Newsletter of the North American Mycological Association

THE MYCOPHILE

VOLUME 53:5 SEPTEMBER-OCTOBER 2013 www.namyco.org

!!! NAMA ARKANSAS FORAY, October 24-27 !!!

Registration for the 2013 NAMA foray has been increasing in the months following the first announcements in *The Mycophile* and on our NAMA website http:/namyco.org/events/NAMA2013/index 2013.html. Currently most of the deluxe rooms have been taken, although there are quite a number of single beds still available. So that means its time to stop procrastinating, and to get your registration and waiver forms in before it's too late!

Word on the street and in the fields is that this first ever NAMA foray in the fertile Ozark mountain forests of Arkansas is taking on the appearance of becoming a super-charged event and a shindig that you will regret missing if you don't sign up for it quickly, before all the beds are taken. Looking at the line-up of the myco-luminaries on the list of participating mycologists, I understand why folks are excited about wanting to be part of this historic foray. To entice you to join us, we have a stellar faculty to help us identify our finds and to enlighten us about their current mycological interests. They include none other than Clark Ovrebo, Alan Bessette, Arleen Bessette, Andy Methven, Michael Kuo, Britt Bunyard, Tom Volk, Rosanne Healy, Jean Lodge, Walt Sturgeon and David Lewis.

The potential is great that some new fungal species previously unknown to science will be found at this foray. The last weekend in October offers an excellent opportunity for more of my fellow mycologists to come to Arkansas to see if they can find and collect a new mushroom or fungus that is currently undescribed. I know you will enjoy collecting the mushrooms as well as all of the other events that make a NAMA foray an unique learning and social experience.

So y'all come on down or up or sideways, from wherever you abide, and join me in the Natural State for the forthcoming fun, fungi and frivolity that will transpire the last weekend in October at the Shepard of the Ozarks conference center.

Jay Justice

IN THIS ISSUE

FORAYS & OTHER EVENTS

This section of The Mycophile is reserved for publicizing the annual forays of NAMA affiliated clubs and other events you may be interested in learning about. If you would like us to list your club's next big event, contact us with details you would like displayed here and send to the editor dianna.smith@comcast.net. See also http:/namyco.org/events/index.html.

September 6-8: ***The New River Valley Mushroom Club*** in conjunction with the ***Mycological Association of Washington (MAW)*** has an event at Mountain Lake, VA.

Eagle Hill Institute: **Mycology Workshops in Maine**, PO Box 9, 59 Eagle Hill Road, Steuben ME 04680. (office@eaglehill.us, www.eaglehill.us)
September 8-14: **Boletes of North America: A Field Seminar and Workshop** with Alan E. Bessette and Arleen R. Bessette.

September 12-15: ***Wildacres Regional Foray*** in the Blue Ridge Mountains of North Carolina.

September 21: ***Western Pennsylvaia Mycological Club Gary Lincoff Foray*** - North Park - 8 am. There is still time to register. See Lincoff-Foray@wpamushroomclub.org.

October 3-6: The ***Missouri Mycological Society (MOMS)*** invites you to their Annual Fall Foray at Mingo Wildlife Refuge in southeastern Missouri. See www.MoMyco.org for more information.

October 24-27: ***Arkansas Mycological Society*** hosts the **2013 NAMA FORAY**. Registration and waiver forms can be found at http://www.namyco.org/events/NAMA 2013/index2013.html. (Note: Membership in NAMA is required to attend NAMA forays. To become a member, please see http://www.namyco.org/join/index.html).

January 24-26, 2014: The fifth biannual ***All California Club Foray (ACCF)*** will be held in January 2014 in Albion, California. Chief mycologist, Dr. Terry Henkel, and grad students from Humboldt State University will assist with taxonomy. This event includes catered meals, comfy lodging, and mushroom hunts in the bountiful Jackson Demonstration State Forest near Mendocino. This foray is open to any current member of a California mushroom club and NAMA members. Cost is $175 per person and includes two nights lodging and all meals from Friday evening through Sunday breakfast. Pre-registration is required. Registration and detailed information can be found at: http://bayareamushrooms.org/forays/accf_2014.html

The Glinting Orange Ganoderma

by William Needham of the Mycological Association of Washington

The striking colors and varnished appearance of *Ganoderma* make it an attractive mushroom to display at home. *(Photo by William Needham)*

Common Name: Varnish shelf, Hemlock polypore, **Ling zhi** or **Ling chi** (Chinese), **Reishi** (Japanese).
The laccate upper surface of the pileus (cap) has the sheen of varnished wood; its lateral single point attachment juts from the tree bole like a shelf.

Scientific Name: *Ganoderma tsugae*
The generic name is a combination of the Greek *ganos*, meaning 'brightness' and *derma*, meaning 'skin' in reference to the glinting surface, or skin, of the fungus. The genus of hemlock trees is *Tsuga*; the fungus is most frequently found on a hemlock host. *Ganoderma lucidum* is essentially identical in appearance and grows on deciduous trees; *lucidum* is Latin for 'full of light, clear, bright' – an additional reference to the lacquered semi-circular cap, or basidiocarp.

(***Ganoderma tsugae*** by William Needham)
The iridescent glow of this burnt orange bracket fungus evokes a numinous provenance that distinguishes it from its more mundane polypore cousins. It undoubtedly caught the eye of the earliest hominids who may have originally used it as an adornment to their environs; it is collected to this day for its natural beauty. Its mystical appearance as an excrescence on a tree bole prior to the advent of the understanding of the scientific age may also have led to its association with local divinities, a sylvan gift from the gods. It is too tough to eat, but it can be readily ground up for consumption; it has been in use in China as a medicinal tea for millennia. It was listed in *Shen Nong Ben Cao Jing*, which is one of the earliest Chinese herbal texts, and dates to the Eastern Han Dynasty (25 – 220 CE). Paul Stamets in *Mycelium Running* notes that "the earliest mention of ling chi occurred in the era of the first emperor of China, Shih-huang of the Ch'in Dynasty (221 – 207 BCE)."

Ganoderma is "probably the most morphologically complex genus of polypores" according to Chang and Miles in *Mushrooms: Cultivation, Nutritional Value, Medicinal Effect and Environmental Impact*. Over 250 separate species have been identified; the taxonomy is based on significant variability in both microscopic and macroscopic physical characteristics. The proliferation of names is attributable at least in part to the global geographical distribution of the fungus and to its extensive use as an herbal medicine. The advent of DNA analyses has resulted in a significant reorganization of the original fungal taxonomy of Linnaeus. A phylogenetic study of the *Ganoderma* genus based on mitochondrial DNA published in the publication *Mycologia* in 2004 found that the 250+ species were in actuality only 6 monophyletic (from a single parent) groups. It is notable that strains of *G. tsugae* and *G. lucidum* from both North America and Europe were found to be in the same grouping. However, strains of *G. lucidum* from Korea and Japan were identical to each other, but different from the strains of *G. lucidum* from Europe and North America. The study concluded that "*G. lucidum*, the most cosmopolitan member of the *Ganoderma*, was polyphyletic according to geographical origins." This may have some significant implications for the burgeoning market for *Ganoderma* products. A study conducted by the Taiwanese Biotechnology Research and Development Institute in 2002 found that Ganoderma products were the highest volume product in their health food market and that the most widely used raw material was *G. tsugae*. The estimated annual production of the more reliable Asian *G. lucidum* was 4300 Metric Tons (MT) in 1997 (3000 MT in China alone) with a market value of about $1.6B.

