ETHNOMYCOLOGICAL JOURNALS: SACRED MUSHROOM STUDIES

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ETHNOMYCOLOGICAL JOURNALS:

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***Psilocybe antioquensis*, Bantrey Srei (Temple of the Women), Angkor Wat, Xiem Riap, Kampuchea.**

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Graphic Poster: Full Moon Mushroom Dream Festival on Koh Phanghan, Thailand. Representing *Psilocybe samuiensis* and *Psilocybe cubensis* and copied from photographs from rice paddie habitats at Na Muang and Ban Thurian, respectively, on Koh Samui Island in The Gulf of Thailand. Graphics: John W. Allen.

An Ethnopharmacological and Ethnomycological Update on the Occurrence, Use, Cultivation of Known Species, Chemical Analysis, and SEM Photography of Neurotropic Fungi from Thailand, Cambodia and other Regions of South, Southeast Asia, Malaysia, Indonesia and Bali.

By

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Summary

In the continuing studies began by Allen and Merlin in the late 1980s and early 1990s, as well as the recent discoveries of a 2nd bluing *Psilocybe* from SE Asia (*Psilocybe antioquensis*), first found at the Temple of the Women (Citadel of the Women) known as Banteay Srei, situated near the hill of Phnom Dei, 25 km (15 miles) north-east of the main group of temples at Angkor Wat, and the presence of *Psilocybe* samuiensis is also noted now from Kampuchea (formally Cambodia). Because of these new findings, the authors of this present study were prompted into presenting an updated report concerning the known species of neurotropic fungi found in certain regions of South and Southeast Asia, Oceanea and the Asian/Polynesian Pacific. Previous investigations on the Thai islands of Koh Samui, Koh Pha-Ngan, Phuket and in various locales situated in Orissa, India, Kampuchea, Vietnam, Burma, Malaysia, Indonesia and Bali, and in several tourist resort locations in the Philippine Islands, indicated that three species of psilocybian fungi (*Psilocybe cubensis*, *Psilocybe subcubensis* and a complex mixture of variations of *Copelandia* species, consisting primarily of *Copelandia cyanescens*), are used for ludible purposes amongst foreign tourists vacationing in that region of the world. A single specimen of *Copelandia cyanescens* and spore prints obtained from 2 separate collections of *Psilocybe cubensis* were successfully cultivated along with *Psilocybe samuiensis*, *Psilocybe antioquensis*, *Psilocybe mexicana*, as well as another species, *Psilocybe pegleriana.* Cultivation of several species of *Psilocybe* are presented along with their comparative chemical analyses of several related species (*Psilocybe samuiensis*, *Psilocybe mexicana*, *Psilocybe antioquensis*, *Psilocybe semilanceata*, including *Psilocybe weilii* and *Inocybe aeruginascens*), and are herein described, along with SEM photography of the first above four noted species. SEM (scanning electron microscopy) results of fragments from collected specimens of the Malaysian collections are presented, as are SEM images of spores from several other known neurotropic species in Southeast Asia. Additional collections of both *Psilocybe cubensis* and *Copelandia cyanescens* from Phuket Island along the Andaman Sea off the East Coast of Thailand facing India were forwarded to México for proper identification by Guzmán. Additionally, JWA traveled to Angkor Wat in Siem Riap, Kampuchea where he again collected specimens of both *Psilocybe cubensis* and *Copelandia cyanescens*. This is the first report of *Copelandia cyanescens* from the temple grounds of Angkor Wat, Kampuchea. Three new unidentified *Psilocybe* species were also studied but have not as yet been identified. A new species was given the tentative name, *Psilocybe violacea* nom. prov., due to the nature of a violet spore deposit that was present on several caps of a single collection of the wild fungi. That species was discovered in 2002 by Travis Canaday wild grasses more than ten feet

in height at Ban Tai, Koh Samui. However, Guzmán readily identified this mushroom as *Psilocybe pegleriana*, a coprophilous fungi common in tropical Asia. Two unidentified *Psilocybes* are partially also described in this study. Under discussion, the authors also present an updated overview of the etiology and history of the ludible and/or recreational use and occurrence of some SE Asia neurotropic species from southern Thailand appearing in the tropics and neotropics of both hemispheres and in other countries of the world. This is the 1st report of *Psilocybe samuiensis* from Kampuchea and from Ranong Province in Thailand and the 2nd for *Psilocybe antioquensis* from Kampuchea, and 2nd report of *Psilocybe pegleriana* from Thailand. Additionally, we present several images representing what appear to be mushroomic symbolisms found in various temples in Thailand and Angkor Wat compounds in Kampuchea, including: Davatas, asparas, and bas relief's that featured sculpted mushroomic like hand-held figures. Furthermore we also note the presence in Thailand of a new suspected active species belonging to the Genus *Amanita*, *Amanita mira* (see figure .

KEYWORDS: *Psilocybe* sp., *Copelandia* sp., *Hypholoma* sp., *Amanita* sp. *Copelandia cyanescens*; *Psilocybe antioquensis, Psilocybe cubensis*, *Psilocybe samuiensis*, *Psilocybe pegleriana, Amanita mira*, cultivation, chemical analysis, SEM images. Micrographs and Recreational and/or ludible use.

Materials and Methods

In 2006, the senior author (JWA) returned to Southeast Asia to finish a 23-year follow-up study of the use and occurrence of neurotropic mushrooms by foreign tourists in various locations in both Thailand and Cambodia. Looking back in retrospect, we note that in 1991, a new species, *Psilocybe samuiensis* Guzmán, Bandala and Allen, was reported from Koh Samui Island. Gartz, Allen, and Merlin later determined the chemistry and cultivation of *Psilocybe samuiensis* during the summer and fall months of 1993, reporting that Guzmán, Bandala and Allen had determined the species to be microscopically directly related to *Psilocybe mexicana*. In the early summer of 2005, JWA again harvested 30 specimens of *Psilocybe samuiensis* in a rice paddie at Angkor Wat in Kampuchea.

Specimens of a bluing *Psilocybe* were discovered by JWA's friends during a foray to Banteay Kdei and Banteay Srei in the early August of 2002. Later a 2nd collection was harvested in June of 2003 near Banteay Kdei. Guzmán, Allen and Sihanonth (2006) later identified this new species as *Psilocybe antioquensis,* a bluing *Psilocybe* first reported from Antioquia, Colombia, S. A. Later Guzmán reported the same species from Jalisco and Veracruz, México and now from Angkor Wat. Additionally several collections of *Psilocybe cubensis* and *Copelandia cyanescens* were harvested from dung of cattle at Alor Setar in the Kedah State of Malaysia, just north of Kuala Lumpur near the Southern Thai border. Similar mixed *Copelandia spp*., were also found in Thailand at the Suphanburi Bann kwai (buffalo house) as well as in Bangkok, Koh Samui, and Phuket. *Psilocybe cubensis* and *Psilocybe samuiensis* from Koh Samui were also collected in the fall of 2002 and 2003, and June and July of 2004. *Psilocybe cubensis* and *Copelandia* cyanescens were found in 2004 by JWA just north of Hanoi, Vietnam.

Between 1986 and 1991, JWA led several expeditions into the jungles of Thailand and Cambodia seeking out new species of psilocybian fungi. And years later, in 1998 through 2006, JWA conducted an additional 10 expeditions to Southeast Asia (June of 1998, September-October 1999, September-October 2000, 2001, July 20 through August of 2003 and June through August of 2004, May-July of 2005, September-October of 2005, as well as in September-October of 2006). Additional specimens of *Psilocybe cubensis*, *Psilocybe subcubensis*, and *Copelandia cyanescens*, as well as several other neurotropic species and some unidentified *Psilocybe* species were also studied and harvested for herbarium deposit. In 1998, 1999, and 2000, Guzmán had identified two species of the team's herbarium deposits as *Psilocybe cubensis and Copelandia* cyanescens collected by JWA and friends in Kuala Lumpur, Malaysia.

Other species under discussion include *Psilocybe samuiensis* from two new locations in rice paddies at Na Muang, Koh Samui and in rice paddies in Ranong Province, in the Eastern peninsula of Thailand facing the Andaman Sea and India. Both *Psilocybe antioquensis* and *Psilocybe samuiensis* were also collected and identified by the author and by Guzmán from locations at various temples at Angkor Wat, Kampuchea. Guzmán verified the above noted herbarium collections, as well as specimens of *Psilocybe pegleriana* from Koh Samui and Suphanburi, Thailand; also three unidentified *Psilocybe* species (2 from Koh Samui and 1 from Suphanburi, Thailand) had bluing in the stipes.

Cultivation of Species

Copelandia cyanescens:

While traveling to Suphanburi in the late summer of 2002, the authors harvested a small collection of *Copelandia cyanescens*. However, observations of a cap on a single specimen from that collection revealed that it did not macroscopically resemble any known species of *Copelandia*. Thus the authors were somewhat skeptical in their macroscopic identification of the partially dried specimen. Throughout the cultivation of this specie we were able to determine that it was indeed *Copelandia cyanescens*. The next three Figures (Figs. 1 to 3) are a result of our first attempt to grow this species from spores that were extracted from a single-mangled dried specimen resulting in some very beautiful results quite large specimens now named on the Internet as Pan Goliath's.

Fig. 1. A dried specimen collected at Suphanburi, Thailand. It appeared to belong to the genus *Copelandia*, most likely *Copelandia cyanescens*.

After some careful agar work we were able to extract a viable culture from spores clinging to the dried gills. It fruited easily and quickly. On our second attempt in cultivating this species, we grew them on cased sterile horse manure processed in a presealable injection port mycobag. Since the bag was hermetically sealed before sterilization, most likely there should be no rupture.

Fig. 2. 1st flush 7 days after casing with a thin layer of sterile peat and calcium carbonate.

Fig. 3. 2nd flush. The largest specimen had a cap diameter of more than over 4 cm (1.5 in) and not fully expanded. This strain tends to produce particularly large well-formed fruits quickly in culture.

Pinhead coloration is a brownish olive that fades to grayish white with maturity. Spore production is heavy over a long period of time. Flesh blues intensely when cut or bruised. The largest specimen of *Copelandia cyanescens* grown is recorded at nearly 2 inches (4 cm) across which is huge for *Copelandia cyanescens*.

Fig. 4. 1st flush 7 days after casing with a thin layer of sterile peat and calcium carbonate.

Fig. 5. 1st flush. The largest mushroom has a cap diameter over 4 cm (1.5 inches) and did not fully expand.

Fig. 6. 2nd flush long shot.

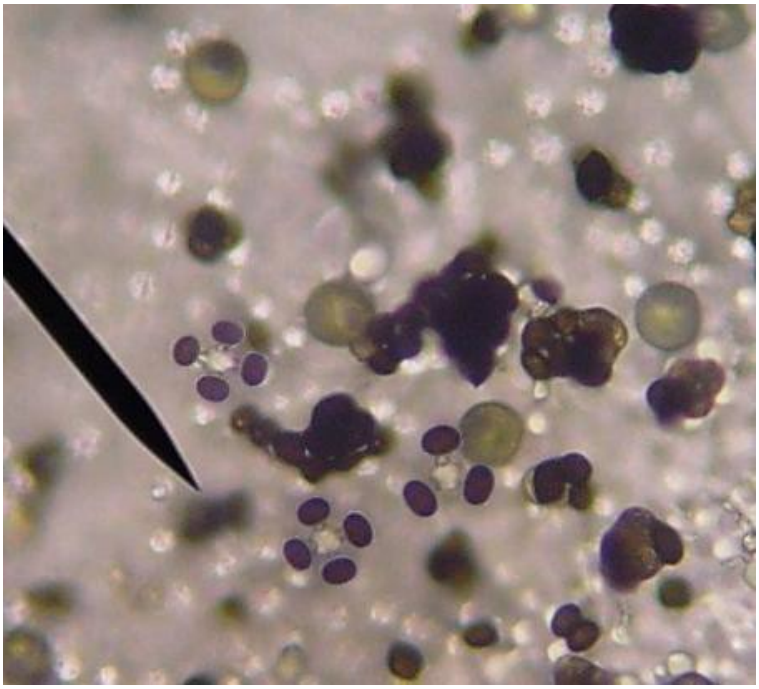


Fig. 7. Close up of gill surface showing basidia with spores. Pointer is approximately 8.4 micrometers in width.

The largest mushroom (so far) pictured below on the following page, measured out at just over 5 centimeters. It seems when grown *in vitro,* fruiting bodies never resemble their natural outdoor cousins.

Fig. 8. Grid in the background is 1/2 inch per square.

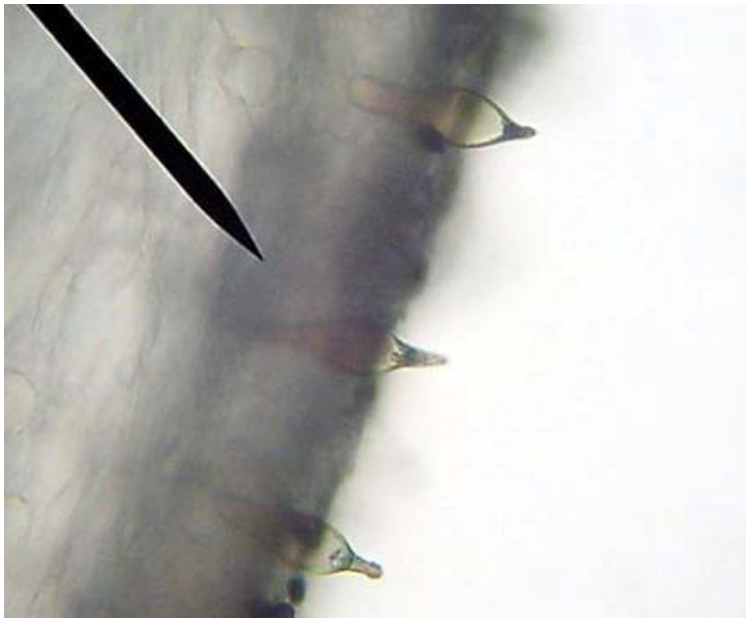


Fig. 9. Pleurocystidia. In this figure, the pointer is 8.4 micrometers in width.

The Natural Occurrence of *Copelandia cyanescens* in a Man-Made Environment

During a recent walk along the garden pathway surrounding the administration building at the Department of Microbiology's Faculty of Science at Chulalongkorn University in Bangkok, one of the authors of this study (PS), noticed the occurrence of numerous small colonies of *Copelandia cyanescens* fruiting in the gardens of the office building.

This was very similar to the finding of mass fruiting's of *Copelandia cyanescens* in gardens at Suphanburi, Thailand, where, in 2003, three of the authors of this paper learned gardeners there had used kwai (water buffalo) fertilizer to enhance the gardens topsoil at the Bann kwai farm.

Later, PS learned that the gardeners had added to the soil, several 10-20 pound bags of commercially mixed composting manured soil they had recently purchased at a public market in Bangkok. The fertilizer apparently was instrumental in enhancing the garden area surrounding the office and lab building at Chulalongkorn University and it was within several weeks after the fertilizer had been mixed with the surrounding topsoil that PS noticed the occurrence of the *Copelandia* mushrooms pictured below.

Fig. 10. A **small colony of *Copelandia cyanescens*. Unintentionally introduced into a garden surrounding the administration building of the Department of Microbiology, Faculty of Science, Chulalongkorn University, Bangkok**.

Again we have a situation where man-made environments are ideal for the outdoor cultivation of many different species of both edible and psilocybian mushrooms in locations across the world where either manure or alder-mulched gardens abound causing shrooms to fruit outside of their natural habitats with much success.

Fig. 11. Introduced *in situ Copelandia cyanescens*. Garden of administration building. Department of Microbiology, Faculty of Science, Chulalongkorn University, Bangkok.

Fig. 12. *Copelandia cyanescens* over 10 cm in height. Garden, administration building. Department of Microbiology, Faculty of Science, Chulalongkorn University, Bangkok.

Fig. 13. Gill structure of a fresh specimen of *Copelandia cyanescens.*

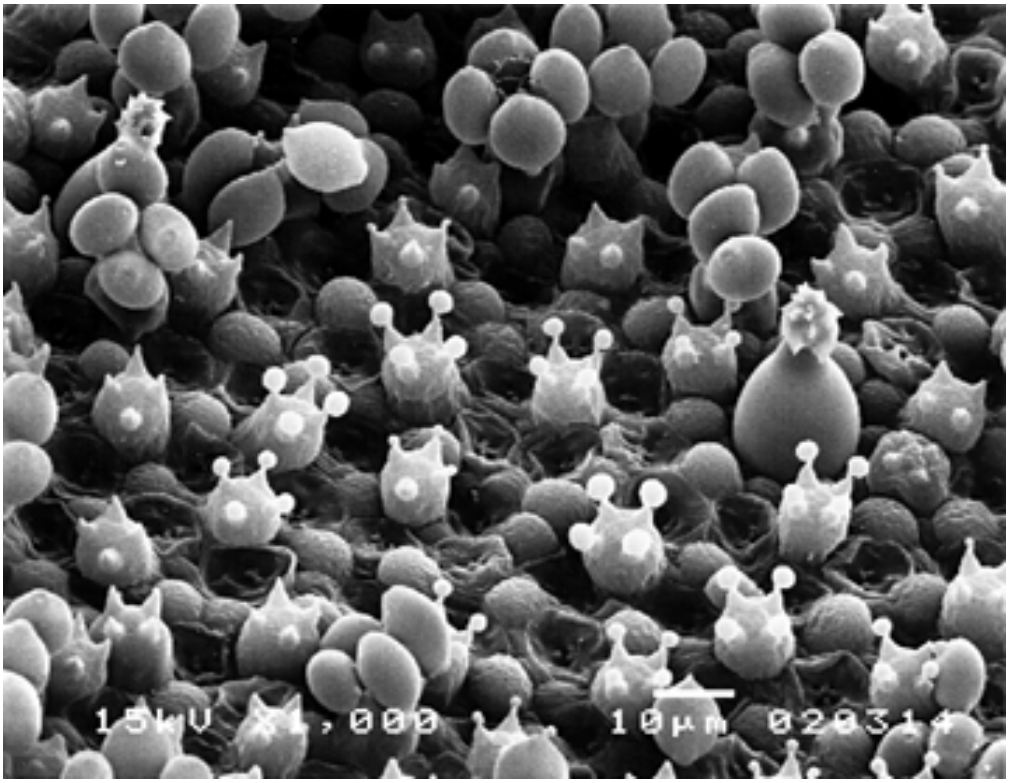


Fig. 14. SEM micrograph of gill fragment of *Copelandia cyanescens* showing basidium modvard, various ages of basidiospores including the crycholicstidiata.

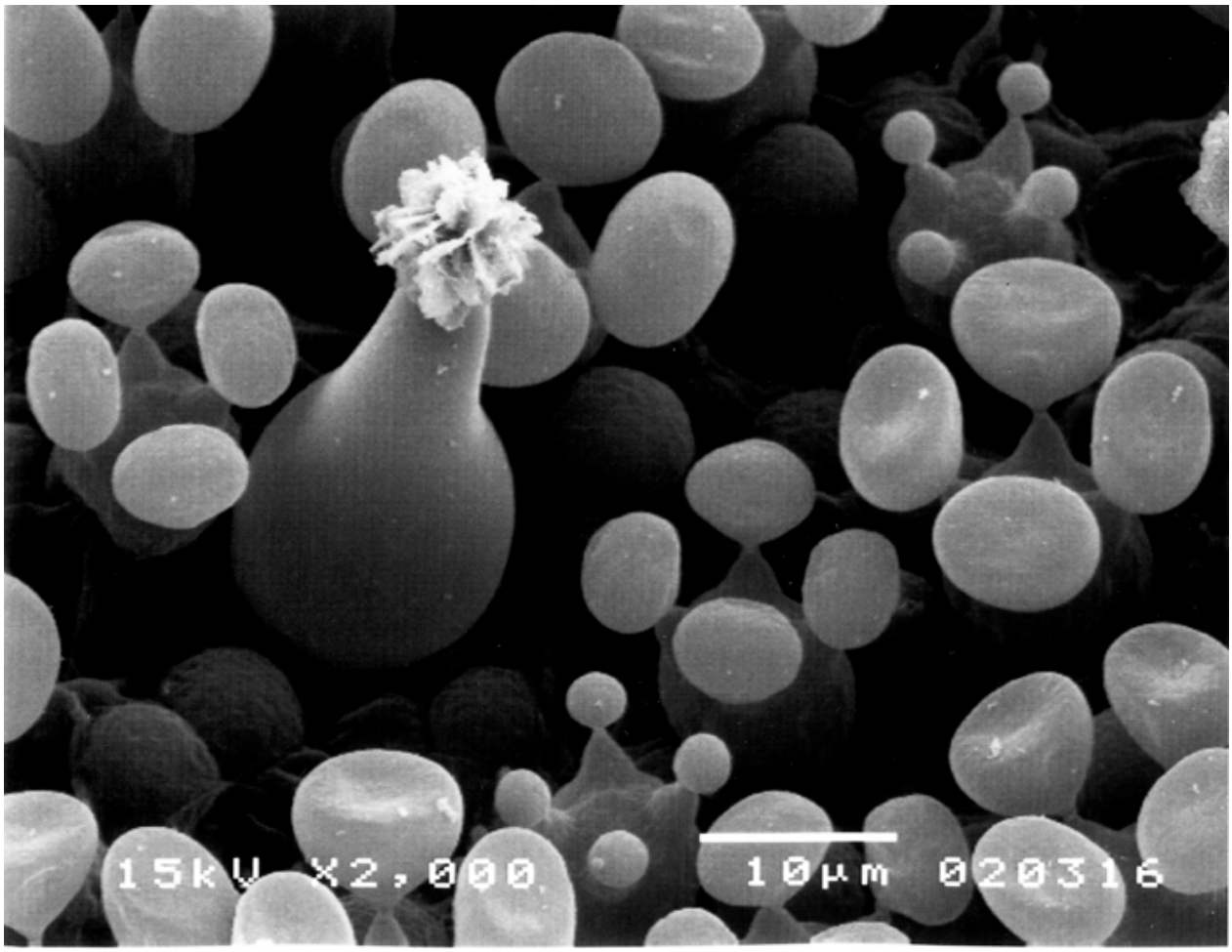


Fig. 15. High magnification SEM of basidiospores and crown cheilocystidia.

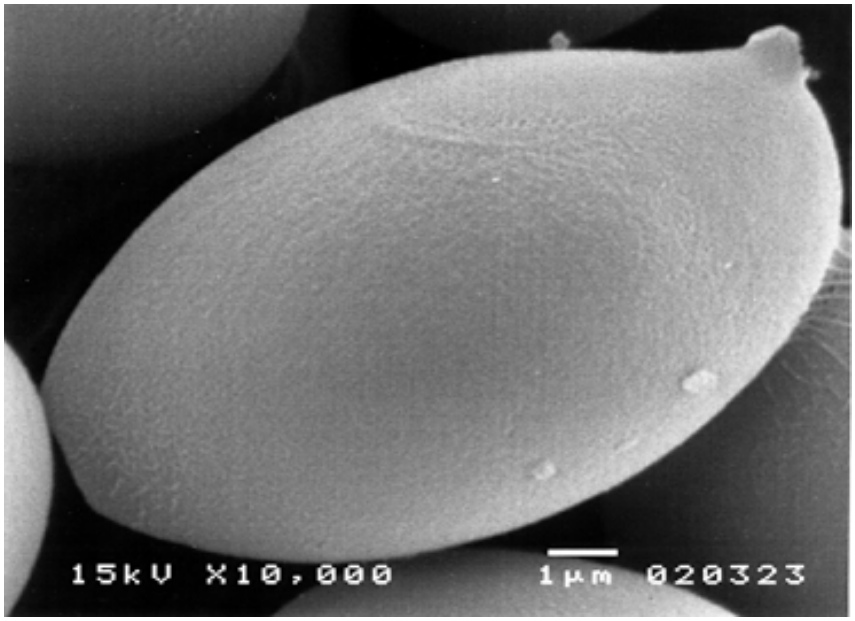
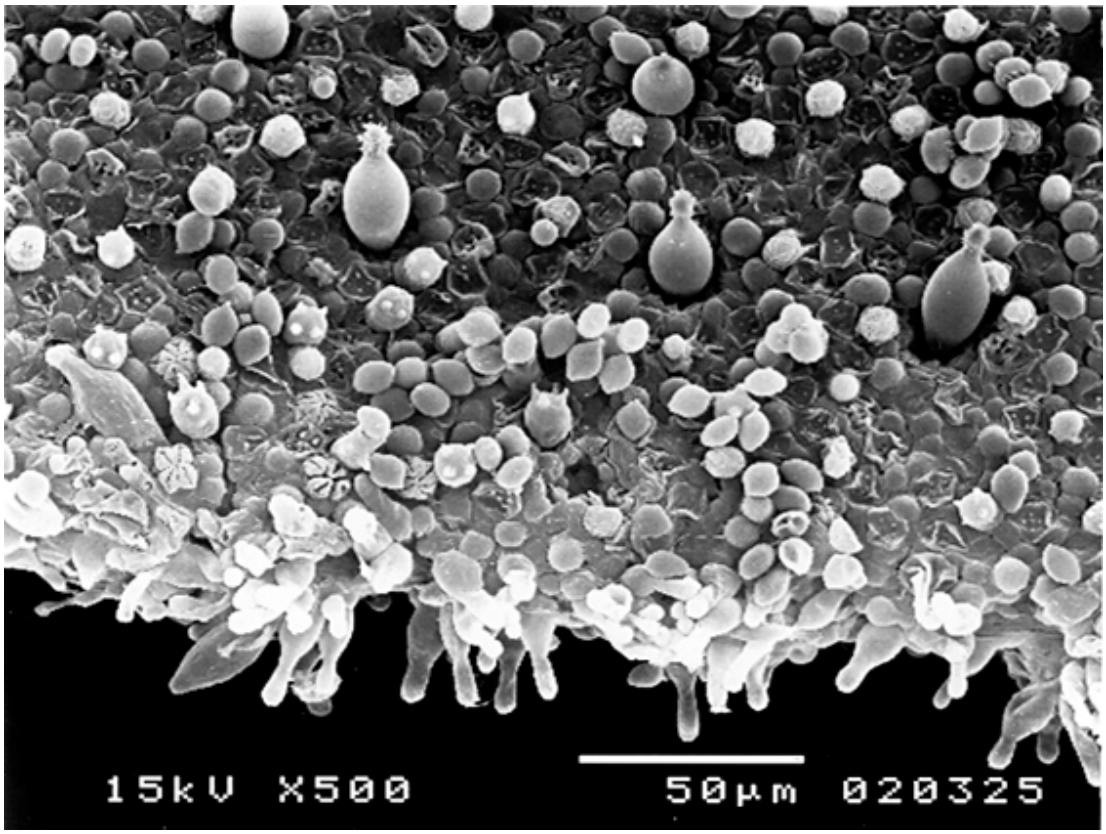


Fig. 16. High magnification SEM of basidiospores of *Copelandia cyanescens* showing the spores lemon-shape and typical germ pore.



