1. Introduction
    - Who is this guy talking about mushrooms and why should I trust him!?
        - Josh Isaac — FAP District Forester for Dickinson and Menominee Conservation Districts
        - BS in Forestry from MTU (with a focus on Wildlife Ecology and Mgt.)
        - Formerly certified through M.D.A.R.D. as a "Wild Edible Mushroom Identification Expert"
        - 20+ years of experience mushroom hunting and counting!!
        - Currently forage for 20ish species of fungi
2. Why mushroom hunting is cool
    - Fun
    - Connect with nature
    - Connect with family/friends
    - Connect with inner self
    - Spiritual connection
    - Create memories/tell stories
    - Food on the table
    - Exorcise
    - Healthy source of vitamins and minerals
    - Make some money!
3. Uses That Put The "Fun" In Fungi!
    - Food
    - Art
    - Medicine

4. Two Fungus types {Phylum)
    - Ascomycetes or Sac Fungi
        - Largest phylum, over 64,000 Species
            - Morchella, Gyromitra, Helvella, Peziza. Sarcoscypha
        - Spores produced in elongated cells (Asci)
        - Spores liberated by pressure
    - Basidiomycetes
        - Major and very diverse group
            - Gill fungi, boletes, polypores, calvarias, jelly fungi and Gasteromycetes (lg. diverse group within Basidiomycetes)
            - Characterized by the presence of Basidia or Basidium (a microscopic, club-shaped spore-bearing structure)

5. Mushroom Morphology
    - Gills, teeth, pores, ridges
        - Gills
            - Adnate
            - Adnexed
            - Decurrent
            - Emarginate
            - Free
            - Seceding

        - Sinuate
        - Subdecurrent
    - Ridges
    - Basal bulb
        - Equal
        - Club shaped
        - Bulbous
        - With volva
        - Rooting
        - With rhizoids
- Volva
- Stipe
- Reticulum
- Ring or Annulus
- Striations
- Zonation

Cap

- Campanulate
- Conical
- Convex
- Depressed
- Flat
- Infundibuliform
- Ovate
- Umbillicate
- Umbonate

Scales

Areolae

Warts

6.) Poisonous Mushrooms

- What is a poisonous mushroom
    - A poisonous mushroom is one that is expected to have an adverse effect on a sizeable percentage of the population the majority of the time.
    - Excludes idiosyncratic reactions and allergies caused by a "usually" edible mushroom.
- Approximately 2,500 species of large, fleshy mushrooms in Michigan
    - 60-100 regarded as generally safe for eating.
    - At least 50 species are known to be poisonous, (there may be more).

7.) Some Commonly found poisonous mushrooms in Michigan

- Amanita Species:
- Amanita bisporigera**
- Amanita muscaria (all varieties)*
- Amanita pantherina*
    - var. multisquamosa
    - Var. velatipes
- Amanita phalloides**
- Chlorophyllum molybdytes
- Clitocybe dealbata
- Coprinus atramentarius (with alcohol)
- Genus Cortinarius (over 1 ,OOO species, some deadly)**
- Genus Galerina (L.B.M.'s; Little Brown Mushrooms)**
- Genus Gyromitra** (with acceptions)

- Genus Inocybe (more L.B.M. 's)
- Lactarius piperatus
- Omphalotus illudens
- Photiota squarrosoides
- Ramaria Formosa
- Many Russula species

Note: Asterisk marks rare deaths, double asterisk marks frequently deadly

8.) Some mushroom myths

- "If an animal can eat it, then so can I."
    - FALSE!! Some squirrels and rabbits can eat Amanita sp. And Russula sp. With no adverse effects.
- "If I eat a little bit and wait for a while with no symptoms, then it is safe."
    - FALSE!! The most dangerous mushroom toxins known have a delayed action. Effects may not be noticed for 6 hours to I O days after consumption!
- "Cooking the mushroom will destroy the toxins."
    - FALSE!! Cooking is highly recommended for all mushrooms to break down sugars that we cannot digest, (chitin). No way to destroy all toxins however.
- "I can do "tests" to distinguish poisonous mushrooms from non." FALSE!!

