

Carnivores in the tundra ecosystem

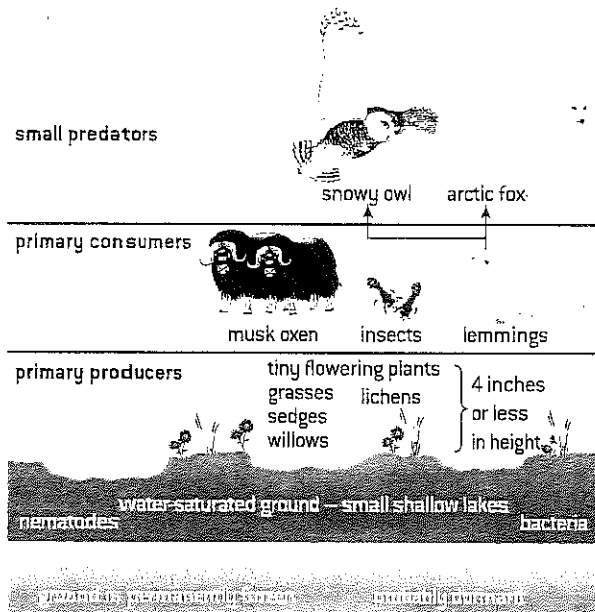


Figure 2.2.5 A food web in the tundra; source Dave Harrison, used with permission

There are several species of bear in the tundra. Polar bears live further north, but are also found in the tundra searching for food. The Kodiak is the largest bear in the Alaskan tundra. It is usually a brown colour. Brown bears are not as fierce as their reputation makes them out to be. They seldom eat meat. Wolves are the top predators of the tundra. They travel in small

families (packs) and prey on caribou and other large herbivores that are too slow to stay with their groups. Some wolves change to a bright white colour in the winter. Otters live near rivers and lakes so they can feed on fish. Shrews are the smallest carnivores of the tundra. Even bats are found in the tundra during the summer. They feed on the swarms of insects that fill the air.

The primary production is not sufficient to support animal life if only small areas of tundra are considered. The large herbivores and carnivores are dependent on the productivity of vast areas of tundra and have adopted a migratory way of life. Small herbivores feed and live in the vegetation mat, eating the roots, rhizomes and bulbs. The populations of small herbivores like lemmings show interesting fluctuations that also affect the carnivores dependent on them, such as the arctic fox and snowy owl.

The blue squares represent the appearance and frequency of snowy owls after almost exponential population increases of lemmings. There is then a lag period of about two years before lemming numbers increase again.

1. Draw a food web for the tundra with **only** the animals mentioned.
2. Why do you think the snowy owls only appear when lemming numbers have fallen? (Hint: climate and decomposers.)

