

Development of Riparian Tree Roots in Compacted Coarse Gravel Mixtures - Analysis of Alternative Measures to Decrease Asphalt Damages caused by Tree Roots

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Tree roots are a major concern in the maintenance of roads in general, and infrequently used paths along rivers and cycling lanes specifically. High repairing costs paired with insufficient mitigation measures lead to the importance of developing a strategy to prevent tree roots from entering the infrastructural construction. Adding to this, damaged asphalt is a threat to cyclists and pedestrians, which makes the search for a solution altogether a pressing matter.

In the process of an ongoing project with ViaDonau, during which different measures are tested on-site along the Danube, a field experiment has been set up to test the impact of coarse gravel as sublayer material on the development of tree roots. The aim is to present a recommendation of a certain gravel mixture to use as sublayer. It should reduce root penetration into the pavement construction and increases a drainage effect to prevent condensation and high moisture levels underneath the asphalt.

The present work is focusing on the root development of the field experiment after two vegetation periods. The field experiment simulates a concrete-paved road with a vegetation strip next to it. The setup is identical for all fields with poplars and willow cuttings planted along the paved area and the possibility for the tree roots to enter the sublayers of the pavement. These sublayers are made up of six boxes filled with differently sized coarse gravel mixtures (0/32, 8/32, 8/32 hydraulic bound mixture, 16/32, 0/63 and 16/63) to test if the composition has an impact on the root penetration and permanent development.

Root dry biomass data in the boxes was collected in 27 subplots. Root dry biomass data was put in relation to the biomass data of the vegetated soil strips in order to consider different biomass development. Additionally for one column of the subplots tree roots were scanned to gain information on the diameter distribution of the collected biomass. Biomass data was also compared to last year's to state the biomass development and a possible establishment of the tree roots.

The prevailing hypothesis is that a mixture with coarse gravel is more likely to inhibit roots from entering the construction because of its draining features due to the lack of fine sediments. As for now, this assumption is mostly coherent with the results of the field experiment. Nevertheless, it seems that the best results were collected of the box with the 8/32 hydraulic bound mixture.