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Title: Growing on the street: Multilevel correlates of street tree growth in Montreal

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**Abstract :**

Tree planting has been favoured in many North American cities, including Montreal which aims to increase its canopy from 20% to 25% in 2025. However, the mortality rate of street trees is especially high in the first few years after planting. Studies have shown that variables that are intrinsic to the tree and those related to its location, the urban form and the socio-demographic characteristics of the surrounding environment are significantly associated either with trees' survival rate or with vegetation cover. In this research we examine variables that have statistical associations with tree growth, which is the diameter at breast height divided by the number of years on the ground, for approximately 28,000 street trees in Montreal. Independent variables were nested into three spatial scales: the tree (species and physical variables), the street section (urban form variables), and the census tract (socio-demographic variables). Multilevel models reveal that 65.51% of the growth variance is potentially explained by the species and planting physical conditions such as the *east* and *north* sides (positive associations with the growth), *signage* as an obstruction (negative association). 28.54% of the growth variance is potentially explained by the urban form, in our case building age (convex relationship with the growth), mixed zoning (negatively) and residential zoning (positively). At the neighbourhood level, although none of our variables is significant, 6.95% of the growth variance is potentially explained by other missing variables. New planting programs should hence consider the urban form in order to improve tree growth.

**Keywords :** street trees, tree growth, planting conditions, urban form, multilevel models

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