9.) Ways to protect yourself

- Never eat any mushroom that you can't positively identify
- Never eat raw mushrooms
- Never eat old or decaying mushrooms
- Be careful the first time you eat a mushroom (consume a small bit)
- Any time you sample a new species, save a whole, uncooked specimen in your refrigerator for identification in case you have an adverse reaction.

- Try new species one at a time
- Do not overindulge
- Respect others, and nature

10.) Mushroom Toxins

- Amatoxins (Class A/Poisindex group 1)
- Cortinarius toxins (Class B/Poisindex group I-A)
- Monomethylhydrazine (Class C/Poisindex group 3)
- Coprine (Class D/Poisindex group 5)
- Psilocybin, Psilocin (Class E/Poisindex group 6)
- Muscimol, Ibotenic Acid (Class F/Poisindex group 2)
- Muscarine (Class G/Poisindex group 4)
- "Unknown toxins (Class H/Poisindex group 7)

11.) Amatoxins

- Mushrooms
  - Amanita, Galerina, Lepiota, and Conocybe
- Symptoms
  - Sever gastrointestinal distress for a day or two followed by remission then possible coma or death due to liver and kidney failure.
- Treatment
  - No known antidote.
  - Stomach can be emptied shortly after ingestion. Not effective however if more than two hours pass.
  - Case-by-case treatment.

1 2.) Cortinarius Toxins

- Mushrooms
    - Species in the genus Cortinarius
- Symptoms
    - Characterized by extremely long delay (3-10 days!!)
    - Diarrhea, vomiting, loss of appetite, headache, feeling of "coldness", eventually kidney failure leading to possible death.
- Treatment
    - Treat as kidney failure
    - Some patients spontaneously recover; others may require dialyses or kidney transplant.

1 3.) Monomethylhydrazine

- Mushrooms
    - Members of the genus Gyromitra (False morels)
- Symptoms
    - Latent period of 6-8 hours followed by feeling of "fullness".
    - Vomiting, watery diarrhea for up to two days.
    - Headache, lassitude, cramps/tntense pain in liver and stomach followed by jaundice.
    - Red blood cells may be broken down. May be fatal.
- Treatment
    - Emesis may help if employed early (>2 hours is no good!)
    - Fluid replacement for dehydration

- Patient should be hospitalized for detection of hemolysis or liver/kidney failure.

14.) Coprine

- Mushrooms
  - Coprinus atramentarius, Clitocybe clavipes, other Coprjnus sp.
- Symptoms
  - May occur shortly after consuming alcohol within 48 hrs. of consuming mushroom.
  - Flushing of face and neck. ▶ Metallic taste in mouth
  - Tingling of extremities
  - Rapid heartbeat
  - Swelling of face and hands
  - Nausea and vomiting
  - Visual disturbances, vertigo. Weakness and confusion
- Treatment
  - Symptoms will subside on their own
  - Reassure patient

1 5.) Psilocybin, Psilocin

- Mushrooms

- Psilocybe and Stropharia sp., Paneolus sp., Some Conocybe and Inocybe sp., Gymnopilus spectablis.

- Symptoms
  - Change of mood
  - May experience fear, excitement, hilarity, hallucinations, loss of coordination, dilation of pupils, rapid heart rate.
  - High fever and seizures in children
- Treatment
  - Reassurance and time
  - Children should be hospitalized

16.) Muscimol, Ibotenic Acid

- Mushrooms
  - A. muscaria, A. pantherina, A. cothurnata, A. frostiana and A. gemmata.
- Symptoms
  - Drowsiness
  - State resembling alcoholic intoxification
  - Followed by hyperactive, confusion, muscular spasms, dilirium and visual hallucinations.
  - Drowsiness and deep sleep lead to a usual full recovery.
  - Fatality rate of 1-5% however.

- Treatment
    - Emesis or gastric lavage may be performed of done early.
    - Overtreatment can be more harmful than none at all.

