

## KEY ECOLOGICAL PARAMETERS OF IMMOTILE VERSUS LOCOMOTIVE LIFE

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**Abstract.** Principles of stable ecosystem organization are considered together with the role of abundant space, matter and energy in its maintenance. Life features the dichotomy of immotile organisms like plants, fungi, bacteria, on the one hand, versus organisms capable of active locomotion (animals) on the other. The immotile life can form a continuous live cover on the Earth's surface. Since all available space is occupied, the immotile life does not experience an affluence of matter, energy and space itself. It turns out that this lack of abundance permits organization, on the basis of immotile organisms, of a stable ecosystem with a steady biomass. This live biomass comprises time-invariable genetic information about how to keep the environment in a stable state by controlling the degree of openness of nutrient cycles. Crucially, depending on their body size, energy and matter consumption by large animals exceed the area-specific fluxes of net primary production and its consumption in the immotile ecosystem by up to three orders of magnitude. The implication is that the herbivorous animals can meet their energy demands if and only if they move and destroy the live biomass of the immotile ecosystem. In consequence, if the immotile heterotrophs are replaced by locomotive heterotrophs, the ecosystem biomass experiences huge fluctuations and the ecosystem loses its capacity to maintain its favorable environment. From available theoretical and empirical evidence we conclude that life's organization remains stable if the share of energy consumption by large animals is strictly limited, not exceeding in its order of magnitude one percent of ecosystem net primary production.

**Keywords:** biotic regulation, locomotion, body size, metabolic rate, solar radiation.