

New Jersey
Mycological Assn.

NJMA News April 1979
Vol. IX No. 4
President: Jim Richards
Editor: Melanie Spock

GARY LINCOFF ON EDIBLES — APRIL 8th

Gary Lincoff will give a presentation on "Edible Wild Mushrooms" at our April meeting. Co-author of Toxic and Hallucinogenic Mushroom Poisoning, Gary is an interesting and energetic speaker. This program is invaluable for beginners. Edible samples will not be served. This meeting is open to the public. SCEEC auditorium, 1:30 p.m.

REVIEW OF TOXINS BY GARY LINCOFF

On March 11, members of NJMA had the privilege of hearing Dr. Donald Simons, a research chemist with Dupont, give a wonderfully lucid and succinct presentation on mushroom toxins. Using two projectors, one with slides of text and formulae, the other with truly beautiful slides of poisonous mushrooms, he led us through a survey of the toxins in mushrooms and the ways in which they produce their toxic effects. He listed eight different kinds of consequences of eating mushrooms and described examples of each.

1. Satiety and Contentment. These are what we are looking for when we eat mushrooms - whatever else we get is the subject of this lecture.

2. Idiosyncratic Reaction. According to Don: "It is probable that all mushroom species commonly considered edible can produce adverse reactions in some individuals." The symptoms can be indigestion, nausea, vomiting or diarrhea. In the case of the common cultivated mushroom, Agaricus bisporus, the cause of the distress is the mal-absorption of the disaccharide trehalose: trehalose is hydrolyzed in the presence of the enzyme trehalase which, if deficient, prevents trehalose from being absorbed from the gut, thereby causing the irritation.

3. Immunologic Injury. Paxillus involutus is eaten and enjoyed by people in some parts of this country and in Europe; in our area the flavor is distinctly unpleasant. People who eat this mushroom over a period of time can become sensitized to it; that is, there is thought to be an antigen-antibody reaction which, in its extreme form, can rupture the cell membrane and result in massive hemolysis and death. Symptoms in such a case could include headache, nausea, lower back pain, and blood in the urine. No poisonings from this mushroom have been reported in the U. S.

4. Interaction with Alcohol or Drugs.

A. Alcohol. Some species of inky cap mushrooms, e.g., Coprinus atramentarius and Coprinus quadrididus, are known to cause a flushing of the face and neck, a swelling and tingling of the hands, palpitations, and occasionally nausea and vomiting, if alcoholic beverages are consumed several hours to a day or two after the mushrooms are eaten. No reaction seems to occur if the drinks are consumed along with the mushrooms, and not afterwards, because it takes time for the compound in the mushrooms to inhibit the enzyme in our system that detoxifies the alcohol by reducing it to harmless waste products.

B. Drugs. Barbiturates or benzodiazepines (GABA stimulants) should not be used in treating Amanita muscaria poisoning because they will only exacerbate the symptoms brought on by muscimol (a GABA mimetic), one of the chief active compounds in the mushroom.

5. Gastrointestinal Irritation. The Jack O'Lantern (Omphalotus olearius = Clitocybe illudens) and the green-spored lepiota (Chlorophyllum molybdites = Lepiota morgani) can cause intense and prolonged vomiting, so much so, as Don says, that at first the victim is afraid that he will die, and then is afraid that he won't.

6. Nervous System Dysfunction.

A. Peripheral Nervous System. Muscarine, which is found in many species of Inocybe (those pesky LBMs - Little Brown Mushrooms) and in Clitocybe dealbata and some other mushrooms, affects the peripheral nervous system, and causes profuse sweating, salivating and tearing. Death could come from circulatory collapse: muscarine has been shown to stop the heartbeat of a frog. The only reported human deaths have occurred in Europe from Inocybe patouillardii.

B. Central Nervous System. Four mushroom constituents are known to act directly on the central nervous system. (1) Psilocybin and Psilocin (the active component readily produced by hydrolysis) are found in several species of Psilocybe and a few other mushrooms. Psilocin is a serotonin mimetic and causes time and space distortions and hallucinations, although the exact mechanism is not yet known. (2) Muscimol (a gamma-aminobutyric acid - GABA - mimetic) is formed by decarboxylation from ibotenic acid (a glutamic acid mimetic). These compounds are found in Amanita muscaria, Amanita pantherina, and a few other mushrooms whose chief symptoms are disorientation and delirium. (4) Monomethylhydrazine, which is formed by hydrolysis in Gyromitra esculenta, is a pyridoxine antagonist; that is it interferes with the normal functioning of Vitamin B₆. Central nervous system symptoms from ingesting improperly prepared G. esculenta can include convulsions, coma, and respiratory failure. In addition, hemolysis can occur, as can liver damage, except that people who are poisoned by Gyromitra esculenta die too quickly for serious liver damage to become manifest. If this is not reason enough to avoid these false morels - and they are eaten in quantity in the Northwest and in Europe, Gyromitra esculenta has been shown to be an experimental carcinogen!

