USING PLANTS FOR GREENING OF TAILING PONDS OF IRON ORE COMBINES OF KRYVYI RIH AREA

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The tailing ponds of the iron ore-dressing combines occupy thousands of hectares in Kryvyi Rih area and create a serious ecologic problem in this region. If the surface of the tailing ponds dries up, it leads to dust storms, which often cover housing areas of the city as well as surrounding villages. To green these tailing ponds is one of the most reliable methods of dust suppression. However, the solving of this problem is fraught with a number of difficulties because very restricted quantity of herbaceous plant species can survive in the sludge substrate under conditions of the steppe zone of Ukraine. It is caused not only by low content of mineral nutrients and absence of organic substances, but primarily by excess in water-soluble salts; their concentration varies between 5 and 20 g/l. Only some of species reside in the sludge spontaneously, e. g. *Salsola tragus* L. s. str., *Kochia scoparia* (L.) Schrad., *Calamagrostis epigeios* (L.) Roth., *Lactuca tatarica* (L.) C.A. Mey., *L. saligna* L., *Phragmites australis* (Cav.) Trin. ex Steud., *Suaeda prostrata* Pall., *Tripolium pannonicum* (Jacq.) Dobrocz., *Scirpus tabernaemontani* C.C.Gmel., *Bolboschoenus maritimus* (L.) Pall., *Sonchus arvensis* L., *Atriplex micrantha* C.A.Mey., *Euphorbia virgata* Waldst. & Kit., but they occur very seldom in the some sites. The spontaneous establishment takes place at the site borders only. During last 30–40 years, different research organizations tried repeatedly to green the tailing ponds without covering with any fertile substrate. We developed two strategies: a) planting of herbaceous perennials which are able to grow in the salinity-affected, infertile, dense substrates and still to regenerate vegetatively, covering the surface of the tailing ponds; b) sowing of annual plant seeds. These species can survive under such conditions, their above-ground biomass serves as a block for dust spreading.

In 2016–2017, we used both approaches to green the tailing ponds of two large iron ore combines in Kryvyi Rih area. As a result, it was possible to make planting around 52 ha by using spring and autumn sowings and planting of plants with a closed root system. Our two-year-long testing of gramineous herbs showed that selected species have high viability in the dump conditions and provide their main function – they limit the spread of a dust. Advantage of gramineous herbs in process of growing composes in forming fibrille root system that fix the surface of a dump, the over-ground part serves as block for dust spreading. At spring plantings of container culture, vegetatively mobile gramineous herbs begin to settle in the vegetative period and, under relatively favourable conditions, even a few meters from the parent. Seeding of gramineous herbs using agrotechnical methods developed by us contributes to the dust retention already in the first months of their growth, as well as their dead and underground biomass at the end of the growing season. There is a kind of mulching of the surface of the sludge with the dead biomass of plants. Right at the moment of tillering gramineous herbs start to perform the function of dust retention. Vegetatively mobile plants colonize the entire surface of the heap including those local areas where the accumulated water periodically evaporates during the hot periods of the year. In addition, the greening of the tailing ponds is carried out once and, in subsequent years, any agrotechnical measures are not needed.

Greening by plants of the tailing ponds is more economically safe, than covering their surface with chemical reagents.

Key words: Kryvyi Rih, Tailing Ponds, Greening