

Basics of a Food Web

Key points:

- **Producers** - make their own food.
- **Consumers** - get energy by eating other organisms.
- A **food chain** is a linear sequence of organisms through which nutrients and energy pass as one organism eats another
- **Food webs** consist of many interconnected food chains and are more realistic representation of consumption relationships in ecosystems.

Introduction

Organisms of different species can interact in many ways. They can compete, or their relationship can benefit each other. Or, of course, they can do what we so often see in nature programs: one of them can eat the other—chomp! That is, they can form one of the links in a food chain.

In ecology, a *food chain* is a series of organisms that eat one another so that energy and nutrients flow from one to the next. For example, if you had a hamburger for lunch, you might be part of a food chain that looks like this: grass → cow → human. But what if you had lettuce on your hamburger? In that case, you're also part of a food chain that looks like this: lettuce → human.

As this example illustrates, we can't always fully describe what an organism—such as a human—eats with one linear pathway. For situations like the one above, we may want to use a **food web** that consists of many intersecting food chains and represents the different things an organism can eat and be eaten by.

Producers vs. consumers

What basic strategies do organisms use to get food? Some organisms, called *producers*, can make their own food—that is, their own organic compounds—out of simple molecules like carbon dioxide.

Producers are the foundation of every ecosystem on the planet. That may sound dramatic, but it's no exaggeration! Producers form the base of food chains and food webs, and the energy they capture from light or chemicals sustains all the other organisms in the community.

Consumers, also known as other-feeders, can't capture light or chemical energy to make their own food out of carbon dioxide. Humans are consumers. Instead, consumers get their food by eating other organisms or their byproducts and turning that into useful energy. Animals, fungi, and many bacteria are consumers. As we'll see shortly, there are many different kinds of consumers with different ecological roles, from plant-eating insects to meat-eating animals to fungi that feed on debris and wastes.

Food chains

Now, we can take a look at how energy and nutrients move through a ecological community. Let's start by considering just a few who-eats-who relationships by looking at a food chain.

A *food chain* is a linear sequence of organisms through which nutrients and energy pass as one organism eats another. Let's look at the parts of a typical food chain, starting from the bottom—the producers—and moving upward.

Food chains give us a clear-cut picture of who eats whom. However, some problems come up when we try and use them to describe whole ecological communities.

For instance, an organism can sometimes eat multiple types of prey or be eaten by multiple predators, including ones at different trophic levels. This is what happens when you eat a hamburger patty! The cow is a primary consumer, and the lettuce leaf on the patty is a primary producer.

To represent these relationships more accurately, we can use a *food web*, a graph that shows all the trophic—eating-related—interactions between various species in an ecosystem.

- At the base of the food chain lie the **primary producers**. The primary producers are most likely green plants that undergo photosynthesis. The organisms that eat the primary producers are called **primary consumers**. They are usually **herbivores**, plant-eaters, though they may be algae eaters or bacteria eaters.
- The organisms that eat the primary consumers are called **secondary consumers**. Secondary consumers are generally meat-eaters—**carnivores**.
- The organisms that eat the secondary consumers are called **tertiary consumers**. These are carnivore-eating carnivores, like eagles or big fish.
- Some food chains have additional levels, such as **quaternary consumers**—carnivores that eat tertiary consumers.

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