7. Liver or Kidney Damage (or both). Although there are many toxic compounds in Amanita phalloides, the group called amatoxins, specifically alpha-amanitin and beta-amanitin, are the agents responsible for human poisoning. Lethal levels of amatoxins are also known to occur in Amanita bisporigera, A. verna, A. virosa, A. ocreata, A. suballiacea, A. tenuifolia, and perhaps A. hygroskopica. Possibly lethal levels are known to occur in Galerina autumnalis, G. marginata, G. venenata, and probably other species of Galerina, as well as Conocybe filaris (which really looks like a Pholiota and is also called Pholiotina filaris) and several species of Lepiota, e.g., L. helveola. Dr. Simons showed a chart of animal sensitivity and tissue sensitivity to the amatoxins, and the surprising data indicated that while human beings and dogs are poisoned by ingested amatoxins, rats and mice are not! The lethal dose of alpha-amanitin in human beings is thought to be 0.1 mg/kg, and the toxin affects the liver, the kidneys, and the gastrointestinal wall, whereas it requires 2.0 mg/kg of experimentally administered alpha-amanitin in the rat liver for an LD₅₀ - that is, a lethal dose for 50% of the animals tested, and only the liver is affected. The mechanism of toxicity of the amatoxins is inhibition of RNA Polymerase B which prevents the transcription of messenger RNA from nuclear DNA.

Kidney damage, and 11 deaths in 102 cases, have been shown to occur from eating any of several species of Cortinarius. The toxic compounds and the mechanism of the poisoning are not yet fully known. No deaths or poisonings have been confirmed from Cortinarius ingestion in the United States.

8. Injury of Unknown Nature and Etiology. A number of mushrooms, including Naematoloma fasciculare, are reported as having caused serious or fatal poisonings, but the nature of the toxins and the mechanism of the toxicity are unknown.

Note: This lecture is a shortened form of a lecture Dr. Simons gave at The N. Y. Botanical Garden Poison Mushroom Program, Nov. 6, 1978. That lecture, "The mushroom toxins from a chemical point of view," will be published along with the other papers presented in that program in a forthcoming issue of Clinical Toxicology.

1979 FORAY SCHEDULE

The Foray Committee, headed by Paul Meyer and Bill Rokicki, has produced a fine foray schedule. During each month a foray is scheduled, the newsletter will give more information and directions, as well as any last minute changes or additions.

<u>Date</u>	<u>Place</u>	<u>Leader</u>
May 13	Jenny Jump State Park	Paul Meyer & Bill Rokicki
May 20	Stephens State Park	Jim Richards
May 27	Lebanon State Park	Bill Rokicki
June 10	Wild Foods Foray-Sundance Stables	Bob Peabody & Greta Turchick
June 22-24	PEEC Weekend Foray	NJMA
July 8	Allaire State Park	Dr. Stan Seigler
July 22	Mahlon Dickerson Park	Al Northup
August 5	Second Annual Sam Ristich Foray at Helmetta Bog	Paul Meyer & Bill Rokicki
August 17	Shark River Park	Vic Gambino
August 24-26	Third Annual Northeastern Foray, Connecticut	
Sept. 9	Echo Hill Park	Gertrude Espenscheid
Sept. 16	Mushroom Fair at SCEEC	Jim Richards
Sept. 23	Second Annual Hiram Korn Foray at The Tourne Park	Neal MacDonald
Oct. 7	Annual Picnic, Stokes State Park	Greta Turchick & Bob Peabody
Oct. 14	Holmdel Park	Vic Gambino
Oct. 21	Autumn Hill Park	Neal MacDonald

CLASS

A beginners mushroom identification course will be taught by Bob Peabody Sat., April 21. Since identifying mushrooms to genus is the starting point in trying to key out a species, the emphasis will be on identification to genus, using slides, a workbook and Largent's books. A list of reference books and a critique of commonly used mushroom books will be included. \$2.00 fee for materials & use of center, 11 a.m.-3 p.m., bring your lunch. Call Bob to register 201-852-6353.

