ECOLOGY, ECOSYSTEMS & POPULATIONS

Section 1

Ecology is the study of relationships between organisms and their environment. When describing ecological relationships we organize information about organisms in different ways. A **population** is a group of individuals of the same species all living together in the same area. A **community** consists of all the organisms living together in an area. Biotic and abiotic factors combine to create a system or more precisely, an ecosystem. An **ecosystem** is a community of living and nonliving things considered as a unit. It is kept in balance by a combination of **biotic** and **abiotic factors**. Biotic, meaning of or related to life, are living factors. Plants, animals, fungi, protist and bacteria are all biotic or living factors. The ecosystem includes all of the organisms in the community as well as the physical or abiotic factors. Abiotic, meaning not alive, are nonliving factors that affect living organisms. Environmental factors such habitat (pond, lake, ocean, desert, mountain) or weather such as temperature, cloud cover, rain, snow, hurricanes, etc. are abiotic factors.

Section 2

There are many complex relationships in an ecosystem. **Biotic** relationships are between living organisms (bio = living). Organisms are greatly influenced by biotic factors like predation, competition, and symbiosis, but they are also influenced by **abiotic** or physical factors, or things that are non-living (a = without; bio = living). Biotic and abiotic factors are interrelated. If one factor is changed or removed, it impacts the availability of other resources within the system.

Biotic relationships are between living organisms (bio = living). One kind of relationship is **symbiosis**. Symbiosis literally means living together, and describes two different species live together in a close relationship. If two species simply live in the same area it is not symbiosis, but if their survival is affected in some way by living together, and if they have evolved over time together due to the selective pressures placed on both by the relationship, they are considered symbionts. There are several special categories of symbiosis. If both species benefit, the symbiosis is **mutualism**. If one species benefits, but one is unaffected, the symbiosis is **commensal**. If one species benefits and one is harmed, the symbiosis is **parasitic**. Parasites may harm the host in many ways, by taking food, killing young, or draining the host of energy, and sometimes kill it.

A second kind of biotic relationship, probably the one most people think of because it is so commonly depicted on nature programs on television, is **predation**. Predation occurs when an organism kills and consumes another organism.

Competition is a third biotic relationship that can have a substantial impact on populations of organisms. When a resource is limited, organisms may compete for it in some form. Interspecific competition is competition amongst individuals of the different species. Intraspecific competition is competition amongst individuals of the same species. Organisms can compete for varying resources- food, mates, space, or access to light or chemical nutrients. The more similar the needs of the competitors, the fiercer the competition between them tends to be.

Section 3

Factors which determine the types and numbers of organisms of a species in an ecosystem are called **limiting factors**. Many limiting factors restrict the growth of populations in nature.

Carrying capacity is the maximum number of organisms the resources of an ecosystem can support. The carrying capacity of the environment is limited by the available abiotic and biotic resources (**limiting factors**)