



# **Climate Change, Air Pollution and Global Challenges: Chapter 11. Impacts of Atmospheric Change on Tree-Arthropod Interactions (Developments in Environmental Science)**

*John J. Couture, Richard L. Lindroth*

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Anthropogenic activities are increasing concentrations of atmospheric pollutants, especially atmospheric CO<sub>2</sub> and tropospheric O<sub>3</sub>, that play significant roles in the functioning of forest ecosystems. Elevated levels of CO<sub>2</sub> and O<sub>3</sub> alter tree metabolism, growth, and chemical composition. Shift in chemical composition may, in turn, cascade through trophic levels to influence ecosystem processes important for forest functioning. As the most abundant animals in forest ecosystems, arthropods influence multiple facets of ecosystem functioning, including herbivory, predation, and nutrient cycling. In this chapter, we review the current state of knowledge regarding the effects of atmospheric change on tree foliar chemistry and address the responses by forest arthropods to atmospheric change at the individual, population, community, and ecosystem levels. We identify knowledge gaps and highlight future research directions that will further our understanding of the influence of atmospheric change on forest ecosystems in future environments.

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