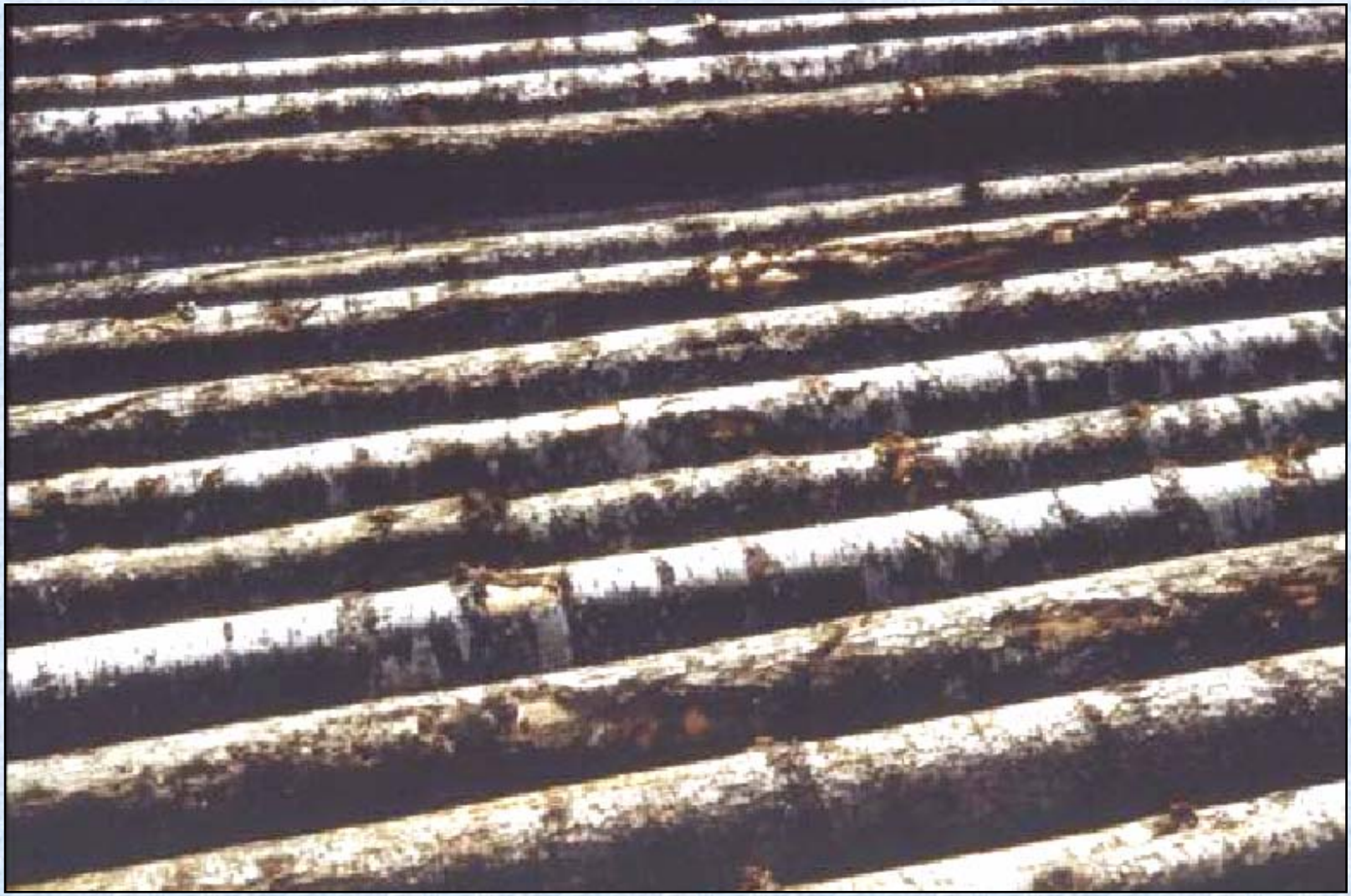
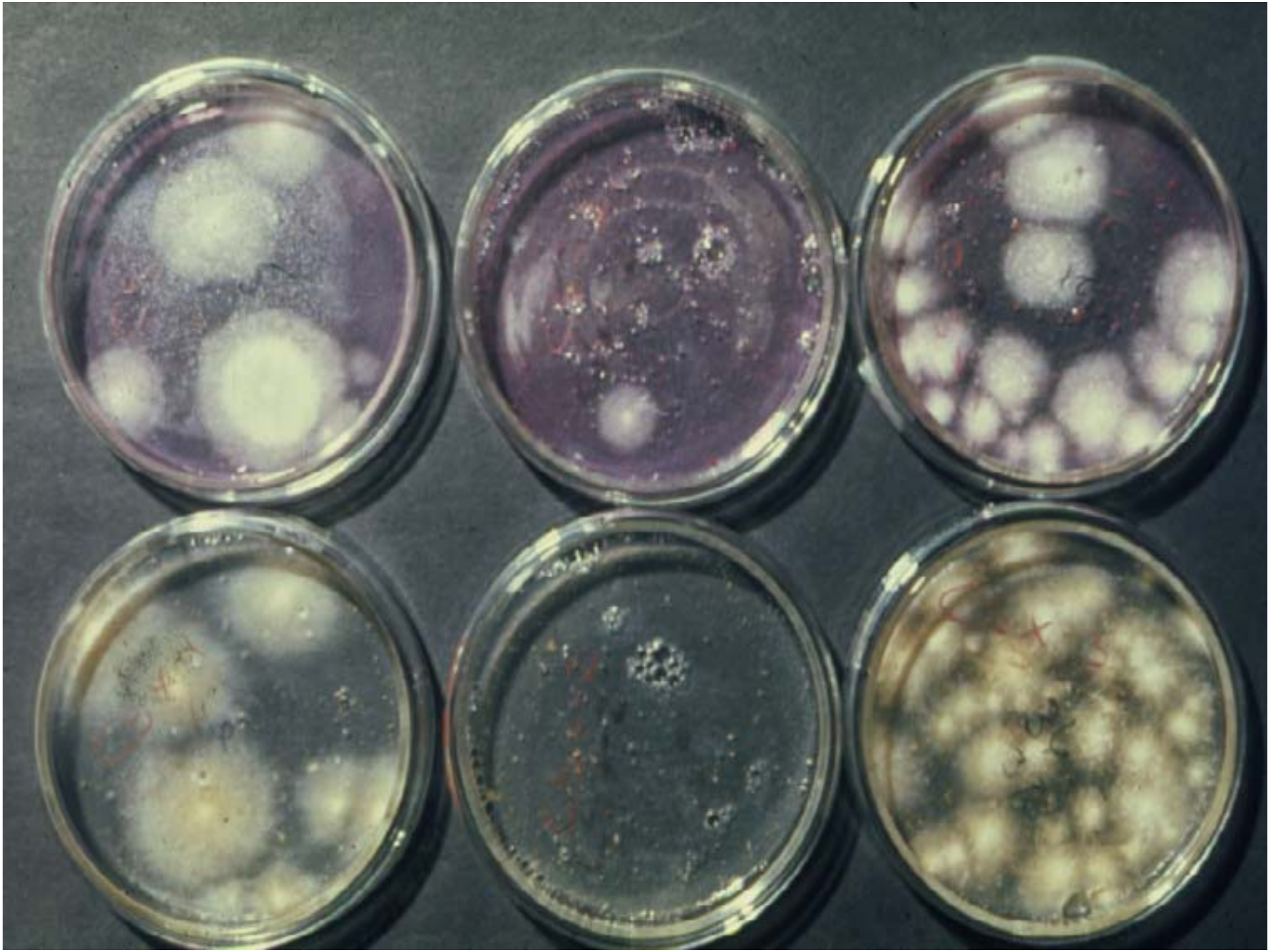
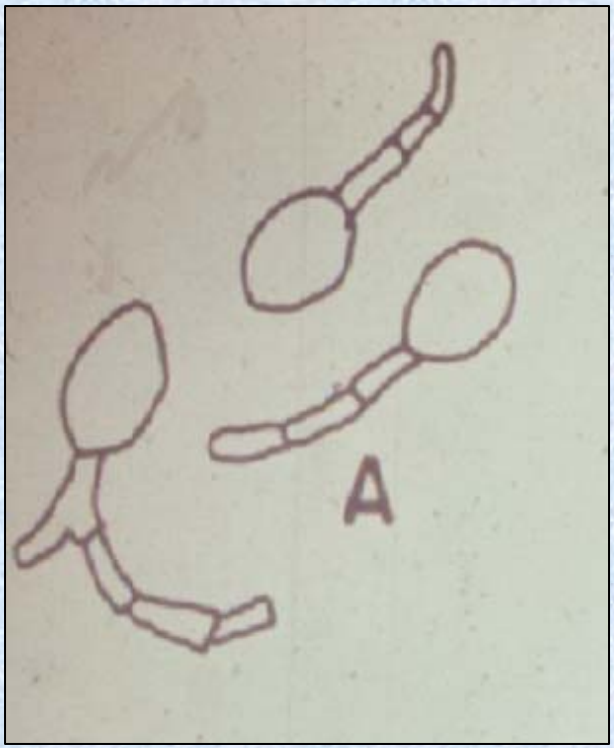

Mold in Wood
Products:



Fungi

- Type
  - Molds
  - Sapstains
  - Decay
- Damage
  - Stain surface
  - Stain Surface and interior
  - Destroy wood, may stain

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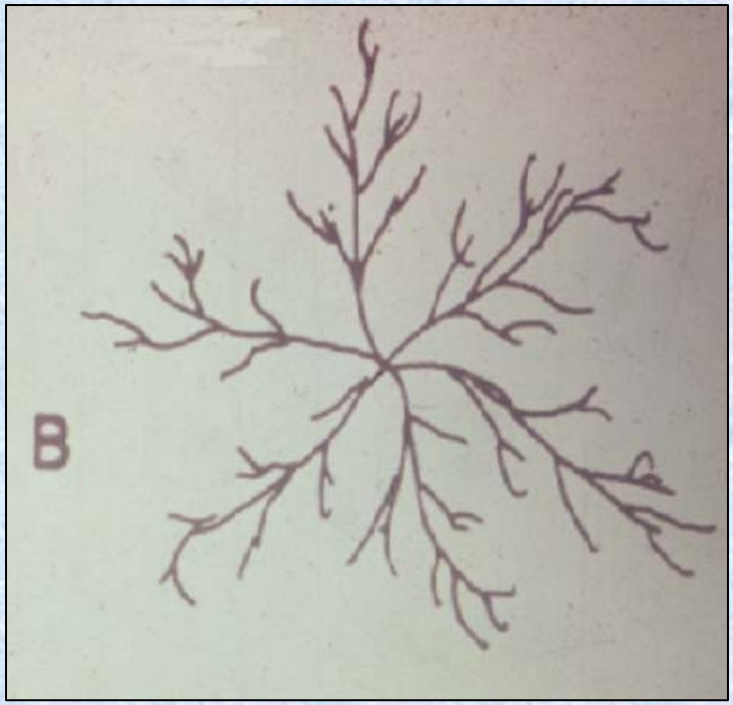
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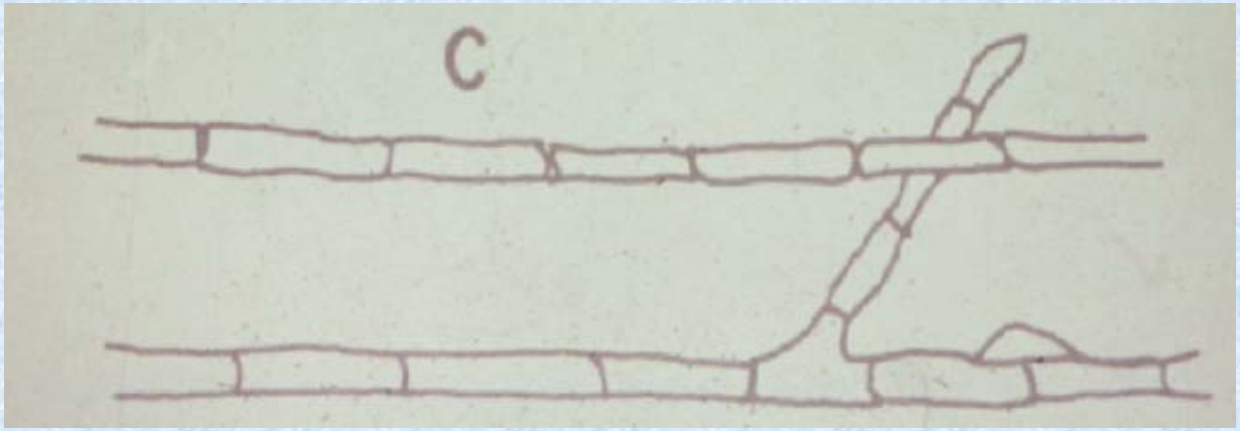
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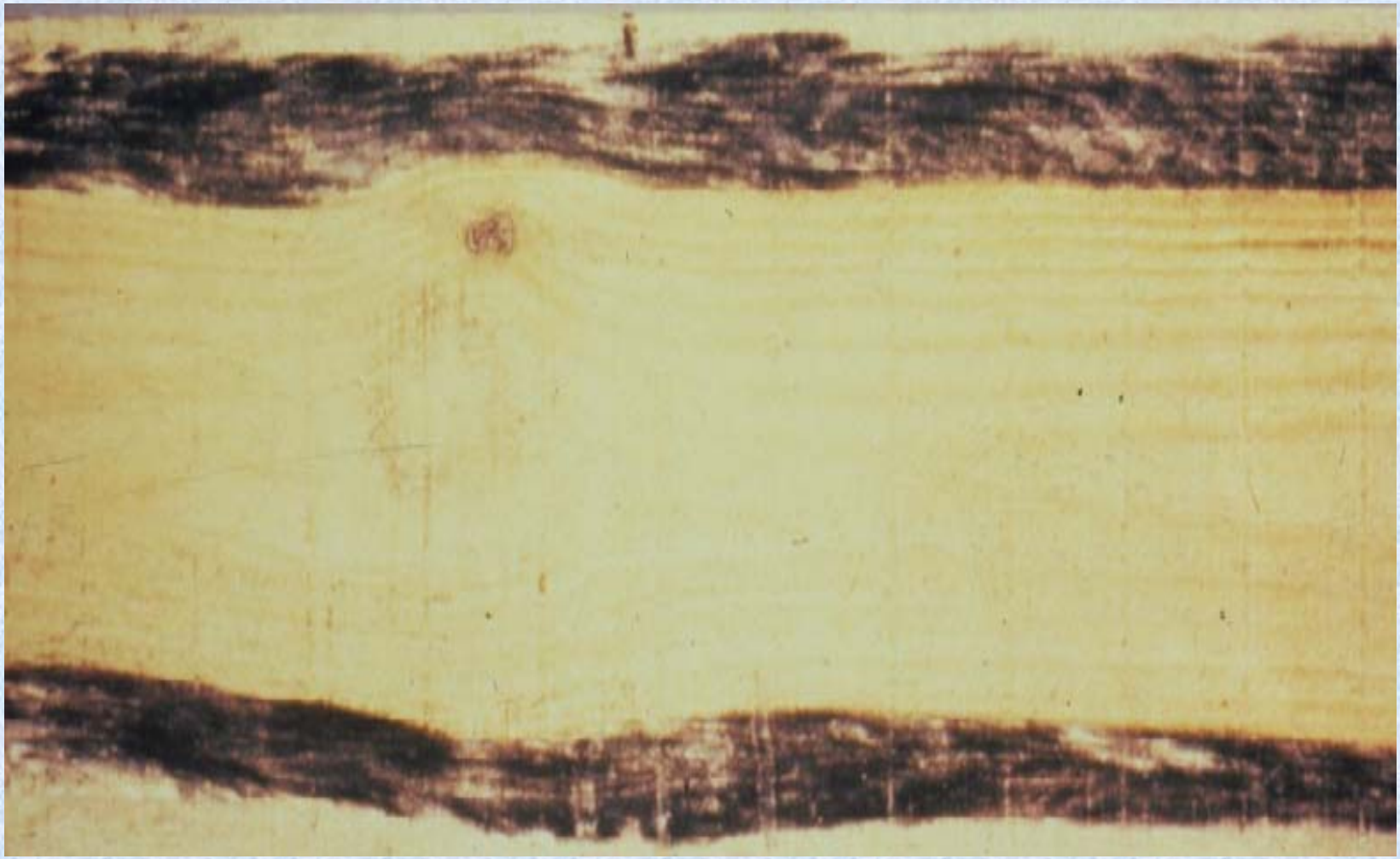
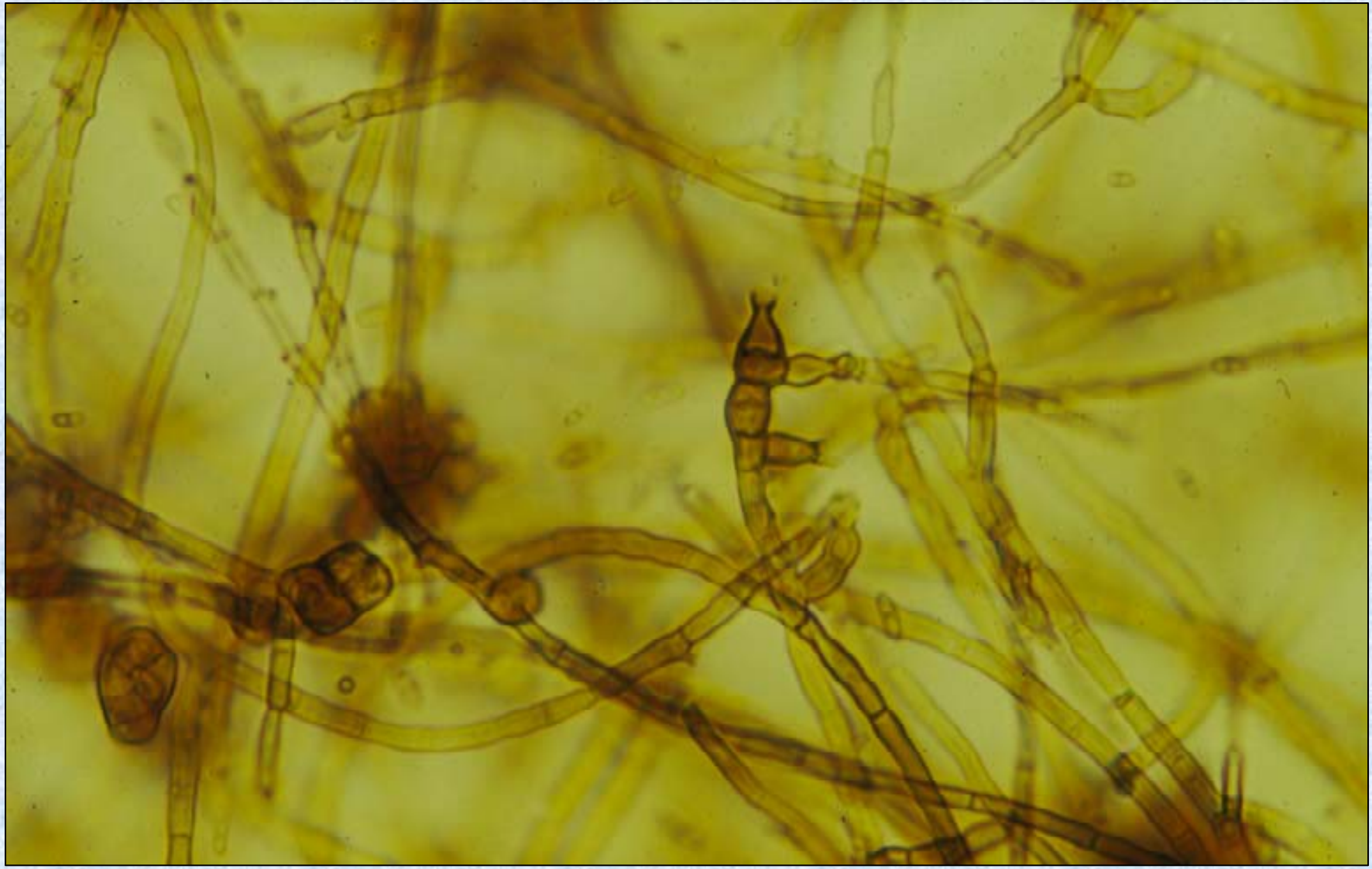
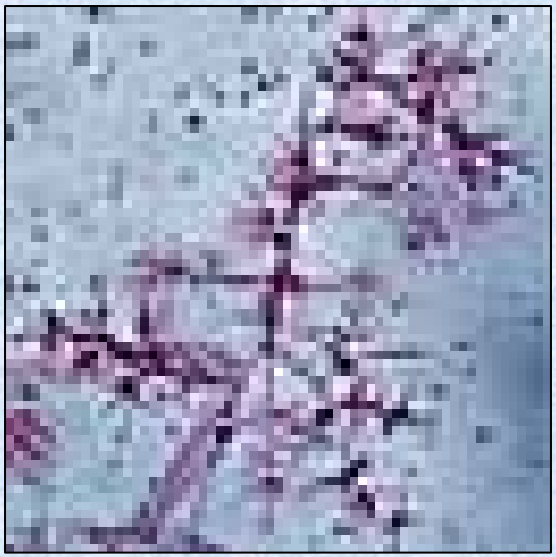


