The following excerpt is from an article by Berlin D. Nelson, Professor, Department of Plant Pathology, North Dakota State University and may be accessed online at http://www.apsnet.org/online/feature/stachybotrys/

The spores of *S. chartarum* are in the soil and are introduced along with flood waters or the dust and dirt entering with the water incursion. Also, building materials at the time of construction can have a coating of dust or dirt that contains *S. chartarum*. The fungus is most commonly found in homes or buildings which have sustained flooding or water damage from broken pipes, roof, wall or floor leaks, condensation, etc. Wet conditions are required to initiate and maintain growth. It is most common on the paper covering of gypsum wall board, but can be found on wallpaper, cellulose based ceiling tiles, paper products, carpets with natural fibers, paper covering on insulated pipes, in insulation material, on wood and wood paneling, and on general organic debris (Figs. 8 to 10). The paper covering on fiberglass insulation is another area for growth (Fig. 11). The fungus can be hidden in the ceiling, walls or floors with no or little visible evidence within the interior of the room. The spores, however, can contaminate the interior of the room through holes and cracks in the building materials (aided by negative pressure) or be transported via the air handling system. It can also be found growing in ducts if there is organic debris. Condensation due to poor design or faulty heating, ventilation, and air conditioning systems can promote growth of the fungus. The fungus will usually produce large amounts of conidiophores and conidia giving the substrate a black appearance that can be slightly shiny when fresh and powdery when dry. I have observed the fungus growing profusely on the paper covering of gypsum wall board within a week after flood water was drained from a building.

Detection and Remediation

Detection of *S. chartarum* is usually by visual inspection and/or air and surface sampling. Because this fungus is not readily airborne compared to other fungi, air sampling in a contaminated indoor environment may show low levels of spores in the air. Also, some media used for mold evaluation of indoor air are not adequate for growth of *S. chartarum*. Inspection of potential sites of contamination, especially in covered and protected places, is a necessity to determine where the fungus occurs and the level of contamination. If areas contaminated with *S. chartarum* are discovered, do not attempt to solve the problem without following recommended safety procedures for working with toxic molds, especially if heavily contaminated. Get advice if there is a serious problem.

There are some general comments about remediation. Refer to the guidelines in the New York City Department of Health web site in the Author's List of Related Links. If you disturb the contaminated areas (such as tearing them out), the dust created can increase exposure to the fungus and its metabolites. Dust control can be achieved through an application of a sodium hypochlorite solution. An approved respirator, gloves, and eye and skin protection are used to handle *Stachybotrys*. Contaminated materials can be disposed of in plastic bags to reduce handling of infested materials. Barriers and negative pressure are used in seriously contaminated areas to vent the air outside and prevent the dust from going into non-contaminated areas of the building. Disinfecting the surface of contaminated materials, a common reaction to deal with molds, may kill the fungus on the surface, but mycelium within the substrate will often survive and grow again. Also, mycotoxins may accumulate in contaminated material (47,48). Removing contaminated materials is the best option. The paper by Vesper et al. (58) has a useful description of mold detection and remediation of a home. For more information on the

assessment and control of bioaerosols see Macher (43).

Home and building owners have a myriad of questions on molds and often need basic information and straightforward advice on how to correct a problem. Fortunately, public health departments, agricultural extension services, and many internet sites now have excellent information available on molds. There are private microbiological services which can be found on the internet, and in some states public universities, extension services, or health departments can offer assistance in mold identification. Home and building owners who suspect mold problems can also acquire the services of private consultants to test for and identify molds, plus obtain advice on remediation.

To prevent indoor contamination by *Stachybotrys* and other molds, aggressive action to correct moisture problems must be undertaken immediately!