



## **The potential of two *Salix* genotypes for radionuclide/heavy metal accumulation. A case study of Rovinari ash pit (Gorj District, Romania)**

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Thermo Electric Power Plants (TEPP) produce a high amount of ash, that contains heavy metals and radionuclides. Ash is usually stored in ash-pits, in mixture with water and contains U235, Th 234 and their decay products, that are released from the coal matrix, during combustion, as well as heavy metals. Warm weather dried the ash and it can be spread by the wind in surrounded area. This paper presents the results of an experiment with two *Salix* genotypes, cultivated on an old closed ash-pit, nearby the Rovinari TEPP, in the middle Jiu valley (Gorj District, Romania), in order to evaluate its tolerance to heavy metals and radionuclides. Ash analysis revealed the presence of natural radionuclides, belonging from ash and coal dust, as well as of Cs 137, of Chernobil provenance. Radionuclides content over the normal limits for Romania were registered for Th 234, Pb210, U235 and Ra226. The heavy metals level in ash was over the normal limits, but under the alerts limits. In order to establish the woody plants tolerance to heavy metals and radionuclides, it is important to study the seedlings behavior. In this respect *Salix alba* and *Salix viminalis* whips and cuttings culture have been establish on Rovinari ash-pit. The observations made on survival and growth rate pointed out the superiority of *Salix viminalis* behaviour. After a period of three years *Salix viminalis* registered a 96% survival rate, while in *Salix alba* annual decreases, reaching to 14%. These results are supported by the radionuclides content in leaves and by the electron microscopy studies. In *Salix alba* the leaves parenchymatic cells present a low synthesis activity. The exogenous particles are accumulated in parenchima cells vacuola, the chloroplasts are usually agranal, with few starch grains and mitochondria presents slightly dillated crista. The ultrastructural features of the mature leaf cells, evidenced the natural adaptation of *Salix viminalis* for development in an environment with a big amount of heavy metals and radionuclides, in comparison with *Salix alba*. In seedlings developed on ash waste dump, in leaf cells, the fine blocks of heterochromatin are dispersed in nucleus. The chloroplast with well developed grana and numerous plastoglobuls, are in active synthesis (being present 2 – 4 starch grains), some chloroplasts being transformed in amyloplast. In the mitochondria matrix, are present ferritin aggregates, with role in cell detoxification processes.