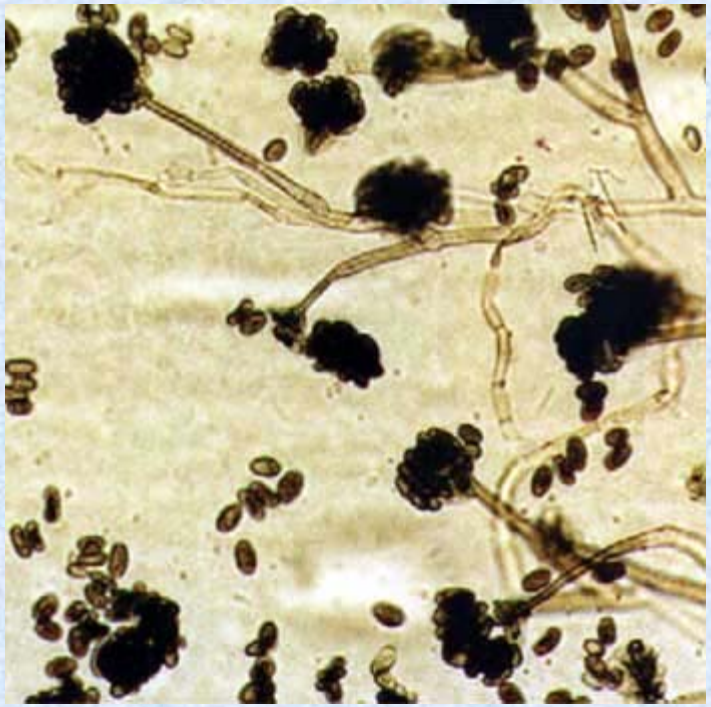
PENICILLIUM



TRICHODERMA



STACHYBOTRYS



Important Genera

- Stachybotrys
- Fusarium
- Penicillium
- Aspergillus
- Chaetomium
- Trichoderma

Mold ID

- Kits easy to distribute
- There is money in it, but..
- Sample collection important
- Does species matter if moisture is the problem?

Mold Species

- 250 to 300,000 species
- 45 species on Douglas-fir sapwood lumber in the first 6 weeks

Risks of Mold and Stain

- Increase wood permeability
- Reduce surface appearance
- Reduce toughness
- Health effects (spores/ volatiles/contact)

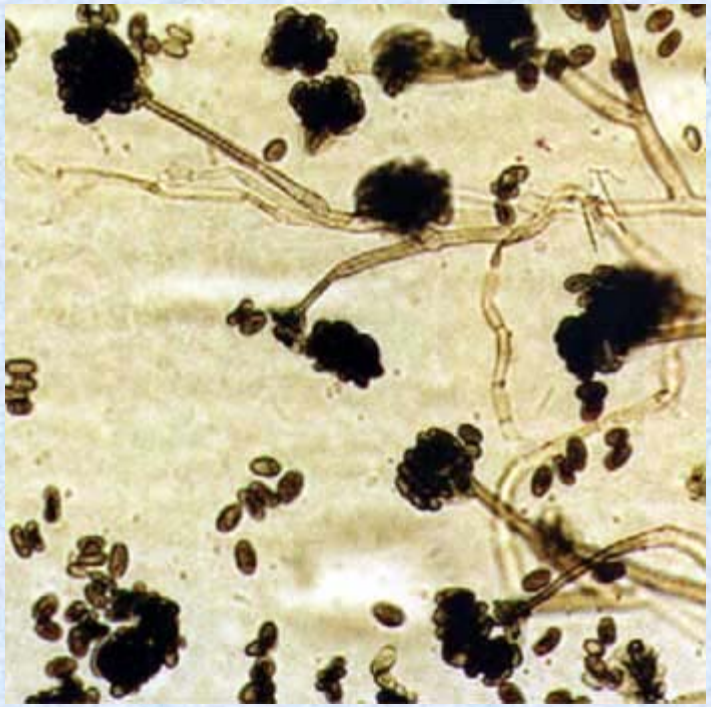
Effects of Molds

- Allergens (most)
- Human pathogens (few)
- Mycotoxins (few)

