# Tree traits and their functional role in cooling urban environments

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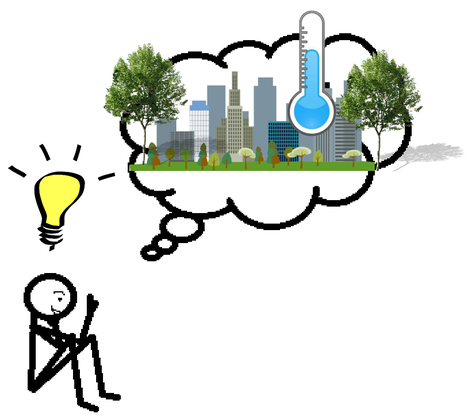
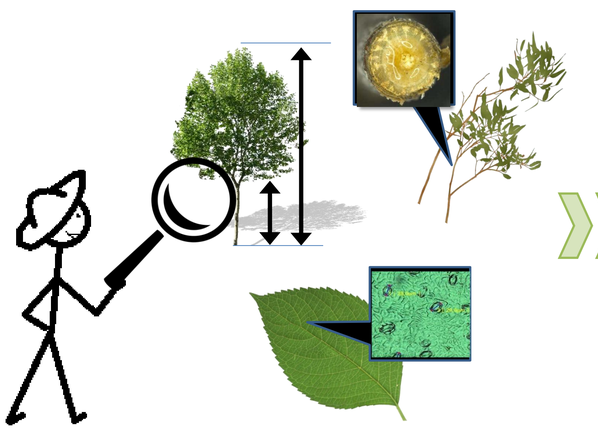
## Background





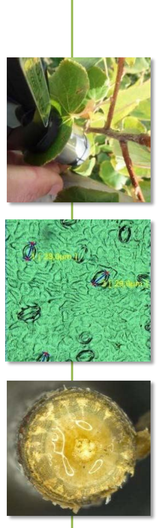
### Research Questions

- Which tree traits are associated with air temperature, relative humidity and perceived temperature?
- Which of these traits are most important for cooling in urbanized areas?

## Methods

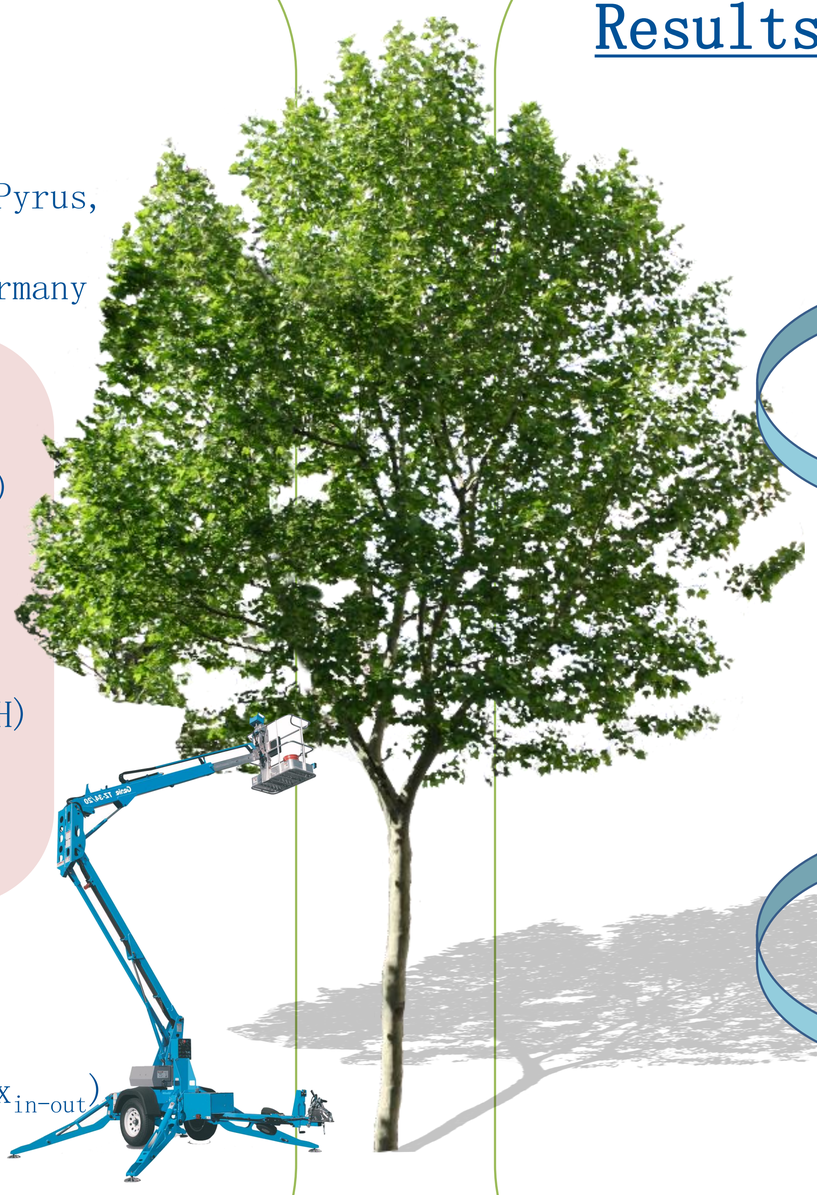

### Species and sites

- 6 species (Genera: Fraxinus, Pyrus, Robinia, Tilia)
- 10 urban sites in Leipzig, Germany



### Traits

- Leaf area index (LAI)
- Leaf dry matter content (LDMC)
- Specific leaf area (SLA)
- Leaf thickness (Lth)
- Height (h)
- Height of crown base (hbase)
- Diameter at breast height (DBH)
- Stomatal traits
- Leaf water potential ($\Delta psi_{leaf}$)
- Turgor loss point





### Climate data

- Air Temperature ($T_{in-out}$)
- Relative Humidity ($RH_{in-out}$)
- Perceived temperature ($Humidex_{in-out}$)

### Data Analysis

Mixed effect models
(**nlme** package in R)

## Results

$\Delta psi_{leaf}$
LAI

**Lower** Air Temperature and Humidex

$\Delta psi_{leaf}$ ...tree is longer transpiring during drought

LAI... represents high shade effect and leaf area for transpirational cooling

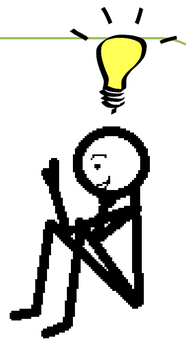
LAI
Hbase
$\Delta psi_{leaf}$

**Increase** Relative Humidity

Hbase... Transpiring leaves are closer to the ground

## Conclusion

- **Leaf water potential, leaf area index** and **height of crown base** are most associated with climate parameters
- Trees with these traits promote the cooling potential in urban areas, leading to an improved human well-being



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