

# Missouri Mycological Society Newsletter

September 1988

## Fall Forays

Sunday Oct. 8th 10:30 am meet in the parking lot at the Missouri AAA office 12901 North Forty Dr. in St. Louis County. It is just north of U.S. 40 and visible from the highway. Either the Mason or Woods Mill exit; I forget which. With luck, there will be many *Suillus* under the white pines in this office park. This is not far from Babler and other collecting spots.

Saturday Oct. 15 at the Newt & Ruth Foster farm, Rt 1 Box 54, Harrison Arkansas (501)741-3139. From Springfield, take Hwy 65 south to Harrison; take Hwy 7 south towards Dogpatch, turn right on Hwy 206, four miles to Foster's mailbox on Left. Turn left at mailbox follow road three miles to farm.

Jay Justice will lead a morning foray from 10-12; Ken Olson will join in the afternoon; second foray at 1:30.

Katy River trail celebration Sunday, Oct. 16th at Missouri River City. From Columbia, take I-70 west to Rocheport exit (marked Hwy BB). Go south (not BB) and it should be right across the Interstate. From noon til 5, but I will need help setting up so if you have mushrooms, be there by 11:30. Admission: \$1.00. Bring a card table, lawn chair, mushroom books, and fresh mushrooms. If you can't spend time at the event, but were able to pick mushrooms beforehand, bring them by. We will try to identify there, if need be. Phil will foray on Oct. 15th; if you want to join, get in touch, or foray on your own.

Sunday Oct. 30th. St. Joe State Park (west of US 67 between Flat River & Farmington). Walt Sundberg, mycologist. Meet at 10:30 at the equestrian staging area just off "B" Hwy just east of the intersection with Primville Rd. Road to park is marked on US 67 just north of "W" Hwy in Farmington, or you can take "W" to "B." This is the state's 2d largest park; while a large portion is mine tailings used by ORVs, there are also mixed hardwoods, pines, and prairie. This is our first foray in Southeast Missouri. For a map, write St. Joe State Park, Rt 1 Box 308, Elvins MO 63601.

## Mushroom Potluck

Phil has been too busy to schedule this event; better luck next year.

## Ag Field Day - Shiitake!

Oct. 14, Wurdack Field Day, Cook Station (19 miles E. of Salem). Tours on a number of topics, including *shiitake*. Contact your local UMC extension for detailed instructions. (courtesy Lynda Richards)

## NAMA Foray

Was held in Northeastern Minnesota in August. Leland von Behren and Lynda Richards went. Lynda sent me a postcard with amanitas and reported seeing some big fly amanitas.

Will be held near Carbondale Oct. 19-22, 1989. Mark your calendars; you will probably never be so close to it again! Can you see yourself as one of 250 mushroom hunters, beating the woods? Listening to our few remaining alpha-experts? Some volunteers will be needed, but more on that next summer.

Remember that NAMA members get a discount for the foray and that local members get a discount in joining NAMA. Your NAMA dues should have reached Phil by Dec. 15th. See next newsletter for more details

## *A. theirsii?*

Phil Roos picked mushrooms last July after heavy rain in hot weather on lawns. Last year, he mis-identified them as *Lepiotas*. This August, after not keying it out in any book, Phil sent two dried specimens to Ken Olson. Ken identified it as an *Amanita*, probably *thiersii*. The spores are amyloid and almost round. There is a picture in Smith & Weber's *Southern Mushrooms*. It is a large mushroom, covered all over (stem & cap) with floccose material, sort of mealy stuff that comes off on your hands or whatever. Free gills, white spores, no cup, not striate. Large, up to 9" tall and 6" wide. If anyone with a camera finds one, take a picture. Apparently, it has previously not been reported this far north. Edible, though less tasty than a meadow mushroom.

## Plases!!

If you go on a foray, let Phil hear from you so he can put your finds in the Newsletter.

If your name or address are incorrect or missing please let Phil know so he can correct it. (Out-of-state and missing members not included on regionally-ordered list.)

## Species List

The only response received from last newsletter's request on species lists comes from Bruce Brock. He suggests that the data base should include the following:

- Genus;
- Species;
- Date collected;
- Locale, in detail;
- General area and host if any - e.g., south side of hill on dead elm;
- Local common name;
- Identification determined by: (e.g., keys, macro, micro, spore color or shape, chemical test);
- Collected by;
- Confirmed by;
- Photographed?

This is a lot to ask since most of you are not sending me your identifications at all. (However, my computer can handle it easily.) So please, send in your mushroom IDs and lets hear some more about what you want on the data base.

## Buddy Samuels Reports

that her husband came home with 40x20x15 cm *Laetoporus Sulphureus* (sulphur shelf) bleached to a creamy white and marvelously branched. The very dry specimen became, minus the lady bug colony and ants, a lovely accent to a plant arrangement.

