

# Attic Mold

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# Topics for Discussion

- Mold vs. mold growth
- Anybody know how prevalent in NW?
- What is main cause?
- Can venting prevent growth?
- Is mold in attics an exposure risk for occupants?
- Why remediate?
- What is best remediation option?



# What I have seen

- Only get called out on “problem” attics
  - New construction
  - Sales
  - Building Inspectors vary
- Dry to very wet wood
  - “Aging” challenging
- Minor spotting to heavy growth
- Localized vs. full coverage
- Units or buildings vary



# What I have seen

- Spots on plywood or OSB as delivered or stored on site
- Growth from construction in rain
- Roof leaks
- Local growth from bad venting
  - Dryers, bathrooms into attic



# What I have seen

- Usually widespread “sooty” appearance from condensation
  - On sheathing, not rafters
  - *Cladosporium*
  - Wood may be currently dry
  - Wet wood may show *Chaetomium*, *Ulocladium*
- Is air flow the key?
  - Blocked soffit vents
  - “Adequate” roof and gable vents?



# “Clean” attic condition





# “Moldy” attic condition – light spotting





# “Moldy” attic condition – more spots





“Moldy” attic condition – soot-like appearance and/or sheen





# “Moldy” attic condition – both



## “Moldy” attic condition





# “Moldy” attic condition – spots and fuzzies on rafters





# “Moldy” attic – one side of roof only



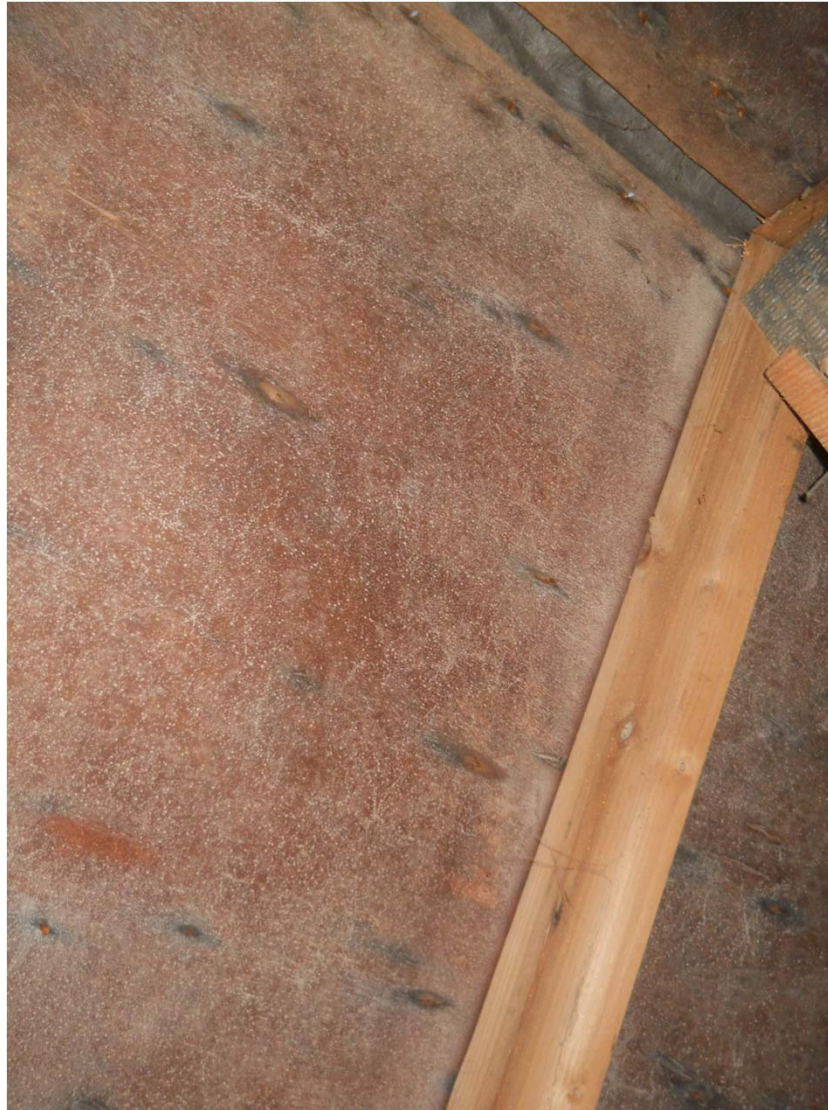


# “Moldy” attic and rafters + bacteria





# “Moldy” attic – white spots on old plywood



## “Moldy” attic – heavy *Penicillium*





# “Moldy” attic – only behind baffles



# “Moldy” attic - old wood sheathing



# Have to clean it up?

- Structural reasons?
- Wood damage, life of roof?
- Sales
  - Building inspector
  - Building value, insurer
  - Disclosure
- Perceived health issues
  - Owner, occupant, buyer



## Have to clean it up?

- Not necessarily for exposure reasons
- Ventilated attic same as outdoors
- No exposure pathway
  - Few penetrations to occupied space
  - Ceiling and insulation are good barriers
  - Air flow usually upward into attic
- Little literature
- Being studied





# Sampling

- Surface sampling
- 2 steps to determine growth & species
  - Tape lift
    - Microscopic examination
    - Hyphae (roots, stalks) with or without spores define growth
    - Associated spores allow ID to level of genus
  - Sterile swab
