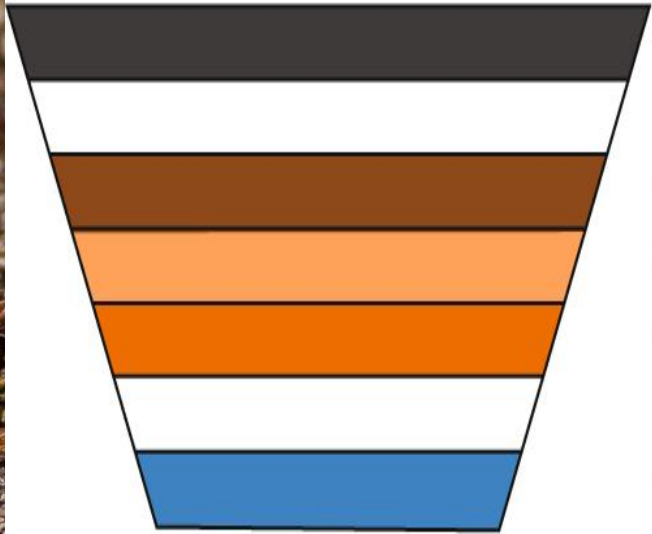
- 1. Typological or Essentialist Species Concept**
- 2. Nominalistic Species Concept**
- 3. Biological Species Concept**
- 4. Evolutionary Species Concept.**





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- What is the best species concept?
 - The Biological Species Concept defines a species taxon as a group of organisms that can successfully interbreed and produce fertile offspring. According to that concept, a species' integrity is maintained by interbreeding within a species as well as by reproductive barriers between organisms in different species.

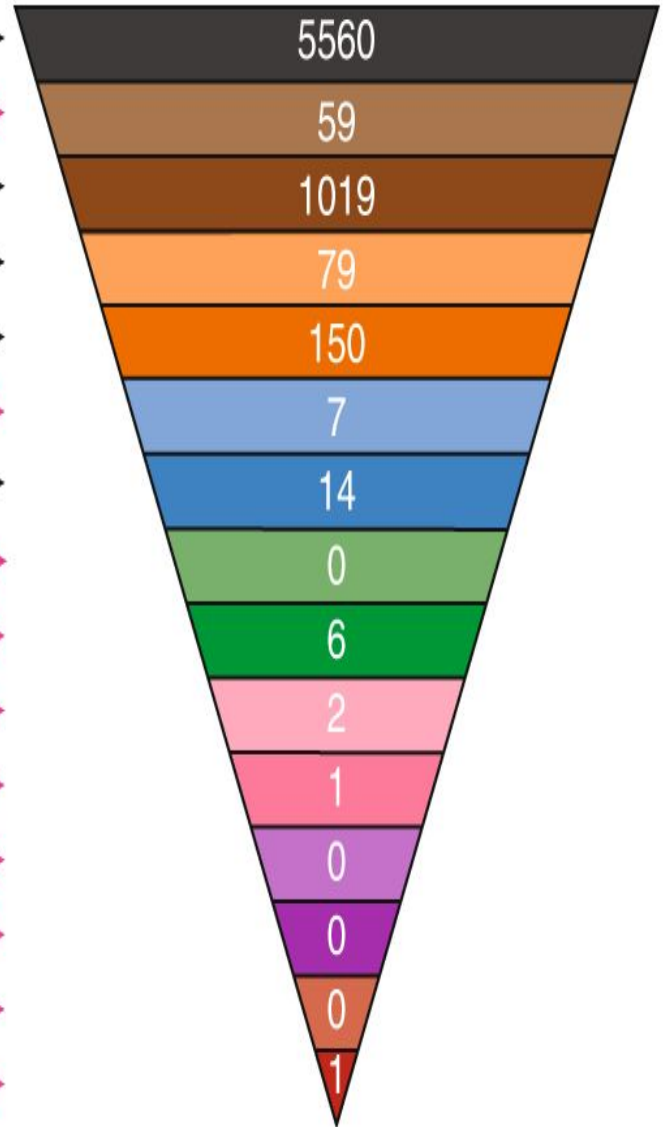
Five-rank structure
(1991–2017)



Rank (...suffix)