## ALPHA-BETA MYCOLOGISTS

by Ron Petersen

There was a time when a good mechanic could diagnose your car problem with

his sense. He looked at the exhaust -- white or black? Felt the oil -- water in it or not? Listened to the rhythm of the engine -- smooth or rough? Smelled the points and plugs -- charred or clean? These days, he plugs the engine into a computer, twists some dials, peers at oscilloscopes, and renders a diagnosis through a layer of electronics. We sell more and more cars with more and more complicated engines costing more and more to repair, and some of us long for the '52 Ford (My first was a '41 Hudson. Nothing frilly and built like a tank.)

Most folks who will read this piece want mushroom identification like a '52 Ford. Uncomplicated. Nothing sophisticated. Hold it in my hand. Touch, smell, taste, scrutinize, (probably not listen, unless its to the advice of some guy who knows better) and call it by name. If that process also reveals whether it is edible or not, so much the better.

But while I might think that simpler is better in automobile maintenance, there is also medicine. Not so long ago diagnosis was pretty sensate -- pulse, blood pressure, tongue color -- and remedy pretty simple -- bleed, sweat, amputate. I may be sorry I can't replace my carburetor anymore, but I'm sure glad that CAT-scans, coronary bypasses and EKGs have been invented.

And like it or not, mushroom identification is going the same way. Given innate human curiosity, some scientists are not going to be satisfied by merely separating this mushroom from that mushroom. After all, this one is white and that one is green. But they will ask troublesome questions, such as *why* is this one white and that one green? Which leads to more. What is greenness and what is whiteness? Do these mushrooms inherit greenness of is it caused by something they are feeding on? And on and on.

Over the years taxonomists (the folks who classify things) have come to understand that there are at least two methods to pursue the identity (or more simply, the name), in the case of most living creatures, fungi among them. They are known as alpha-taxonomy and beta-taxonomy and everything you have read so far was written so that I would not lose you over what comes next.

A mycological alpha taxonomist uses his/her senses to arrive at an adequate (not perfect) identification of a mushroom. Usually the senses are stretched to allow for a microscope, but that's about it. Some argue

that macrochemical reactions - dropping chemical solutions on the fruit body to see if there are changes -- also should be in the alpha category, but others say no. So alpha-taxonomists look, smell, taste, feel, write keys and descriptions, take pictures, and give alpha-lectures that most people understand because they are about whole mushrooms, or at least pieces of mushrooms anyone can see through a microscope. Moreover, alpha-taxonomists are the professionals who are invited to forays year after year -- food and lodging paid -- to share their wisdom with folks of like mind but less experience. Because virtually all amateurs are alphas, they get most of their pleasure and benefit (in that order) from professional alphas and that the breed may go extinct is meat for another article.

But never satisfied, mycologists insist on probing deeper. Recently, for instance, Oswald Hilber in Germany and Dave Largent in California confronted with mushrooms which smelled of "coal tar," ground up the fruit-bodies, chemically extracted the slurry, and ran the smell part through a gas chromatograph. Result, we now know what chemicals cause the odor. Does this help us to identify the mushroom? Not now, but if we find a mimic, a look-alike, the chemistry may help. More important, we have a handle on this odor. Will all coal-tar odors be caused by the same compounds?

What Hilber and Largent did was beta-taxonomy; the interposition of technology between the mushroom and the mycologist. Another example: it is possible to hook up a microscope, a TV, and computer to select spores automatically, measure them, and display statistics from the measurements. Beta-taxonomy.

Beta-taxonomy uses the techniques of such disciplines as genetics, biochemistry, electron microscopy, and physiology to describe the mushrooms around us more accurately. But do we need such data merely to identify our afternoon gatherings? Maybe we do and maybe we don't, but we don't seem to be satisfied unless we are constantly probing for more information, even if we don't use it. We climb the taxonomic Mt. Everest because it is there.

Ah, but there is more. The use of beta techniques for taxonomic purposes stems from two basic questions: What is a species? Why is it so?

The first question has plagued biologists for a couple hundred years. A caul-

dron of controversy about Darwin, evolution, and divine creation, for openers, boil down to two present-day philosophical answers.

Philosophy one: a species is what a competent taxonomist says it is. No joke intended. Such an idea depends both on the organism involved (Can they be separated taxonomically?) and the responsibility of the taxonomist. This "alpha" viewpoint is the one we are used to.

Philosophy two: if two organisms can mate and produce viable offspring, they are of one species. Of course, we must sample sufficiently. It won't do to try it once and happen to have picked two females, which we judge to be of two species because they don't produce offspring.

These two philosophies represent two different species concepts: morphological species separated by their forms and shaped (a very "alpha" idea) and biological species which must be tested biologically before taxonomic judgement is made (definitely "beta").

