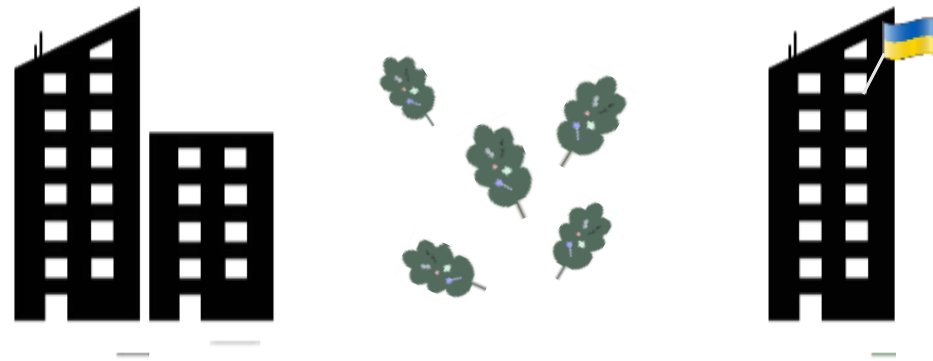


# Foliar fungi under urban stress

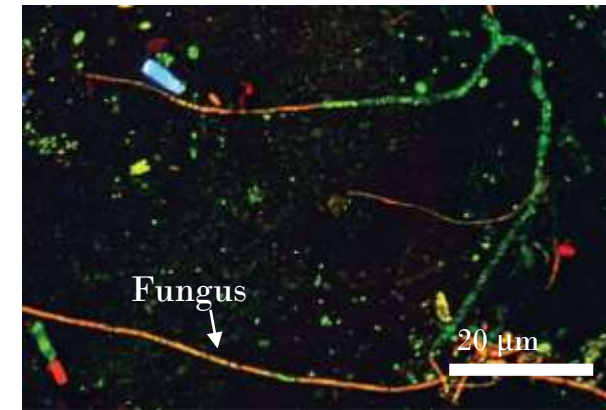
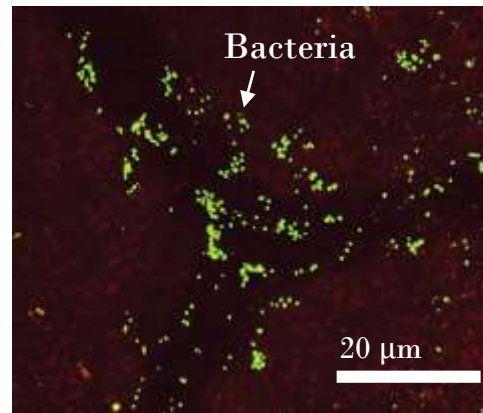
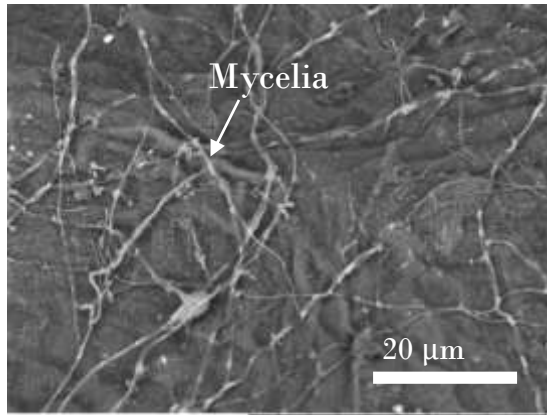
**Maria Faticov**, Jorge Amorim, Ahmed Abdelfattah, Laura van Dijk,  
Isabelle Laforest-Lapointe and Ayco Tack

