Ecological succession is the process of change in the species structure of an ecological community over time. The time scale can be decades (for example, after a wildfire), or even millions of years after a mass extinction.

The community begins with relatively few pioneering plants and animals and develops through increasing complexity until it becomes stable or self-perpetuating as a climax community. The "engine" of succession, the cause of ecosystem change, is the impact of established species upon their own environments. A consequence of living is the sometimes subtle and sometimes overt alteration of one's own environment

Types

Primary, secondary and cyclic succession

An example of Secondary Succession by stages:

1. A stable deciduous forest community
2. A disturbance, such as a wild fire, destroys the forest
3. The fire burns the forest to the ground
4. The fire leaves behind empty, but not destroyed, soil
5. Grasses and other herbaceous plants grow back first
6. Small bushes and trees begin to colonize the area
7. Fast growing evergreen trees develop to their fullest, while shade-tolerant trees develop in the understory
8. The short-lived and shade intolerant evergreen trees die as the larger deciduous trees overtop them. The ecosystem is now back to a similar state to where it began.

Causes of plant succession

Autogenic succession can be brought by changes in the soil caused by the organisms there. These changes include accumulation of organic matter in litter or humic layer, alteration of soil nutrients, or change in the pH of soil due to the plants growing there. The structure of the plants themselves can also alter the community. For example, when larger species like trees mature, they produce shade on to the developing forest floor that tends to exclude light-requiring species. Shade-tolerant species will invade the area.

Allogenic succession is caused by external environmental influences and not by the vegetation. For example, soil changes due to erosion, leaching or the deposition of silt and clays can alter the nutrient content and water relationships in the ecosystems. Animals also play an important role in allogenic changes as they are pollinators, seed dispersers and herbivores. They can also increase nutrient content of the soil in certain areas, or shift soil about (as termites, ants, and moles do) creating patches in the habitat. This may create regeneration sites that favor certain species.

Mechanisms

In 1916, Frederic Clements published a descriptive theory of succession and advanced it as a general ecological concept.[10] His theory of succession had a powerful influence on ecological thought. Clements' concept is usually termed classical ecological theory. According to Clements, succession is a process involving several phases:

1. Nudation: Succession begins with the development of a bare site, called Nudation (disturbance).
2. Migration: It refers to arrival of propagules.
3. Ecesis: It involves establishment and initial growth of vegetation.
4. Competition: As vegetation becomes well established, grow, and spread, various species begin to compete for space, light and nutrients.
5. Reaction: During this phase autogenic changes such as the buildup of humus affect the habitat, and one plant community replaces another.
6. Stabilization: A supposedly stable climax community forms.

Microsuccession

Succession of micro-organisms including fungi and bacteria occurring within a microhabitat is known as microsuccession or serule. This type of succession occurs in recently disturbed communities or newly available habitat, for example in recently dead trees, animal droppings, exposed glacial till, etc.

Theories

There are three schools of interpretations explaining the climax concept:

- Monoclimax or Climatic Climax Theory was advanced by Clements (1916) and recognizes only one climax whose characteristics are determined solely by climate (climatic climax). The processes of succession and modification of environment overcome the effects of differences in topography, parent material of the soil, and other factors. The whole area would be covered with uniform plant community. Communities other than the climax are related to it, and are recognized as subclimax, postclimax and disclimax.
- Polyclimax Theory was advanced by Tansley (1935). It proposes that the climax vegetation of a region consists of more than one vegetation climaxes controlled by soil moisture, soil nutrients, topography, slope exposure, fire, and animal activity.
- Climax Pattern Theory was proposed by Whittaker (1953). The climax pattern theory recognizes a variety of climaxes governed by responses of species populations to biotic and abiotic conditions. According to this theory the total environment of the ecosystem determines the composition, species structure, and balance of a climax community. The environment includes the species responses to moisture, temperature, and nutrients, their biotic relationships, availability of flora and fauna to colonize the area, chance dispersal of seeds and animals, soils, climate, and disturbance such as fire and wind. The nature of climax vegetation will change as the environment changes. The climax community represents a pattern of populations that corresponds to and changes with the pattern of environment. The central and most widespread community is the climatic climax.

The theory of alternative stable states suggests there is not one end point but many which transition between each other over ecological time.

Ecesis - (ecology) the process by which a plant or animal becomes established in a new habitat. establishment. bionomics, environmental science, ecology - the branch of biology concerned with the relations between organisms and their environment.

climax community, or **climatic climax community**, is a historic term for a biological community of plants, animals, and fungiwhich, through the process of ecological succession in the development of vegetation in an area over time, have reached a steady state. This equilibrium was thought to occur because the climax community is composed of species best adapted to average conditions in that area. The term is sometimes also applied in soil development. Nevertheless, it has been found that a "steady state" is more apparent than real, particularly if long-enough periods of time are taken into consideration. Notwithstanding, it remains a useful concept.

The idea of a single climax, which is defined in relation to regional climate, originated with Frederic Clements in the early 1900s. The first analysis of succession as leading to something like a climax was written by Henry Cowles in 1899, but it was Clements who used the term "climax" to describe the idealized endpoint of succession.

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