Mold Risk Factors

- Fungal species
- Moisture
- Spore load
- Individual sensitivity

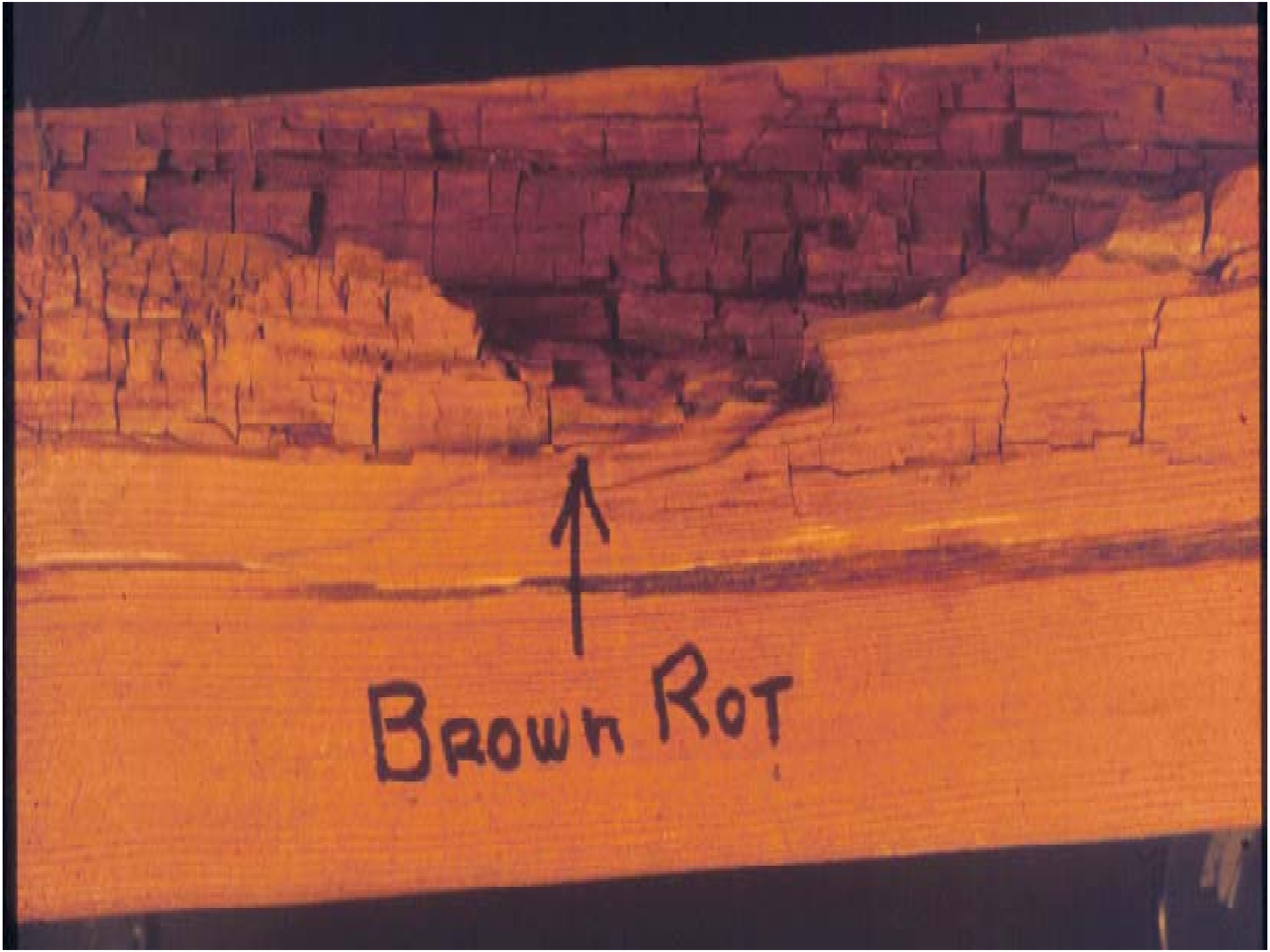
STACHYBOTRYS

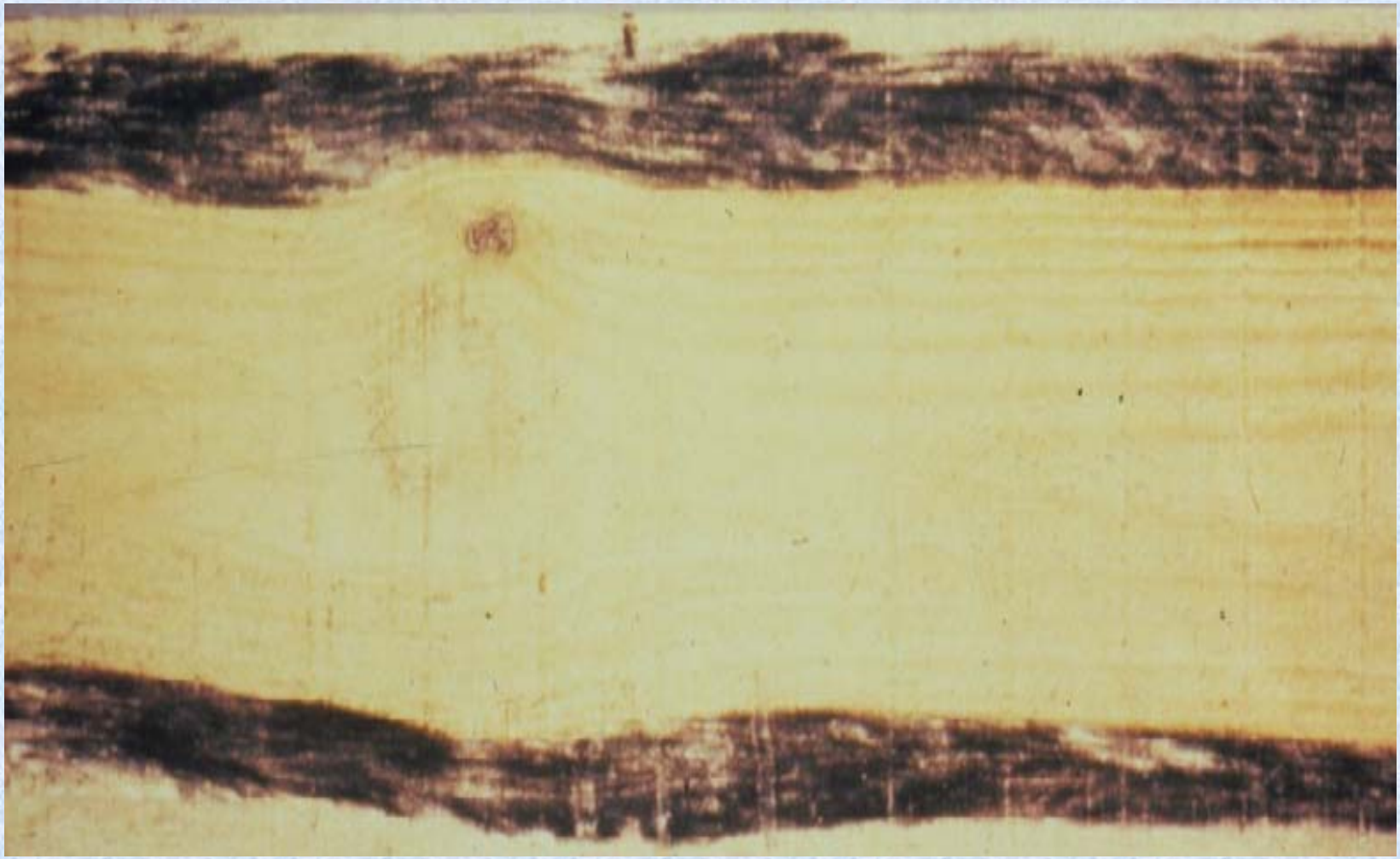


Factors Affecting Fungal Growth

- Sapwood Content
- Temperature
- Wood Moisture Content
- Time of Year
- Treatments


PORTLAND
Oregon
DECAY
OREGON


Brown Rot



Mold Prevention

- Short log storage
- Sprinkling
- Kiln dry within 48 hrs. of sawing
- Keep wood dry
- Chemical treatments

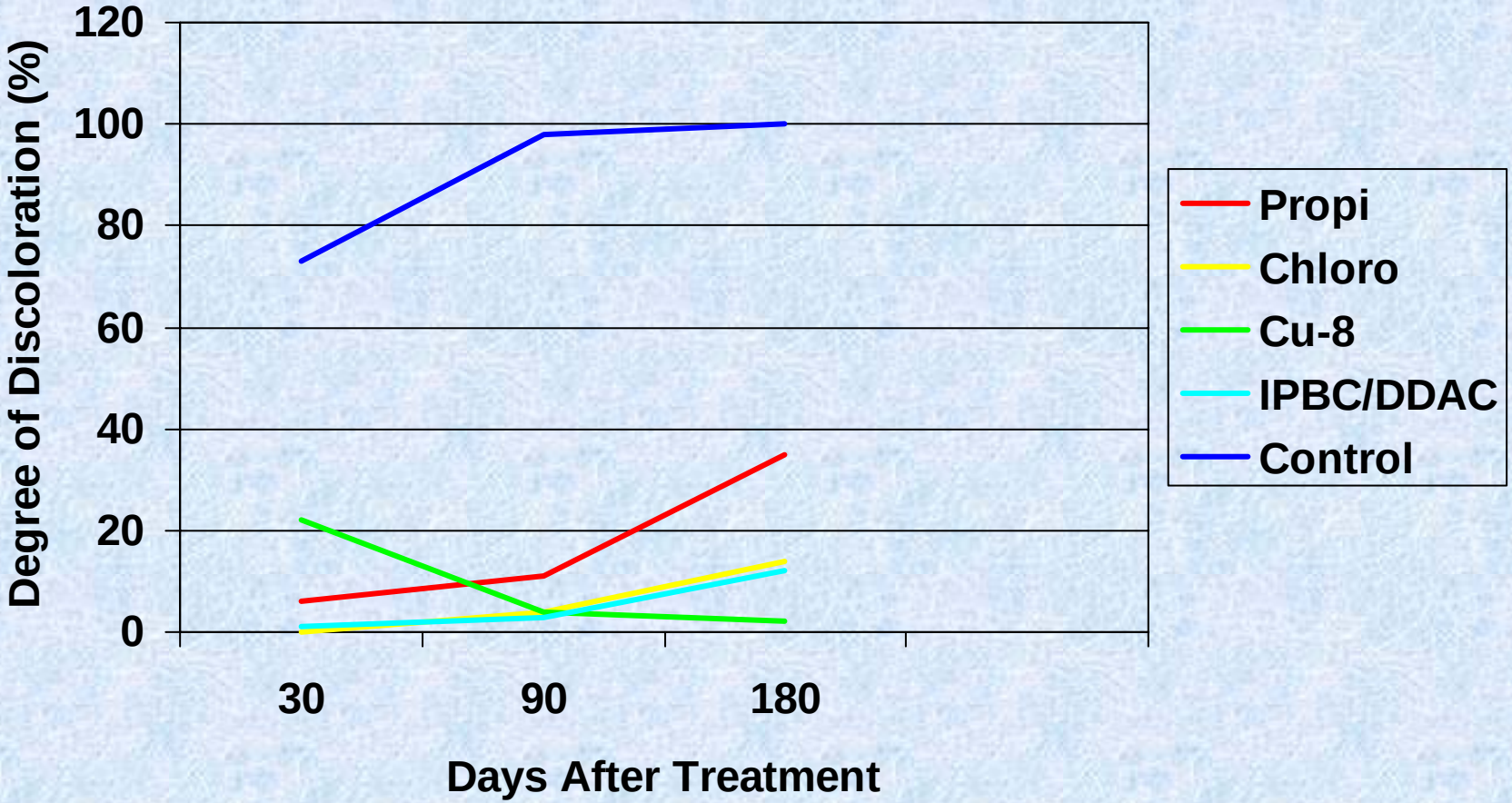
Anti Stain/Mold Chemicals

- NP-1: 3-iodo-2-propynyl butyl carbamate (IPBC) plus didecyl dimethyl ammonium chloride (DDAC)
- Britewood XL: Propiconazole plus DDAC
- Mycostat P: Propiconazole
- Nex-Gen: Methylene bisthiocyanate plus tetrachloroisophthalonitrile

Chemicals (Cont).