Post-doctoral fellow, UdeS, Sherbrooke, QC, Canada

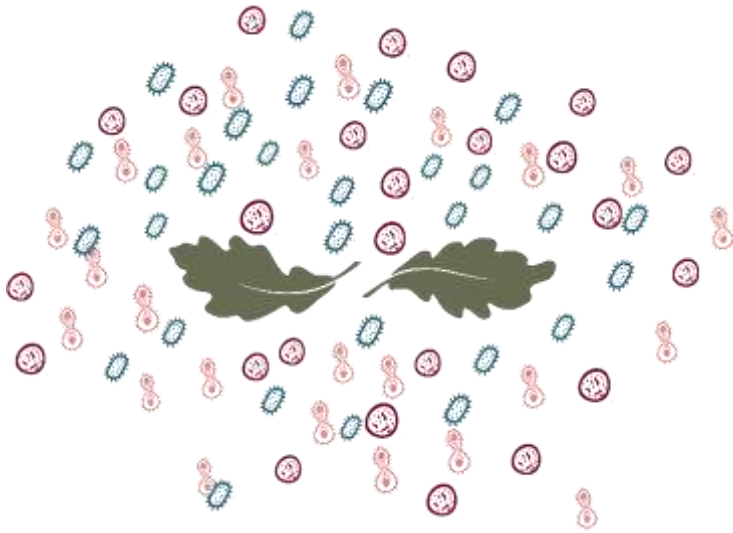


# Leaf surface hosts a large number of microorganisms

Vacher et al., 2016 “The Phyllosphere: Microbial jungle at the plant–climate interface”



# Fungi play important role for plant and human health in urban environment

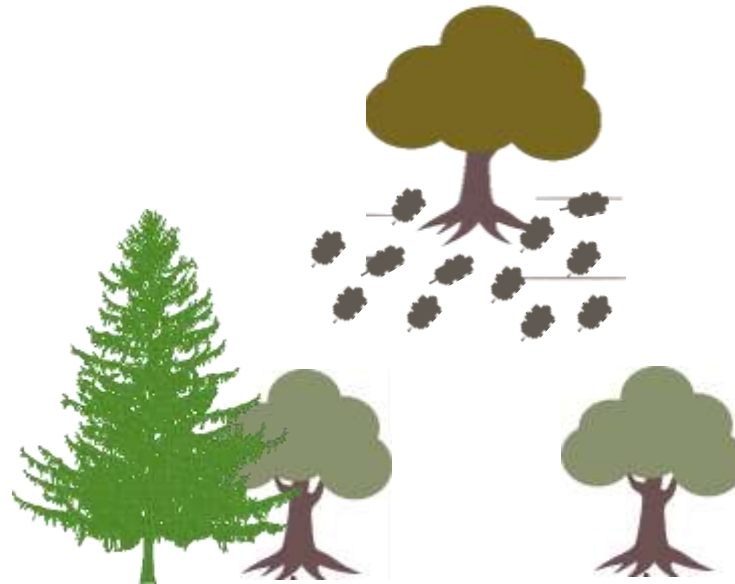


- increase plant defence and help to endure abiotic stress
- extract resources and weaken plant defences
- play role in leaf senescence and decomposition
- leaf fungi are in constant exchange with fungi in the air – may have serious health implication for humans

# Questions

What is the impact of urban microclimate on foliar fungal community?

What is the impact of air and habitat quality on foliar fungal community?



# Study design: Urban SIS project and urban trees

- Historical climate data downscaled to 1 km×1 km resolution over Stockholm, Sweden
- Dynamical downscaling performed for 6 years: 2012, 2013, 2014, 2015, 2017, 2018

+ nice bonus

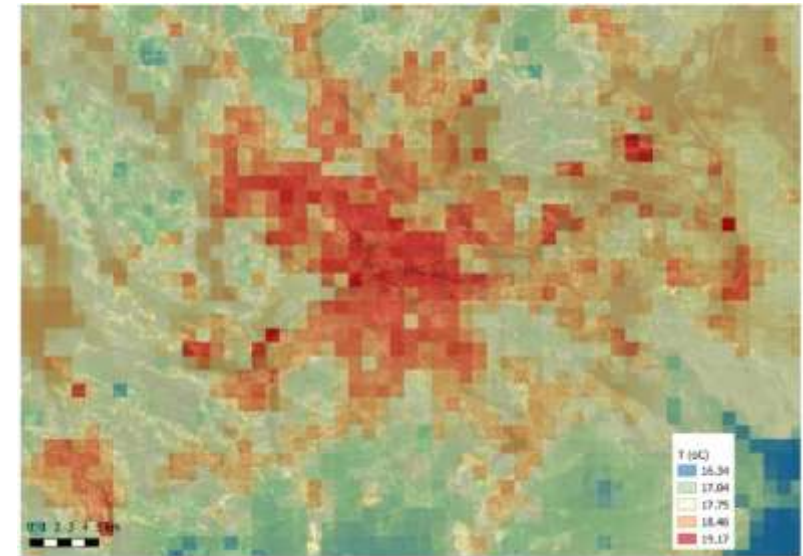
Air quality models over 1 km×1 km resolution



