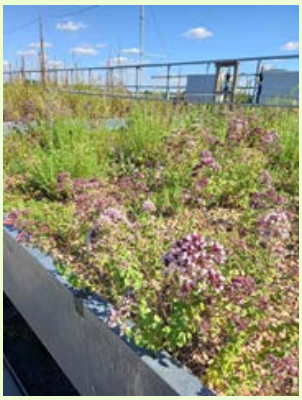
11th Newsletter of the UFZ Green Roof Research

August 04, 2022



Research green roof
at the Helmholtz Centre for Environmental Research – UFZ

Europäische Union

Europa fördert Sachsen.
EFRE
Europäischer Fonds für regionale Entwicklung

This construction measure is co-financed by tax funds on the basis of the budget passed by the members of the Saxon state parliament.

Research partners:

UFZ HELMHOLTZ Zentrum für Umweltforschung

UNIVERSITÄT LEIPZIG

BN Bundesamt für Naturschutz

Practice partners:

Ingenieurbüro Blumberg

ZinCo

Stadt Leipzig
Amt für Umweltschutz

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UFZ Green Roof Research

Working group „Climate study and climate modelling of the impact of green roofs on buildings and cities“

To assess the potential of different green roof systems for climate adaptation in urban areas, energy flows are measured and modelled. An important basis for the modelling of the **soil heat flux** is the recording of the soil temperature.

Using SMT100 sensors, measurements of the soil temperature of the different green roof systems are carried out at a depth of 4 cm. Figure 1 shows the measured values of the soil temperature for the summer of 2021.

There are no significant differences in the median soil temperature between the gravel roof, extensive green roof, and intensive green roof. Fluctuations in soil temperature are already noticeably reduced in the intensive green roof due to the significantly higher biomass, although the general level of soil temperature remains almost unchanged. The wetland green roof can significantly reduce both the fluctuations and the median value of the soil temperature, which can be attributed to the introduction of cooler water and the high specific heat capacity of the water.

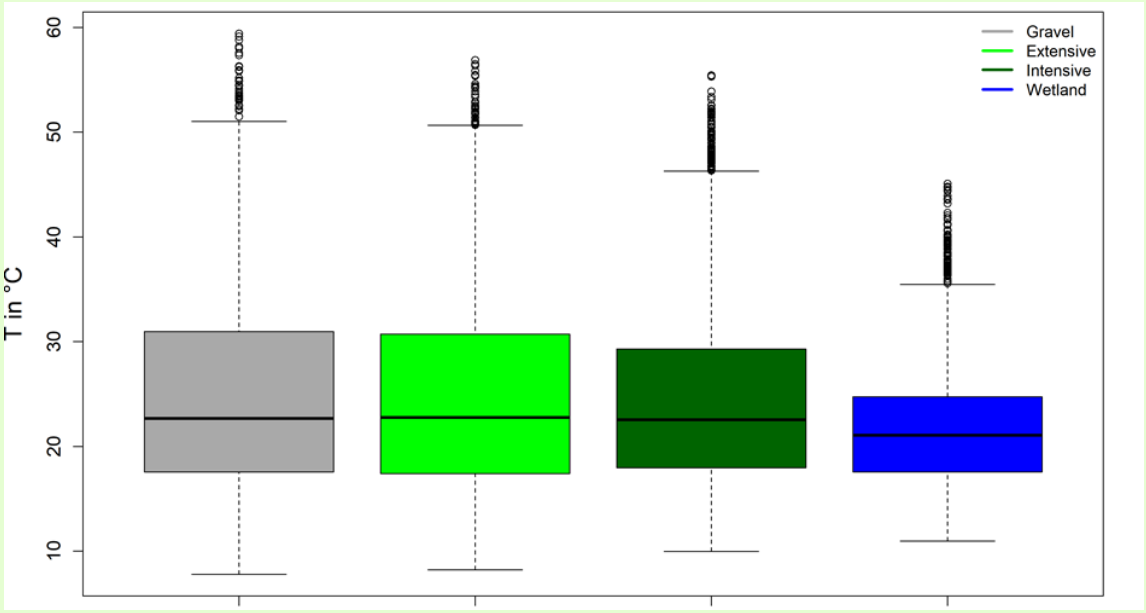

Figure 1 - **Boxplot of the summer soil temperature of the green roofs**: Shown here is the soil temperature of the green roofs at a depth of 4 cm, averaged over several sensors.

