

Phytopathogenic microfungi are plant parasites commonly found in the human environment. They are responsible for reduction of yields as well as deterioration of the quality of plant products and the decorative value of ornamental plants. On the other hand, they may pose a potential threat to human health, as fungi are a generally known and prominent source of allergens. The magnitude of this threat is evidenced by the fact that the prevalence of respiratory allergies to fungi is estimated at 30% among atopic individuals, and this incidence is still dramatically increasing. The distribution of plants and fungi depends on the geographical location, air quality, human activity, and local source of vegetation. Lately, it is also affected by climate-related factors (temperature, humidity, extreme weather events). In Poland, massive invasion of plant microfungi from Asia, North America, and even Australia could be observed during the last few years.

In response to allergens, disease symptoms often occur as rhinitis often accompanied by ocular signs. However, the small size of fungal spores enables deeper penetration of the respiratory tract leading to development of asthma. Asthma is an inflammatory disease of the airways characterized by airway hyperresponsiveness and airflow limitation. It is a serious public health problem affecting people of all ages and increasing dramatically throughout the world. When uncontrolled, asthma can lead to severe limitation of the activities of daily life and can even be fatal. The increased incidence of asthma is the reason for looking for its environmental causes, especially since observational studies indicate a relationship between meteorological variability and the incidence and intensity of asthma, atopic dermatitis, and allergic rhinitis.

The most important allergenic fungi belong to the genera *Alternaria*, *Aspergillus*, *Cladosporium*, *Penicillium*, and *Fusarium*; however, it cannot be excluded that very common phytopathogenic microfungi, which have not been studied in this respect before, can also cause allergy symptoms. These native and invasive microfungi parasitize herbaceous plants, shrubs, planted species as well as ornamental plants or wild species that are very popular in parks and gardens. Phytopathogenic fungi cause massive infestation of plants and release huge amounts of spores, especially in the spring, summer, and autumn. Such dissemination of plants and their parasites increases the risk of human contact with potential allergens.

It is well known that allergic reactions strictly depend on the biochemical composition of inhaled fungal material, and proteins are prominent among fungal allergens. Many allergenic proteins have been identified and approved by the WHO-IUIS Allergen Nomenclature Sub-committee for *Alternaria*, *Cladosporium*, *Aspergillus*, *Penicillium*, and *Fusarium*. Although carbohydrates were long considered to be essentially nonallergenic, some reports have suggested the presence of carbohydrate allergens in *Alternaria alternata*. Lipids or their complexes with protein as well as chitin (fungal wall component) are able to promote allergic reactions as well. **Up to now, the representatives of plant parasites from Erysiphales, Puccinales, Peronosporales or Albuginales chosen in this project have not been characterized in respect of proteins, fatty acids, or sugar identification.**

Our project assumes that phytopathogenic fungi parasitizing common plants in Poland could be a potential source of allergens for humans. Therefore, the main objective of the project is to check the ability of the chosen microfungi to induce acute and chronic asthma in mice. Additionally, the modern spectral methods employed in the project will provide comprehensive biochemical characteristics of fungal material that can be inhaled by humans. Prospective results of the project may have clinical importance for extending the list of fungal allergens and may allow getting standardized novel fungi allergens with potent usefulness in allergy diagnosis with skin and blood tests.