

The influence of vegetation type on riparian urban forest microclimates

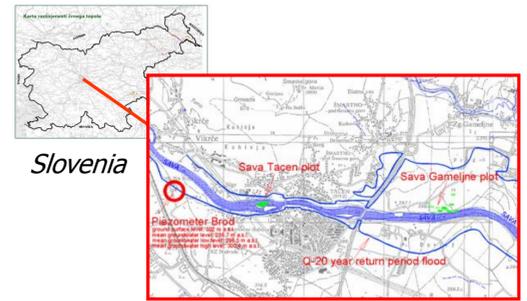
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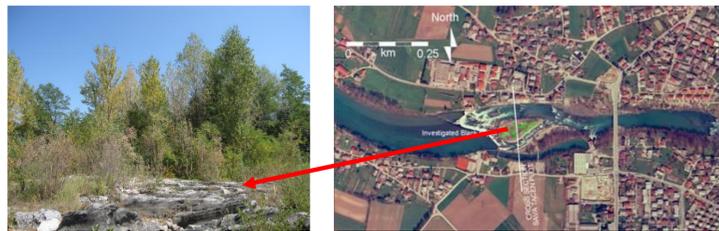
INTRODUCTION

Climate regulation is important ecosystem services provided by urban forests, closely related to human well-being. Vegetation, which represents a significant proportion of many urban and peri-urban landscapes, can modify climate by altering local exchanges of heat, water vapor, and CO₂ (Peters and McFadden, 2010).

We analyzed seasonal patterns of air temperatures and selected meteorological stress indicators at four sites representing the most common vegetation types in the riparian forests in the peri-urban area in the City of Ljubljana, to determine how distinct urban forest communities vary in their microclimatic effects over time.



Sava river, Ljubljana



Island Black poplar stand



Riparian Black poplar stand

MATERIALS AND METHODS

Air temperature in fifteen minutes time step were collected over a period of 5 years using four automatic digital air temperature sensors (i-button, Dallas semiconductor) (Sinjur and Vertačnik, 2007).

RESEARCH PLOTS

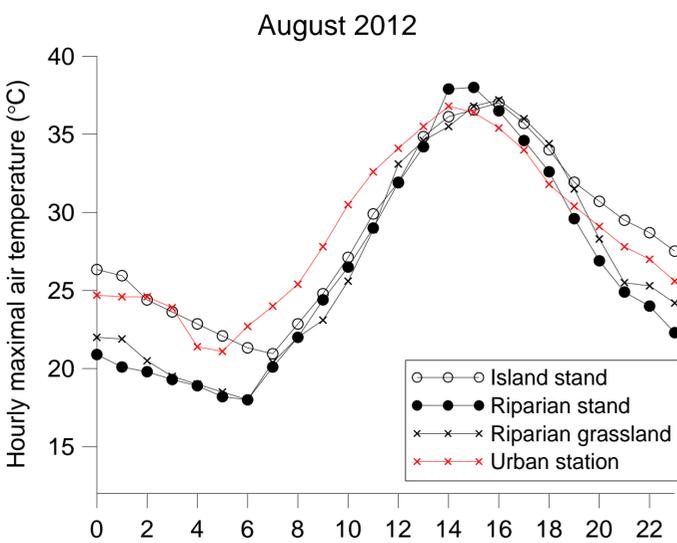
1. Island Black poplar stand
2. Riparian Black poplar stand
3. Riparian grassland
4. Urban climatological station Ljubljana

Meteorological stress indicators were calculated at research sites and compared to the climatological station in the urbanized area:

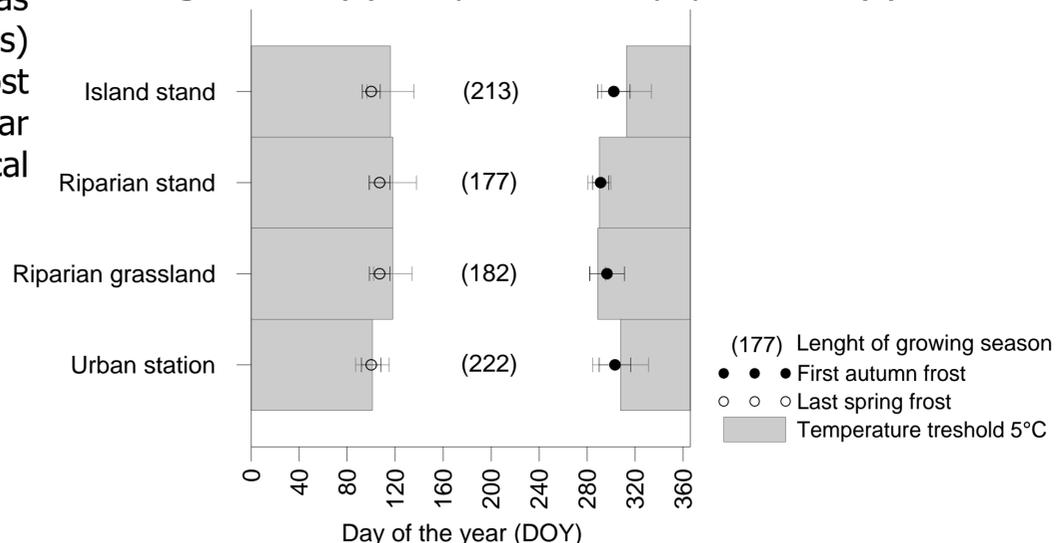
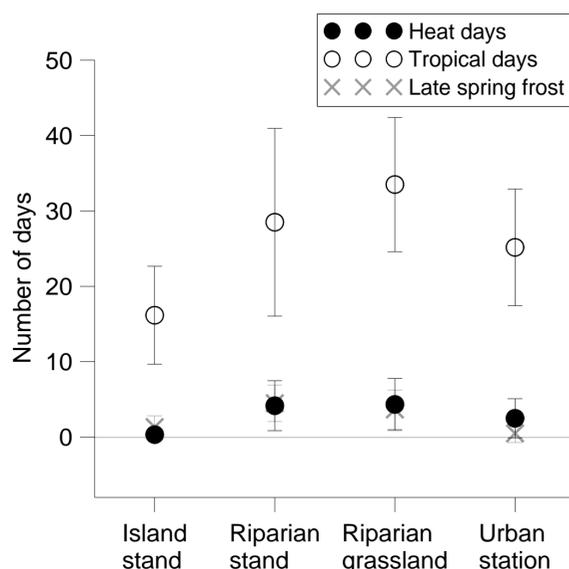
- **Last spring frost:** day in the year (DOY) with minimal day temperatures in April and May < 0°C;
- **First autumn frost:** day in the year (DOY) with minimal day temperatures in September and October < 0°C;
- **Tropical days:** the number of days with maximal air temperatures > 30°C;
- **Heat days:** the number of days with maximal air temperatures > 35°C.

RESULTS

During the heat wave in August 2012 the island Black poplar stand experienced less **heat days** (1) compared to the urban climatological station (4), riparian grassland (6) or riparian Black poplar stand (6).



In the urban climatological station was the longest growing season (222 days) with lowest number of late spring frost days (3). In the island Black poplar stand was lowest number of tropical days (97) and heat days (2).



CONCLUSIONS

Seasonal patterns of air temperatures were controlled more by differences in riparian vs. urban site location than by vegetation functional type. In the island Black poplar stand air temperatures across the year were buffered by the Sava River microclimate.

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