17.) Muscarine

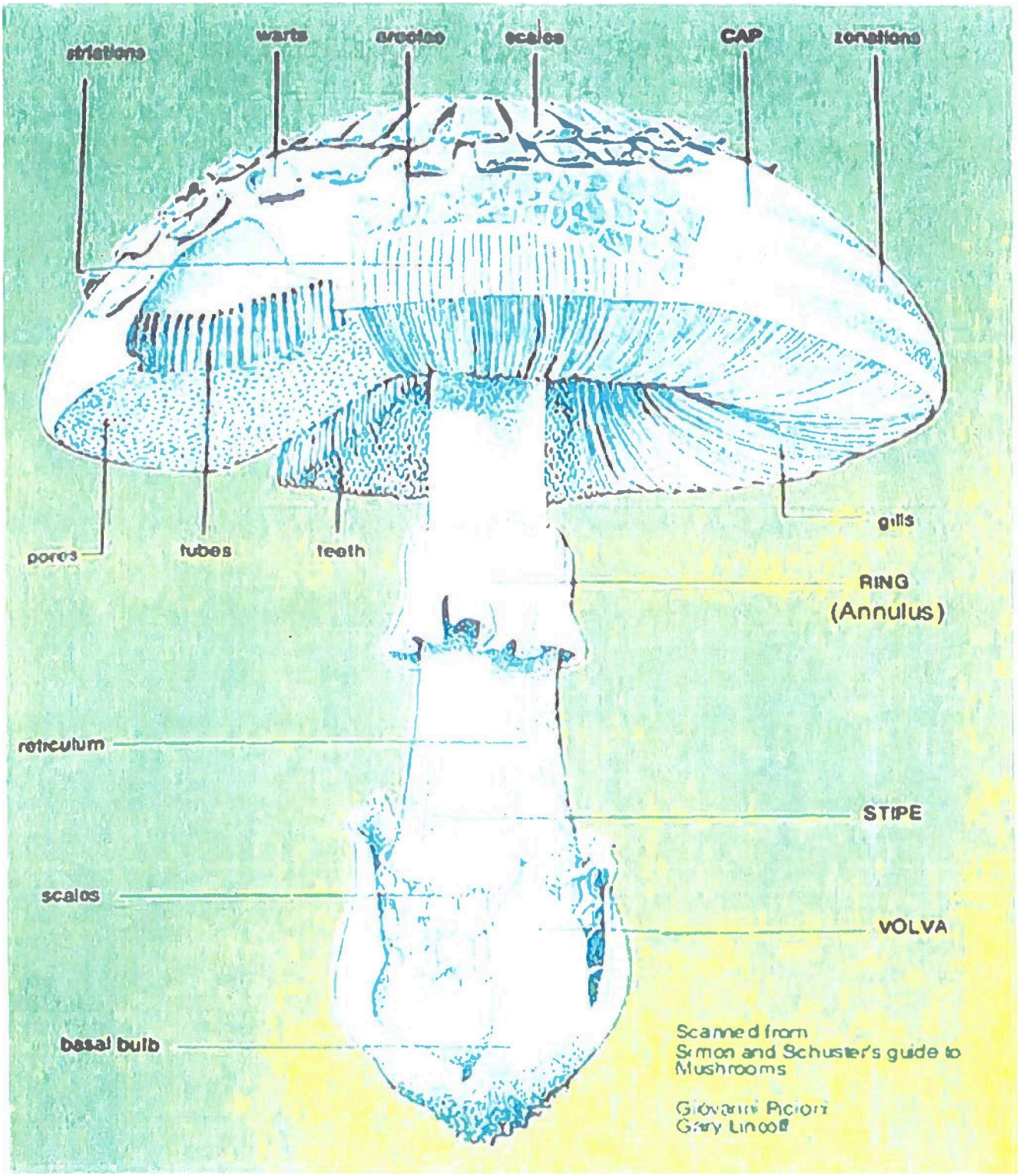
- Mushrooms
    - Certain members of the genera Inocybe and Clitocybe.
- Symptoms
    - PSL-perspiration, salivation, lacrimation
    - "SLUDGE"- salivation, lacrimation, urination, defecation, gastritis, emesis.
    - Begins 30-1 20 minutes after consumption
- Treatment
    - Atropine- specific antidote for muscarine poisoning.
    - Should only be administered by a physician.