CORRECTION

February's newsletter, page 5, the paragraph beginning "We have gone through..." should have read: "We have gone through the Class A objectives and before proceeding to the Class B ones, it should be pointed out that we already know enough to answer the question: Is it Entoloma abortivus or abortivum? Some people say that the species belong to the genus Clitopilus....."

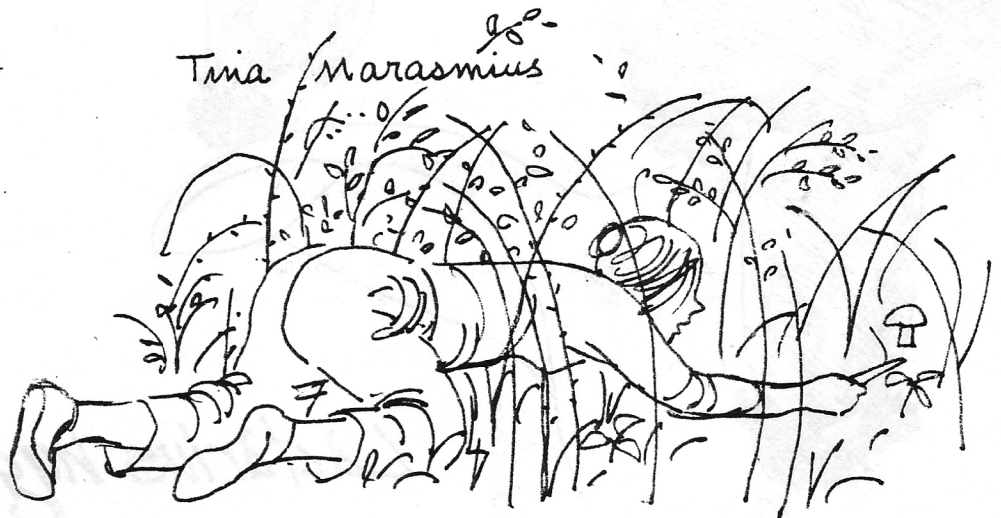
TAXONOMY

The Taxonomy Committee will meet April 10th at SCEEC, and April 24th at Rutgers.

RECIPES

By next month, we hope to have the recipes from the February meeting in the newsletter, and one from Fran Neal.

From Ursula Hoffman -- Hansel's and Gretel's little man remains Amanita muscaria. A German teacher tells me that its color in the German original is purpurrot, i. e. crimson.



Just about now everybody I know will drive past.

Mycophagist's Corner

Lactarius hygrophoroides Berk. and Curt. is a synonym for Lactarius distans Pk., commonly called the distant-gilled lactarius. The gills are white to buff, very distant and partially extending down the stalk (resembling a hygrophorus).

The 1½-4 inch cap is convex, depressed in age, dry, azonate and velvety in appearance colored yellowish-tawny to brownish-orange. The very brittle, thick flesh is pale and unchanging when bruised. The copious, white latex does not change. The stipe is ½-2½ inches long, ¼-½ inch thick, equal, without hairs, and the same color as the cap. L. hygrophoroides has white spores, 7-10 x 6-7u, globose to broadly ellipsoid, coarsely reticulate. Single to gregarious, it grows on humus in woods of broad-leaved trees, especially in open areas and edges of clearings in the Eastern U.S., July to September.

All sources consider this to be edible and good. According to Greta Turchick, this species ranks at the top of her list alongside the morel. She suggests trying it raw with a touch of salt. No other source suggests eating a Lactarius raw. Greta's two favorite ways to prepare are the following: 1. Wash lightly, slice and fry in very light safflower oil. It browns easily. Stir in a little salt & garlic. 2. Separate caps from stems, dip caps in

flour and fry like a cutlet. Greta states that this mushroom should not be boiled - ever - as it then tastes like clay. To preserve, fry and freeze; to use, reheat or eat cold. Upon frying there is almost no shrinkage.

Thanks to Bob Peabody, Greta Turchick & Neal MacDonald for help with this page.