- PQ-8: Copper-8-quinolinolate
- Tuff-Brite: Tetrachloroisopthalonitrile
- Sta-Brite P: IPBC
- Britewood XL: orthophenylphenate

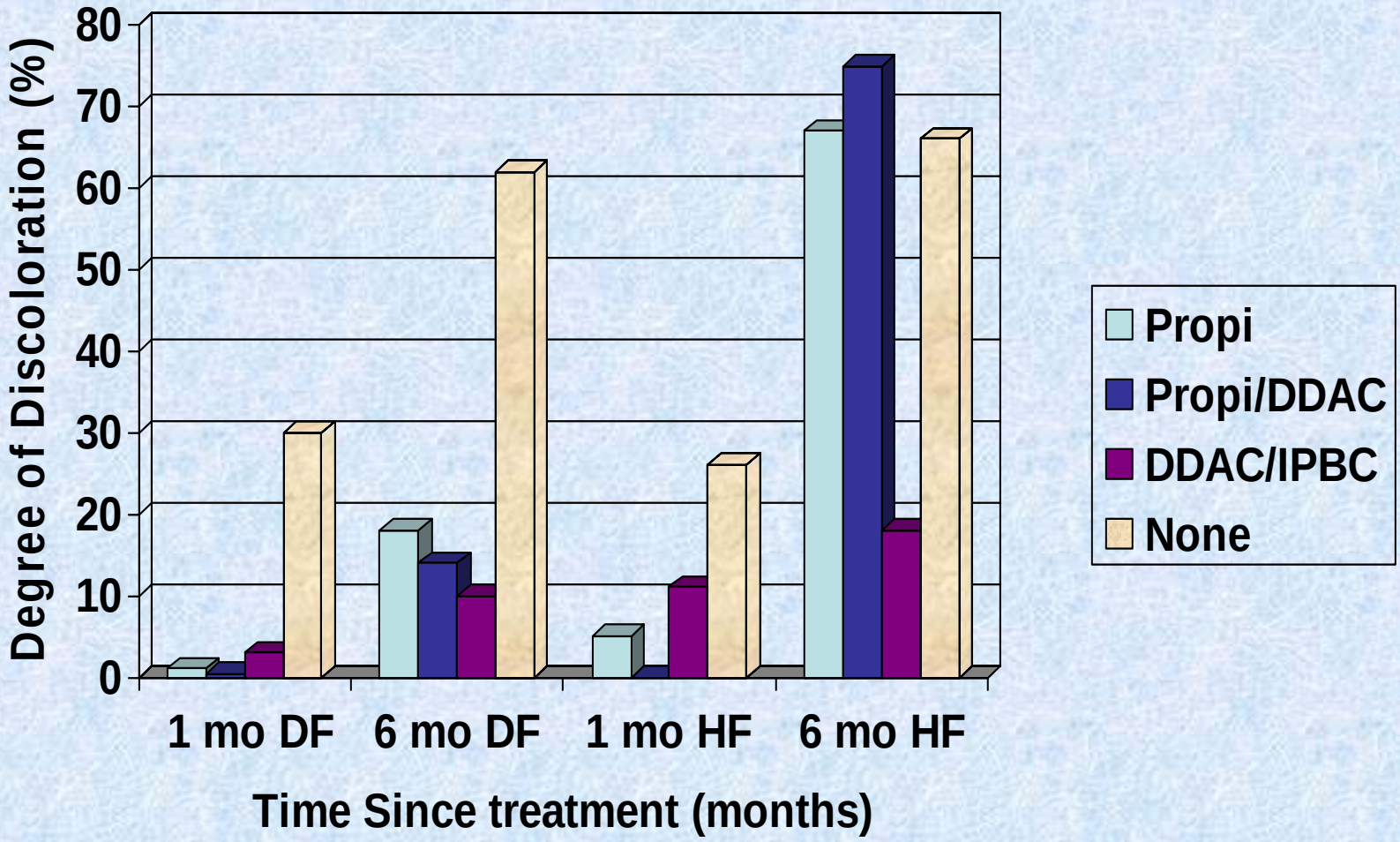
Performance of Antisapstain Chemicals



Treatment of KD Lumber

- Propiconazole
- Propi/DDAC
- DDAC/IPBC

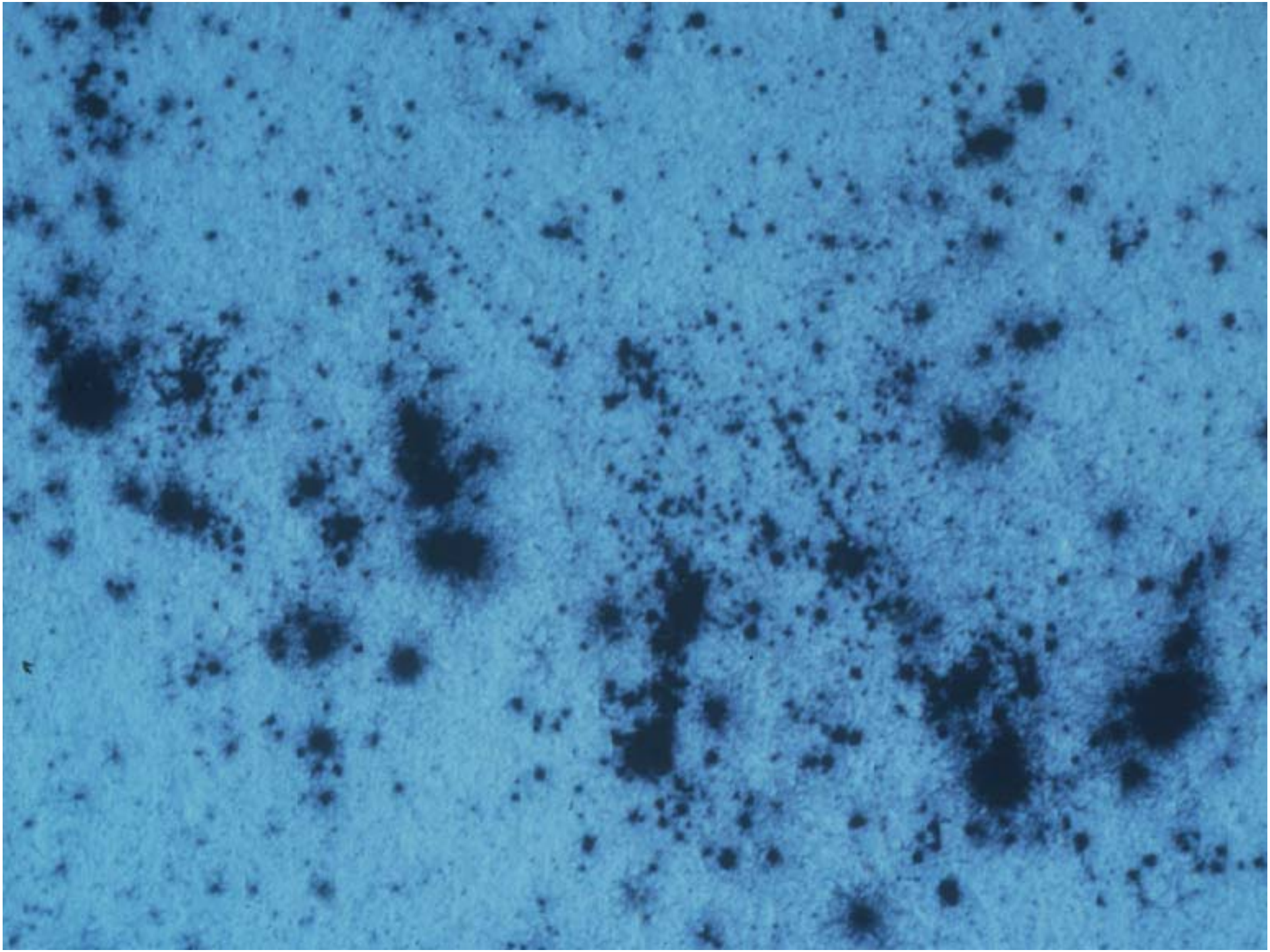