Mycologists of the biological species philosophy must grow, mate, macerate, and otherwise tamper with mushrooms in their pursuit of scientific truth. The equipment and laboratories necessary for such work are sophisticated and hardly available at forays. Beta shop talk often bores the alphas around them. With few notable exceptions, therefore, betas are not invited to outings. Their loss. But their influence is felt nonetheless, usually because they interact with the professional alphas, muddying what formerly were pristine, primeval clear waters and sullyng virginal minds with agnostic complications.

The devil must be given his due. Thinking alphas listen, struggle to comprehend, and incorporate these beat ideas into their taxonomic conclusions -- for good reasons. Undergirding the beta-taxonomist is the following line of logic: We can all agree that the essence of a species (that which separates it from all others) should be dictated by its genes. Those traits should be genetic or inevitable and ought not to be subject to capricious change. The green mushroom should not be white when it grows under pines instead of hemlocks. It stands to reason, then that the closer we probe toward the very genes of a mushroom, the closer we get to an idea of "speciesness," its unique species traits.

Like books and their covers, a whole mushroom held in the hand or even

squashed under a microscope cannot reveal much about its genes. So, the folklore goes, alpha-taxonomists must do a pretty superficial job. Most alphas would probably agree, but time, training, personality, and the enormity of the task do not permit a careful beta-level examination of every mushroom species. We'd be at it forever, and we don't have that long. Charles Horton Peck, George Atkinson, Alex Smith, and their illustrious ilk felt comfortable in a scientific community in which alpha was the only taxonomy, but times have changed.

Well, what kinds of studies get closer to the genes of mushrooms? First, when possible, mushrooms can be grown in the laboratory, usually not as mushrooms but as moldy-looking mycelium, and the mycelium mated with that of other strains in the same complex. Such experiments sometimes produce surprising results.

Now and then cultures from mushrooms indistinguishable by Alpha observations will not mate. And rarely cultures of mushrooms long thought to be different species prove perfectly compatible. In such situations alpha judgement must be questioned and debated. Such controversy creeps into mycological gathering to confound us time and again. "Jack-O-Lantern" mushrooms are a case in point. One species or several? Orson Miller tells us that although they are easily separated on the alpha level, they are infertile throughout Europe and North America, so are assumed to belong to a single biological species.

Next might come the biochemical identifications of interesting chemical compounds like those coal-tar odors. Pigments have become prime targets. Are all green mushroom colors the same whether *Russula*, *Clitocybe*, or *Stropharia*? Are the orange chanterelle pigments related to the orange of the "Jack-O-Lanterns?" Many other compounds are also under investigation, including *Lactarius* milk constituents, peppery-tasting substances, the green and blue-staining compounds. Much of this work is being done in Europe.

Other targeted compounds are proteins and amino acids, perhaps only one or two steps removed from genes. Most studies deal with enzymes (one kind of protein) and small proteins found inside cells. Techniques are pretty sophisticated: grow the organism in the laboratory, grind it up and extract only the interesting proteins, subject them to an electric charge across the gel

layer, strain them, and compare those on one strain with those of another. The technique is called electrophoresis, and youngsters like Steve Rehner and Rytas Vilgalys will be telling us all about their findings and day now. Nonetheless, it does not seem destined to galvanize the pot-hunters of most mushroom clubs.

Finally the genes themselves. Genes are incorporated in that complex molecule DNA, deoxyribonucleic acid. The DNA itself can be split and the fragments of the various strains matched to test their similarity. Slow, expensive, and complicated. But thanks to Jim Anderson, Bob Ullrich, and others, now we know that the "Honey mushroom" (the single morphological species *Armillaria mellea*) comprises at least eight biological species.

So where does all this lead? For biologists of the late 20th century, alpha-taxonomy has the look and feel of an antiquated art like alchemy, not the glitz and dazzle of the cutting edge of research. It is not widely considered an important and glamorous field of scientific activity, and the number of institutions that grant Ph.D. degrees in it can be counted on one hand. As our alphas retire or die, they are being replaced, if at all, by beta-level mycologists. Beta-level science commands more grant and contract money so it is more attractive to government and university programs.

Within twenty years our country may no longer have enough alpha workers to put a name on a mushroom intelligently, even though we may have many mycologists who can expound on proteins, DNA, sexuality, and the like. In no way can one deny the importance of beta work. It is not only efficacious but fascinating. Its results, of course, will be meaningless if its practitioners cannot accurately name the fungi with which they work. That will put mycological research in jeopardy. I am told that the same situation occurs in spiders, fish, and other organism groups. It will also mean that forays will have to call on the same aging, wizened, withered alpha professionals to serve as "authorities." We had better not tire of one another.

[Reprinted from *Micllvania*, 1987 via *Arkansas Fungi*. Ron Petersen is at Botany Dept, U. of Tennessee, Knoxville.]

(Phil's response next newsletter.)