INTRODUCTION TO ORGANISM AND POPULATION

An organism is the smallest unit of ecological hierarchy and basic unit of ecological study. It may be microscopic (e.g., Amoeba, Chlorella, bacterium) or macroscopic (e.g., Rose, Mango, Crocodile, Dog, Human being). An organism can be unicellular (e.g., Amoeba, Euglena, Chlamydomonas), colonial (e.g., Volvox) or multicellular (e.g., Fish, Lizard, Mango tree). Each organism is capable of growth, self repair, movement and self regulation of its activities.

A population is the term we use to describe a group of individuals or organisms of a single species that live within a particular geographic area. For example, there may be one population of Cedrus trees in the Himalayas or the coconut trees on the coastal ares of Kerala. In other words, population is a group of interbreeding organisms that are members of the same species living in the same area at the same time. Organisms that are all members of the same species, are called conspecifics. While, a community is the term used to describe two or more populations of different species that occupy the same space at the same time. For example Pinus and Cedrus populations living together in Himalayas. Each population is genetically distinct. Most species have hundreds to thousands of unique populations, with each population adapted to variations in the local environment. Thus, the population is the basic ecological unit of any species.

Each organism has one of three roles in any ecosystem: producer, consumer, or decomposer. (a) Producers are green plants or protists that manufacture their own carbohydrate food from inorganic water and carbon dioxide. (b) Consumers are animals, pathogens, or parasites that obtain food by ingesting other organisms. (c) Decomposers are non green protists or prokaryotes that digest dead organic remains of producers and consumers. Every species can be assigned to one of a relatively small number of life history patterns. Each pattern represents a unique budget of activities and resources that allows a population to continue in existence from generation to generation. Some of the activities are germination, growth, and reproduction. The distribution of a population is affected by abiotic factors such as soil nutrient level, soil moisture availability, intensity of solar radiation, or the incidence of wildfire. Every plant transmits the incoming solar radiation energy into

reflection, re-radiation, convection, metabolism, storage, and transpiration. Distribution also is determined by biotic interactions with other species, such as competition (in which a substance is removed from the environment), amensalism (in which a substance is added to the environment), herbivory (consumption by an animal), and mutualism (cooperative behavior in which the probability of survival is increased for both interacting populations).

A population is identified, in part, by where it lives; its area of population may have natural or artificial boundaries. Natural boundaries might be rivers, mountains, or deserts, while examples of artificial boundaries include mowed grass or manmade structures such as roads. The study of population ecology focuses on the number of individuals in an area and how and why population size changes over time. The statistical study of any population, human or otherwise, is known as demography. Populations can change in their numbers and structure—for example age and sex distribution—for various reasons. These changes can affect how the population interacts with its physical environment and with other species. By tracking populations over time, ecologists can see how these populations have changed and may be able to predict how they're likely to change in the future. Monitoring the size and structure of populations can also help ecologists manage populations—for example, by showing whether conservation efforts are helping an endangered species increase in numbers.

To study the demographics of a population, there are three parameters. One is simply the number of individuals in the population, second one is the density i.e. the number of individuals per area or volume of habitat and the another one is the size i.e. area of the specific population. Size and density are both important in describing the current status of the population and, potentially, for making predictions about how it could change in the future. Larger populations may be more stable than smaller populations because they’re likely to have greater genetic variability and thus more potential to adapt to changes in the environment through natural selection. A member of a low-density population—where organisms are sparsely spread out—might have more trouble finding a mate to reproduce with than an individual in a high-density population.

Scientists often estimate a population's size by taking one or more samples from the population and using these samples to make inferences about the population as a whole. A variety of methods can be used to sample

populations to determine their size and density. For immobile organisms such as plants—or for very small and slow-moving organisms—plots called *quadrat* may be used to determine population size and density. Each quadrat marks off an area of the same size—typically, a square area—within the habitat. A quadrat can be made by staking out an area with sticks and string or by using a wood, plastic, or metal square placed on the ground, as shown in the picture below. Through these studies, density, abundance and frequency of the population is studied.