Towards climate services for European cities: Lessons learnt from the Copernicus project Urban SIS

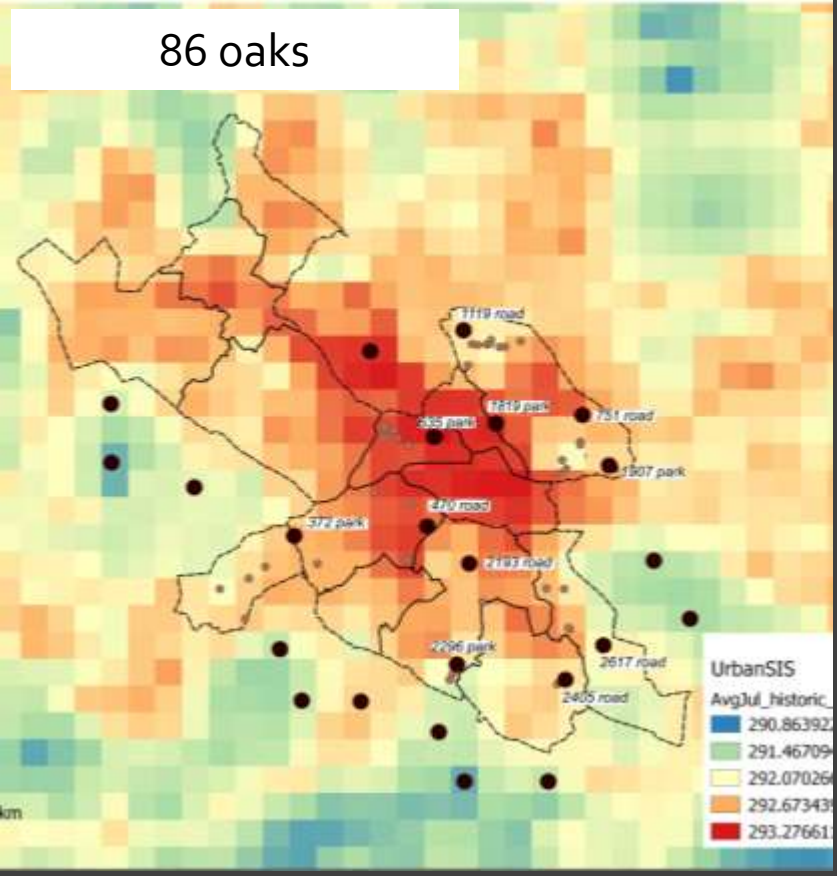
Lars Gidhagen<sup>a</sup>, Jonas Olsson<sup>b,\*</sup>, Jorge H. Amorim<sup>c</sup>, Christian Asker<sup>d</sup>, Danijel Belusic<sup>e</sup>, Ana C. Carvalho<sup>f</sup>, Magnuz Engardt<sup>g</sup>, Yeshewatesfa Hundecha<sup>h</sup>, Heiner Körmich<sup>i</sup>, Petter Lind<sup>j</sup>, David Lindstedt<sup>k</sup>, Esbjörn Olsson<sup>l</sup>, Jürgen Rosberg<sup>m</sup>, David Segersson<sup>n</sup>, Lena Strömbäck<sup>o</sup>

<sup>a</sup> Swedish Meteorological and Hydrological Institute, SMHI, P.O. Box 50, 402 22, Norrköping, Sweden  
<sup>b</sup> Environmental and Health Administration, Box 2030, 104 20, Stockholm, Sweden

