

The role of rowan (*Sorbus aucuparia* L.) on the formation of the properties of mountain soils, in particular their biodiversity

A changing climate is contributing to the instability of ecosystems around the world. Biodiversity is an important element in supporting ecosystems because it encompasses all forms of life on Earth and contributes to the proper functioning of ecosystems. Soil, as the main habitat for many organisms, is the basis of biodiversity on Earth. It is in the soil that important processes take place that affect plant growth, the water cycle and organic matter, among other things. Soil organisms support many of these soil processes, indirectly influencing changes in ecosystems. Many soil organisms are linked to the species richness of flora, forming symbioses with plants, among other things.

The dynamics of global warming, and especially the prolonged period of drought, have caused the death of spruce stands growing in the Polish mountains. In places where spruce downy trees are present, as well as in gaps in the stands, rowan (*Sorbus aucuparia* L.) is growing in the first place. Rowan is one of the few species found in the higher layers of the mountains. This species has a very wide tolerance to temperature, precipitation or wind, so it easily occupies areas of the upper regale and ranges above the upper forest boundary.

The aim of the research will be to confirm the positive role of rowan in shaping the biodiversity of mountain soils in spruce stands. The research will be carried out in Babia Góra National Park in the upper regale belt on the northern and southern slopes. The experiment will be conducted in spruce stands and spruce stands with admixture of rowan. Among other things, the chemical properties of the soil, enzyme activity and the number and diversity of microorganisms will be studied. A state-of-the-art Next-Generation Sequencing (NGS) method will be used to determine very precisely which microbes live in the soil. In addition, rowan roots and their secretions will be analyzed, which can affect soil life. Knowledge of the relationships studied can contribute to a better understanding of forest ecology, biochemistry and soil microbiology. Simultaneous analysis of 3 elements: soil, litter and roots, will indicate the relationships between them. This research can translate into better forest management, taking advantage of the productive function of the forest along with promoting biodiversity. Research conducted on the common rowan will indicate the potential of undervalued native species, and may provide a basis for analogous use of native species of other climatic zones around the world.