Fish Population Dynamics

Prof. Dr. Hasan Hüseyin ATAR

- Studies in biology, the science of living things, can be directed at increasing levels of biological organization from molecules, cells, organs, to organisms (or species) and beyond to populations and ecosystems. A population is a group of individuals belonging to the same species and a community is a collection of populations inhabiting a particular area. An ecosystem is a functional and relatively self-contained system that includes communities and their nonliving environment.

- Fisheries studies and management are concerned with a unit stock, which may be defined as a discrete group of individuals that has the same gene pool, is self-perpetuating, and has little connection with adjacent groups of the same species. Although this definition may not satisfy biogeographers, it does describe a unit which, because it has similar biological characteristics, may be studied, assessed and managed as a discrete entity

- From a fisheries assessment and management viewpoint, it is important to determine whether two adjacent stocks are either sufficiently interactive to be regarded as a single unit stock, or independent enough to be treated as separate unit stocks. In most cases, several criteria are used to confirm or refute a stock's unit status.

- Within a unit stock, individuals may be distributed uniformly, randomly or in aggregations. A uniform or even distribution rarely occurs in nature, mainly because the environment is rarely uniform. Even if the environment is relatively even, such as on a sandy sea floor, the distribution of sedentary species is likely to be non-uniform as a result of the uneven settlement of larvae from the plankton. However, a uniform distribution may be approximated in species where there is competition, territoriality or aggression between individuals. Territorial reef fishes, for example, often exclude others of the same species from a range around a home base on the reef. Random distributions are also rare in nature, if only because the aspects of the environment on which the species depend, such as food and shelter, are not randomly distributed.
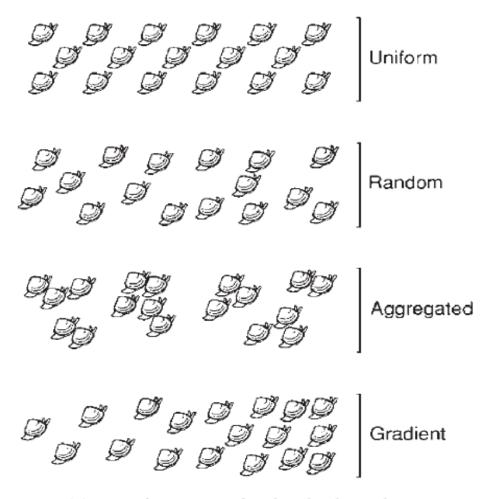
Uniform

Random

Aggregated

Gradient

Fig. 1.3 Types of spacing of individuals within an area.

- In fisheries studies the estimation of abundance, or at least relative abundance (the number of individuals at one time relative to the number present at another time), is important in determining the effects of fishing and environmental disturbances.