1 8.) Unknown Toxins

- Catch-all term to cover any toxin that docsn 't fall into the previous categories.
- Mushrooms
    - Chlorophyllum molybdites, lepiota naucina, Omphalotus illudens, Enteloma sp., Paxillus involutus, Boletus subtomentosus, Laetiporus sulfereus
- Symptoms
    - Gastrointestinal irritants unless otherwise noted

    - Abdominal cramps
    - Vomiting/diarrhea
- Treatment
    - Due to exact nature of toxin being unknown, no specific antidote can be recommended

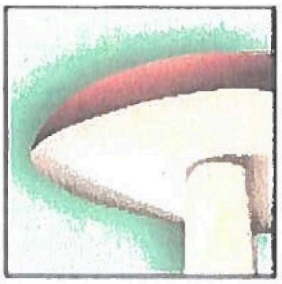
Mushroom Anatomy



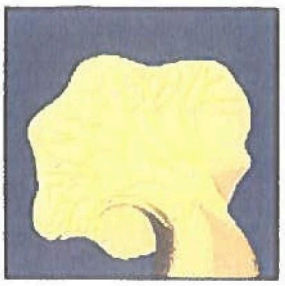
Credit: Michigan Wild Foraged Mushroom Certification Program

Spore-bearing surface under cap

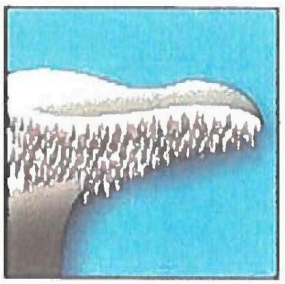
Gills:
wide and thin sheet-like plates radiating from stem



Pores:
many small tubes ending in a spongy surface



Ridges:
short, blunt elevated lines on stem and under cap



Teeth:
many small finger-like projections

Gill attachment

Adnate - gills widely attached widely to stem

Adnexed - gills attached narrowly to stem

Decurrent - gills running down stem for some length

Emarginate - gills notched immediately before attaching to stem

Free - gills not attached to stem

Seceding - gills attached, but breaking away from stem at margin (often older specimens)

