

Review Questions: Population Distribution and Biodiversity

1. Two forests, A and B, contain the following trees: forest A is composed of 28 birches, 30 firs, 27 poplars, 26 spruce and 3 pines; forest B is composed of 20 birches, 60 firs, 15 poplars and 3 spruce. Answer the following questions.

a) Which forest has the greater species richness?

A: 5 species = Richer forest
B: 4 species

b) What is the relative abundance (in percentages rounded to the nearest whole number) of the different species in the two communities? (Note: Totals may not equal 100% because of rounding.)

A
25% birch, 26% firs, 24% poplars,
23% spruce, 3%
B → 20% birch, 61% firs, 15% poplars,
3% spruce

c) Which forest has the greater biodiversity? Explain your answer.

(A)

2. Which pattern of distribution is illustrated by each of the following situations?

a) In a forest, the fir trees are scattered about at random.

Random

b) Fungi grow in colonies on the trunks of dead trees.

Clumped

c) Several clouds of mayflies hover over a lake.

Clumped

d) The hummingbirds in a valley aggressively defend their respective territories; they tend to build their nests at equal distances from one another.

Uniform

Some More Questions on Community Interactions:

1. Some wasps lay their eggs inside the body of another insect, such as the fly. When the eggs develop into larvae, the larvae eat their host (for example, the fly) to free themselves from its body.

a) What type of interaction exists between the wasp larvae and the host insect (the fly)? Explain your answer.

The relationship between the two species is an example of parasitism, a form of predation. The larva is the parasite that takes advantage of the host (the fly), which dies as a result.

b) What effect will this interaction have on the density of the two populations?

It will tend to increase the density of the wasp population and reduce the population density of the host (the fly).

2. Lichen, which have no roots, live on trees. The lichen attach themselves to the branches of spruce and fir trees, which ensures them a position high enough to receive light and capture moisture from the air. Contrary to popular belief, lichen are not harmful to trees.

a) What type of interaction exists between lichen and trees? Explain your answer.

The relationship between the two species is an example of commensalism because the lichen benefit from it, while the trees are unaffected by it.

b) What effect will this interaction have on the density of the two populations?

It will tend to increase the density of the lichen population, but there will be no effect on the density of the trees.

3. When the same number of wheat and barley seedlings are planted in a single container, both species try to take the water and nutrients available.

a) What type of interaction exists between the wheat and the barley? Explain your answer.

The relationship between the two species is an example of interspecific competition because the two species are competing for access to limited resources.

b) What effect will this interaction have on the density of the two populations?

It will tend to lower the density of the two populations.

4. The individuals of a certain species of bird do not accept that birds of the same species—family members excepted—occupy their territories. They find their food and the materials to make their nests all within this territory. When the birds return from their winter migration, there is a race to occupy the best territories, which are the areas with the most resources. What type of interaction exists between the individuals of this species? Explain your answer.

The relationship between individuals of this species is an example of intraspecific competition because the areas with plentiful resources are limited in number.

5. Yellow-billed oxpeckers are African birds that perch on the backs of large mammals of the savanna, such as giraffes. The birds search the animal's skin for ticks to eat, even going so far as to explore the inside of its ears.

a) What type of interaction exists between giraffes and oxpeckers? Explain your answer.

The relationship between the two species is an example of mutualism because both species benefit from it. The bird finds food, and the giraffe gets rid of its ticks.

b) What effect will this interaction have on the density of the two populations?

It will tend to increase the density of the two populations.

6. The *Ancistrus* is an aquarium fish commonly known as the *bushynose*. It is a fish that likes algae and eats those that accumulate on the glass sides of the tank.

a) What type of interaction exists between *Ancistrus* and algae? Explain your answer.

The relationship between the two species is an example of predation because the fish feeds on the algae.

c) What effect will this interaction have on the density of the two populations?

It will tend to increase the population density of the fish and decrease the density of the algae.