Figs. 17. High magnification of gill tissue and cheilocystidia crowns aligning to show the edge of the gill fragments at the bottom of the image of *Copelandia cyanescens*.

Psilocybe antioquensis:

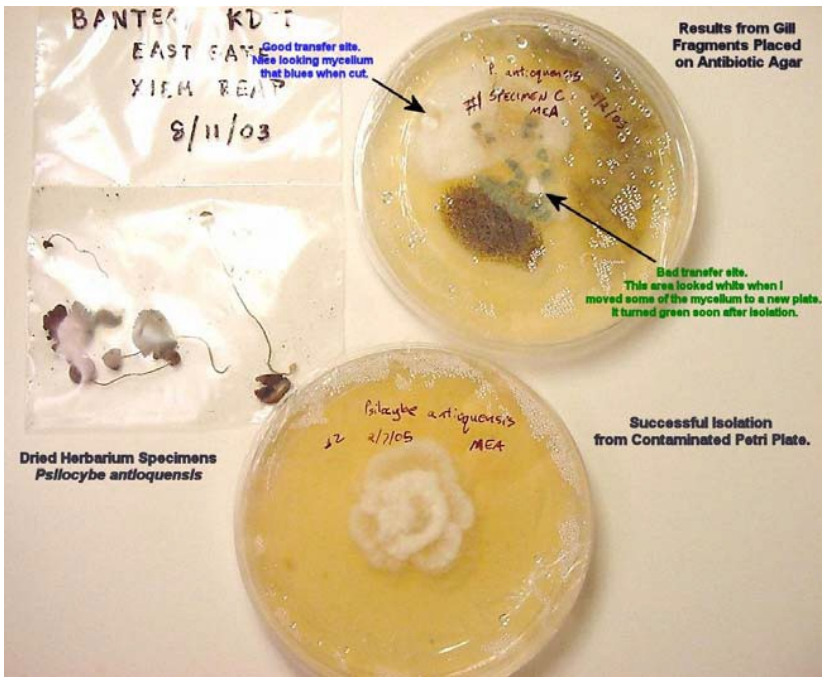


Fig. 18. Isolation of viable mycelium from spores attached to gills of a dried mushroom.

Fig. 19. The conida of a species of Pestola.

Well, the nice white mycelium pictured above in the Petri plates turned out not to be mushroom mycelium after all, but are actually the conidia of a species of *Pestalotia*, a genus of andolse endorphytic fungi that often causes disease in mangrove plantations and other plants. A 2nd experiment using agar dosed with benlate fungicide to inhibit sporulating molds, eventually allowed the mushroom spores to germinate. A preliminary report of the first attempt to cultivate *Psilocybe antioquensis* collected in Cambodia was noted. Below is an image of the first single collection of *Psilocybe antioquensis* from Banteay Kdei and from Banteay Srei (The Temple of the Women). Information regarding the conidia can be found on the Internet at the following URL posted directly below:

http://www.botany.utoronto.ca/ResearchLabs/MallochLab/Malloch/Moulds/Pestalotiopsis.html/

Fig. 20. A dried specimen of Psilocybe antioquensis with a nickel for scale.

Fig. 21. *Psilocybe antioquensis* collected at the Citadel of the Cell (Banteay Kdei), an ancient prison at Angkor Wat, Kampuchea.

Fig. 22. Spores extracted from a dried specimen of *Psilocybe antioquensis*. Pointer is 8.4 micrometers in width.

Fig. 23. Pins resulting from a culture isolated from the dried specimen.

The substrate is sterilized horse manure cased with peat/oyster shell. Pins formed 5 weeks after casing at 78F. The fresh mushrooms reportedly blued and the cultured mycelium definitely bruises blue on agar.

Fig. 24. While some pins get bigger, some are also stalling. Only one seems to be still going strong.

Fig. 25. A mature fruiting body of *Psilocybe antioquensis.*

Fig. 26. Most previous minodium pind aborted and many continued to do so. This lone survivor formed a less fully mature fruiting body. It appears to be sporeless and abnormal. The image shows a 1-1½ in. pinner.

Cultures:

Spores were streaked on 2% malt extract agar with gentamycin sulfate antibiotic. The spores were extracted from a dried specimen germinated in at 27°C in 10 days. The mycelium stained blue when cut on the agar. Fructifications were obtained on sterile horse manure, with no supplements, cased with sterilized peat moss with 25% crushed oyster shell by volume at 25°C after 5 weeks. The mushrooms reached their complete development in 30 days after pinheads were noted, and were normal, except that they presented a larger, whiter stipe with a small pileus." Most of the developing mushrooms aborted before growing to maturity and no spores were visible on the gills.

In the image posted directly below, we were able to obtain a successful isolation of healthy mycelium from dried mushroom specimens using benlate (mold specific fungi) in concentrations of 10 mg per liter and gentamycin sulfate (antibiotic) malt agar. No contamination occurred after the addition of benlate and gentamycin sulfate introduced into the culture medium. We did streak dried gill tissue over the surface using sterile forceps to spread out the spores, then we left the tissue on the agar at the end of the streak. Typically, the tissue mass contaminates but spores left by the streaking usually germinate cleanly. We were certain by now that only the spores produced the mycelium but there was no definite way of knowing as we had several mycelial types growing.

Fig. 27. Addition of benlate (10mg per liter) gentamycin sulfate (100mg per liter) attempt worked great. No signs of molds or bacteria at all. A vast difference compared to the earlier attempt with only gentamycin.

Updated info on a 2nd attempt to cultivate *Psilocybe antioquensis*

More specimens of *Psilocybe antioquensis* were later collected by (JWA) and some Cambodian children along a cattle trail at the east gate to Banteay Kdei (Citadel of the Cell), all basically found fruiting in manured soil at Angkor Wat in Xiem Riap, Kampuchea.

Fig. 28. Freshly harvest fruiting bodies of *Psilocybe antioquensis*.

Fig. 29. *In situ* image of the second collection (2003) of *Psilocybe antioquensis*.

Fig. 30. Dried mushroom specimens of *Psilocybe antioquensis* used for spore extraction and cultivation.

Fig. 31. Young *Psilocybe antioquensis* mushrooms developing on grass seed cased with pasteurized peat/calcium carbonate in small glad-ware container.

Fig. 32. Maturing mushrooms. In the 1st flush, there was heavy bluing on the damaged and aborted mushrooms. None of these early fruits grown in the lab resembled the Naturally occurring wild specimens collected in Cambodia.

Fig. 33. Fruiting bodies of *Psilocybe antioquensis.*

Fig. 34. Freshly harvested fruiting bodies of *Psilocybe antioquensis*.

Fig. 35. Mature fruiting bodies of *Psilocybe antioquensis.*

Fig. 36. Freshly harvested specimens of *Psilocybe antioquensis*.

Fig. 37. *Psilocybe antioquensis.* 2nd cultivation attempt in 2009. Photo: Workman.

Fig. 38. *Psilocybe antioquensis* 2nd cultivation attempt (2009). Photo: Workman.

SEM's of *Psilocybe Antioquensis*

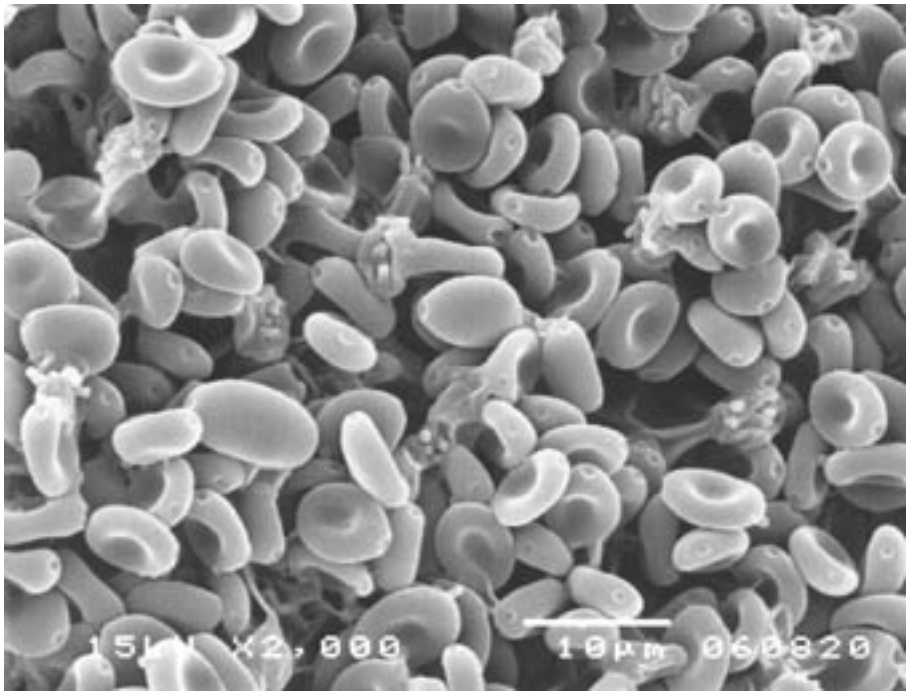


Fig. 39. SEM micrograph of the basidiospores of *Psilocybe antioquensis.* Observe the ellipsoid shape and red blood cells of the spores.

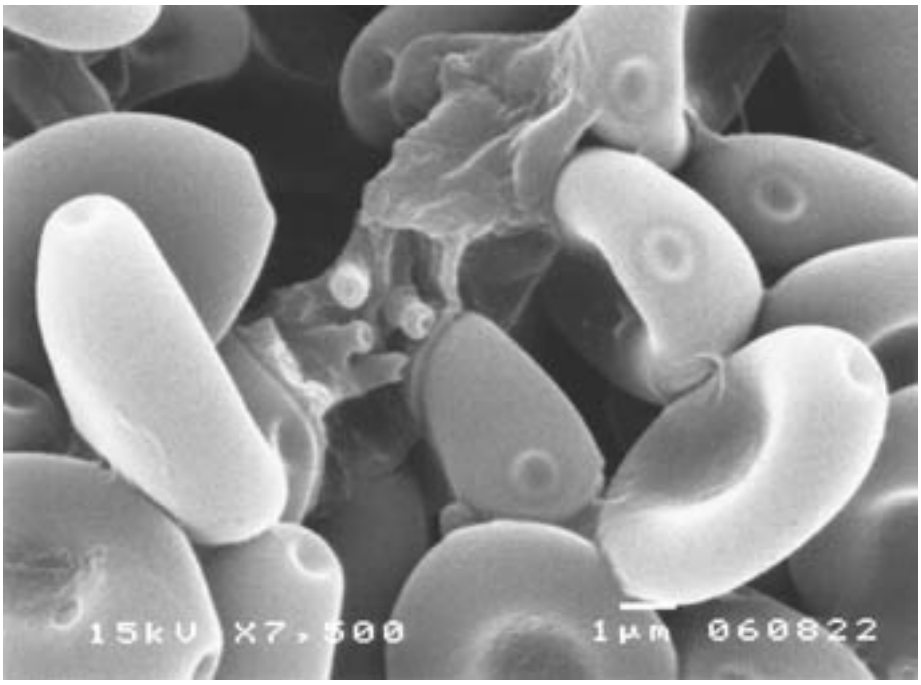


Fig. 40. High magnification SEM of the basidiospores of *Psilocybe antioquensis* attached to gill tissue with marked of germ pore.

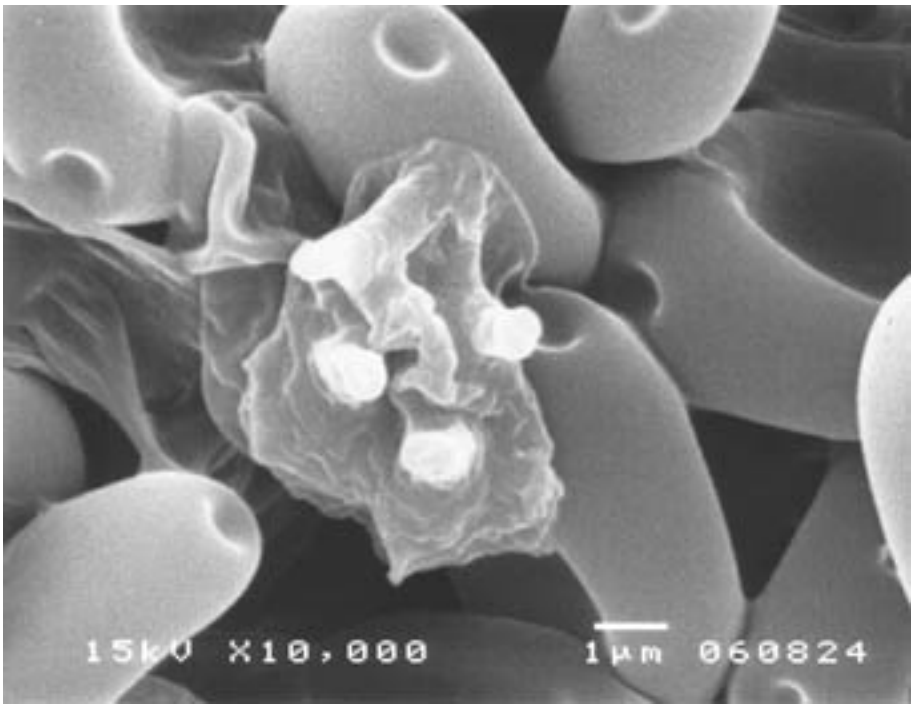


Fig. 41. *Psilocybe antioquensis* SEM.

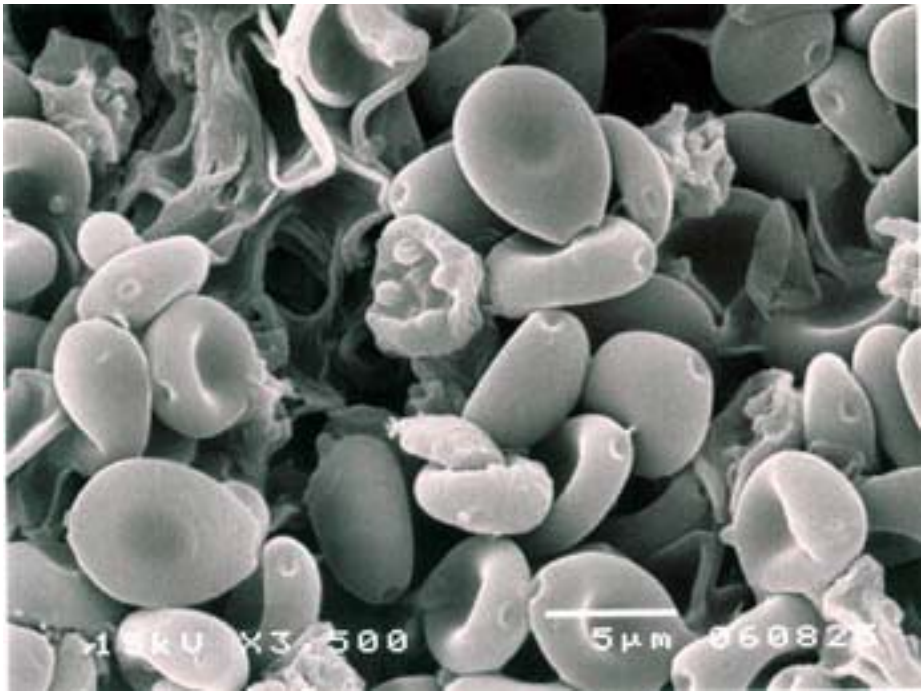


Fig. 42. Psilocybe antioquensis SEM.

Psilocybe cubensis:

Spore prints for the cultivation of *Psilocybe cubensis* were obtained in decomposing elephant dung compost near Na Muang, Koh Samui, Thailand. See discussion for comments on the appearance of *Psilocybe cubensis* in elephant dung.

While traveling around the tropical isle of Koh Samui, the senior author turned onto a side road into the interior of a coconut grove near the region of Na Muang. This is an area where they cart various collections of elephant dung from around the region and dispose of the defecation in a sterile manner in brush away from human habitats. Eventually after some composting, especially during the monsoon season, the elephant handlers eventually cover the elephant dung balls with palm fronds. It was in such an area as seen in the next image where the senior author (JWA) discovered several species of mushrooms in the elephant dung balls. One species was *Psilocybe cubensis*.

Interestingly, in 1988, one of the authors (JG), together with G. K. Muller, grew *Psilocybe cubensis* on elephant dung obtained from the Leipzig Zoo. They were cultivated in the Botanical Gardens at 23-27 degrees Celsius. The spawn was rye grain with fruitings appearing in 4 weeks.

Fig. 43. An elephant at Na Muang, Koh Samui and composting dung-balls.

Utilizing a fresh spore print (July 2005) obtained from a specimen collected in elephant dung, we used PDA to grow mycelium and were able to obtain a nice sized pinner in a petri plate. The spawn grew rapidly within 8 days permeating the medium in pre-sterilized rye berry seed. Then we mixed the colonized rye berry seed with pasteurized wheat-straw and horse manure compost. In 20 days of mixing the two in a mycobag, we started to see pinners forming throughout the cake and the cake was then transferred to a terrarium.

Fig. 44. *Psilocybe cubensis* in elephant dung with patches of white mycelium.

Fig. 45. *Psilocybe cubensis* in elephant dung, Na Muang, Koh Samui.

Below is a series of pictures showing the development of *P. cubensis* grown on organic compost cultures (20, 21, and 22 days) after inoculation of spawn and compost. This was a most interesting cultivation project as it eventually produced 2 terrariums of 4 flushes each within 47 days after inoculation of the rye berry spawn and mycelia with pasteurized compost. We grew some really interesting specimens, including one that resembled an elephant's eye and truck.

Fig. 46. Day 20.

Fig. 47. Day 21.

Fig. 48. Day 22.

A large 5-pound cake was split into two terrariums. The above image is the result of terrarium number 1 after 22 days since mixing spawn with the compost.

Fig. 49. Day 23 of the end of the 1st flush of box 2.

Fig. 50. Day 36 of the 3rd. flush. Eye of Elephant

Interestingly, this odd mutated growth happen to resemble the eye of an elephant with its trunk curled up, similar in photo below of an elephant walking on a highway north of Erawan, Thailand in the NE region of the country. Eventually this strain produced 2 terrariums and a total of four flushes each, ending on the 47th day of their growth.

Fig. 51. The real "Eye of Elephant," near Erawan, Thailand.

The Tak Mountain Cube

On a misty mountain Sunday morning, in July of 2005, the senior author, along with two professors and four students from Chulalongkorn University, were wrapping up a three-day mushroom foray at an altitude of 1000 meters at the Taksinmaharat National Forest in Tak, Thailand. We had been collecting micro-fungi and other species for research at the University.

Fig. 52. Taksinmaharat National Forest. Tak, Thailand, 7 a.m., July 2004.

Around 8:30 in the morning, one of the authors (PS) ask that JWA accompany him outside to a nearby lawn were he believed he had just found a single specimen of hed kee kwai (mushroom which appears after water buffalo defecates, *Psilocybe cubensis*) growing from a grassy lawn with no visible manure heap.

This was totally unexpected at this altitude in the mountainous regions of Tak. However, nearby was a lean-to shanty shed with aluminum siding for a roof and in that opened-aired shed was a mound or powdered buffalo manure, used to fertilize the lawns in the National Forest along the roads where the lodges were and in the general public areas. We inquired of the rangers at the Park regarding the presence of the powdered manure and learned that the manure came from water buffalo belonging to various Hill-Tribe peoples living in the mountainous jungle regions of Tak and the powdered manure was sprinkled on the grounds as a fertilizer.

Fig. 53. An *in situ* photo of a single Taksinmaharat National Forest Mountain Cube at 1000 meters altitude, Tak, Thailand.

Fig. 54. *Psilocybe cubensis* from Tak.

Two attempts were made to grow the Tak mushroom. The first time the large mycobag developed a pool of green liquid at the bottom of the bag due to aspergillus mold. When the bag was opened to place the 5-pound cake into the terrarium, green water ran onto the cakes compost and spawn mixture, thus contaminating the cake. We tried to resolve this contamination by immediately soaking the cake in cold tap water that should have shocked it into growth. Two flushes resulted from this action and they were very small. The first flush yielded two long 8" mushrooms. The 2nd flush occurred one week later producing a flush of 8 mushrooms. One mushroom was quite large (cap 4" in diameter).

The 2nd attempt to cultivate this mushroom was quite successful as seen in the images below. Pinners appeared on the 18th day after mixing the spawn composed of rye berry seed and pasteurized wheat-straw mixed with horse manure.

Fig. 55. First flush. Tak Mountain Cube. 21 days after mixing spawn with compost.

Fig. 56. Day 22. First Flush.

Fig. 57. Day 23. First flush.

Fig. 58. Day 24. First flush.

Fig. 59. Day 24. First flush. 4 hours later.

The 2nd flush also produced some beautiful large pinners as seen in the images below; some appeared to be very sexual in their forms. The caps of these specimens were from 2 to 3 1/h inches in diameter.

Fig. 60. A small corner of the 2nd flush of the Tak Mountain Cube 27 days later.

Fig. 61. A few hours later. Center fungi removed for cloning purposes. 28-days.

Fig. 62. A Bouquet of the Tak Mountain Cube. Day 32.

Fig. 63. Day 28 of the 2nd flush.

Below, we see from a chopped in half cake from the third flush of the Tak Mountain Cube, a new fast flush.

Fig. 64. Day 37 of the third flush.

Psilocybe mexicana Heim.

Fig. 65. Mycelium forming in agar.

Fig. 66. A jar of spawn of *Psilocybe mexicana*.

Roger Heim first cultivated *Psilocybe mexicana* in 1958. The majority of those 1st *in vitro* cultivations often resulted in spore less fruiting bodies of the species. Caps curled and over turned inwards and upwards observed in the selected photo images posted below

Fig. 67. *Psilocybe mexicana* with a single sterile spore less cap.

Fig. 68. A handful of curled up caps producing spores.

Fig. 69. A close up of the above *in vitro* fruiting bodies.

Psilocybe mexicana Heim – Jalisco Strain.

A multi-spored culture of *Psilocybe mexicana* - Jalisco strain fruited on grass seed cased with peat/calcium carbonate. Several phenotypes were observed and documented.

Fig. 70. Fruiting bodies of the Jalisco strain.

Fig. 71. 1. Light spore production. Good size but somewhat irregular cap margin. 2. Dwarfed malformed cap and stems. 3. Large floppy irregular caps. Poor spore production. 4. Very tiny but apparently normal. 5. Good spore production but the caps show a characteristic dryness that can cause an abrupt halt in growth. 6. Two tall, tiny caps. 7. Best: Good form, size and spore production. Specimen cloned. Grid is ½ inch in diameter.

Results show fruiting of cloned mushroom (1st flush). Evidence that increased spore production trait was retained as shown by spore deposit on a lower cap.

