

FUNGI

Most molds are ubiquitous in nature. All molds are considered irritants and allergens. They can produce symptoms of watery eyes, running nose, scratchy throat, headaches and malaise.

<i>Absidia</i> species	Common environmental fungus found in soil, stored grain, plant debris, decaying vegetables, indoor environments and some food.
<i>Acremonium</i> species	Ubiquitous in nature. Found in soil, decaying plant material, and decaying food. Can be a plant parasitic to plants. Indoors, found in fiber glass insulation, drain pans humidifier water ,carpets and cellulose-based building materials suffering from chronic wet conditions ($A_w=0.90-0.98$). Has been associated with indoor health complaints. May produce tricothecenes. Often found growing with <i>Stachybotrys</i> .
<i>Alternaria</i> species	World wide, saprophyte on dead plant parts, soil, decaying wood, weed pulp and compost, plant pathogen, isolated from many kinds of foodstuffs, gypsum board, wallpaper, textiles and dust. One of main fungal causes of allergy and asthma; associated with hypersensitivity pneumonitis. $A_w=0.85-0.88$.
<i>Arthrinium</i> species	Soil, plant saprophyte, decomposing plant material and grasses. More common in the autumn. Can be allergenic.
Ascospores	Ubiquitous. Pathogen of plants, timber and ornamental trees, and fish. Some associated with insects. Commonly recovered in outside air. Some associated indoors with damp cellulosic materials.
<i>Aspergillus glaucus</i> group	Soils, decaying food products, fruit juices, grain, nuts, milled rice, and various dried foodstuffs. Xerophilic fungus. Allergenic.
<i>Aspergillus candidus</i>	Mostly isolated in tropical and subtropical regions. It has been isolated from soils, grains, flour, nuts, fruits, and various foodstuffs. It is reported to have a minimum water activity at 0.75. This fungus produces a range of secondary metabolites.

<i>Aspergillus clavatus</i>	A common contaminant of barley during malting. It is reported to be the cause of “malt workers’ lung”. Found in soil and animal manure. Significance in the indoor environment is not well defined at this time.
<i>Aspergillus flavus</i>	Widespread in the soil and decaying vegetation; food.. It has a preference for moderate water activity substrates ($A_w=0.75-0.80$), although it can also be recovered from wet materials. Allergenic; has been associated with asthma. It has been recovered indoors from carpet and building materials. <i>A. flavus</i> produces aflatoxin, a potent mycotoxin and human carcinogen. It may cause aspergillosis in susceptible individuals.
<i>Aspergillus fumigatus</i>	Soil, bird droppings, compost, wood chips, water damaged materials or organic rich substrates in building. Commonly found in house dust. Allergenic; associated with asthma and Farmer’s Lung. Opportunistic pathogen. Xerophilic fungus. ($A_w=0.82$)
<i>Aspergillus nidulans</i>	Worldwide distribution although commonly found in subtropical and tropical soil, spices and other foods. It occurs on deteriorated cellulose materials and is a biodeteriogen on damp building materials. It is sometimes isolated from house dust samples and is moderately xerophilic. Can cause aspergillosis. It may produce toxins including the potent carcinogen and mutagen, sterigmatocystin, a precursor to aflatoxin. Sterigmatocystin is an International Agency for Research on Cancer, World Health Organization category 2A carcinogen. Opportunistic pathogen. ($A_w=0.78$)
<i>Aspergillus niger</i>	Cosmopolitan, isolated from house dust, soil, plant litter, dried nuts, fruits, seeds, and different kinds of untreated textile material such as jute, hemp, and cotton bracts. It is reported to have a minimum water activity at 0.77 (xerophilic) and can grow at pH 2.0 at high A_w . A small number of isolates may produce ochratoxin A.
<i>Aspergillus ochraceus</i>	($A_w=0.77$) Found in grains and soil. Can produce toxins.
<i>Aspergillus parasiticus</i>	Occasionally isolated from agriculture environments. Rare in indoor environments. Mycotoxin producer.
<i>Aspergillus penicillioides</i>	Xerophilic fungus. Found in house dust and food.

