

# First results from PUKI – plenty of sunshine desired!

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**Thanks to your participation, PUKI can show its very first results - keep up the good work!**

In the last blog post, we introduced you to the five stars of plant research that we are investigating at PUKI ([www.puki.hhu.de](http://www.puki.hhu.de)) with the support of citizen scientists<sup>1</sup>. Here we would like to show you the first results we have obtained from the data and samples collected by you, the citizen scientists, in 2024.

In total, we received about **120 plant samples**, **110 pod samples** and **80 soil samples** from you. The lower number of soil samples is due to the fact that many plants grow in pavement cracks (Figure 3 in <sup>1</sup>), where it is of course usually impossible to take soil samples if you don't want to get into trouble with the public order office!

We are still a long way from our goal of collecting nationwide (Figure 1). However, this is only the first year of the project. Most of the collections have taken place in **North Rhine-Westphalia**, where we have already been able to recruit many citizen scientists, partly through our numerous events<sup>2</sup>. Many thanks at this point to the Bürgeruni of the HHU, which helped us with events and runs this PUKI blog.

Many collections took place in **Potsdam** in the summer because Prof Dr Anja Linstädter<sup>3</sup> was busy collecting there with her students. Three collection sites can also be found in Saxony-Anhalt near the Hanseatic town of Salzwedel, and one in Bavaria west of Munich.