One of the primary defining taxonomic aspects of the *Ganoderma* genus is the presence of thick double-walled spores called chlamydospores (*chlamys* is Greek for 'mantle' – a protective cover). These spores are highly protective against environmental extremes and help explain the global proliferation of the fungal genus. *Ganoderma* fungi, once grown from the chlamydospores, consist of corky, thick fruiting bodies that grow on hardwoods or conifers according to the species; they are in all cases a white rot, wood decay saprobe. A saprobe derives its nutrition from dead plants - fungi that live on live plants are parasitic or mycorrhizal. This is not to say that they are benign, as they can also infect live trees.

According to Bryce Kendrick in The Fifth Kingdom "*Ganoderma* may not kill trees, but they cause serious decays of both standing and structural timber. These rots cost us many millions of dollars every year." There are white rot fungi and brown rot fungi; the color distinction refers to what they don't consume rather than what they do. In other words, white rot fungi consume the brown lignin (and some but not all of the white cellulose) so that the resultant decayed mass is white in color. Conversely, brown rot fungi consume only the white cellulose so the end result is brown.

The use of *G. lucidum* and *G. tsugae* in China from the dawn of prehistory with purported benefits to health, life and longevity has resulted in the attribution of preternatural powers to the fungi. The word '*ling*' in Chinese translates into something like 'spiritual, miraculous, and/or divine' and conveys a notion of its efficacy and provenance. This has been exaggerated in the English rendition to everything from 'mushroom of immortality' to 'magic fungus.' From China, the beneficence of *Ganoderma* spread to the rest of Asia; in Japan, it is called either *reishi*, which means something like 'auspicious plant' or 'immortality plant,' or mannentake, which translates to '10,000 year mushroom' The extensive history of the use of *Ganoderma* as part of a long-term health regimen and the vast body of fervent, though hearsay, testimonials by its users establishes at least the likelihood of a modicum of truth to its purported life extending properties.

Assays of *G. lucidum* and *G. tsugae* over the past half century have revealed that they contain a virtual pharmacological cornucopia of potentially beneficial chemical compounds. Over 150 triterpenes and 50 polysaccharides have been identified as being uniquely derived from this fungal group starting from the first isolation of Ganoderic acids A and B in 1984 (these numbers vary according to the source - Stamets lists 119 triterpenes and 100 polysaccharides in Mycelium Running). Triterpenes are precursors to steroids in both plants and animals and very generally have cytotoxic (cell killing), liver protecting and lipid lowering effects. Polysaccharides are much more generic, consisting of long chains of carbohydrate molecules such as cellulose and chitin. In the case of the *Ganoderma* fungi, the polysaccharides are found to be carcinostatic; they inhibit the growth of cancerous tumors. Laboratory studies of the compounds that can be derived from *Ganoderma* fungi and their effects on a wide-range of medical problems are legion and on-going. Anti-tumor behavior has been demonstrated in ganoderic acids T, V, W, X, Y and Z, a property that is attributed to the stimulation of the body's own production of lymphocytes as opposed to a direct effect. Ganodermic acid S inhibits the aggregation of platelets and could thus be beneficial as an anti-clotting agent to prevent embolism-induced strokes. In what may also be related to coagulation, Ganoderma acid F acts to lower blood pressure. Several derivatives including Ganoderic acids R and S and Ganosporeric acid A have been shown to improve liver function, a finding that supports the traditional Chinese use of *G. lucidum* to treat hepatitis. According to Chang and Miles in Mushroom, *Ganoderma* fungi were used in traditional Chinese medicine "to improve intellectual capacity and memory, to promote agility, to lengthen life span, and to relieve hepatopathy, nephritis, hyperlipemia, arthritis, asthma, gastric ulcer, arteriosclerosis, leukemia, diabetes and anorexia." The 'mushroom of immortality' may in some ways be true to its

(***Ganoderma tsugae*** by William Needham)

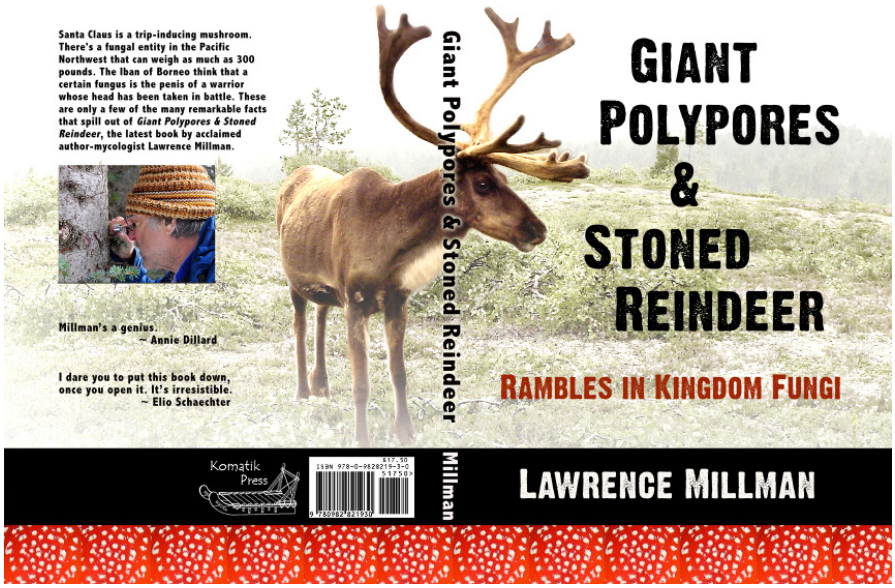
metaphor in promoting longevity, lending credence to (mostly Asian) health regimen of daily *Ganoderma* tea to offset the ravages of time and age. While there is certainly nothing inimical to this practice, a cautionary note is proffered: there is at this juncture a great deal of uncertainty concerning geographic origin and species. In addition, the chemical complexity of the various *Ganoderma* species is daunting and therefore attributing syllogistic relations to a specific disease is at this point dubious. An elixir perhaps, but a medicine no.

This article first appeared in the January 2013 edition of *The Potomac Sporophore* newsletter of the Mycological Association of Washington (MAW).

William Needham has been on the board of the Mycological Association of Washington DC for the last ten years, having served as Secretary, Program Chair and Newsletter Editor.

THE LARGEST GANODERMA IN THE WORLD

by Lawrence Millman
from his newly published book
Giant Polypores and Stoned Reindeer



Near Alexander Creek, Alaska, there's a birch tree with a very large *Ganoderma applanatum* growing on it. The size of the fruiting body is not two, three, or even four feet in diameter, but approximately a quarter of a mile in diameter. Or so the Susitna Dena'ina who live in Alexander Creek will tell you.

"A quarter of a mile?" I said to a Native man. "You expect me to believe that?"

"You don't have to believe it, but it's true," he replied.

Reputedly, the large *Ganoderma* in question -- which the Susitna Dena'ina call k'adatsa (big birch fungus) -- is gifted with magical powers. If you cut off a piece of it and carry it around with you, no harm will come to you. Or if you ignite a piece of it, the smoke will serve not only as a mosquito smudge, but also as a smudge against anyone to whom you owe money -- they won't be able to see you, either.

But you can't simply cut off a piece of the k'adatsa and walk away. You have to leave some sort of gift on its cap, maybe some unspent cartridges, maybe a recent copy of Alaska Sportsman, or maybe a few coins. If you don't leave anything, you'll spend the rest of your life wandering around aimlessly in the Alaska bush.

Needless to say, I was very interested in this oversize fungus, so I tried to get someone in the village of Alexander Creek (pop. 40) to take me to see it. Everyone seemed either too busy for such a lengthy expedition, which included a boat trip as well as an arduous hike, or they thought the k'adatsa might be invisible to a White Man. One man agreed to be my guide, but only if I paid him $5,000...in advance.

Finally, I had no choice but to play my trump card. *Ganoderma applanatum* is thought to be medicinal, especially in China, where it's apparently used to cure rheumatic tuberculosis and

(The Largest Ganoderma by Larry Millman)

esophageal cancer as well as to inhibit tumors. Indeed, Christopher Hobbs includes a reference to the Alexander Creek k'adatsa in his book *Medicinal Mushrooms*.

