

## Summary

Riverside riparian forests are azonal forest communities that do not have any production values, but they are the necessary biological support of the river and they are Europe's most valuable habitats under the Natura 2000 network. Well-preserved riparian forests fulfill many non-production ecological functions. However a loose tree stands, narrow stripes of these forests along the river valleys and their fragmentation, which today characterize most of the preserved forests, have caused these functions are strongly limited in many places, and additionally multidirectional disturbances cause problems related to the renewal of the treestand. Learning of the factors that support or hinder the natural regeneration of the treestand in various types of riparian forests and in diverse ecological conditions was the main purpose of this work.

In 2017, in several river valleys of the Tatra Mountains and the Western Beskids there were established 30 permanent study plots (10 x 10 m) in 3 riparian forest communities: *Alnetum incanae* Lüdi 1921 in lower subalpine forest, *Salicetum albo-fragilis* R. Tx. 1955 in submontane areas and *Populetum albae* Br.-Bl. 1931 – the most endangered in Poland and abroad. Mapping and measurements of young trees in subsequent growing seasons (2018 and 2019) allowed to determine their survival, positioning and growth rate.

These studies investigated the impact of qualitative factors (the presence of flooding and LWD, structure of river bank, forest associations, type of undergrowth [the undergrowth floristically varied, the undergrowth with dominance of native/ non-native plant species] and intensification of anthropopressure) and quantitative factors (forest structure, soil chemistry, grain size) on the survival and growth rate of young trees.

During the initial stage of the carry out investigation: *Alnus incana*, *Salix sp.* and *Populus sp.* were expected in the natural regeneration tree stand. Finally, *A. incana*, *Acer platanoides*, *A. pseudoplatanus*, *Fraxinus excelsior* i *Padus avium* which showed the highest abundance were also taken into detailed analysis. Additionally, the results of survival and growth rates of all species were analyzed – even those with the smallest numbers.

The research showed that the effective natural tree stand regeneration (survival and growth) seems to be more influenced by qualitative than quantitative factors.

Natural tree stands regeneration is supported by: the undergrowth floristically varied, natural river bank, presence of LWD, less frequent flooding and limited anthropopression. The survival of young trees is also negatively influenced by herbivores.

The influence of quantitative factors on the survival of young trees is not so clear – young trees are characterized by a slightly higher survival rate on study plots with the gap in tree canopy. A clear, positive correlation was found with the elevation of the examined plots above the average water level, while a negative correlation was obtained with some grain size characteristics of the substrate.

Young tree specimens are characterized by greater increments on areas with greater underbrush canopy and greater bryophyte plot coverage, while they are negatively correlated with the number of alien species in the plot and the soil granulometric composition.

The results presented above refer to the total number of young trees, but individual species have different individual requirements with regard to the analyzed factors.

Protective recommendations are based on the results of observations and models of survival and growth rate young trees. It would be necessary to protect well-preserved riparian forest plots, preventing human's destructive activity in river valleys, restoration of river banks where it is necessary. In addition, leaving LWD in phytocoenoses, protecting young trees against grazing, and monitoring of appearance and development of populations of alien species, especially those invasive ones.