

Abstract

Natural habitats of psamophilous species of aculeate hymenoptera, which are inland drift sand, are disappearing. This causes these species to become threatened or even extinct. However, ash contains heavy metals that are accumulated in tissues by plants, vertebrates, and invertebrates. These elements cause various organisms different complications, ranging from mild complications to serious complications often ending with the death of an individual. The aim of this work is to determine whether and, if so, what selected elements of aculeate hymenoptera accumulate in their tissues, depending on the type of substrate and the food strategy. For the purpose of this work, a total of seventeen elements have been selected, which are expected to occur in coal fly ash and have been shown to have toxic effects through studies of various organisms. Concentrations of these elements were measured in the substrate of four sites (two sand dunes and two ash deposits) and in the tissues of fifty-five species of aculeate hymenoptera. The relationship between the type of substrate and the number of elements contained in it was tested using t-test and the individual sites compared with respect to the concentration of elements in the substrate by the PCA method. In addition, the concentration of selected elements in the hymenoptera relative to the substrate type was tested by the GLM and GEE method and the relation of the concentration of selected elements in the hymenoptera tissue to the substrate type and the feeding strategy using the GEE method. Phylogenetic correction was used when using the GEE method,. The results show that the selected elements are actually found in fly ash at higher concentrations than in sand and that although sands are similar in terms of element concentration to each other, the ash deposits differ from each other. Further, it has been shown that the hymenoptera from coal fly ash deposits, related on the type of substrate, accumulate only some of the selected elements in their tissues and that the food strategy can have a significant effect on the accumulation of selected elements. The knowledge gained by this work is crucial for further research on the influence of selected elements on tailstocks from ponds.