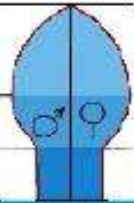


Population Distribution/Dispersion

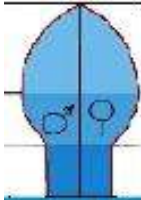
- In addition to measuring size and density, further information about a population can be obtained by looking at the distribution of the individuals throughout their range.
- **A species distribution pattern is the distribution of individuals within a habitat at a particular point in time—broad categories of patterns are used to describe them.**
- **Individuals within a population can be distributed at random, in groups, or equally spaced apart (more or less). These are known as random, clumped, and uniform distribution patterns, respectively (Figure 2).**
- Different distributions reflect important aspects of the biology of the species. They also affect the mathematical methods required to estimate population sizes.
- An example of random distribution occurs with dandelion and other plants that have wind-dispersed seeds that germinate wherever they happen to fall in favorable environments.
- A clumped distribution, may be seen in plants that drop their seeds straight to the ground, such as oak trees; it can also be seen in animals that live in social groups (schools of fish or herds of elephants).
- Uniform distribution is observed in plants that secrete substances inhibiting the growth of nearby individuals (such as the release of toxic chemicals by sage plants).

- It is also seen in territorial animal species, such as penguins that maintain a defined territory for nesting.
- The territorial defensive behaviors of each individual create a regular pattern of distribution of similar-sized territories and individuals within those territories.
- Thus, the distribution of the individuals within a population provides more information about how they interact with each other than does a simple density measurement.
- Just as lower density species might have more difficulty finding a mate, solitary species with a random distribution might have a similar difficulty when compared to social species clumped together in groups.



Population Distributions: Clumped



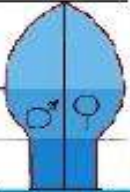


Spatial Distributions

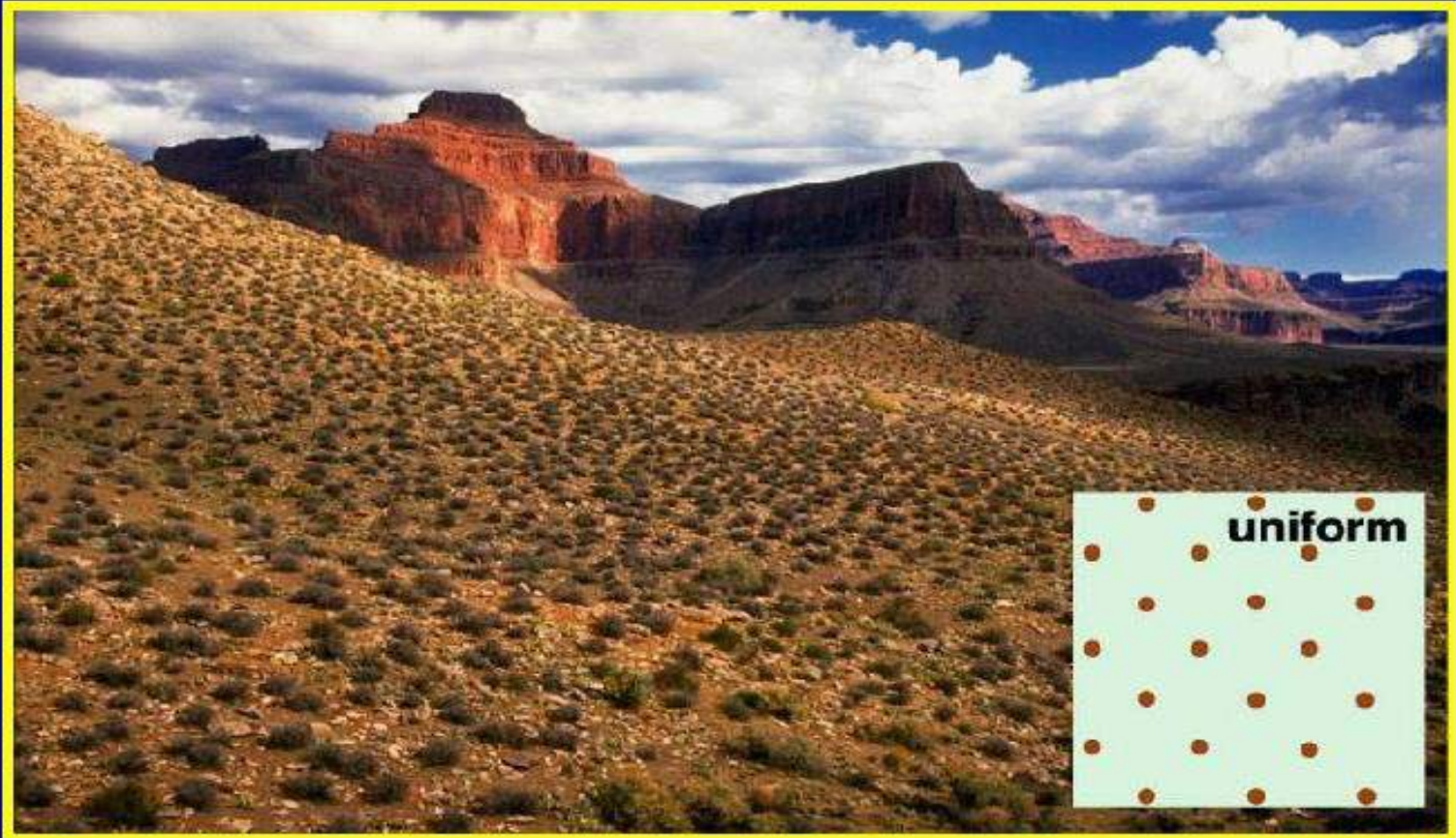
Uniform distribution – **constant distance maintained between individuals; common among territorial animals defending scarce resources or defending breeding territories**

