

Ecological Pyramid

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Ecological Pyramid is a graphical representation of number of organisms, biomass, and productivity at each trophic level. It is also called **Energy Pyramid**. There are three types of pyramids. They are as follows – Pyramid of biomass, Pyramid of numbers, Pyramid of energy.

Pyramid of Biomass

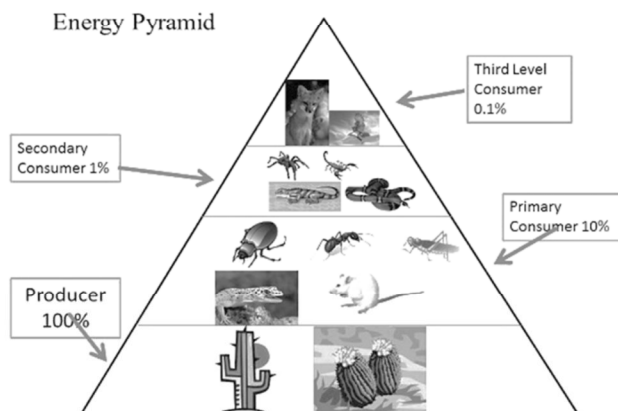
Pyramids of Biomass display the quantity of biomass (organic matter present in an organism) present per unit area at each trophic level. It is represented with the producers at the base and the top carnivores at the top.

It is generally ascertained by collecting all organisms that occupy each trophic level separately and then measuring their dry weight. Each trophic level has a certain standing crop. Standing crop is mass of living material at a particular time and is measured as the mass of living organisms (biomass) or the number in a unit area.

Upright Pyramid of Biomass

Terrestrial Ecosystems have mostly pyramids of biomass that has large base of primary producers and smaller trophic level on top, therefore the upright pyramid of biomass.

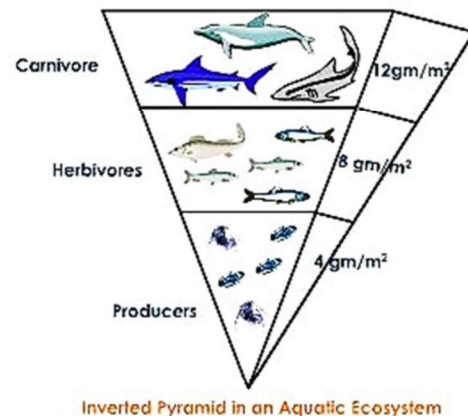
The biomass of producers is most numerous. The biomass of primary consumers is less than that of the producers. Similarly, the biomass of secondary and tertiary consumers are comparatively less than its lower level respectively. The top of the pyramid has very less amount of biomass.



Inverted Pyramid of Biomass

It is found in most aquatic ecosystems. In aquatic ecosystem, the pyramid of biomass may assume an inverted shape. However, pyramid of numbers for aquatic ecosystem is upright.

In a water body, the producers are tiny phytoplankton growing and reproducing rapidly. In such condition, the pyramid of biomass has a small base, with the biomass of producer at the base providing support to consumer biomass of large weight. Hence, it assumes an inverted shape.



Pyramid of Numbers

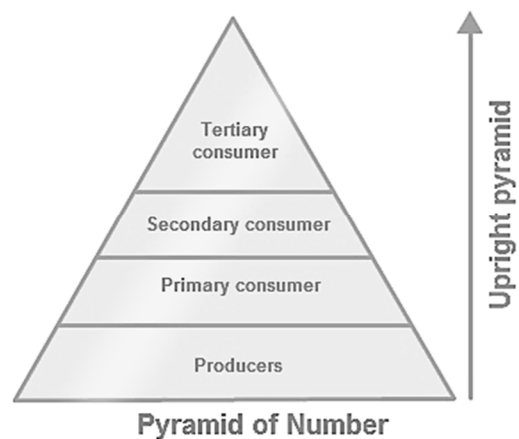
It is the graphic representation of number of individuals per unit area of various trophic levels. Large number of producers tend to form the base whereas lower number of top predators or carnivores occupy the top. The shape of the pyramid of numbers differs from ecosystem to ecosystem.

For example, in an aquatic ecosystem or grassland areas, autotrophs or producers are present in large number per unit area. The producers support a lesser number of herbivores, which in turn supports fewer carnivores.

Upright Pyramid of Numbers

Here, the number of individuals decreases from the lower level to the higher level. This type of pyramid is usually found in the grassland ecosystem and the pond ecosystem. In a grassland ecosystem, the grass occupies the lowest trophic level because of its copiousness.

Next comes the primary producers – the herbivores (for example – grasshopper). The number of grasshoppers is quite less than that of grass. Then, there are the primary carnivores, for example, the rat whose number is far less than the grasshoppers. The next trophic level is the secondary consumers such as the snakes who feed on the rats. Then, there are the top carnivores such as the hawks who eat snakes and whose number is less than the snakes. The number of species decreases towards the higher levels in this pyramidal structure.

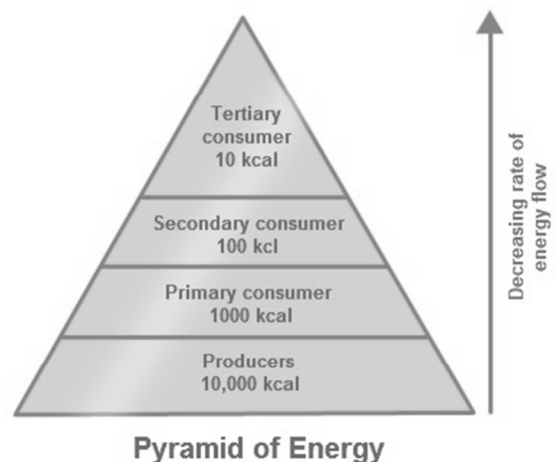


Inverted Pyramid of Numbers

Here, the number of individuals increases from the lower level to the higher trophic level. For example, the tree ecosystem.

Pyramid of Energy

It is a graphical structure representing the flow of energy through each trophic level of a food chain over a fixed part of the natural environment. An energy pyramid represents the amount of energy at each trophic level and loss of energy at each is transferred to another trophic level.



Energy pyramid, sometimes called trophic pyramid or ecological pyramid, is useful in quantifying the energy transfer from one organism to another along the food chain. Energy decreases as one moves through the trophic levels from the bottom to the top of the pyramid. Thus, the energy pyramid is always upward.

Energy Flow in Ecosystem

Energy moves life. The cycle of energy is based on the flow of energy through different trophic levels in an ecosystem. Our ecosystem is maintained by the cycling energy and nutrients obtained from different external sources. At the first trophic level, primary producers use solar energy to produce organic material through photosynthesis.

The herbivores at the second trophic level, use the plants as food which gives them energy. A large part of this energy is used up for the metabolic functions of these animals such as breathing, digesting food, supporting growth of tissues, maintaining blood circulation and body temperature.

Carnivores at the next trophic level feed on the herbivores and takes energy for their nourishment and growth. If large predators are present, they represent still higher trophic level and feed on carnivores for energy. In this way, different plants and animal species are linked to one another through food chains.

Decomposers which include bacteria, fungi, molds, worms, and insects break down wastes and dead organisms, and return the nutrients to the soil. The producers then take up nutrients from the soil. Here, energy is released.

