

The risk of exposure to airborne *Ambrosia* pollen from local and distant sources – an example from Denmark.

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Title The risk of exposure to airborne *Ambrosia* pollen from local and distant sources – an example from Denmark

Background: *Ambrosia artemisiifolia* L. is a noxious invasive alien species in Europe. It is an important aeroallergen and millions of people are exposed to its pollen.

Objective: To show that atmospheric concentrations of *Ambrosia* pollen recorded in Denmark can be derived from local or more distant sources.

Methods: Using a combination of pollen measurements, air mass trajectory calculations using the HYPLIT model and mapping all known *Ambrosia* locations in Denmark.

Results: The annual pollen index recorded in Copenhagen during a 15-year period varied from a few pollen grains to more than 100. Since 2005, small quantities of *Ambrosia* pollen have been observed in the air every year. Through a combination of Lagrangian back-trajectory calculations and atmospheric pollen measurements, we demonstrated that pollen arrived in Denmark via long-distance transport from centres of *Ambrosia* infestations such as the Pannonian Plain and Ukraine. Combining observations with results from a local scale dispersion model show that it is possible that *Ambrosia* pollen could be derived from local sources identified within Denmark.

Conclusions: The high allergenic capacity of *Ambrosia* pollen means that only small amounts of pollen are relevant for allergy sufferers, and just a few plants will be sufficient to produce enough pollen to affect pollen allergy sufferers within a short distance from the source. It is necessary to adopt control measures to restrict *Ambrosia* numbers. Recommendations for the removal of all *Ambrosia* plants can effectively reduce the amount of local pollen, as long as the population is small.