Post KD Treatment Effectiveness

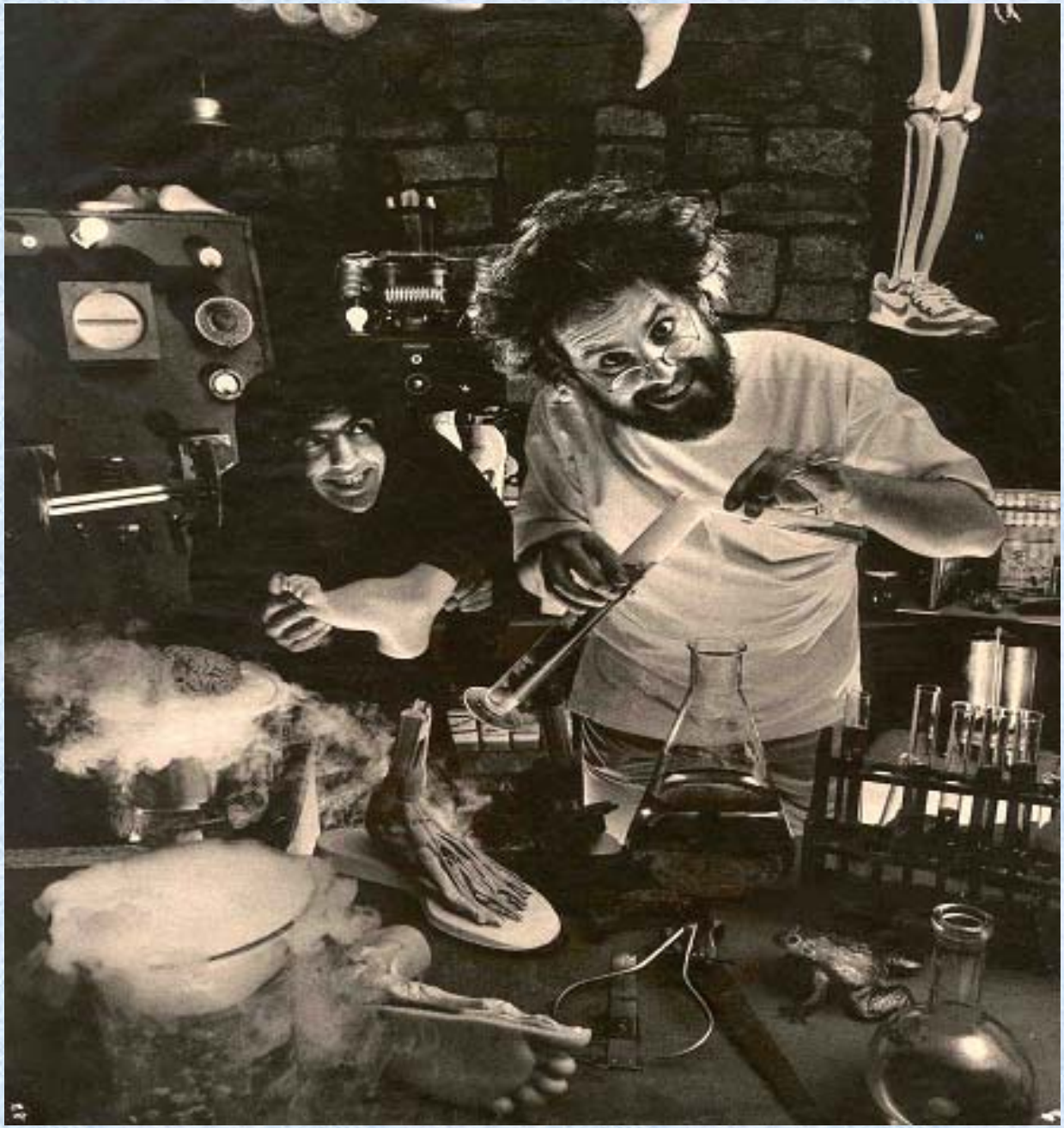


KD Treatment

- Provides short term protection against rewetting
- Protection declines w/storage time
- Higher conc. may be useful


CCA
ACZA

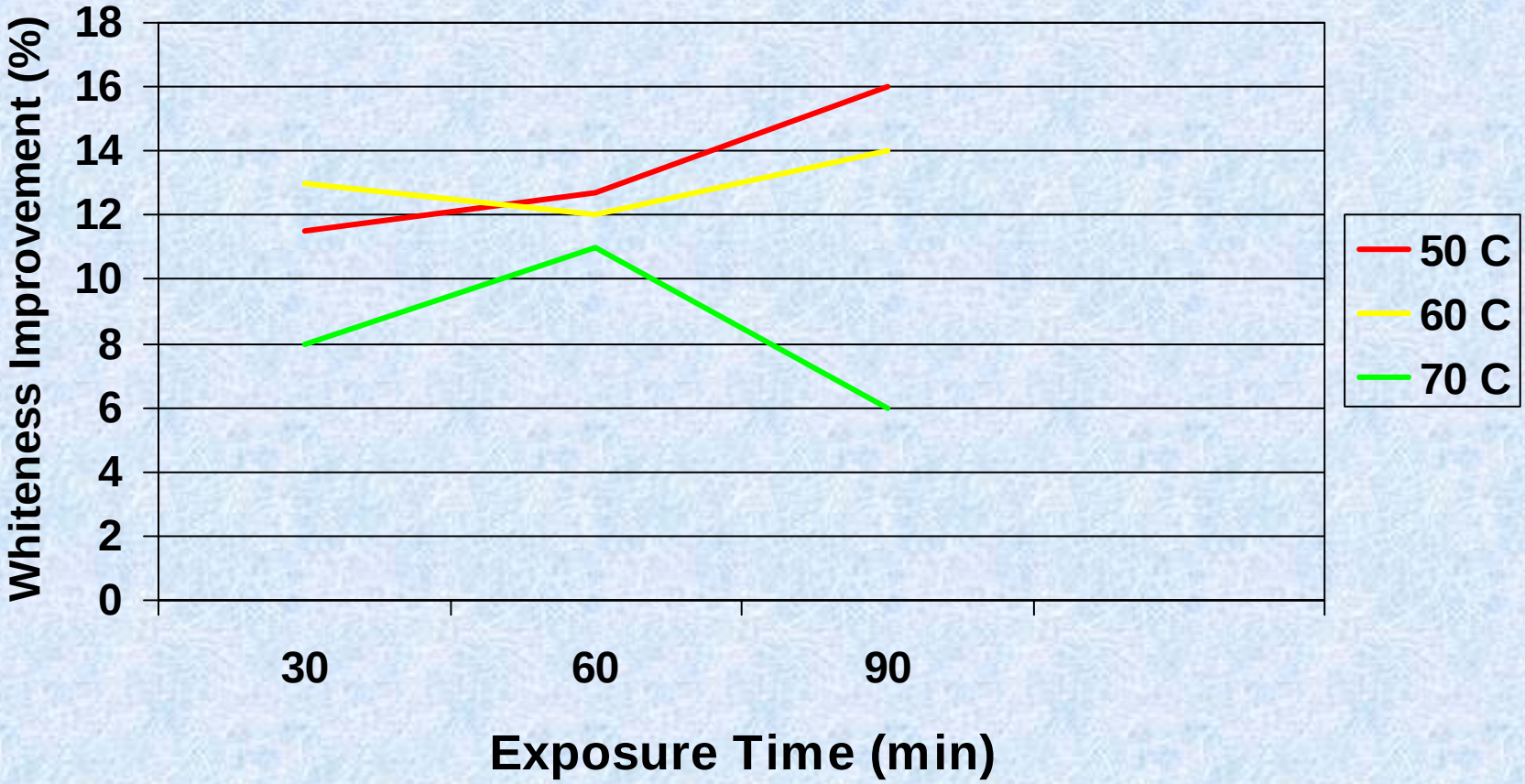




Color Removal

- 1-3 % hydrogen peroxide
- 0.3 % NaOH
- 4 % Na-silicate
- (Lee, 1994)

