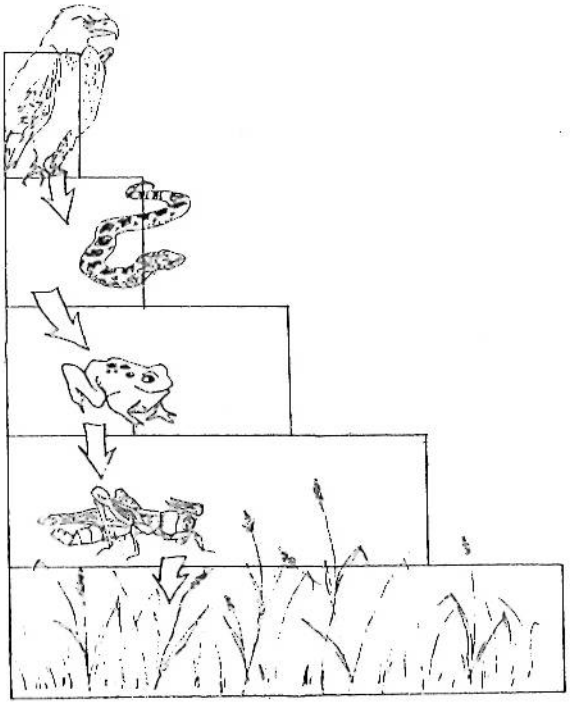
An Ecosystem and Its Ecological Relationships

Introduction: Every organism fits into an interrelated and interacting system. This involves other organisms (the biotic factors) ass well as factors from the non-living environment (the abiotic factors). Ecologists call this system of interrelationships an ecosystem. The world as a whole is a gigantic ecosystem of balance which is controlled by many hundred of very small ecosystems.

Man has finally realized that he lives in an ecological world and is subject to the same laws that apply to other living things. He is learning that when he alters one part of an ecosystem, he influences all other parts.

Question: What are some ecological relationships in an ecosystem?



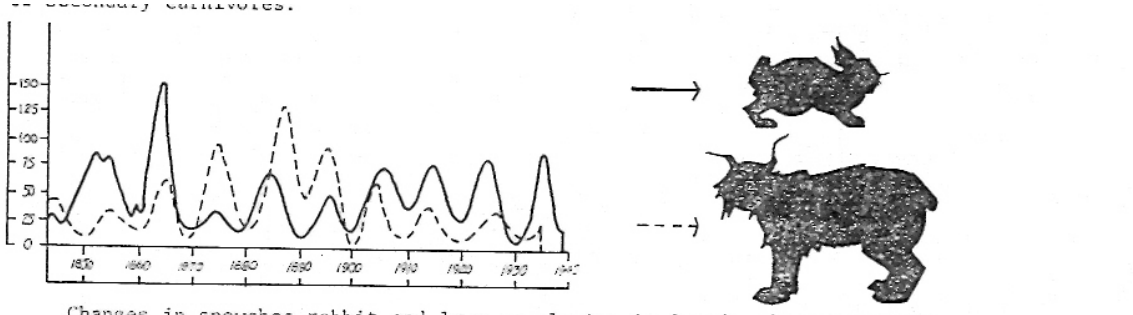
For every large organism in the ecosystem there are h
needed at the base of the food pyramid.

Fig. 1 Food Pyramid

1. Where in this pyramid would the largest number of organisms appear?
2. Where is this pyramid would the largest animals (by size) appear? Where would the smallest appear?
3. Describe the simple food chain shown in terms of who eats who.

At the bottom of this food pyramid are the producers. These organisms use sunlight to convert chemicals into food molecules, usually through the process of photosynthesis. All other organisms are consumers (organisms that need to eat other living things to obtain their food). As consumers eat, they use most of the energy for survival so they pass on very little to the next consumer.

4. Name the consumers in this pyramid.
5. Name the producers in this pyramid.
6. Which consumer get the LEAST energy from the animal it eats? Explain your answer.



Changes in snowshoe rabbit and lynx population in Canada, from fur trade records. Why do you think changes in lynx population lag behind those of rabbits?

Fig. 2 Interrelationship of Animals

The population of any given species is determined in part by the birth rate and the death rate. If the birth rate is greater than the death rate, the population of that species will increase.

7. In figure two, the population of lynx and the population of rabbits are compared. What is the relationship between these two populations?
8. On figure two, use a colored pencil to sketch a line to represent the change in the grass population during this same time period. (hint: think about what the rabbits eat).
9. Give at least two non-living factors that might affect the rabbit population.

