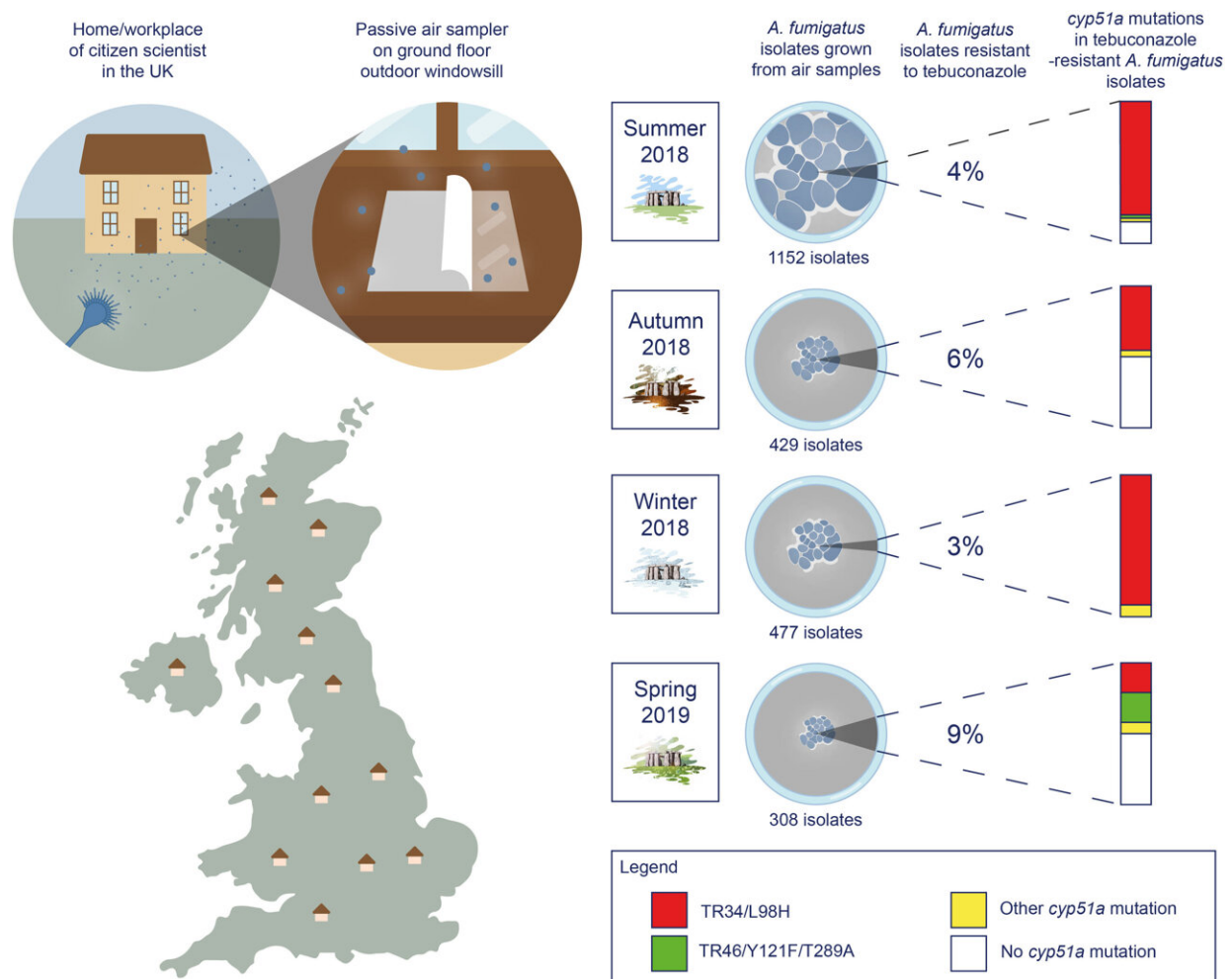


# Citizen science shows widespread exposure to drug-resistant fungal spores

July 24 2023, by Sabine L. van Elsland



Infographic detailing the collection of air samples from outdoor ground floor windowsills of homes and workplaces across the U.K. on four solstice/equinox dates between summer 2018 and spring 2019. *A. fumigatus* isolates were cultured from air samples and tested for susceptibility to the agricultural fungicide tebuconazole, and tebuconazole-resistant isolates had their *cyp51A*

promoter and coding regions sequenced to determine alleles responsible for azole resistance. Credit: *Science Advances* (2023). DOI: 10.1126/sciadv.adh8839

Fungal pathogen *Aspergillus fumigatus* has acquired resistance to agricultural fungicide and first-line clinical antifungal drugs.

*Aspergillus fumigatus* is a fungus which plays a key role in the break down of plant and soil organic matter. But exposure to this mold can cause a chronic and acute life-threatening disease in humans, called aspergillosis.

New work published in the journal *Science Advances* by Dr. Jennifer Shelton and team focused on *Aspergillus fumigatus* and [drug resistance](#) using a unique approach working with the [general public](#) to conduct research.

During the [northern hemisphere](#) seasonal equinoxes and solstices of 2018 and 2019, citizen scientists across the U.K. collected air samples.

*Aspergillus fumigatus* isolates were cultured in half of the 1,900 samples that were send back.

Further analysis of these isolates showed that one in 20 spores we inhale were resistant to an agricultural fungicide called tebuconazole.

This fungicide is the third most used azole in agriculture and is an indicator of the fungi developing resistance to medical drugs used to treat aspergillosis.

An individual in the U.K. is exposed to drug-resistant *Aspergillus fumigatus* spores for 22 days per year according to calculations

presented in the report.

Dr. Jennifer Shelton, Molecular Ecologist at UK Center for Ecology & Hydrology said, "We set out to determine the levels of azole-resistance in *Aspergillus fumigatus* spores circulating in UK air and could not have achieved this without the contribution of our citizen scientist volunteers.

"Once we understand the scale of the problem we can begin to mitigate it and help those most at-risk of developing aspergillosis to reduce their exposures."

Prof. Mat Fisher, Fisher Lab at the MRC Center for Global Infectious Disease Analysis said, "Fungal infections are often neglected, yet cause a global public health burden. The worsening problem of resistance to antifungal drugs needs urgent attention if we are to continue to protect those that are at risk from [fungal disease](#)."

**More information:** Jennifer M. G. Shelton et al, Citizen science reveals landscape-scale exposures to multiazole-resistant *Aspergillus fumigatus* bioaerosols, *Science Advances* (2023). [DOI: 10.1126/sciadv.adh8839](#)

Provided by Imperial College London

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