<i>Aspergillus ochraceus</i>	Cultivated soils, decaying vegetation and dried foods. Occasionally encountered in building environments. It produces ochratoxin A. Ochratoxin A is primarily a nephrotoxic compound. Several other toxic compounds and volatile chemicals are reportedly produced. This fungus is mesophilic with the optimal water activity, $A_w=0.95-0.99$ and the minimum A_w for growth at 0.77.
<i>Aspergillus restrictus</i>	Common in indoor environments. Also isolated from soil, seeds, cotton goods and a wide variety of dried foods.
<i>Aspergillus sydowii</i>	Mesophilic, soil and plant organism. Not considered to be toxigenic. Commonly isolated from drywall, dust and wall cavities.
<i>Aspergillus terreus</i>	Worldwide distribution in different soils, but most commonly in subtropical regions. Occurs on stored grains, cotton deteriorated straw and cellulose materials. It is also isolated from air and house dust. Salt tolerant and xerophilic. It is a biodeteriogen on damp building materials. It can cause aspergillosis. It may produce toxins. ($A_w=0.78$)
<i>Aspergillus ustus</i>	Present in low frequencies in many soils; predominately from warm temperate areas.
<i>Aspergillus versicolor</i>	Soil, food products, biodeteriogen on damp building materials. It is associated with cellulose-based materials and wall cavity surfaces suffering from alternating wet/dry cycles. It is also very common in building dust, surfaces, air, carpet and behind vinyl wall coverings. Produces sterigmatocystin, a potent carcinogen and mutagen. Xerophilic fungus ($A_w=0.78$)
<i>Aureobasidium pullulans</i>	Worldwide, common soil isolate, food and wood. During the autumn, colonizes the surfaces of leaves. Requires elevated humidity or moisture, especially found in bathrooms, kitchens, on window sills, and other damp materials in homes, such as painted wood. Associated with allergies. No mycotoxin production known.
Basidiomycetes/Basidiospores	Worldwide, found in soil, woodlands and decaying vegetation.. Many are plant pathogens. Some species are an agent of “dry rot”. Allergenic.
<i>Beauveria</i> species	Found in soil and plant debris. A parasite of insects.

<i>Bipolaris</i> species	Soil and plant debris. Plant pathogen, especially grasses. Can produce the mycotoxin sterig-matocystin. Allergenic.
<i>Botrytis</i> species	Ubiquitous. Soil, soft fruit, vegetables, plant pathogen and saprophyte. Highest in spring. May be found in indoor plants, carpets, paper, and wallboard. Allergic. $A_w=0.93-0.95$.
<i>Chaetomium</i> species	Soil, seeds, wood and straw materials. Found on a variety of substrates containing cellulose including paper and plant compost. It has been found on paper in sheet rock and can be allergenic. Some species may produce mycotoxins.
<i>Chrysosporium</i> species	Commonly isolated from soil, plant material, birds and skin. It is especially common in soils rich in cellulose. It is often isolated in the indoor environment.
<i>Cladosporium</i> species	Commonly encountered mold in normal indoor and outdoor air and substrata samples. It is often found on wood products, dead plants, soil, paint and textiles. . It tends to be recovered more frequently from moderately high water activity ($A_w>0.80-0.85$) building materials.
<i>Cryptococcus albidus</i>	A variety of soils and moist substrates. Normal skin flora.
<i>Cunninghamella</i> species	Found in soil dwelling and plant material.
<i>Curvularia</i> species	Common saprophyte. Plant parasite. Can be allergenic. Can be pathogenic, especially in immunocompromised hosts.
<i>Epicoccum nigrum</i>	Common in air, soil, plant materials, moldy paper, dust and pulp, and occasionally grows on water-damaged drywall or wood products. Has been associated with hypersensitivity pneumonitis and allergic sinusitis. It is a secondary invader of plants. It is mesophilic with an optimal A_w 0.98 and minimum 0.91. No mycotoxin production is reported.
<i>Exophila</i> species	Common in plant materials, decaying wood, sewage sludge, and pulp samples. May produce toxins.
<i>Fusarium</i> species	Widely distributed in the soil, plants and grains. Important plant pathogen. Often found in humidifiers. Requires very wet conditions. $A_w=0.86-0.91$. Indoors , found on carpet,