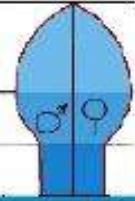
Examples: iguanas, shorebirds, tawny owls

Advantage: a uniform distribution helps ensure adequate resources for each individual



Population Distributions: Uniform

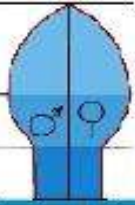




Spacial Distributions

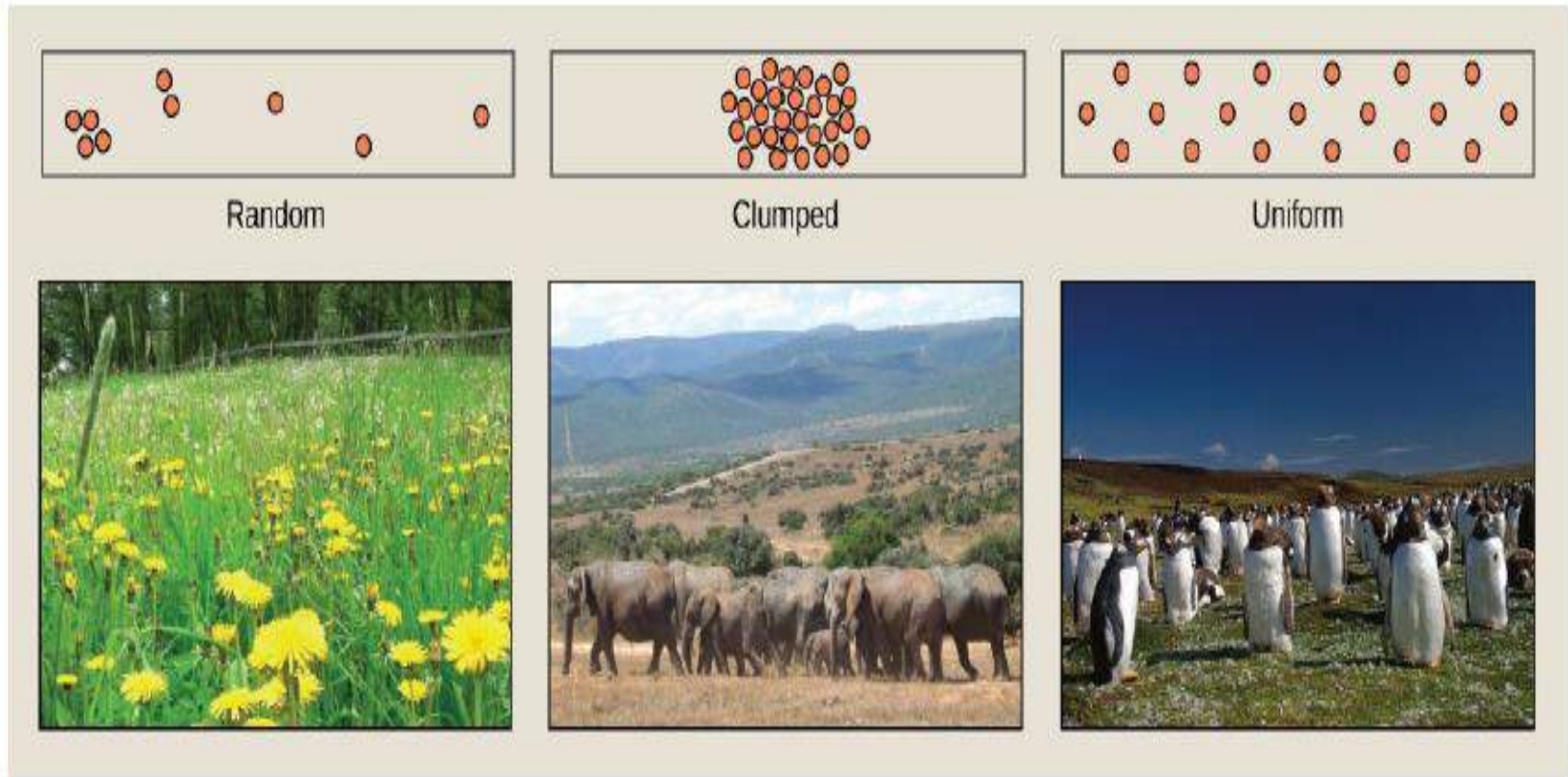
Random distribution – rare, exhibited by individuals that do not form social groups; occurs when resources are not scarce enough to require territorial spacing

Examples: Trees and other plants in rain forests



Population Distributions: Random





(a)

(b)

(c)

Figure 2. Species may have a random, clumped, or uniform distribution. Plants such as (a) dandelions with wind-dispersed seeds tend to be randomly distributed. Animals such as (b) elephants that travel in groups exhibit a clumped distribution. Territorial birds such as (c) penguins tend to have a uniform distribution. (credit a: modification of work by Rosendahl; credit b: modification of work by Rebecca Wood; credit c: modification of work by Ben Tubby)

Population Dispersion

- Spacing patterns within a population



clumped

Why clump?

Provides insight into the environmental associations & social interactions of individuals in population



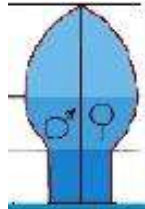
random

Why random?



Why uniform?

uniform



Spatial Distributions

Clumped distribution – **includes family and social groups**

Examples: elephant herds, wolf packs, prides of lions, flocks of birds, and schools of fish

Advantages

- **Provides many eyes that can search for localized food sources**
- **Confuses predators with sheer numbers**
- **Cooperation for hunting more effectively**