



## **Quantification of indoor pollen concentrations (*Juniperus ashei*) during rainy episodes in Austin, Texas**

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Mountain cedar (*Juniperus ashei*) is producing high quantities of pollen exerting the so-called cedar fever in individuals allergic to this pollen species. Standard pollen monitoring programs evaluate outdoor pollen concentration; however, information on indoor pollen is crucial for human wellbeing as people stay most of the day inside buildings. In this study, we analysed the differences of indoor pollen loads between rooms with different use and ventilation at The University of Texas at Austin, School of Architecture, and focused on the effect of rainy episodes on the indoor pollen load.

Pollen of mountain cedar was sampled in January and February 2015 in Austin, Texas, using Personal Volumetric Air Samplers, every second hour between 8 am and 6 pm on a total of 6 days. These samplers were installed in seven rooms and two outdoor research facilities, the Thermal Labs that were controlled for ventilation. In addition, one sampler was located outside to obtain background pollen concentrations. We calculated the daily pollen index (DPI, sum of hourly pollen counts), the campaign pollen index (CPI, sum of all daily pollen indices) and the ratio between indoor and outdoor pollen concentrations (I/O ratio).

The highest CPI (906) was recorded in a room where the window and door was frequently opened, the smallest CPI (75) in a storeroom with no window and no forced ventilation. The highest hourly pollen concentration of 177 pollen grains/m<sup>3</sup> was measured in one of the Thermal Labs. Values at this level can already exert symptoms in people allergic to this pollen. We also found that there were higher I/O ratios during rainy episodes, when a lower outdoor pollen count was recorded. Mean I/O ratios were higher during rainy episodes (0.98, SD = 1.95) compared to non-rainy episodes (0.05, SD = 0.09). This suggests that pollen was accumulated in the course of the pollen season reaching even higher levels than outdoors. The low ratios during the non-rainy episode seem to signal a low risk for allergy sufferers when staying inside. However, the overall mean daily pollen concentration of mountain cedar can reach values greater than 5,000 pollen grains/m<sup>3</sup>. Thus, small ratios can still be associated with high indoor DPIs.

In addition to background pollen concentrations, further studies and monitoring programs should consider indoor pollen concentrations. Moreover the influence of meteorological weather conditions should be further investigated.