	drywall, foam, wood and in cutting fluids. Known to cause allergies. May produce toxins. Potential pathogen.
<i>Geotrichum</i> species	Yeast found as part of normal human flora, in dairy products, grain fruit, and soil. ($A_w=0.90$)
<i>Gliocladium</i> species	A soil dwelling and decaying plant fungus. It degrades cellulose and its confirmed presence in building environments may indicate the presence of chronically wetted wood.
<i>Gliomastix</i> species	Present in plant debris, soil, wood and textiles. Allergenic.
<i>Malbranchea</i> species	Widespread distribution in soil and decaying vegetation.
<i>Memmoniella</i> species	Closely related to <i>Stachybotrys</i> . Worldwide distribution on plants and soil. Recently reported to produce several mycotoxins. It can be recovered from chronically wet cellulose-containing materials such as wallpaper. Potential toxin producer.
<i>Mucor</i> species	World-wide in soil, decaying organic material and fruit.. Common in air. It is commonly encountered in building dust and carpet samples. It is a hydrophilic species, $A_w=0.90-0.94$. It can cause allergic alveolitis. No mycotoxin production is recorded for this species. It is a rare opportunistic pathogen.
<i>Myrothecium</i> species	Plant pathogen. Found in soil and grasses. Often found in homes with many house plants. Mycotoxin producer.
<i>Myxomycetes</i>	Slime mold. Ubiquitous, found on decaying wood and plant material located in cool, shady, moist environments.
<i>Nigrospora</i> species	Soil and decaying plant material; Plant parasite. Can be allergenic.
Non-sporulating fungi	Soil, decaying organic material, plants. Isolates do not sporulate during routine culture and cannot be identified.
<i>Paecilomyces</i> species	A toxigenic fungus and very common thermotolerant fungus from soil, plant materials, pulp, dust and paper samples. $A_w=0.79$.
<i>Penicillium</i> species	Soil, decaying plant material, compost piles, food products, biodeteriogen on damp building materials. It is found on

concrete wall surfaces and in dust and soil accumulations suffering from water condensation and/or infiltration problems. It has also been recovered from carpets, wallpaper, drywall surfaces that have been subject to flooding and fiberglass insulation. Allergenic. May cause hypersensitivity pneumonitis and asthma. Moderate xerophilic $A_w=0.78-0.86$. Some species may be toxigenic.

<i>Periconia</i> species	Outdoor fungus. Associated with grasses and dead leaves.
<i>Phialophora</i> species	Widely reported from wood, wood products, in soil, and in air. May be two distinct species. <i>P. verrucosa</i> has shorter, vase-shaped collarete and restriction enzyme mapping of ribosomal DNA. <i>P. americana</i> appears more common from environmental sources, while <i>P. verrucosa</i> is more commonly isolated from human lesions. Both organism are potential pathogens.
<i>Phoma</i> species	A common indoor allergen and is also commonly found on various plant and in soil. It can grow extensively on painted walls, ceiling tiles, and the reverse side of linoleum, particularly in humid places.
<i>Pithomyces</i> species	Widespread on decaying vegetation, especially grasses and plants. Can produce sporidesmin (a piperazinedione), a mycotoxin.
<i>Rhinocladiella</i> species	Naturally found in soil and woody plant materials as a saprophyte.
<i>Rhizopus</i> species	World wide, It is often isolated from soil, garden compost, municipal waste, house dust, wood pulp, and decaying, fruits and vegetables. Often isolated from forgotten leftover food, fruit and vegetable garbage. $A_w=0.93$. Allergenic. May be pathogenic to immunocompromised.
<i>Rhodotorula</i> species	Yeast. Isolated from soil, air, water, fruit juice, and dairy products. Part of normal flora of humans. Often associated with very moist areas.
<i>Scedosporium</i> species	Soil, decaying plant matter and dung.
<i>Scopulariopsis</i> species	Commonly recovered from building dust, wallpaper and drywall surfaces suffering from chronic wetness. It is also recovered from decaying plant material, soil, and house dust.