Author: Niels Wollschläger (SUSOZ, UFZ)

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Working Group „Green Roofs as a Pollutant Sink“

Aisha Abdul-Waris

In the UFZ Department ISOBIO, Aisha Abdul-Waris has started her work in the BioTrap project (Identification and localization of urban particles trapped by plants; funded by the German Academic Exchange Service, DAAD). She will examine dust particles on and in plants using correlative microscopy.

In the five-year project FINEST (Use and management of finest particulate anthropogenic material flows in a sustainable circular economy), researchers from the UFZ Departments UBT and UMB, the Helmholtz Institute Freiberg for Resource Technology (HIF) at the Helmholtz Centre Dresden-Rossendorf (HZDR), the Helmholtz Centre Berlin (HZB), the Karlsruhe Institute of Technology (KIT), the Technical University Bergakademie Freiberg (TUBAF) and the University of Greifswald will start to investigate ultrafine materials of anthropogenic origin such as microplastics, mineral additives (additives) and metal-containing dusts with respect to possible recycling options in July 2022. The FINEST project, which has strong links to green roof pollutant research at UFZ, will be coordinated by HZDR and funded by the Hermann von Helmholtz Association of German Research Centres with a total of five million euros.

Working Group „Process-related indicators of different green roof variants“

The kick-off meeting of the **MaNuGrün project** (Management of extraordinary precipitation events in urban areas with the help of green roofs; funded by DBU) took place in July 2022. As part of the project, ten green roofs with different system structures are being examined under varying levels of precipitation. The aim is to make concrete statements regarding the protective effect and the retention capacity of the individual systems and in comparison. The project is coordinated by the Education and Demonstration Center for Decentralized Infrastructure (BDZ e.V.). In addition to the UFZ/UBZ, the project partners also include the municipal waterworks in Leipzig GmbH, Stadtentwasserung Dresden GmbH and the HTWK Leipzig.

Unfortunately, the "Process-related indicators of different green roof variants" working group says goodbye to its head, Dr. Jan Knappe. We wish Jan good luck in his new home country England!

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Working group „Biodiversity“

After the species recordings in transects for extensive, intensive and marsh roofs could be completed within the framework of **Anastasia Härtel**'s bachelor thesis, the repeated growth measurements of single individuals for the modelling of future vegetation development using "GRASSMIND" are about to be completed. The creation of a model will be limited to the intensive green roof due to various challenges (see Figures 2 and 3).

Christian Hecht has carried out vegetation surveys for all green roofs for selected plots, which are an important addition to the previous vegetation data collected by Sarah Fischinger and Anastasia Härtel.

For the months of August and September 2022, arthropod catches will be made again. The methodology will be based on that of 2020, when **Merle Pfaffelmoser** started her entomological studies. Thus, window traps (for all flying arthropods), yellow traps (especially for hymenopterans) and ground traps (especially for ground-bound arthropods, also from the group of pests) will be used again.

Figure 2: While the native replanted species on the intensive roof showed good vitality and some of them already flowered in the first year, the trial for the extensive roof had drastic consequences due to adverse weather conditions. Drought and heat from May onwards led to the death of all above-ground organs. There is hardly any hope for new shoots. The picture shows (from top left to bottom right) withered plants of spring cinquefoil (*Potentilla neumanniana*), speedwell (*Veronica prostrata*), whorled sage (*Salvia verticillata*), and elecampane (*Inula hirta*).

Author: Peter Otto, University of Leipzig

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Working group „Biodiversity“

Figure 3: The native species replanted on the wetland roof in 2021 have different adaptabilities to this extreme site. As expected, those with a distribution focus on moist but not wet soils have reduced growth on this type of roof. The picture shows, especially in the left area (arrow), the snake's knotweed (*Bistorta officinalis*) fighting for survival against six directly competing species. On well nutrient-supplied moist soils, the leaves of the snake's knotweed reach up to about 50 cm in length, whereas on the wetland roof they are only about 5 cm long, i.e. one tenth.

Author: Peter Otto, University of Leipzig

4th Leipzig Green Roof Academy

On 28 June 2022, the **4th Leipzig Green Roof Academy** kicked off at the UFZ in cooperation with the Office for Environmental Protection of the City of Leipzig, with twelve students from different universities taking part this year. After an introduction to the topic of multi-functional green roofs, the students started to develop a green roof concept for a school complex at Parkbogen OST in Leipzig in group work under the guidance of practical partners. On the second day, an excursion to urban green roofs took place.

The award ceremony will take place on 25 August 2022 in Leipzig's New Town Hall.

Photo: André Künzelmann, UFZ

Photo: Lucie Moeller, UFZ

More information on the UFZ Green Roof Research:

https://www.ufz.de/forschungsgruendach

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