

Cities as harbingers of climate change:
common ragweed, urbanization, and public
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Cities as harbingers of climate change: Common ragweed, urbanization, and public health

Lewis H. Ziska PhD^a ... James G. Straka PhD^d

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Abstract

Background: Although controlled laboratory experiments have been conducted to demonstrate the sensitivity of allergenic pollen production to future climatic change (ie, increased CO₂ and temperature), no in situ data are available. **Objective:** The purpose of this investigation was to assess, under realistic conditions, the impact of climatic change on pollen production of common ragweed, a ubiquitous weed occurring in disturbed sites and the principal source of pollen associated with seasonal allergic rhinitis.

Methods: We used an existing temperature/CO₂ gradient between urban and rural areas to examine the quantitative and qualitative aspects of ragweed growth and pollen production. **Results:** For 2000 and 2001, average daily (24-hour) values of CO₂ concentration and air temperature within an urban environment were 30% to 31% and

1.8Â° to 2.0Â°C (3.4Â° to 3.6Â°F) higher than those at a rural site. This result is consistent with most global change scenarios. Ragweed grew faster, flowered earlier, and produced significantly greater above-ground biomass and ragweed pollen at urban locations than at rural locations. Conclusions: Here we show that 2 aspects of future global environmental change, air temperature and atmospheric CO₂, are already significantly higher in urban relative to rural areas. In general, we show that regional urbanization-induced temperature/CO₂ increases similar to those associated with projected global climatic change might already have public health consequences; we suggest that urbanization, per se, might provide a low-cost alternative to current experimental methods evaluating plant responses to climate change. (J Allergy Clin Immunol 2003;111:290-5.)



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Keywords

Global change; seasonal allergenic rhinitis; Amb a 1; common ragweed

Abbreviations

[CO₂] , Atmospheric CO₂ concentration

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Reprint requests: Lewis H. Ziska, PhD, Alternate Crop and Systems Laboratory, United States Department of Agriculture, Agricultural Research Service, 10300 Baltimore Avenue, Beltsville, MD 20705.

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