

Pollen levels are rising across Europe

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When trees and plants release their pollen, millions of hay fever sufferers are affected by sneezing fits and itchy, watery eyes. Today in Germany, roughly every fourth person suffers from allergies – and this figure is set to rise. Climate change is seen as one of the factors fuelling the increase in allergic responses. Lab experiments and a small number of open-air studies have shown that increased concentrations of carbon dioxide (CO₂) in the air can boost plant growth and subsequently pollen production. Warmer temperatures and invasive species are also leading to longer pollen seasons.

An international team of researchers headed by ecoclimatologist Prof. Annette Menzel at the Technische Universitaet Muenchen (TUM) has revealed just how much the pollen burden has increased across Europe. The team of scientists evaluated 1,221 long-term pollen series from thirteen different countries, calculating normalized trends of annual pollen indices over a period of at least ten years. These indices can now be used to compare different key allergenic pollen species from different climates.

The researchers found that the concentration of airborne pollens has risen particularly sharply in cities in recent years. In [urban areas](#) across Europe, pollen concentration has risen by an average of three percent per year. In rural areas, they recorded a rise of one percent per annum. An increase in CO₂ concentration is the most probable cause for the rise in pollen levels.

Prof. Menzel believes that [allergy](#) sufferers from Reykjavik to

Thessaloniki will be exposed to even higher pollen levels in the future. "Even today, cities are warmer, dryer and more polluted places," explains Prof. Menzel. The ecoclimatologist is therefore using urban areas as a testbed for developing more accurate predictions about the effects of climate change. Temperatures in dense, urban environments, known as heat islands, can be one to three degrees higher than the surrounding areas. Levels of CO₂ and pollutants are also often higher in these environments. Ozone values, however, are usually higher in the regions surrounding larger cities. But this does not give the all-clear for rural areas, as the climatologist explains: "The conditions we are recording in urban environments today are expected to spread to rural areas in the future."

Pollen, however, is only a carrier of allergens, making pollen count just one factor in the prediction of future allergy trends. Prof. Menzel is therefore working with allergologist Prof. Claudia Traidl-Hoffmann from the Center of Allergy and Environment (ZAUM) (TUM / German Research Center for Environmental Health) to research allergy trends in urban and [rural areas](#). Their investigations have revealed that levels of allergens vary from year to year and that [pollen](#) counts also differ in rural and urban areas. More detailed research results will soon be available. What the scientists do already know, however, is that city dwellers will not be the only ones suffering from future climate trends.

More information: C. Ziello, T.H. Sparks, N. Estrella, J. Belmonte, K.C. Bergmann, E. Bucher, M.A. Brighetti, A. Damialis, M. Detandt, C. Galan, R. Gehrig, L. Grewling, A.M. Gutierrez Bustillo, M. Hallsdottir, M.-C. Kockhans-Bieda, C. De Linares, D. Myszkowska, A. Paldy, A. Sanchez, M. Smith, M. Thibaudon, A. Travaglini, A. Uruska, R.M. Valencia-Barrera, D. Vokou, R. Wachter, L.A. de Weger, A. Menzel (2012): Changes to airborne pollen counts across Europe, *PLoS ONE*. [dx.plos.org/10.1371/journal.pone.0034076](https://doi.org/10.1371/journal.pone.0034076)

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