Sinuate - gills smoothly notched and running briefly down stem

Subdecurrent - gills running briefly down stem

Cap morphology

Campanulate - bell-shaped

Conical - triangular

Convex - outwardly rounded

Depressed - with a low central region

Flat - with top of uniform height

Infundibuliform - deeply depressed, funnel-shaped

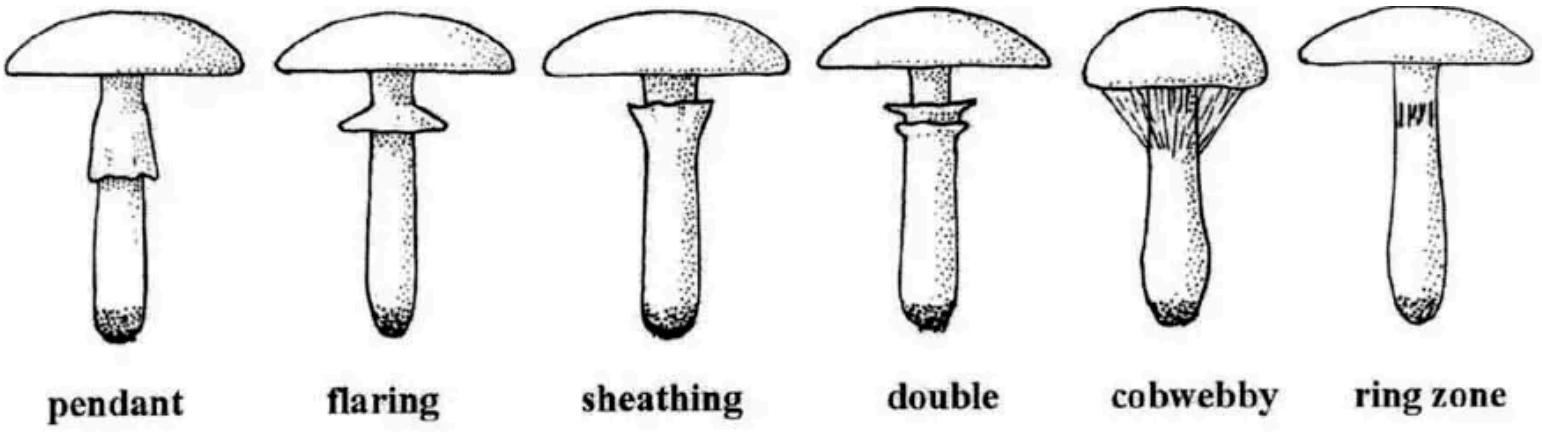
Ovate - shaped like half an egg

Umbilicate - with a small, deep depression

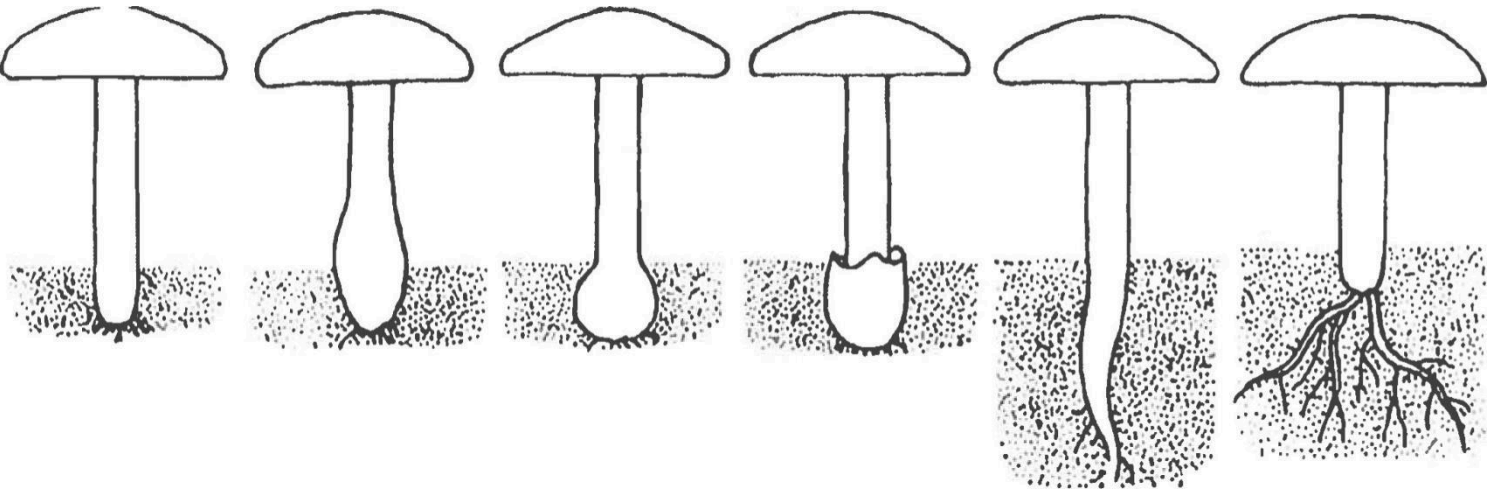
Umbonate - with a central bump or knob

Credit: https://soppdagelse.blogspot.com/2013/01/intro-to-mushroom-cap-morphology.html

