Ecosystems are shaped by many factors, such as light, rainfall, and soil, but animals also play a crucial role. Large carnivores like wolves can indirectly benefit plants by influencing their herbivorous prey (animals that eat plants). This effect is known as a *trophic cascade*. For example, when wolves reduce the number of deer in an area or change where deer feed, trees and other plants may grow faster. While many studies have focused on how a single prey species influences a single tree species, we still know very little about how these interactions affect entire communities of animals and trees.

Our project aims to explore these interactions in the Białowieża Forest, one of Europe's last remaining primeval forests. We want to understand how wolves influence the feeding habits of ungulates (hoofed mammals like deer and bison) and, in turn, how these feeding patterns impact the growth and diversity of young trees. Instead of focusing just on tree species, we will examine *plant functional traits*—key characteristics of plants, such as leaf shape or wood density, that determine how they function in the ecosystem.

The project addresses two general questions:

1. Where and how much do ungulates browse on trees, and how does wolf activity influence this?
2. Do changes in ungulate browsing patterns caused by wolves affect the diversity and traits of young trees, and therefore overall forest biodiversity?

To answer these questions, we will use a combination of modern research techniques:

- Camera traps to monitor the distribution and behaviors of wolves and ungulates.
- DNA analysis of ungulate feaces to determine their diets.
- Field measurements of tree traits, such as height, leaf characteristics, and chemical composition.

We will collect data across different areas of the forest where wolf and ungulate activity is well-documented. We will also consider factors like soil quality, light availability, and the seasons, as these can influence both predator-prey interactions and tree growth.

Why is this important?

Traditionally, European forests have been viewed as being shaped mostly by rainfall, temperature, and soil conditions. However, recent research suggests that large predators and herbivores have always played a significant role in these ecosystems. Understanding these relationships can give us new insights into how forests work and how we can manage them effectively.

This research is especially relevant today for two reasons:

- Rising ungulate populations can lead to over-browsing, causing biodiversity loss and conflicts with agriculture and forestry.
- The return of large carnivores like wolves to many parts of Europe may help balance these ecosystems, but we need to understand how this works.

By studying Białowieża Forest, we hope to uncover the mechanisms behind species diversity in this unique ecosystem. These findings will not only help us protect Białowieża but will also provide lessons for managing other temperate forests across Europe and beyond.

Our work will ultimately help people understand the critical roles that wolves and other large mammals play in keeping forests diverse. This knowledge can guide conservation efforts and help balance the needs of wildlife, forests, and human activities.