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Surface absorption and translocation of Cs in Cryptomeria Japonica

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The accident of Fukushima Daiichi Nuclear Power Plant caused by earthquake in March 2011 dispersed a large amount of radiocesium into the environments. Since three quarters of Fukushima prefecture are occupied with forests, decontamination of radiocesium from forests has been a serious subject. In order to establish an effective decontamination method in forests, it is important to clarify the dynamics of radiocesium in forest ecosystem. The purpose of this study was to understand the surface absorption and translocation of cesium in Cryptomeria Japonica, which is major plantation tree species in Fukushima. We focused on the absorption from the surface of bark and leaves, because it was supposed that the surface adsorption should be the first intake process of radiocesium just after the accident. The experiments were conducted at a forest of 10-years-old C. Japonica in Fukushima Prefectural Forestry Research Center. Bark was removed from three stems. Cesium solution (0.01 M, 133CsCl) was applied on the stems of C. Japonica with or without barks on August, and kept them for three weeks. After fell down these trees, several organs, such as inner woody part, upper branches, and leaves, were sampled. For another trees, Cs solution was applied on the surface of leaves at the same time as the application on stems, and kept for one day. After 10 weeks, the trees were cut down and several organs were sampled. The concentrations of Cs in several organs, such as inner woody part, upper branches, and leaves, were analyzed by using ICP-MS after wet digestion with nitric acid. The analytical results showed that application of Cs solution on stem surface induced the intake of Cs, and the intake was occurred under both cases with and without bark. And, Cs was detected in the leaves at top of tree. Therefore, it was indicated that the absorbed Cs was transported to the tree top within 3 weeks. In case of the application on leave surface, we detected Cs at a branch part located about 10 cm from the applied leaves. This means that Cs might be translocated from leave to branch through a seasonal physiological process. These results suggested that a part of the deposited radiocesium should be absorbed from stem surface and leaves, and moving inside of C. Japonica .