

Wood Decay



Wood Decay Fungi

Types of wood decay fungi

Wood-decay fungi can be grouped in various ways:

- by their method of degrading wood, which reflects fundamental differences in enzymic activities –
 - white-rot
 - brown-rot
 - soft-rot fungi
- by their general biology - whether they are:
 - pathogens which attack and destroy the living sapwood,
 - "parasites" which attack and kill moribund or stressed trees, or
 - saprotrophs which colonise dead wood

by whether they are primary colonisers or secondary colonisers, cause heartrots of standing or fallen trees, are host-restricted or "generalists", etc.

Types of Decay

■ White-rot fungi

- These fungi degrade all the major wood components more or less simultaneously
 - Cellulose
 - Hemicelluloses
 - Lignin

- White rots are caused by the two major root-rot pathogens of trees,
 - Honey fungus, *Armillaria mellea*
 - *Heterobasidion annosum*
 - also by many other saprotrophic fungi

■ Brown-rot fungi

- Brown-rot fungi degrade the cellulose and hemicellulose but leave the lignin more or less intact as a brown framework.
- Only about 6% of wood-decay fungi cause brown rots, and all these fungi are members of the *basidiomycota*.

e.g. Common birch polypore, *Piptoporus betulinus*

■ Soft-rot fungi

- Soft-rot fungi degrade only the cellulose and hemicelluloses
- typically occur in wood of high water content and high nitrogen content.
- Commonly found in rotting window frames, wet floor boards and fence posts, etc
- least specialised of the wood-rot fungi.

Heartrot Fungi

e.g. *Ganoderma adspersum*

- white-rot fungus
- beech and other broadleaves
- spores enter wounds

e.g. caused by shedding of branches

- grows in the non-living heartwood

weakens the tree

→ susceptible to wind damage

White rot



Brown rot



■ Types of Decay Fungi

- Brown-rot (soft woods – mostly)**
- White-rot (hard woods – mostly)**
- Soft-rot**

■ Dry rot (A type of brown rot)

- 30 to 40 percent in wood with low ventilation

■ Wet rot (collective term for white and brown rots)

- very wet wood discolours and gets brittle هش

Dry rot



White Rot Fungi

- **This group of organisms is known as white rot because of their ability to degrade lignin.**
 - **The decaying wood looks white.**
 - **Cellulose and hemicelluloses are also degraded.**
- **Largest number of species belong to Basidiomycotina**
 - **Xyariaceous and Diatrypaceous also numerous.**
- **White rot fungi typically decay hardwoods**
 - **They will decay softwoods but hardwoods are their food of choice.**
- **Simultaneous decay: All the cell components are degraded simultaneously from lumen outwards.**
- **Preferential decay: Lignin and hemicelluloses are removed selectively across the cell wall leaving cellulose.**

Brown Rot Fungi

- **With brown rot fungi, cellulose and hemicelluloses are degraded with only limited lignin degradation.**
 - **Decayed wood is brown and crumbly.**
- **Most species belong to Basidiomycotina.**

- **Brown rot fungi typically decay softwoods.**
- **Attack starts at the cell lumen and works outwards.**
 - **Cellulose is rapidly degraded.**

Soft Rot Fungi

- **Soft rot occurs in areas where plant matter is in contact with excessive amounts of moisture.**
- **The term soft rots comes from the soft appearance of the decayed surface.**
 - **When dry the wood surface is cracked.**
- **Members: Ascomycetes and Fungi Imperfect.**
- **Degradation is mainly through cavity formation in the secondary wall.**
- **Soft rot fungi attack holocellulose; lignin protects the plant.**