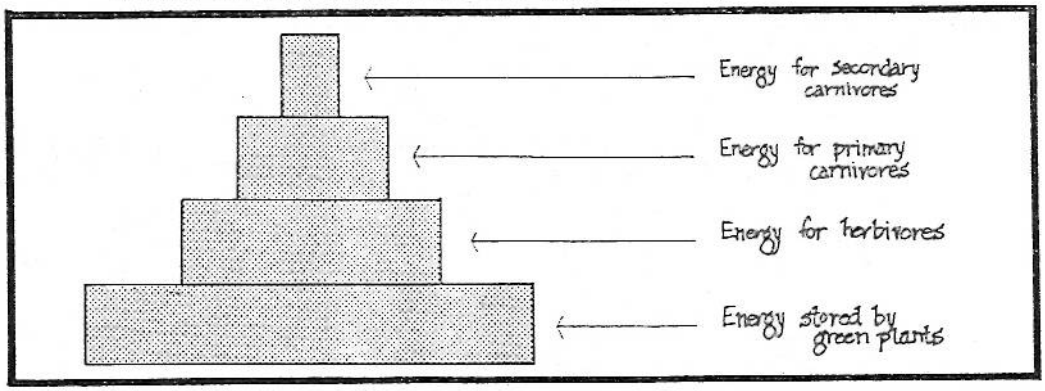


Fig. 3 Steps of the pyramid represent the amounts of energy available to the different types of consumers.

Figure three is an energy pyramid for a general food chain in an ecosystem. Each level of the pyramid represents the available energy from the organisms that make up that level.

10. Which level of the pyramid represents the most available energy?
11. Why don't the herbivores pass on all of the energy they have to the primary consumers?
12. Can this food chain go on and on through even higher levels of carnivores and still benefit the last carnivore? Explain your answer.
13. Come up with a simple food chain that includes a producer, a herbivore and primary and secondary carnivores. Write the names of your organisms on figure 3 in the appropriate area.

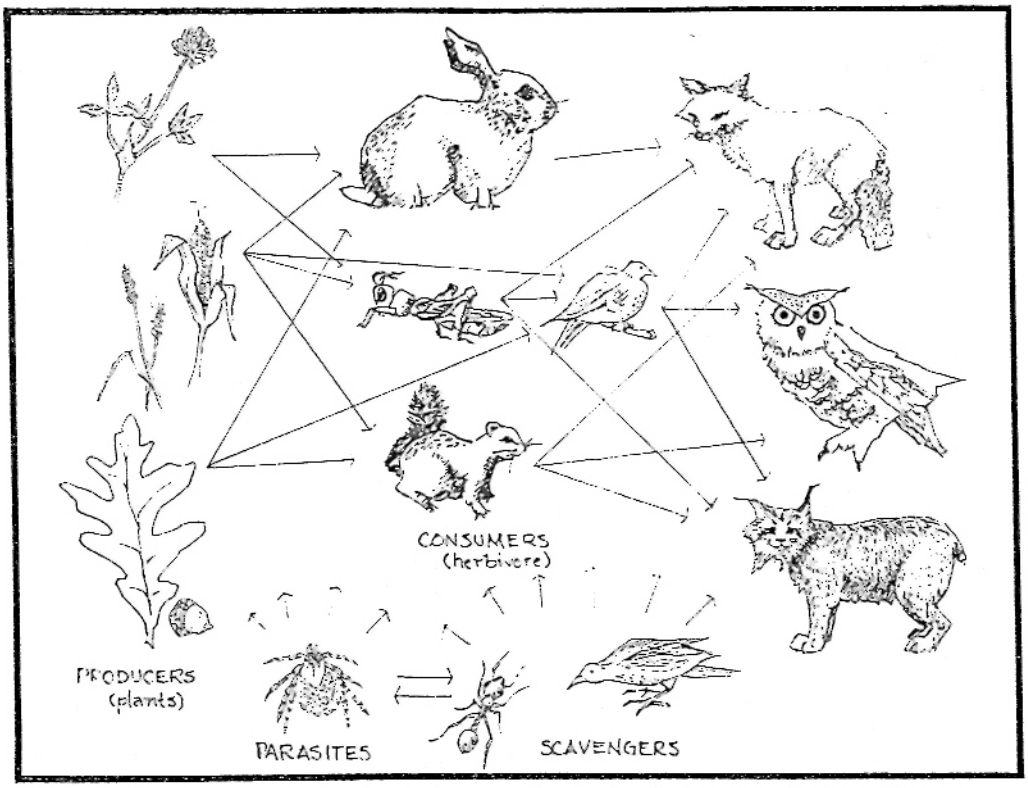


Fig. 4 Observe the food web above. The food web involves both producers and consumers. Note the relationship of the parasites and scavengers to the food web.

In the life and death contest of a food chain, only one animal in the long run can consistently emerge victorious—the predator who ends the entire chain. Yet in the food web, many chain are present to allow many organisms to survive in a complex ecosystem.

14. Can man be placed in a simple food chain? Give an example.
15. Notice how few of the relationships have a simple one to one relationship between producer and consumer. Why is it important that populations in a food web have more than one source of food?
16. How would the ecosystem pictures in figure four adapt if there was a drought? Explain your answer.
17. How would the ecosystem in figure four be affected if the grasshoppers suddenly died out? Explain your answer.
18. If a large store chain decided to build in this ecosystem and plowed up the land, how would the ecosystem adapt? Explain your answer.
19. In the ecosystem shown in figure four, which organisms would be most able to survive a major disruption? Explain your answer.