

# **Field training 01 - Vegetation sampling**

**Documentation**

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2023-06-12

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# 1 Herbaceous vegetation sampling

## 1.1 Procedure

Date: 16.05.2023

Group-ID: 4

Participants: Dennis, Fabian, Louis, Lukas, Marie-Louise, Maxwell

Coordinates: 51.332222, 12.384167

Material used:

- Frame ( $1 \text{ m}^2$ )
- Peg and 3 m cord
- Smartphone (GPS + plant species determination)
- Book (Flora Vegetativa)
- Survey sheet

The aim of the vegetation sampling was to collect a random vegetation ground truth sample for 5x5 meter remote sensing imagery. On May 16th 2023, we recorded herbaceous vegetation on four subplots of 1x1 meter each ( $1 \text{ m}^2$ ) on the meadows of a small park named ‘Kanonen-teichanlage’ between Liebigstraße and Brüderstraße in 04103 Leipzig, Germany. Firstly, we selected a homogeneous location without trees, shrubs or disturbances within a range of 20 meters. On that area, the location where a randomly thrown pile landed marked our central subplot. Secondly, we measured the coordinates of the relevé in LatLong/WGS84 format using a smartphone. Following, we recorded metadata as well as plant species abundance for the present herbaceous vegetation. The metadata includes a plot image, coverage of litter [%], soil [%], water [%] and moss [%] as well as the height. In order to assess the height, we measured the vertical extend from the base of the plant (soil level) to the tip of the highest point using a ruler, and excluding any aerial leaves or roots. This process was repeated several times (~20) for different species and the mean height calculated subsequently. For the remaining metadata, we calculated the mean of our personal/individual estimates ( $N = 6$ ). Lastly, we identified all present species using the free software ‘FloraIncognita’, ‘PlantNet’ and the book ‘Flora Vegetativa - Ein Bestimmungsbuch für Pflanzen der Schweiz im blütenlosen Zustand’ (2020) by Eggenberg and Möhl. The cover fraction of each species was again calculated by taking the mean of our six individual estimates. The same procedure was conducted for three more subplots arranged in  $120^\circ$  directions three meters from the center subplot. Additionally,

the recorded species cover fractions as well as the metadata of the four subplots was aggregated to a main plot using the mean of the four values, respectively. Afterwards, the recorded data as well as the metadata as well as the aggregated data at the plot level were entered in GoogleDocs sheets, which can be see in Tables 1.1 and 1.2.

## 1.2 Plot images



Figure 1.1: Subplot 1 (center plot). Photo taken at: 05/16/2023 13:32 CET.



Figure 1.2: Subplot 2. Photo taken at: 05/16/2023 14:37 CET.