Fig. 72. Beautiful fruiting bodies similar to *in situ* specimens.

A good early sign that a strain will produce spores as well is a very dark caramel colored cap. Pale and/or orangish [ochraceous] specimens produce spores poorly. No sclerotia are visible in the casing layer at this time. Typically, other strains of *Psilocybe mexicana* put a great deal of energy into large lumps of sclerotia that heaved up the casing layer prior and during fruiting. The Jalisco strain of *Psilocybe mexicana* did produce some sclerotia *in vitro* after an extended incubation times. That first flush of fruiting bodies occurred after we obtained and cloned a pinner isolated from mycelium grown in agar (PDA). The *in vitro* grown *Psilocybe mexicana* actually resembled the macroscopic features associated with this species when observed in manured fields of wild grasses where cattle and sheep graze

In contrast to these results, Gartz (1994) obtained from another strain, sclerotia from a rice/water substrate with an early beginning after only 2 weeks of cultivation.

The sclerotia contained:

0.18 – 0.65% psilocybine,
Up to: 0.39% psilocine, and
only: 0.01% – 0.02% baeocystine, (Dry weight).

Fig. 73. A flush of the Jalisco strain of *Psilocybe mexicana*.

Fig. 74. ***In situ Psilocybe Mexican*** **from Jalisco. Photo: Fulvio Castillo Suarez.**

Fig. 75. ***In situ Psilocybe mexicana*** **strain, Mexico. Photo: Alan Rockefeller**.

Fig. 76. Freshly harvested specimens of the Jalisco strain.

Psilocybe mexicana Heim – The A Strain.

Psilocybe mexicana strain A is noted for its exceptional sclerotia forming abilities but it can be fruited under controlled conditions. Note the beautiful formation of the sclerotia in the image posted directly below. On Dec 2, 2008, the Dutch parliament banned the possession and sales of psilocybian mushrooms because many tourists were consuming too many mushrooms, causing problems for the local populations and the Dutch Parliament actually used a paper by Guzman, Allen and Gartz (1998) to note what species would become illegal in the Nederland. However, the lack of judgement amongst the uniformed Dutch 'lawmakers' unkowningly also banned several species of edible fungi, yet failed to include as illegal, the active sclerotia of *Psilocybe tampanensis*, *Psilocybe mexicana* and other fungi items such as spores, and grow kits which wnen used will produce tryptamine alkaloids noted in the banned fungi. So mushroom farms are still successful from tourist influence due to legal sales of active sclerotia in Smart Shops, along with grow kits and spore prints. All still available in the Nederland and no recent shroomatic problems between tourists and magic mushrooms have arisen since the ban went into effect.

Fig. 77. The sclerotia of *Psilocybe mexicana* Heim.

In the images below, substrate grass seed was used and cased with sterile peat and calcium carbonate in a 4:1 ratio. Fruiting temperature was between 75-78°F with a good exchange of air.

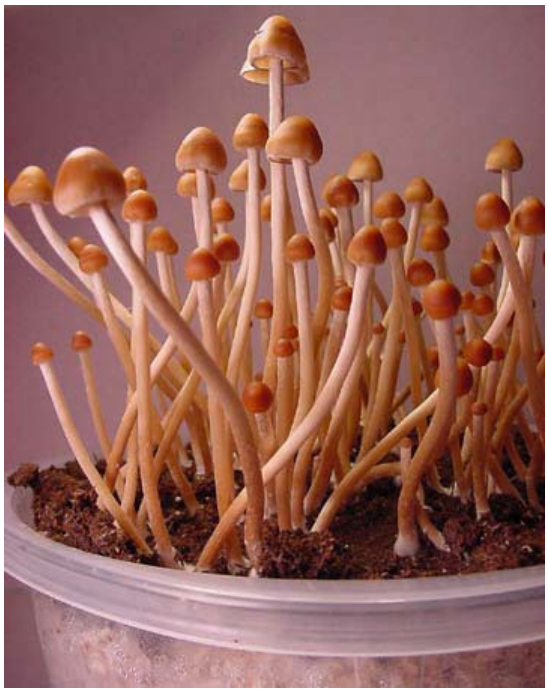


Fig. 78. Tall thin young fruiting bodies of *Psilocybe mexicana* A strain.

Fig. 79. Mature fruiting bodies of the A strain.

Fig. 80. A close up of the in vitro grown specimens. They are very close macroscopically to their natural occurring cousins in Oaxaca, Mexico.

Fig. 81. A single specimen of the A strain of *Psilocybe mexicana* Heim.

SEM Photographs of the *Psilocybe Mexicana* Jalisco Strain.

Fig. 82. Gill fragments of *Psilocybe mexicana* magnified 40X under the stereomicroscope.

Below SEM micrographs of basidiospores of *Psilocybe mexicana* show some ellipsoid shaped spore and typical germ pores. Collapsed red blood cell shapes are also present.

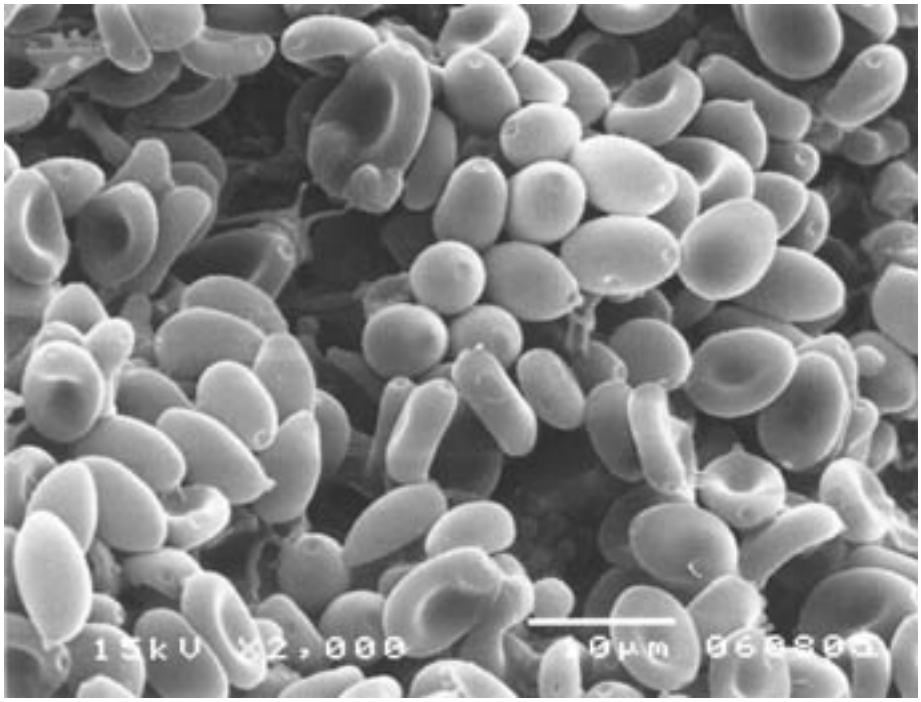


Fig. 83. Germination of spores of *Psilocybe mexicana*, Jalisco strain.

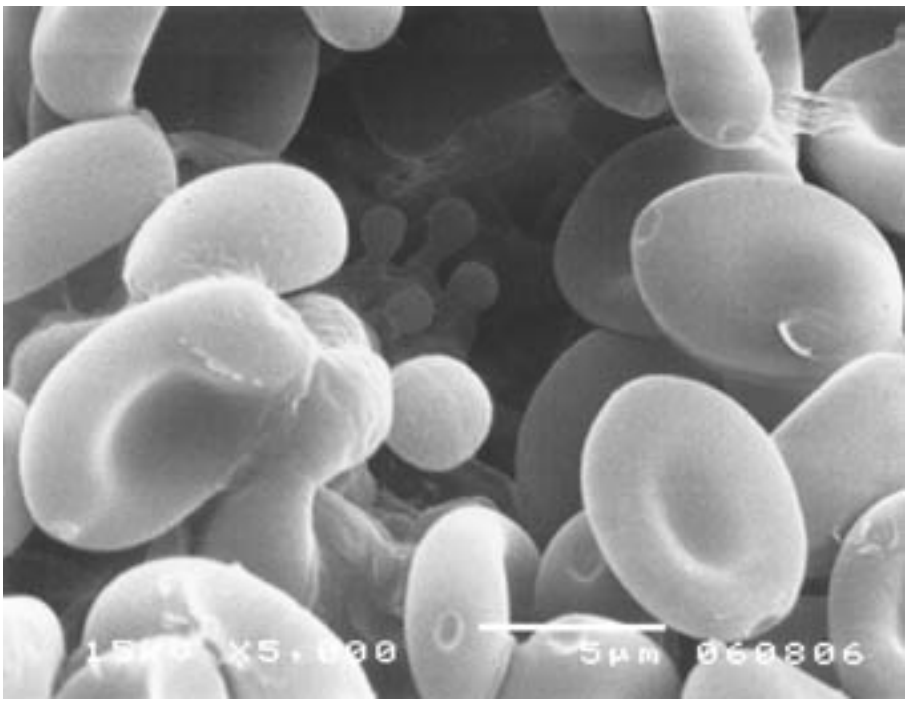


Fig. 84. High magnification scanning electron micrograph showing formation of 4-spored young basidiospores of *Psilocybe mexicana* (center of image).

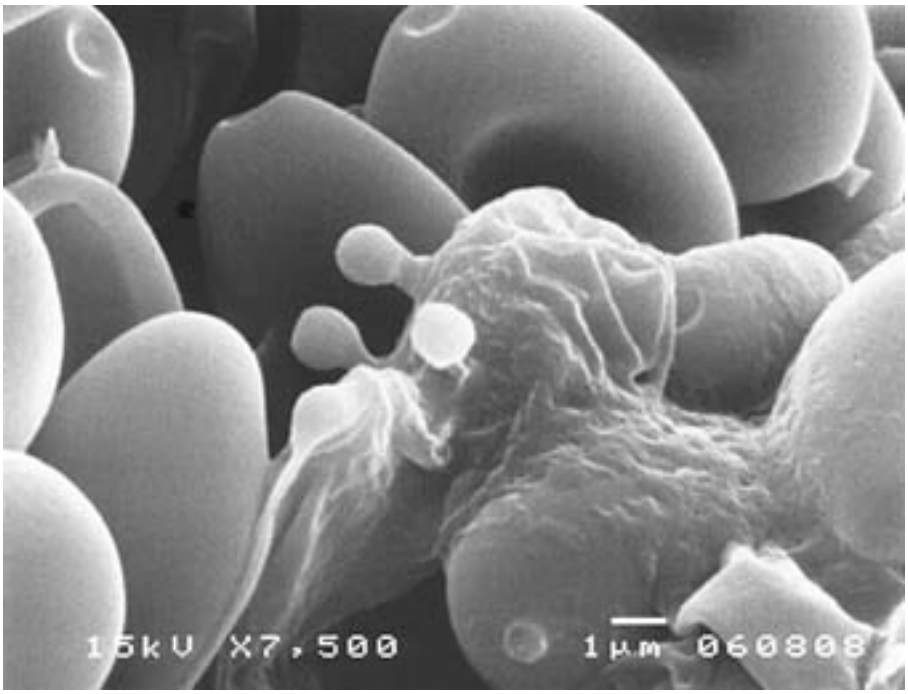


Fig. 85. The germination of spores with four young basidiospores forming on Basidium.

Psilocybe pegleriana

Fig. 86. *Psilocybe pegleriana*, Ban Tai, Koh Samui, Thailand, 2001.

At first, *Psilocybe pegleriana* was assumed to be a new species, distinguished by its heavily violet spore deposit. It was discovered in the fall of 2001 at Ban Tai, Koh Samui in the manure of the SE Asian water buffalo and given the tentative name of *Psilocybe violacea* Nom. Prov. The name was provisional since a published identification was unknown at the time. Since no spore prints were available, a dried specimen was acquired from Chulalongkorn University in Bangkok where the collection was deposited. Unfortunately, the received specimens arrived pulverized into a fine powder. This made it impossible to observe microscopic gill structures. So Intact spores were visible in the powder and were streaked onto PDA media with 10mg/liter of benlate fungicide added to inhibit molds. On 4/20/02, we streaked some spore deposits on the Petri plate.

By 4/23/02, a rapid growth of whitish slime with some yellowish slime areas began

to appear in the agar. On 5/01/02, a possible patch of mushroom mycelium began to emerge from the slimy areas in the agar and by 5/06/02; dark lumps were forming in mycelium in the petri plate images featured below.

Fig. 87. An agar plate (PDA with benlate fungicide) showing slimy like contaminantes and dark structurlike lumps soon began to grow and develope from the presumed target mycelium and soon began to resemble what appeared to be sclerotia.

Fig. 88. Close-up of above agar plate showing minodia formation on tiny mushrooms. Many are malformed but some look like normally shaped carpophores. Image (5/11/02). Grown on MEA (malt extract agar).

Fig. 89. Micro-mushroom excised from culture plate: Cap size 1 mm. in diameter.

The gill area is dark so an attempt was made to retrieve some spores to confirm that the mushrooms are from the spore sample and not from an outside contaminate.

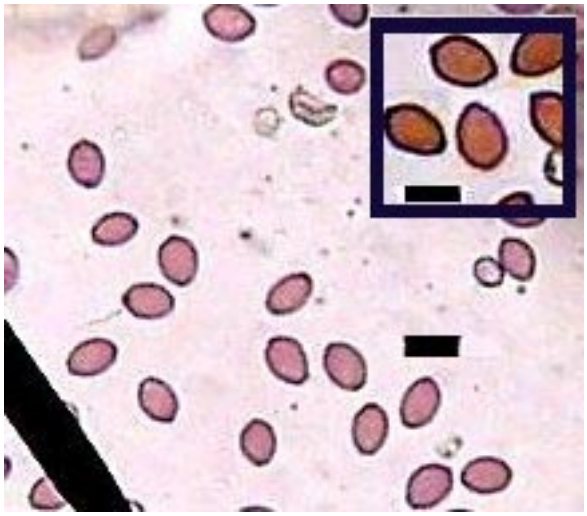


Fig. 90. Spore sample of micro-mushrooms with original sample inset and at the same scale. The spores appear to be identical in shape but are much smaller.

Samples of mushroom producing mycelium have been isolated on new antibiotic (gentamycin sulfate 100 mg/liter) malt agar media. The ease and speed of mushroom generation was encouraging. Isolates were placed on grass seed for further growth tests. The agar-grown mushrooms were surprisingly pale and tiny, but it was assumed that growth on a more complete medium without antibiotics or fungicides would result in larger and more colorful specimens.

Fig. 91. A 2nd attempt at germinating spores.

This occurred as a result of using a crushed specimen using a potato dextrose agar mixture with 10mg/1 liter benlate fungicide and 100mg/1 liter gentamycin sulfate antibiotic. Using this method we were able to show a much reduced slime growth and a much quicker spore germination of small fruiting bodies in the plate of agar. The image is at 14 days after streaking. This plate was stored upside down and several prints were deposited on the lid of the plate. Surprisingly this method worked out quite well as seen in the photos posted below.

Fig. 92. A few harvested mushrooms from the above plate next to a penny for scale.

Fig. 93. Isolation transfers to malt agar on 5/11/02 from the plate shown near the top of the page (streaked at 4/20/02). Note missing wedge that was used to transfer to birdseed. Although this petri dish is labeled as *Psilocybe violacea*, the species is as noted above, *Psilocybe pegleriana.*

Fig. 94. Close up of above plate showing developing mushrooms 4 days after transfer. A clean wedge was taken from this plate at day 2 and place on sterile birdseed. Good growth on birdseed noted in less than 24 hours. Hyphal knots visible at day 2. Pinhead mushrooms on day 3, with fruits of fungi on day 4 (above image).

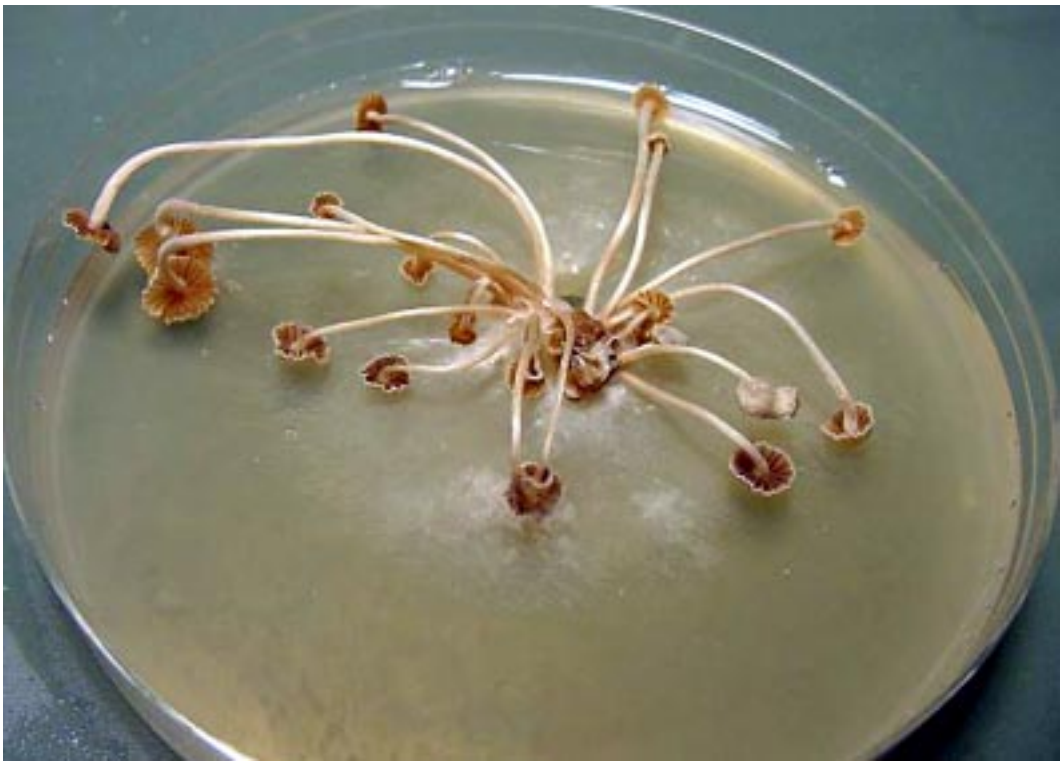


Fig. 95. Same plate day 7 after agar wedge transfer.

Over incubated sterilized horse manure in a quart jar inoculated with birdseed spawn generated from the above plate. These mushrooms seemed to appear instantly and so we cased this jar and place it in the fruiting chamber.

Fig. 96. See close-up of top of jar posted below.

Fig. 97. A close-up of the top of the jar pictured above.

Fig. 98. 2 days later than previous image.

Fig. 99. *Psilocybe pegleriana* fruiting bodies growing along the stems of same. These are not of a parasitic nature.

Another attempt to cultivate this species produced a massive entanglement of 9 to 12 inch-high fruiting bodies interwoven amongst each other like banyan branches spreading outward and upward; like vines creeping up the length of the cake as seen in the images posted directly below. We were thus able to obtain numerous fruiting bodies that appeared along the bottoms and sides of the cake.

Fig. 100. ***Psilocybe pegleriana*** **fruiting in a 10-pound mycobag of Kowanite compost. See below for results of a smaller 2nd flush on day 25 of this project).**

Fig. 101. Looking down into the top of the mycobag of *Psilocybe pegleriana*.

Fig. 102. A partial section of the matted mycelium of the mycobags 1st flush. These unusual *in situ* specimens of *Psilocybe pegleriana* are, like most indoor cultivated fungi, quite macroscopically different in appearance than their natural occurring cousins.

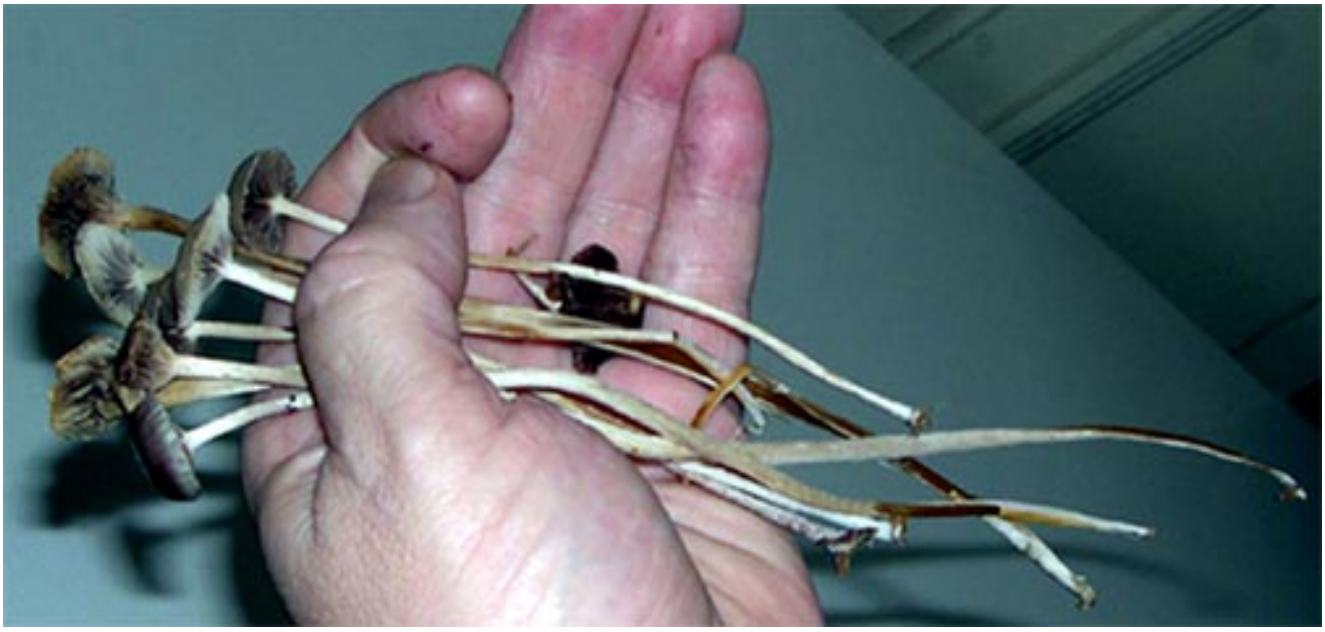


Fig. 103. A small hand-held bouquet of *Psilocybe pegleriana* on day 25 of a 2nd flush.

Fig. 104. Mature fruiting bodies of a 2nd Flush of *Psilocybe pegleriana*. This small 2nd flush produced fruiting bodies similar to those from a natural pastureland habitat.

Fig. 105. The final results of a 3rd flush produced only a few fruiting bodies.

Fig. 106. The last of the 3rd flush indoor cultivation of *Psilocybe pegleriana* from a sporeprint obtained from Spore Works Laboratory in Tennessee.

Since *Psilocybe pegleriana* is not known to be an active species, no chemical analysis was permormed on this species.

SEM of *Psilocybe pegleriana*

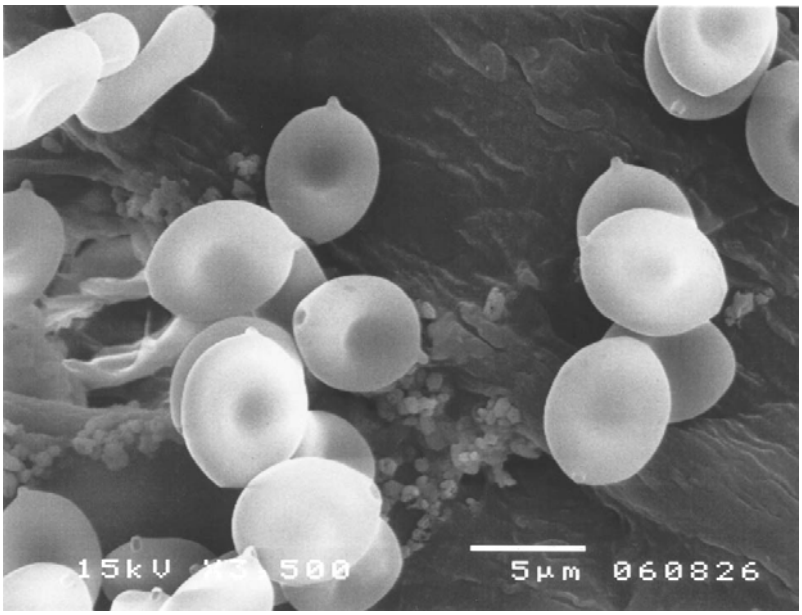


Fig. 107. *Psilocybe pegleriana*. SEM of the germination of spores.

Psilocybe samuiensis. Guzmán, Bandala, and Allen.

