



Bhutan's Buddha Mushroom

by Daniel Winkler

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The road wound its way in tight curves up the narrow valley along a mountain river. The gushing water was brown from the heavy monsoon rains. I was already a day late, coming straight from the International Medicinal Mushroom Conference in China, and eager to make the late morning session at a panel on medicinal plants and their increasing scarcity in High Asia at the quadrennial conference on Traditional Asian Medicines. We passed by a farmer selling apples and chili peppers along the roadside. He also sold small plastic bags full of a yellow product that reminded me of chanterelles. Could it be? A few kilometers up the narrow road I spotted another improvised stand, and passing by more slowly I clearly saw mushrooms. Late or not, I had to call a stop. I rushed out of the car before it had come to a complete stop. Two farming ladies were selling bags of smallish, bright-yellow chanterelles, aromatic whitish brown matsutake, and big purple corals. Quickly, I took pictures, bought some chanterelles and a coral, and got back in the car.

I had been invited to Thimphu, Bhutan, to present my research (Winkler, 2005; 2008) on caterpillar fungus, *Ophiocordyceps sinensis* (formerly known as *Cordyceps sinensis*) (Sung et al., 2007). I was

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initially hesitant to participate, since the invitation only included a small grant that would barely cover a fraction of the travel costs. However, once I realized the conference was taking place during mushroom season, I knew I had to attend.

I had wanted to come to Bhutan, or *Druk Yul* ("Land of the Thunder Dragon") as the Bhutanese people know it, for 25 years but somehow it previously had never worked out. This was partly due to Bhutan's policy of minimizing the impact of tourism by letting in a very limited amount of guided groups, and maximizing the financial benefits by offering only high-end tourism. However, through the years I had been in contact with Dr. Phuntsho Namgyel, a Bhutanese researcher who studied caterpillar fungus and matsutake, Bhutan's most precious fungal resources, as a source of rural income (Namgyel, 2003). So I had hopes of exploring Bhutan's fungal economy instead of joining exclusive tours that would speed right past forests full of mushrooms.

It hadn't been easy to get back in contact with Phuntsho. As it turned out, he had switched fields and was now the director in the Election Commission of Bhutan. This was a new office, since Bhutan's new young King, Jigme Khesar Namgyel Wangchuck, had ordered the country to become a democracy. This move was not so popular with many people, but as the Fourth King, Jigme Singye Wangchuck, had pointed out, democracy was the future and one bad king could ruin a country.

Bhutan is located in the eastern Himalayas, sandwiched between India and currently Chinese-controlled Tibet. It is nearly the size of Switzerland but has fewer than a million inhabitants (compared to Switzerland's 7.8 million); approximately 100,000 inhabit the valley containing the capital city, Thimphu. The strong pull of the urban area worries planners, so the administration works hard on improving living conditions in the countryside to slow down emigration. Part of this effort has seen recent construction of beautiful market halls in Thimphu. The market is arranged by region, as farmers from tropical foothills offer a very different

range of fruit and vegetables than farmers from the Himalayan highlands. In one market we saw many farmers offering *Sese shamu* chanterelles (probably *Cantharellus cibarius*), always portioned in open plastic bags, at about 100 Ngultrum (US\$2) per pound. Also commonly for sale were big purple corals. A few people offered low-grade matsutake; and one farmer sold *Goli shamu*, "the big cat" (*Catathelasma imperiale*).

Rural mushroom income is regarded as an important factor for rural development, and Bhutan has been dedicating resources to this cause for many years now. For example, since 2006, the annual *Cordyceps* harvest has been sold through a government-organized auction system in order to maximize local income in remote regions, which otherwise have an extremely hard time generating enough cash income to participate in a modern cash economy. Harvesting *Yartsa Goenbub* (as caterpillar fungus is commonly known in Bhutan) was only legalized in 2004, a move that immensely improved the life of mountain farmers. The collection of *Yartsa Goenbub* has become their main source of cash. Meanwhile, annual poaching by intruding Tibetans of *Cordyceps* growing in Bhutanese territory remains a big problem in the border region (Hywell-Jones, 2003). This extremely remote and mountainous border is very difficult to patrol, being several days' walk from the nearest road-head.

