

## Succession

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As any particular area ages or passes through time, the kinds of dominant plants in the area change in a fairly predictable manner. Of course, as the kinds of plants in an area change, this will also have some effect on the kinds of animals found there. The assemblage of plants and animals in the area is called the community. Succession refers to the different communities that are found in an area through time.

There are two kinds of succession: primary and secondary. Let's talk about primary first. With primary succession, the area starts out as bare rock. This could be a rock outcropping, recently formed volcanic rock, or any number of other possibilities. But, for whatever reason, the area is now bare rock with no plants growing on it. Bare rock, by definition, is not soil. Soil is a mixture of broken up pieces of rock mixed with humus. Humus is decaying organic matter, and is what helps give soil its texture, nutrients, and dark color. Most plants need soil and cannot grow on bare rock. However, a few can. They are called lichens and mosses. Lichens and mosses are different from each other. Lichens are not actually plants, but are very "plantlike." However, neither lichens nor mosses have true roots. Instead they have structures that allow them to hold onto the rock, and absorb water and nutrients. They are also both very short, usually less than an inch tall. The appearance of lichens and mosses on the bare rock is the first step in succession. As the lichens and mosses go through the process of growing and dying, humus starts to build up. Also, the rock starts to weather and break apart. Eventually, thin soil appears and begins to start building up.

After some time, small annual plants will begin to appear. These are plants that sprout, grow, flower, make seeds, and die all in one growing season. The annuals will be mostly broad leafed plants that are fairly small. Since they are fast growing and have true roots, they are good colonizers. Their roots help them grow in the thin soil and anchor the plant. The roots also help to break up the rock even more, while helping to hold the soil together. The annual plant will be the dominant vegetation for a few years, and during this time, the soil will build up even more.

After a couple of years, perennial plants will start to show up. Perennial plants are plants that live for several growing seasons. These plants will be taller than the annuals, and even though it takes them a little longer to get established, in the end they will outcompete the annual plants and become the dominant vegetation in the area. Perennials can be broad leafed or grasses. During this stage of succession, the grasses will tend to become more dominant until the area is called a grassland. If you look at any grassland, you will see that while grass is the dominant species, there are a lot of broad leafed plants there as well. During the grassland stage, the soil continues to build.

After a few years, shrubs, and eventually trees, will begin to appear in the grassland. The shrubs will appear first and then give way to shade intolerant trees, which around here are usually pines and cedars. These trees grow fairly quickly, but need a lot of light to stay healthy.

Finally, after many years, shade tolerant trees will begin to grow. In our area, these are trees like oaks and hickories. These trees grow much more slowly, but they can tolerate some shade. Even though it takes them a very long time, they will eventually outgrow the pines and shade them out. At that time, succession ends, and the area has become a mature forest. If not bothered, it will remain a mature forest perpetually. This is called the climax community.

What I have just described is primary succession, from rock all the way to a mature forest. The other kind of succession is called secondary succession, and it's very easy. Any time a disturbance happens to an area, it sets the successional stages back. Say that a farmer plows up a grassland and farms it for a few years. Then he stops farming it, and just leaves the field. Succession will start again, but not from the beginning. There is already soil there, and probably the annual plants will come in the first couple of years, and then the perennial grasses will show up, and succession will continue like normal. Anytime succession is set back, but there is still soil there, it is called secondary succession. Any time the disturbance happens so badly that the area is set clear back to bare rock, then primary succession will occur.

Let me give you a couple of examples. Let's say a volcano erupts, and the explosion knocks down all the pine trees growing on the side of the volcano. The successional stage was set back from a pine forest to grassland. The grasses will grow for a while, and slowly the pine trees will start growing again. That is secondary succession. Now, let's say that the volcano erupts and lava flows down the side. When the lava flow cools, it will be a sheet of rock. Primary succession will start on the rock, and eventually it will make it all the way back to pine forest, but it may take decades, or even centuries to occur.

The last thing I want to talk with you about succession deals with the climax community. We normally think about the climax community as being a mature forest, but there are cases where environmental conditions cause succession to stop at an earlier stage. For example, in the American west, there is not enough rain to support trees, so the climax community is the grassland. Even if the area is not disturbed, the community will not go beyond grassland. Similarly, in parts of Canada and Alaska, the climax community is the pine forest. This is because pine trees can grow in much colder climates than deciduous trees.