Installing Artificial Macropore in Blueberry Pot to Enhance Vertical Infiltration and Fix of Radioactive Cesium.

*Masahiro Hayashi[1], Eiko Inao[2], Yasushi Mori[1]

1.Graduate School of Environmental and Life Science,Okayama University, 2.Miyagi Prefectural Institute of Agriulture and Horticulture

Fukushima nuclear power plant damaged by the East Japan Great Earthquake caused radioactive fallout around the Tohoku region. Because radioactive Cesium was positively charged, it was reported to being adsorbed to soil surface within 5cm deep. However, organic soil with less clay mineral would bind the radioactive Cesium weakly. Therefore radioactive Cesium would be transported to rhizosphere zone, which results in absorption by plants or crops.
Artificial macropores were installed to effectively transport radioactive fallout from the surface to deeper profile, by bypassing the root zone. Radioactive Cesium was expected to be adsorbed by clay minerals at the deeper profile. We carried out pot experiments for blueberries with peat moss. Artificial macropore filled with bamboo fiber (d=1cm, length=20cm) was installed in experimental pot. In this experiment, macropores were covered by plastic tubes so that solutes were effectively conducted to deeper profile without any distribution during transporting process. Six treatments were prepared such as macropore, macropore with ammonium sulfate, macropore with potassium, no macropore and no macropore with ammonium sulfate, no macropore with potassium. After one year, peat moss pots were cut into layers to determine radioactive Cesium concentration.
Results showed that, without macropore, radioactive Cesium did not move to deeper profile. When ammonium sulfate was applied without macropore, Cesium would be released from soil then it would be absorbed by blueberry. Macropore with ammonium sulfate effectively conducted Cesium to deeper profile but blueberry also absorbed it. Macropore with Potassium conducted Cesium to deeper profile to some extent and moreover, blueberries did not absorbed Cesium, probably because Cesium is a congener of Potassium.

Keywords: radioactive cesium, solute transportation, macropore

