

Diversity of airborne fungi in cultured and urban sites in Basra Province, Iraq

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Abstract. Ameen MKM. 2024. Diversity of airborne fungi in cultured and urban sites in Basra Province, Iraq. Biodiversitas 25: 2870-2877. Atmospheric aerosols consist of particles with diverse sizes, shapes, fungal particles are relatively prevalent. They are related to air pollution and several plant, animal, and human health effects. This study was conducted to compare the airborne fungal biodiversity between cultivated and urban areas in Basra Province, Southern Iraq. Results showed that a total of 1654 fungal colonies consisted of 26 genera and two sterile mycelium belonging to 32 species. These fungal isolates belonged to three groups, namely Ascomycota, Zygomycota and Basidiomycota. Among them, Ascomycota had the highest percentage frequency (90.6%), followed by Zygomycota (6.25%) and Basidiomycota (3.12%). The highest i.e., 0.91 and 0.9 fungal diversity was found in Abu Al-Khaseeb 2 and Ad-Dayr, respectively, while the lowest was in urban areas and desert nature as Um Qasr, Al-Zubair 0.78 for each. The highest frequency 18.2 10.9 8.8, and 8.5% of fungal isolates were *Cladosporium herbarum*, *Aspergillus fumigatus*, *Aspergillus niger*, and *Penicillium* sp., respectively. The highest similarity was 0.77 observed between the airborne fungal communities at the Alseeba and Altannumah sites. From the results of this study, it was concluded that airborne fungi can be influenced by the type of terrain they inhabit. There was greater diversity in cultivated areas compared to urban and non-cultivated areas.

Keywords: Aerobiology, airborne fungi, cultivated areas, diversity, urban areas

INTRODUCTION

Air is the breath of life, essential for the sustenance and survival of all living beings on earth. Its presence is a fundamental necessity for the well-being and continuation of our world. Atmospheric aerosols consist of particles with diverse sizes, shapes, and sources, present in both outdoor and indoor air environments (Kalyoncu 2019). These particles are categorized into biological (fungal cells or spores, bacteria, viruses, pollens, protozoa, and algae), chemical, and physical groups (Kalyoncu 2019).

Fungi are one of the most diverse groups of life on the earth. They can live as saprobes, mutualists, endophytes, or pathogens in practically any terrestrial habitat. Indeed, the fungi kingdom is thought to have between one and five million species, with only about 5% of them being identified (Blackwell 2011). In the air, fungal particles are relatively prevalent. They are related to air pollution and several plant, animal, and human health effects (Kalyoncu 2019).

Exposure to fungi has caused various human health problems, including irritations, infections, allergies, and toxic effects, with toxigenic fungi suspected of causing more problems (Yamamoto et al. 2015; Jara et al. 2017; Atya et al. 2019; Wei et al. 2019). More than 80 fungal genera are associated with respiratory tract allergies symptoms (Frączek et al. 2017), and more than 600 fungal species are linked with significant human and animal infections, with many more species causing significant plant diseases (Fisher et al. 2016). The presence of several toxigenic fungi, according to an American Industrial

Hygiene Association field guide, necessitates immediate risk management remedies (Odebode et al. 2020).

Fungal spores have caught the attention of researchers all over the world because due to their proven and prospective pathogenic and allergic capabilities, since of fungal spores has an impact on human health, as it can cause asthma and allergies, whether indoor or outdoor (Baxi et al. 2016; Alam et al. 2022). Airborne fungi play a significant role in spreading many plant diseases that result in substantial economic losses, among those airborne fungi causing economic losses. Several *Botrytis* species cause significant losses in various economically important horticultural and floral crops. For instance, *Botrytis cinerea* is known to infect tomato, grapevine, strawberry, and flax, resulting in substantial agricultural damage (Filingier and Elad 2016). Mango, banana, papaya, pineapple, and avocado are considered significant tropical fruits cultivated in tropical regions for local consumption, export, and as income sources for growers. These fruit crops are vulnerable to *Fusarium* infections both in the field and post-harvest, leading to root rot, vascular wilt, stem rot, and fruit rot. Among the *Fusarium* species most commonly linked to diseases in these major fruits are *F. oxysporum* and *F. solani*, prevalent particularly in tropical regions (Zakaria 2023), as well as their capacity to spread and survive in a wide range of environments (Grinn-Gofroń et al. 2020; Korneykova et al. 2020).

The fungal community of aerobic fungi can be affected by phytopathogenic fungi. Fungal species were identified in different environments, from cultivated and uncultivated places and from some coastal areas (Chen et al. 2021). Up to now, the effects of various land cover