Peroxide Effect on Brightness



Peroxide Bleaching

- Costly
- Effect shallow
- Does not kill fungus in wood

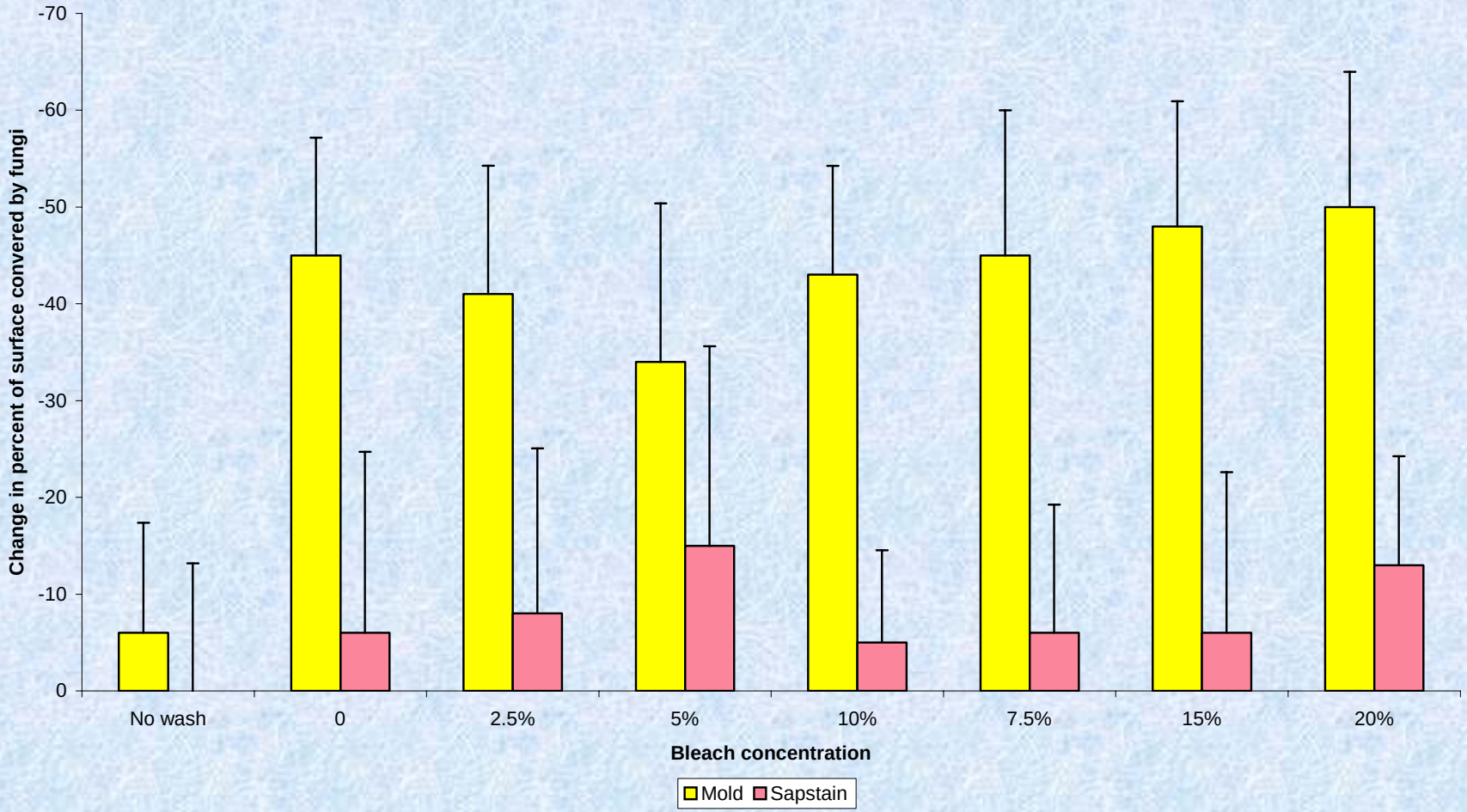
Mold Removal

- Power wash
- Bleach
- Biocides

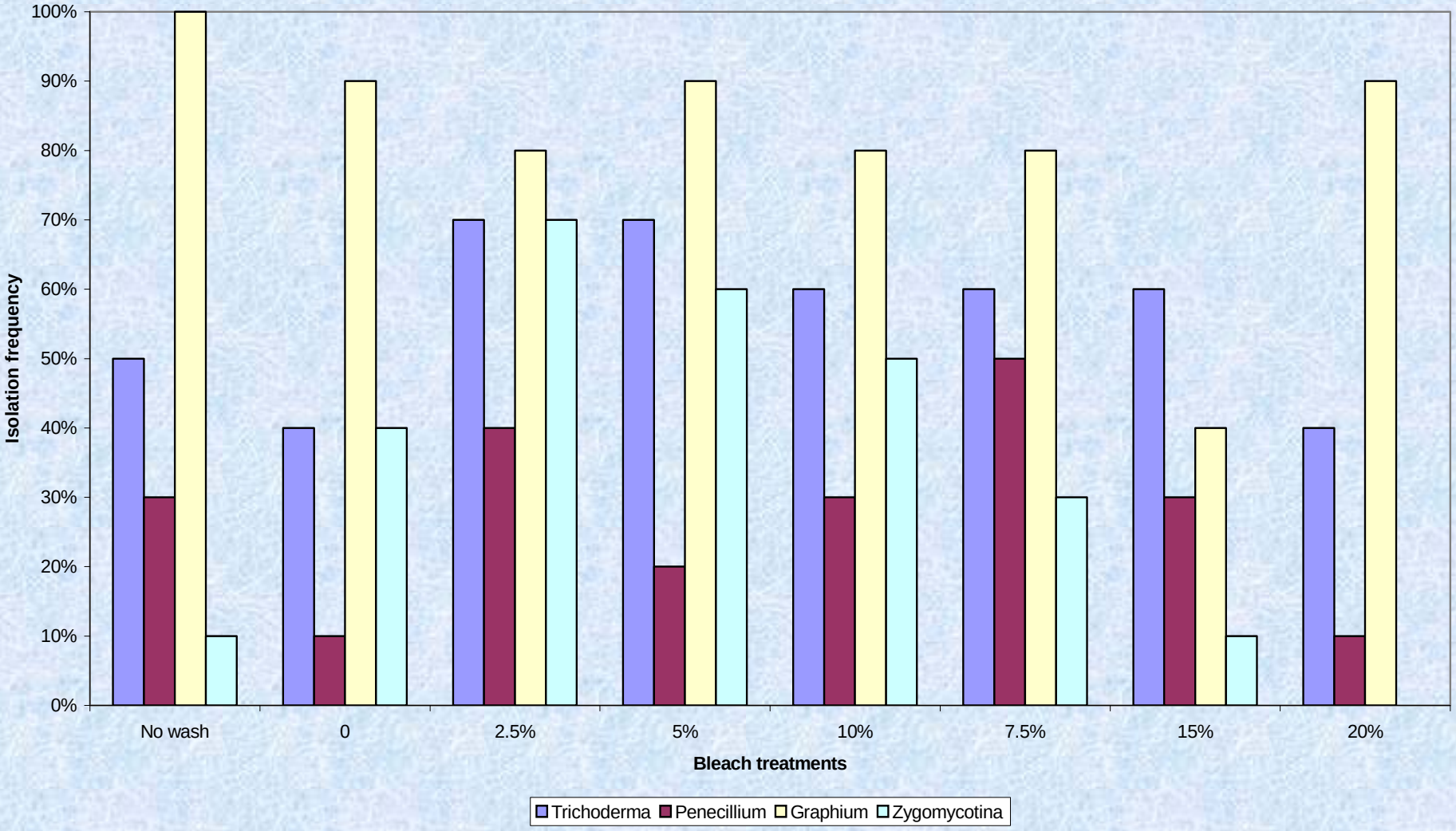
Mold/Stain Removal

- Heavily stained Douglas-fir sapwood
- Boards washed with 0-20 % bleach
- Selected boards treated with Timbor BoraCare, or DDAC
- Incubated for 4 weeks at 32 C
- Fungal colonization determined

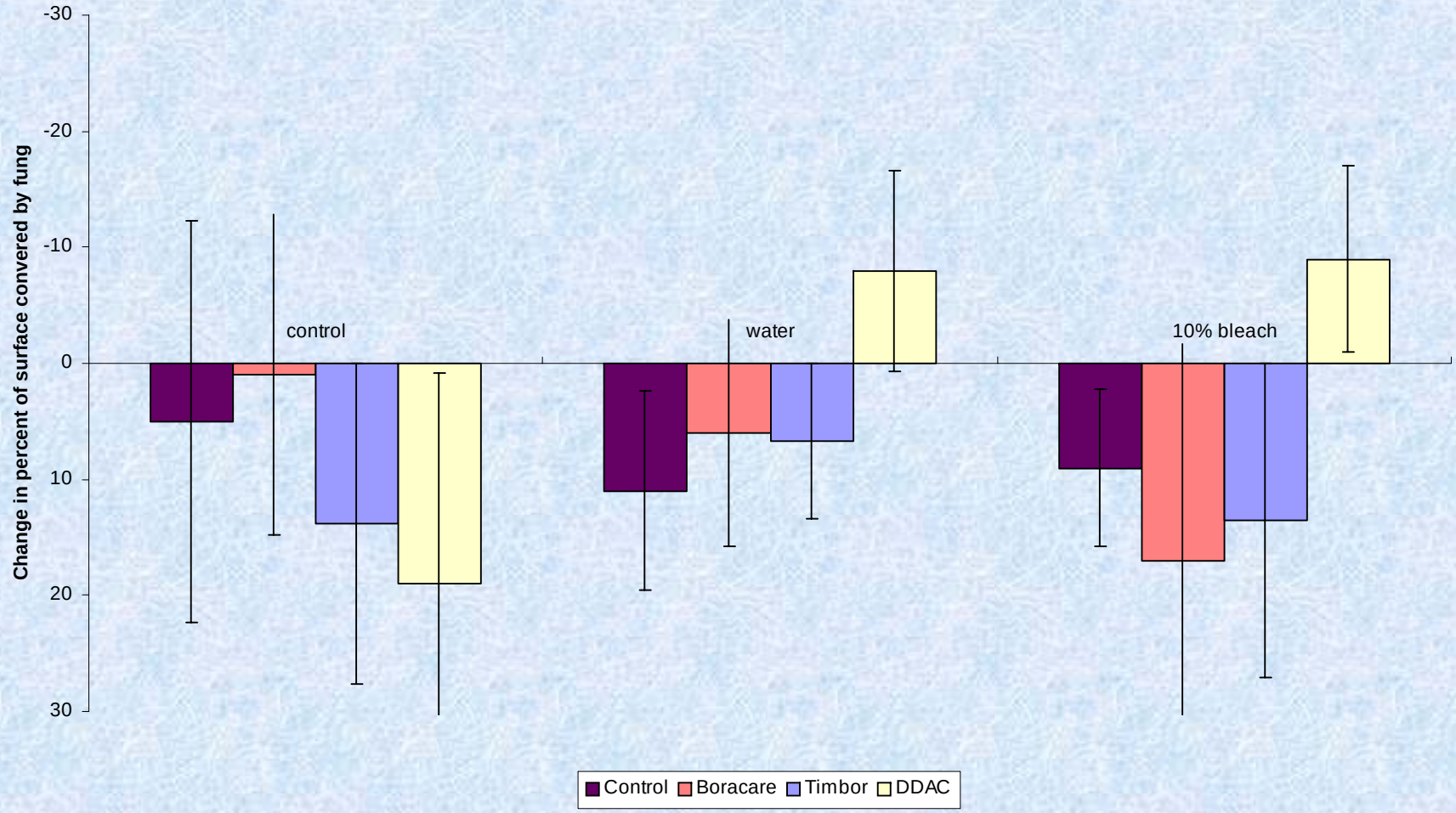
Ability of bleach to reduce fungal discoloration