"I'm suffering from gout, incipient madness, tonsilitis, chronic cynicism, and tick-borne encephalitis," I told a potential guide. "A cup of tea from your k'adatsa may be my only hope."

I was directed to the Alaska Native Health Clinic down the street.

In the end, I had to be satisfied with a two foot *Ganoderma* growing on a stump just outside the village. One evening I visited it and, watching a storm of brown spores cascade from its underside, I thought: How remarkable!

(The book is available only from Komatik Press (P.O. Box 381582, Cambridge, MA 02238) for $20 postpaid or from Larry Millman at the following email address: <l.millman@comcast.net>)

LETTER TO THE EDITOR

There is a piece of misinformation in Bill Bakaitis' article which should be corrected, particularly for the benefit of NY State mushroomers. He writes "we are likely to see enforcement of the existing laws which prohibit the collection of even the 'fruits' (e.g. mushrooms) of forest products." Inasmuch as he is a New York resident and alludes to "the public land areas available in the Catskills and Adirondacks" he is no doubt referring to the laws of NY State. This information is outdated since the DEC conservation laws were altered, with little fanfare, in 2010 and now read "***190.8g. No person shall deface, remove, destroy or otherwise injure in any manner whatsoever any tree, flower, shrub, fern, fungi or other plant organisms, moss or other plant, rock, soil, fossil or mineral or object of archaeological or paleontological interest found or growing on State land, except for personal consumption or under permit from the Commissioner of Environmental Conservation and the Commissioner of Education, pursuant to section 233 of the Education Law***." (Emphasis mine.) This may be viewed on the DEC website at: http://www.dec.ny.gov/regs/4081.html. Previously, the wording was the same, only the underscored phrase having been added. This is clumsily written, but the intent is clear. Collecting mushrooms for "personal consumption" is permitted only all NYS DEC lands; although the phrase is vague, the parameters of personal consumption have not been quantified, and are therefore open to interpretation, which may someday be tested in court if applied too stringently. So far as I am aware, no citations have been issued for over-collecting. Whether this change in the law also applies to NYS parks is not established, and is a legal question on which I am not qualified to comment. However, in my experience, establishing good relations with local authorities of particular parks can go a long way to obtaining permission for reasonable collecting practices. (A permit to enter DEC property is needed only on Long Island.)

Joel Horman, LIMC

Lesser Lights of the Fungal World:
A Bioregional Approach to Medicinal Mushrooms

Robert Dale Rogers, RH (AHG)

The clinical use of medicinal mushrooms by herbalists is increasing each year, due in part to an excellent number of good books on the subject. *Medicinal Mushrooms* by fellow Guild member Christopher Hobbs remains a classic to this day (Hobbs 1995). Since that publication, the use of mushrooms for health and culinary purposes has sky-rocketed. Twenty years ago, *Agaricus bisporus* (button mushroom) was the one and only choice in supermarkets. Today a wide range of organic fruiting bodies are available, including variations of the button (crimini and portabella), *Pleurotus ostreatus* (oyster), *Flammulina velutipes* (enokitake), and *Lentinula edodes* (shiitake). In natural foods stores, the selection can be nothing short of amazing.

Where I live, in northern Canada, the summers are short, and my cultivation of mushrooms is restricted to one shiitake log on the balcony of my condominium. On the plus side, however, I live on the edge of the boreal forest and within an hour I can slip into wilderness where few people have ever walked. The mixture of poplar, birch, spruce, pine, and tamarack forests yield an abundance of medicinal mushrooms that can be collected and prepared as medicines for the long winter ahead. Here are three of my favorite but less well-known mushrooms with considerable health benefits.

***Ganoderma applanatum*,** Artist's Conk

Ganoderma applanatum (Artist's Conk) is a cousin of the more famous and well-researched *G. lucidum* (reishi). Artist's conk is a large polypore growing in northern Alberta on large mature Populus balsamifera (balsam poplar) trees. Throughout North America, artist's conk is found on a variety of hardwoods. They grow quite large and can weigh over 13.6 kg (30 pounds)! The record is 52 kg (almost 115 pounds), with a circumference of over three meters, found in the mountains of Kuiu Island, southeastern Alaska, in 1951.

I use tinctures of this polypore whenever reishi is indicated for a client. Studies have shown it effective as an analgesic, anti-bacterial, anti-inflammatory, anti-tumor, anti-viral, blood sugar modulator, immune tonic, respiratory tonic, and agent for eye health (Rogers 2011). In vitro studies suggest gram positive bacteria are more sensitive to this mushroom than gram negative (Smania 1999). Artist conk's protein and sugars significantly inhibit tumor growth and increased levels of natural killer cell activity (Yong-Tae Jeong 2008).

Dr. Ryan Drum, a noted AHG professional member, reported using decoctions of artist's conk for treating Hashimoto's thyroiditis. He recommends 12 ounces of cool tea daily for three

Robert Dale Rogers is a professional member of AHG. He teaches herbal studies at Grant MacEwan University and the Northern Star College of Mystical Studies in Edmonton, Alberta, Canada. Robert is an assistant clinical professor in family medicine at the University of Alberta, chair of the medicinal mushroom committee of the North American Mycological Association and serves on the editorial board of The International Journal of Medicinal Mushrooms. He has authored 14 books on bioregional plants and fungi. His latest is *The Fungal Pharmacy: The Complete Guide to Medicinal Mushrooms and Lichens of North America* (North Atlantic Books, 2011).

days; then a break and repeat. combining well with *Lycopus spp*. (bugleweed), or *Melissa officinalis* (lemon balm) for the former condition, and with *Rhodiola rosea* (rose root) and *Fucus vesiculosus* (bladderwrack) for the latter.

Like various *Ganoderma* species and a number of medicinal mushrooms, artist's conk is both anti-inflammatory and immune-modulating. In the biomedical model, anti-inflammatory drugs like cortisone and NSAIDS suppress the immune system. Such drugs may lead, over time, to auto-immune conditions, where the body becomes confused and attacks its own tissue. But medicinal mushrooms, including *Ganoderma* species, not only provide relief from inflammation and pain, but also inhibit interleukin-2 secretion, suggestive of immunomodulation. That is, they help bring homeostasis to the body. Therefore, think of this mushroom for rheumatoid arthritis, systemic lupus erythematosus, Guillain-Barré syndrome, or erythema etiologies. Furthermore, artist's conk and lemon balm make a great anti-viral combination for herpes simplex and herpes zoster, taken internally and used externally as a wash. Finally, my good friend and mushroom mentor, Martin Osis, decocts the conk as a footbath to relieve the pain of gout very quickly.

I like to gather the very young conks during the summer, or the soft, juicy new tissue forming an annular ring. Although larger conks may be just as potent, I prefer new growth for making teas or tinctures simply because they are easier to process. I have made tinctures from large specimens, and or planer to be a good friend indeed.

Decoctions are easy. Simply add 3–5 g of fresh conk to 500 mL of water. Simmer on low heat for up to two hours. The addition of Vitamin C appears to increase efficacy. I add 1 g of dried rosehips to this mixture; our local species *Rosa acicularis* contains 7.1% ascorbic acid, along with bioflavonoids and numerous other compounds. Therapeutic dosage is 150–250 mL, two to three times daily.

There are many theories, or opinions, on making a polypore tincture. Here is my preferred method, based on empirical evidence, and lots of trial and error:

Take one part by weight of finely chopped conk and cover with five parts by volume of 95% alcohol. For example, 100 g of material is covered with 500 mL of 198 proof Everclear. Let this sit for two weeks, shaking daily. Then strain and squeeze, preserving the marc. Take this well pressed material and make a 1:20 decoction at a slow simmer. Reduce volume by half, squeeze, strain and combine this decoction with the alcoholic preparation you made earlier. Bottle and label. Therapeutic dosage is 3–5 mL daily in divided doses.