- ← Species (irregular) →
- Subgenus (...*virus*) →
- ← Genus (...*virus*) →
- ← Subfamily (...*virinae*) →
- ← Family (...*viridae*) →
- Suborder (...*virineae*) →
- ← Order (...*virales*) →
- Subclass (...*viricetidae*) →
- Class (...*viricetes*) →
- Subphylum (...*viricotina*) →
- Phylum (...*viricota*) →
- Subkingdom (...*virites*) →
- Kingdom (...*virae*) →
- Subrealm (...*vira*) →
- Realm (...*viria*) →

15-rank structure
(2019)



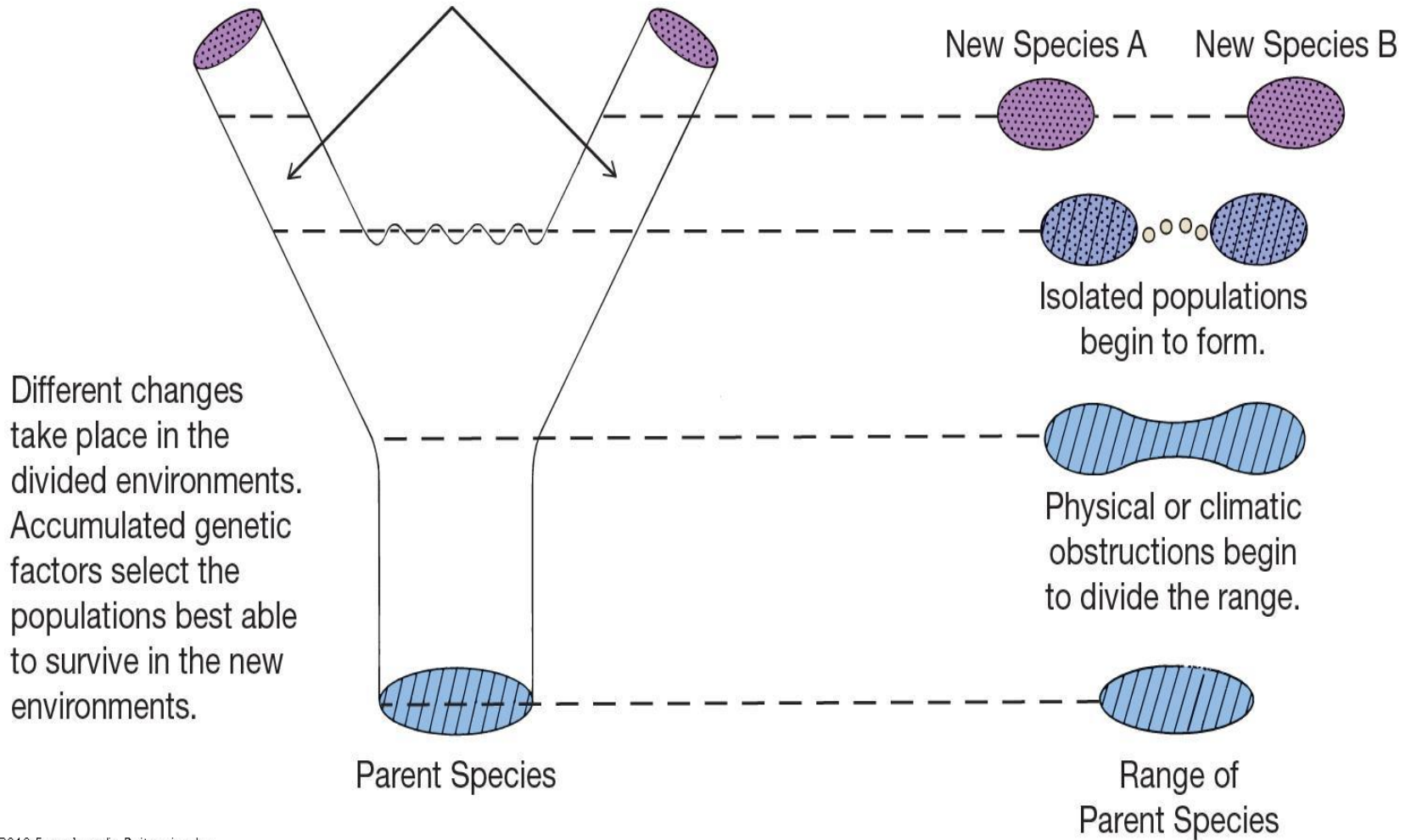
Taxa

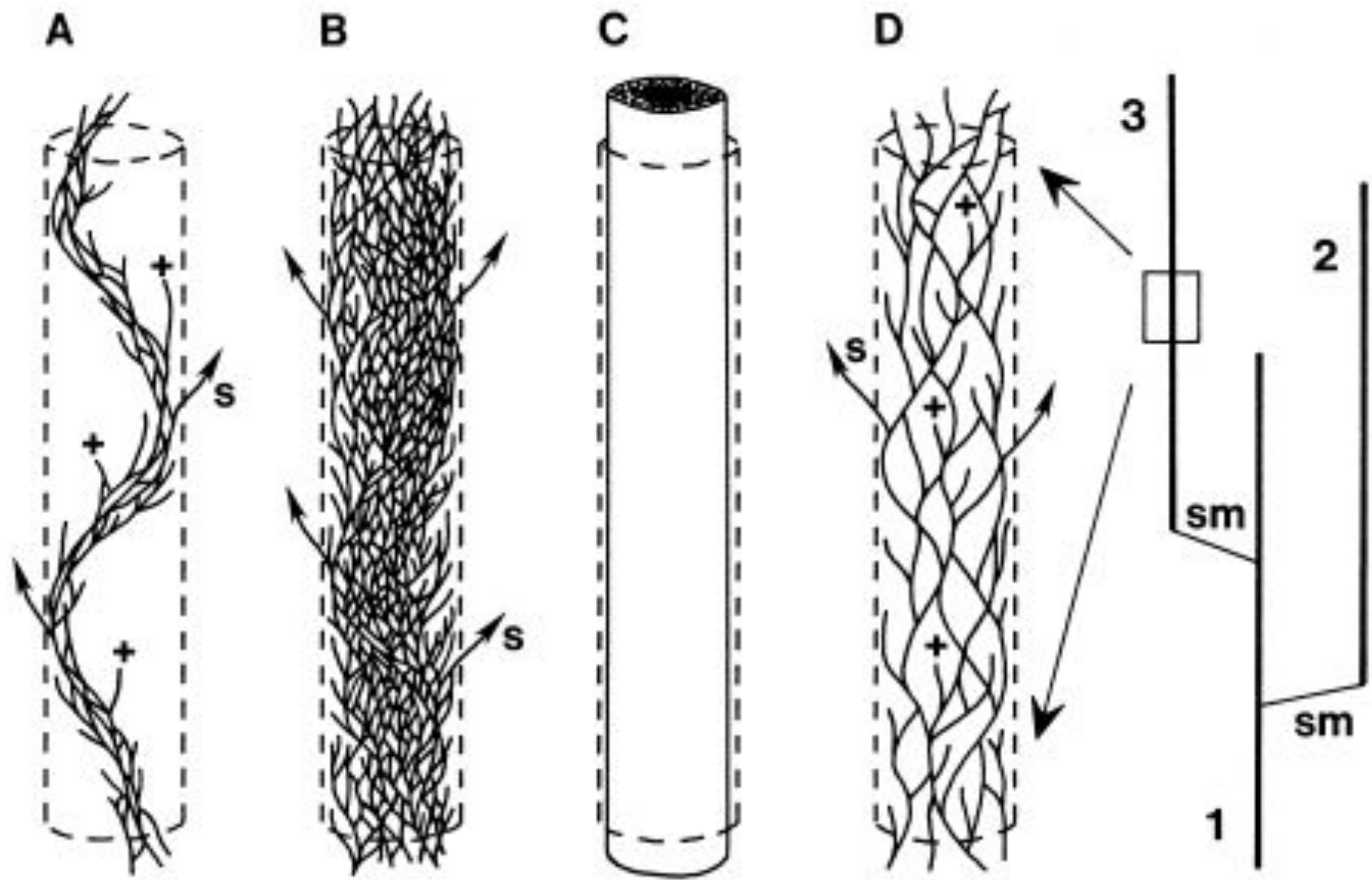
Many

Few

How many new species may arise

The isolated populations are now so divided that they do not interbreed. This permits them to establish new genetic patterns of separate species.