Veil types

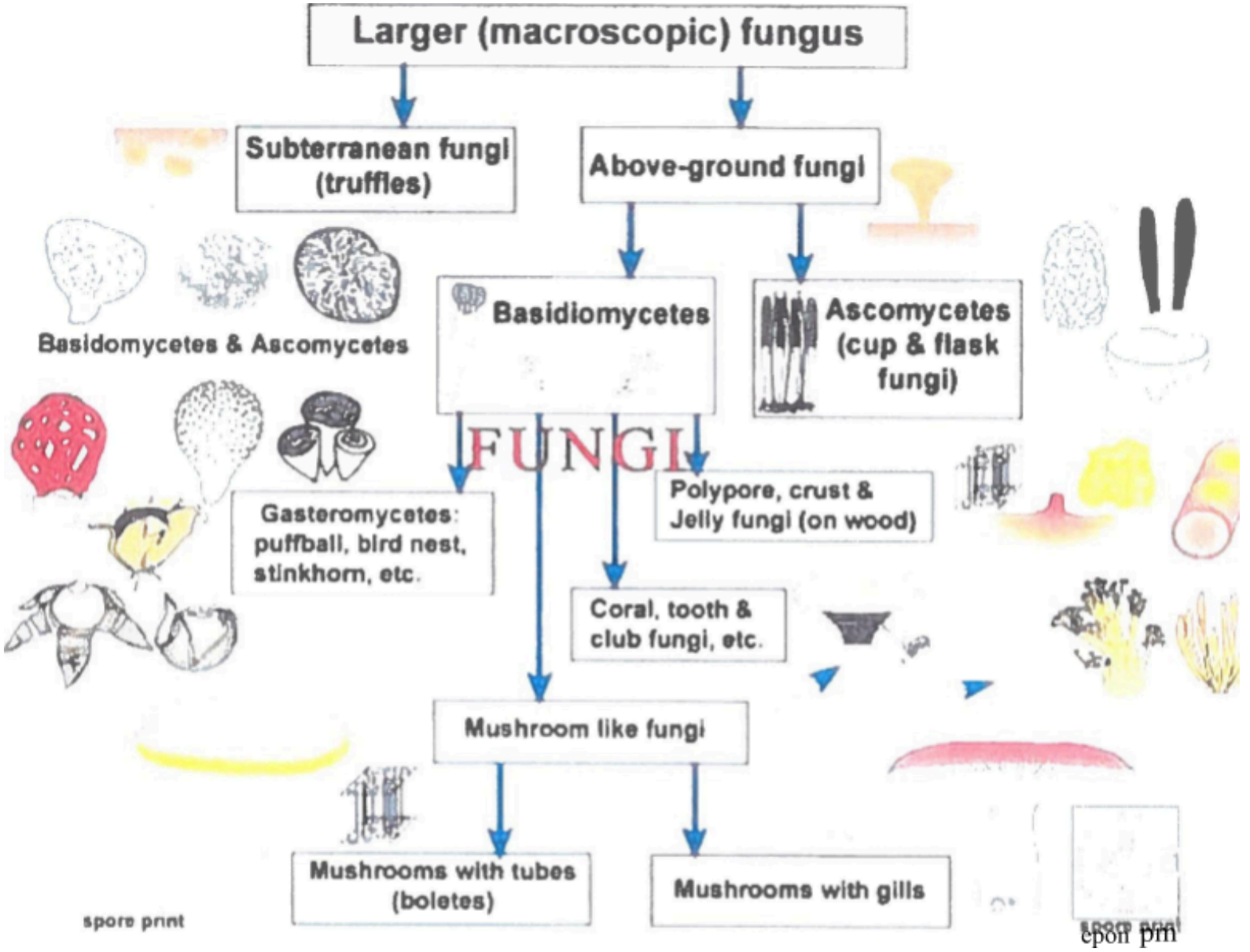


Stipe (stem)