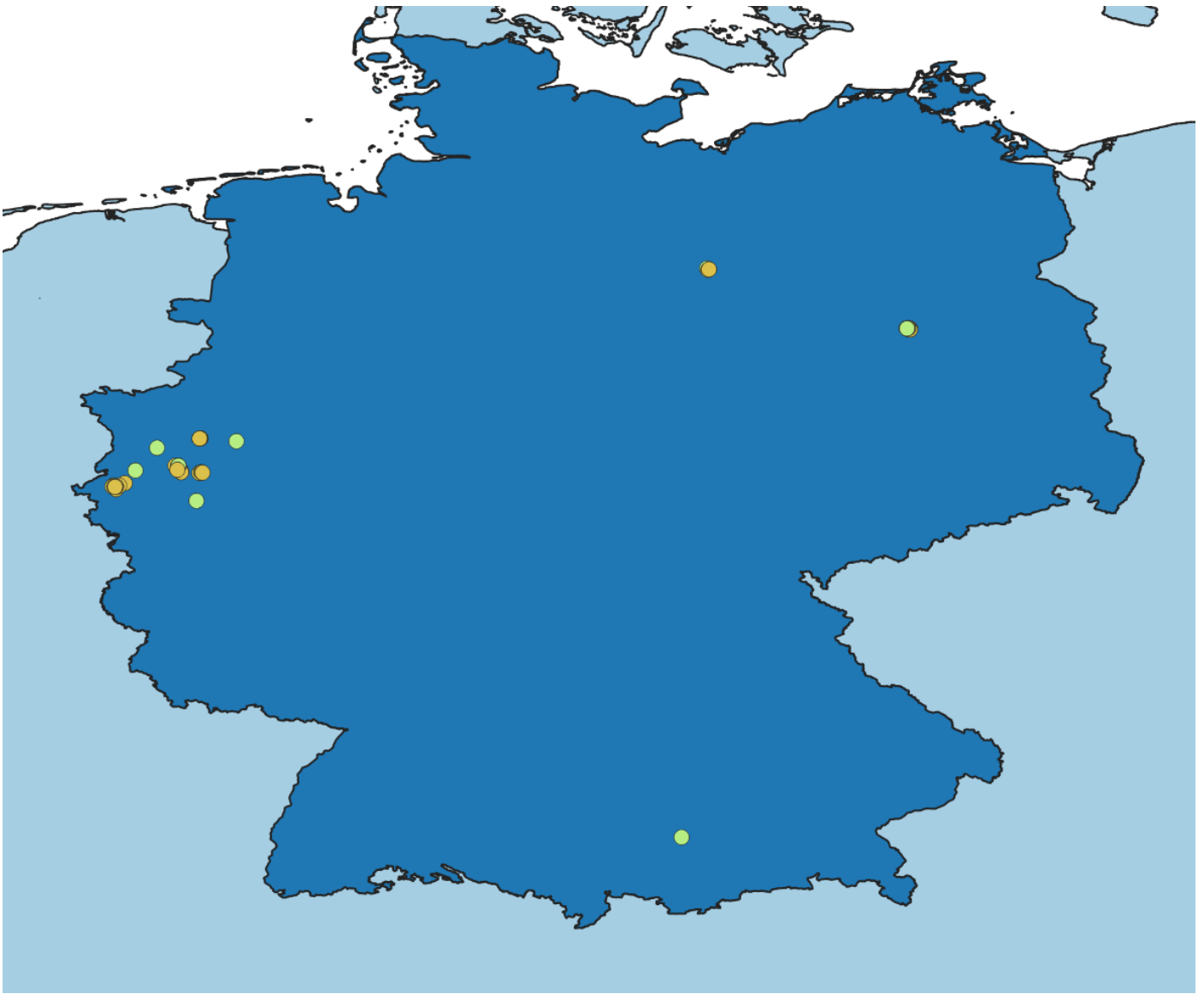
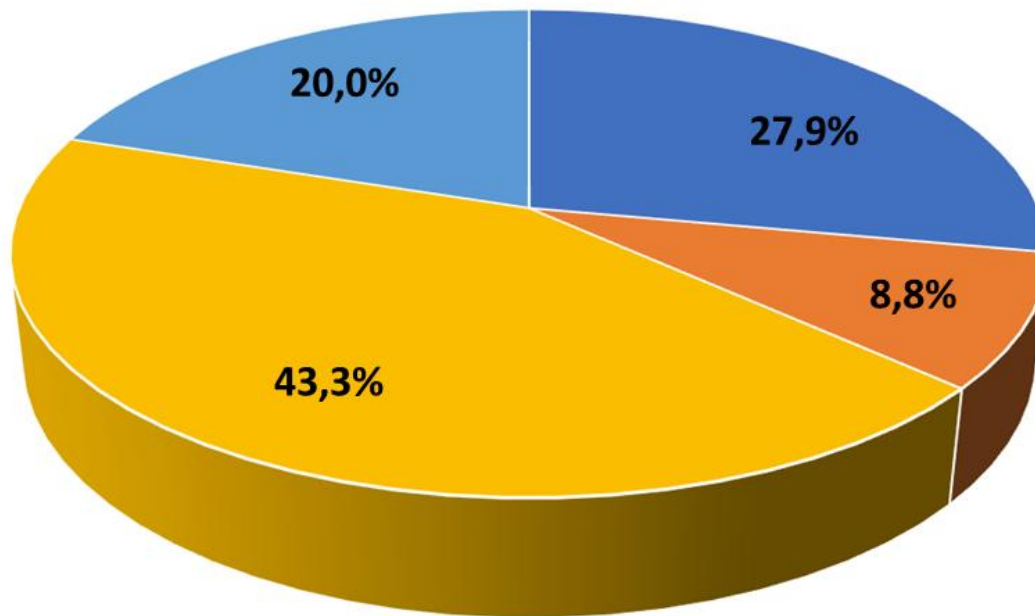


Figure 1. Geographical distribution of collection sites in Germany. Volunteers either only entered data into *Flora Incognita* (light green dots) or they also collected plant and soil samples (light brown dots) (map created with freely accessible maps and QGIS by B. Walther).

Of our five target plants, only four have been collected so far. Most of the collections have been of the perennial wall-rocket, followed by the thale cress, the hairy bittercress and the shepherd's purse (Figure 2). So our request to you: **keep an eye out for the turnip rape in 2025!**



- Acker-Schmalwand
  - Rübsen
  - Viermänniges Schaumkraut
- Gewöhnliches Hirtentäschel
  - Schmalblättriger Doppelsame

Figure 2. Percentage distribution of plant species calculated from 330 data entries. Not a single data entry was made for the turnip rape (Acker-Schmalwand = thale cress, Gewöhnliches Hirtentäschel = shepherd’s purse, Schmalblättriger Doppelsame = perennial wall-rocket, Viermännige Schaumkraut = hairy bittercress).