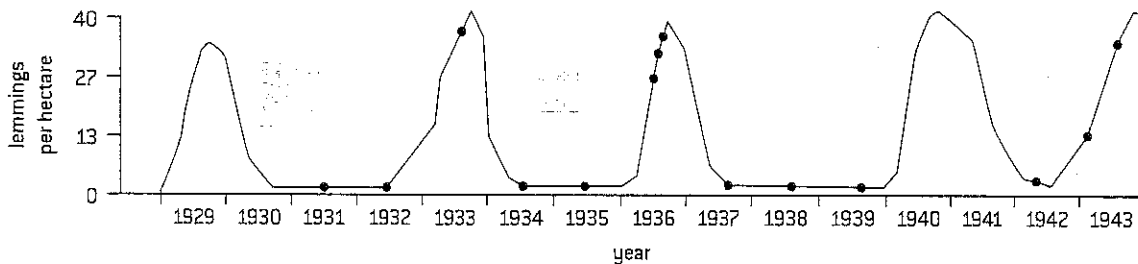


Figure 2.2.6 Snowy owl and lemming numbers in the tundra from 1929 to 1943

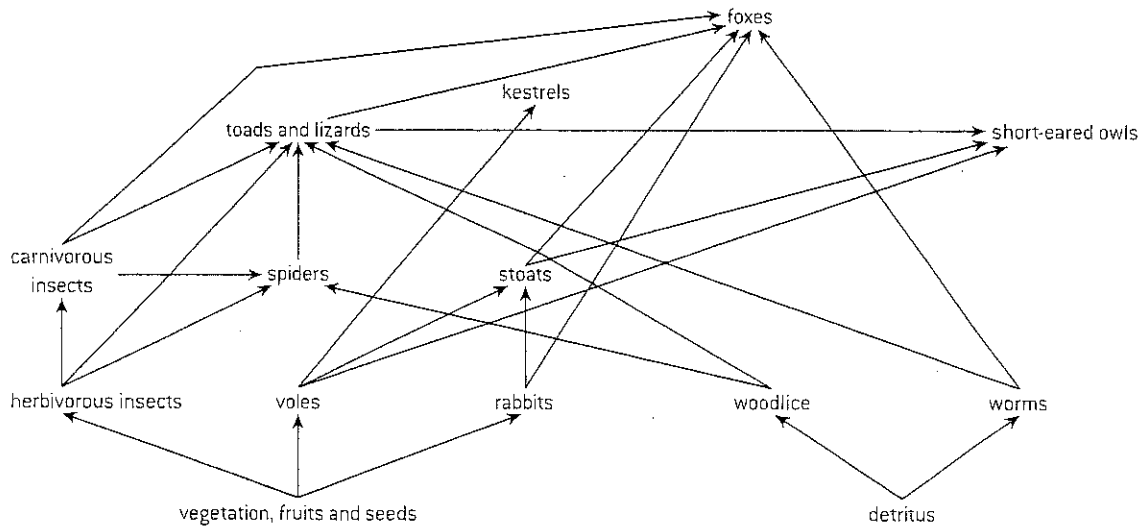


Figure 2.2.7 A simplified food web from the acid heathland at Studland, Dorset, UK

1. What is the longest food chain in this food web?
2. Name two species that are found at two trophic levels.
3. If all kestrels die, what may happen to (a) voles and (b) short-eared owls?
4. If there is a great increase in the rabbit population, what happens to (a) rabbit predators and (b) the vegetation?
5. If a pesticide is added to kill spiders, what may happen to the foxes?

Ecological pyramids

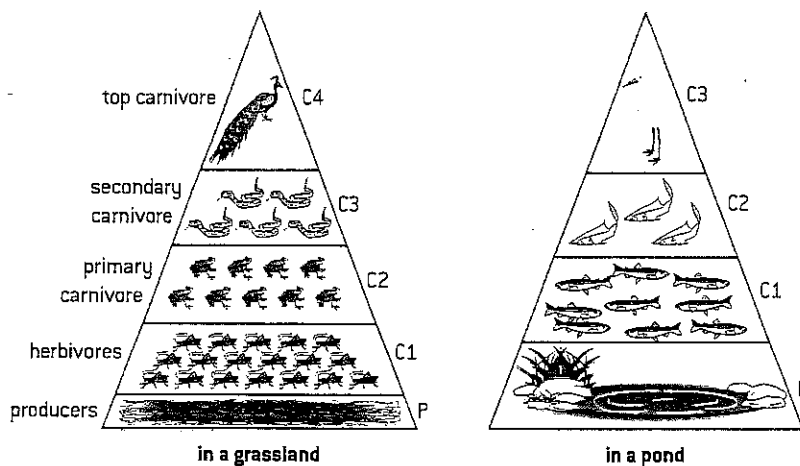
Pyramids are graphical models of the quantitative differences between amounts of living material stored at each trophic level of a food chain.

- They allow easy examination of energy transfers and losses.
- They give an idea of what feeds on what and what organisms exist at the different trophic levels.
- They also help to demonstrate that ecosystems are systems that are in balance.

Key term

Ecological pyramids include pyramids of numbers, biomass and productivity and are quantitative models and are usually measured for a given area and time.

All pyramids may be represented as in figure 2.2.8.



▲ Figure 2.2.8