specially primary production. [Since it is the first and form of energy storage it the rate at which the energy accumulates in the green plants or producers is known as primary productivity] P. productivity is the rate at which energy is bound or organic material is created by photosynthesis per unit of earths surface per unit times. It is mostly ~~of the~~ expresed as energy in calaries/ m^2/years or dry organic matter in g/m^2/years ($g/m^2 \times 5.92 = 4$) The amount of organic matter present at a given time per unit area is called standing crop or biomass & as such productivity which is a rate, is quite different from biomass or standing crop. The standing crop is usually expressed as dry wt. Primary productivity is the result of photosynthesis by green plants including algae of different colours. Bacteral photosynthesis or chemosynthesis although of small significance may also contribute to primary productivity. The total solar energy trapped in the food material by photosynthesis is referred to as gross primary production.

A good fraction of gross primary production is utilized in respiration of green plants. The amount of energy bound organic matter created per unit area & time that is left after respiration of these plant is net primary production or plant growth. Only the net primary productivity is available for harvest by man & other material.

Net productivity of energy = gross productivity – energy used in respiration.

The rate at which the heterotrophic organisms resynthesize the energy yielding substance is termed as secondary productivity. Secondary productivity are the productivity of animals & saprobes in communities.

There are three functional concepts of productivity —

① Standing Crop → It is the abundance of the organisms existing in the area at any one time. It may be expressed in term of individuals as biomass of organisms as energy content or in some other suitable terms. Measurment of standing crop reveals the concentration of individuals in the various population of the ecosystem.

② Material removed → The second concept of productivity is the material removed from the area per unit time. It includes the yield to man, organisms removed from the ecosystem by migration & the material with drown as organic deposits.

③ The production rate → It is the rate at which the growth process are going forward within the area. The amount of material formed by each link in the food chain per unit of area or volume is the production rate.

All the three major groups of organisms producers, consumers & reducers are the functional kingdoms of natural communities. These three repre

the majas directions of evolution & are char-terised by different modes of nutrition. Plants feed primarily by photosynthesis, animals feed primarily by ingesting food that is digested in & absorbed from an intestinal cavity & the saprobes feed by absorption & have read for an extensive surface of absorption. The principal kinds of organisation evolved among saprobes are the unicellular bacteria yeasts, chytrids of lower fungi & a hyphes fungi with mycelial bodies.

In terrestrial communities as much as 90% of net primary production remain unharvested & must be utilized as dead tissue by saprobes and soil animals. In terrestrial ecosystem the saprobes have a larger and more essential role than animals in degrading dead organic matter to inorganic forms & in such ecosystems secondary production by reducers (decomposers) should exceed that by consumers, though the former is even more difficult to measure than the latter biomass of decomposers with their microscopic cells & filaments embedded in good sources is also difficult to measure & that is small in relation to their productivity & significance for the ecosystem. Small masses of reducers degrads & transform for larger masses of organic matter to inorganic remenant In so doing decomposers disperse back to the environments the energy of photo-synthesis accumulated in the organic compound that decomposes. Thus they

have a major part in the energy flow of ecosystems. A community or ecosystem like an organism is an open energy system. The continuous intake of energy by photosynthesis replaces the energy dissipated to environment by respiration & biological activity and the system does not discontinue. [Through the loss of free energy to maximum entropy; or the amount of energy entrapped is greater than the energy dissipated, the pool of biologically useful energy of organic bonds increases. This result increases of community, biomass will decrease and it may in some sense retrogress] The pool of organic energy is in steady state such as the la in succession. If energy intake is less than energy dissipation the community biomass will decrease and it must some sense retrogress. The pool of organic energy is in steady state su as the case in climax communities. Three aspect of this steady state may be recognised —

① The steady state of population climax communities in wh equal birth & death rates in popula keep the number of individuals rela constant.

② The steady state of energy flo

③ The steady state of the matte of community, where additional of material by photosynthesis & organ synthesis is balanced by loss of material respiration & decompositions

TROPHIC LEVELS

The trophic structure of an ecosystem is one kind of producer-consumer arrangement where each food level is known as trophic level or it can be expressed like this - The organisms with similar feeding habits are grouped together & known as trophic level.

Green plants (T_1) ⟶ Herbivore (T_2) ⟶ Carnivore (T_3) ⟶ Top carnivor (T_4) ⟶ Decomposers (T_5) ⟶ Trophic level

Elton (1947) observed that the number of organism at T_1 is always higher than that of T_2 & at T_4 it is least. He has indicated that the food chain in any ecosystem can not be more than five step long as when the green plant (step 1) is eaten by herbivore (step 2), only 10% of the food is assimilated in the biomass of the animals & the rest 90% is used up to provide energy for the metabolic activity of the animals. At step 3 when the herbivore is eaten by a carnivore only 10% of the total mass of the herbivore ingested as food assimilated in the bio-mass of the animals. Thus the energy lessen at each step of the trophic level. The carnivores may be eaten by the top carnivores. (step 4) which after death becomes the large source of food for decomposers at step 5 which ultimately break down the food into its inorganic components & release the remaining energy.

Trophic structure of an ecosystem could be indicated by means of ecological pyramids in which green plants ~~from~~ and successive levels (consumer T_2, T_3, T_4) ~~form from~~ the ~~tiers~~ tiers which makes ~~the~~ the aper.

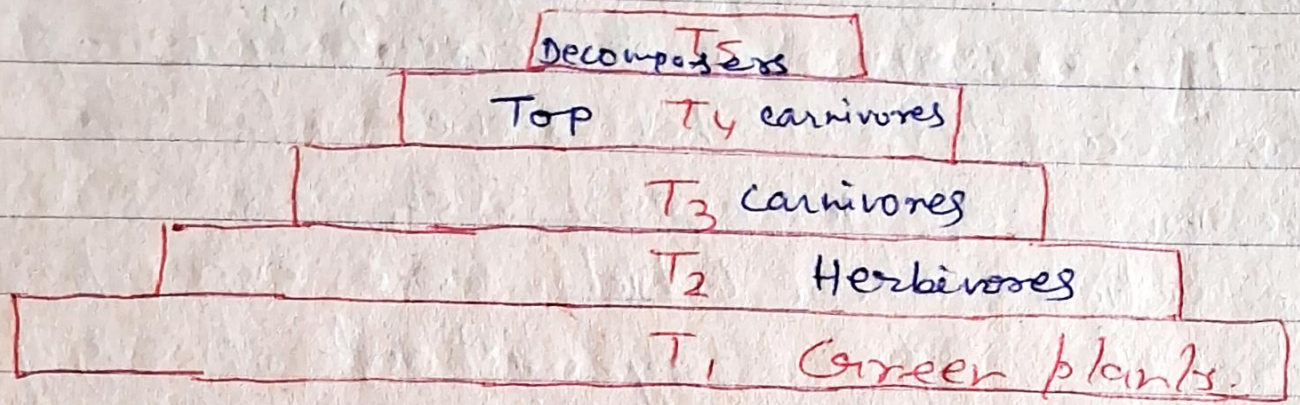

Fig - T_1 from the base of the pyramid & successive trophic levels from its tiers.

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