Furthermore, Bhutan has done the most advanced field trials researching *Ophiocordyceps sinensis* ecology (Cannon et al., 2009), despite the fact that Bhutan's annual production is below a ton and thus less than 1% of the annual production of the Tibetan Plateau and the Himalayas (Winkler, 2011). In 2009, 595 kg were auctioned off for 78 million Ngultrum (at US\$1.66 million, nearly \$2800 per kg). Bhutanese people are very interested in *Cordyceps*. Most I talked with were familiar with *Yartsa Guenbub* and it is frequently featured in Bhutan's newspapers. I was even interviewed by the *Bhutan Today*, a daily newspaper, and invited to present my Tibetan *Cordyceps* and matsutake research at the Ministry of Agriculture. Impressively, a report on the event showed up the same day on the Ministry webpage!

The caterpillar fungus collected in Bhutan and the other Himalayan areas is known in Tibet as *Go Marpo Yartsa Gunbu*, meaning "red head summer grass winter worm," red head for the darker red color of the larval head segment. This distinction is based on the host insect and not the fungus. Zang and Kinjo (1998) had claimed that the Himalayan *Cordyceps* was a distinct species (*C. nepalensis*), but this has been disproved by DNA studies (Sung et al., 2007). Furthermore, the Himalayan ghost moth larvae are much smaller. One kilogram of dried Bhutanese caterpillar fungi contains 4000-5000 specimens. For comparison, 1 kilogram of small Tibetan caterpillar fungus contains only up to 3000 specimens; and to reach 1kg of the biggest Tibetan caterpillar fungi, only 1600 specimens are needed. And in this case, size does matter! We should not forget that a great variety of attributed medicinal properties, the libido-stimulating aspect is central to many Chinese consumers who dictate the prices. Apart from differences in size, there is no scientific evidence that supports this traditional bias against the Himalayan *go marpo* that would explain why Bhutanese collectors only receive 30% to 60% of the value for their caterpillar fungus. Biochemical assays could change such perception if the results were to indicate that the active ingredients of the Himalayan and Tibetan caterpillar fungus are comparable.

During the conference, Phuntsho took me to the National Mushroom Center (NMC), just a short walk from the venue, to meet his friend Dawa Penjor, the NMC director, whom I presented with booklets on Pacific Northwest chanterelles, morels, and matsutake. We connected quickly through our shared fascination with mushrooms. I told Dawa that I would love to go out in the field with them, and Dawa was so kind as to organize an overnight excursion to Genekha (Gaynekha), the village where the "first" matsutake was found. Actually, this mushroom was known before, but in 1988 a Japanese visitor realized that Bhutan's *Po Shamu* - nicknamed back then for its sometimes suggestive shape resembling the male organ - was identical with the famous Japanese matsutake. By the very next year, commercial harvesting had started,

and ever since then it has been collected in several areas of Bhutan where warm temperate oak-pine forests prevail. Most of the matsutake are exported fresh, by air, to Japanese customers. All the mushroom needed was a new name, and this it found. Everyone now knows it as *Sangay Shamu*, “the Buddha Mushroom.”

In Genekha we met the Gup, the village headmen and the chairman of the local mushroom cooperative, who coordinates the matsutake harvest. We talked about matsutake in Bhutan, Tibet, and the Pacific Northwest. The local officials were very interested to hear about the international trade. At the end of our meeting the Gup expressed his worries that by exporting all their matsutake mushrooms the locals would be undermining their sexual prowess. It took me awhile until I really understood his point and remembered that matsutake in Japan also regarded as an aphrodisiac. I pointed out that not all matsutake are exported, that there are plenty of super hot chilies and that I had seen plenty of kids. Thus, it seemed like they were doing just fine, which painted a nice smile on the face of the Gup. Our visit was timed so that we could attend the matsutake market the next afternoon. Several buyers come to the village three days a week to meet with local collectors, whose matsutake are sorted into two categories. Class A consists of specimens whose caps have not fully opened and whose partial veil is still more or less intact. Collectors can sell Class A matsutake for US\$5 per pound. Class B are open-capped mushrooms, which fetch \$2. Most mushrooms at the market fall into Class A. Collectors make about \$650–850 per season, which constitutes over 40% of their annual income. A decade ago matsutake generated over 80%, but the money from the trade has been invested in agriculture, used to buy cows, introduce power tillers, and to diversify crop cultivation. Thus, the fungal income served as “spore” money to increase overall income. This strategy was strongly supported by King Jigme Singye Wangchuck, Bhutan’s Fourth King, who, when visiting Genekha, pointed out that complete dependence on matsutake was an unwise strategy for sound rural development.