<i>Sepedonium</i> species	Found in soil, a pathogen to mushrooms.
Smut	Basidiomycota. Plant pathogen. Outdoor origin.
<i>Sordaria fimicola</i>	Found in soil, seeds, herbivore animal dung. Isolation from indoor samples associated with sewage contamination.
<i>Spiegazzinia</i> species	Commonly found in warm-temperature areas in soil and on dead leaves, stems, trees and plant debris.
<i>Sporobolomyces</i> species	Soil, plant material. Normal flora of man. Requires very wet conditions.
<i>Sporotrichum</i> species	Saprophyte on plant materials. Allergenic.
<i>Stachybotrys chartarum</i>	Soil and decaying plant substrates. A toxigenic mold that is usually, but not always recovered from chronically wetted cellulose-based materials. It has been linked to health problems in contaminated building occupants.
<i>Stachybotrys parvispora</i>	A colonist of cellulose containing plant parts and soils, especially in tropical and subtropical regions. Mycotoxin production has not been reported.
<i>Stemphylium</i> species	Ubiquitous, found in soil and on decaying vegetation. Plant pathogen. Indoors found in dust, wood and paper. Allergenic.
<i>Syncephalastrum racemosum</i>	Isolated from soil, dung, and grain.
<i>Tetraploa</i> species	Natural habitat includes leaf bases and stems just above the soil on many kinds of plants and trees.
<i>Torula</i> species	Found in soil, grasses, and decaying wood and plant material. Associated with cellulose containing materials. Allergenic.
<i>Trichoderma harzianum</i>	Soil, decaying wood and plant material. Often found on wet wood or on insulation supporting high water activity ($A_w > 0.9$). It may produce trichothecene mycotoxins and a strong pungent odor.
<i>Trichoderma koningii</i>	Isolated from dust samples and chronically wetted cellulose based substances.

<i>Trichoderma viride</i>	Soil, decaying wood and plant material. Hydrophilic species($A_w > 0.90$). Encountered on chronically wetted structural wood elements in building environments. It can also be encountered in moist dust accumulations in ventilation ducts, wet basement soil, and wet insulation. It produces a variety of toxic metabolites including trichothecenes.
<i>Trichothecium</i> species	Found in flour, corn, soil and decaying plant material. Can produce the mycotoxins trichothecin and other trichothecenes. ($A_w = 0.90$)
<i>Tritirachium</i> species	Found in soil.
<i>Ulocladium</i> species	The fungus is a high water activity species, $A_w = 0.89$. It is saprophytic and recovered from surfaces of plants, wood, decaying plant material paper, textiles, etc. It is not known to be toxigenic. Allergenic.
<i>Ustilago</i> species	Plant pathogen.
<i>Verticillium</i> species	Common in soil and decaying plant matter. Plant pathogen.
<i>Wallemia sebi</i>	Found in fruits, soil, hay and textiles. Common in indoor environments. Xerophilic. Grows on relatively dry surfaces. $A_w = 0.69-0.75$.
Yeast	Normal flora of humans. Soil, plants and decaying organic material. Yeasts occur in indoor air from damp indoor sources, such as carpet and HVAC units. In settled dusts, yeasts, mainly <i>Candida</i> , are exceedingly common