The habitats are where things get interesting ecologically. We know that all five target plants are so-called ‘**pioneer plants**’<sup>1</sup>. The data you collected confirms this: the three most common of the 11 **habitat types** were path and roadside, flowerbed and pavement (Figure 3), i.e. open habitats that normally receive a lot of light.

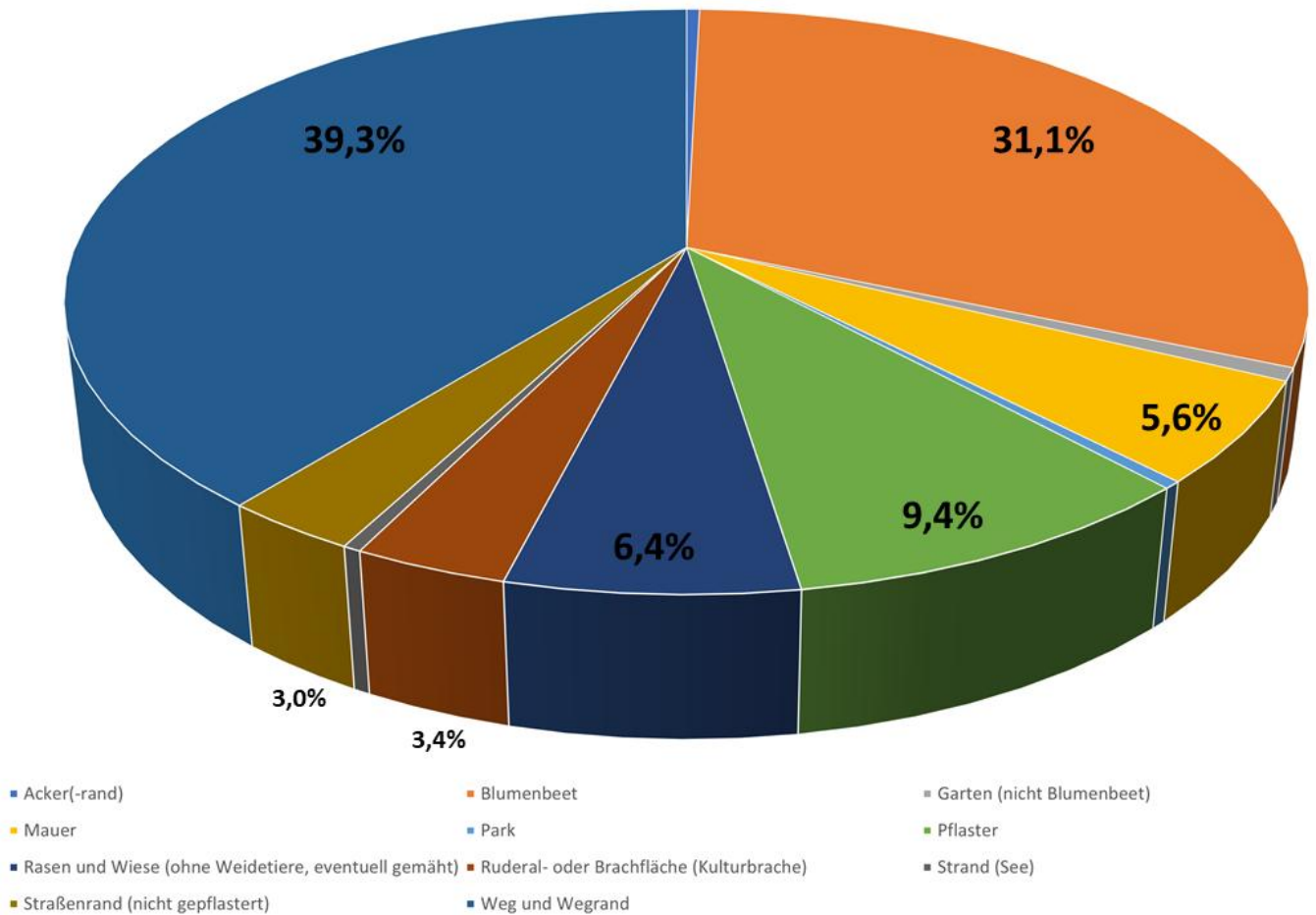


Figure 3. Percentage distribution of habitat types calculated from 267 data entries. The 11 habitat types are ordered clockwise, with field (edge) at the top, followed by flowerbed, garden, wall, etc. Four habitat types had a share of < 1.0% (namely field (edge), garden, park, and beach).

