

Factors influencing litter decomposition rates in upstream and downstream reaches of river systems of eastern Canada

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Abstract: In northern Nova Scotia, Canada, we compared litter decomposition rates in cool, woodland brooks and warm, unshaded rivers within the same drainage basins to test the influences of temperature, litter-feeding invertebrates (shredders) and sedimentation on decomposition rates. In the South River system, mass loss rates from N-poor red maple (*Acer rubrum*) and N-rich speckled alder (*Alnus incana*) leaf litter confined in mesh bags were measured in the summer and again at autumn leaf-fall. In the summer, decomposition of both species proceeded faster at the cool upstream site, and decomposition of maple litter was faster than N-rich alder. In the autumn, decomposition was much slower in cold water and differences between sites and species disappeared. In the South River system, the total volume of litter-feeding invertebrates (shredders) was greater upstream in summer and downstream in autumn. Movement of benthic sediments did not modify decomposition rates in either season. Summer mass loss experiments with alder leaves on two other river systems produced similar results to those from the South River system. Water temperature appears to have an indirect, negative effect on decomposition rates in summer, because of limitations on distributions of stenothermal shredders, but a direct and positive effect in autumn, when cold water limits biological activity.