Dawa and Phuntsho had arranged for us to stay overnight in the house of



the family of the late Aum Kuchum, the lady who had found the first matsutake, with an eye to joining in on an early morning matsutake hunt. The family lived in Zamto village, about half an hour’s drive on a very rough road up the valley. On the way there we encountered a collectors’ camp in a small meadow surrounded by dense oak forests. Thirty-five men from a lower village, for whom the walk up into the woods was too far for a daily matsutake hunt, had camped in group tents. Their daily work done, they were playing *Khuru*, throwing heavy metal darts over a distance of 20 yards. We were invited to join in, and it took quite a while until I managed to figure out how to give the weighty dart the right spin to fly straight.

We continued on, only to find the road blocked by a landslide. In May a totally unseasonable typhoon had struck Bhutan and caused much destruction. So we had to hike the last bit. Soon, the narrow, forested valley opened up. Now, the southern slope was dotted with tall, beautiful wooden farmhouses with ornate windows surrounded by already harvested fields. Once in the house, which we entered by way of a small bridge over a dry moat, we were served milk-tea and cookies. This was soon followed by a sumptuous dinner.

First we received a big bowl of “red

rice,” a rice with a natural pinkish grain. I was shown how to use the sticky, cooked rice to clean my hands by first rubbing it and then kneading it in my hands. The color change of the rice convinced me that my hands were now clean enough to eat with. On top of my rice I received a ladle each of *ema datsi* and *shamu datsi*. *Datsi* is a cheese sauce, somewhat close to our idea of a cream sauce, and a Bhutanese favorite. *Ema* are green chilies. In Bhutan hot peppers are a vegetable, not a spice. Incredible amounts of hot green and red chilies are eaten every day. Not surprisingly, the *shamu datsi* - mushrooms in cheese sauce - were also enriched with lots of chilies. The mushroom served was the Himalayan Gypsy (*Cortinarius [Rozites] emodensis*), which looks just like its close relative the Gypsy Mushroom (*Cortinarius [Rozites] caperata*) but can be distinguished by the pinkish-purple hue of its gills and wrinkled cap. It was difficult to discern its taste beyond a hint of pleasantly fungal, owing to the overwhelming presence of the green peppers. Rounds of *arak*, a clear grain alcohol most often derived from rice, were also served, but *arak* turned out to be the wrong kind of drink to fight the spiciness of the food. We went to bed early, since we were scheduled to rise at 5 a.m. to hunt for matsutake.

At dawn, following Dema, the daughter of Aum Kuchum, we quickly traversed some pastures covered with aromatic weedy wild hemp on the way uphill to the matsutake forest. The altitude of nearly 10,000 ft slowed me down. In the morning light, the forest of stout evergreen oaks (*Quercus semecarpifolia*) and Bhutan pines (*Pinus wallichiana*) decorated with long strands of *Usnea* lichen interspersed with tall rhododendrons and *Pieris* shrubs seemed like a land out of a fairy tale. The silver-gray *Usnea longissima*, recently reclassified as *Dolichousnea longissima* (Articus, 2004), is also known in Bhutan as “Dakini hair.” Dakinis are female celestial beings that usually reside in a different sphere but once in a while manifest in the human dimension to help humans along the path of wisdom.

It did not take any divine intervention to find the first mushrooms. Bright yellow chanterelles and a variety of bright red and white russulas dotted the ground.

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The consumption of improperly identified mushrooms is a big problem in Bhutan and neighboring Nepal (Aryal, 2009). Every year many people become sick or even die from eating poisonous mushrooms. One of the Mushroom Center's main objectives is to educate the public. Dawa and the NMC have published two posters featuring the main edible and poisonous mushrooms. They have also produced table calendars and brochures about poisonous mushrooms and mushroom poisonings - with symptomatic diagnoses - which have been distributed widely in Bhutan. In addition, the NMC is working on a compilation of Bhutan's fungi, but there is no end in sight. (Note: In Europe some mycologists suggest calling the fungal flora "funga," just as the Americans jockey for "mycota." However, funga seems a better choice, since it is consistent with the Latin example of flora, fauna, and funga, and gives the pleasure of alliteration. Meanwhile, mycota has Attic Greek hyphae.)

Matsutake were much more elusive, the daily collection by locals having cleaned out the forest successfully. There was always the possibility that some had been hidden under moss, carefully heaped on top, to avoid predation by competing collectors. A small Class A budding matsutake was found, but since it was still below the minimum size of 7.5cm required by collection regulations, we took our cue from the collectors and hid it under some moss so it could grow some more.