Speaking of **light incidence**: Because these are pioneer plants, we had also expected that most collection sites would receive a lot of light. And your data confirms this: most of the collection sites were categorised as sunny, followed by semi-shady and shady (Figures 4-5). And because we have received the data from you, we can now do some more in-depth research.

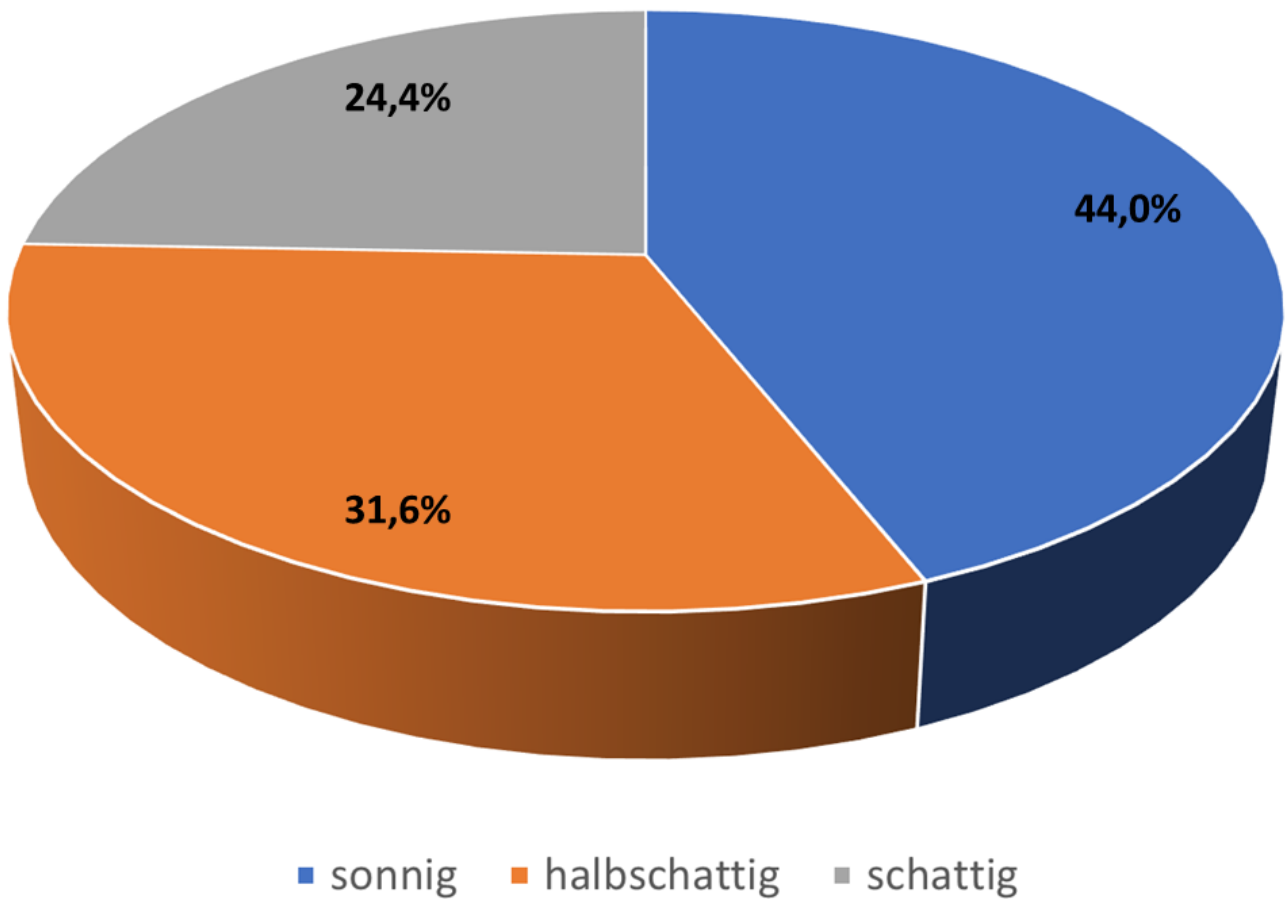


Figure 4. Percentage distribution of light incidence calculated from 266 data entries.





Figure 5. A very typical location for the perennial wall-rocket: a sunny spot right on the edge of the path (Düsseldorf, 15 August 2024; photo by B. A. Walther).

The order of **sunny > semi-shady > shady** is clear for three of the species, but for the hairy bittercress, it is the other way round! Only 8.1% of the hairy bittercress' locations were categorised as sunny, and the rest were split roughly half and half between semi-shady and shady (Table 1). Of course, your observations were not collected systematically and representatively, but purely at random. It could therefore be that the observations of light incidence for the hairy bittercress are purely random and therefore not representative. But it is an interesting first observation, and this is exactly where we can continue our research in the future.

Species	% sunny	% semi-shady	% shady
thale cress	41,1	31,5	27,4
shepherd's purse	68,0	24,0	8,0
perennial wall-rocket	61,3	24,5	14,2
hairy bittercress	8,1	46,8	45,2

Table 1. Percentage of the three categories of light incidence for four of the target plants.

And further research means above all: **more data!** Because the more data we have, the more reliable our results and conclusions will naturally be<sup>4</sup>. For example, many of you have also entered which other plant species grow in the vicinity of the target plant in the 'Notiz' input field. This helps us to better understand the habitat and ecosystem of the plants (Figure 6).