Lactarius hygrophoroides

MELZER'S REAGENT by Dave Paterson

Melzer's reagent is difficult to obtain but it is really more important as a concept than as a practical field aid. It permits one to commence bridging the gap between Kauffman and Miller. In many cases it enables one to grasp the reasoning behind the generic changes that have occurred since Kauffman. It is one of the windows through which one may perceive the new vistas which are developing on the mycological horizon.

Melzer's reagent is prepared by mixing four substances together. In parts by weight they are: water, 20; potassium iodide, 1.5; iodine, 0.5; chloral hydrate, 20. Unfortunately chloral hydrate is a dangerous and controlled chemical which has been used as a nerve sedative and soporific (sleep inducer). It is commonly known as a Mickey Finn (knockout drops). Film buffs will recall numerous Warner melodramas of the 30's in which the hero was slipped a mickey in his drink. It was undoubtedly the potion that Sydney Greenstreet used to send Bogey bye-bye in their second encounter scene from *The Maltese Falcon*. The Broadway actress and cinema beauty, Jeanne Eagels, died from an overdose of chloral hydrate in 1929.

If Melzer's reagent is added to mushroom spores, one of the following changes will be observed:

- A. The spores will turn blue-black; this is called AMYLOID
- B. The spores will turn reddish-brown; this is called DEXTRINOID
- C. The spores will not change color (or only discolored by reagent); this is called NON-AMYLOID.

Those who recall their High School chemistry will note a similarity with the Litmus test: change to red; change to blue. Use the following as mnemonics (memory aids): ever notice that kids named Dexter (for dextrinoid) seem to have red hair; imagine that a person named Emil or Emile (for amyloid) tripped over a mushroom and was bruised black and blue.

The more important applications for generic separations based mainly on spore reactions to Melzer's reagent follow:

Amanita: This genus is divided into amyloid and non-amyloid species
amyloid: abrupta, atkinsoniana, bisporigera, brunnescens, chlorinosma, cinereoconia, cinereopannosa, citrina, cokeri, excelsa, flavoconia, flavorubescens, onusta, peckiana, phalloides, polyramis, porphyria, ravenellii, rubescens, spissa, virosa

non-amyloid: caesaria, cothurnata, farinosa, frostiana, fulva, gemmata, inaurata, muscaria, parvicolvata, spreata, vaginata, wellsii.

Cantharellus is non-amyloid; Cantharellula is amyloid; Hygrophoropsis is dextrinoid.

Chroogomphus is amyloid on the stem mycelium; Gomphidius is non-amyloid on the stem mycelium.

Cystoderma: amianthinum is amyloid; cinnabarinum is non-amyloid.

Mycena species are mostly amyloid; Marasmius is non-amyloid.

Omphalina is non-amyloid; Xeromphalina is amyloid.

Melzers Cont.

Lentinus is non-amyloid; Lentinellus is amyloid.
Panus is non-amyloid; Panellus is amyloid.

<u>AMYLOID</u>	<u>DEXTRINOID</u>	<u>NON-AMYLOID</u>
Amanita (above)	Hygrophoropsis	Amanita (above)
Cantharellula	Lepiota (most)	Cantharellus
Chroogomphus (above)	Leucoagaricus	Clitocybe (most)
Cystoderma (above)	Leucocoprinus	Collybia
Lactarius		Craterellus
Lentinellus		Cystoderma (above)
Leucopaxillus		Flammulina
Melanoleuca		Gomphidius (above)
Mycena (most)		Hygrophorus
Panellus		Laccaria
Russula		Lentinus
Xeromphalina		Limacella
		Marasmius
		Omphalina
		Oudemansiella
		Panus
		Pleurotus
		Tricholoma (most)

Although this is an important reagent, it will never become as popular as those three other reagents cherished by mushroomers: salt, pepper and butter.

WELCOME NEW MEMBERS

Frank Tomaini
 Wayne Michaelchuck
 Wm. & Sallie Pitt
 Frances Neal
 Al & Wanda Wills

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MEETING NOTES cont.

Thanks to Bill Rokicki, John Durkota, Hiram Korn, Jim Richards, Bob Peabody and Greta Turchick for donating the mushrooms, as well as the chefs who contributed 4-5 lbs. of imported morels and other ingredients.

The chefs have tentatively committed themselves to a repeat performance in the fall with fresh mushrooms. They have also promised to give us recipes, which will be published in a future newsletter.

My tummy told me it was the best meeting I ever attended. I'm sure everyone in attendance would give "our compliments to the chefs".