

AMAZING FUNGI: Friend and Foe

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Fungi: **mycology**, 10,000+ species in Indiana, fungus v. fungi v. funguses, numerous and radically different groups incl lichens (1/2 fungus), hypha(e) & mycelium, cell walls of chitin, spores, nutrient & water uptake, habitat specific, heterotrophic—saprophytic (decay) & parasitic (disease), protection/defense (toxins, antibiotics, antivirals) 2008 TED talk by Paul Stamets

Optimum growing conditions: RH 60%+, warm (70°F), reduced air movement
achlorophyllose symptom v cause

Lichens - symbiotic relationship fungus (reprod) & alga (food); 500 spp in IND; do not harm trees
Types: Crustose, Foliose (Shield), Fruticose, Squamulose

Slime "Molds" plasmodial & reproductive phases Dog Vomit, Chocolate Stem, Pretzel, Wolf's Milk

Birds Nest Fungi (*Cyathus* & *Crucibulum*)

Powdery Mildew (1,000+ spp. several genera)

Cedar Apple Rust (*Gymnosporangium* spp.)

Mayapple Rust (*Puccinia [Allodus] podophylli*)

Orange Shoe Rust (*Puccinia graminis*)

Ergot (*Claviceps purpurea*)

Early Blight (*Alternaria solani*)

Late Blight (*Phytophthora infestans*)

Devastating (acute) tree diseases - Chestnut Blight, Dutch Elm Disease

Chronic tree diseases - Phomopsis on Rocky Mtn Juniper, Smooth Patch (*Aleurodiscus* spp.)

Mushroom v Toadstool — *It seemed like a good idea - Knowing a little, but thinking you know a lot*
All mushrooms are edible, but some only once

Amanita (hallucinogenic [muscimol] urine drinkers) *A. muscaria* & *A. bisporigera* (Destroying Angel)

Death Cap (*A. phalloides*) & Parasol Fungi (Green-spored *Lepiota*)

Field Mushrooms & Fairy Rings (*Agaricus bisporus* & *A. campestris*)

Puffballs (*Calvatia* & *Lycoperdon*)

Wood Ear (*Auricularia auricula-judae*) & other cup/jelly fungi

Oyster (*Pleurotus*)

Shiitake (*Lentinula*)

Lion's Mane (*Hericium*)

Yellow Morel (*Morchella esculenta*) Black & Half-free

Yellow Chanterelle v Jack O'Lantern

Honey Mushroom (*Armillaria mellea*) rhizomorph

Chicken-of-the-Woods (*Laetiporus sulphureus*)

Habitat Preference & Seasonality (esp. late summer/early fall precipitation)

McFarland & Mueller book Edible fungi (**never eat a fungus you do not know, and never uncooked**)

Advantages of mycophagy—cuisine, stimulates immune system, antiviral & anticarcinogenic, reduces inflammatory response, mood & concentration booster, etc.

Bread, ALL Booze, Cheese (some), Medicines (antibiotics), Citrus Beverages, Soy Products (Clara Peeters, 1615)

mycorrhizae: 90%+ of plants have fungal beneficial associate(s), started as parasitism evolved to symbiotic relationship (mutualism), similar to cyanobacteria and Fabaceae, some are obligate, increases SA:vol, assists in the uptake of water & nutrients, protection (antibiotics), enhances seedling and transplant survival, produces more vigorous and healthier plant growth, enhances flowering & fruiting, improves plant tolerance to drought & salinity, optimizes fertilizer use (P), helps maintain soil quality (esp. structure), nutrient cycling & erosion control **decrease dramatically in soil disturbed by human activity ("soil" becomes dry and alkaline)**

TYPES Ectomycorrhiza (10%) mainly forested) pines, spruce & some hardwoods (oak, beech, willow)

Endomycorrhiza (85%) 300,000 species both herbaceous & woody

Orchid & Ericad mycorrhizia mycoheterotrophic *Monotropa uniflora* & *Russula*

NOT MYCORRHIZAL ALL: Brassicaceae, Commelinaceae

SOME: Amaranthaceae, Chenopodiaceae, Caryophyllaceae, Polygonaceae, Fabaceae

Mycogrow combo of 30+ different soil inhabiting mycorrhizal fungi & bacteria; special mix for vegetables; preparation, sugar starter; root hair production; no harm in over-application, simply watering

Maybe we should rethink the synthetic fertilizer BS

Fungi Perfecti (catalog) fungi.com