

Forests are crucial in regulating the water balance of the country, continent, and the entire globe. They naturally regulate the water cycle by accumulating water during excess and releasing it during a shortage. Precipitation is the primary source of water in forest areas, which seeps into the soil through the tree canopies. The plants use the water stored in the soil for photosynthesis, and the amount of water in the soil determines whether the plants will grow correctly or be stunted due to a lack of water.

Rainfall measured under tree canopies is often lower than in open space. This is because some precipitation is trapped in the tree canopies on the surface of leaves, trunks, or branches and does not reach the soil surface. The amount of water retained on the surface of plants during rainfall is called interception, which depends on various factors, such as leaf area, rainfall intensity, and the size of raindrops. However, not all factors that impact the process of water interception in tree canopies have been thoroughly researched. It is believed that leaf diseases caused by pathogenic fungi may significantly affect the amount of water retained on the leaf surface during rainfall and its passing through the tree canopies into the soil. Some fungi that infect leaves form mycelium on their surface, which can change their structure and interceptive properties. Therefore, in the proposed project, we want to conduct comprehensive field and laboratory research on the impact of pathogenic fungi infecting leaves on the distribution of rainwater through tree canopies, i.e., on that which is intercepted and on that which reaches the soil surface in the form of throughfall and stemflow.

We will conduct research on the example of *Erysiphe alphitoides*, the fungi that cause a disease called oak powdery mildew. This fungus most often attacks young oak leaves, on which a characteristic white coating is formed - the mycelium of the pathogen. The disease reduces the growth of young oaks and, if it occurs every year, even causes them to die. In the project, we will verify several research hypotheses. We expect that the presence of fungi on leaf surfaces affects how raindrops adhere to and move across the leaf surface. The presence of fungi probably increases the interception of water in the tree canopies and thus reduces the amount of water reaching the soil surface during rainfall. An increased amount of water retained in tree canopies may decrease soil moisture, i.e., a decrease in the amount of water available to plants. Consequently, this may lead to a reduction in the physiological functions of trees and their weakening. Reducing the vital functions of trees by controlling the passing of rainfall through tree canopies into the soil by pathogenic fungi may be their strategy to stimulate further development of the pathogen. The research carried out as part of the proposed project will expand knowledge about the factors influencing the process of rainfall penetration through tree canopies. So far, no studies have been carried out on the impact of pathogens on the interception of water in tree canopies, the amount of water reaching the soil in the form of throughfall, or changes in soil moisture during rainfall. Our research will be the first in this regard.