

Air mass trajectories and land cover map reveal cereal crops as major local sources of *Alternaria* spores in Worcester and Leicester, UK.

Alternaria is a plant pathogen and human allergen. Agricultural areas are known sources of *Alternaria* spores. Transport of *Alternaria* spores may occur between such geographical regions. This study examined *Alternaria* spore abundance and potential pathways for atmospheric transport of the spores between the cities of Worcester and Leicester in the UK, both surrounded by agricultural land. *Alternaria* spores were sampled using Burkard volumetric samplers for the period 2016-2018 at Worcester and Leicester, located ~90 km apart. The Hybrid Single-Particle Lagrangian Integrated Trajectory (HYSPLIT) model and UK's land cover map for crops were used to examine the relationship between air mass trajectories and potential source areas of *Alternaria* spores at the two locations during an episode (27 Jul-07 Aug 2017) of high spore concentrations. During the 3 years of observation, 61 and 151 days of clinical relevance were recorded at Worcester and Leicester, respectively. Spore concentrations at Leicester were considerably higher than in Worcester. Analysis of the crop map showed higher amounts of winter barley and oilseed rape near to Leicester than Worcester. HYSPLIT calculations showed that during the episode, the air masses arrived at both stations from Ireland and the Atlantic Ocean. Long distance transport probably had a small and equal contribution to the observations at both sites. The hypothesis is therefore that the substantially higher concentrations of *Alternaria* spores at Leicester are caused by specific local sources with high emission potential: potentially winter barley and oilseed rape. Local sources of winter barley and oilseed rape likely contributed to *Alternaria* spore concentrations of clinical significance in the urban areas of Leicester and Worcester. The strength of the local sources likely resulted in higher emissions of spores at Leicester than at Worcester. Long distance transport probably had a small but equal contribution to the total spore load at the two stations.

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