Gartz, Allen and Merlin (1992) were the first to successfully cultivate *in vitro* specimens of *Psilocybe samuiensis*. Mycelium was obtained from the spores of a dried specimen of *Psilocybe samuiensis* by methods described by Stamets and Chilton (1983) and was stored as stock culture on 6% malt agar. Strains on agar of a related species *Psilocybe tampanensis* Guzmán and Pollock and *Psilocybe semilanceata* from Germany were also obtained. In a ratio of 1 to 6% on malt agar, the whitish mycelium of *Psilocybe samuiensis* grew at a faster pace than that of similar mycelium of *Psilocybe semilanceata*. The rapid growth of *Psilocybe tampanensis* was similar to the growth of *Psilocybe samuiensis*; however, the former species soon formed brownish sclerotia on the agar as it does with *Psilocybe mexicana* (Stamets and Chilton 1983). Even after a relatively long growth period (3 months), the mycelium of *Psilocybe samuiensis* formed only a few small brownish sclerotia.

Similar conditions were observed while cultivating the three species on Lolium seed/water (1:1.5). The same conditions were also observed in complete darkness; and *Psilocybe tampanensis* and *Psilocybe samuiensis* both grew with rapid speed. Observations on the rapid formations of sclerotia in *Psilocybe tampanensis* after a few weeks of cultivation were already reported by Stamets and Chilton (1983). In contrast, *Psilocybe samuiensis* in cultivation only formed thick whitish mycelium (rhizomorphs, diameter 2 to 3 milliliters) throughout the media, and produced no sclerotia. Under the same conditions of cultivation, *Psilocybe semilanceata* grew slowly, producing only a fine and whitish mycelium with no formation of sclerotia or rhizomorphs.

Until this present study, it was not possible to produce complete fruit bodies of *Psilocybe samuiensis* on either malt extract agar or Lolium seed medium. Some small incomplete fruit bodies of *Psilocybe samuiensis* (up to 2 centimeters high) appeared, but failed to develop into normal sporulating mushrooms. These premature formations only occurred on agar with a low concentration of malt (0.5% to 1.5%). After stopping their natural growth, these incomplete fruit bodies began to exhibit a slight spontaneous bluing reaction.

At this time it was not possible to cultivate mushrooms on a lolium seed/water mixture (Stamets and Chilton. 1983). *Psilocybe samuiensis* also grows well on some grains such as rye or rice. A mixture of rye/horse dung/water (2:1:2) did produce fruit bodies of *Psilocybe samuiensis* after 4 months cultivation, and 3 weeks after casing with peat/chalk (2:1) (Stamets and Chilton, 1983). Two flushes produced eight mushrooms but only six of the mushrooms were analyzed (Gartz, Allen & Merlin, 1994).

Fig. 108. After 4-months, *Psilocybe samuiensis* fruited from Lolium seed in horse/dung compost. Photo: Jochen Gartz.

Fig. 109. *Psilocybe samuiensis* in Lolium seed & horse/dung compost. Images below represent a slow minimal cultivation of this species that grow similar to *Psilocybe semilanceata, Psilocybe antioquensis* and *Psilocybe mexicana* (grass-root attachers in tall-rank grass), often somewhat difficult to fruit *in vitro*.

Fig. 110. A few specimens began to fruit. Photo: Stephan.

Fig. 111. *Psilocybe samuiensis* cultivated indoors. Photo: Stephan.

Fig. 112. *Psilocybe samuiensis* cultivated indoors. Photo: Stephan.

Fig. 113. Indoor cultivation of *Psilocybe samuiensis*. Photo: Fungus Maximus.

Fig. 114. *Psilocybe samuiensis*. Photo: Courtesy of Spore Works Labs.

Fig. 115. *Psilocybe samuiensis*. Photo: Courtesy of Spore Works Labs.

Fig. 116. *Psilocybe samuiensis*. Notice the sclerotia formation in the jar.

Fig. 117. *Psilocybe samuiensis* indoor cultivation by Ralph.

Fig. 118. *Psilocybe pegleriana* with ruler for size comparison.

Psilocybe samuiensis also cultivated at a local Thai University.

Psilocybe samuiensis was found growing in Ranong Province by Dr. Scott Leibler, an expert in orchids from Thailand who had earlier read of research by JWA and Mark D. Merlin (1992). Fresh specimens were harvested for study. A print made from a fresh cap was placed into agar (MEA) plus yeast, resulting in a small growth that took 6 weeks to germinate 78º F. Once germinated, the mycelium grew rapidly and spontaneously and fruited about 2 weeks after growing out, which also took 2 weeks.

Fig. 119. *Psilocybe samuiensis* Photo: Courtesy of Scott Leibler.

Fig. 120. A complete fruiting body of *Psilocybe samuiensis*. Photo: Scott Leibler.

Fig. 121. Blue-green staining in the stipes of *Psilocybe samuiensis* grown in the above petri plate. Photo: Courtesy of Scott Leibler.

SEM's of *Psilocybe samuiensis* 2003 basidiospores

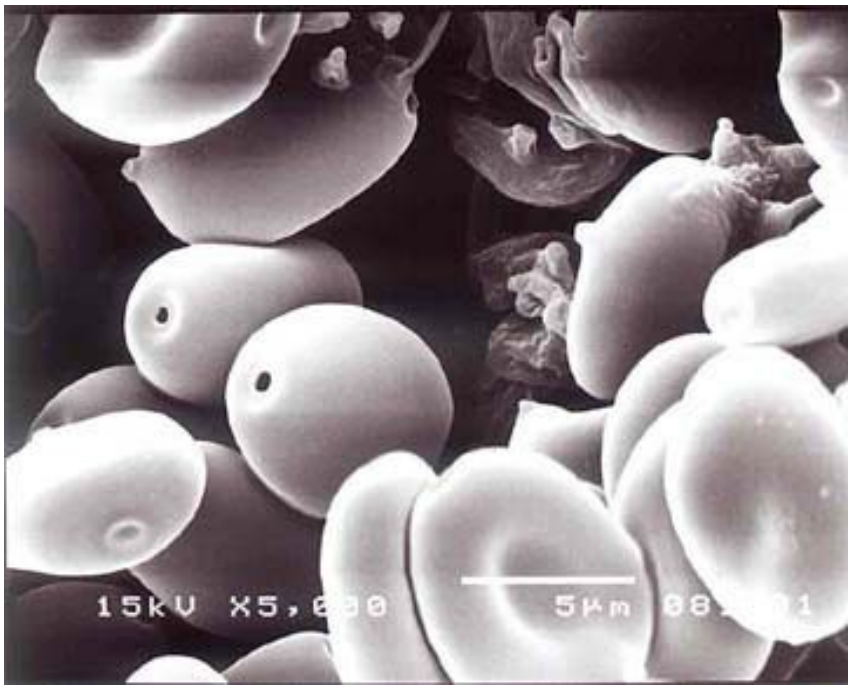


Fig. 122. *Psilocybe samuiensis*. 2003-1. Also observed in this image are the germ pores and nipples of the spores.

Fig. 123. Scanning electron micrograph of *Psilocybe samuiensis* basidiospores show a similarity to red blood cells. 2003-2.

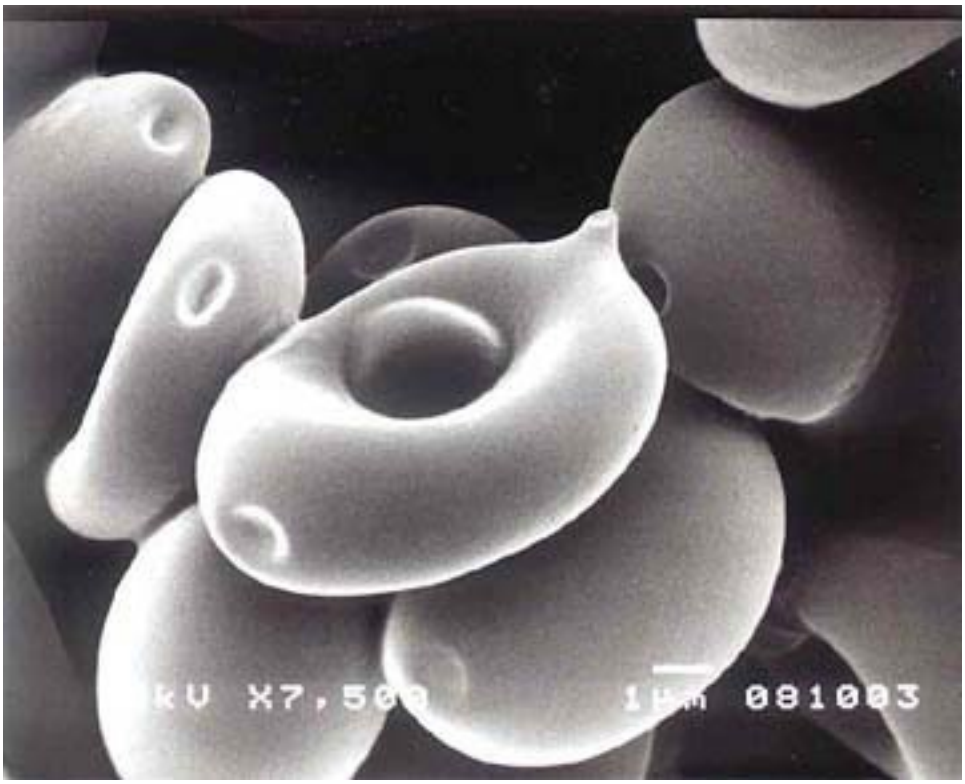


Fig. 124. High-magnification of *Psilocybe samuiensis* basidiospores we see the nipple and the germ pore on each end of the center spore. 2003-3.

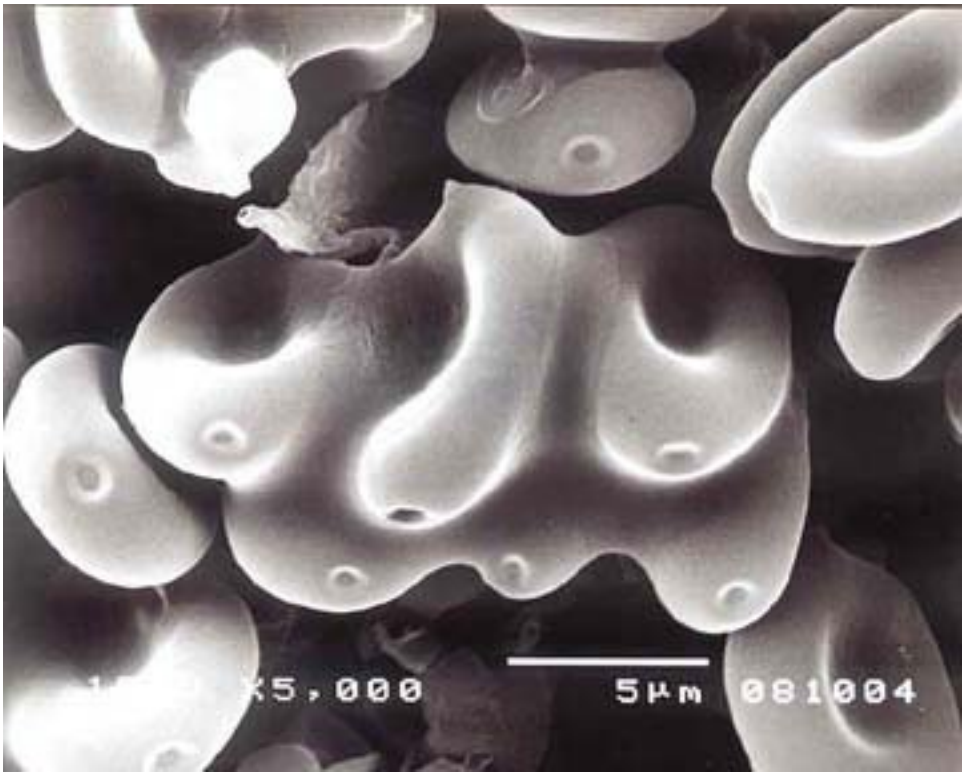


Fig. 125. *Psilocybe samuiensis*. Observe the basidiospores binding together. 2003-4.

SEM of *Psilocybe samuiensis* 2004

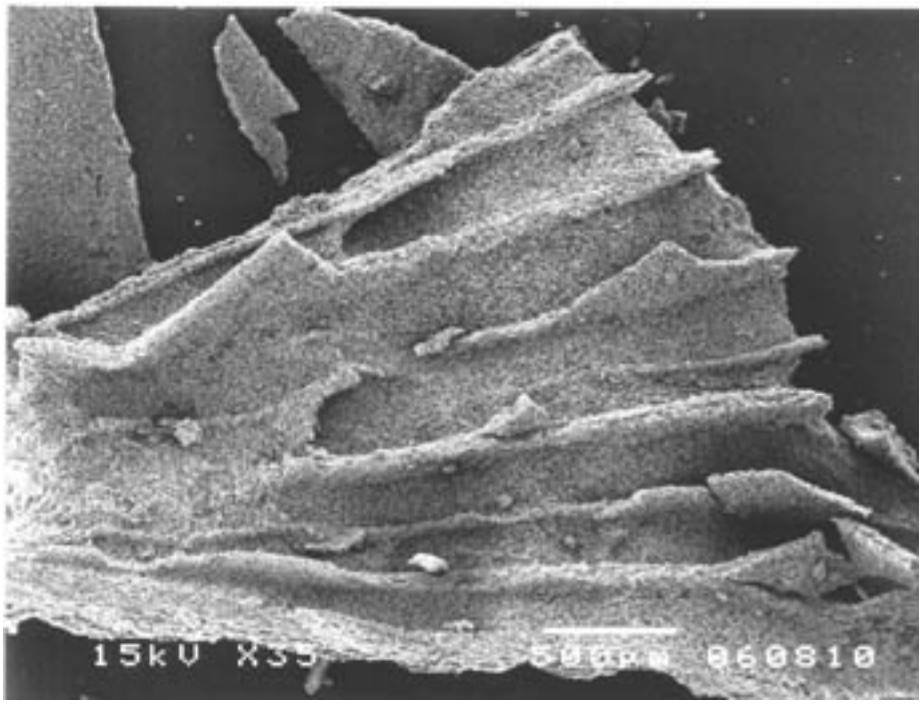


Fig. 126. A low magnification scanning electron micrograph of a gill plate of *Psilocybe samuiensis*. 2004-1.

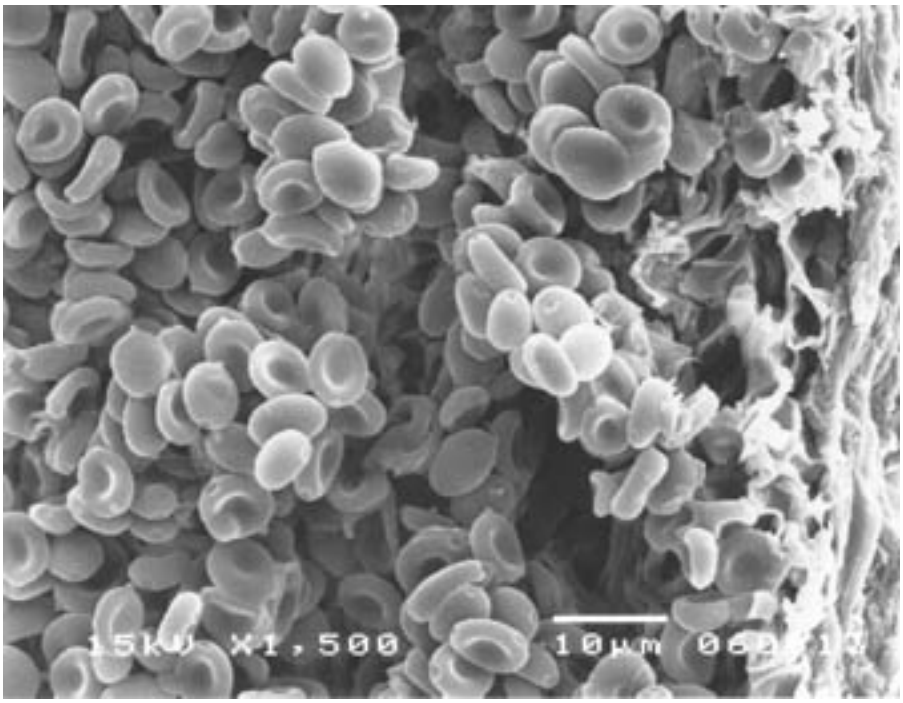


Fig. 127. SEM of *Psilocybe samuiensis* basidiospores. 2004-2.

Results of Chemical Analysis

Analysis of *Copelandia cyanescens*

T. STIJVE (1992) reported the results of a chemical screening for tryptamine derivatives carried out on samples from Koh Samui (Thailand), gathered in 1990:

Psilocybine	< 0,025
Psilocine	0,95
Baeocystine	< 0,025

(All results are expressed in percentage on dry weight).

Comparing the above data with those reported in the same paper for samples of *Copelandia cyanescens* from other sites, it is evident that the content in psilocybine and psilocine varies appreciably, while the content in baeocystine does not.

The fact that the Thailand samples analysed practically contain no psilocybine could point to a lack of a phosphorylating enzyme; moreover, a small but detectable amount of tryptamine was found (0,005 % on dry weight), possibly a precursor in the biosynthesis of psilocine.

According to Stijve (1992), the presence of psilocine in a certain number of *Panaeolus* could be interpreted as a consequence of a genetical accident. According to this hypothesis, initially these species produced more or less significative quantities of serotonine (5-hydroxytryptamine), then after a mutation they were able to produce 4-hydroxylated tryptamines, along with the 5-substituted ones.

Analysis of *Psilocybe samuiensis* from Cambodia

Analytical investigations showed that the collection of *Psilocybe samuiensis* from Cambodia contained, in fact, near identical concentrations of psilocybine, psilocine and small amounts of baeocystine as to those found in the collections from Koh Samui, Thailand.

Psilocybe samuiensis from Angkor Wat.

Fruit Bodies	Psilocybine	Psilocine	Baeocystine (% dry weight)
1	0.51	0.31	0.02
2	0.48	0.41	0.03
3	0.35	0.28	0.05
4	0.52	0.25	0.03
5	0.63	0.31	0.05

Fig. 128. Herbarium specimens of *Psilocybe samuiensis*. Chulalongkorn University, Bangkok, Thailand.

In an earlier study, 15 specimens of naturally occurring fruit bodies of *Psilocybe samuiensis*, collected by [JWA] from Ban Hua Thanon, Koh Samui, and were later analyzed by HPLC and TLC techniques (Gartz, 1987).

Table 2: Amounts of indole alkaloids in *Psilocybe samuiensis* (analysis of methanolic extracts of dried fruit bodies-fb-by using HPLC, previously unpublished).

Sample	part of the Mushroom	psilocybine	psilocine (.% in dry weight)	baeocystine
1	Basidome	0.40	0.30	0.01
2	Basidome	0.52	0.30	0.01
3	Basidome	0.61	0.10	0.03
4	Basidome	0.55	0.62	0.04
5	Basidome	0.23	0.81	0.02
6	Basidome	0.81	0.13	0.04
7	Basidome	0.63	0.05	0.01
8	Basidome	0.59	0.20	0.02
9	Basidome	0.50	0.05	0.01
10	cap	0.71	0.32	0.01
	stem	0.23	0.41	0.02
11	cap	0.65	0.13	0.03
	stem	0.23	0.22	0.04
12	cap	0.75	0.21	0.02
	stem	0.36	0.62	0.01
13	cap	0.62	0.51	0.05
	stem	0.49	0.32	0.02
14	cap	0.48	0.30	0.02
	stem	0.26	0.21	0.03
15	cap	0.90	0.12	0.05
	stem	0.23	0.48	0.01

Analysis of the above concentrations are noted in Gartz, (1987, 1989a, 1989b, and 1994).

Psilocybine was found to be present in the cultured, non-bluing mycelium of *Psilocybe samuiensis* grown on 6% malt agar. Amounts of psilocybine, ranging from 0.24 to 0.32% dry-weight were analyzed in 5 different batches of mycelium grown over a four-week period. Analyses also revealed that these quantities of psilocybine were much lower than those detected in the naturally occurring fruit bodies obtained from the field. Interestingly, no other indole derivatives were detected in the extracts of the in vitro grown mycelium.

Alkaloidal levels obtained from the slightly bluing sclerotia of *Psilocybe tampanensis* were high. Additionally, the amount of psilocybine obtained from five different cultivations grown on 6% malt agar and Lolium seed ranged from 0.34% to 0.68% by dry weight, and from 0.41% to 0.61% in three sections of sclerotia obtained from a single cultivation on Lolium seed. The sclerotia obtained from Lolium had a concentration of psilocine from 0.11% to 0.32%. The sclerotia obtained from malt agar also contained 0.21% to 0.52% psilocine, but no baeocystine was detected.

High amounts of psilocybine were detected (0.23% - 0.90% dry weight); and a few specimens contained similar amounts of psilocine (0.05% - 0.81% dry weight). Baeocystine, a precursor to psilocybine, was also detected (0.01% - 0.5% dry weight) in all naturally occurring specimens of *Psilocybe samuiensis* but in much smaller concentrations than psilocybine. This is in sharp contrast to the high concentrations of baeocystine and very small amounts of psilocine (only in a few specimens), which were detected in naturally occurring field specimens of *Psilocybe semilanceata* from various origin (Gartz, 1993), and in vitro cultivated fruit bodies of *Psilocybe semilanceata* (Gartz, 1991a, 1991b).

In contrast to the cultivated specimens of *Psilocybe cubensis* by Gartz (1987), it was revealed that where the accumulation of psilocine is often higher in the stems than in the caps, analyses of *Psilocybe samuiensis* revealed that the caps contained more psilocybine than the stems. Identical concentrations of the alkaloids (psilocybine, psilocine, and baeocystine) were found in the cultivated fruit bodies of *Psilocybe samuiensis* and *Psilocybe semilanceata* grown in rye/horse dung (Gartz, 1991a, 1991b). Stijve also found similar concentrations of psilocine and psilocybine in 5 naturally occurring fruit bodies of *Psilocybe samuiensis* (collection F, 8 August, 1991, psilocybine, 0.14%; psilocine, 50%; baeocystine, 0.01%).

Fig. 129. *Psilocybe weilii* cultivated on woodchip after 2 months of mycelial growth.

Fruit Bodies	psilocybine	psilocine	baeocystine (% dry weight)
1	0.52	0.28	0.05
2	0.38	0.18	0.03
3	0.63	0.31	0.02
4	0.54	0.40	0.03
5	0.48	0.21	0.04

Both wood debris and lawns habitats in America, as well as *in vitro* cultivated fruit bodies of *Psilocybe weilii* as noted above, revealed similar concentrations of alkaloids and a minute amount of baeocystine. Earlier analysis of natural grown fruit bodies of *Psilocybe weilii* from Georgia, USA in the autumn of 1995 by [JG], showed a similar analytical result as first published by Stamets (1996), but without the name [JG] who in 1997 was the first pioneer to cultivate *Psilocybe weilii* on rice/water and later was able to fruit on woodchip compost without a casing. This occurred because of an acceleration of the mycelial growth achieved by using plant hormones (brassinosteroids).

Similar observations by [JG] occurred with the cultivation of *Psilocybe cubensis* on woodchips and on simple mycelial growing on compost and a horse dung/rice-mixture (Gartz *et al.*, 1990)

Psilocybe antioquensis from Cambodia also contained very similar concentrations of the 3 primary active known alkaloids.

Psilocybe antioquensis

Fruit Bodies	Psilocybine	Psilocine	Baeocystine (% dry weight)
1	0.33	0.28	0.02
2	0.48	0.31	0.05
3	0.51	0.22	0.06
4	0.21	0.18	0.02
5	0.31	0.20	0.03

The following table covers the concentrations of alkaloids found in the "classical teonanácatl" from Oaxaca, Mexico (cultivated fruit bodies).

Psilocybe mexicana (in Vitro)

Fruit Bodies	Psilocybine	Psilocine	Baeocystine (% dry weight)
1	0.31	0.33	0.05
2	0.64	0.20	0.03
3	0.48	0.15	0.04

It is interesting to note that the analysis of sclerotia from a 2nd strain of *Psilocybe mexicana* grown on rice/water mixture was very similar to the growth of the above noted fruit bodies (Gartz, 1994). In contrast to these subtropical mushrooms, the much studied *Psilocybe semilanceata* (Fr.) Kumm., from the temperate zone looked macroscopically very similar to *Psilocybe mexicana* and revealed high amounts of the precursor alkaloids, psilocybine and baeocystine. In some cases, only trace amounts of psilocine were detected.

On the chromatogram (page 73), another mushroom from the temperate zone with significant amounts of baeocystine is also shown. German and Hungarian specimens of *Inocybe aeruginascens* Babos were harvested from both sand and grass between May-June of 2006 (Gartz 1987, 1989a, 1989b; and Jansen, Gartz & Laatsch, 2006a, 2006b). This species and *Psilocybe semilanceata* both synthesize psilocybine in a biochemical process of methylation from baeocystine. *Inocybe aeruginascens* also contains the newly discovered indole derivative aeruginascine (see chromatogram [page 73], Gartz, 1987; Gartz, 1989a, 1989b; and Jensen, Gartz & Laatsch, 2006a). The isolation and synthesis of this close relative of psilocybine was successful (Jansen, dissertation, 2004; Jansen, Gartz & Laatsch, 2006b).

