Land cover measurements and biodiversity in Vabaduse boulevard, Tartu Estonia

Tilen Burja, Vid Felicijan, Luka Komatar, Laura Javoršek - Slovenia
Erik Lindgren, Kätrin Kaunimäe, Marit Lõbu, Anti Tohva, Roomet Tapfer, Marianna Lili Aly, Milena Saan - Estonia
Ternova Kateryna Oleksiy Ternovoy - Ukraine

Supervisor: Marie Johanna Univer

Research questions and hypotheses

Q1: What kind of species can be found in the Vabaduse city park?

Q2: What is the ratio of native species to non-native ones?

H1: There are more native species than non-native species in the research area.

H2: The study area is classified as a forest according to the MUC code.

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Research methods and equipment

Land cover: Clinometer, densiometer, rope, flags, measuring tape, GLOBE data entry app, interactive identifier keys.

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Figure 1: Measuring tree’s circumference.

Photo: Marie Johanna Univer

Methodology

- 30x30 meter square, which was picked to include a variety of plant species.
- Determining MUC code using the field guide protocols

Figure 2: Research area marked by the red square. Map source: Estonian Land Board. Edited by Erik Julius Lindgren.

Methodology

- Calculating canopy coverage using a densiometer on the 42,4 meter long diagonal transects.
- Estimating height of trees using inclinometer
- Measuring circumference of trees using measuring tape
- Measuring and marking using measuring tape and marker flags

Figure 3. Using the measuring tape. (Source: Courtesy of the authors)

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Site description

- City park
- Historic (before 1918)
- Preserving fallen trees, adding new species

NE: 58.383324, 26.72444

SE: 58.383056, 26.724428

SW: 58.383068, 26.723904

NW: 58.383336, 26.723927

Figure 4. Satellite picture of Vabaduse boulevard (Source: Estonian Land board)

Tree height measurement

	Average height (m)	**Average circumference (cm)**	**# of trees**
European lime (*Tilia × europaea*)	25,9	239	6
European horse chestnut (*Aesculus hippocastanum)*	21,3	207	2
Both species combined	24,8	231	8

Figure 5. European lime in the middle and European horse chestnut on the right
(Source: Courtesy of the authors)

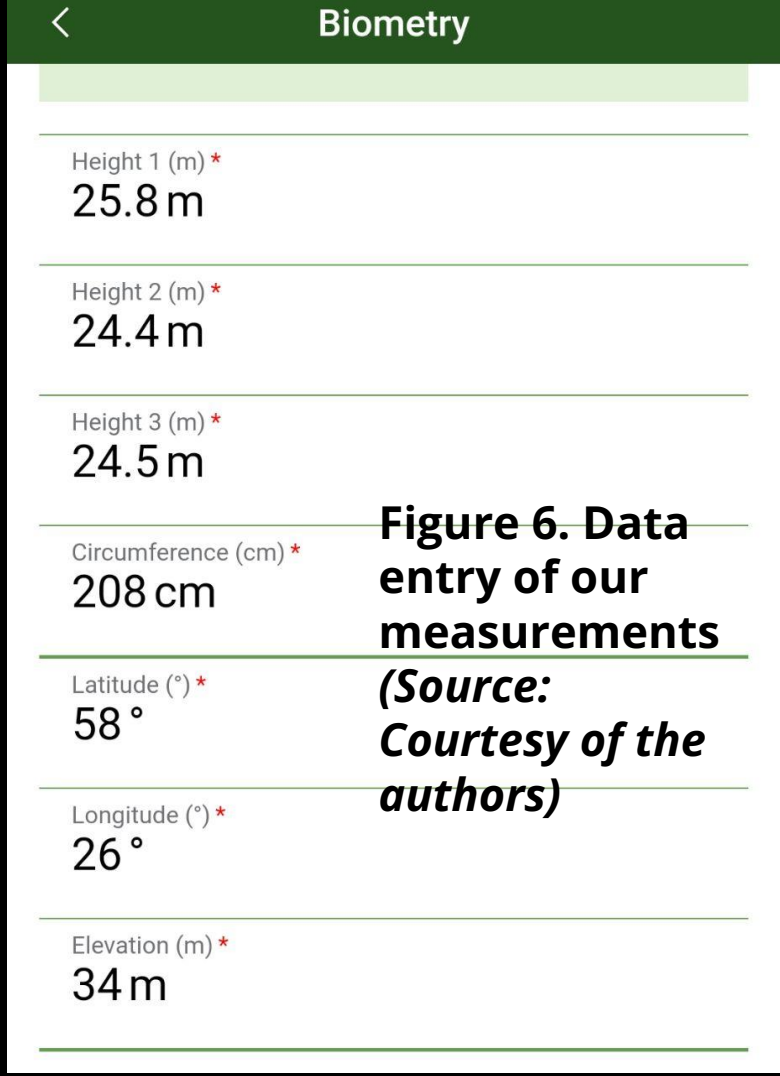

Figure 6. Data entry of our measurements *(Source: Courtesy of the authors)*

Results

	Plants		
	Woody plants	Graminoid	Total plants
Number of species	13	21	34
Number of non-native species	5	2	7
Number of invasibe species	0	0	0

Mosses	Fungi	Lichen	Animals	Total species	Percentage	Percatage of total plants
1	3	1	8	47	100,00 %	100,00 %
0	0	0	1	8	17,02 %	18,92 %
0	0	0	0	0	0,00 %	0,00 %

Figure 7. Small Balsam.
(Source: Courtesy of the authors)

Figure 8. Hooked bristlegrass.
(Source: Courtesy of the authors)

Note: small balsam is an invasive species in Slovenia, but a common weed in moist places in Estonia

Photos of the Site´s enviroment

Figure 9. Close-up of ground cover
(Source: Courtesy of the authors)

Figure 10. View of the research area
(Source: Courtesy of the authors)

Figure 10. European horse chestnut.
(Photo: Laura Javoršek)

Question arose: Why are almost all European horse chestnut leaves brown?

Figure 11. *Cameraria orhidella on the leaf of* European horse chestnut. (Photo: Laura Javoršek)

Figure 10. European horse chestnut. (Photo: Laura Javoršek)

Who causes brown spots on leaves?
Answer: Cameraria orhidella (hobukastani keerukoi)

Conclusion and discussion

- About 47 species were found, of which 34 were plants,
- 1 were mosses, 3 were fungi, 1 were lichen and 8 were animals.
- Out of 47 total plant, animal and some other species,
- 8 (~17%) were non-native.

- There are more native than non-native species, in accordance with our first hypothesis
- The study area can also be classified as a forest, so the second hypotheses is also true.

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Aitäh!

Thank you!

Дякую!

Hvala!