Ganoderma applanatum
(Photo Courtesy of Robert Rogers)

How to Make a Polypore Tincture

The following instructions are for making a tincture from polypore mushrooms like reishi, artist's conk, or amadou.

---

1. Finely chop your fresh or dried polypore. For fresh, you may do this by hand; dried conks will probably require a band saw or planer.

---

2. To one part by weight of chopped polypore, add five parts by volume of 95% alcohol.

---

3. Seal tightly and let macerate for two weeks. Shake your mixture daily.

---

4. Strain and press out the marc*. Reserve the liquid.

---

5. Weigh the marc, place in a pot, and add 20 parts by volume of water. Decoct at a low simmer until reduced by half.

---

6. Strain and press. Discard the marc. Combine this decoction with the alcoholic extraction you completed in step 4.

---

7. Bottle and label.

---

*The term 'marc' refers to the residue that remains after the liquid is expressed.

***Fomes fomentarius*, Amadou**

Another favorite polypore of mine is *Fomes fomentarius* (amadou or false tinder conk). This perennial conk is hoof-shaped and hardened.

Remnants of this fungi date back to Mesolithic camps from 8000 BCE. Hippocrates called it mukes and used it in a manner similar to moxibustion for inflammation and even cauterization. In Slavic countries of Europe, the fruiting body has long been used for infection and inflammation of the gastrointestinal tract. It has been used in various incense mixtures to banish evil spirits and purify the residence of the deceased (Saar 1991). The Ainu of northern Japan smudged the conk for similar purposes.

In northern Alberta, the Cree powdered the conk, known as waskaskwitoy, and applied it to frostbitten flesh. They also cut strips and burned it on skin, as a counter-irritant to restore blood flow to area. They would use two of these clam-shaped conks as a vehicle for fire embers, which would smolder without smoke for many days of travel. The inedible polypores were possibly thrown into soups and stews to prevent spoilage and food poisoning (Stamets 2005). I believe valuable polysaccharides were released to help optimize immune function through the long, cold, and often brutal winters.

Oetzi, the famed Ice Man found on the exposed glacial slopes of the Alps in 1991, carried amadou's dissociated context hyphae as a fire starter. The name "false tinder conk" refers to this use, and this chamois-like material was soaked in dung water to make it ready to receive a spark. The context fiber is carved from the layer just under the surface, preferably from large, fresh specimens. The material is stretched and teased as it is cut, and large pieces can be obtained in this manner. This pliable "felt" is used in Romania and Hungary to manufacture hats, vests and purses, and is prized by fly fishermen for its soft, water repellent surface.

In China, the conk was boiled and tea taken for digestive stagnation, as well as cancers of the stomach, uterus and esophagus (Ying et al 1987). Traditional Chinese Medicine (TCM) uses conk decoctions to warm the lungs, reduce asthma and edema, and for other cold, damp conditions. In Japan, it is known as tsuriganetake and taken in tea form for colds, flu, bronchitis and general debility.

Alcohol extracts of amadou inhibit nitric oxide synthase (iNOS) and COX expression via down-regulation of NFkappaB, suggestive of anti- inflammatory and anti-tumor potential (Park et al 2004).

The presence of antibacterial, antiviral and antifungal activity in amadou has long been recorded (Brandt & Pirano 2000). A recent study (Seniuk et al 2011) looked at the water- soluble melanin-glucan complex (MCG) in Fomes fomentarius. In vitro, MCG completely depressed growth of *Candida albicans*. It showed antimicrobial effect on Helicobacter pylori identical to erythromycin at all concentrations. High anti-HIV-1 activity, along with weak toxicity against blood cells, make it a great adjunct therapy for these difficult infectious pathologies. Work by Suay et al (2000) showed amadou's inhibition of two opportunistic bacteria, *Pseudomonas aeruginosa* and *Serratia marcescens*. The former is showing increasing antibiotic resistance and is a leading cause of hospital-acquired infections in the United States and Canada. Serratia marcescens causes pulmonary disease and septicemia in immune-compromised patients.

Fomes fomentarius
(Photo by Robert Rogers)

Preparation of tincture and dosage is similar to *Ganoderma applanatum* above. Individuals sensitive to alcohol may put drops into hot water and allow it to evaporate for five minutes before ingestion. My own experience suggests that glycerites produce an inferior product.

***Hericium spp.*, Lion's Mane, Coral Mushroom**

My third mushroom selection, easy to wildcraft or grow from spawn plugs on logs, are *Hericium* species. Known as comb tooth, coral mushroom or coral hedgehog, these are some of the most beautiful, distinctive and tasty mushrooms of our forests. Various species grow on hardwoods or conifers, and are my wife's favorite edible.

They are usually insect-free and have a satisfying chewy texture. We have variations of *H. americanum*, *H. coralloides* and *H. ramosum* in our area, with exact identification somewhat difficult. The Gitksan First Nation of British Columbia call *Hericium abietis*, kaedatsots, meaning "bird hat."

In Japan, *H. erinaceus* (lion's mane) is known as yamabushitake, meaning "those who sleep in the mountains." It is said to resemble the suzukake, or ornamental garment worn by Buddhist monks of the Shugendo sect. In China it is known as shishigashira, meaning "lion's head." It is found on oaks in California and north into British Columbia, but sometimes on maple or beech trees. It is grown on a small scale for the high-end restaurant trade, and in French bistros it is called pom pom du blanc, due to its shape and color.

Lion's mane is used in TCM to improve digestion and for gastric ulcers, as well as for its toning effect on the nervous system. It contains a number of polypeptides and polysaccharides that enhance the immune system, may help restore or rebuild nerves, and have been found useful in chronic bronchitis (Wasser & Weis 1999). Hericenones C-H, found in the fruiting bodies, have been found to induce the synthesis of nerve growth factor (NGF). This helps in the development, maintenance and enhancement of important sensory neurons and may be useful in the amelioration of Alzheimer's disease and similar chronic brain-related disorders (Kawagishi et al 1999). Erinacines found in the mycelium also induce NGF production (Kawagishi et al 1994). Other work suggests that erinacines are amongst the most powerful naturally occurring compounds yet identified (Kawagishi et al 2004).

Hericium coralloides
(Photo by Robert Rogers)

In one Japanese study, 50 of 100 patients in a rehabilitation hospital received 5 g of dry, powdered lion's mane mushroom in soup. The other 50 patients received placebo powder. All patients were elderly and suffering from cerebrovascular disease, Parkinson's disease, spino-cerebellar degeneration, diabetic neuropathy, spinal cord injury, and various degenerative orthopedic diseases. After six months, six of seven patients with severe dementia taking the daily mushroom dose demonstrated improvement in perceptual

improvement in functional independence measure.

A more recent study was conducted with 29 men and women aged 50 to 80 years, all suffering mild cognitive problems (Mori et al 2008). In this double-blind (DB), placebo-controlled (PC) trial, significant improvement was shown in the mushroom group at eight, 12 and 16 weeks. The dosage was just 1 g of dried fruiting body three times a day in capsule form. All 14 who received the mushroom showed improvement after three months compared to placebo, but there was a decline four weeks after supplementation was discontinued.