    - Live spores grow into colonies
    - Species differentiated (speciation)



# Surface Sampling

– Tape lift



– Swab



# Air Sampling

- Compare with surface samples
- Indoors, outdoors, in attic
- Spore Trap and Cultured
- Wide variability
  - Take pairs



# Air Sampling

- Spore Trap (Zefon Air-O-Cell)
  - Spores/m<sup>3</sup>
  - Dead or alive
  - Microscopic examination
    - Spore counts to level of genus (Pen/Asp-like)





# Air sampling

- Andersen sampler
  - CFU/m<sup>3</sup>
  - Petri dishes
  - Live spores form colonies
  - 3-5 days
  - Species differentiated (speciation)



# Let's say a "fix" is asked for...Teamwork

- Building enclosure engineer
  - *Source of moisture*
  - *How to stop it (otherwise mold will return)*
  - *Ventilation*
    - *Codes*
    - *Is that enough?*
  - *Cost*
    - *Fix vs. replace roof*
    - *Insulation issues*



Let's say a "fix" is asked for...

- *Mold cleanup - What is the goal?*
  - *Address structural / rot issues?*
  - *Address cosmetic/visual issues?*
    - *Will stains remain?*
  - *Address perceived exposure issues?*
    - *Eliminate exposure source?*



Let's say a "fix" is asked for...

- *Spray 10% Bleach = Kill the Mold*
  - *Readily available, cheap*
  - *Chemical, PPE issues*
  - *Stains remain?*
  - *Allergens remain*
  - *Wet!*





Let's say a "fix" is asked for...

- *Remove mold growth?*
  - *HEPA vacuum*
    - *Access, stains will remain, abrasive enough?*
  - *Scrub*
    - *Access, labor, stains may remain*
  - *Sand, wire brush*
    - *Access, labor, spreads dust, damage to wood*



Let's say a "fix" is asked for...

- *Remove mold growth (cont.)?*
  - *Strong peroxide*
    - *Chemicals, PPE, "destroys" mold and stains?*
  - *Strong hypochlorite (bleach)*
    - *Chemicals, odor, PPE, "destroys" mold?*
  - *Dry ice blast*
    - *CO2/confined space, spreads spores, cost*
  - *Soda blast*
    - *Spreads spores, cleanup, cost*



# Hypochlorite spray – still damp, odor



# Peroxide spray – foams up





Let's say a "fix" is asked for...

- *Encapsulation = Eliminate exposure, cover stains with coatings*
  - *OK on sheathing?*
  - *Adhesion (water & "fuzzies")*
  - *Need to "kill" mold?*
    - *With EPA fungicide? \$60/gallon*
    - *With non-EPA additive? \$20/gallon*
    - *With no additive? Kilz?*
  - *Is primer a "red flag" for buyers?*



# Encapsulation



And now, your building  
enclosure experts...