Taking mushroom photos and identifying species to a new member of the Mushroom Center slowed me down, so I soon lost sight of Dema, Dawa, and two of his people. We found many familiar mushrooms, including chanterelles (*Cantharellus cibarius*), brittlegills (*Russula emetica*, *R.*

cyanoxantha, and *R. delica*), amanitas (*A. citrina*, *A. rubescens* and *A. franchetii*), milkcaps (*Lactarius scrobiculatus* and *L. rufus*), waxycaps (*Hygrophorus russula* and *H. olivaceoalbus*) and a whole range of knights such as *Tricholoma sejunctum*, *T. sulphureum*, and *T. focale*, besides matsutakes. We also found a huge *Goli shamu* (*Catathelasma imperiale*), which Dema identified as a big cousin of the matsutake. Here, local knowledge and taxonomy are well aligned, as the "big cat" and matsutake both used to be in the *Armillaria* genus (which also includes honey mushrooms). We found a lone king bolete (*Boletus edulis*), which is not common in the oak-pine forests. More common were smallish pale brown boletes, with a bright yellow stipe base and dotted pinkish scales above, looking close to a yellow foot (*Tylopilus chromapes*), and a range of slippery jacks (*Suillus* sp.). In addition, many *Phylloporus*, a bolete with bright yellow gills, dotted the ground. There were edible polypores such as *Boletopsis* and *Albatrellus*, some hedgehogs (*Hydnum repandum*) and several species of hawkwings (*Sarcodon* spp.). Familiar Ascomycetes such as elfin saddles (*Helvella* sp.), hooded false morel (*Gyromitra infula*) and slippery cap (*Leotia viscosa*) abounded. Once we came across a big purple *Ramaria* coral, commonly called *Bjichu kangru*. In Dzongkha, the official language of Bhutan (and closely related to Tibetan), it means "bird foot," since the branches look just like bird feet if you turn the mushroom over. Nobody knew its real scientific name, but everybody seems to eat it. Once back home, I sent an image to Dr. Ronald Petersen, a *Ramaria* specialist. He suggested that it should be the same edible *Ramaria* he had described from Yunnan as *R. violaceibrunnea* var. *asiatica* with Zang Mo in *Acta Botanica Yunnanense* in 1986 and elevated to species status as *Ramaria asiatica* in 1988. Also abundant was the beautiful and tasty Himalayan gypsy (*Rozites emodensis*), much appreciated in Tibeto-Himalayan cultures. In Bhutan it is known as *Dungshing Shamu*, the fir mushroom (see Winkler, 2009). We picked the young Himalayan gypsies, but left behind many older ones, which lose much of their pink-purple complexion. And of course there were countless mushrooms I had never seen in my life

or simply could not place or label.

Returning to the farmhouse, we started an ID session with European and Japanese books, as there is no "Mushrooms of the Himalayas" book. Dawa is very troubled by the use of European names, but has no real alternatives owing to the lack of comprehensive taxonomic research in the region. Dawa's copy of *Fungi of Japan* by Imazeki, Otani and Hongo (1988) is completely worn, a clear indication that it is his favorite quick reference, not only because it has awesome photos, but primarily because the Himalayan flora is part of the Sino-Japanese flora, a fact that seems to be paralleled in the fungal realm. I commiserated with Dawa, pointing out that in North America many mushrooms were also named for European species, often receiving their own names many decades or even a century later. Dawa was aware of the case of our Pacific chanterelle, *Cantharellus formosus*, which was known for a long time as *C. cibarius*, in spite of being very distinctive from its smaller European cousin.

Speaking of chanterelles, while collecting below Chari Gonpa up the valley from Thimphu with Sabrintara and Dorji, both members of the NMC, we found "regular" chanterelles (*Cantharellus cibarius*), white chanterelles (*Cantharellus* sp.), and a dark blue-gray chanterelle (*Craterellus cornucopioides*). The last, known as the horn of plenty, is an excellent edible, but is not really eaten in Bhutan because of its dark color. This gloomy perception is also reflected in its German name *Totentrompete*, "death trumpet," and similar names in other European languages. Interestingly, close by in Tango I found the winter chanterelle *Craterellus tubaeformis*, but was told by Wangdi, a fungophile monk, that this mushroom was not edible. Also in Tango, I found a beautiful mushroom resembling very much our wooly chanterelle (*Gomphus floccosus*), but this specimen was hardly wooly and deeper orange in color. On the same moist shady slope under deciduous oaks, I found my first *Amanita rubrovolvata*, a beautiful tiny, orange-red, spotted fly agaric with a red volva. Another tiny but absolutely stunning, mushroom was the viscid *Aureoboletus thibetanus*, with its dimpled - or more technically