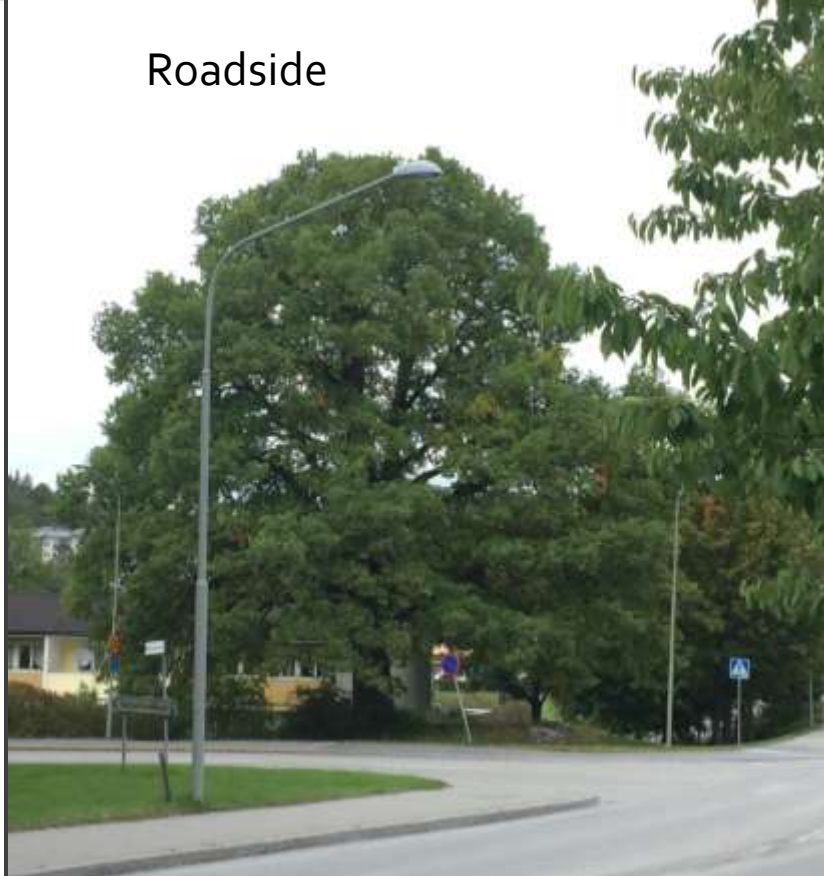


Mean summer temperature in 2014 as simulated by HARMONIE-AROME over Stockholm

