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Title: Quantification of Ozone Flux, Oxidative Stress and Visible Injury in the foliar parts of Lagerstroemia speciosa

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Keywords: Ozone Flux  
Lagerstroemia speciosa  
Oxidative Stress

Issue Date: Apr-2022

Publisher: IISER Mohali

**Abstract:** The urban air pollution mitigation potential of avenue trees plays a significant role in urban landscape planning and urban forestry tree species selection. Therefore, plants have been used for biomonitoring for air quality of the city. In the present study, we selected Lagerstroemia speciosa a common landscaping tree species in India and monitored the impact of tropospheric ozone ( $O_3$ ). Further, critical levels to L. speciosa have been investigated through morphological, physiological and biochemical oxidative stress parameters. The results of the present study clearly showed that the visible leaf injury (%) increased with increasing AOT  $40 O_3$  ppb h<sup>-1</sup> exposure and leaf age, and that fertilization slows this process. Further, it is found that with the enhancement of visible injury level from mild to severe caused reduction in the amount of total chlorophyll content in the leaves of L. speciosa. The oxidative stress markers including  $H_2O_2$  content, lipid peroxidation (measured in terms of MDA content) and membrane damage in terms of electrolyte leakage (%) increased with increasing visible injury level (from mild to severe). These indicate the stress generated by the reactive oxygen species (ROS) a primary cause of this premature aging. Additionally, the antioxidant activity was measured through non-enzymatic assays i.e., Ascorbic acid content increased with the increasing visible injury level which could be the reason why the tree is rated as relatively air pollution tolerant despite being susceptible to ozone induced ROS. The total phenolic content was higher at the lower concentration of low and severe injury levels however, at higher concentration a significant decrease was observed in the content irrespective of the injury level. Overall, this indicator species appears to be suitable to document visible injury as first signs of injury can be observed within 3 days after the onset of exposure while severe damage and shade effects are visible in less than 25-day old leaves. Therefore, L. speciosa tree species appears to be a useful bioindicator for ozone levels in the Indo-Gangetic plains of India.

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