The fruiting body may also relieve depression, anxiety and insomnia in pre- and post-menopausal women (Nagano et al 2010). Thirty women aged 35 to 46 years were given cookies either containing 0.5 g of powdered fruiting body or no powder. Four cookies were eaten throughout the day. In this randomized, DB, PC trial of four weeks, the participants filled out daily reports using four outcome measures. These were the Kupperman Menopausal Index (KMI), Center for Epidemiologic Studies Depression Scale (CES-D), Pittsburgh Sleep Quality Index (PSQI), and Indefinite Complaints Index (ICI). The last was based on KMI but added items such as cognitive function, hair, skin, lower back pain, bladder and vaginal health measures. No change was noted in sleep quality, but both CES-D and ICI mean scores were lower in the group taking enhanced cookies, compared to placebo. Anxiety and depression were lower, as well as comments associated with issues of frustration, palpitations, and increases in concentration and incentive.

For gastric ulcers, decoct 30 g of dried fruiting body in 500 mL of water for 10 minutes. Divide in two doses and take 12 hours apart on an empty stomach. Dried powder can be put in 500–750 g vegetable or gelatin capsules. Or, simply add to your daily smoothie or cooked cereal, soup or stew. Standardized extracts on the market from commercial sources standardize to 0.5% hericenones and 6% amyloban. You can tincture the fresh fruiting body, and that is my favorite method. Use one part by weight to three parts volume of 60% alcohol. Dosage is from 5 to 10 ml twice daily.

REFERENCES

Brandt C R, Pirano F 2000, Mushroom antiviral. Recent Research Development Antimicrobial Agents Chemotherapy. 4:11-26

Hobbs C 1995, Medicinal Mushrooms: An Exploration of Tradition, Healing and Culture. Botanica Press, Santa Cruz, CA

Jeong Y et al 2008, *Ganoderma applanatum*: A promising mushroom for antitumor and immunomodulating activity. Phytotherapy Research. 22 (5): 614-619

Kawagishi H et al 1991, Hericenones C, D, and E, stimulators of nerve growth factor (NGF)-synthesis, from the mushroom *Hericium erinaceum*. Tetrahedron Letters. 32(35): 4561-4564

Kawagishi H et al 1994, Erinacines A, B and C, strong stimulators of nerve growth factor (NGF)-synthesis, from the mycelia of *Hericium erinaceum*. Tetrahedron Letters. 35(10): 1569-1572

Kawagishi H et al 2004, The anti-dementia effect of lion's mane mushroom and its clinical application-*Hericium erinaceum*-lion's mane. Townsend Letter for Doctors & Patients. 249: 54-56

Mori K et al 2008, Nerve growth factor inducing activity of *Hericium erinaceus* in 1323N1 human astrocytoma cells. Biological and Pharmaceutical Bulletin. 31(9): 1727

Mayumi N, Shimizu K, Kondo R, Hayashi C, Sato D, Kitagawa K, & Ohnuki K 2010, Reduction of depression and anxiety by 4 weeks *Hericium erinaceus* intake. Biomedical Research. 31(4): 231-237

Park Y et al 2005, Anti-inflammatory and anti-nociceptive effects of the methanol extract of *Fomes fomentarius*. Biological & Pharmaceutical Bulletin. 27(10): 1588-1593

Rogers R 2011, The Fungal Pharmacy: The Complete Guide to Medicinal Mushrooms and Lichens of North America. North Atlantic Books, Berkeley CA

Saar et al 1991, Ethnolycological data from Siberia and northeast Asia on the effect of *Amanita muscaria*. Journal of Ethnopharmacology. 31 (2):157-173

Seniuk O, Gorovoj L, Beketova G, Savichuk H, Rytik P, Kucherov I, Prilutsky A, & Prilutsky A 2011, Anti-infective Properties of the Melanin-Glucan Complex Obtained from Medicinal Tinder Bracket Mushroom, *Fomes fomentarius* (L.:Fr.) Fr. (Aphyllophoromycetideae). International Journal of Medicinal Mushrooms. 13(1): 7-18

Smania A et al 1999, Antimicrobial activity of steroidal compounds isolated from *Ganoderma applanatum* fruitbody. International Journal of Medicinal Mushrooms. 1 (4): 325-330

Stamets P 2005, Mycelium Running: How Mushrooms Can Help Save the World. Ten Speed Press, Berkeley, CA p 224

Suay et al 2000, Screening of Basidiomycetes for antimicrobial activities. Antoine van Leeuwenhock. 78(2): 129-140

Wasser S & Weis A 1999, Therapeutic effects of substances occurring in higher Basidiomycetes mushrooms: a modern perspective. Critical Reviews in Immunology. 19(1): 65-96

Ying J et al 1987, Icones of Medicinal Fungi from China. Translated by X. Yuehan. Science Press, Beijing, China

Originally published in the *Journal of the American Herbalists Guild,* Vol. 11, Issue 1. www.americanherbalistsguild.com

PAT'S PICKLED MUSHROOMS

By Patricia Guarino

Ingredients:

Wild mushrooms - preferably Hen-of-the-Woods
1 TBS Hot pepper flakes (to taste)
Mason jars
3 cloves Garlic (minced)
Kosher salt for washing (1/4 cup) & marinating mushrooms (1 TBS)
1/4 cup Apple cider vinegar
3 TBS Olive Oil

Directions:

Clean all the dirt off the mushrooms, and cut into small strips. Then fill a large pot halfway with water and let it come to a full boil.
(To clean: Fill your sink with cold water, put the mushrooms in the sink & pour 1/4 cup kosher salt over them. Quickly rub the mushrooms between your hands to get the dirt out then squeeze out some of the water. Or use an alternate method).
Put the mushrooms in the pot of boiling water, for about 10 minutes, then drain them in a colander. When the mushrooms are cooled down enough to handle, take a cotton dish towel, put some of the mushrooms inside, close the corners, and wring them as dry as you can.
Put these in a clean bowl. Repeat.
Boil your jars and tops for about 30 minutes
Combine apple cider, 3 TBS olive oil, and spices in a bowl, a bit at a time, to taste. Add the mushrooms and let sit and taste for spice level. Fill jar and add additional olive oil to cover. Allow air bubbles to escape to prevent spoilage. Refrigerate.

(Recipe from the *LI Sporeprint*, Vol. 20, Number 4, Winter 2012 newsletter of the LIMC).

A Look at NAMA's Finances

By Herbert Pohl, NAMA Treasurer

NAMA's fiscal year 2012-2013 ended June 30, 2013. I would like to give you an overview of our finances for the period July 1, 2012 to June 30, 2013, and highlight some of the changes that took place during the last year

To start out, I can report that NAMA is in a stable financial condition. Our cash account was $62,667.96 plus a loan of $6,298.50 to the NAMA 2013 foray compared to $66,045.27 in the previous year

At the Trustee Meeting in December 2012 in Scotts Valley California the trustees approved a resolution to lower the membership dues; this resulted in a slightly lower intake of dues income, ($29,743 versus $30,155)

Carlene Cliver (Skeffington), after many years of faithful service, resigned as the custodian of the education rental program. Her Education Bank Account has been closed and the amount of $1,085 has been transferred into the NAMA general account. Steve Rock has taken Carlene's place and has opened a local bank checking account with a NAMA seed money deposit of $100.

The Postal Service Account that had been used for mailing of *The Mycophile* had been dormant for some time. The account was closed and the remaining fund of $789 was transferred into the NAMA general account.

The 2012 NAMA foray, that was organized and managed by NAMA, provided a net income to NAMA in the amount of $14,272. The foray committee presented a budget that was very closely met by the final budget result.

The NAMA Endowment Fund received donations from members in the amount of $2,025 and $1,086 from the Silent Auction at both the NAMA and Wildacres Regional foray. The value of the Endowment Fund as of June 30, 2013 was $66,776 with an average current yield of 3.45% or an estimated annual income of $2,066. The original goal of the Endowment Fund was to have it grow to $100,000 before tapping into it to fund any programs.

To clear up any misconception, the yearly donation of $2,000 given to the Mycological Society of America (MSA) for the Fellowship Award has not come out of the Endowment Fund but is still paid out of NAMA's general fund.

