Factors Influencing Aboveground Live Biomass of Carpathian Spruce

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Field-based estimation of aboveground biomass (carbon) stocks in different forest types and under different growing conditions requires an understanding of variability in tree growth forms as a function of canopy position and degree of dominance vs. suppression. Our study is investigating a simplified ground-based methodology which can be used by foresters to quantify and validate stand-level carbon sequestration and storage estimates, such as those made remotely. We conducted our study in spruce (*Picea abies*) stands in the Carpathian Mountains of western Ukraine. We used whole tree measurements, based on sectional dry weights, to develop predictive equations for spruce aboveground biomass using the component ratio method. Relationships between different biomass components (stems, limbs, etc.) and site-specific environmental conditions (canopy layer, elevation, etc.) were tested to yield a more robust understanding of factors influencing live tree productivity. Our preliminary results include both allometric and volumetric equations. The results of this research will help scientists understand more about inter-stem competition, effects on growth form and biomass development, and other controlling influences such as climate. The study also will help inform forest carbon projects in the region, for instance by allowing more precise biomass estimation and mapping of carbon storage potentials.