

## **The role of habitat factors in successful invasion of alien plant *Acer negundo* in riparian zones.**

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Ash-leaved maple (*Acer negundo*) is one of the most invasive species occurring in riparian zones. The invasion is especially effective in disturbed areas, as the plant favours anthropogenic sites. The plant was also observed to be able to penetrate into sandy bars, also those separated from the land, inaccessible to people. It's removal is time-consuming and laborious, often involves damage done to sensitive vegetation and the results are doubtful, as the plant quickly regenerates. The invasion patterns and establishment of ash-leaved maple in natural ecosystems are poorly investigated. The aim of this study was to test how habitat factors such as: light availability, soil characteristics and competition contribute to ash-leaved maple effective colonization of natural sand bars free from anthropogenic pressure. In 2014 sand bars located in Vistula River Valley in Warsaw were inventoried and classified basing on their development stage as 1 – initial, 2 – unstable, 3 – stable. Apart from the occurrence of the invasive ash-leaved maple the plants competing with it were recognized and the percentage of the shoots of shrubs and herbaceous plants was estimated. PAR was measured at ground level and 1 meter above ground, the thickness of organic layer formed on the top of the sand was also measured as the indicator of sand bar development stage. The maple's survival in extremely difficult conditions resembles the strategy of willows and poplars naturally occurring in the riparian zones, which are well adapted to this environment. The success of invasion strongly depends on the plants establishment during sand bars initial stage of development. The seedlings growth correlates with the age of the sand bar ( $r_1=0,41$ ,  $r_2=0,42$  i  $r_3=0,57$ ). The colonization lasts for 4-6 years and the individuals start to cluster in bigger parches. After that period the maple turns into the phase of competition for space. Habitat factors such as shading ( $r_2=0,41$  i  $r_3=0,51$ ) and organic layer thickness ( $r_2=0,35$  i  $r_3=0,35$ ) become limiting factors to the plants development. The diversity of shoot age increases with the bars age ( $r=0,78$ ), but the new emerging shoots are suckers rather than newly established seedlings. The removal of ash-leaved maple in the early development stage is ineffective as this is a period when high number of seedlings develop. The removal at the later stage leads to damage done to sensitive herbaceous vegetation which is developed by then. Management of the invasive ash-leaved maple should be held on sand bars older than 10 years, the moment the competition of other trees and shrubs reduces the establishment of new seedlings. Removal of trees of diameter bigger than 10 cm will impair the plants expansion with minimal damage done to the habitat.