GLOBE Estonia Learning Expedition 2024

Soil and land cover connections near Taevaskoja Holiday Centre

Authors: Thora Liisa Vildersen, Kaili Merila, Hele-Mari Jalasto, Aleksei Pomaznev, Laura Lanno

Instructors: Jaan Pärn

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ABSTRACT

Taevaskoja is a small settlement in Põlva county with beautiful nature (Figure 1). We researched the connections between soil and land cover of different areas near the Taevaskoja Holiday Centre. We worked through three different regimes: one that was dry, one that was wet, and one which was a fen, and each area was different by land cover and soil. We wanted to know about differences of plant species growing in different kinds of soils and moisture levels. We used different tools to gather data, such as a soil drill to see the soil and a densiometer to see the plant coverage and more. It turned out that dry and humid areas host different plant species and in different amounts.

Figure 1. Map of Estonia and the red dot marking Taevaskoja.

Figure 2. Picture of our group

Research questions and Hypothesis

Our objective was to explain the connections between land cover and soil.

1) Hypothesis: There are different species in dry soil compared to wet soil.
2) Hypothesis: With different moisture levels in the soil, the amount of plants growing there varies.

Materials and Methods

The tools and methods we used:

- GLOBE Biosphere land cover protocols (Land cover classification; Biometry)
- Soil drill
- TEROS 12 sensor to measure the moisture of the soil
- Clinometer to measure the height of trees
- Tape measures to mark the research areas
- Yarn to mark the research area
- Densiometer to measure the amount of plant species
- Soil colour chart to know the contents of the soil
- Flora Incognita (plant identification app)
- MUC field guide
- 1.Database: Ellenberg_disturbance_values
- Estonian Land Board Geoportal
- Google maps

Figure 3. Our research areas marked 1-3 → dry, wet, fen

Figure 4. In the picture Kaili is using the soil colour chart to see the contents of the soil.

Figure 5. The first tool on the picture is a clinometer and the other one a densiometer.

Figure 6. A picture of the soil colour chart and the soil drill.

Figure 7. A picture of the yarn and tape measure.

Results

Both of our hypotheses turned out to be true. Plant species in dry areas are different from species in more humid areas. With different moisture levels there is a different amount of plant species.
In the dry regime, there were many trees, for example European red pine and European spruce. Also, different species of moss such as mountain fern moss and red-stemmed feather moss, but there were more different kinds of plant species, for example wall lettuce, mountain cranberry, narrow buckler-fern and many more.
In the wet regime, there were still the same trees, but a little less of them. Some species were the same as in the dry area, but there were also many other species, for example wild strawberry and common cow-wheat. The third area was a fen, a wetland, where there were almost no trees and the water was covering the ground. There we found fibrous tussock-sedge, meadowsweet, marsh fern, wood horsetail and more.

