

Effects of mowing on biodiversity in parks of Tartu

Mumbai group

2023

Introduction

- Urbanization poses a great threat to global biodiversity (Seto et al. 2012)
P Natl Acad Sci USA
- Lawns support important urban ecosystem services (sequestering carbon and nitrogen, reducing water flow, controlling erosion), resources for small mammals and invertebrates, habitat for organisms that interact with plants (pollinators, pest-control species) as well as human well-being and connections to nature (Bertoncini et al. 2012). *Landscape Urban Plan*

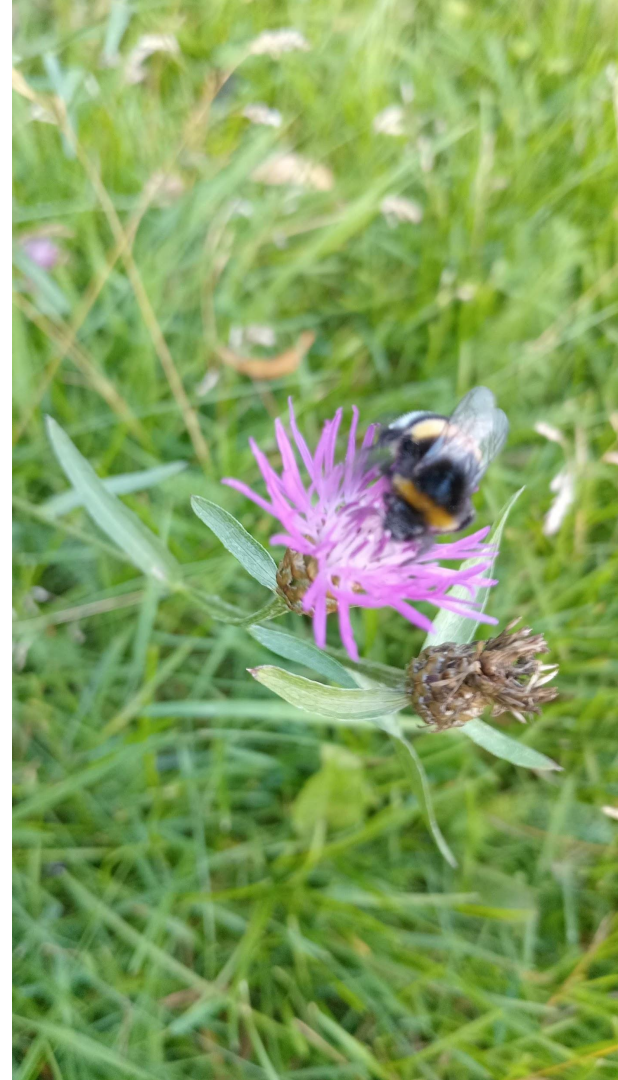
Conventional mowing in Tartu

- Every week in usual summer
- Last mown in June / beginning of this summer

Curated Biodiversity in Tartu

- Capital of Culture 2024
- Began in 2020
- The parks of Tartu's city centre
- Only mown once a year, not mown this year

Source: <https://tartu2024.ee/curatedbiodiversity>



Research questions and hypotheses

- We decided to examine and analyse the difference of biodiversity on mown and unmown areas of the City Centre of Tartu. We hypothesized that the not mown area would be more biodiverse.

- Which mowing regime hosts more species: mown or curated?

Hypothesis 1: The curated regime hosts more species.

- Does the curated regime host species with specific habitat needs?

Hypothesis 2: The curated regime hosts more species which are sensitive to disturbances.

Hypothesis 3: The curated regime hosts more shade-tolerant and moisture-demanding species.

