Dirk Loddenkemper

What factors influence the rate of decomposition in forests?

Tonya Ramey investigates the animals and processes which help sustain our forests. She does part of this work in the Malcolm Knapp Research Forest, about 60 kilometres east of Vancouver, across the Pitt River. This forest, managed by the University of British Columbia, hosts research projects from multiple institutions that mostly deal with forest ecology and management.

Nutrients are recycled into the soil through decomposition, the vital process in which organic matter is broken down into simpler components that can be used by other organisms. The rate of decomposition is important for the movement of nutrients through the ecosystem. Many factors can affect this rate. The influence of living things, like animals which consume dead plant material (called *detritivores*), or the action of fungi and microbes on fallen leaves, are called *biotic* factors. Non-living factors, like temperature or moisture, are called *abiotic* factors.

To find out what animals, like beetles and spiders, are unique to the areas around streams, Tonya set out pitfall traps made of cups sunk into the ground at different distances from the stream bank. The cool, moist soil and air near the stream can be a refuge for animals during the dry summers, creating a unique *riparian* (or stream-side) community. She then brought the contents of the traps back to the lab to review under the microscope. She is currently identifying the species in these communities and how each may contribute to the cycling of forest nutrients.

Tonya is also measuring the decomposition rate of leaves from both alder and cedar trees. The high moisture near streams can potentially provide better conditions for fungi and bacteria to grow on fallen leaves, thus creating an ideal food source for larger animals that consume litter, like detritivorous insects. Other factors, such as the types of plants and the amount of nitrogen their leaves contain, can also influence decomposition rates and animal communities.

Research such as this examines how biotic and abiotic factors interact to regulate important ecosystem processes, allowing us to understand how forests work and how we can better protect them.

a.

b.

c.

all photographs by Tonya Ramey

Tonya's equipment included pitfall traps (a, top right corner) and mesh bags of leaves (a, centre). Contents of the pitfall traps (b), such as snail-killing beetles (*Scaphinotus angusticollis*) (c) were brought back to the lab and kept in vials of preservative.