



### Fungal spores as autumn allergens in Ukraine

Intermittent allergic rhinitis has very obvious seasonality, which is caused by the periodical nature of the vegetative season of plants and fungi. It is also known that despite a drastic decrease in the pollen concentrations in autumn, symptoms of allergy and asthma persist during the autumn period too. It can be explained by the relatively high concentrations of fungal spores, which are observed in autumn. To prove this hypothesis and to evaluate the possible impact of climate change on the levels of airborne fungal spores in autumn we analyzed the seasonal dynamics of sporulation of various fungi and investigated the diversity and concentration levels of airborne fungal spores in order to improve the accuracy of allergy forecasts.

The study was performed at the National Pirogov Memorial Medical University, Vinnytsya, Ukraine (VNMU), from 2011 to 2021. Fungal spores were collected using a Burkard impact pollen trap of a Hirst type located at the roof of the VNMU at the 25 m altitude. Slides were read by 3 horizontal transects in the years 2009-2011 and by 12 vertical transects in the years 2012-2020 under magnification of 400X.

Sporulation of fungi of Oomycota (Peronospora), Ascomycota (Alternaria, Cladosporium, Epicoccum, Lep-toshaeria, Stemphylium, Pithomyces, Pleospora, Periconia, Helminthosporium) and Basidiomycota Divisions, namely Agrocybe, Coprinus, Fusarium, Ganoderma, Puccinia, and other Uredo-, Ustilago- and other unclassified Basidiospores was taken into account.

The study revealed that aggregated concentrations of these spores were the highest in the middle and end of summer. But in autumn, when there is not much pollen in the air, reproduction of most fungi continued with relatively high concentrations.

This pertains to most Basidiospores, which are known by the formation of their sporulating fruiting bodies in autumn. Namely, stable high concentrations in autumn are observed for Agrocybe, Coprinus, Uredinales, Ustilaginales, and unclassified Basidiospores. Their concentrations fluctuate between a couple of dozens to 400 hundred spores / m<sup>3</sup>.

Among Ascospores the most numerous was Cladosporium with concentrations exceeding 3000 spores/m<sup>3</sup>. Concentrations of around 100 spores / m<sup>3</sup> were common in autumn for Alternaria, Epicoccum, Periconia, Stemphylium were also continuously present but the concentration of it was low – around 10 spores / m<sup>3</sup>. Continuous sporulation of spores lasts until the end of the sampling period, which stops at the end of the first 10-day period of November.

1. Climate change leads to changes in the length of the fungal season of vegetation.
2. Spore load is observed in the autumn period, which makes fungal spores a specific agent of the airborne respiratory diseases at that time, especially at the background of low pollen concentrations.
3. This information should be considered while forecasting seasonal allergy symptoms in autumn.

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