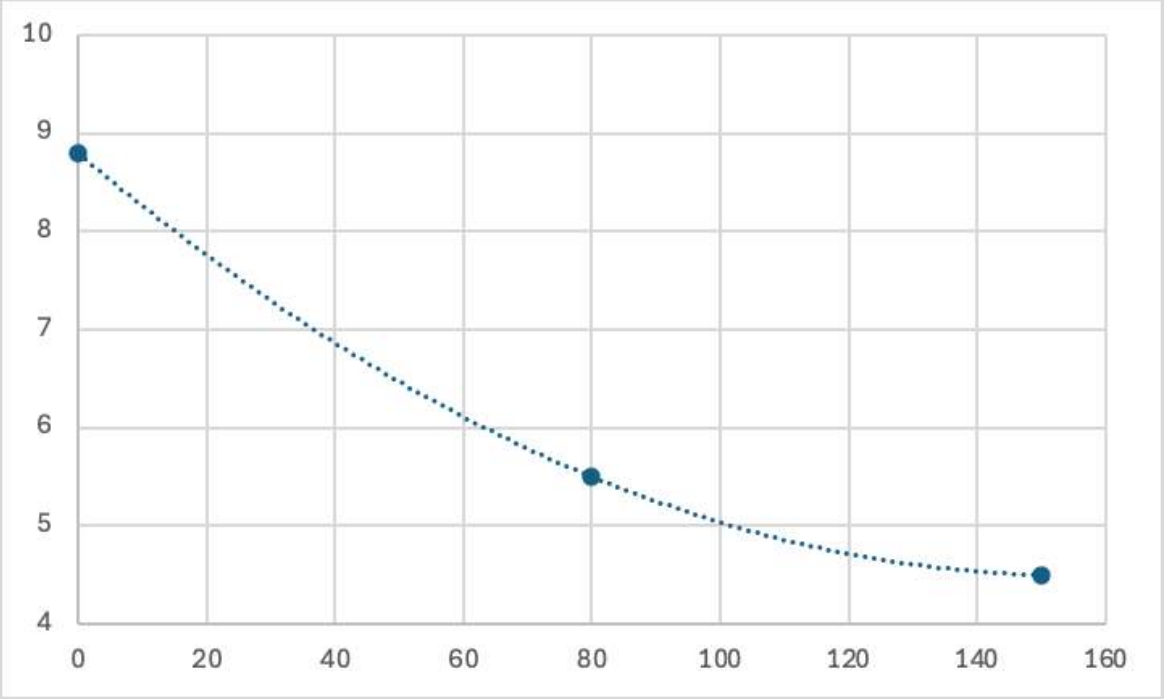

Figure 8. Plant species moisture needs, Ellenberg scale 1-10. The plants in more humid soils also require more moisture to survive.

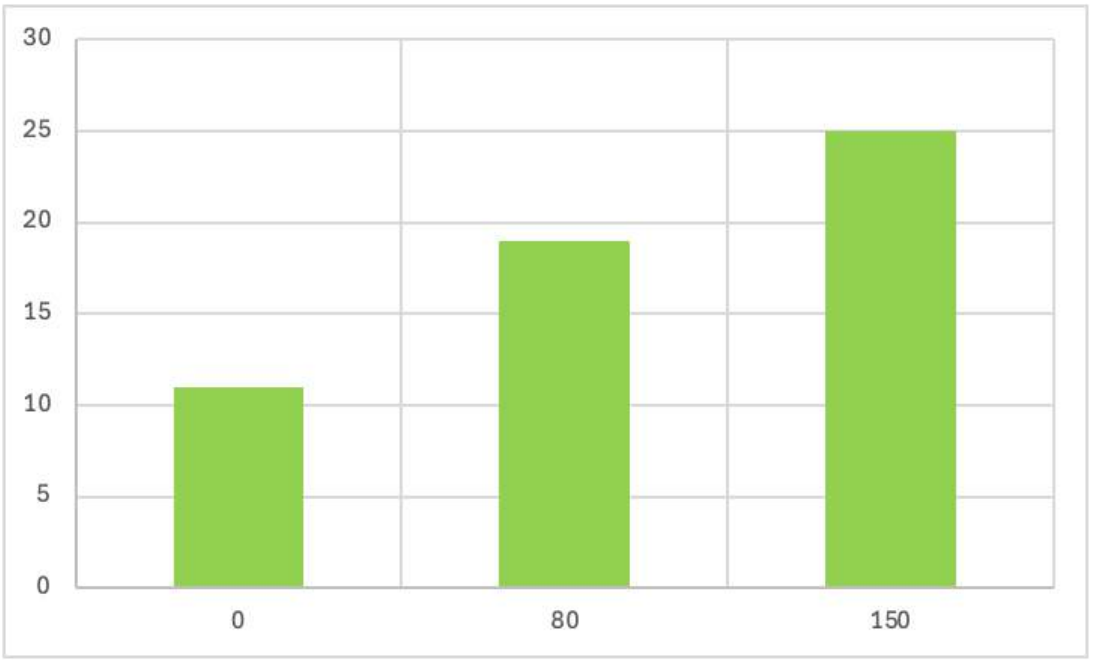

Figure 9. The water level of each regime and the amount of plant species diagram. Shows the connection of soil moisture and the amount of plant species. The numbers vertically on the diagram are the amount of plant species and the numbers horizontally is the water level of each regime in cm.

Discussion

Our research shows that dry soil hosts different plant species compared to more humid soil and that the amount of species varies from dry and moist soil, which means both of the hypotheses were correct. In our research, some species that were found in the dry area were not found in the fen and vice versa, proving that species are different in soils of different moisture. When counting the amount of plant species during our expedition, we found that different amounts of plant species grow in dry areas than more in more moist soils, which confirmed our second hypothesis.

Conclusions

Our research showed that all of our hypotheses were correct. There are different species in soils of different moisture levels and that a different amount of plants grow in moist and dry soils. The nature of Taevaskoja is very diverse, including dry areas and a fen, while having many different plant species. Taevaskoja hosts so many different forms of life and is very diverse, and is important to every being living there and should therefore be protected. Any harm to the Taevaskoja natural habitat affects species there and beyond. The research is important because Taevaskoja is a special place and all research about it is useful. To make sure that the nature of Taevaskoja stays the same, more research like this should be made regularly. This was a great experience and chance to learn about nature surrounding us.

References

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