Title: **“Characterizing Soil Physical Properties Using HYPROP 2 Measurements under Various Humus-Building Measures”**

This study aims to investigate the effects of different humus-building measures on water retention and the hydraulic properties of the soil using HYPROP-2 measurements. Using advanced soil monitoring technology, the complex relationship between soil structure, moisture dynamics and humus-forming measures will be characterized. The results will provide valuable insights for the optimization of soil management strategies, the improvement of water use efficiency and the promotion of sustainable agricultural practices in agroforestry systems.

Objectives:

1. Employ HYPROP 2 measurements to evaluate soil physical properties, including water retention curves and hydraulic conductivity, under different humus-building measures.
2. Investigate the spatial heterogeneity of soil physical properties due to proximity to the hedgerow line through measurements on several plots.
3. Investigation of the influence of different organic amendments, cover crops and tillage methods on soil structure and water-related parameters.

Methodology:

1. Select representative plots with distinct humus-building measures, incorporating organic amendments, cover crops, and alternative soil management practices.
2. Utilize the HYPROP 2 instrument to measure soil water retention curves and hydraulic conductivity at different soil depths in selected plots with different humus build-up measures at contrasting locations.
3. Conduct parallel soil sampling at different time points to capture seasonal variations in soil physical properties, mainly soil moisture contents.
4. Analyze the collected data to identify patterns, correlations, and impacts of humus-building measures on soil physical properties.
5. Develop practical recommendations for optimizing soil management strategies based on the findings.

Expected Outcomes:

1. A modified agroforestry model with the ability to simulate the long-term effects of different humus-forming techniques on the physical properties of the soil.
2. Measured and explicit effects of specific hummus building techniques on the arrangement, texture and composition of the soil.
3. Detailed spatial analysis revealing discrepancies in simulated soil physical characteristics between different agroforestry plots.
4. Establishing relationships between measured soil physical properties and key indicators of soil condition and fertility.