Fig. 130. Mature fruiting bodies of *in vitro* grown specimens of *Psilocybe semilanceata*.

Psilocybe semilanceata (naturally grown near Mansfeld-Harz Mountains in Germany.

Fruit Bodies	psilocybine	psilocine	baeocystine (5 dry weight)
1	0.98	—	0.34
2	1.08	0.01	0.42
3	1.13	--	0.38
4	0.89	0.02	0.28

All of the above investigations and many others by (JG), including many other species (for example, *Psilocybe natalensis* from South Africa and *Psilocybe samuiensis* from Koh Samui, Thailand (Gartz, 1994; Gartz, Allen & Merlin, 1994), over a 23-year-study period by JWA and his colleagues were able to revealed that subtropical and tropical mushroom species tend to contain large amounts of psilocybine and psilocine and only a few concentrations of baeocystine. This is a sign that the synthesis of psilocybine via psilocine is the main biochemical route. Of course, psilocine can also be a splitting product from psilocybine as a result of the action of the enzyme phosphatase, which is very common in organisms including fungi.

The temperate species tend to a significant synthesis of baeocystine as a direct precursor for the synthesis of psilocybine. Only some species such as *Psilocybe azurescens* (Gartz, 1994; Stamets and Gartz, 1995) contain both high amounts of psilocine and baeocystine. Such as it may be it appears that such species have both main routes of synthesis of psilocybine or more probably that significant amounts of psilocybine reacted to psilocine during a high activity of phosphatase.

Fig. 131. Fresh fruiting bodies of *Psilocybe samuiensis*. Chulalongkorn University, Bangkok, Thailand.

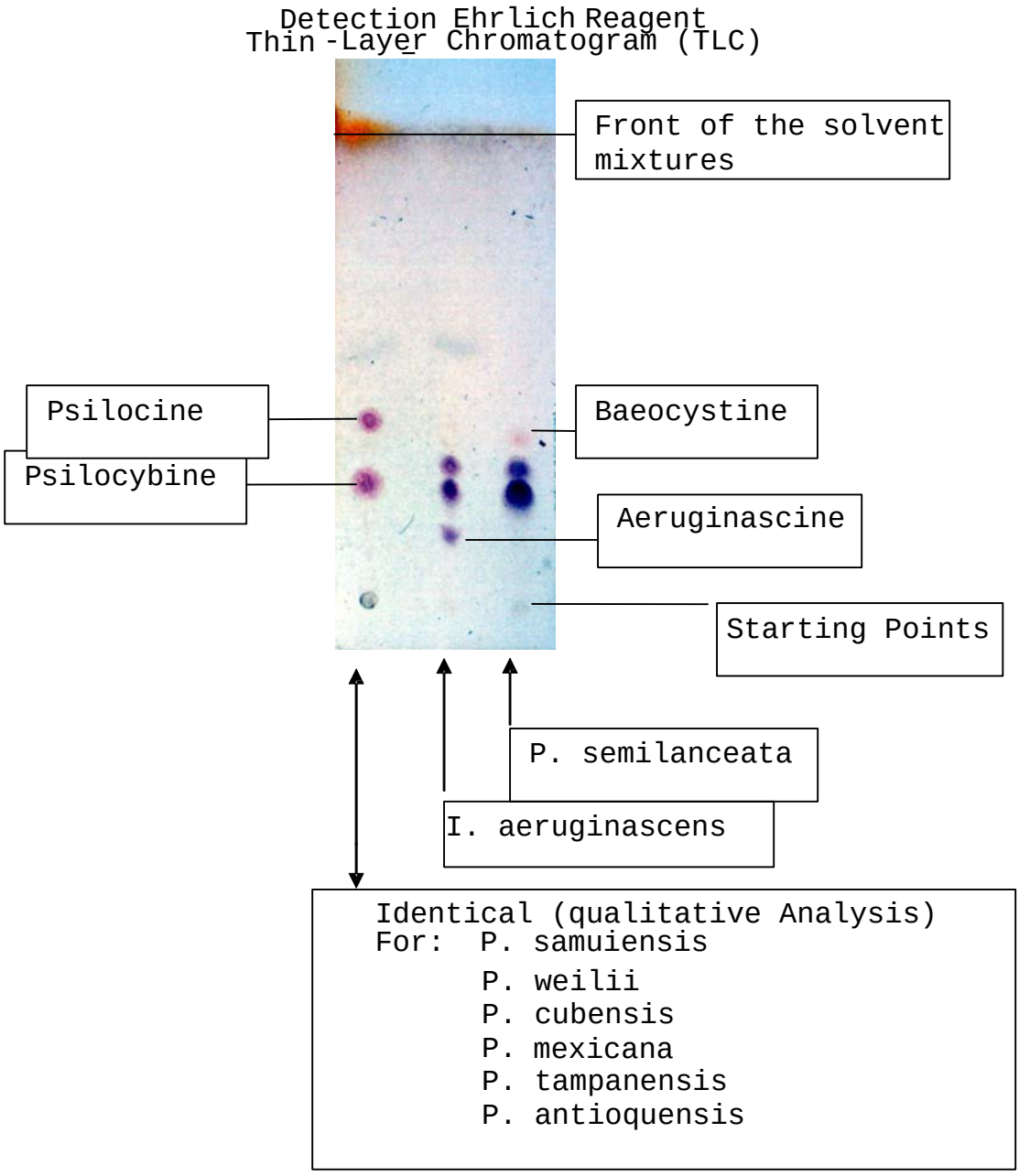


Fig. 122. Chromatogram of studied species.

Psilocybe pegleriana from Koh Samui and Suphanburi, Thailand

During the fall months of 2001, what appeared to be a possible new species of *Psilocybe* was found on a single manure dung heap of a kwai (water buffalo) in a rice paddie at Ban Tai, Koh Samui, Thailand. As noted earlier in this study, the authors tentatively named this species, *Psilocybe violacea* nom. prov. The name was derived due to the natural dense violet spore deposits that fell onto the tops of the fresh caps. Later Guzmán examined the Ban Tai Samui fungi of 2001 and noted that they were

conspecific with *Psilocybe pegleriana*, a tropical species common in Asia (Guzmán *et. al.*, 2007). Two years later during the summers of 2003 and 2004, two of the present authors (PS and JWA) visited the Suphanburi Bann kwai (buffalo house) farm. While there we photographed and collected similar related fungi. Although this interesting species bares a macroscopic resemblance to *Psilocybe pseudobullacea*, including the veil remnants on the stipes of the collected specimens, we found no indication of any violet-colored spore deposit on the 2003-2004 Suphanburi specimens as observed on the caps of the previous Ban Tai, Koh Samui collection of 2001. See violet-spore deposit image (fig. 86; p. 46).

Fig. 133. *Psilocybe pegleriana*, Suphanburi, Thailand.

Fig. 134. *Psilocybe pegleriana*. Suphanburi, Thailand.

During several trips between 2001 through 2004, JWA observed an unidentified species, later identified by Dr. Roy Watling of the Royal Botanic Gardens, Edinburgh, Scotland as a possible species of *Psilocybe*. This unidentified species was first observed fruiting abundantly in grassy areas of manured sandy-clay-like soils in rice paddies at two locations on Koh Samui). Specimens of various sizes were forwarded to Dr. Gastón Guzmán, who macroscopically identified them only as a non-hallucinogenic species of *Hypholoma* with no relationship to *Psilocybe*. However, one of the authors (JG) found that analyzed specimens that contained 0.02% tryptophan are common in many mushrooms and a potential precursor to psilocybine.

Fig. 135. Unidentified *Hypholoma* sp., Koh Samui, Thailand.

Fig. 136. Unidentified *Hypholoma* sp., Koh Samui, Thailand.

Fig. 137. Unidentified *Hypholoma* sp. with fly. Koh Samui, Thailand.

Fig. 138. Unidentified *Hypholoma* sp., Koh Samui, Thailand.

Fig. 139. Gill structure of unidentified *Hypholoma* sp. Koh Samui, Thailand.

Fig. 140. A Basket of drying specimens of an unidentified species of *Hypholoma*.

Fig. 141. A field of the unidentified Species of *Hypholoma.*Na Muang, Koh Samui.

Fig. 142. A single specimen of the unknown *Hypholoma* sp. amongst a small colony of *Psilocybe samuiensis* at the rice paddies of Na Muang, Koh Samui, Thailand.

Fig. 143. Gill fragments of the unidentified *Hypholoma* in preparation for SEM work.

SEM of ellipsoid-shaped basidiospores of unidentified *Hypholoma.*

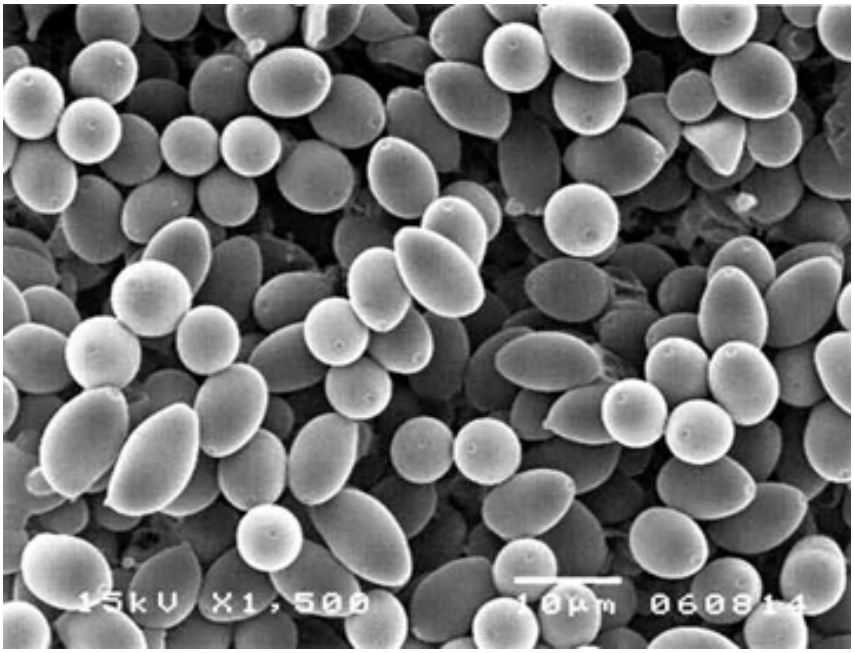


Fig. 144. Spores of an unidentified species of *Hypholoma*.

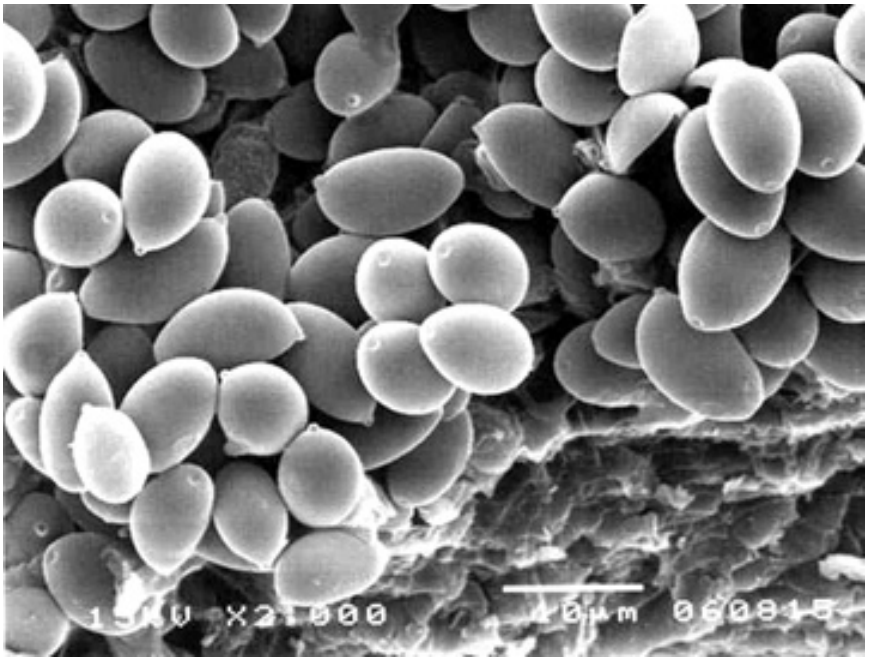


Fig. 145. SEM of basidiospores on gill-fragment tissue of an unknown *Hypholoma* sp., with the typical oval shape and germ pore.

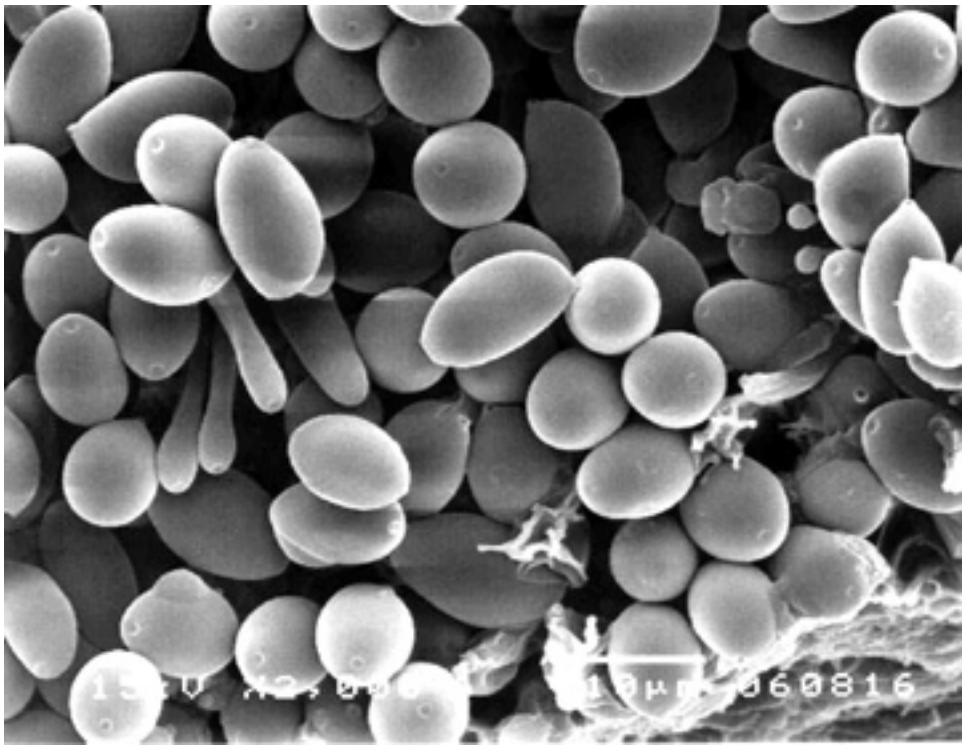


Fig. 146. Germination of *Hypholoma* basidiospores and some 2-basidiosporea attached to basidia and cheilocystidia.

Another New and Unusual Species of *Psilocybe*

This species is rather unique, in and of the fact that it slightly macroscopically resembles *Psilocybe cubensis* but differs in the texture of the pileus and also in the stem which is covered with filaments as seen in the image below.

Fig. 147. Observe the white filaments on the stipe and spore deposits on the fresh leatherly-like caps.

Fig. 148. This species occurs in Kwai dung at Ban Hua Thanon, Koh Samui.

Fig. 149. This species was discovered in only 2 heaps of Kwai (water buffalo) dung at Ban Hua Thanon, Koh Samui.

Fig. 150. Observe the leathery-like caps on the top right of image.

Fig. 151. Observe the somewhat wavy caps in the same collection.

Differences between the new species and *Psilocybe cubensis* are obvious by comparing the lone half specimen of *Psilocybe cubensis* with its incurve margin in the top left-center of the above image by comparing it to that of the other specimens in the collection basket featured in figure 152 below which shows no developed incurved margin in any of the specimens. Unfortunately, this collection was improperly stored in one of the offices of the university and geckos ate the mushrooms, which eventually caused the geckos to defecate the mushroom material into a fine powder. This new interesting and slightly bluing unidentified *Psilocybe* species was collected in the early fall of 2003.

Fig. 152. A single cap of *Psilocybe cubensis* differentiates and separates the two species from one another.

Finally in comparison to the *Psilocybe antioquensis*, *Psilocybe samuiensis* and *Psilocybe mexicana*, the authors also examined the spores of *Psilocybe semilanceata*. Specimens used in stubs to produce the SEM's were obtained from 2 small polyethylene tubes filled with identical powdered lyophilised mushroom material. The mushroom was collected in meadows situated at 1600m, at La Planiaz sur les Avant, Vaud, Suisse.

Fig. 153. In situ fruiting bodies of *Psilocybe semilanceata* from Europe.

SEM's of *Psilocybe semilanceata*.

Fig. 154. SEM 1 of *Psilocybe semilanceata* basidiospores at various stages.

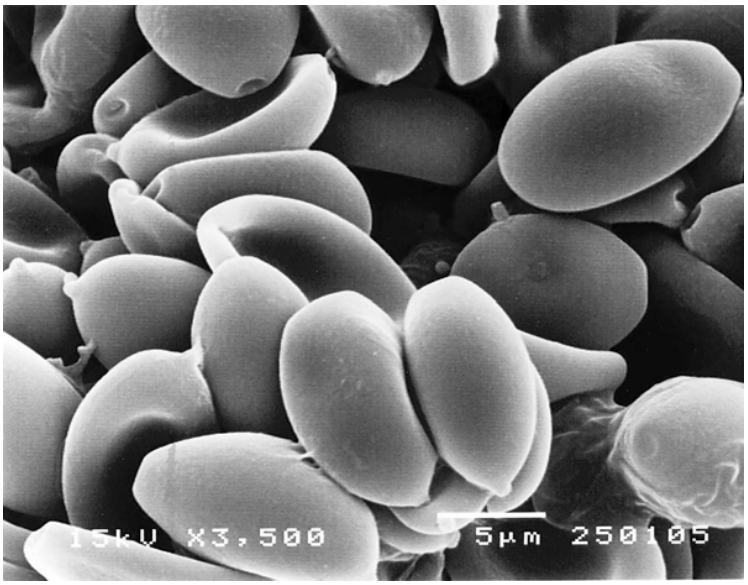


Fig. 155. SEM 2 of *Psilocybe semilanceata* basidiospores showing typical characteristic oval shape with germ pore and nipple at the end.

Another unidentified bluing *Psilocybe* from Koh Samui

In August of of 2006, the senior author of this study (JWA) found four specimens of a short 4-inches-high stemmed *Psilocybe* species. Upon handling, portions of the stem of this mushroom immediately began to oxidize to a dark blue color. The macroscopic appearance of this mushroom slightly resembled that of *Psilocybe cubensis*. However, the stipe retained no visible annulus or veil remnants, thus suggesting that it might be a new unidentified species. The four specimens were sun dried and placed on deposit at Chulalongkorn University for further study.

Fig. 156. A New unidentified bluing *Psilocybe* from Ban Taling Ngam, Koh Samui.

An Update on Magic Mushrooms in Some Third World Countries

Magic mushrooms are still a popular form of recreation at many resort areas in and around Southeast Asia. During the late summer and early fall months of 1998-2006, the senior author (JWA), led an additional 11 mushroom forays and cultural excursions into various locations throughout Thailand, Malaysia, Burma, and Cambodia in search of neurotropic fungi during his 23-year study of mushrooms from SE Asia. The results and studies of these excursions are described below.

Thailand

Between 1998 and 2000, fresh specimens of *Psilocybe cubensis* and/or *Psilocybe subcubensis* and some fresh specimens of *Copelandia cyanescens* were collected on both Koh Samui and Phuket Island and examined for botanical identification. These latter collections also consisted of three new unidentified specimens of *Psilocybe*.

During these three most recent expeditions, the author observed numerous new restaurants on the Thai Islands of Koh Pha-Ngan and Koh Tao that were now serving magic mushroom omelettes for the tourist industry.

Since the mushrooms were made illegal in 1989, it wasn't until 1992 that the listing of mushroom omelettes and mushroom smoothies, soups and pizzas disappeared from many

of the menus in various restaurants which offered these exotic food items to their customers. However, restaurant waiters at many resorts can have the resort chefs prepare "hed kee kwai" omelettes, if requested. There appeared to be no new cases of emergency room treatment due to dysphoric reactions and accidental overdoses from the consumption of adulterated LSD laced-omelettes as the author had earlier reported in the late 1980s and early 1990s (see Allen & Merlin, 1992a, 1992b).

The Thai Rath newspaper (Unsigned, 1998) from Bangkok presented a full-page report on the Full Moon drug festival held on Koh Pha-Ngan Island. It mentioned the availability of "het kee kwai" mushrooms. Dominating this article is the tragic story of an alleged German scientist who was caught at the airport with over 5000 doses of ecstasy, MDA, MMDA, 2cb (Nexus), 3 sheets of "magic paper" (LSD), and some other drugs. Although reluctant, the Thai authorities eventually released the dealer due to improprieties in the existing Thai laws. Ironically, it was reported that the German tourist complained that he was upset that the Thai military police that had arrested him would not return his drugs (see discussion for actual Thai translation of that news article in the notes at the end of this study).

In the year 2000, the senor author noticed that the majority of shops on Koh Samui, which initially sold hand-painted mushroom motif T-shirts in Ban Nathon, and other villages on the Island were mostly void of these items. The author did observe two shops in Ban Nathon that still displayed 'magic mushroom' T-shits, hankies and greeting cards. Two shops in Ban Nathon still offered tourists beautiful hand-painted mushroom motif batiks from Bali and one crafts shop at Big Buddha also displayed Bali Batiks with mushroom motifs on them. One artist in Bangkok still created hand-painted magic mushroom motif T-shirts. By 2001, no shops on Koh Samui were selling Bali batiks. However, some Thai artists on Koh Samui were now creating their own style Thai batiks for the tourist trade and a few of them were creating mushroom batiks. By the summer of 2004, there were now a few dozen batik shops in business on Koh Samui, yet not a single mushroom batik from Bali could be found for sale anywhere on Koh Samui Island.

Fig. 157. Batik-Poster by Adisron Junlawanno and John W. Allen. Designed by JWA.

Fig. 158. Batik-Poster art by Adisron Junlawanno and John W. Allen. Designed by J. W. A.

Fig. 159. Batik Poster Art by Adisron Junlawanno and John W. Allen. Designed by JWA.

Fig. 160. Batik by Adisron Junlawanno and designed by John W. Allen.

Fig. 161. Batik Poster by Adisron Junlawanno and John W. Allen. Graphics by JWA.

Fig. 162. Batik Poster Art by Adisron Junlawanno and John W. Allen. Designed by JWA.

Fig. l63. An Art Poster by Adisron Junlawanno and John W. Allen. Designed by JWA.

In Bangkok, the senior author (JWA) talked with numerous tourists in Banlumphu (Thailand's European District) who had attended the full-moon mushroom festival on Koh Pha-Ngan mentioned the names of some new bungalow resorts where they where able to purchase and consume magic mushrooms in various sources of food items. Two resorts, Pinks Bungalows and the Palm Beach Resort were among those mentioned. Unfortunately, the senior author (JWA), while waiting to attend the Full Moon Mushroom Festival, fell asleep and slept through the whole nights wild festivities, totally unaware and, oblivious to all the partying of more than six thousand revelers.

In 2001, *Psilocybe samuiensis* Guzman, Bandala and Allen, first reported by the senior author (JWA), was collected a 2nd time in 10 years in a 2nd location in rice paddies of Ban Hua Thanon, about 100 meters from the original 1991 collections. The latter species was unknown to the majority of local farmers as a psychoactive species and not known of to tourists but known only to a few adult cattle tenders with whom JWA was acquainted with and a few children who assisted JWA on his collection of the species in the rice paddie fields of the Village of Ban Hua Thanon. Taxonomic investigations by Guzmán, Bandala and Allen (1993) described the species as the first record of a bluing *Psilocybe* from Thailand and the first one found outside of the Americas belonging directly to the section *Mexicanae* Guzmán from Mesoamerica.

Since *Psilocybe samuiensis* appeared to be a rare mushroom, further collections seemed far and in between. However in 2002, 3 specimens were found at a 2nd location on Koh Samui in September and again in 2003, another 8 specimens were gathered in the rice paddies of Na Muang. Finally, in the summer of 2004, between the months of May-July, hundreds of fresh specimens were collected again in the rice paddies of Na Muang from two large flushings approximately 1 month apart. This changed the parameters of the fruiting season of *Psilocybe samuiensis* to May Through August during the monsoon rainy season. In 2005, three trips were made to Koh Samui for the collection of prints and specimens. In the same field at Na Muang, local farmers had converted numerous rice paddies into a sandy clay-like soil garden for the planting of corn. Due to the extreme heat of the open field, the corn shriveled up and dried.

