



## Coupling of boreal forests and lakes: Effects of conifer pollen on littoral communities

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**ABSTRACT:** Conifer pollen deposition is a visually striking spring event in boreal lakes, representing a potentially major allochthonous input of limiting nutrients. We conducted a lake survey and mesocosm experiment at the Experimental Lakes Area in northwestern Ontario to test the hypothesis that jack pine (*Pinus banksiana*) pollen inputs subsidize littoral nutrient levels and stimulate algal growth and zooplankton abundance. A series of floating litterfall collectors were deployed along transects that span a 0.27-km<sup>2</sup> headwater lake (Lake 373) and monitored after ice-out to quantify pollen deposition over a 45-d period. Lake 373 (L373) received 11-56  $\mu\text{mol P m}^{-2} \text{d}^{-1}$  from pollen, or an annual total of about 10 kg of P. These data were used to determine pollen amendment levels (ambient, 3x, 10x) for an experiment involving 18, 1-m<sup>2</sup> littoral mesocosms distributed over three lakes (L239, L373, and L442). Pollen amendments significantly increased total phytoplankton and herbivorous zooplankton biomass, resulting in greater abundance of inedible filamentous green algae and large diatoms. Pollen also exerted a positive lake-specific effect. Periphyton biomass also increased in response to pollen additions, especially filamentous green algae and diatoms in L239 and L442. Conifer pollen subsidizes nutrient levels and promotes production in small boreal lakes.

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