equal club shaped bulbous with cup (volva) rooting with rhizoids

Pics from the Michigan Wild Foraged&lushroom Certification Program



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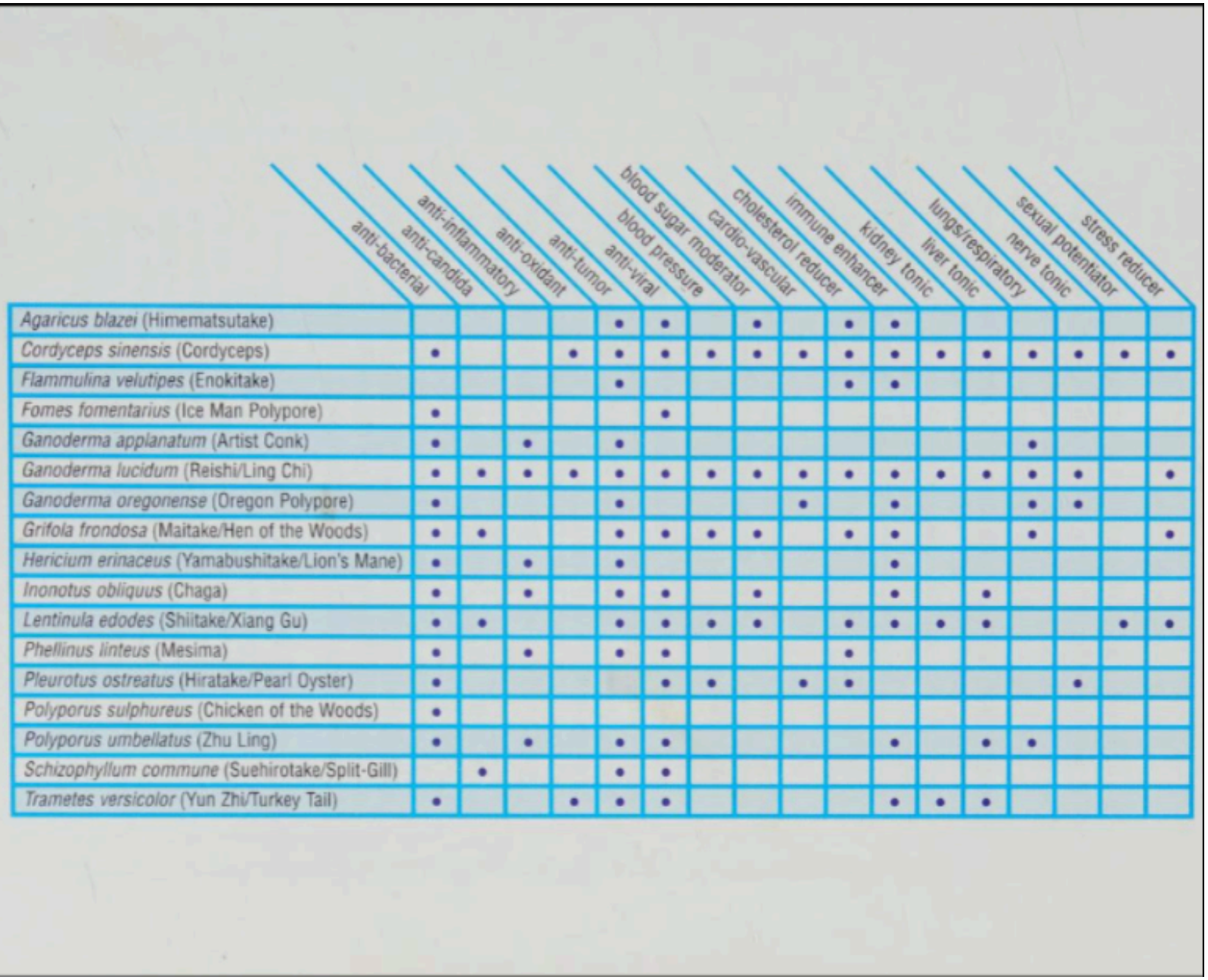
CROSS-INDEX OF MUSHROOMS AND TARGETED THERAPEUTIC EFFECTS'



	anti-bacterial	anti-candida	anti-inflammatory	anti-oxidant	anti-tumor	anti-viral	blood pressure	blood sugar moderator	cardio-vascular	cholesterol reducer	immune enhancer	kidney tonic	liver tonic	lungs/respiratory	nerve tonic	sexual potentiator	stress reducer
Agaricus blazei (Himematsutake)					•	•		•		•	•						
Cordyceps sinensis (Cordyceps)	•			•	•	•	•	•	•	•	•	•	•	•	•	•	•
Flammulina velutipes (Enokitake)					•					•	•						
Fomes fomentarius (Ice Man Polypore)	•					•											
Ganoderma applanatum (Artist Conk)	•		•		•									•			
Ganoderma lucidum (Reishi/Ling Chi)	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•		•
Ganoderma oregonense (Oregon Polypore)	•				•				•		•			•	•		
Grifola frondosa (Maitake/Hen of the Woods)	•	•			•	•	•	•		•	•			•			•
Hericium erinaceus (Yamabushitake/Lion's Mane)	•		•		•						•						
Inonotus obliquus (Chaga)	•		•		•	•		•			•		•				
Lentinula edodes (Shiitake/Xiang Gu)	•	•			•	•	•	•		•	•	•	•			•	•
Phellinus linteus (Mesima)	•		•		•	•				•							
Pleurotus ostreatus (Hiratake/Pearl Oyster)	•					•	•		•	•					•		
Polyporus sulphureus (Chicken of the Woods)	•																
Polyporus umbellatus (Zhu Ling)	•		•		•	•					•		•	•			
Schizophyllum commune (Suehirotake/Split-Gill)		•			•	•											
Trametes versicolor (Yun Zhi/Turkey Tail)	•			•	•	•					•	•	•				

Source: "MycoMedicinats: An Informational Treatise on Mushrooms" by Paul Stamets.