Although, two specimens of *Psilocybe cubensis* were found in the remaining rice paddies at the Na Muang site in 2005, only one specimen of *Psilocybe samuiensis* was collected for herbarium deposit, but was lost in transfer to Bangkok.

A contributor to this study, Dr. Scott Leibler had communicated with the senior author while conducting orchid research in Ranong province for 6 years. During his tenure in Thailand with a University, Dr. Leibler had been studying orchid production for several years when he came upon a rice paddie where he observed and harvested some specimens of *Psilocybe samuiensis.* The collections where found near the provincial capital of Ranong, 500 km south of Bangkok and 300 km north of Phuket along the Andaman Sea facing India. The cultivation of *Psilocybe samuiensis* by Dr. Scott Leibler produced from mycelium, several fruiting bodies on agar (PDA). Spores were obtained from a print taken from a single specimen. Mild but intense bluing occurred in a petri dish as shown above in Figs. 199-121 in a single image posted on pages: 62-63.See 3rd image (Pers. Comm., 11-28-2006).

Fig. 164. *In situ, P. samuiensis* from Ranong Province. Photo: Scott Leibler.

Fig. 165. Freshly harvested carpophores of *Psilocybe samuiensis*. Photo: Scott Leibler.

Fig. 166. *Psilocybe samuiensis*. Ranong Province, Thailand. 2006. Photo: Scott Leibler.

Copelandia cyanescens in Ban Lamai, Koh Samui

Fig. 167. Deep azure bluing in *Copelandia cyanescens* at Ban Lamai, Koh Samui.

Fig. 168. A *Bufo* toad stands guard over crop of *Copelandia cyanescens* at Ban Lamai, Koh Samui.

Fig. 169. *Bufo* Toad and *Copelandia cyanescens* near Ban Lamai, Koh Samui.

Malaysia

In 1998, while in Alor Setar, Kuala Lumpur, Malaysia, the senior author collected specimens of both *Psilocybe cubensis* and *Copelandia cyanescens*.

Fig. 170. Two varieties of *Copelandia* spp., from Alor Setar, Kuala Lumphur, Malaysia. On the left are conical-shaped caps, on the right, bell-shaped caps.

The Malaysian collections were forwarded for herbarium deposit at the University of Leipzig, Germany and the Instituto de Ecologia, in Mexico. Since the author could not mail these specimens from Malaysia, they were dried and preserved and brought back to Bangkok where additional collections were deposited at the Department of Microbiology at Chulalongkorn University.

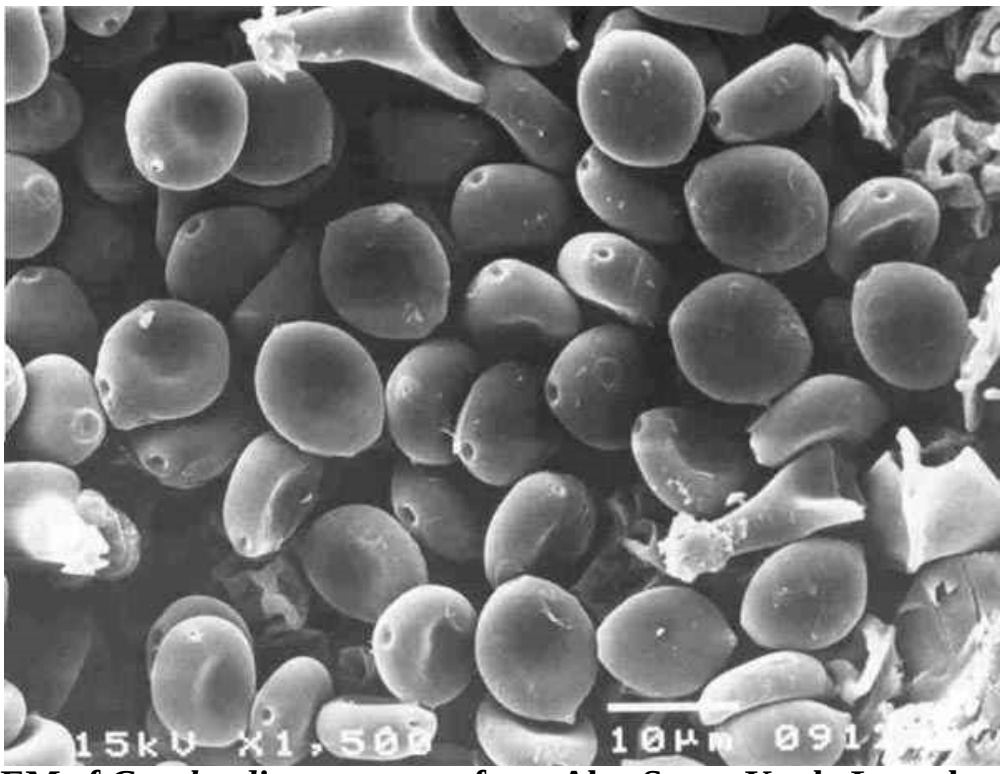


Fig. 171. SEM of *Copelandia cyanescens* from Alor Setar, Kuala Lumphur, Malaysia. These basidiospores also show both nipples and germ pores.

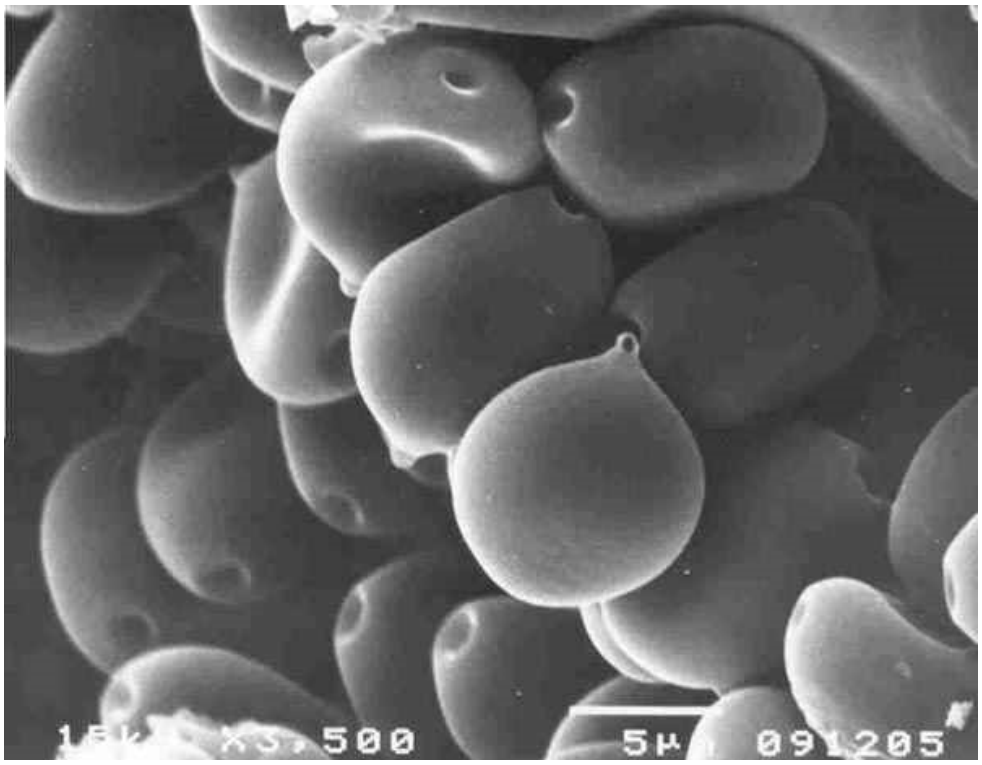


Fig. 172. SEM of *Copelandia cyanescens* from Alor Setar, Kuala Lumphur, Malaysia.

Fig. 173. *Psilocybe cubensis* from Alor Setar, Kuala Lumphur, Malaysia.

SEM of *Psilocybe cubensis* spores showing typical germ pore and edges of gill plates. Harvested at Alor Setar in Kuala Lumphur, Malaysia.

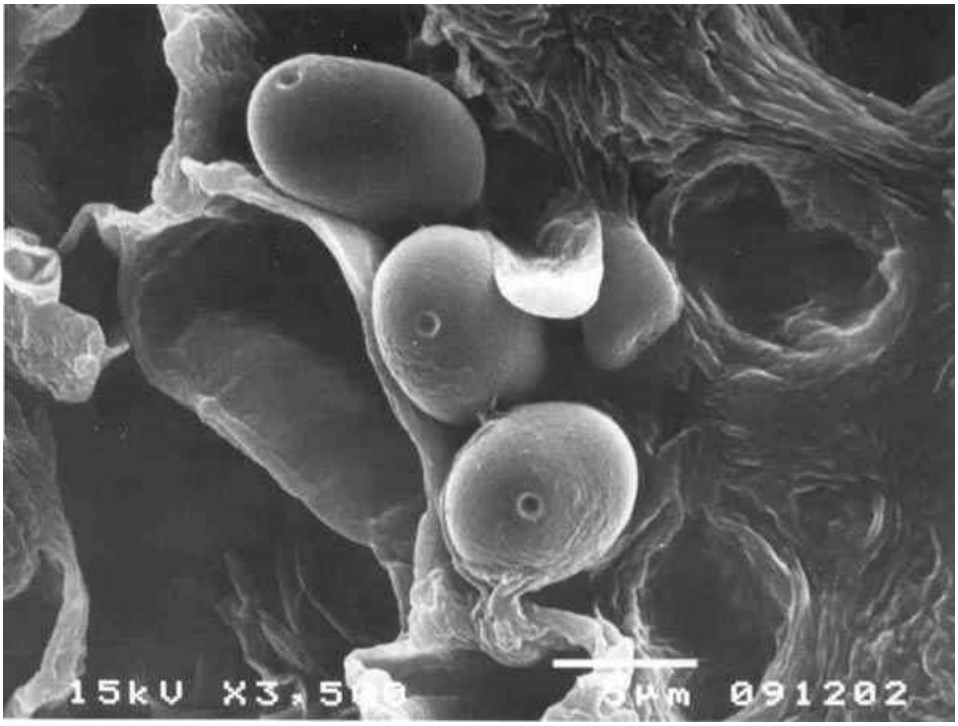


Fig. 174. SEM of *Psilocybe cubensis* from Alor Setar, Kuala Lumphur, Malaysia.

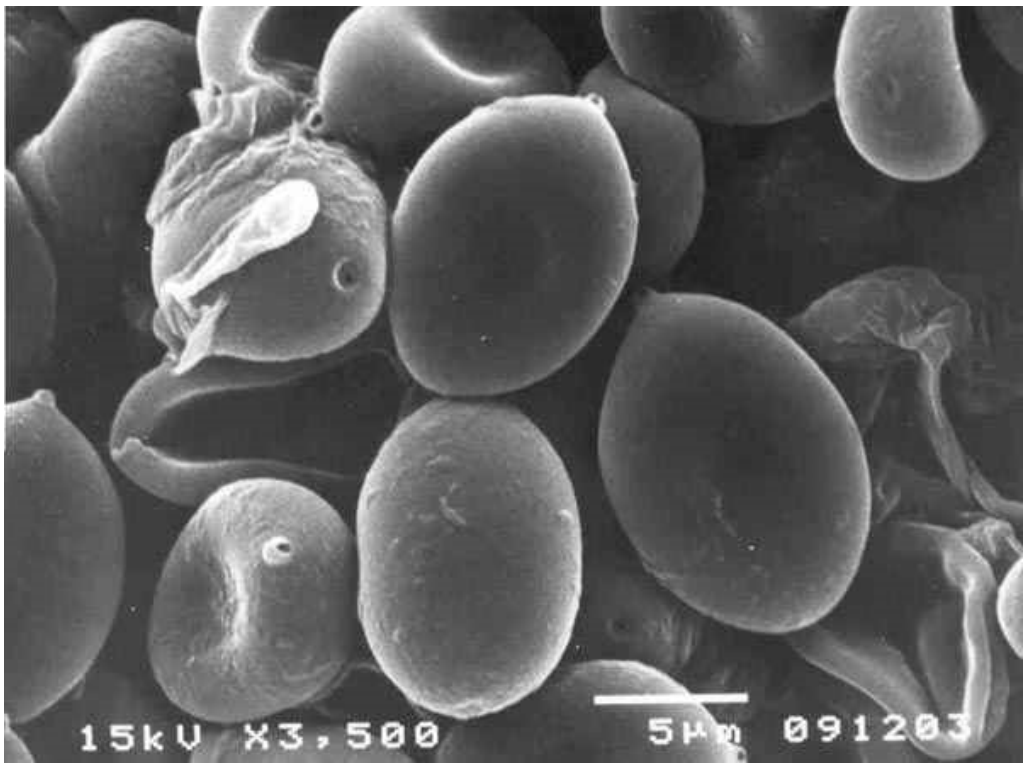


Fig. 175. SEM of *Psilocybe cubensis* from Alor Setar, Kuala Lumphur, Malaysia.

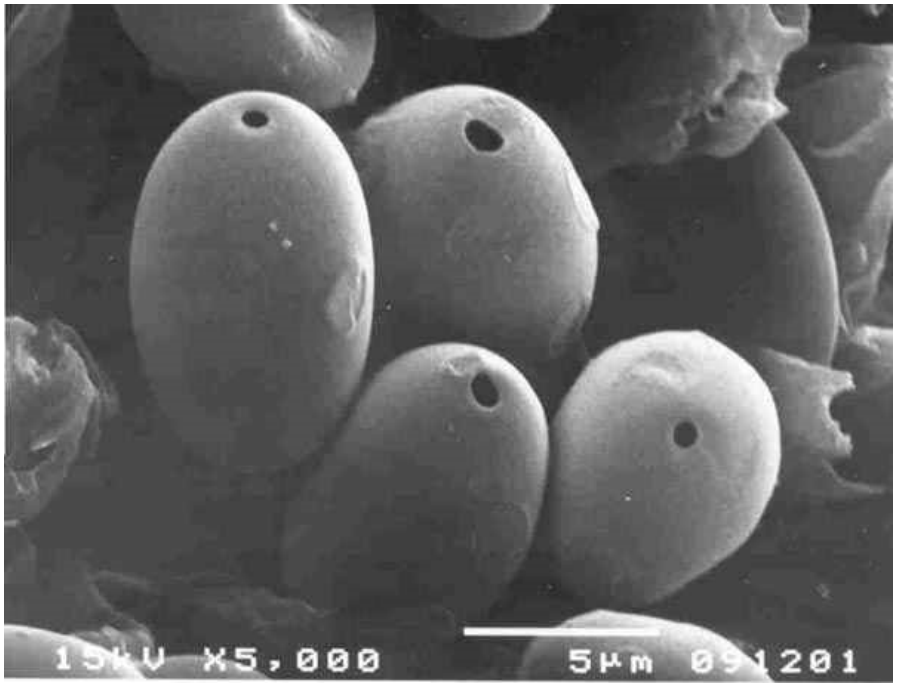


Fig. 176. SEM of *Psilocybe cubensis*, Alor Setar, Kuala Lumphur, Malaysia. Scanning electron micrograph of spores showing oval spore ornamentations with visible pores on the spores.

Later, in a personal communication to JWA, Dr. Guzmán identified the Malaysian collections as *Psilocybe cubensis* and *Copelandia cyanescens*. Since previous chemical analyses of the Asian specimens of *Psilocybe cubensis* have all been similar, we decided that that there was no need to perform an analysis of the Malaysian collections.

Most residents in and around the village of Alor Setar, Kuala Lumpur, when shown the fresh mushroom specimens were not aware of the visionary properties of the collected mushrooms. One produce vendor of edible mushrooms in a public market told the senior author that these mushrooms made people act crazy. He said a relative of his had once eaten these mushrooms and lost his mind for several days. This was the only person who acknowledged that the mushrooms were probably of a neurotropic nature.

In Malaysia, the authors found no recreational use of these mushrooms amongst tourist interviewed while on these excursions. However we would like to point out that although the mushrooms are not illegal by law, Malaysia has some of the harshest draconian drug laws in the world and we suspect that some individuals have probably consumed entheogenic mushrooms in that country.

This is the first report of *Copelandia cyanescens* and *Psilocybe cubensis* from Malaysia.

Cambodia

In Cambodia, as in Thailand and India, there are no fences and cattle roam freely. Recently, some cattle tenders are building barb wired fences. Although water buffalo (Bubalus bubalis) are common in the region of Angkor Wat, Cambodia, it appears that cattle (Bos indicus and Bos Guarus) dominate the Angkor plateau.

On October 3, 1999 and again in September-October 2000, the senior author visited the temples at Angkor Wat, Angkor Thom and Angkor Bayon.

Mushroom specimens of both *Psilocybe cubensis* and unidentified specimens of *Copelandia species* were photographed, harvested and preserved for botanical identification and deposited with Dr. Gastón Guzmán. Later Dr. Guzmán identified the specimens as *Psilocybe cubensis* and *Copelandia cyanescens*. This is the first report of *Copelandia cyanescens* (= *Panaeolus cyanescens*) from Kampuchea.

Previously, Ola'h 1970) identified both *Panaeolus cambodgeniensis* (= *Copelandia cambodgeniensis* and *Panaeolus tropicalis* (=*Copelandia tropicalis*) from Cambodia and Heim and Hofmann (1958) also reported the presence of *Stropharia cubensis* from Cambodia and Thailand. At the time of their discoveries in SE Asia, they were unable to find any use of these mushrooms by the ancient Khmer Rouge or Mon cultures of past or present use of the mushrooms as a tool in healing and curing or any ritual use of the discovered species.

Talks with native children revealed that some tourist have collected both of the psilocybian species found in and around the Angkor temples, as well as edible mushrooms fruiting on the temple grounds.

In the summer of 2002 and fall of 2003, the senior author collected specimens of what appeared to be a new species of a bluing *Psilocybe.* Later investigation of this species by Guzmán, Allen and Sihanonth (2006), revealed it to be an already known species, *Psilocybe antioquensis*, originally identified from Antioquia, Colombia and from several locations in Mexico. In the summer of 2005 (July 1-3), the senior author collected what appeared to be *Psilocybe samuiensis* from a rice paddie field just south of Banteay Kdei, where previously two collections of *Psilocybe antioquensis* were harvested. Specimens were sent to Dr. Guzmán in Mexico who verified their identity as *Psilocybe samuiensis.* This is the first report for *Psilocybe samuiensis* in Cambodia and also noted is the presence of *Panaeolus antillarum*.

Fig. 177. Sketch of *Psilocybe antioquensis* by Wipaporn of Ban Nathon, Koh Samui.

Bali

In the summer of 1999, mushroom smoothies (milk shakes) were selling at resort restaurants for 80,000 Rupiahs (equivalency at the time was US$10), up from 50,000 Rupiahs the year before (1998). We found many restaurants that still cater mushroom food items to tourists on request. And for the most part, such use is limited to the younger crowd, particularly the surfers at or near Kuta Beach.

We were able to determine from street interviews with local European tourists who had vacationed at resorts in and around Kuta Beach that the elder folks on the beach are definitely opposed to the use of mushrooms, as well as some of the younger tourists, though not as many. A couple of young surfers reported, “only 'crazy' people went out in the water under the influence of mushrooms.' Other than that, even though drugs are illegal, an incredibly large variety of drugs are often offered to tourists who are just walking down the main street (at night).” Thai cost for mushrooms was $3.00a meal.

Mushrooms are also available on numerous islands along the surrounding coast of Bali and other regions of the Surabaya Coastline. One such Island is Gili Trawangan where many foreign-owned restaurants still openly display advertisement boards that magic mushrooms were available at their establishments.

Fig. 178. Restaurant on the Isle of Gili Trawangan, along tne Surabaya Coast near Bali.

Fig. 179. Restaurant on Gili Trawangan, off the Surabaya Coast near Bali.

Fig. 180. Restaurant on Gili Trawangan, off the Surabaya Coast near Bali.

North Viet Nam

In the summer of 2004, a three-day excursion to Hanoi was rewarded with several small collections of both *Psilocybe cubensis* and an unidentified species of *Copelandi*a; the former species was physiologically much sturdier than those collected in Thailand, Cambodia, and Malaysia.

Fig. 181. *Copelandia cyanescens*, north of Hanoi, Viet Nam.

Fig. 182. *Psilocybe cubensis* collected near Hanoi, Viet Nam.

Nepal

Schroeder and Guzman (1981) first reported the presence of *Psilocybe cubensis* and/or *Psilocybe subcubensis* from Pokhara, Nepal. Recently, *Psilocybe subcubensis* was identified as fruiting in manure. Collected specimens were examined and harvested from Nepal Royal Chitwan National Park, near Sauraha, south of Rapti River, in the tropical evergreen forest, gregarious, on rhinoceros dung and dark places inside the jungle (Guzmán and Kasuya, 2004).

DISCUSSION

Photographs, as well as SEM's, including newly collected (July, 2004) specimens of *Psilocybe samuiensis* (Collection A-2004) were examined for comparison to the newly reported species *Psilocybe antioquensis* (Collection D-2003). Mushrooms collected in 2003 at Banteay Kdei, Kampuchea (Cambodia) and then studied to show their relationship in comparison to *Psilocybe mexicana* Heim. Below, in Fig. 1-2, we show the basidiomes of *Psilocybe antioquensis* and Fig. 3 represents the ellipsoid and somewhat lemon-shape of those basidiospores.

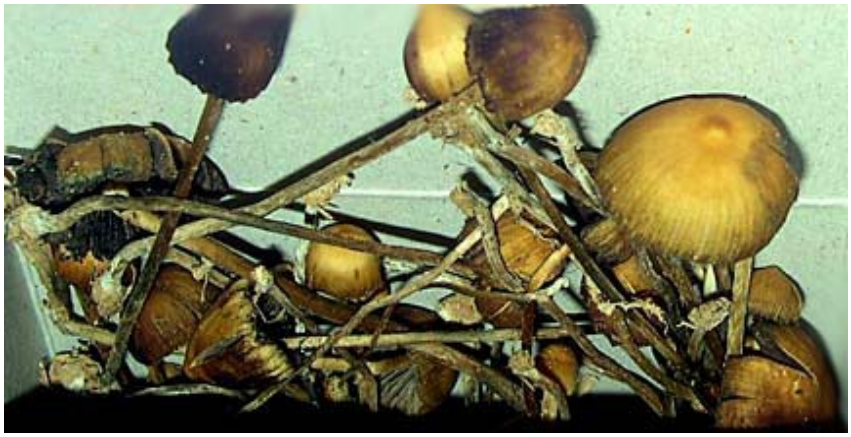


Fig. 133. A small collection of *Psilocybe antioquensis*, Banteay Kdei, Kampuchea.

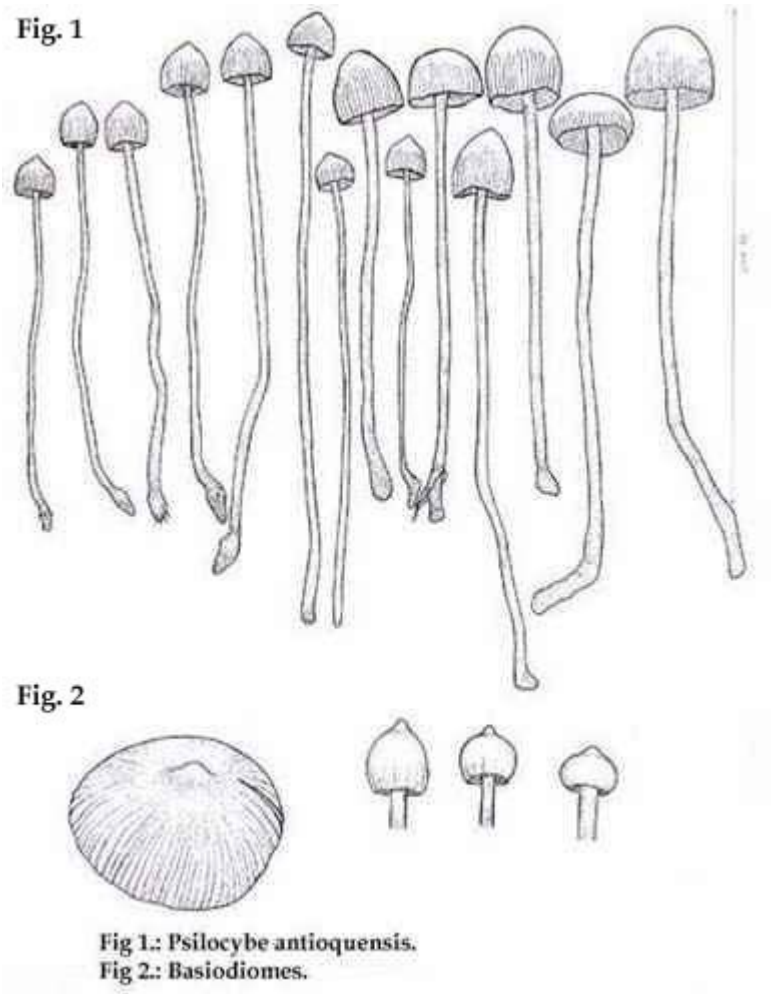


Fig. 184. *Psilocybe antioquensis* and the basidiomes of same.