86 oaks



Roadside

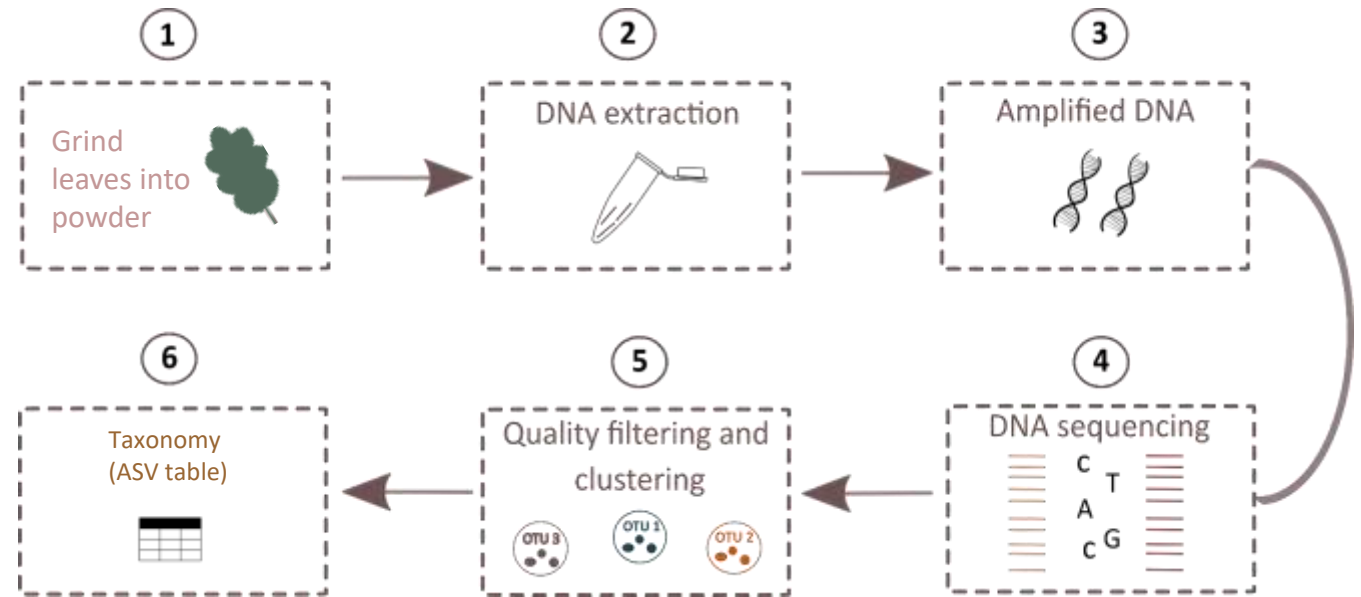
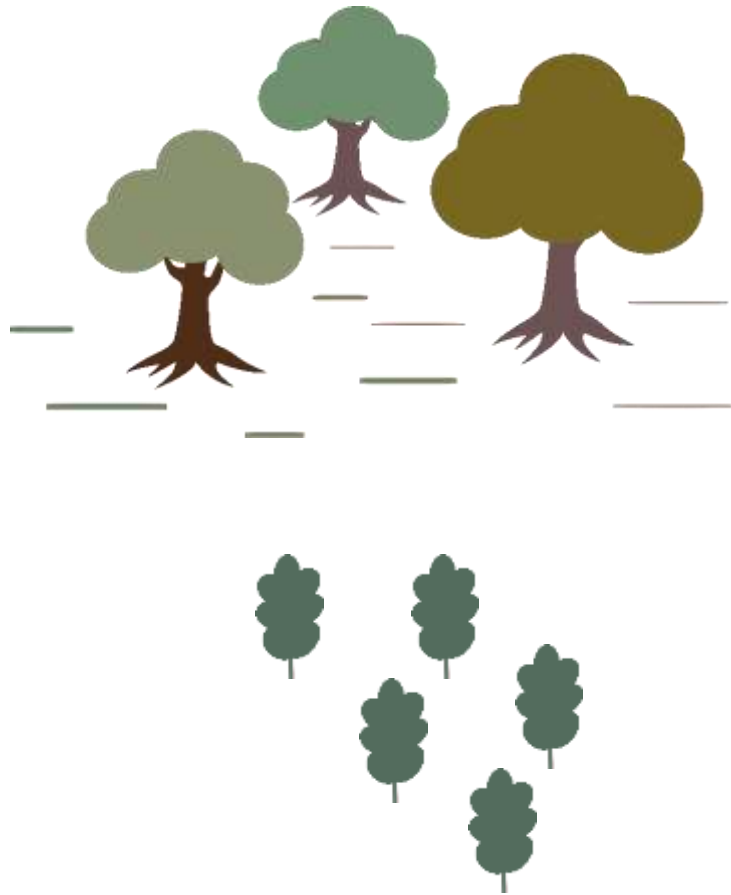


