

Different species concept

The Species Concept

Species, as we know them, are groups of individuals that look alike, live together, and interact with one another. This is a very vague definition of species as nature has provided so many variations in animals that it is very difficult to precisely define a species. Various concepts to explain as to what actually constitutes a species have been given from time to time. Some of them are given below.

1. Typological or morphological species concept

This is also called essentialism and was put forth by Plato and Aristotle in 350 BC. was later followed by Linnaeus According to this concept universe has a limited number of types and individuals are not given any recognition. Species are groups of individuals that resemble each other in most essential visible morphological characters

Drawback -

This concept emphasizes only the appearance of the animals.

2. Nominalistic species concept

It believes that "Nature produces individuals and nothing more"

This concept was put forward by Buffon and Lamarck in mid 18th century in France. According to this concept, only individuals exist and species are man-made aberrations or abstractions (idea).

Drawback-

Such classifications are likely to be erroneous as they give equal importance to all characters.

3. Genetic species concept

Simpson (1961) advocated that genetically identical individuals should be called Biospecies. M. Florkin (1964) gave a definition as follows: "Species are groups of individuals with more or less similar combinations of sequences of purine and pyrimidine bases in their DNA and with a system of operators and repressors leading to the biosynthesis of similar amino acid sequences."

Drawback-

This definition is too complicated to be followed. Moreover, no two individuals (with the possible exception of monozygotic twins) are genetically identical.

4. Evolutionary species concept

This concept takes into account the lineage of a species. Evolutionary species concept was advocated by Simpson (1961) who suggested that "An evolutionary species is a lineage" (an ancestral descendant sequence of population), evolving separately from others and with its own unitary evolutionary role and tendencies. The following definitions have been given: (write any one or two definition)

Meglitsch (1954) said, "Natural population evolving as a unit in actuality and retaining this capacity in case artificial barriers are removed."

Simpson (1961) gave this definition - "Species is a lineage evolving separately from others and with its own unitary evolutionary role and tendencies."

Wiley (1978): "Species is a single lineage of ancestral descendant populations of organisms which maintain its own evolutionary tendencies and historical fate."

Van Valen (1976) defined it as "A species is a lineage occupying an adaptive zone minimally different from that of any other lineage in its range and which evolves separately from all lineages outside its range."

Drawback

Biologically the above concept is acceptable but it is difficult to find evidence of lineage for lack of fossil evidence in most cases.

5. Biological species concept

First proposed by K. Jordan (1905), this concept combines elements of typological, nominalistic and genetic aspects and lays emphasis on the reproductive isolation. According to Ernst Mayr (1969), "Species are groups of actually or potentially interbreeding natural populations that are reproductively isolated from other such groups."

(It has two aspects:

- (a) A group of interbreeding populations.
- (b) Reproductively isolated from other such group

Drawback-

However, there are several difficulties in applying this concept, three of them are important:

1. Insufficient information
2. Uniparental reproduction
3. Evolutionary intermediaries

Biosystematic Species Concept:

It includes experimental taxonomic studies also. The variation taking place in reciprocal transplant and hybridization etc., are to be included successfully. Most common examples are Ecotypes, Ecospecies, Coenospecies etc.

Ecotype:

Closely, related but ecologically distinct population which are largely interfertile are called ecotypes.

Ecospecies:

Similar but hybrids between them are of reduced viability.

Coenospecies:

These are not interfertile at all (even artificially).

To provide solution to the species problem we should keep in mind that-

- (a) All populations tend to vary and that no two are even alike.*
- (b) Some of these variations are adaptive and are of survival value.*
- (c) Forces of nature result in the extinction of some individuals while other survives the same force.*
- (d) Some of the variations shown by individuals within a population must be hereditary if successive generations are to be modified from the ancestral types.*
- (e) Environment of the individuals must not be static*

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