In January 2013 NAMA provided a non-interest loan to the Arkansas Mycological Society in the amount of $6,298.50 as seed money for the NAMA 2013 Foray.

Previous Year Comparison

	June 30, 2013	June 30, 2012
Checking/Savings		
Education Comm Check Acct	90.78	0.00
Education Comm Bank Acct	0.00	1,038.45
TD Bank Check Account	62,577.11	64,217.78
US Bank	0.07	0.07
Postal Service Account	0.00	788.97
Loan Receivable		
NAMA Foray 2013	6,298.50	0.00

NAMA
Profit & Loss Previous Year Comparison

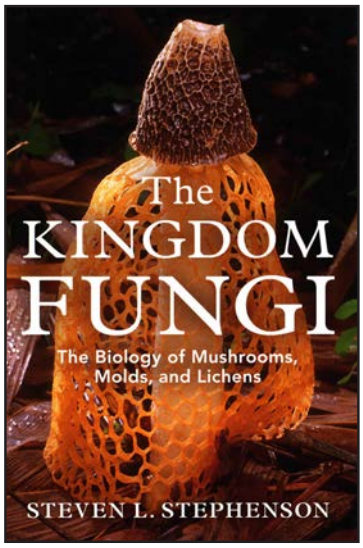
	Jul 12 – Jun 13	Jul 11 – Jun 12	$ Change	% Change
Ordinary Income Expense				
Income				
Donations Received	476.00	0.00	476.00	100.0%
Dues Income	29,743.44	30,155.24	-411.80	-1.4%
Education Committee	397.65	253.20	144.45	57.1%
Interest Income	0.21	2.68	-2.47	-92.2%
Mailing List & Label	0.00	125.00	-125.00	-100.0%
Photo Contest Fees	44.00	44.00	0.00	0.0%
Silent Auction Proceeds	893.00	0.00	893.00	100.0%
Total Income	31,554.30	30,580.12	974.18	3.2%
Expense				
ACH Deposit	0.00	-0.23	0.23	100.0%
Administration Services				
Comp. Foray Registration	2,765.00	0.00	2,765.00	100.0%
Executive Sec Expenses	827.05	494.65	332.40	67.2%
Executive Sec Stipend	5,000.00	5,833.00	-833.00	-14.3%
Menbership Sec Expen..	607.16	839.43	-232.27	-27.7%
President's Expenses	210.03	393.28	-183.25	-46.6%
Treasurer's Expenses	128.33	217.52	-89.19	-41.0%
Total Administrative Setrvic..	9,537.57	7,777.88	1,759.69	22.6%
Bank Charges	6.18	-56.15	63.33	111.0%
Dues Expenses	342.89	0.00	342.89	100.0%
PayPal Fee	304.63	82.91	221.72	267.4%
Program Service				
Awards	0.00	200.00	-200.00	-100.0%
Cultivation	96.30	92.17	4.13	4.5%
Education	162.92	246.29	-83.37	-33.9%
Forays	0.00	5.00	-5.00	-100.0%
Knighton Award	305.00	0.00	305.00	100.0%
Mycophagy	146.69	128.57	18.12	14.1%
Mycophile	2,724.88	2,477.66	247.22	10.0%
NAMA Brochure Expens..	0.00	578.16	-578.16	-100.0%
Photography	470.73	450.00	20.7	4.6%
Scholarships	2,000.00	2,000.00	0.00	0.0%
Vouchering Expenses	4,715.20	6,060.00	-1344.80	-22.2%
Web Committee	79.00	596.40	-517.40	86.8%
Total Program Services	10.700.72	12,834.25	-2,133.53	-16.6%
Uncategorized Expenses	0.00	200.00	-200.00	-100.0%
Total Expenses	20,891.99	20,838.66	53.33	0.3%
Net Ordinary Income	10,662.31	9,741.46	920.85	9.5%
Other Income/Expense				
Other Income				
Endowment Fund Donatio..	2,025.00	5,152.75	-3.127.75	-60.7%
National Foray	73,598.50	7,542.73	66,055.77	875.8%
Regional Forays	9,075.00	3,319.00	5,756.00	173.4%
Total Other Income	84,698.50	16,014.48	68,684.02	428.9%
Other Expense				
Memorial Expenses	200.00	0.00	200.00	100.0%
National Foray Expenses	59,326.12	2,340.00	56,986.12	2,435.3%
Regional Foray Expenses	8,481.00	3,262.00	5,219.00	160.0%
Total Other Expenses	68,007.12	5,602.00	62,405.12	1,114.0%
Net Other Income	16,619.38	10,412.48	6,278.90	60.3%
Net Income	27,353.69	20,153.94	7,199.75	35.7%

NAMA 2012 Foray Budget

Mission Springs – Dec 2012
Foray Costs & Profit

Budget	Assumed	Actual
Registrants	205	247
Faculty	20	27
Bus $1027 per bus x 2 busses x 2 days	$4,108	$4,260.00
15 passenger van $150 x 4	$ 600	$ 374.33
Gas for vans $50 x 4	$ 200	$ 78.18
Program (printing)	$ 350	$ 393.37
Souvenir – pin	$ 750	$ 0.00
T-Shirts (300)	$ 0	$1,937.98
Souvenir – Mushroom Inf.	$1,500	$ 0.00
Supplies/printing/copies/mailing	$ 550	$ 456.75
Display/collecting expenses	$ 0	$ 120.52
Cooking Demonstration	$ 0	$ 82.01
Socials @ $5	$1,125	$1,179.59
Permits	$ 0	$ 203.00
Insurance	$2,000	$ 0.00
	$11,183	$9,085.73
Stipends	$1,500	$1,500.00
Dye Workshop		
Fees		$1,495.00
Expenses		$ 658.14
Profit		$ 836.86
Foray Balance		
Total collected		$69,413.50
Paid to Mission Springs		$43,897.25
Foray Expenses		$ 9,085.73
Faculty Stipends		$ 1,500.00
Dye Workshop Expenses		$ 658.14
Income minus Expenses		$14,272.38

Three page analysis by Herb Pohl, NAMA Treasurer



The Kingdom Fungi: The Biology of Mushrooms, Molds, and Lichens
Steven L. Stephenson
2010 / ISBN 978-0-88192-891-4 / 272 pp. + 56 pp color photos
Timber Press (http://www.timberpress.com)
$34.95 (hardcover)

At first glance, I assumed this would be another book along the lines of Nik Money's *Mr. Bloomfield's Orchard*, R.T. and F.W. Rolfe's *The Romance of the Fungus World*, Elio Schaechter's *In the Company of Mushrooms: A Biologist's Tale*, and George Hudler's *Magical Mushrooms, Mischievous Molds.* However, once I began reading, it didn't take long to realize that the subtitle is accurate and that the focus is more on the biology of fungi and less on humans and their interactions with fungi than those other titles. Indeed, the stated purpose of The Kingdom Fungi is "to introduce the reader to the biology, general structure, and morphological diversity of the 'true' fungi as well as other funguslike (slime molds and water molds) and not-just-fungi (that is, lichens) organisms traditionally considered by the scientists (mycologists) who study fungi."

The content is well described by the 12 chapter titles: What are fungi? Fungi that live in water; The most ubiquitous of all fungi (principally the yeasts and molds); A diversity of form and function (within the ascomycetes); Morels, truffles, cup fungi, and flask fungi; Mushrooms and other larger (basidiomycete) fungi; Lichens—more than just fungi; Slime molds; The role of fungi in nature; Interactions of fungi and animals; Fungi and humans; and Fossil fungi. A glossary, list of references, and index complete things.

