

Should I sample outdoors, in the rain?

Dr. Harriet Burge

If you are sampling ambient air indoors, you must also collect an outdoor sample, preferably at least two.

The tendency to not sample outdoors, in the rain is based on the belief that rain “cleans” the air, and that the sample will not be valid if rain water enters the orifice. Rain does wash dry spores, pollen and air pollutants from the air. It also makes the air smell fresh in part by causing the release of volatiles from soil microorganisms. It also causes the release of many wet spore types and splash dispersal of others.

Those of us who analyze time discriminated spore traps (e.g., from the recording Burkard spore trap) can tell when rain first starts because puffball spores begin to appear. These are released when rain drops hit the ripe fruiting bodies. These quickly disappear if the rain continues. As surfaces become wet, ascomycete fruiting bodies absorb water, and their wet spores are shot into the air. In addition, bacteria and yeasts are washed from leaf surfaces, and some basidiospores are shot into the air. So, concentrations of ascospores and sometimes basidiospores as well as yeasts and bacteria increase rapidly.

As the rain continues, concentrations gradually decrease, although not to zero. Interestingly, some of the ascomycetes that release ascospores in rain are the same species that release dry conidia under sunny, windy conditions.

There are further complexities in air spora patterns that overlay these short term variations. For example, snow cover does drastically reduce the number of spores available for dispersal, and the air during a snow storm is really clean! This is one condition under which outdoor samples may not be necessary. Outdoor spore patterns also change with changing wind conditions. In Florida there are times when the outdoor spore aerosol comes from Africa.

The bottom line is that no database, no matter how extensive, is going to substitute for on site sampling if indoor/outdoor comparisons are to be made. EMLab P&K's MoldRange

does aid in the interpretation of outdoor samples, and will be even more useful when data is available for local zip codes.

I would collect an outdoor sample when I first arrive at a building, then do the indoor sampling, then collect another outdoor sample. If it is actively raining during these sampling events, shelter the sampling orifice so that water doesn't actually enter the device. It is also important to transport samples collected in the rain to the lab within 24 hours of collection time, or refrigerate them if this is not possible. Some spores will germinate on the sample, and even produce spores if the sample is sufficiently moist.

I would also make notes on the weather for each sampling event. Interpretation will be easier if you know overnight weather patterns, what the weather is doing during the sampling, wind speed and direction, outdoor humidity, and the exchange rates of the indoor air with the outdoor air for the indoor areas being sampled.

Dr. Harriet Burge, Director of Aerobiology and Research and Development and Chair of EMLab P&K'sTM Scientific Advisory Board. Widely considered the leading expert in IAQ, Dr. Burge pioneered the field more than 30 years ago. She has served as a member of three National Academy of Sciences committees for IAQ, including as Vice- Chair of the Committee on the Health Effects of Indoor Allergens.

To submit a question to Dr. Burge, write to her by e-mail at askdrburge@emlab.com. All questions posed to Burge will receive a reply, although space limitations prevent us from publishing them all. By submitting a question, you agree to have your question and its answer published in a future edition of IE Connections.

Source:

This page is reprinted from Indoor Environment Connections, Volume 10, Issue 3, January 2009. Originally published by Indoor Environment Communications.