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Relationship between airborne *Alternaria alternata* and *Alternaria* spp. spores

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Alternaria is a plant pathogen and human allergen. *Alternaria alternata* is one of the most abundant fungal spores in the air. The purpose of this study was to examine whether *Alternaria* spp. spore concentrations can be used to predict the abundance and spatio-temporal pattern of *A. alternata* spores in the air. This was investigated by testing the hypothesis that *A. alternata* dominates airborne *Alternaria* spp. spores and varies spatio-temporally. Secondly, we aimed at investigating the relationship between airborne *Alternaria* spp. spores and the DNA profile of *A. alternata* spores between two proximate (~7 km apart) sites. These were examined by sampling *Alternaria* spp. spores using Burkard 7-day and cyclone samplers for the period 2016–2018 at Worcester and Lakeside campuses of the University of Worcester, UK. Daily *Alternaria* spp. spores from the Burkard traps were identified using optical microscopy whilst *A. alternata* from the cyclone samples was detected and quantified using quantitative polymerase chain reaction (qPCR). The results showed that either *A. alternata* or other *Alternaria* species spores dominate the airborne *Alternaria* spore concentrations, generally depending on weather conditions. Furthermore, although *Alternaria* spp. spore concentrations were similar for the two proximate sites, *A. alternata* spore concentrations significantly varied for those sites and it is highly likely that the airborne samples contained large amounts of small fragments of *A. alternata*. Overall, the study shows that there is a higher abundance of airborne *Alternaria* allergen than reported by aerobiological networks and the majority is likely to be from spore and hyphal fragments.

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