Park



**86 oak trees surveyed in Stockholm area**

# Study design: Illumina sequencing to characterise urban fungal community

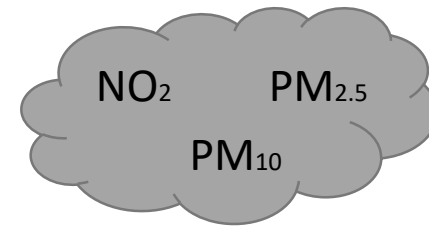


# Study design: climatic, air quality and habitat quality data

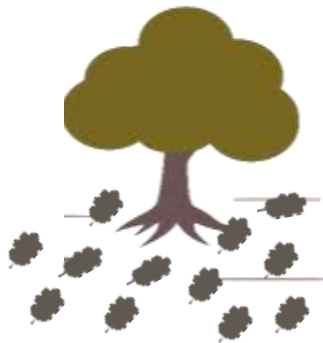
## Climate variables



## Air quality



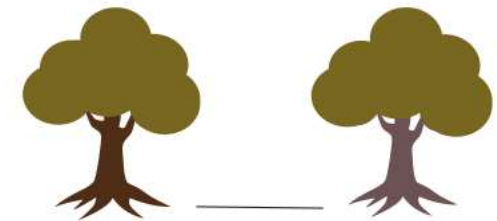
## % of litter cover



## Sunlight exposure



## Spatial connectivity



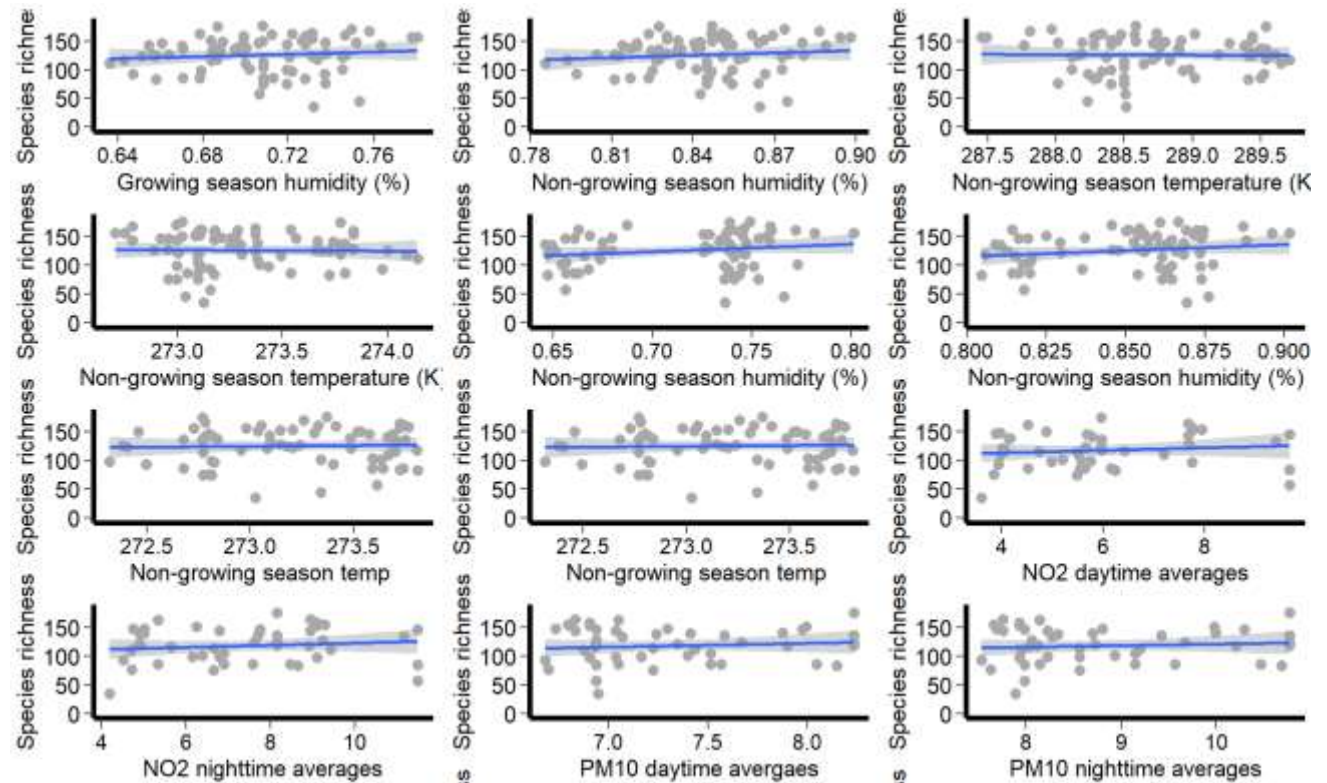


# Results: variation in climate has **no effect** on fungal richness and evenness

Fungal richness (number of species)

