

FOOD CHAIN IN AN AQUATIC ECOSYSTEM

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ABSTRACT

The primary focus of the Ramanpad lake was to study the trophic energy structure, function and steady state of ecosystem. The autotrophs convert the radiant energy in to chemical energy through the process of photosynthesis. This chemical energy in turn converts into heat energy which helps in the metabolism of the organism. The linkage between one organism and another organism for their existence is referred as food chain. The food chain is nothing but the sequence of energy flow that is trophic levels. This sequence finally ends up with an organism which will not be eaten by any other, but it disintegrate or decompose. In an ecosystem the energy flow is related to the first law of thermodynamics and the energy transform into the form of heat that is the second law of thermodynamics applies. If the number of organisms involved in food chain the flow of energy is decrease at every stage. Some of the workers describe aquatic ecosystems in terms of their annual energy budget and integrated trophic flow. The Ramanpad Lake which is situated in Telangana state that is considered to be beauty full lake in India.

Keywords: Food chain, Energy flow. Trophic level.

Introduction:

Aquatic ecosystem has been shaped by concepts of energy flow, food webs, and trophic levels (Odum 1971)¹, It is qualitatively described the inter connections among organisms through feeding relationships (Forbes 1887)² later quantified as trophic pyramids. In recent years reservoirs have received much attention due to environmental crisis. Many workers have studied on phytoplankton of fresh water but we are interested in the study of energy flow in the aquatic ecosystem. Although a lot of literature is available on the studies of phytoplankton of fresh water habitats, lakes, very few workers are studied on the aspect of energy flow.

The individual population were made into trophic levels or categories that is producers, herbivores, carnivores, top carnivores and decomposers this is based on the food habits,

Our study started in the year 2012-2013 and completed most of the work within three seasons .our aim is to examine the relationships between the organism involved in food chain. The primary focus of the study was to the quantity the trophic levels in the Ramanpad Lake. The metabolic rates of individual populations were placed into categories or trophic levels that are producers, herbivores, carnivores, top carnivores and decomposers based on their food habits.

Material and methods:

The present study was carried out from 2012-13 taking into consideration of all the three seasons that is Summer, Monsoon and Winter. The maximum temperature is 43°C and with rainfall 800cm per annum and with 10°C is minimum in winter season. Ramanpad Lake is situated on latitude 16°-21'-12"N Long 77°-50'-51"E Latitude. The

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algae, diurnal movements of zooplanktons were observed and identified. The trophic levels were observed and recorded.

Results and discussion

The energy flow in Ramanpad lake was studied in all the three seasons for one year that is 2012 summer to 2013 winter.

The base of terrestrial and freshwater food webs dramatically varies James J. Elser et al (2000)³. For every population for its survival and to established the energy fixation is a must with sufficient nutrient supply and also the transfer of energy from bottom that is primary producers to the top carnivore. B Strait (1995)⁴. The phytoplankton or micro organisms are autotrophs, due to the presence of chlorophyll they make their own food material, the energy is stored in the form of carbohydrates. They are regarded as primary producers and they come under the first level in the pyramid of energy. The primary producers or phytoplankton are microscopic and large in number. The next level is zooplanktons. As they have diurnal movement can be observed in the morning, afternoon, or in the evening times. At that specific time we can study the movement and behavioral aspects of zoo planktons. The pond ecosystem maintain by cycling energy and nutrients obtained from external sources. The first trophic level that is producers are primary producers example algae (micro organisms, bacteria). They use solar energy and perform photosynthesis to produce organic matter. The herbivores which feed solely on microorganisms make the second trophic level. The predators that eat herbivores from the third trophic level. The organisms which feed at several trophic levels are at the highest trophic levels, the bacteria, fungi, moulds, worms, insects, which breakdown dead organisms and wastes return nutrients to the soil. Nearing 10% of net energy of one trophic level is passed on to the next level. The energy losses between trophic levels is due to respiration, growth and reproduction. Energy is not recycled during decomposition in turn they are released as heat.

