



Effects of continuous cover forestry on soil moisture pattern – Beginning steps of a Hungarian study

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Nowadays Hungarian foresters encounter a new challenge. The traditional management practices do not meet anymore with the demand of the civil society. The good old clearcut is no more a supported technology in forest regeneration. The transition to the continuous cover forestry induces much higher spatial variability compared to the even aged, more or less homogeneous, monoculture stands. The gap cutting is one of the proposed key methods in the Hungarian forestry. There is an active discussion among forest professionals how to determine the optimal gap size to maintain ideal conditions for the seedlings. Among other open questions for example how the surrounding trees modify the moisture pattern of the forest floor in the gap?

In the early steps of a multidisciplinary project we established four research plots to study the spatial and temporal variability of soil moisture in the forest gap and the surrounding undisturbed stand. Each plot is located in oak (*Quercus spp.*) stands. Natural regeneration of oak stands is more problematic in our climate compared to the beech (*Fagus sylvatica*) which is located in the more humid or semi-humid areas of our country. All plots are located in the western part of Hungary: close to Sopron, Bejczytyános, Vép and Vajszló settlements. The last plot is an extensive research area, which is located in the riparian zone of a tributary of Feketevíz River. We monitor here the close-to-surface groundwater level fluctuation with pressure transducers. With a diurnal fluctuation based method it is possible to quantify the evapotranspiration differences between the gap and the stand.

In two of the remaining stands (Bejczytyános and Vép) the gaps were opened in 2010. The monitoring of soil moisture began in 2013. A mobile sensor is used to monitor soil-moisture in a regular grid. The spatial variability of soil-moisture time-series shows a characteristic pattern during the growing-season.

The plot in Sopron was established in 2013. Gaps with three different sizes were opened and fenced round to close out wild game. The initial status of the gap was recorded by a terrestrial laser scanner (LIDAR). From the resulting 3D point cloud high-resolution digital terrain and canopy surface model are derived which will help the planned numerical modelling. To prevent the unnecessary disturbance in this plot, two perpendicular transects were selected in each gap. The soil-moisture is monitored along these lines together with additional investigations, for example throughfall, and litter interception, tension disc infiltrometry, plant composition and cover. The microclimatic parameters such as near surface air temperature, relative humidity, radiation, wind speed and soil temperature is continuously recorded along the transects and compared to a nearby reference meteorological station located at an open area.

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