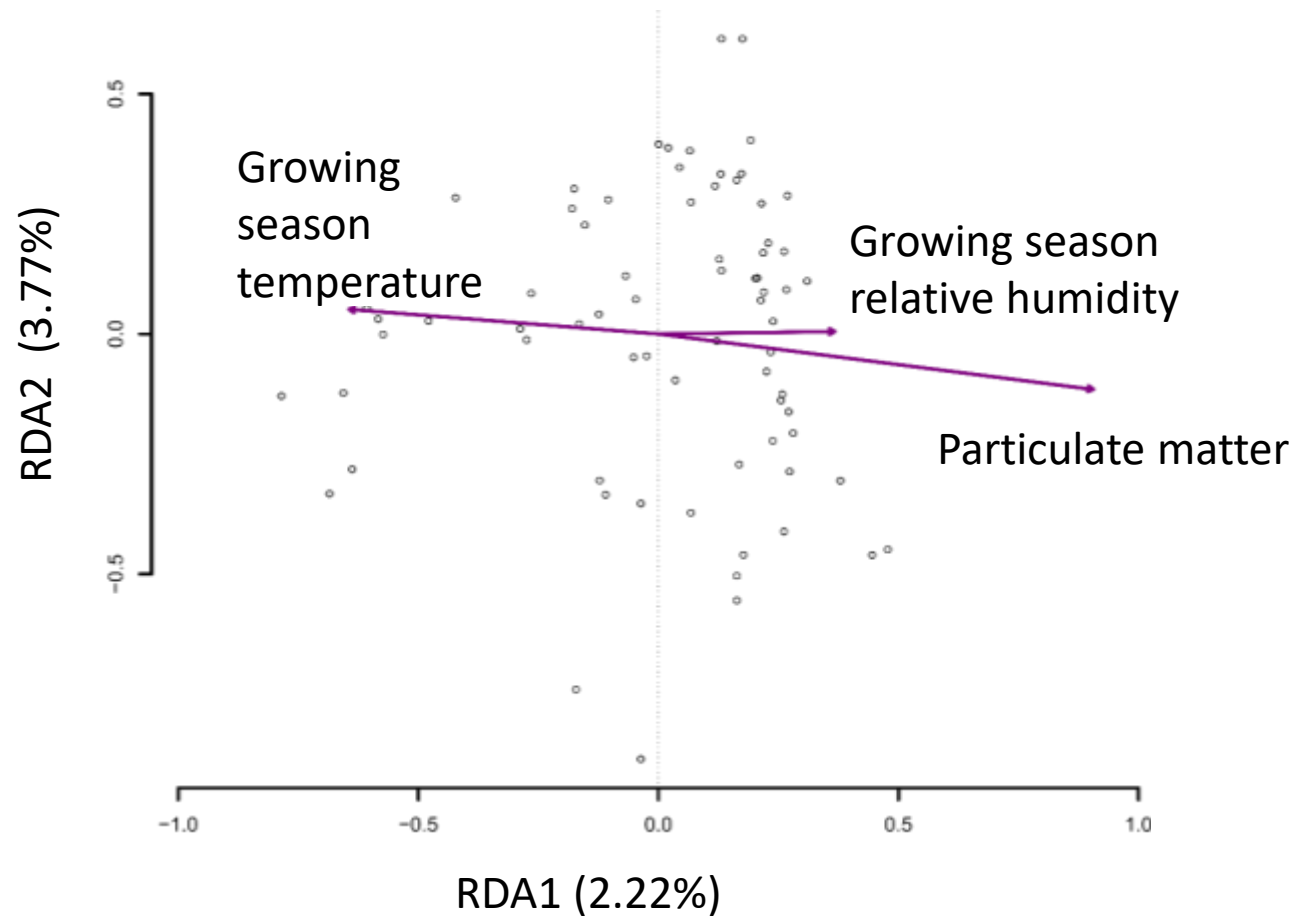


Fungal evenness (number of individuals of each species)



