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The use of hydrogel in afforestation of postindustrial areas

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Abstract: Some areas intended for afforestation are characterised by a lack of moisture and mineral nutrients. One of the approaches to improve water retention capacity of soils is the use of hydrogels (polymer soil conditioners). The presented experiment was performed with 4 different methods of hydrogel applications and control in a post-industrial area – a dumping ground of the Brown Coal Mine Bełchatów (Forest District Administration Bełchatów). The Aquaterra product (pure hydrogel) and hydrogel with nutrients (TerraVit) produced by Terra-Gubin company were used in all experiments. From 292 to 306 one-year old seedlings of Pinus sylvestris L. of an average height of 80–101 mm were planted in each plot. The influence of hydrogel application method on successful afforestation and growth of seedling was analyzed after the first vegetation year. Maximum number of survived seedlings (93.3%) was observed for hydrogel applied through roots coating, minimum (72.4%) for hydrogel with fertilizers applied under plants. Results obtained for pure hydrogel surface application (89.1%) and pure hydrogel applied under plants (85.3%) can be compared with results from control plot (89.7%). Mean heights of surviving seedlings were similar (128–130 mm) for root coating, and both methods of hydrogel application under plants, in contrast with surficial hydrogel application (117 mm) and control where they were minimal (111 mm). Mean height increments in surviving seedlings were minimum in control plot (31 mm), and similar (38–40 mm) for root coating and surface application. The best results of height increments (47 mm) were obtained when hydrogel mixed with fertiliser was applied under plants. To sum up, in view of plant survival the best method of polymer soil conditioner (hydrogel) application was root coating; this method gave also satisfactory increments of plant height.

Key words: afforestation, hydrogels, Pinus sylvestris