



Linkage between river hydromorphological characteristics and ecological status of *Populus nigra* – development of a modeling framework for riverain ecosystem

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Populus nigra (Black poplar) is a medium-sized to large deciduous flood forest tree, 20-30 m tall, with a trunk up to 1.5 m diameter. The species is dioecious (male and female flowers on different plants), with pollination by wind. It is endangered due to intensive past river regulations that have destroyed a lot of its habitats throughout Europe. There are few places that preserved good Black poplar gene potential. Successful regeneration process of the species may present good ecological conditions of river corridors. Knowledge of Black poplar ecological needs is therefore of a large importance for both, species regeneration projects and sustainable river management. We develop methodological aspects for modelling Black poplar ecosystem needs with the use of river hydrological and morphological parameters.

Analysis of development stages and vitality of Black poplar is done for two rivers in Slovenia, both part of the Danube river catchment. First location is on the Sava river near Ljubljana. Here monitoring of soil chemical and physical characteristics, meteorological parameters and biotic parameters of Black poplar is being performed on one hectare large plot area. Second location is on the Mura river in the North-East Slovenia. For the 10 km long and approximately 1 km wide river corridor section a presence of Black poplar is described and surface water flow characteristics, groundwater fluctuation dynamics and river morphological elements are determined. We obtained data

from field inspections, national cartographic fond and hydrological monitoring.

The presence of young trees of Black poplar indicates that larger river morphological and flow dynamics and moderate groundwater fluctuations sustain better ecological conditions its pollination and growth. The most important riverine morphological elements for pollination and growth of young Black poplar are non vegetated areas of sand sediments (river bars, regularly flooded channel banks or side channels) with aerobic ground (soil) conditions and wet ground (soil) in two thirds of the year. The optimal flood frequencies, river hydraulic and morphologic properties and sediment transport processes are studied further to describe hydrological and morphological elements needed to sustain healthy and vital Black poplar population in the Mura river corridor.