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Quartz sand as "blank" compound in rehabilitation experience of industrial barren

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During 2008 the field test was performed near the smelter complex Monchegorsk (67°51'N, 32°48'E) to estimate suitability of innovate method for site remediation in severe conditions such as in industrial barren. The method is based on cultivation of perennial grasses using hydroponics with thermally inflated vermiculite from local deposit (Kovdor) followed by rolled lawn placement on very contaminated sites near Monchegorsk. Growing in very contaminated ground resulted in 50% rolled lawn surface loss during first year but with biodiversity maintenance. Field experiment was carried out in three variants (1- mineral ground – flat site; 2- mineral ground- slope sites; 3- organogenic ground – flat site in depression in five replicates. More comprehensive results were received for mineral ground due to better natural washing compared to organogenic ground. In all variants we observed secondary roots formation. It seems obvious that plant roots choose the best zones of soils to grow, and that they avoided toxic zones. Observations continued during 2009 to follow freezing influence and nutrient loss rate. We observed grass survival of about 20-30% during second year of field test but grass roots proliferated very slowly in contaminated ground. Affinity to the ground is one of most important estimate of rolled lawn efficiency for grass cover creation.

One of possible measure to improve rolled lawn affinity is to establish additional permeable barrier for grass roots isolation from toxic ground. Simultaneously with rolled lawn placement litterbag experiment was carried out with quartz sand as filling. Quartz was chosen as blank compound and as possible material for permeable barrier creation. Original quartz have some initial nutritional status: pH 6.87, available forms of K 1.9 mg g-1, Ca 9.5 mg g-1, Mg 2.8 mg g-1, P 0.4 mg g-1. There was both increasing and decreasing of quartz nutritional status during 2008-2009 period. Besides quartz is recognized to be some barrier for pollution load due to organic matter and related heavy metals and Al sorption onto a quartz sand surface. Laboratory pot experiment are planed to be carry out to estimate quartz barrier function efficiency for grass survival.