speaking, highly rugose - chestnut-brown cap and yellow pores. It was first described from oak forests in Yunnan, whose species composition is not too different. Big old oaks also serve as habitat for huge Reishi or varnish conk (*Ganoderma* spp.) and hand-sized *Oudemansiella*, which grow below leaning trunks, probably preferring the rain protection for fruiting. Also growing on an oak was a bright orange-brown cluster of something looking awfully like the big laughing mushroom, *Gymnopilus spectabilis*, a psychoactive mushroom. Some days later over dinner I was told by a Bhutanese that his father used to talk about *Ga sham*, the laughter mushroom. He knew that it was an orange mushroom growing on wood that causes lots of laughter after consumption. Unfortunately, I could not question his father and I would not be too surprised if I fed him the information regarding color and substrate.

Joining us in the woods here below Chari Gonpa were a bunch of young Nepali women (Bhutan has a large Nepali population known as Lhotsawas), who were apparently picking any good-sized mushrooms, often asking us if they could eat them. We told them we didn't know what they were picking, pointing out that it is not wise to eat any mushroom you cannot recognize for sure. They did not care for this bit of advice, and went their way with a wild assortment of brittlegills, milkcaps and corals; at least they had no seriously poisonous mushrooms, as far as we knew. I was told several times that many people are convinced that any toxicity in a mushroom can be neutralized by cooking them with the seed from a native prickly ash, "tingay" (*Zanthoxylum* sp.), known in China as Sichuan pepper (see also Doriji, 2009).

Moving up the slope, it became steeper and steeper. The extreme gradient slowed us down greatly, and the mossy "ground" in the form of the slope was right in our faces. As I was photographing a big white *Ramaria* while struggling not to slide away downhill, I noticed a minute, filigreed fruiting body with a yellow base and the rest all covered in white spores, like a small tree covered in powder snow. Eureka! I had found a *Cordyceps*! We searched the area diligently and found four more similar, minute fungi. As it turned out, we had found three different species, all technically not *Cordyceps*,

but anamorphs of *Cordyceps*, one of them most probably *Isaria tenuipes*. This I was told by Dr. Nigel Hywel-Jones, a Welsh mycologist who started out as an entomologist only to be caught and trapped in the fungal web. Nigel has been researching *Cordyceps* fungi in Southeast Asia for two decades, with his recent research focus in Bhutan. Although it is absolutely fascinating discussing *Cordyceps* and other entomophagous

The last day of my trip, I had reserved to see Bhutan's most spectacular monastery, Taktsang, the "Tiger's Nest." Legend tells that at this site the saint-magician Padmasambhava, who introduced Buddhism to Bhutan and Tibet, landed riding on a tigress. This absolutely stunning temple is built into a vertical granite cliff. This cliff of thousands of feet comes complete with a roaring waterfall. Padmasambhava



Aureoboletus thibetanus

fungi with Nigel, he himself is not much of a mycophagist. However, that wasn't much of an issue in a country where the only Italian restaurant serves you an excellent pizza con funghi cooked with fresh *Sese sham*, the "oak mushroom" we know as chanterelles. Along with this fabulous pizza you can order "Red Panda," a yeasty, bubbly wheat beer very similar to a Bavarian Hefeweizen.

meditated here for four months in the 8th century. It might be no coincidence that close by in Paro, is Bhutan's airport, tucked into a narrow valley of rice fields and farmhouses. Landing there is a totally crazy experience. It seems as if the wing tips are brushing along the pine forested slopes, so close that I was eagerly trying to spot mushrooms

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*Dawa emphasized that the NMC would love to be able to send some of its staff abroad for training to improve their taxonomic skills, and pointed out that taxonomic experts interested in coming to work in Bhutan would have the opportunity to help NMC with mushroom taxonomy. Bhutan should be a paradise for any mycologist; it has not only a forestation rate of over 70% but also boasts an incredible biodiversity, from tropic Himalayan foothills to high alpine areas peaking out at 7314 m (23,997 ft). If there are any mycology departments interested in cooperating with Bhutan, and able to offer an opportunity for training, I would be glad to help make the connection. Another important task of NMC is disseminating the knowledge of mushroom cultivation in the country. At the time of my visit, NMC was growing shiitake (*Lentinula edodes*), oyster mushrooms (*Pleurotus ostreatus*), and the medicinal Reishi (*Ganoderma lucidum*).*

from my window seat. A tiger was surely better adapted to land here, as reported from the year 747 AD, than today's 737!

