

Král, K., S. M. McMahon, D. Janík, D. Adam and T. Vrška (2014): Patch mosaic of developmental stages in central European natural forests along vegetation gradient. For. Ecol. & Manag. 330 17-28.

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Short reference: Král et al. (2014)

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Abstract

The shifting mosaic of patches in different phases of forest development is a widely used framework for describing stand dynamics, structure and biodiversity in European temperate forests. In spite of the common application of patch mapping of developmental stages/phases, an objective and quantified evaluation of patch mosaics has been missing. This approach identifies patches of forest stand according to a developmental trajectory, from Growth, through an Optimum stage to Breakdown. Here we present the first attempt to compare quantitative and qualitative characteristics of patch mosaics of stand developmental stages using three decades of extensive data in five study sites along a vegetation gradient. We do this using the same, observer independent method based on an artificial neural network classifier. We also used the historical stem position datasets to evaluate the change of mosaic characteristics in time.

Resulting patch patterns were analyzed by standard mosaic metrics commonly used in landscape ecology, evaluating area, shape, aggregation and connectivity of patches. The mean patch size of the mosaic of four developmental stages showed a relatively narrow range of 570–800 m² in all study sites and censuses. The shape of patches in all sites and years had no significant differences, and the aggregation of patches of the same type was similar in all sites at the mosaic level. Conversely, we did find some stage-specific patterns. For example, the Growth stage was usually the most abundant (covering 25–50% of the stand), and had the highest mean patch size, ranging between 590 and 2800 m².

The Growth stage patches also had the most complex shapes. On the contrary, the Breakdown stage usually had the opposite values, forming constantly small (250–720 m²), simple and scattered patches in the mosaic. These basic traits were found in all study sites and were stable in time. We also found some common trends in the dataset, such as increasing mean patch size of the Breakdown stage along the altitudinal vegetation gradient. The complex Steady State stage was generally more abundant than expected according to results of other studies and thus might indicate processes that have not been well described in previous, subjective, applications of the patch mosaic paradigm.

habitat: open/dry oak forests

habitat: coniferous mixed woodlands

habitat: oak-hornbeam forests, beech forests

habitat: swamp and riverine forests

forest dynamic, gap dynamic, succession

forest structure: stand

forest type classification

deadwood

methodology: analysis, statistics

Location: ER Archívum - digitális

URL: [ScienceDirect](#) Type: scientific paper

Strict forest reserves: [Y - AZ ÖSSZES ERDŐREZERVÁTUM \(HU\)](#)

Horváth Ferenc

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