Examples of mown and curated regimes



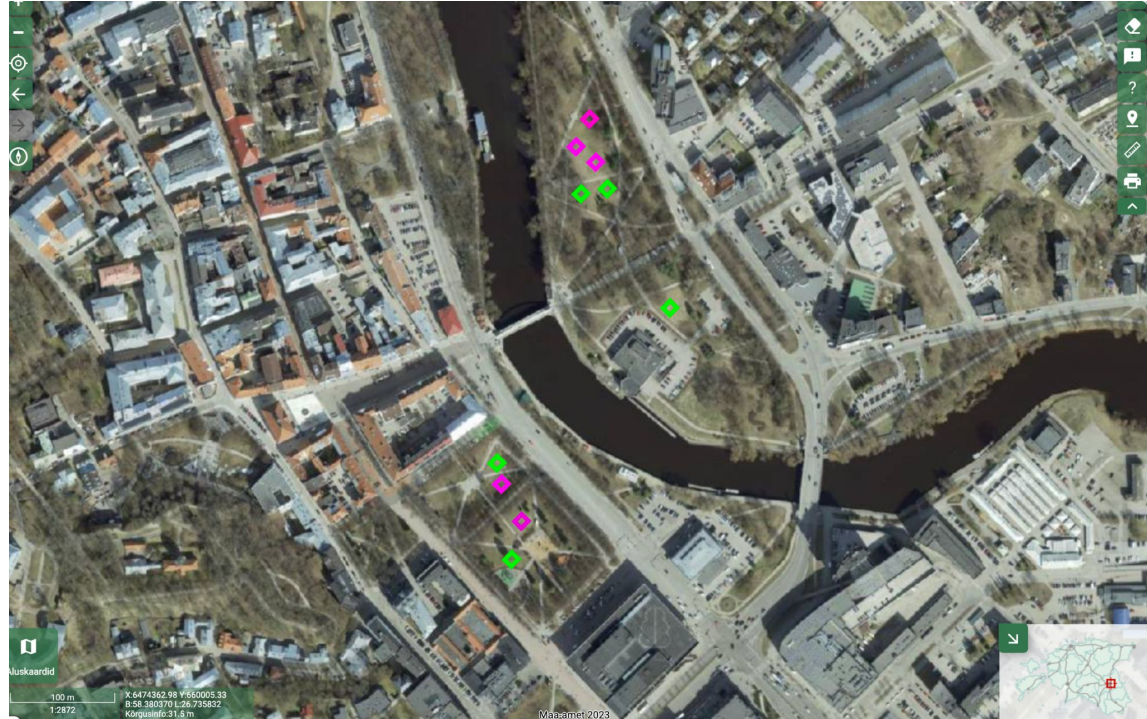
Mown



Curated

Research areas

- 10m x 10m squares with uniform land cover away from canopy in Ülejõe park and Tartu Central park
- 5 mown ◆ and 5 curated (not mown) ◆



Ortophoto: Estonian Land Board, May 2022

Research methods

- Tape measure and flags to fix the size of squares
- Google Lens for identifying plant species
- Densiometer to measure plant species cover in each square
- Tichý et al. 2023 J. Veg. Sci. database for Ellenberg-type environmental niche values of plant species
- Midolo et al. 2023 Global Ecol. Biogeogr. database for disturbance tolerance values of plant species

Results: Comparison of mowing regimes (1)

Mown

- 17 plant species; 5 exclusive to mown areas
- Exclusive species: *Ranunculus repens*, *Prunella vulgaris*, *Stellaria graminea*, *Plantago lanceolata*, *Knautia arvensis*



335 *Knautia arvensis* Collet

Acher-Knautie.

Knautia arvensis



Ranunculus repens L.

Ranunculus repens

Results: Comparison of mowing regimes (2)

Curated (not mown)

- 20 plant species, 8 exclusive to curated areas
- Exclusive species: *Veronica persica*, *Campanula latifolia*, *Matricaria chamomilla*, *Juglans sp.*, *Populus sp.*, *Capsella bursa-pastoris*, *Medicago lupulina*, *Tragopogon pratensis*









Veronica persica



Capsella bursa-pastoris

Results: Coverage of dominant species (>5%)

	<i>Achillea millefolium</i> % 	<i>Alchemilla vulgaris</i> % 	<i>Bromus inermis</i> % 	<i>Poa pratensis</i> % 	<i>Taraxacum</i> sp. % 	<i>Trifolium repens</i> % 
not mown	22.3	0	27.5	29.6	18.0	2.6
mown	21.0	5.6	0	29.4	23.1	21.7

Results: Number of squares with non-dominant species (<5%)

	<i>Ranunculus repens</i>	<i>Prunella vulgaris</i>	<i>Veronica persica</i>	<i>Campanula latifolia</i>	<i>Matricaria chamomilla</i>	<i>Juglans sp.</i>
mown	2	2	1	0	0	0
not mown	0	0	3	1	1	2

Discussion and conclusions

- Hypothesis 1: The curated regime hosts slightly more species (18 herbs and 2 baby tree species vs. 17 herbs in the mown regime).
- Hypothesis 2: The curated regime hosts more species that typically grow under low mowing frequency.
- Hypothesis 3: The regimes host species with similar light and moisture needs.
- The Curated Biodiversity experiment has made a visual difference in Tartu's vegetation but so far impact on plant species is modest. However, the curated squares were dominated by flowers whereas the mown squares had almost no flowers (which is important for pollinators).

Thank you for listening!