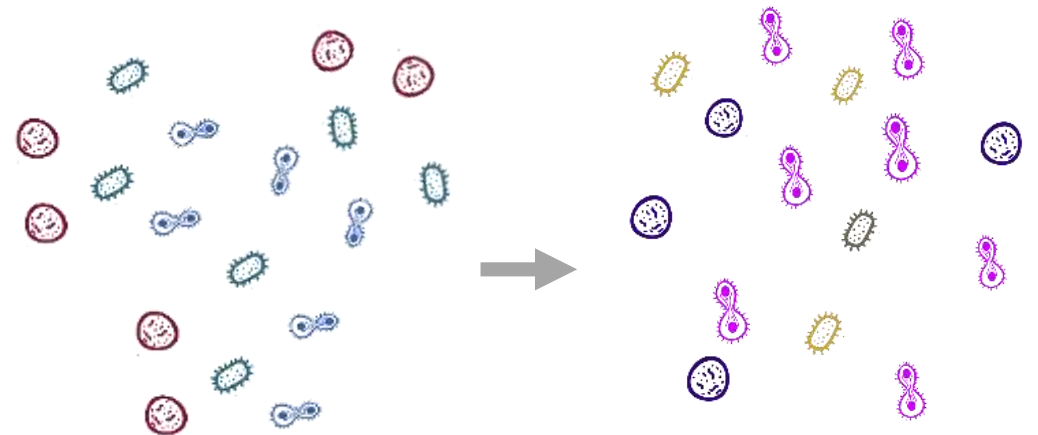
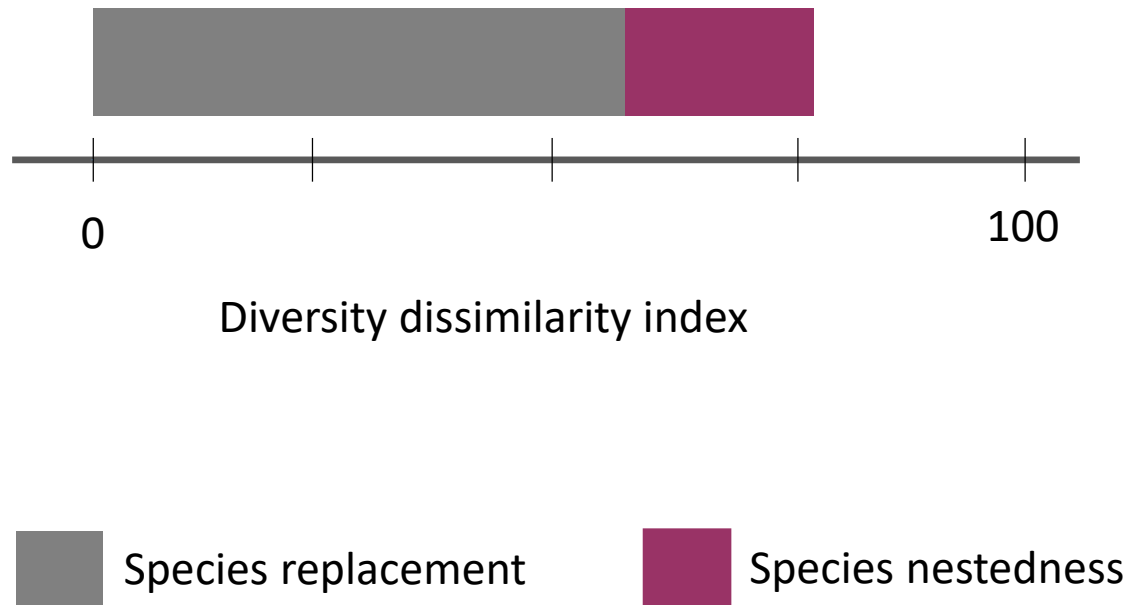
Climate, air and habitat quality have no effect on the variation of fungal richness and evenness on urban trees

# Results: effect of climate and air quality on fungal community composition



- Relative humidity and temperature during growing season explain the variation in community composition
- As well as particulate matter (PM<sub>10</sub>)

# Results: mechanisms underlying differences in community composition in response to particulate matter (PM10)



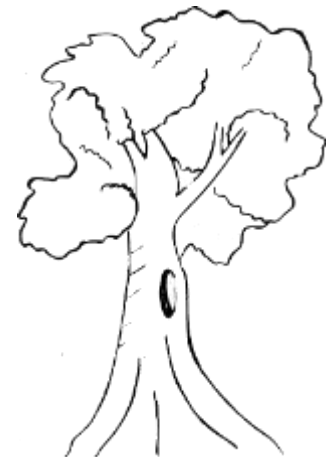
# Summary and future steps

Fungal richness and evenness are not affected by variation in urban climate or air quality – fungi occupy many different environmental niches

Climate and air quality shape fungal community composition

PM<sub>10</sub> influences fungal community composition through species replacement mechanism

**Future:** Which functional groups are sensitive to variation in climate



# Thank you for listening!

## AND SPECIAL THANKS TO CO-AUTHORS:



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