

# Trends (or Fads) in Mycology

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Many years ago, during my day job as a diagnostic pathologist, I penned an editorial about the current trends and fads in this field of medicine (Benjamin, 1989). Turns out that diagnosing a tumor and giving it a label is similar to identifying a mushroom. Not surprisingly the process is almost identical. Both are ephemeral human constructs: ideas and myths that we share with each in order to communicate, without much reality in nature. They all change over time as we learn more. Our classification systems are imperfect. We know that the Linnaean system is not well suited to fungi or for the microbial world in general. In part this is due to our hazy definition of a species. There are almost as many ways of defining a species as there are opinions. The concept itself is a moving target. The problem of naming “new” mushrooms was well illustrated by Dr. Money in a recent commentary (Money, 2013). He even recommended that simple numeric tags be used for new collections, while placing them in a higher taxonomic rank for which there was reasonable phylogenetic evidence.

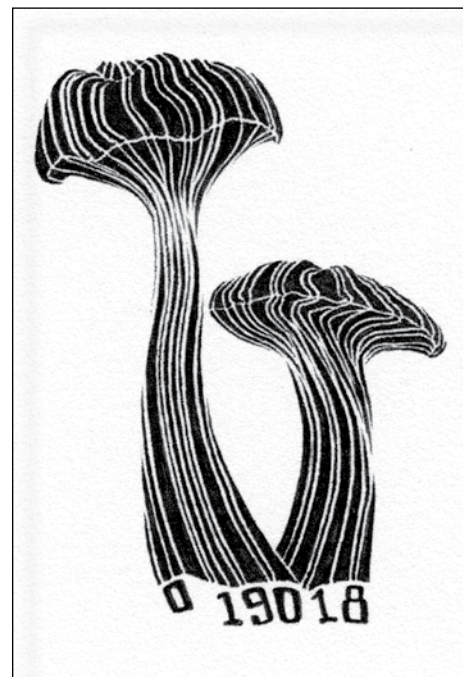
Here is a human pathology analogy. In almost all our tissues are fibroblasts, cells which manufacture the fibers that hold us together. Occasionally they form tumors. One group is clearly malignant—left alone they will eventually metastasize and kill. Another group is benign—simple removal is curative. A third family is locally aggressive—they do not spread, but if not adequately excised with a generous margin of healthy tissue they will recur and invade the local tissues and organs. Within each of these families are numerous specific entities (“species”), all with different names. Some are specific to a location, some to the age of the patient, some have characteristic microscopic features and all are genetically distinct. And here comes the philosophy. For those few of us that are lumpers, placing the tumor in the right

family is what is needed. It is what the patient and surgeon care about. Others, “splitters,” persevere for days until they can apply the currently “correct” name. Both the lumpers and the splitters usually reach the same outcome, but the second takes a lot more time, study, additional tests, (such as stains, electron microscopy, enzyme histochemistry, immunohistochemistry, DNA hybridization, gene sequencing, etc.), and increased cost. From the patient’s standpoint neither one is more “right” than the other. The lumpers are pragmatic, the splitters are academic. By the way the word academic has been defined as “very learned, but unable to cope with the world of practical reality.” This is not intended to be pejorative—after all, I spent most of my career in academics. Another way to express these philosophical differences is that the splitters are categorizers, while the lumpers are synthesizers (Mukerjee, 2016).

So how does this translate to mycology? In the beginning we used our eyes—gross morphology—to classify fungi. Then along came the microscope and some criteria for classification were refined. Next arrived various and sundry chemical tests as well as stains, followed by transmission and scanning electron microscopy. Each added snippets of new knowledge and understanding. The latest trend is analyzing gene fragments, such as the ITS sequence of ribosomal RNA, and making assumptions about relatedness or organisms and evolutionary pathways. None of this will solve the dilemmas the way the acolytes of the new technology envisage. Sampling a tiny fragment of a genome is fraught with its own issues (Kiss, 2012), and yet the term “barcoding” is being accepted as sacred. We are adding little pieces to the biologic puzzle—a functional approach here, a structural protein there, a messenger RNA, a receptor molecule, a piece of a gene, all within an organism of unique appearance, precisely located and adapted to a specific ecosystem. All

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we are doing is looking at the same unit from a new vantage point with a new technique. There is a wise old adage that says, "To be successful (not necessarily creative), if you don't have a new idea, use a new tool." It will contribute enormously to our basic understanding of mycology and no one would deny its importance. But I would not be willing to discard our vision, naked or aided with a microscope. Next will come full gene sequencing and then proteomics and then ... ?

Personally, I like the idea of species complexes. There are those who do care about the number of cryptic species, as they may be important for broad ecological and biodiversity studies. But carried to its logical conclusion, every organism will prove to be genetically unique.

Most amateur mycologists are rightfully perplexed by this new science. Very few understand the complexities of genetics.

Latin binomials are changing as often as some change underwear, so there has been a revival in common names. I am not suggesting a return to the simplest form of classification—edible, poisonous, we don't care—but at the same time we should not be coercive with new names for common well known entities. Most amateur mycologists don't care which morel they are consuming. Even if they did, chances are its name will be changed next season. And to be clear, these and future genetic studies are important. But they are mere way-stations to better understanding, not an end-game.

It is well to keep in mind the comment at the start of the Human Genome Project. Norton Zinder, the chairman of the committee, said, "Today we begin. We are initiating an unending study of human biology. Whatever it is going to be, it will be an adventure, a priceless endeavor.

And when it is done, someone else will sit down and say, "It's time to begin." (Mukerjee, 2016).

### References Cited

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## Peaceful Screams

the beautiful  
drooping bugle  
of foxglove

calls reveille  
to beavers  
gnaw red alders

the molting crow  
drops a feather  
while azalea

perfumes the canyon  
the fossilized moon  
is a roving totem

born to know  
every detail  
of earth's shadow

overnight a chanterelle  
pushes through  
a century of duff

raindrops gather  
to leap the falls  
as a group

a bundle of gnawn  
sticks looks good  
beside the fireplace

Ken Letko – California