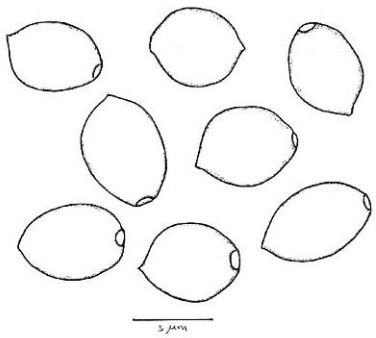


Fig. 3. Basidiospores.

Fig. 185. Basidiospores of *Psilocybe antioquensis.*

The A collections (A-2002, A-2004) includes SEMS imagery representing *Psilocybe samuiensis* collected in 2001 and 2004 from Ban Hua Thanon and Na Muang, Koh Samui, respectively.

The B collection of specimens (August 2002) and SEMS represents *Psilocybe antioquensis* (collection B-2002) collected at the Citadel of the Women (Banteay Srei), 40 km from the main temple of the Angkor Wat compound. An amateur mycologist from Los Angeles found a single specimen of the B collection at the left side of the temple doorway. 3 more specimens were found 15 kms away from Banteay Srei by JWA and a few other travelers.

The August 2002 collection (collection C-2002), was discovered by Grant Trowbridge, who noticed two specimens in the hard sandy soil near the walls of an old Cambodian prison. With the picking assistance of several Cambodian children, the authors subsequently gathered a total of 8 specimens. The location of these specimens ranged in the trailings of the manure left by *Bos Guarus* (wua in Thai for cow and Goh in Kampuchean for cow). They appreared fruiting in old manured soil from the east gate entrance alongside of an old Cambodian prison called the 'Citadel of the Cell,' and extended to the far corner of the wall. This location is quite large since the prison walls extend about 1200 meters by 1600 meters. The mushrooms were found alongside from the east gate of the prison compound to the corner wall.

In the latter part of 2003, JWA again returned to Angkor Wat, seeking new found specimens of *Copelandia* and *Psilocybe sp.,* but none were observed due to the failure of the appearance of what were late monsoon rains.

During this visit, JWA, along with the assistance of numerous poor Cambodian children, collected approximately 83 specimens; however, no spore prints were made due to the extreme heat and humidity; further compounded by the dirty hands of local children who at the time had been playing in muddy floods running along the area by the walls of Banteay Kdei. At that time JWA learned that the area of that east gate to the 'Citadel of the Cell' is referred to as, "Banteay Kdei." So "Banteay Kdei" is the location of the D collection of August 2003 (D-2003).

Some Further Notes

At the end of the left wing of the 2nd gate to Angkor Wat, one of the authors (JWA), along with a fellow amateur mycologist, observed and photographed an image of Shiva holding what appears to be a mushroom in the palm of his hand on one of the bas-reliefs on the 2nd inner wall of Angkor Wat. This new discovery of Shiva holding a mushroom may suggest the possible use of neurotropic fungi by primitive Mons, Khemrs or Buddhists in Cambodia during the 8th to 12th century at Angkor Wat. Milo, a 3-time participant in Exotic Forays expeditions to Southeast Asia brought this bas-relief to the attention of [JWA]. It is possible that Shiva could be holding a Lotus or a mushroom. No one in Cambodia has been able to confirm whether Shiva is actually holding what resembles a large-capped mushroom and at the same time, no one has been able to identify the sculpted object in Shiva's hand is a bas-relief of a lotus.

Fig. 186. A bas-relief of Shiva holding what appears to be a mushroom, circa 1200 a.d.

Shiva is sometimes called *Nilakantha*, that's to say "with a blue throat", in relation with the mythological episode in which Shiva drink the poison halahala that had threatened the universe. Being Shiva an ecstatic god, in this case the blue colour of the throat is significative, because of its relation with the bluification phenomenon of psilocybian mushrooms when they are handled or bruised, a phenomenon that is specific for such species. Moreover, Shiva was born after a thunderbolt, like mushrooms in general in many legends in the world (Samorini, 2001; Wasson, & Wasson, 1958).

In 2007, the senior author of this study [JWA, Pers. Comm., 7-20-07] received several emails from Cambodia with photographs that appeared to be mushroom representations taken in the Angkor compound. While we were unable to find anyone at Angkor to verify that the images in the photographs portrayed mushrooms, we recognized that they definitely did not appear to be photographs of the Lotus. We will report and discuss these images at the end of this study[4].

In reference to the coprophilic nature of *Psilocybe cubensis*, especially in what could very well be 'the cradle of civilization,' McKenna (1988) once questioned the origin of this neurotropic mushroom, wondering whether it is "exclusively a creature of the manure of *Bos indicus*, or can it occur in the manure of other cattle?" Although *Psilocybe cubensis* often occurs in association with the manure of *Bos indicus*, as well as buffalo, gaur, other bovine cattle and sheep, especially after heavy rainfalls and/or monsoons in

tropical and subtropical climates, Schultes (1988, Pers. Comm.), indicated that this mushroom species, as well as certain other species of psilocybian fungi, can occur in the manure of other wild ruminants, including species of deer. Guzman (1983) and Watling (1989, Pers. Comm.) also reported that some species of psilocybian fungi have been found in association with Kangaroo feces, while Paul Stamets (1978, 1994), indicated the association of *Psilocybe cubensis* from elephant dung. This association has been confirmed by one of the authors (JWA) who photographed specimens of *Psilocybe cubensis* in dung of elephant found on the Thai island of Koh Samui in the summer of 2004, as also noted above in the cultivation of said specimens from elephant dung. And as previously noted, in rhinoceros manure in Nepal (Guzmán and Kasuya, 2004).

McKenna also suggested that the origin of *Psilocybe cubensis* could be traced to Kampuchea, but provided very little evidence to support this assertion. He based his assumption on an archaeological excavation in the Non Nak Tha region of northeastern Thailand where bones of *Bos indicus* had been unearthed in association with human graves dating from around 15,000 yr. BP (McKenna, 1988). McKenna was unaware of the occurrence of *Psilocybe antioquensis* while studying the Southeast Asian mycological data known at the time of his writings.

A similar representation suggesting a possible relationship between ancient Chao Samui people and neurotropic fungi species adorns the Magic Tarnim Gardens of Khao Pom, 450 meters near the top of the highest peak on Koh Samui Island. Here one finds a beautiful sculptured representation of a primitive Chao Samui man, appearing directly alongside of two giant sculpted mushroom stones. This representation of an ancient Neanderthal sculpted man standing alongside of these beautiful sculpted Psilocybe *cubensis* looking mushrooms also seems to suggest the possible use and association of the sacred mushrooms amongst some primitive Chao Samui Islanders in the Gulf of Thailand. There are actually two mushroom stones on the mountain; however, one cap was knocked to the ground by a fallen tree during an intense monsoon rainstorm. The shroom icons look representative of Macrolepiota; an edible species sought by Chao Samui people or *Psilocybe cubensis*, common on Samui wherever buffalo and cows roam.

Fig. 187. A Samui Neanderthal-like man, JWA and mushroom stone, Tarnim, Koh Samui. Altitude 400 meters.

Fig. 188. A tree fell here during a storm and collapsed a 2nd Shroom Stone.

We must not forget that from India to Malaysia, southern China and Africa, *Psilocybe cubensisis* are also common in elephant dung. Furthermore, an additional three specimens were collected at the Queen of Thailand's Palace Gardens where the rare white elephants of the King reside when the weather is not too hot for them.

Fig. 189. A Full Moon fantasy frenzied art poster by Adisron Junlawanno and John W. Allen. Designed by JWA.

Full Moon Party

Fig. 190. A billboard advertising the annual Full Moon Festival on Koh Phangan Island.

"Have you heard about 'Full Moon Party'?" asked the journalist in the Thai Rath newspaper. "It is about many foreign tourists who take drinks adulterated with drugs while at parties held during the full moon." Such action occurs on the tiny Thai Island of Koh Pha-Ngan, 11 kilometers north of Koh Samui. The effects from taking these drugs are definitely different than those of other drugs such as cigarettes or alcoholic drinks. This drug is a mushroom and those who use it call them "magic." Reports indicate that "Whoever uses these mushrooms will experience the same effects as one who smokes ganja (marijuana)." Currently, these mushrooms are illegal in Thailand, yet this has not deterred their use amongst certain segments of the tourist population. Over 300 meals a month are prepared.

Another drug described in this article is referred to as "Magic Paper." This latter is an obvious reference to LSD. The Thai newspaper describes this drug as looking like a stamp or a sticker. Effects occur from 'magic paper' after one puts the paper in his or her mouth. The newspaper reports that this 'magic paper' will make one intoxicated as if on alcohol. Another new kind of drug known as 'Nexus" was also confiscated just 3 weeks ago in Thailand by the Military Police. It was created chemically by a German scientist and is known to tourists as "NEXUS." [Nexus is another name for 2cb or 'Erox']. Finally, according to this article, The reporter stated that he feels that "since there are no laws in Thailand against the use of these drugs, the Thai people should not be blamed for the use of these drugs by tourists in Thailand since many of them are not illegal because there is nothing mentioned about these drugs in the Thai laws. However, the drugs mentioned in the Thai Rath Newspaper are illegal under current Thai law.

No current medical problems regarding mushroom overdoses or the mis-use of the mushrooms have been reported to the Thai authorities since 1992.

This includes both the various hospitals situated on Koh Samui and the police of Koh Samui and Koh Pha-Ngan (see report below of Thai parliament member who reported such activities to the authorities and their response to such allegations).

In Bangkok, the senior author (JWA) talked with numerous tourists in Banlumpoo (Thailand's European district). Many of those tourists interviewed by the senior author (JWA) mentioned having attended the full-moon mushroom festival held on Koh Pha-Ngan Island as well as mentioning the names of many new bungalow resorts where they where able to purchase and consume magic mushrooms. Two resorts, Pinks Bungalows and the Palm Beach Resort were mentioned. Furthermore, several resorts in Bo Phut Beach on Koh Samui and in Lamai, still offered its customers 'magic mushroom' omelettes when requested.

In late 1999, the senior author along with two friends, traveled from Koh Samui and Koh Pha-Ngan to the temples of Angkor Wat, Cambodia. There they collected two distinct variations of *Copelandia* and several small specimens of *Psilocybe cubensis* and/or *Psilocybe subcubensis* in and out side the temple walls. Cattle were observed on the temple grounds. Between the Thailand border and the temples of Angkor Wat, the senior author (JWA) and his traveling companions observed tens of thousands of rice fields, with water buffalo and cattle scattered along the roadway for a few hundred miles. On a particular excursion in September of 2005, several of the participants observed both Copelandia species and *Psilocybe cubensis* in manure heaps scattered along the roadway. In 2006, No psilocybian mushrooms were found at Angkor due to a lack of rain.

Collections:

A: *Psilocybe samuiensis*-Koh Samui-Sept-Oct 2001.
B: New? Unidentified *Psilocybe* sp.-Bantrey Srei, Xiem Riap, Kampuchea, 9-2002.
C: New? Same as B: Unidentified *Psilocybe* sp. Citadel of the Cell, Xiem Riap, Kampuchea, 9-2002.
D: Black Spored, Possibly *Copelandia*, Bantrey Srei, Kampuchea, 9-2002.
E: Unidentified *Psilocybe* possibly *Psilocybe violacea* (=*Psilocybe pseudobullacea*)-Suphanburi, Thailand, 10-6-2002.
F: Unidentified *Psilocybe violacea* (=*Psilocybe pegleriana*) 9-2002.
G: Unidentified *Copelandia* species-Suphanburi, Thailand, 10-6-2002.
H: *Copelandia* sp., Suphanburi, 10-6-2002.
I: *Copelandia* sp. (probably *Copelandia cyanescens*, Angkor Wat, Kampuchea, 9-2002.
J: *Copelandia* sp. Ban Taling Ngam, Koh Samui, 9-2002.
K: *Psilocybe cubensis* and or *Psilocybe subcubensis*, Ban Phang Ka, Koh Samui, 9-2002.
L: *Psilocybe cubensis*. Ban Hua Thanon, Koh Samui, 9-2002.
M: Possibly *Psilocybe cubensis* or *Psilocybe pseudobullacea*. Koh Samui, 9-25-2002.
N: *P. samuiensis* print
O: *Stropharia* species, unidentified.

(2001-2003) Collections:

Samuiensis A. (A-2001). From Ban Hua Thanon, Koh Samui. Samuiensis A (A-2003) Na Muang, Koh Samui, Thailand. At Instituto de Ecologia (XAL), and Bangkok (Chula).

Psilocybe antioquensis B (B-2002) from Banteay Srei, Xiem Riap, Cambodia. Chulalongkorn, Thailand.

Psilocybe antioquensis C (C-2002) from Citadel of the Cell, Banteay Kdei, Cambodia). Both collections B and C from 2002. Chulalongkorn, Thailand.

Psilocybe antioquensis D (D-2003) from Bantrey Kdei), Xiem Riap, Angkor Wat Compound, Cambodia. (XAL), BISH. Chulalongkorn, Thailand.

(Holotype (XAL). Isotypes in (BISH) and (CHULA).

In 2004, numerous collections of *Psilocybe cubensis*, *Psilocybe samuiensis*, and *Copelandia cyanescens*, as well as several collections of three, as yet unidentified, *Psilocybe* species were deposited with the department of Microbiology at Chulalongkorn University in Bangkok and are available for research.

In 2005, 5 large collections of *Copelandia cyanescens* were deposited at Chulalongkorn University in Bangkok. The collected specimens were obtained from two locations. The wua (cow) coconut grove north of Ban Lamai and the buffalo arena at Ban Saket, Koh Samui. *Psilocybe cubensis* specimens also were collected from three locations on Koh Samui but were pooled into one dried container. The *Psilocybe cubensis* were primarily from Ban Thurian, Ban Saket and Na Muang, Koh Samui.

A small collection of what appear to be *Psilocybe samuiensis* was collected in a single rice paddie near Banteay Kdei, Xiem Riap in the Angkor Wat Compound in July of 2005 and was later identified by Gastón Guzmán.

In the early fall of 2006 (Aug. 28-Sept. 2, 2006), several small collections of both *Copelandia* species and *Psilocybe cubensis* were harvested and dried for herbarium deposit. Four specimens of a new unidentified bluing *Psilocybe* were also collected and dried and preserved. A second collection of a possible new species was forwarded to a Jamaican researcher for cultivation and culture work. The Ranong specimens of *Psilocybe samuiensis* are stored at an unidentified lab in Thailand.

(2006) Collections:

Copelandia cyanescens: 8-30-2006-allen-2006-1; 9-1-2006-Allen-2006-2; 9-2-2006-allen-2006-3.

Psilocybe cubensis: 8-26-2006-allen-2006-4; 8-27-2006-Allen-2006-5; 8-27-2006-Allen-2006-6.

Unidentified *Psilocybe* sp. 9-2-2006-allen-2006-7.

NOTES

1: Full Moon Party Drugs

Regarding the Full Moon Party as noted above, the following report is an unedited version of the article that appeared in 1999 in the Thai Rath newspaper and reveals some of the Thai culture shock in its translation of the events printed in the article.

We have left this Thai to English translation intact to show how the Thai mind of the individual who interpreted the news report perceived the journalists concept regarding the recreational use of mushrooms and drugs in their culture.

Nexus, new drug for parties Thailand cannot blame them to stop it

"Have you heard about the "Full Moon Party"? It is about alias people made a party by using drug. It is not cigarette, or alcohol drink. It came from mushroom. And people call it "Magic Mushroom" Whoever uses it; they will feel the same as having marihuana. It is illegal now to use in Thailand. Next one will talk about "Magic Paper (LSD, blotter acid)." It looks like sticker. People use it by putting it in the mouth. It will make them getting drunk. New kind of drug that was just released last 3 weeks, it was made by Germany chemistry by using the name "NEXUS (2-CB) and Thailand still cannot blame people who used it because there is nothing mention about in the Thai laws." [Also confiscated were more than 5000 doses of MDMA, MDA and several other analogues, JWA].

In regards to the above translation, the confiscated drugs are illegal in Thailand, but since they are unknown to most Thai's and because they are not an Eastern subculture phenomena, the reporter lacked an understanding of the cultural use of those substances in other societies.

Ketamine was also mentioned as a new drug in Thailand, available over the counter at any Thai pharmacy. The Thai Rath reported that tourists have sex in many new positions, never before tried by those who use this drug. The Reporter seemed almost apologetic to this use or what he believed was the frivolous use of drugs by tourists in Thailand. He explained that the Thai people were sorry for the behavior of tourists in their country. Below is an excerpt concerning a loal Thai resident's translation and his interpretive attitude regarding the use of these drugs in Thailand?

2: Koh Pha-Ngan Slur

Negative comments made recently by a member of the upper house following an inspection visit to the full moon party have prompted an angry response from officials on Koh Samui and Koh Pha-Ngan. "Senate member Mrs. Rabiat Pongpanit complained that she saw batik Buddha images displayed next to bikinis on Samui and that during the full moon party she witnessed foreigners eating magic mushrooms and having sex in public on the beach.

Several high-ranking officials, including the Governor of Surat Thani, Mr. Vichit Vichaisam, have since criticized the senator's comments, and even suggested that Mrs. Rabiat may have been mistaken in what she saw.

Mr. Vichit stressed that security is now very tight at the full moon party, especially in terms of drug controls, and said that police very rarely find anyone taking illegal substances at the event, which suggests that there are not many drugs available [last months Community magazine reported the seizure of several thousands doses of Ecstasy].

He invited other members of parliament to visit the island and see for themselves, and added that careless criticism would not help the Surat Thani authorities that he claims are working extremely hard to clean up the image of the full moon party. Mr. Pornled Chakchai, the Chief of the Koh Pha-Ngan District Office was also angered by the comments, and said that not once [in] three years of inspections had he witnessed foreigners having sex on the beach. He admitted that the senator may have seen couples hugging and kissing, which he says is quite normal behavior for foreigners, but added that even this is not encouraged in public, and officials often ask party goers to refrain from too much 'heavy petting' on the beach. Mr. Chakchai said that his two priorities for Koh Pha-Ngan are to make it drug-free and pollution-free and those projects in both these areas are already proving very successful. The head of the Koh Pha-Ngan Tourism Association, Mr. Chanched Piriyasatit echoed these assertions, and added h o w impressed he and his colleagues were by the level of official presence at the monthly full moon party. Most tourists, he said, visit the island to relax surrounded by nature, not to take drugs and have sex, and he expressed concern that rumors would only encourage young Thai people to attend the party as spectators. Despite strong denials, Koh Pha- Ngan and particularly the full moon party continues to be thought of as a hotbed of debauchery and ill repute, and some would argue that such publicity is at least part of the reason for its lasting success. Whatever the attitude of the Government, economic concerns seem certain to guarantee that the party never ends (Unsigned A, 2005)."

One week after this appeared in print, both the Bangkok Post (on two occasions, two days in a row, and the Bangkok Nation, both published articles claiming the Government was working to also make Koh Samui a drug free island (Unsigned B, 2005).

In one sense, this is a kind of a joke. It may be possible that the Surat Thani people and the leaders of this region do not want Bangkok in their business. A point of interest lies in the fact that even being under the influence of drugs is a crime in itself. Especially regarding the magic mushrooms known as 'het kee kwai' ("mushroom that appears after buffalo defecates)." To truly make the islands drug free, they would have to arrest and lock up all of the four-legged ruminants such as the kwai (buffalo), wua (cows) and elephants (Chung), since they too constantly eat the magic shrooms as they consume the grasses which grow over and above the hidden mushrooms.

3: *Copelandia cyanescens* in Europe

It is possible to find Asian tropical psilocybian species in Europe; their presence is made easy by the dung habitat, as a consequence of the importation of herbivorous quadrupeds from tropical regions.

As for the species here considered, in 1965 at Ménton (South France) there was an accidental collective intoxication after the ingestion of *Copelandia cyanescens* found on dung of horses imported from tropical regions for Ménton's racetrack (Heim, R., *et al.*, 1966). In 1972 the same species was located in the province of Turin (Piedmont, northern Italy) (Fiussello & Ceruti Scurti, 1972), while in the '80s it was gathered in the public gardens of Bolzano (Trentino-Alto Adige, northern Italy) (Festi, 1985).

At first, the presence of such a species in Europe seemed fortuitous but it is possible that its diffusion is sufficiently stable in the areas where the horses graze (Samorini, 1993); However, *Copelandia* species are more likely to be common in the manure of buffalo, cow and/or gaur, before being found in the manure of horses. Also included here, the authors must note the once-only appearance of an abundance of *Copelandia bispora* in Bern, Switzerland on a church lawn (Senn-Irlet, Beatrice; Adolph Nyffenegger, and Rudolph Brenneisen. 2000).

4: Mushroom symbolism at the Temples of Angkor Wat.

In the early summer of 2007, the senior author [JWA] received several emails from a young student of religion and philosophy, Kerry Colonna.

Five images were forwarded which showed possible Davatas and figures on bas-reliefs from various temples at the Angkor Wat Compound. Presented here for the first time (photographers unknown) are these images and some comments of their possible relationship to mushroom symbolism and ludible use by early Hindu, Mons, Khmers and Buddhists.

Fig. 191. A Graphic shroom visual by JWA from a Photo of Big Buddha, Koh Samui.

Fig. 192. Davatas holding what appears to be mushrooms.

Regarding the above photo of the Devatas with mushrooms

The above attached image was downloaded a couple of years ago from an Internet site promoting tourism in Cambodia. The investigator was hoping that the authors might be able to help with the identification of the objects held by the foreground figure in the Devatas above. Although, from this angle, they appear to clearly depict mushrooms, at the time we could not locate any other images from this archeological site that revealed such a convincing depiction. Please be advised that we are interested in any informed interpretations that come to our attention. With this in mind, we have hopes that this may seriously challenge author Andy Letcher's thesis on the lack of evidence that ancient cultures outside of Mexico did not use entheogenic mushrooms species in their cultures (Letcher, 2007; Allen, 2008).

In a 2nd personal communication [7-20-2007] to JWA, Kerry Colonna of Los Angeles wrote:

"Dear John,
The image you received had been sitting on my computer desktop for the last 3 years, as I was then fully absorbed in reviewing scientific literature that explored the role of tryptophan and tryptamine metabolites on immunological processes. I regret having changed the title of the Angkor image as the original document title could have yielded a most successful image search to its source. But I do recall that it came from a commercial site promoting tourism in Cambodia.

Recently, I was largely motivated by Andy Letcher's compelling challenge to the historical evidence of entheogenic mycology in Old World cultures ("*Shroom, A Cultural History of the Magic Mushroom*"), and I drew inspiration from the Devata image and spent a few weeks exploring the art and mythologies of Cambodia's Angkor Wat. I was fortunate to come upon a 1993 article by Rudiger Gaudes ("Kaundinya, Preah Thaong, the 'Nagi soma': Some Aspects of a Cambodian Legend," Asian Folklore Studies 52:333-358), which traces the mythologies and legends of the origins of the Cambodian kingdom. In these legends, Gaudes references ancient tales of an expelled prince from India known as Phra Thong (or from Burma, or Preah Thaong of Java) who fled to the coast of Cambodia and fell in love with a serpent lady, naga soma, whom frequented the land of Kamphuxa ("The Water Born") from her subterranean realms in order to sun bathe. Gaudes cites several variants of these legends from archeological, anthropological and scholastic research dating back to the 19th century, and he attributes these legends to the divine origin of the Angkor Wat and Angkor Thom civilization. He further explores the literature of the "Mahabharata" to uncover associations with the soma mythologies and the naga serpents as depicted in the form of the lingam and devaraja cults, and also as they related to the records of Zhou Daguan, the Chinese ambassador to Angkor during the 13th and 14th centuries. Gaudes summarizes Daguan's observations of the Angkorean king's life and power as dependent upon the goodwill of the water spirits as the proper and initial masters of the land.

Given such close associations with the naga-soma legends suggested by Gaudes it seems reasonable to question any literal interpretation of the Lotus (which may stand as a metaphor for the diverse variations of the "water-born serpent" depicted among the asparas and Devatas of the Angkorean complex).

When Sappho Marchal (daughter to the 1927 French conservator of Angkor Wat) published her drawings of 'Khmer Costumes and Ornaments of the Devatas of Angkor Wat" (Orchid Press, 2005, p. 7) she referred to the objects held by the Devatas as remaining unidentified, citing George Groslier's speculations about sacred jewels or perhaps religious symbols ("Recherches sur les Cambodgiens," Paris: Augustin Challamel, 1921, p. 82). Considering the diversity of the objects depicted, it appears that many seem to be hybrids of different biological genera, including some bizarre stylized combinations of serpentes and fungi taxa. Certainly, many panels clearly depict the lotus or some stylized derivative thereof, yet certain panels seem to depict convincing representations of basidiomycete species.