Depends upon several factors trophic levels of an ecosystem exist. The predators comparatively larger and can utilized the energy that was produced at the level bellow, hence the predators have large areas to meet their needs generally the terrestrial ecosystems have more than five trophic levels.

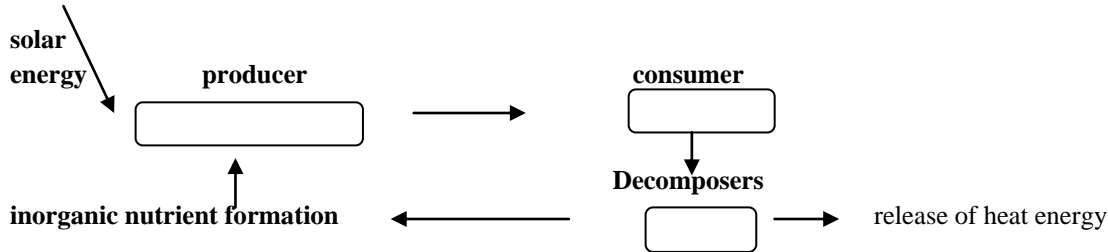
The microscopic phytoplanktons carry out the photosynthesis, they are with simple structures their primary production is consumed and used for energy. The energy fixed through primary production travels up to the food chain the phytoplankton are small but grow very rapidly, that means they support large populations. The simplest way to describe the flux of energy through ecosystem is as food chain in which energy possess from one trophic level to the next. The loss of energy between trophic levels is due to contaminants accumulated in animal tissues. This is called bioaccumulation. This processes the food chain and at the food webs level. The higher trophic level organisms are threatened which effects their reproduction, risking numerological damage and birth defects. The flow of energy is unidirectional this enables us the course of energy in an ecosystem to be followed. The lake play an important role in the maintain of ecological balance Sandhya, Mahesh pawar, Smita Rajendra sonawane (2011)⁵. The phytoplankton mainly consists of microscopic algae, motile, unicellular, colonial, multicellular, filamentous and they form the basic link in the food chain in all aquatic animals Misra SM, et al (2001)⁶. Energy flow is an important ecological determinant. Odum. E.P. (1969)⁷ pointed out food chain based once to complex food web structure and from less stable to more stable communities. Fresh water communities and their ambient water solution represent highly dynamic ecological system. The systems were divided into series of compartments for the purpose of studying



fluxes of elements.

sun release of heat energy

release of heat energy



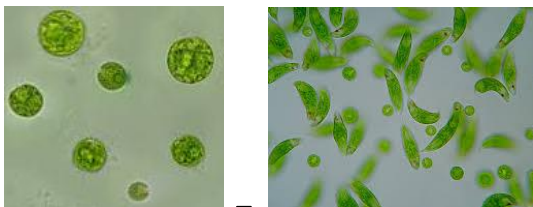
Conclusion: In any Biological Community the abundance of the primary producers for the fixation of energy is the major aspects, the supply of nutrients from one trophic level to another that is from the producers to the consumers is checked by the populations and also on the completion among organisms, this also depends on the density of the populations and its composition. The food chain and transfer of energy is a continuous process in any ecosystem. The producer population controls the predator population that is competition among the different population. The food chain and food webs influenced by the intra and interspecific competitions and also the presence of toxic pollutants.

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Primary producers



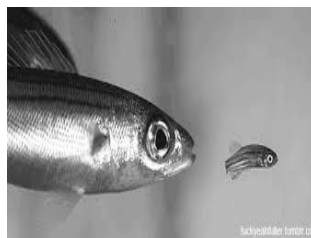
Primary ↓ consumer



Secondary ↓ consumer



Tertiary ↓ consumer





Primary producers (Algae) — primary consumers (zooplankton) —secondary consumer(small fish) —tertiary consumer(bird eating fish) —fish eating fish—crocodile eating fish—man fishing—consumptions