Figure 6. Ecosystems, even in the city, are defined by their relationships between different species and species groups. Here, two different insect species visit the perennial wall-rocket of Figure 5 (Düsseldorf, 15 August 2024; photos by B. A. Walther).

So first of all, a big thank you to you, our data collectors, for the data and samples you have already sent in, and then a big request to you to continue collecting in 2025 and perhaps recruit even more participants. You can also help by organising and leading collections with new participants or helping with public relations and educational work.

Please send all questions and suggestions to: **Bruno Walther**, Heinrich-Heine-Universität Düsseldorf, Gebäude 26.14, Raum 01.067, Universitätsstr. 1, 40225 Düsseldorf, Tel: 0211-81-13427, Email: [Bruno.Walther@hhu.de](mailto:Bruno.Walther@hhu.de)



Further information can be found here:

<sup>1</sup><https://buergeruni.hhu-blog.de/index.php/2025/01/15/nun-sind-es-die-jackson-5-buergerwissenschaftsprojekt-hat-nun-fuenf-stars-der-pflanzenforschung/>

<sup>2</sup><https://www.puki.hhu.de/neuigkeiten>

<sup>3</sup>[https://www.puki.hhu.de/fileadmin/redaktion/Fakultaeten/Mathematisch-Naturwissenschaftliche\\_Fakultaet/Biologie/puki/Anja\\_Linstaedter\\_Vorstellung\\_26.\\_Sep.\\_2024.pdf](https://www.puki.hhu.de/fileadmin/redaktion/Fakultaeten/Mathematisch-Naturwissenschaftliche_Fakultaet/Biologie/puki/Anja_Linstaedter_Vorstellung_26._Sep._2024.pdf)

<sup>4</sup>Stichprobengröße – Definitionen, Erklärungen, Beispiele & Formeln.

<https://www.resonio.de/marktforschung/stichprobengroesse/#:~:text=Die%20Stichproben gr%C3%B6%C3%9Fe%20ist%20wichtig%2C%20weil,ungenau%20und%20nicht%20repr%C3%A4sentativ%20sein.>