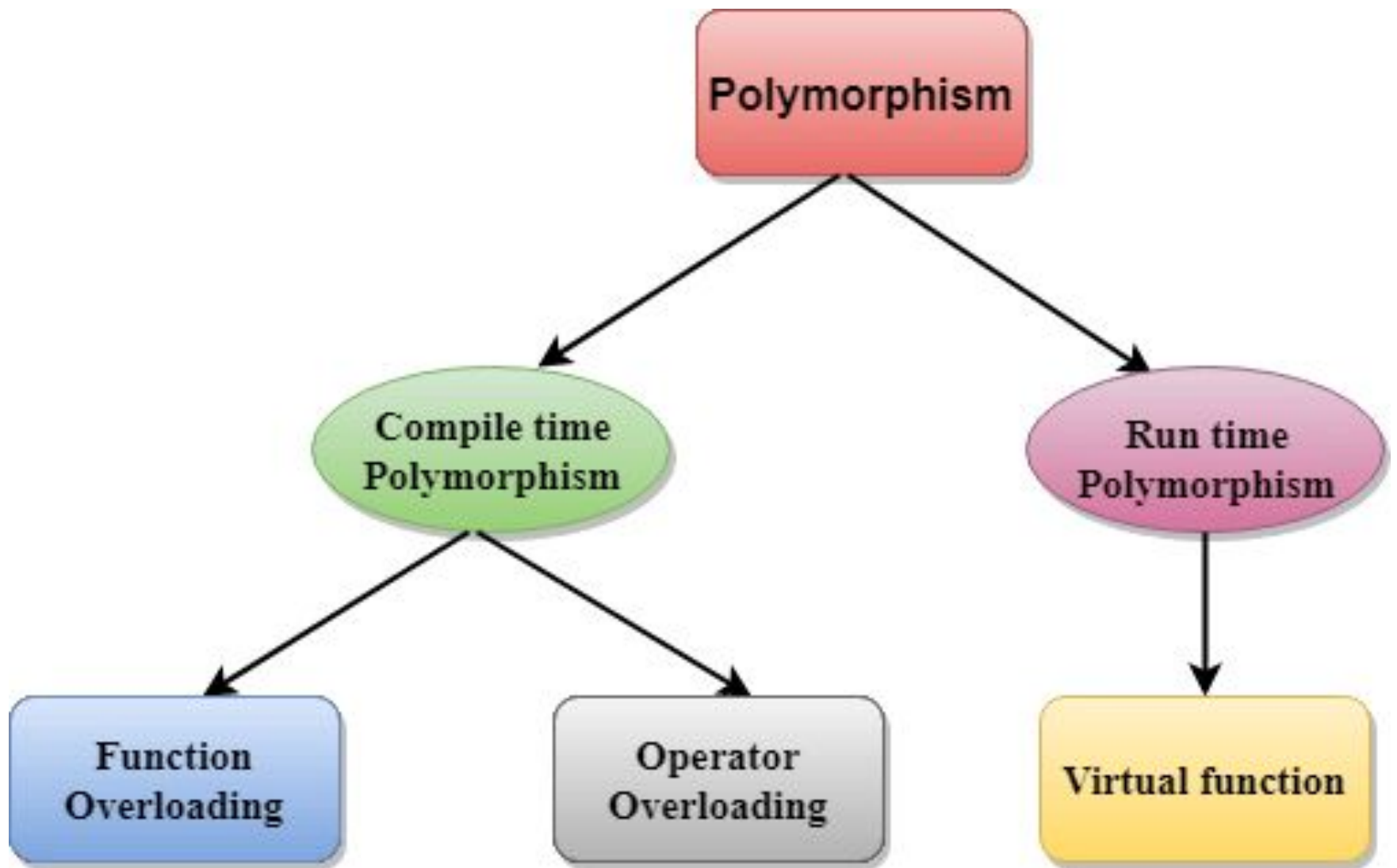


STRUCTURE OF SPECIES:

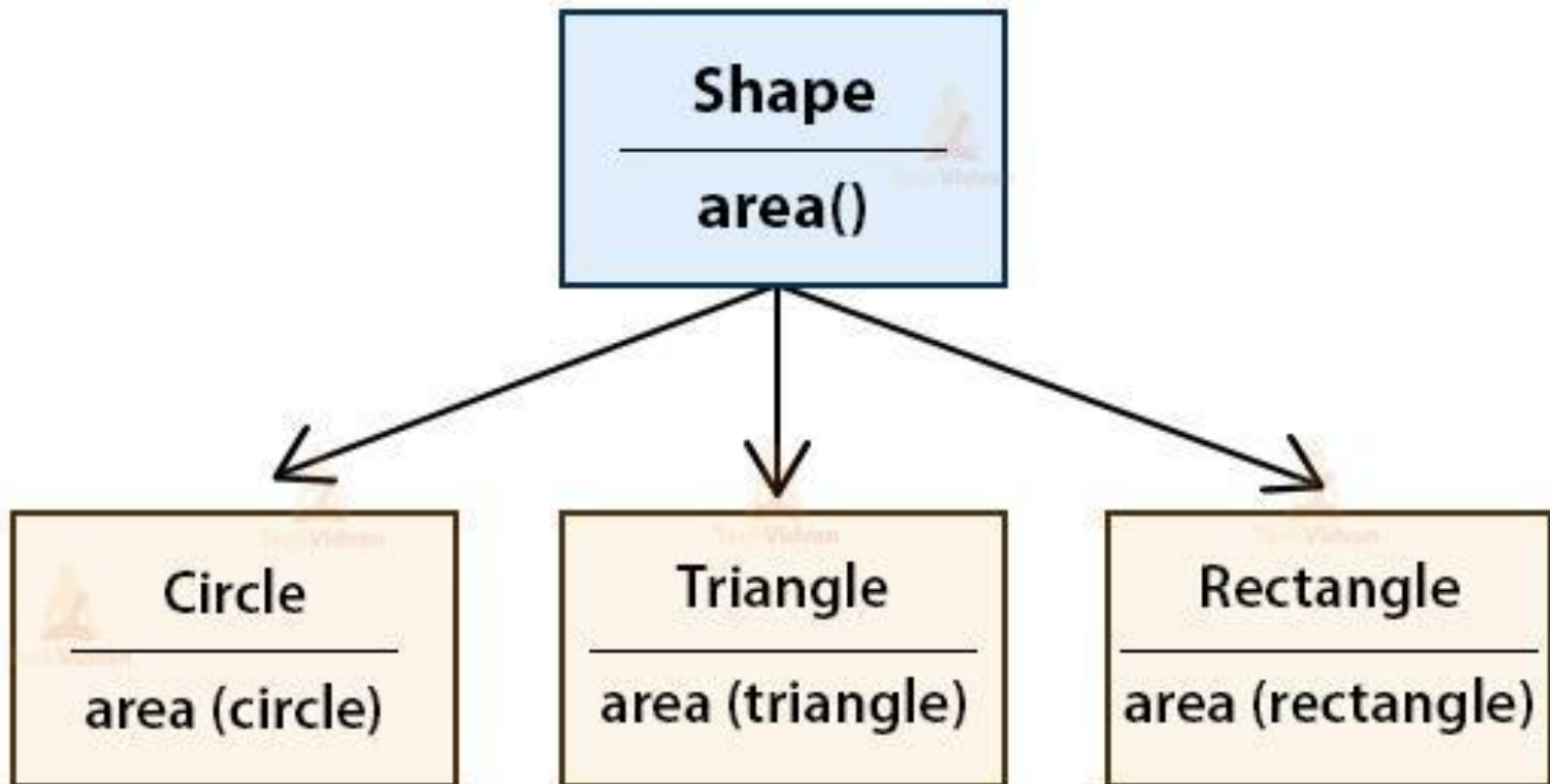
- **1. The possible internal structures of species-lineages. In general, species consist of demes or habitat clusters, and comprise clades. A) A lineage consisting of a bundle of demes that oscillate through the phenotypic/habitat space of an established species but does not fill up the space, as in the other models.**

POLYMORPHISM

- Polymorphism is the ability of an object to take on many forms. The most common use of polymorphism in OOP occurs when a parent class reference is used to refer to a child class object. Any Java object that can pass more than one IS-A test is considered to be polymorphic.



Example of Polymorphism in Java



POLYMORPHISM IN LEPIDOPTERA