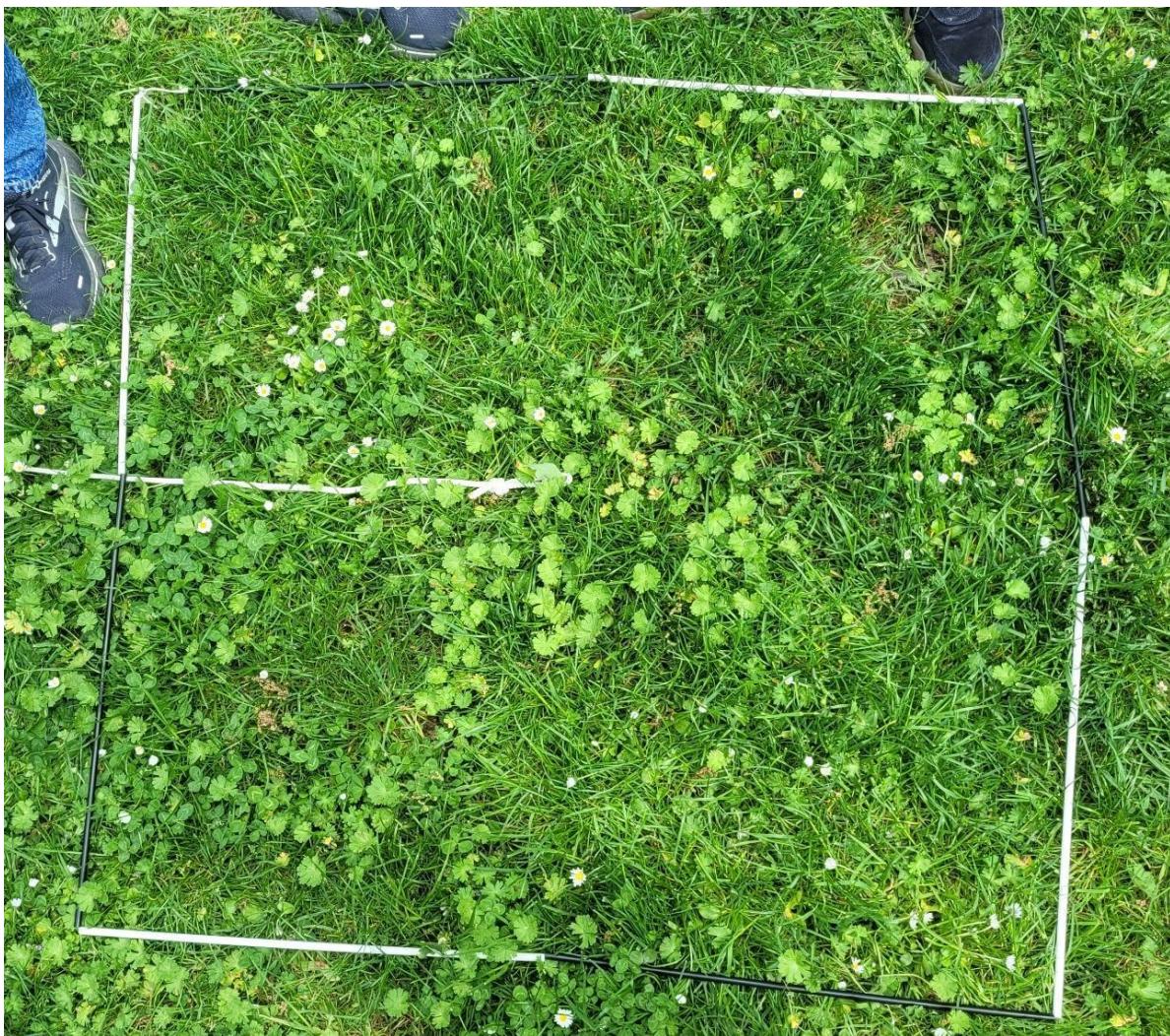


Figure 1.3: Subplot 3. Photo taken at: 05/16/2023 15:04 CET.



Figure 1.4: Subplot 4. Photo taken at: 05/16/2023 15:14 CET.

### 1.3 Recorded species tables

Group-ID	Plot-ID	Subplot-ID	Date	X-Coordinate center	Y-Coordinate center	Litter / %	Soil / %	Water / %	Moss / %	Height / cm	Acer platanoides	Achillea millefolium	Bellis perennis	Capsella bursa-pastoris	Dactylis glomerata	Elymus repens	Geranium molle	Geranium pusillum	Lolium perenne	Poa annua	Polygonum aviculare	Trifolium repens	Veronica arvensis	
4	1	1	16.05.2023	51.332222	12.384167	1.5	11	0	8	6				15	4		2	15	1	50	10	0.5	10	1
4	1	2	16.05.2023			1	4	0	1	6			0.5	22		2		18	1	55	15	0.5		1
4	1	3	16.05.2023			1	3	0	2	6	0.5	3	8			1	19		38	19		18	0.5	
4	1	4	16.05.2023			1	10	0	1	4			6			15	17		28	10	0.5	1	2	

Table 1.1: Subplot x species table for the recorded herbaceous vegetation including metadata.  
The values are the cover fraction of the total plot in [%].

Group-ID	Plot-ID	Date	X-Coordinate	Y-Coordinate	Litter / %	Soil / %	Water / %	Moss / %	Height / cm	Acer	Achillea	Bellis	Capsella	Dactylis	Elymus	Geranium	Geranium	Lolium	Poa	Polygonum	Trifolium	Veronica	
					platanoides	millefolium	perennis	bursa-pastoris	glomerata	repens	molle	pusillum	perenne	annua	aviculare	repens							
4	1	16.05.2023	51.332222	12.384167	1.13	7	0	3	5.5	0.13	0.88	12.75	1	0.5	4.5	17.25	0.5	42.75	13.5	0.38	7.25	4.13	

Table 1.2: Aggregated plot x species table for the recorded herbaceous vegetation including metadata. The values are the mean cover fraction of the four subplots plot in [%].

# 2 Woody vegetation sampling

## 2.1 Procedure

Date: 16.05.2023

Group-ID: 4

Participants: Dennis, Fabian, Louis, Lukas, Marie-Louise, Maxwell

Coordinates: 51.332222, 12.384167

Material used:

- Quadrant
- Tape (for distance and diameter measurements)
- Smartphone (GPS + tree species determination)
- Survey sheet

Woody vegetation was surveyed using the ‘point centered quarter method’ (PCQM) on May 16th, 2023. This method is used to estimate plant abundance by placing a cross at a random location and assessing tree traits of the nearest tree in each quadrant. The data also serve as ground truthing data for 5x5 meter satellite images and are intended to represent species composition of the tree layer in described park area. For this purpose we selected again a random point by throwing a pile in the air and noted down the metadata, i.e. date and coordinates in LatLong/WGS84 format using a smartphone. No explicit photos of the recorded location nor trees were taken. In order to record the tree layer using the PCQM, we identified the nearest tree in each quadrant using a tape for the distance measure and knowledge as well as the software ‘FloraIncognita’ to determine the species. The nearest species were named Acer platanoides, Acer pseudoplatanus, Cornus sanguinea and Quercus robur. For each tree, the distance from the determined center location and the girth at breast height (~130cm) [cm] were measured with a tape. The diameter at breast height [cm] was then calculated with  $\frac{girth[cm]}{\pi}$ . Based on the diameter, the basal area [cm<sup>2</sup>] was calculated with the formula  $\pi r^2$ , with  $r = \frac{diameter[cm]}{2} [cm]$ . Afterwards, the recorded data as well as the metadata were entered in a GoogleDocs sheet, which can be seen in Table 2.1.

## 2.2 Recorded species table

Group-ID	Plot-ID	Tree-ID	Date	X-Coordinate center	Y-Coordinate center	Species	Distance	Girth (cm)	DBH / cm	BA / cm <sup>2</sup>	total BA / cm <sup>2</sup>
4	1	1	16.05.2023	51.332222	12.384167	Acer platanoides	9.8	239	76.08	4545.54	4545.54
4	1	2	16.05.2023			Acer pseudoplatanus	10.9	205	65.25	3344.24	3344.24
4	1	3	16.05.2023			Cornus sanguinea	15.7	36	11.46	103.13	103.13
4	1	4	16.05.2023			Quercus robur	25.2	302	96.13	7257.78	7257.78

Table 2.1: Table for the recorded woody vegetation including metadata.