

Animals are sometimes regarded as motile, chemically complex, self-perpetuating entities that, in many different fashions, convert food protein of one type into food protein of another. Unlike plants, animals are not able to synthesize their own body proteins from basic molecules, energized by sunlight. The primary animal feeding types, or food converters, are herbivorous and feed essentially on plant material. These in turn are eaten by carnivores which may also prey on each other. Some animals, particularly among the vertebrates (including man), are omnivorous and are able to utilize, to some degree, both plant and animal protein. Many groups of invertebrates, because of their small size, are essentially herbivorous. On the other hand, virtually all vertebrate species feed on animal protein at one stage or another of their life history but some (especially in the adult stage), such as the ungulate mammals, tortoises, and many birds, have become secondarily adapted to feeding on plant material. For animal protein, man feeds primarily on other vertebrates or their products and, in modern times, derives only a small proportion of his sustenance from invertebrates (shellfish, shrimps) or their products (honey).

Although some invertebrate animals are obviously man's benefactors (bees, silkworms, earthworms), the group as a whole causes man his greatest physical discomfort, financial loss, disease, and even death. Canadians are universally aware of damage caused by insects and other arthropods that destroy man's crops, riddle his clothing and household furnishings, parasitize his domestic animals, bite and sting his hide and infect his body with disease, undermine his buildings and generally contribute to life's problems. Canadians may be less aware of the expensive measures required to repair damage by other invertebrates, particularly in the marine environment. Shipworms and gribbles reduce wharves and pilings to damp sawdust; barnacles, mussels, sea mosses and hydroids foul the bottoms of boats and clog water conduits; and swarms of sea lice and amphipod crustaceans strip the bait from fishing lines and lobster pots and even eat the defenceless lobsters in their crowded holding trays. Thus, if man did not realize the inestimable value of invertebrates in the pollination of plants and in the food cycle of nature, a cycle necessary to his own existence, he might very well be tempted to put the invertebrates on the negative side of the balance sheet!

Canadians tend to be more familiar with the terrestrial fauna than with the animals of fresh and salt water. Thus, among the vertebrates, the aquatic fish are least familiar to us and, among the invertebrates, the aquatic crustaceans are less well known than the essentially terrestrial insects and spiders. Except for arthropods and molluscs, few invertebrate groups are significantly terrestrial, the earthworms (about 25 Canadian species, mostly introduced) being a notable exception. Their close cousins, the microdriles (about 60 Canadian species), and their more distant cousins, the leeches (about 40 Canadian species), occur mainly in fresh water but a few are marine. The flat worms (Platyhelminthes) have free-living members in fresh and salt water; the flukes and tapeworms are parasitic in higher animals and have a complicated life history involving two or more hosts, one of which is usually aquatic.

Taxonomically, the vertebrate animals of Canada are fairly well known. Even among the fishes, the likelihood of a species new to science being found in the region is slim. The invertebrates, on the other hand, are much less well known. In some groups, such as the ubiquitous minute worm-like nematodes, fewer than 1,000 Canadian species are known, probably representing only 10 p.c. of the total fauna. In certain parasitic worm-like animal groups (Acanthocephala, Nematomorpha) and some free-living aquatic groups (Echiura, Tardigrada) only a few Canadian species are known. Even in relatively well-studied micro-organisms of fresh water, such as the Rotifera ('wheel-bearing' animalcules) and their relatives (more than 1,000 Canadian species), much is yet to be learned. Particularly rewarding fields of systematic research await students of the microscopic interstitial animals of the soil and sea bottom, and of the macro-invertebrates of the Pacific Coast of Canada.