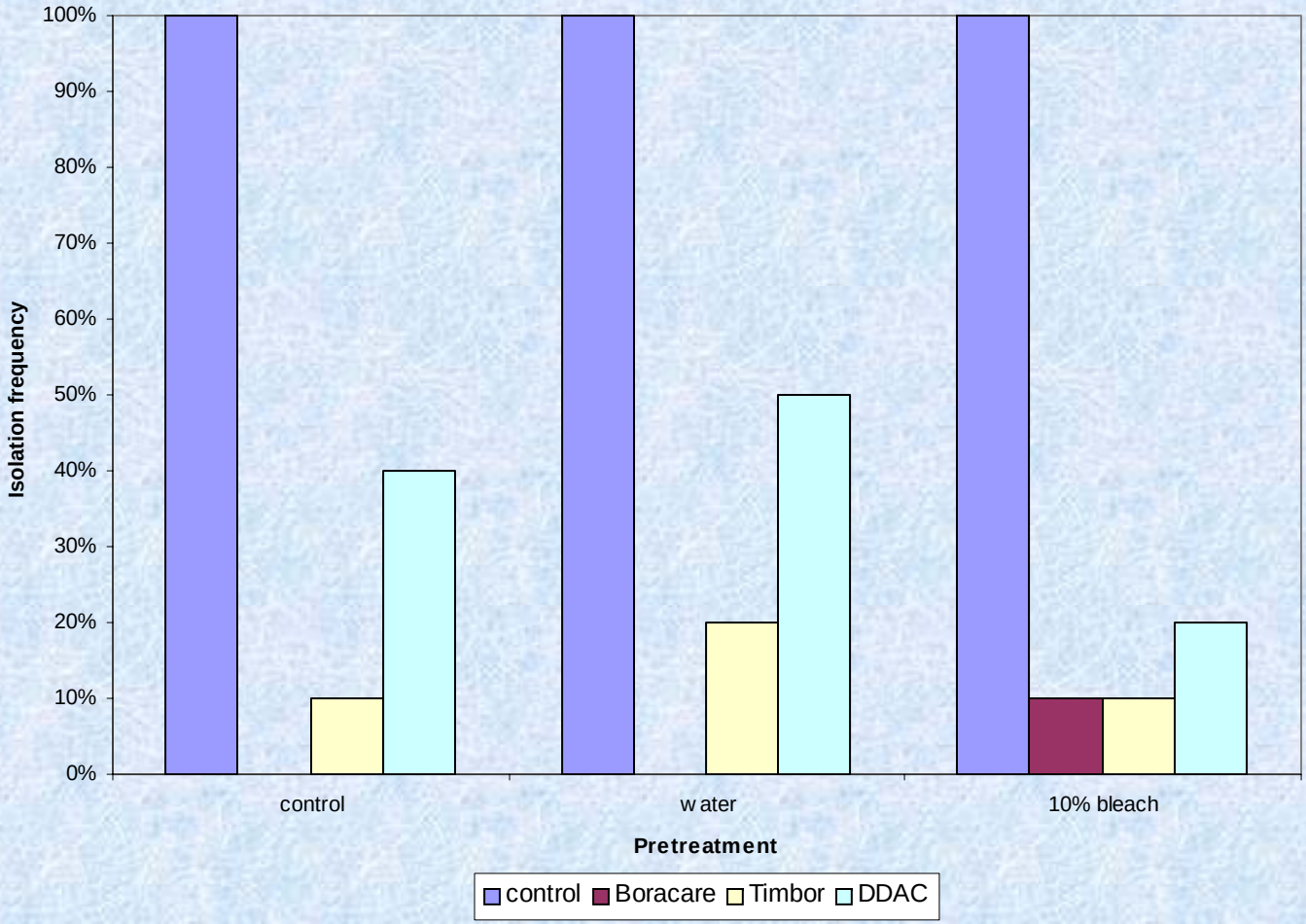
Ability of bleach to reduce fungal isolations



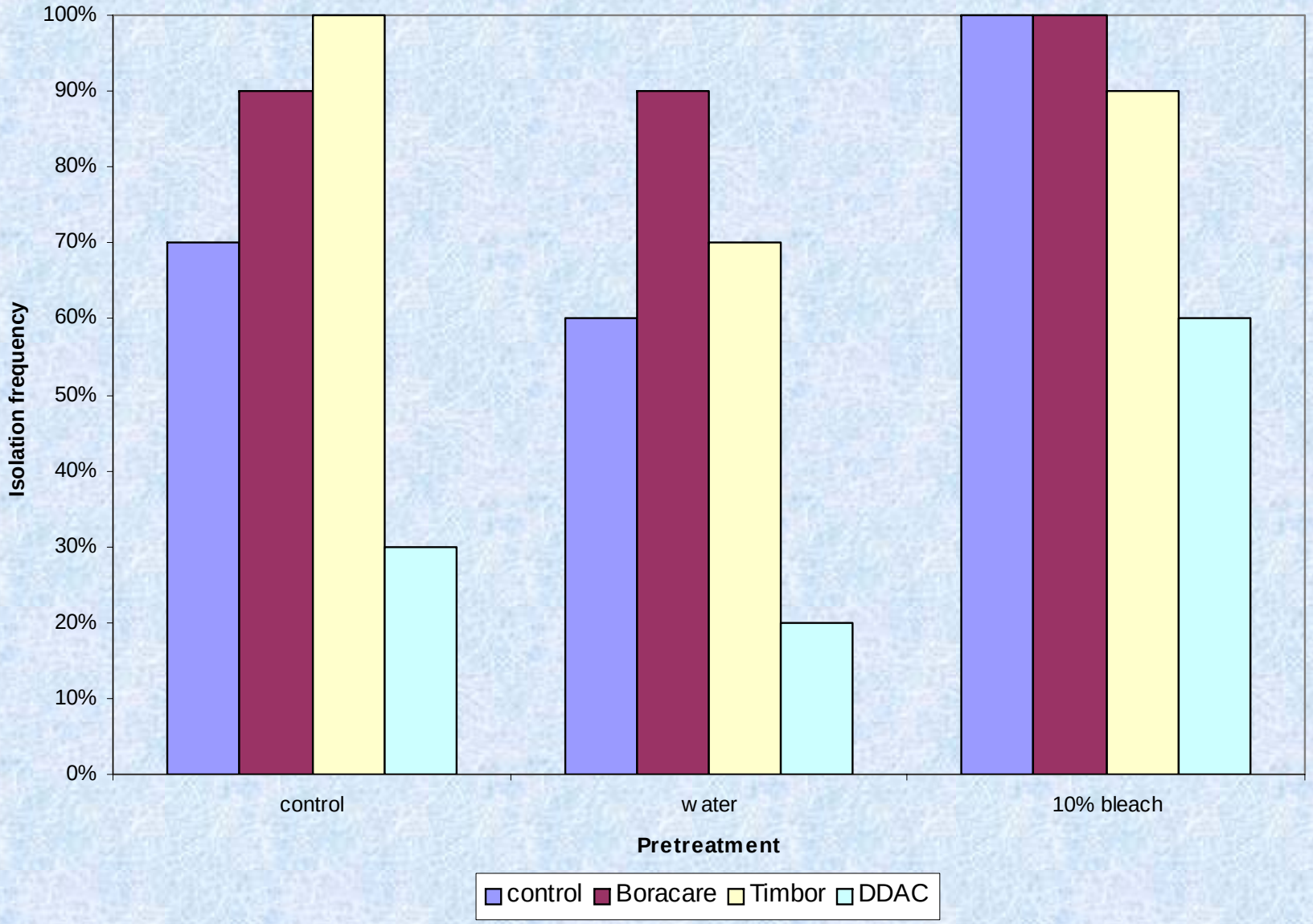
Effect of anti-fungal compounds on wood appearance



Ability of boron to prevent *Graphium*



Ability of boron to limit *Trichoderma*



Controlling Mold

- Bleach reduces visual effect
- Chemicals do not eliminate fungi
- Moisture control is essential

Future of Mold Problems

- Litigation moves through courts (>$2.4 Billion in 2002)
- Most litigation will fail, but….
- Homeowners will demand mold free materials
- Industry must respond to meet demand

Meeting the Demand

- Improved design to remove moisture from structures
- Development of more breathable materials
- Biocide incorporation in materials
- Moisture resistant materials