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Simulation on the Impacts of the Street Tree Pattern on Built Summer Thermal Comfort in Cold Region of China

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Research Highlights:

- 1) About the Layout: the absolute position of vegetation is replaced by relative planting position.
- 2) About the Vegetation Height: taking into account the height ratio of vegetation to architecture.
- 3) Because the behavior in the vehicle does not belong to outdoor activities, in the calculation of thermal comfort, select the area without the middle part of the street.

Abstract

The phenomenon of global warming and urban heat island has raised the attention for the outdoor thermal comfort. Vegetation in the improvement of urban micro-climate has been confirmed by a large number of scholars. The problem of the uncomfortable summer climate in China's Cold region didn't get enough research. In this paper, the summer thermal comfort of the street canyon has been studied. The main research intent is to analyze the relationship between the street tree pattern and the thermal comfort of street canyon.

It's demonstrated that, in north-south street, it is suitable for the arrangement of street tree to be at the centre on one side of the street. The higher the height of the street tree, the more comfortable thermal environment the street gets. However, when the ratio of the street tree height to the street building is greater than 10:18, the improvement effect decreases. In east-west street, planting the street tree clinging to the street buildings can provide a better thermal comfort improvement effect.

The result of this study can serve as a guide to the greening design in China B-cold region and other regions with similar climatic conditions.

Keywords: Tree Pattern; Thermal Comfort; Environmental Simulation

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