I arrived at the base of the temple mountain at two in the afternoon, much too late for a hike, given that I had only four hours of daylight left and had been told that the climb up to the temple would take at least two or three hours. I would have to rush if I wished to have any time at all to enjoy the mountain retreat. A taxi delivered me to the base, but I was hesitant to get out, since five minutes earlier a powerful downpour had started to pound the taxi. I had no umbrella, no pre-arranged ride back, and everything was dark and wet. But what the heck, I thought. I had wanted to visit this temple ever since I had first seen it in photos many years ago. I jumped out of the taxi and rushed into the pine woods.

My trousers were soaked within minutes. The ground was full of fungal action, but I did not want to repeat my experience of the day before, when I had failed to reach Chari temple, due to having given all my time to photographing mushrooms. I only allowed myself quick glances at mushrooms when I was catching my breath; and I took only one photo of a river coming down on the wide entrenched trail. Taktsang was completely invisible in the hard rain and low clouds. I took a few short cuts through the dense lichen-clad forests to save time, but ended up worrying whether I was still on the right path. I really had to face up to my lack of awareness. By having wasted too much time in the morning in Thimphu, I was now rushing to "enjoy" the peak experience of my journey.

Finally the path leveled out. The view was still all heavy fog, but I spotted a small gate. Yes, I was in the right place! The path turned into a stairway and went steeply down a nearly vertical cliff. It led me to a wooden bridge under a roaring waterfall that shot out between two cliffs. To the right of the falls was a dry retreat cabin; not a drop of rain reached that spot under the cliff. The path led up a bit and there was Taktsang Gonpa. If I were a flying tiger or an eagle, I would have my nest here too!

I was hoping for a moment of peace inside the temple, but the young monk kept asking questions about my family. Even sitting in meditation posture with closed eyes didn't gain me a moment's solitude. Being soaked to the bones, I quickly got a chill. Movement was needed. I went back down again and while climbing the steps beyond the waterfall, the clouds suddenly parted, giving me the most stunning glimpse of the Tiger's Nest. A perfect surprise! More clouds moved in, a drizzle started up, and down I went.

On the way down, I managed to stop for a few mushrooms: a fried chicken mushroom (*Lyophyllum* sp.), a very popular mushroom in Bhutan known as *Nala Shamu*, lion's mane (*Hericium erinaceus*) and more of the beautiful *Amanita rubrovolvata*. The fading daylight reminded me that I had not arranged a ride back to Paro. I reached the road at twilight, but not a single car was to be seen in the spot where I

had hoped to hitch a ride. I hiked down the road for a mile or so before I heard the first car approaching. Bright lights blinded me. A pick-up truck stopped and the middle aged driver asked in good English where I wanted to go. There were two others in the truck, three members of the Bhutanese Royal Body Guard. And although they were not on their way to Paro themselves, they offered to drive me to town. Completely soaked, cold and hungry, I was immensely grateful to have been offered such a gracious ending to an awesome journey.

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(all my articles can be downloaded from my webpages www.MushRoaming.com)

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About the author

Daniel Winkler grew up collecting wild mushrooms in the Alps. He received a Diploma (= master) in Geography, Ecology, and Biology at FU Berlin. He lives in Kirkland, Washington, and works as researcher and NGO consultant on environmental issues of the Tibetan Plateau and Himalayas. He has published on forest ecology, forestry, land use, medicinal plants and in recent years mostly on fungi [see www.danielwinkler.com]. Working in High Asia, Daniel realized that mushrooms play a crucial role in Tibetan culture. Since 1998, he has been researching Tibet's diverse mushroom industry and its importance for rural people. He also leads annual "MushRoaming" tours to Tibet and Ecuador [visit www.mushroaming.com]; Bhutan tours are organized on request. ☘

Myco-Solstice

Unearthing the dark's
shroom-shaped shades from
a bonfire's ember nebulae
while watching stars
like petri dishes of
expanding mycelial thought