

Invasive species are animals, plants or fungi that are introduced accidentally or deliberately into a place where they are not normally found. Nowadays introductions and spreading of foreign and invasive organisms are one of the most important problems in nature conservation. Biological invasions have caused great loss of species diversity around the world. The scale of introductions of non-pathogenic beyond their natural range seems to be significant. We know that at least 200 species of symbiotic fungi have been moved from native ranges to novel habitats. In recent time several aliens from other continents have settled outside their native range. An example is the Australian stinkhorn octopus (*Clathrus archeri*) fungus similar to red flower, North American giant stropharia (*Stropharia rugosoannulata*) – fungus that escaped from a cultivation, tasty Western painted suillus (*Suillus lakei*) appearing in home gardens near Douglas fir, or, making a sensation among amateurs of mushroom picking American bolete (*Aureoboletus projectellus*).

Studies describing spreading of non-native fungi proved that these fungi are extending their range rapidly, not only in Poland but also in other parts of the world. Everything seems to be all right, mushroom enthusiasts enjoy picking off the *Aureoboletus* and giant stropharia, and photographers enjoy their lens with stinkhorns and painted suillus. Seems to, because the true is that fungi can be also invaders! The negative impact of alien fungi has already been detected. The European *Amanita phalloides*, heavy poisonings fungus, can be found in North America, Australia, and New Zealand. *Suillus lakei* strongly affects the Douglas fir invasion in South America and New Zealand, and the Asian truffle (*Tuber indicum*) displaces the most culinary valuable European species of truffles. Therefore, in the project, we will investigate the impact of alien fungi on native forest ecosystems, including mycobiota. We assume that the potentially invasive species can affect negatively native fungi, soils and ecosystems functioning.

In the proposed project we will use advanced molecular tools (new generation sequencing, population genetics study). Such tools allow estimating the quantitative and qualitative relations between alien fungi and native mycobiota. The obtained results allow assessing the scale of the threat by non-native fungi. The novelty of the project is a combination of the molecular methods with tools allowing to estimate the impact of alien species on the soil ecosystem. We will examine the decomposition rate and enzymatic activity of soil and mycorrhizas, as well as the impact of potentially invasive fungi on mites assemblages, regarded as bioindicator organisms. The proposed project is in line with the latest trends in research on the functional ecology of fungi.