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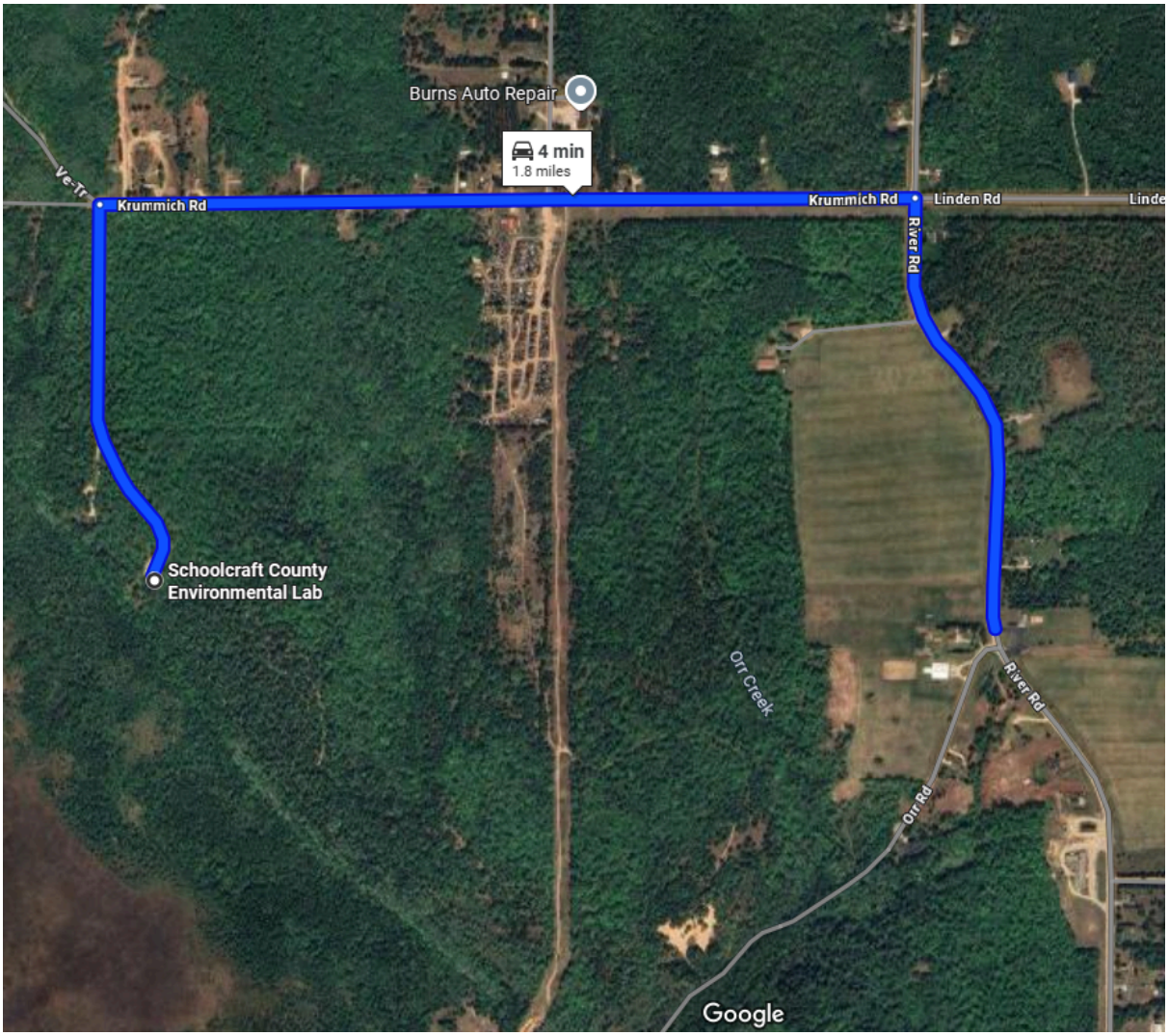
MICHIGAN FORESTRY Assistance Program

MENOMINEE CONSERVATION DISTRICT


Burns Auto Repair
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Linden Rd
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River Rd
Schoolcraft County
Environmental Lab
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