The book reads rather like a textbook and the writing is generally clear and accessible. However, it lacks the abundant supporting diagrams, charts, illustrations, and tables that would be integrated throughout a typical textbook. Instead, it includes 124 color photographs, mostly of mushrooms and microscopic fungi or microscopic features of larger ones, grouped into two glossy-paper sections (a cost-saving, but convenience-reducing, move). While the photos are of good to quite excellent quality and admirably are reproduced at generous size, they don't provide the level of assistance that many readers will need to fully understand portions of the text. For instance, it is nearly impossible to comprehend how a clamp connection forms without an accompanying step-by-step diagram. Another hindrance for many readers will be that a basic knowledge of general biology, such as an understanding of the concepts *haploid*, *diploid*, *mitosis*, and *meiosis*, is assumed. Although a glossary is included, many of the entries will be of little help and one probably would need to turn to a biology textbook or online biological glossary for assistance.

Overall, the information is sound and I noticed no major errors. However, Stephenson is a world expert on slime molds and works far less with mushrooms and other "real" fungi, so perhaps it is not surprising that bits of missing or misleading information have crept into a book that covers such a wide range of subject matter. For instance, he gives an inaccurate characterization of the ericoid type of mycorrhiza. In one instance, he refers to chytrids as plants. "Loss of the expertise needed to collect and cultivate truffles" seems unlikely to be a major factor in the decline of their abundance in European markets. I find it hard to believe, given the incredibly high prices fetched by the Périgord and Italian white truffles, that modern trufflers no longer know how

to find them or promote their growth in tended orchards. Far more likely is increased urbanization and all that goes along with that (which is mentioned as a key factor), such as loss of potential habitat and increased deposition of nitrogen, the latter of which appears to be the biggest factor in the historic declines in many species of ectomycorrhizal mushrooms elsewhere in Europe. *Scutellinia scutellata* is said to be very abundant and easy to identify, mainly because of its color and the eyelash-like hairs that adorn the edges of the cup. Actually there are a large number of similar-colored eyelash-bearing scutellinias that can be rather difficult to identify and many collections labeled "*Scutellinia scutellata*" on foray tables and lists aren't that at all. Only a very small number of species of *Cladonia* (those placed in the genus *Cladina* by some lichenologists) comprise the bushy, much-branched types called 'reindeer' lichens, not all cladonias. Not all carbohydrates can be categorized as "simple" molecules, and cellulose is an example. In addition, there are quite a few places where editing to remove redundancy or to improve the flow of information would have made the text easier to understand. And, surprisingly in a book written by a professional mycologist, there are several instances where the plural 'fungi' is used when the singular 'fungus' should have been.

Admittedly, these are mostly subtle points that could be considered nits, and many would not even be noticed by most readers. But that is the point. I think it is important for the information in books such as this to be as accurate as possible, because the intended audience is largely folks who do not have specialized expertise in the subject and are not likely to question details of the presentation.

Despite these issues, *The Kingdom Fungi* could make a good introduction to the fascinating biology of the fungi for those who know little about it. However, if you already have a basic understanding and have other books such as Bryce Kendrick's *The Fifth Kingdom*, then I'm not sure there is enough new ground covered here to make this a necessary addition to your library.

Steve Trudell

The 2013 Henry Pavelek Sr. Memorial Scholarship from the North American Truffling Society

Henry Pavelek Sr. joined NATS in 1982 and soon was elected President. His energy and enthusiasm for truffles and truffling provided much of the driving force that established NATS as a sustainable organization. A scholarship fund has been established in his memory. Applicants should be graduate students or outstanding undergraduates conducting research on physiology, taxonomy, phylogeny, ecology, animal interactions, commercial harvest, or culinary attributes and uses of hypogeous fungi. The scholarship for 2013 is for $1500. The recipient will be announced at the NATS December 7 meeting & potluck in Corvallis. The application form can be accessed by clicking on its link at www.natruffling.org. The application deadline has been extended to Oct. 31.

Editor: I encourage mycologists and clubs to send your articles, recipes, puzzles, etc. for possible inclusion in The Mycophile to dianna.smith@comcast.net. Deadline for the next issue is November 1st.

Guidelines for submitting manuscripts to Dr. Michael Beug for McIlvainea can be found at http://namyco.org/publications/mcilvainea/mcil_instructions.html.

The Newton NM1 a portable microscope with great potential for mycologists

Geoffrey Kibby

Figure 1. The Newton NM1 Portable Microscope

Two years ago fellow mycologist Don McNeil told me of a new portable microscope which was in development by the Millenium Health Microscope Foundation. It was going to be called the Newton and was being designed for use in the study of tropical diseases in countries where full-sized microscopes were too expensive or required mains electricity which was not always available in the field.

I expressed an interest and started to monitor their website. Two years went by and still it said "In development…". Finally, this year the microscope was released after extensive and very successful field trials and Don soon acquired units for both of us. What follows is my experience and thoughts after using the microscope for some weeks.

HISTORY

The Newton design team were inspired by, and based many of their ideas on, the old and sadly no longer manufactured McArthur portable microscope, which many mycologists may be familiar with. That microscope, although of an extremely high standard was too expensive for widespread use in countries such as Africa, India etc and production had in any case ceased after its designer Dr John McArthur died in 1996.

The Newton team's aim was to produce a microscope of comparable high quality and ease of use, that could be powered by standard batteries and would be in a price range government institutions could afford.

Following investment and funding by a number of agencies the research and development plus field trials have finally been completed. For a more complete history of the design and development see www.millenium-microscope.org.

DESIGN

The biggest challenge with any portable microscope is of course to reduce the size of the instrument and this is achieved in this case by bouncing the light path backwards and forwards using a series of highly reflective mirrors. Cambridge Optronics, one of the distributors of the microscope have an excellent visual of this on their website www.cambridgeoptronics.com.

By this method the entire microscope was squeezed into a unit a mere 154mm long, 122mm wide and 66mm high (Fig. 1.) and weighing just 480 g in its basic form! The body is made of what feels like strong, polycarbonate plastic and the whole unit has a very high quality, precision feel about it. Three objective lenses may be fitted from a choice of x10, x40, x60 and x100, the latter being an oil-immersion lens. The lenses are switched in operation by turning a wheel on the underside of the unit. Different eyepieces from x10 to x16 are available including the option of a 100 division measuring graticule.

RESULTS

Light is provided by a tiny LED light on a movable arm (arrowed in the figure above) and this is fadeable by turning a wheel. In practice the lowest power was sufficient for most uses. Power is provided by 3 AAA batteries or by plugging it into a computer or other USB power source using the cable provided. The LED is very efficient and stated figures suggest a battery life of 300 hours at full power - remarkable if true!

The whole kit comes in a very nice case with a shock-absorbing foam interior and this allows the user to cut out extra slots to add additional items such as slides, droppers etc.

Other available options include an adapter to attach a mobile phone to act both as a screen and as a camera. You can also fit a USB-powered video camera which replaces the eyepiece and enables live images to be shown on a laptop computer. Fig. 2 shows some *Cortinarius* spores taken via my iPhone - pretty impressive.

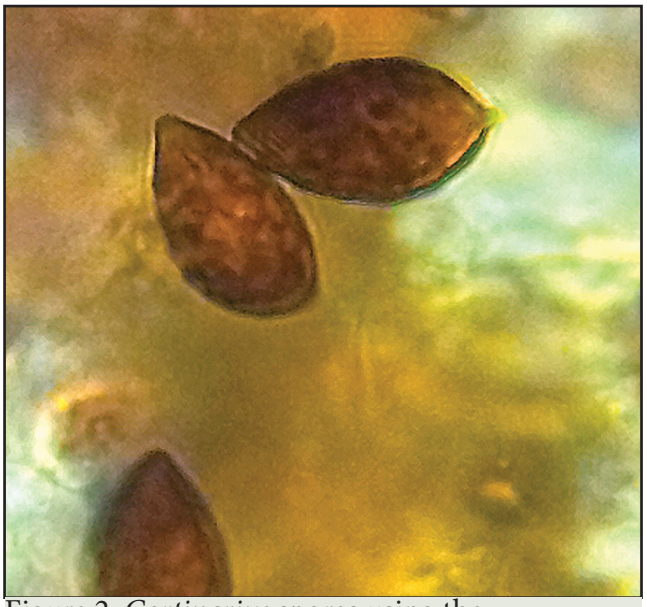


Figure 2. *Cortinarius* spores using the Newton NM1 and an iPhone.

