**Modeling the Effect of Stand and Site characteristics on the probability of Mistletoe Infestation in Scots Pine Stands using Remote Sensing Data**

Over the past decade, there has been a marked increase in the presence of mistletoe (*Viscum album* ssp. *austriacum*) within Scots pine (*Pinus sylvestris*) stands in several European regions, resulting in significant disturbances. Given the potential implications for forest health and management, understanding the factors influencing the occurrence of mistletoe in these stands is crucial for the implementation of effective forest management strategies aimed at mitigating damage and preventing future spread of mistletoe. Today, remote sensing is a reliable source of information in forestry and the use of different methods is constantly evolving. High spectral resolution imagery is provided by multi- and hyperspectral sensors mounted on satellites, aircraft or unmanned aerial vehicles (UAVs) such as drones. UAVs provide higher spatial resolution than satellite imagery and ensure high labour productivity. With high spatial resolution drone data, we can obtain accurate information on the location and extent of mistletoe in stands. However, Airborne Laser Scanning (ALS) measurements allow us to obtain highly accurate data on stand characteristics at an unprecedented scale. Consequently, the range of variation in growth conditions can be greatly expanded with ALS measurements. Therefore, the fusion of ALS and UAVs is a reasonable alternative to traditional inventory methods, which are time consuming, costly and can be subject to large errors. Therefore, the main objective of this study was to determine the probability of mistletoe occurrence in Scots pine stands in relation to stand related endogenous factors such as top height and stand density, as well as topographic and edaphic factors. We used unmanned aerial vehicle (UAV) imagery of 2247 stands to detect mistletoe in Scots pine stands, while most stand and site characteristics were calculated from airborne laser scanning (ALS) data. We found that mistletoe infestation in Scots pine stands is influenced by stand and site characteristics. We documented that the densest and tallest stands were more susceptible to mistletoe infestation. Site type and specific microsite conditions related to topography were also important factors influencing mistletoe occurrence. In addition, climatic water balance (CWB) was a significant factor in increasing the probability of mistletoe occurrence, which is important in the context of predicted temperature increases associated with climate change. Our results are important for better understanding patterns of mistletoe infestation and ecosystem functioning under climate change. In an era of climate change and technological development, the use of remote sensing methods to determine the risk of mistletoe infestation can be a very useful tool for managing forest ecosystems to maintain forest sustainability and prevent forest disturbance.