
RECENT RESEARCH ACTIVITIES

Role of Termites in the Soil Nutritional Ecosystem of Temperate Regions

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Termites are dominant soil animals in the tropics and sub-tropics [1], and play a major role in the soil nutritional ecosystem by recycling ligno-cellulosic materials and minerals [1]. In addition, soils of termite mounds, which are abundant source in tropical areas, are known to be beneficial materials for human as soil fertilizer [2] and wall materials of houses [3].

In contrast, ecological role of termites in temperate countries are not well understood. It is mainly due to their notoriety as the most important pest for houses. The simple calculation of termite population in urban landscapes of Japan, which is based on the infestation rate of houses [4], reveals that on average more than 100 individuals are living in 1m². We, thus, have just started the international collaborative research on role of termite in the soil nutritional ecosystem of temperate regions.

In Japan, the monitoring devices, PVC pipe with a removable cap on the top and wooden feeder stakes, were set-up in the Living-sphere Simulation Field (LSF) site of Kyoto University near coastline in Hioki City, Kagoshima Prefecture in 2013. LSF site is located in planted pine forest area. Another 2 monitoring sites are located in suburban planted pine forest fragments in Uji campus of Kyoto University. Four additional monitoring sites, which are dominated with planted Hinoki (*Chamaecyparis obtusa*), Konara (*Quercus serrata*), Akamatsu (*Pines densiflora*), Akamatsu-Soyogo (*Ilex pedunculosa*), are in a secondary forest on Ryukoku-no Mori near Ryukoku University in Otsu City, Shiga Prefecture in 2014. In the USA, similar devices were set-up in planted pine forests in suburban.

After 5 - 6 months, the monitoring devices are surveyed and the following samples are collected: a) termite mud-tubes attached on the surface of the wooden stakes, b) termites, c) 10-cm depth soil samples 1-m apart from the monitoring devices. Termites are kept with water saturated wood blocks for 2 weeks to obtain frass samples. All the samples are served for the CHN analysis (organic materials) and the ICP analysis (minerals) after the pre-treatment.

The preliminary results from the USA (Forschler, unpublished data) showed that there were 3 types in elements as follows: i) K, C, N, Na, Mn, Mg, B: the higher concentrations in the termite-related samples than in a soil sample, ii) P, Zn, AL, Cu: the lower concentrations in the termite-related samples than in the soil samples, iii) Cd, Co, Ca, Fe: similar levels in both the sample. In Japan, termites were collected from 34 out of 72 monitoring devices (47%) in the LSF site with 22 frass samples. All the collected samples are now under the pre-treatment for the analyses.

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