**Characteristics of Populations (11.1)**

Quantitative measurements are used to study populations.

Population size (N) = the number of individuals of the same species living within a specific geographical area.

What are some issues that ecologists might have with determining “N”?

Population density (Dp) = # of individuals per unit of volume or area

Crude Density = number of individuals of the same species per total unit area or volume.

Ecological Density = number of individuals of the same species per unit area or volume actually used by the individuals

Most times in the “real world”, populations are estimated by using various methods:

1. Transects: population is sampled along a long rectangular area or line. Width dependent on whether organism is sessile (stationary) or mobile. Useful for low density species, or if organisms are very large.
2. Quadrats: quadrats of a known size are placed at random sites in an area and the number of individuals with the boundaries are counted. Good for sessile or organisms that move very little.

Dp = N

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P501-Estimating Population Size

1. Mark-Recapture: animals are trapped, marked/tagged, released and at a later date the same traps/nets are set and a comparison is made on the proportion of marked to unmarked animals.

Pop. Size (N) = (# of originally marked) X (# individuals in recapture)

(marked ind. in recapture)

Population Distribution: influenced by the distribution of resources and the interactions among members of a population or community.

1. Uniform dispersion (competition causes territories to be set up) or farmers fields, orchards, etc.
2. Random dispersion (patternless)
3. Clumped dispersion (most populations)

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| --- | --- | --- | --- |
| Distribution Pattern | Resource Distribution | Resource Abundance | Interactions between members of a population |
| Clumped | Clumped | Varies | Positive |
| Uniform | Uniform | Scarce | Negative |
| Random | Uniform | Abundant | Neutral |

Distribution Patterns are fluid and can change with the seasons or even during the course of a day. Patterns change due to complex interactions between behaviours and other characteristics that increase each individual’s chances of reproduction and survival.

Life History: The survivorship and reproductive patterns shown by individuals in a population. Life histories include age of sexual maturation, how often it reproduces, # of offspring if produces, life span

Two main measures to describe life history:

1. Fecundity: Average # of offspring produced by a female over her lifetime. Usually the # of offspring is inversely related to the amount of care parents provide.
2. Survivorship: the proportion/percentage of individuals in a population that survives to a give age. Scientists use a *cohort* to study this.

-*Type I survivorship*: high rate of juvenile survival, individuals live until sexual maturity and beyond. E.g. Human

-*Type III survivorship*: most individuals die as juveniles, only a few live long enough to produce offspring however these will produce many offspring. E.g. oyster

-*Type II survivorship*: Between Type I & III-the risk of mortality is constant throughout an individual’s lifetime.

HMK: P508 #2, 3, 4, 5,8, 10,14