The microscope is easily used hand-held or can be mounted on a small tripod for longer use. The focusing wheel is rather small and difficult to control under high power and an additional, larger clip-on wheel is available and should definitely be purchased.

As the microscope uses an inverted system with the objectives below the slide, the slide and cover slip must be inserted upside down also. This is tricky but gets easier with practice. When using the x100 oil-immersion lens I find it easier to put the oil on the lens and then raise it up to touch the cover-slip having first positioned the mechanical stage into the correct position.

I find the microscope easy to use, giving very high quality images for such small lenses. The click stops for the three objectives could be made more obvious and secure - it is sometimes difficult to be sure the lens is positioned correctly and this is something the manufacturer should address.

The light source is very bright indeed and often it is best raised slightly to reduce the light or you can tape a piece of tissue over it to reduce the power even more.

The price of the basic NM1-400 unit is about £400, and for the NM1-1000 with the mechanical stage and high power lenses around £600. For prices of the optional extras see the websites of either Cambridge Optronics or GX Optical (www.gxoptical.com).

For a powerful, well-made microscope at a great price, to easily carry to forays etc or even use in the field you need look no further than this amazing unit. I wish the company every success with this remarkable product.

Traditional Forest Managment Reduces Fungal Diversity

In the beech groves of Navarre a team from the UPV/EHU-University of the Basque Country has analysed the influence exerted by forestry management on the fungi populations that decompose wood. There is a shortage of dead wood in forests because fallen branches and trees tend to be cleared away. This wood, if available, ought to be decomposing, as it is the habitat of many living beings like lignicolous fungi. These fungi are capable of decomposing dead wood and turning it into organic and inorganic matter. So clearing away the dead wood from the forests is ecologically harmful for the fungi. Nerea Abrego-Antia and Isabel Salcedo-Larralde, biologists in the Department of Plant Biology and Ecology of the UPV/EHU-University of the Basque Country, have recently quantified this effect on fungi populations that live off dead wood in various beech groves in Navarre. The main conclusion of the study is that forestry and classical forest management are harming the community of saproxylic fungi. What is more, the researchers have discovered that in the forests being exploited various fungi species are disappearing and in some cases even whole families are affected.

The conclusion of the research is crystal clear: the clearing away of remains of dead wood is harming the populations of lignicolous or saproxylic fungi. Nevertheless, Isabel Salcedo, director of the research, has qualified this: "You see everything very clearly, but you don't accept it that easily. The pre-hypothesis could be that as the basic matter is lost, the environment will be directly affected. But the aim of our work is to prove it. In forestry only recently did they start to notice this phenomenon, while in Europe it began to be proven scientifically about ten years ago." The work of the UPV/EHU researchers has focussed on the traditional exploitation of various beech groves, and the result has been published in the specialised journal Forest Ecology and Management. "It is a journal of great quality," pointed out Salcedo. "In the field of mycology, the journals that publish the description of species and systematics papers tend to have little impact; yet this one devotes attention to the ecological approach and has a more universal influence. The works that analyse the ecological aspect have a greater impact, and as far as we are concerned, it is usually quite difficult to get them published. But in this piece of work we paid great attention to the statistical and ecological aspect, which has enabled us to get the paper published in such an important journal."

The analysis was carried out on samples from sixteen zones, of which eight are exploited and the other eight are not. After the samples had been gathered, they were classified in accordance with a standard criterion that is used by mycologists in this field so that the research can be repeated. "The first main variable to do the classifications was the size of the wood remains in the debris. They are classified according to three sizes, from the largest to the smallest," explained Salcedo. "Normally, the smallest debris in this classification is not analysed. Yet many fungi have to be identified under the microscope, although there are known species that are very large, like the tinder fungus Fomes fomentarius. But it is more difficult to gather samples of the rest and identify them, and it takes longer."

After the classification of the wood in terms of size, the next criterion is the level of decomposition. For each size three levels of decomposition were established: the recently fallen, the ones that have begun to decompose and the ones that are fully decomposed. "A more precise classification could have been made, but we found that the levels of decomposition fitted well into the three groups." The debris analysed was classified into nine groups. After classifying the debris, the fungal species existing in each were identified, in other words, the community of fungi existing in each twig. As far as possible, the "quantity" of each species is also established, even though this is no easy task. As Salcedo pointed out, this last parameter is difficult to apply.

The other European studies have concentrated on large-sized woody debris, which is why importance has been attached to the volume of dead wood in the forests when it comes to preserving them. However, according to the research by Salcedo and Abrego, the factor that exerts the most influence on the diversity of saproxylic fungi is the diversity of the woody debris, not the volume of wood, in other words, that the nine groups classified should appear the maximum possible number of times. "This conclusion is a result very much to be taken into consideration in forest management," stressed Salcedo. At the same time the influence exerted by forest fragmentation on the presence of fungi is also being analysed. Based on this research, the growth of the edge or intervening matrix which happens as a result of forest fragmentation also has a negative effect on their diversity.

The main conclusion of the study is that forestry and classical forest management are harming the community of saproxylic fungi, at least in the zones studied. The work of these UPV/EHU biologists specifies the levels of this damage.

(*From Science Daily, July 26, 2013* http://www.sciencedaily.com/releases/2013/07/130726092358.htm)

McIlvainea: Journal of American Amateur Mycology – request for articles

McIlvainea is an open-access, refereed journal for the amateur and professional mycological community. It is published by the North American Mycological Association as a rolling publication. Articles are published as soon as they have been refereed and approved. Instructions for authors appear on the NAMA website www.namyco.org/publications/mcilvainea/mcil_instructions.html.

NAMA plans to develop *McIlvainea* as a tool to educate citizen scientists who can assist with establishing a North American mycoflora. *McIlvainea* will be a home for more technical papers than those that appear in *Fungi Magazine* and *Mushroom: The Journal* and more directed at the lay public than articles that may appear in *Mycologia*. Articles that review recent developments in fungal taxonomy of Macromycetes would be particularly welcome. It could also become a home for outstanding senior student research papers that may not yet be quite ready for *Mycologia*. We encourage all NAMA members to be thinking about how they can contribute to the North American mycoflora project and encourage you all to write up your research in McIlvainea.

Feel free to contact me about ideas that you may have for a paper.

Michael W. Beug
Editor, McIlvainea
Professor Emeritus
The Evergreen State College
beugm@evergreen.edu

North American
Mycological Association
c/o Ann Bornstein
61 Devon Court
Watsonville, CA 95076 Change

Service Requested

Newsletter of the North American Mycological Association
THE MYCOPHILE

Auriscalpium vulgare
The Conifer Cone Spine or Ear Pick Fungus
Photo and text by Tim Wheeler

This is a very beautiful little fungus and is easily overlooked. Its short stature, dark colors, and caps barely the size of a nickel, make for a boring intro. However, up close and viewed from below these little fungi start to shine. The upper surface is kidney shaped, usually some shade of brown, but often appearing whitish due to the dense covering of hairs. The lower surface is pale, covered in short spines or teeth. Spore print white. The stem is thin, off-centered and also hairy. This odd toothed fungus, alongside just a handful of other species, are important in recycling all those spent conifer cones.