



Range of Tolerance

Ecosystems are defined by the nonliving factors of the environment and the organisms living there. Water is a nonliving factor. Every ecosystem must have water. But the amount of water in an ecosystem can be different. Lake and ocean ecosystems thrive underwater. Rain forest ecosystems thrive with a lot of water. Desert ecosystems thrive with very little water. The organisms there have adaptations that help them survive in their environment.

Chaparral ecosystems are found on the West Coast of the United States. Chaparral is not quite as dry as desert. But plants and animals living there must survive long summers and falls without rain. The plants are tough and brushy with long roots. Many of the animals burrow deep into the rocky soil.

A chaparral ecosystem





**Chaparral ecosystems
before and after a fire**

Another challenging nonliving factor in chaparral ecosystems is fire. Wildfires leave the land's surface black and lifeless. But before long, life returns. Animals that hide deep in their burrows come back to the surface after the fire passes. The roots of chaparral plants are still alive. As soon as the rains come, new branches and leaves sprout. The ashes from the burned plants provide nutrients for the new plants to grow and thrive. The chaparral ecosystem can survive well even when wildfire burns it to the ground.

The chaparral ecosystem has plants and animals that can thrive even when there are fires. The plants and animals that live there have a high range of tolerance for heat and fire. Plants and animals whose optimum environment is a forest ecosystem might survive in the chaparral ecosystem, but not nearly as well. They do not have as much tolerance for heat and fire. Plants and animals that live in rain forests would die in the chaparral ecosystem. They have no tolerance for heat and fire.

Review Questions

1. All plants need water. What does *optimum water* mean for a plant? What does *range of tolerance for water* mean for a plant?
2. Describe an adaptation of a plant or animal that enables it to survive in the chaparral ecosystem.

How Organisms Depend on One Another

Animals depend on plants for survival. Trees provide shelter for birds to build nests. High in the branches, eggs and baby birds are safe from snakes, skunks, and coyotes. The owl in the picture below is protected from weather and predators in a tree. Beetles and isopods live under tree bark. Walking sticks hide on trees to protect themselves from predators. Animals also depend on plants for food. Animals eat leaves, flowers, fruits, seeds, bark, stems, sap, and roots of plants. It's easy to find many ways that animals depend on plants for survival.

Plants depend on animals for survival, too. You read about the swollen-thorn acacia tree. The ants help the tree survive. If an insect lands on the tree, the ants will attack it. If another plant touches the tree, the ants cut it away. The acacia tree depends on the ants for protection. And the ants depend on the tree for shelter and food.



An owl nesting in a tree



A walking stick looks like a twig.



A bee collects pollen and nectar for food.



Pollination

What other ways do plants depend on animals? Think about honeybees visiting flowers. Bees collect pollen and nectar from flowers. This is food for the bees. The bees depend on plants for food.

The plants also depend on the bees. Pollen must get from one flower to another for plants to make seeds. This is called **pollination**. Plants can't move, so the pollen must be carried from one flower to another. Bees carry pollen as they fly from flower to flower. (Can you see the yellow dust on this bee's body? That's the pollen.) Bees make it possible for plants to produce seeds. The seeds grow to become adult plants, which make flowers with pollen and nectar. Then the cycle starts over again.

Other insects, such as butterflies and moths, also visit flowers for food. Plants depend on insects to bring pollen, and insects depend on plants for food. Without bees and other insects that visit flowers, plants cannot survive. Without flowers on plants, bees and butterflies cannot survive.

Seed Dispersal

When seeds are ripe, they are ready to grow. Seeds have a better chance of survival if they sprout away from the parent plant. The new plant will be able to get more light, water, and nutrients. **Seed dispersal** is the term used to describe ways that seeds move away from the parent plant.

Sometimes wind disperses, or scatters, seeds. Wind is dispersing the small seeds of this dandelion.

Animals can also disperse seeds. Squirrels, chipmunks, and birds often take seeds and fruits (acorns, sunflower seeds, berries, and cherries) for food. They may drop the seeds or bury them and forget where they put them. Seeds with hooks can also stick to animals to be carried away from the parent plant.

Animals depend on plants for survival. Plants give animals food and shelter. Plants also depend on animals for survival. Animals help pollinate plants and disperse seeds.



Dandelion seeds blowing in the wind



Sometimes birds drop the seeds they are carrying.



A chipmunk eating an acorn

Review Questions

1. Describe three examples of how animals depend on plants for survival.
2. Describe three examples of how plants depend on animals for survival.
3. Do you think animals pollinate flowers and disperse seeds on purpose or by accident? Explain why you think so.