Along with images of the asparas and Devatas, many murals depicting episodes from the Hindu "Puranas" are also evident; as I'm sure you're probably aware. These also hold great promise for their pictorial interpretations of mythological episodes involving soma. A 1976 interpretation of the "Vishnu Purana" from "Mahabharata" by Dr. E. Krishnamacharya details the Kusha myth originating from the land of the sacred grass (Prana) surrounded by divine waters where all devas offer their presence, including Udbhida (the sprouting one). In the massive collections of essays contained within the many volumes of the "History of Science, Philosophy and Culture in Indian Civilization," S. Sundara Rajan interprets Udbhida as a varga (group) of fungi that included five sub groups including Iksuja (on sugarcane), Karisa (on cow dung), Kshitija (on soil), Patala (on straw) and Venuja (on bamboos) taken from the Ayurvedic "Susruta samhita" (in *Medicine and Life Sciences in India* Vol. IV, Pt. 2, ed. B.V. Subbarayappa, Centre for Studies in Civilizations, 2001, p.

647). Of course, these are singularly isolated identifications among a plethora of Devas, Gandharvas, Yakshas and Kimpurushas inhabiting the kingdom of the Prana. It seems evident that the soma described in "RigVeda" and later "samhitas" could very well encompass many elements of entheogenic identity, and it may well be appropriate to consider that all previous interpretations could be correct.

I located an exhaustive, if still incomplete, Japanese website created by Hatano Naoki detailing many of the panel relief's of the asparas and Devatas of Angkor Wat, Angkor Thom, Bayon Temple, Ta Proehm and surrounding sites such as Banteay Srei with detailed maps of their specific locations within the complex (see attached link). While I was unable to locate the specific panel I sent to you, it stylistically appears to fall within the characteristics and patina of the panels from the Angkor Thom complex. Fair warning that you could easily loose several hours exploring the images of these fascinating monuments.

Sincerely,

Kerry Colonna"

After asking permission to use the above text, a third letter arrived which also dealt a little more light on this subject.

"Monday 23 July 2007

Hello John,

Yes, I wrote the text of my last email, but, at best, it merely covers second hand sources to what is clearly [a] complex, sacred subject matter occluded in antiquity. Perhaps the key to understanding why entheogens have been so marginalized throughout history is to understand how they held such powerful influences and were ultimately canonized under various Decknamen and metaphors such as naga- soma as a means to convey their mystery and symbolic significance. Your work in S/SE Asia is pioneering in laying the groundwork for presenting likely candidates as a source for these naga-soma mythologies, something unthinkable as little as 50 years ago. Serious progress in decoding the mythologies will most likely occur among open-minded scholars familiar with the ancient Sanskrit texts and fluent in Hindu and the Kampuchea dialects."

Kerry also asked if I, or any of my colleagues have been keeping track of the folk names or local nomenclature of the *Psilocybe* and *Copelandia* species we have identified in this paper. He suggests, as has Terence McKenna, that this area of the world seems to hold great promise for revealing many secrets of our earliest spiritual doctrines.

Fig. 193. A small mushroom appears in the hand on this Devata.

Fig. 194. A close-up of the above image showing a possible mushroom.

In Kampuja (Kampuchea, Cambodia) the common name for mushrooms edible or otherwise is supt (pronounced as “sa-up.”

Fig. 195. Another Devata with a possible mushroom.

Fig. 196. In this image we can see what appear to be possible carvings of *Copelandia cyanescens* or a related synonym. Common in manure of 4-legged ruminants.

Appendix: Notes on compounds found in mushrooms other than the known psilocybian alkaloids

The beginning of the interest in the biochemistry of psychoactive mushrooms can be traced back to the discovery of the ritual use of mushrooms in Mexico by R.G. Wasson and the investigations carried out by A. Hofmann and ending in the identification of the active principles psilocybine and psilocine. But even if the chemo-taxonomical research is in constant and rapid developments, as the publications on the subject demonstrate, there hasn't been any true progress in the study of mushroom chemistry and in the identification of new active principles, accept those of Gartz and his colleagues in Europe (Stijve & Glutzenbaum, 1999).

Indeed, a certain attitude is common according to which some mushrooms species are considered trivial regarding their edibility, because of their reduced dimensions and/or rarity; but this fact often hides a scarce knowledge of either the biochemical or the toxicological aspects involved or quite a complete lack of precise investigations (Samorini, 1990).

On the other hand, it must be stressed that the [pandemic] diffusion of the ludible use of psychoactive mushrooms in the world has brought about, an increase in the number of new active species identified as such. But there are still some aspects to consider in order bringing about a better understanding in the study of the available data.

First of all, one has to take into account the bluification phenomenon generally valid for psilocybian mushrooms when they are handled; this is due to an enzymatic oxidation of psilocine forming a blue compound. Every gilled-mushroom that stains blue could be

a good candidate for being a new psilocybian mushroom and this could be a general rule, but the association between bluification and presence of psilocybian alkaloids is not always valid, because some psilocybian mushrooms don't stain blue and the reverse, species that show bluification are not psilocybian (IBID., bluing toxic-*Boletus* species). Then, some species could be mistaken for others or be casually found among the active species during the recollection for the subsequent chemical analysis. In fact, the identification of small brownish mushrooms is generally difficult and there's also a specific expression (found in American texts) identifying all small and insignificant mushrooms species in general, that's to say "Little Brown Mushrooms" (LBM) (Stijve *et al.*, 1984; Gartz, 1996).

As for the chemical-analytical methodology, the problem with determinations carried out in the past was the low selectivity and sensibility of the methods, leading to false-positive identification of psilocybian alkaloids in some species. For example, serotonine and its precursor 5-hydroxytryptophan may have been mistaken for psilocybine during analyses on some species of *Panaeolus* (Stijve & Kuyper, 1985). In particular, problems arise due to the lack of confirmatory procedures, when exact quantitative results are not reported and when the concentrations detected are very close to the detection limit of the method (Stijve & Kuyper, 1988). Nowadays, with the development reached by modern analytical chemistry, chemical analyses are more reliable, but the errors of the past normally take some years to be corrected (Stijve & Glutzenbaum, 1999).

Other aspects are represented by the fact that sometimes these data are based on indirect, uncontrolled and poorly or not referenced reports and by the continuous and untiring research for new psychoactive mushrooms that leads to speculations. We have not to let apart the role of imagination and suggestion and the possibility of a hoax to exploit the gullibility of unwitting laypersons. So it is important to maintain reservations on sensational scientific discoveries in non-scientific literature.

Different important aspects (and limitations) are of taxonomical and chemical nature. In fact, some mushroom species present different number of biochemical races (due to a genetic variability), so that it is not simple to exactly identify the taxonomical characters and to carry out reliable chemical analyses. In general, the identification of new psychoactive compounds in mushrooms maybe a difficult and long analytical work that can discourage the researchers (IBID.).

The presence of some not precisely yet identified and not well studied compounds one could find in some species of mushrooms, if confirmed, could contribute to the total psychoactive action, modulating for example the main effects of the psilocybian alkaloids psilocybine, psilocine, baeocystine, nor-baeocystine and the newly detected aeruginascine; such compounds could act in a synergic way, the total effect being the sum or the product of the effects of the single compounds.

As for the genus *Psilocybe*, in the '90s, Stijve and De Meijer (1993) reported the presence of a possible new psilocybin analogue in *Psilocybe cubensis*, of which the chemical nature was under investigation in that period. Additionally, one of our colleagues at Chulalongkorn University (Sunisa Suwancharoen) also has found what she believes to be a new compound in a Thai collection of *Psilocybe cubensis*, grown *in vitro* in a lab at

Chulalongkorn University in Bangkok and two other compounds (sesquiterpenoids) in *Psilocybe samuiensis,* one of which is known as psilosamuiensin A (Pornpakakul, S. *et al.*, 2008). In *Psilocybe semilanceata*, Stijve (1984) found two not yet identified and not yet studied tryptamines that could contribute to the effect of the mushroom and in samples from the Pacific Northwest an indole compound with mobility slightly slower than psilocybine was put in evidence in TLC (Repke & Leslie, 1977). In another analysis, 8 new compounds were identified, some of them with a presumed steroidal structure (Calligaris, 1993-1994). In samples from Sweden, phenethylamine (PEA) was determined with a maximum concentration of 146 µg/g on fresh material (Beck *et al.*, 1998). This compound formed by decarboxylation of the ubiquitous amino acid phenylalanine was not identified in any other mushroom until reported in *Psilocybe semilanceata* [sic!].

The effect of PEA is amphetamine-like, principally inducing tachycardia and general adverse reactions one could note after ingestion of *Psilocybe semilanceata*; the differences in effects between synthetic psilocybine and the mushroom could be due to the presence of PEA in the latter. On the other hand, the concentration of PEA is highly variable in respect to that of psilocybine, so adverse reactions are evident only in some cases.

PEA is rapidly inactivated by MAO-B enzymes, forming phenyl acetic acid, while psilocybine is first dephosphorilated to psilocine, which in turn is inactivated by MAO enzymes, giving 4-hydroxyindolacetic acids. But for psilocine this seems the minor metabolic pathway in rats, so that psilocine is a poor substrate for MAO enzymes. It is not precisely known if psilocine is a substrate for MAO-A or MAO-B enzymes, but one could speculate if there is a metabolic interaction between PEA and psilocine through competitive inhibition of MAO enzymes.

Unknown indole compounds (in concentration over 0,10 % on dry weight) were put in evidence in *Psilocybe coprophila, Psilocybe eucalypta, Psilocybe inquilina,* and *Psilocybe montana* (Margot & Watling, 1981). *Psilocybe coprophila* is not active and occurs in Thailand and has a cosmopolitan distribution in much of the world.

As noted above, we recall the isolation and identification of aeruginascine from *Inocybe aeruginascens*; this new compound, closely related to psilocybine, will be the subject of a forthcoming paper, as reported in the text above. If possible, aeruginascine is responsible for the cheerful properties of *Inocybe aeruginascens and* it would seem a characteristic compound typical of this species (Gartz, 1989, 1995; Stijve & Glutzenbaum, 1999). However, similar effects of euphoria are also reported for *P. semilanceata* and other species of the genus *Psilocybe*.

As for the genus *Pluteus*, in samples of *Psilocybe ephebus* collected in the Netherlands and Switzerland psilocybin was not identified, but the test for tryptamines gave positive results; suggesting that it is suspected to have a presence of a psilocybin analogue (Stijve & Bonnard, 1986). *Psilocybe ephebus* and *Psilocybe xylophilus* contain some unidentified tryptophan metabolites (Stijve & Bonnard, 1986; Stijve & De Meijer, 1993).

Other not yet identified tryptamines are present in some species of *Psathyrella*, *Leucoagaricus* and in *Sarcodon atroviridis*. As for *Psathyrella* spp., two fluorescent tryptamines (named psathyrelline I and psathyrelline II), that are not present in species of *Panaeolus*, *Psilocybe* and *Stropharia*, were put in evidence (Stijve 1985, 2002-2003) and a tryptophan metabolite was found in *Psilocybe spadicea* (1-2 % on dry weight) (Stijve & De Meijer, 1993). In *Leucoagaricus* sp., the presence of 6- or 7- substituted tryptamines (tryptophanmetabolites) is supposed; apparently these compounds are neither hallucinogenic nor acutely toxic, as they are present in *Leucoagaricus pudicus*, an edible species (Stijve & De Meijer, 1993; Stijve 2002-2003). In general, little is known about tryptophan metabolites substituted in the positions of the indole nucleus other than 4- and 5- in biological material, still being considered as laboratory curiosities (Stijve, 2002-2003). In *Sarcodon atroviridis* there are not less than4-tryptamines and tryptamine (Stijve, 1995, 2002-2003; Toro, 2004).

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Also, special appreciation is extended to the following young adventurers who participated in some of these excursions to the far side of the world. They include Dr. Mark D. Merlin, Dan Curran, Mike Adams, Dennis McCommis and Milo Zverino who first noticed the image of Shiva with a mushroom on the bas-relief at Angkor Wat. Other Seattlites included Dr. Jon and Carrie of HPX Productions and Grant Trowbridge of Seattle, Washington. Among other participants (between 2000-2006), we include the following mentions of appreciation to: Alex, Travis Canaday, Nataya, Chief Ill Eagle, Mike Acevedo, Keyes Lloyd, Leland, Rachel and Shane from Georgia and David Cox of Taipei. Additional thanks are also given to Rich Gee, Owen Emlen, Laura Sackett and Perry Manasche and Dr. William Harrison of Tarzana, California. Special appreciation is also extended to Kerry Colonna of Los Angeles who contributed the five last images of Devatas and bas- relief images of possible mushrooms being depicted in those images. For further information on the neurotropic fungi of Southeast Asia as described in this study, please refer to http://www.mushroomjohn.org (Tales of the Shroom).

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Fig. 197. *Amanita mira*. Photo: Courtesy of Tim Flegel, Mahidol University, Thailand.

Fig. 198. A Photo shopped poster by Adisron Junlawanno and John W. Allen. Designed by JWA.

Fig. 199. Sporulating *Psilocybe cubensis* at Na Muang, Koh Samui.

Feature below is a curious baby kwai (water buffalo) at the Eastern Seaboard area of Ban Phang Ka, Koh Samui. Here we found some beautiful *Copelandia* specimens and while JWA Photographing the fresh mushrooms, the baby kwai made his way right over to where the shrooms were growing.

Fig. 200. *Copelandia cambodgeniensis* in buffalo dung at Ban Phang Ka, Koh Samui, Thailand. Observe the color change from the heat of the sun.

Fig. 201. *Psilocybe cubensis*. On a farm in Ban Thurian fruiting in powdered buffalo manure scattered and later sold for fertilizer at local markets. These are very robust specimens.

Fig. 202. Ban Thurian, Koh Samui. Coconut Grove-kwai farm mushroom habitat.

A Chemical Referral and Reference Guide to the Known Species of Psilocin and/or Psilocybin-containing Mushrooms and their Published Analysis and Bluing Reactions: An Updated and Revised

By
John W. Allen

***Psilocybe allenii Borovička*, Rockefeller *et* Werner *sp. nov*. Observe bluing in the split stems which are very hollow, splintering when pinch lifting them from the soiled mulch.**

ABSTRACT

Numerous species were removed from previous published lists by Allen, Gartz *et* Guzmán (1992) and Guzmán, Allen *et* Gartz (2000). These earlier compilations included several species based on false positives, doubtful relationships, and/or no bluing present whatsoever. This current list is restricted to those species that were chemically analyzed (indicated with **bold-face numbers**). Referenced papers include: chemical analysis of baeocystine, norbaeocystine, psilocine, psilocybine and aeruginascens, plus other related tryptamine alkaloids). Those species known to exhibit a bluing or greening reaction in specimens when damaged by human handling or natural causes are marked by a •. Those with an *****asterisk indicate false positives which are noted at the end of this update.

Additionally, a novel second 2, 3,-secoaromadendrane-type sesquiterpenoids, named psilosamuiensis A, was isolated from the broth of *Psilocybe samuiensis* (Pornpakakul *et al., 2009).* Also, see, Borovička, Rockefeller *et* Werner (2012) for taxonomy of new species #32 in this reference list.

Furthermore, the auhor has also listed numerous errors from various field guides regarding regarding regarding psilocybian fungi misidentified or falsely labeled as toxic.

Basidiomycotina
Agaricales
Plutaceae
***Pluteus* Species**:

1. *Pluteus atricapillus* (Secr.) Singer* [= *P. cervinus* (Schaeffer) P. Kumm. Orton (1986) discussed this synonymy and concluded that the true name is *Pluteus cervinus* because the epithet *Agaricus atricapillus* Batsch is debatable and uncertain. Singer (1986) introduced the name *Pluteus atricapillus* (Secr.) Singer, but as Secretan's work has been declared invalid, this interpretation is not considered any more] (Ohenoja *et al.*, 1987).

•2. *P. cyanopus* Quél.

•**3**. *P. glaucus* Singer (Stijve *et* Meijer, 1993).

•4. *P. nigroviridis* Babos.

5. *P. salicinus* (Pers.: Fr.) P. Kumm. (Christiansen, Rasmussen *et* Høiland, 1984; Gartz, 1987c; Gartz, 1993a; Ohenoja *et al.*, 1987; Saupe, 1981; Stijve *et* Bonnard, 1985; Stijve *et* Kuyper, 1985; Stribrny, Borovička and Sokol, 2003).

•6. *P. villosus* (Bull.) Quél.

Coprinaceae
***Copelandia* Species [revised by Gerhardt (1996)].**
•7. *Copelandia affinis* Horak [= *Panaeolus affinis* (Horak) EW. Gerhardt] (Thomas, 2008b).

8. *C. bispora* (Malençon *et* Bertault) Singer *et* R.A. Weeks [= *C. papilionacea* var. *bispora* Malençon *et* Bertault; *Panaeolus cyanescens* var. *bisporus* (Malençon *et* Bertault) G. Moreno *et* Esteve-Ravis; P. bisporus (Malençon *et* Bertault) Ew. Gerhardt]. (Allen, 1998; Senn-Irlet, Nyffenegger *et* Brenneisen,
2000).

9. *C. cambodginiensis* (Ola'h *et* R. Heim) Singer *et* R.A. Weeks [= *Panaeolus cambodginiensis* Ola'h *et* R. Heim] (Merlin *et* Allen, 1993).

10. *C. chlorocystis* Singer *et* R.A. Weeks [= *Panaeolus chlorocystis* (Singer *et* R.W. Weeks) Ew. Gerhardt] (Weeks *et al.*, 1979).

11. *C. cyanescens* (Berk. *ET* Broome) Singer [= *Panaeolus cyanescens* (Berk. *et* Broome) Sacc., *P. papilionaceus* sensu (Bres.). Also, see *Copelandia westii*] (Gartz, 1994b; Hall, 1973; Heim, Hofmann *et* Tscherter, 1967; Merlin *et* Allen, 1993; Ola'h, 1969; Ola'h, 1970; Weeks *et al.*, 1979).

12. *C. lentisporus* (Ew. Gerhardt) Guzmán [= *Panaeolus lentisporus* Ew. Gerhardt].

13. *C. tirunelveliensis* Natarajan & Raman [= *Panaeolus tirunelveliensis* (Natarajan & Raman) Ew. Gerhard].

14. *C. tropicalis* (Ola'h) Singer & R.A. Weeks [= *Panaeolus tropicalis* Ola'h] (Ola'h, 1970).

Coprinaceae
***Panaeolus* Species:**
15. *Panaeolus africanus* Ola'h (Ola'h, 1969, 1970).

???*P. antillarum* (Fr.) Dennis* (See Discussion).

???*P. ater* (Lange) Kühner & Romagnesi* (See Discussion).

???*P. bisporus* Bertault & Malençon Gerhardt (see *Copelandia bispora*) (Allen, 1998; Senn-Irlet, Nyffenegger & Brenneisen, 2000).

*16**.*** *P. castaneifolius* (Murrill) A.H. Sm. [= *P. olivaceus* F. H. Møller; *Panaeolina castaneifolia* (Murrill) Bon; P. castaneifolia (Murrill) Ew. Gerhardt: this latest seems to be the true name; see Gerhardt (1996)].

17. *P. microsporus* Ola'h & Cailleux (Ola'h, 1969).

18. *P. olivaceus* F.H. Møller [it is sometimes confused as a synonym of *P. castaneifolius*]. (Ohenoja *et al.*, 1987).

???*P. papilionaceus* (Fr.) Quél. var. *papilionaceus sensu auct. non-sensu* Ew. Gerhardt [= *P. campanulatus* (L.: Fr.) Quél.]* (Ola'h 1969). Formerly known as *Panaeolus sphinctrinus*.

•20**.** P. retirugis (Fr.) Quél.* (Ola'h, 1969).

???*P. semiovatus*. (See Discussion).

???*P. sphinctrinus* (Fr.) Quélet* (See Discussion. Now known as *Panaeolus papilionaceus*).

21. *P. subbalteatus* (Berk. & Broome) Sacc.* [= *P. venenosus* Murrill, now known as *Panaeolus cinctulus*]. (Beug & Bigwood, 1982; Gartz, 1993a, 1996; Ohenoja *et al.*, 1987; Ott & Guzman, 1976; Stijve, 1987; Stijve & Blake, 1994; Repke, Leslie & Guzmán, 1977; Stijve & Kuyper, 1985).

???*Panaeolina foenisecii* (Fr.) Maire*. (See Allen and Merlin, 1993). (See Discussion).

Bolbitiaceae
***Agrocybe* Species:**
22. Agrocybe farinacea Hongo. (Koike, Yutaka. Yokoyama, Kazumasa., Wada, kuhkp., Kusano, Genjiro., and Shigeo Nozoe. 1981).

Bolbitiaceae
***Conocybe* Species:**
23. *Conocybe cyanopus* (G.F. Atk.) Kühner [= *Pholiotina* "*Galera*" *cyanopus* G.F. Atk.; *Pholiotina cyanopoda* (G.F. Atk.) Singer; *Galerula cyanopus* G.F. Atk.]. (Benedict, Tyler & Watling, 1967; Benedict, Brady, Smith & Tyler1977, 1962; Beug & Bigwood, 1982; Christiansen, Rasmussen & Høiland, 1984; Gartz, 1992b; Gartz, 1993a; Gartz, 1996; Ohenoja *et al.*, 1987; Repke, Leslie & Guzmán, 1977).

24. *C. kuehneriana* Singer. (Ohenoja *et al.*, 1987).

•25. *C. siligineoides* R. Heim. (Wasson, 1957a).

26. *C. smithii* Watling [= *Galerula cyanopus* Kauffman]. (Benedict, Tyler & Watling, 1967; Benedict, Brady, Smith & Tyler, 1977; Repke, Leslie & Guzmán, 1977).

Strophariaceae
***Hypholoma* Species:**
27. *Hypholoma gigaspora* (Natarajan & Raman) Guzmán [= *Psilocybe gigaspora* Natarajan & Raman; *Naematoloma gigaspora* (Natarajan & Raman) Guzmán]. (No bluing, Guzmán, 1996b).

28. *H. guzmánii* (Natarajan & Raman) Guzmán [= *Psilocybe guzmánii* Natarajan & Raman; *Naematoloma guzmánii* (Natarajan & Raman) Guzmán]. (No bluing, Guzmán, 1996b).

29. *H. poperianum* (Singer) Guzmán [= *Naematoloma poperianum* Singer]. (Guzmán, 1999b).

Stropharia
***Psilocybe* Species:**
•30. *Psilocybe acutipilea* (Speg.) Guzmán; =*Deconica acutipilea* Speg. (Guzmán, 1983).

•31. *P. aequatoriae* Singer; =Hypholoma aequatoriae (Singer) Guzmán. (Guzmán, 2004).

•32. *P. allenii* Borovička,. Rockefeller *et* Peter G. Werner, *Sp. Nov.* (Borovička, Rockefeller and Werner (2012).

•33. *P. alutacea* W.S. Chang & A.K. Mills. (Chang, Y. S., Gates, G. M. and D. A. Ratkowsky, 2006).

•34. *P. angustipleurocystidiata* Guzmán. (Guzmán, 1983).

35. *P. antioquensis* Guzmán, Saldariaga, Pineda, Garcia, and Veláquez, 1994). (Allen, J. W; Piapukiew, J; Sihanonth, P; Gartz, J. and G. Toro, 2008-2009).

•36. *P. aquamarina* (Pegler) Guzmán [= *Stropharia aquamarina* Pegler]. (Guzmán, 1995a).

37. *P. arcana* Borovička & Hlavácek. (Stribrny, Borovička and Sokol, 2003).

38. *P. argentipes* K. Yokoy. (Koike *et al.*, 1981; Ohenoja *et al.*, 1987).

•39. ***P. atlantis*** Guzmán, G., Hanlin, R. T. & C. White. (Guzmán, 1983).

???*Psilocybe atrobrunnea* (Lasch.) Gillet* (Not Active. See Discussion).

•40. *P. armandii* Guzmán & S.H. Pollock. (Guzmán, 1983).

41. *P. aucklandii* Guzmán, Hanlin *et* C. White. (Guzmán, 1983).

•42. *P. australiana* Guzmán & Watling. (Guzmán, 1983).

43. *P. aztecorum* R. Heim emend. Guzmán, =*P. mexicana* var. *longispora* R. Heim nom. nud. non *P. aztecorum* var. *aztecorum s. Natarajan et Raman.* (Heim & Hofmann, 1958b; Heim & Wasson, 1958).

44. *P. aztecorum* var. *bonetii* (Guzmán) Guzmán [= *P. bonetii* Guzmán]. (Ott & Guzmán, 1976).

45. *P. azurescens* Stamets & Gartz. (Gartz, 1995a; Gartz, 1996[1998]; Stamets & Gartz, 1995).

46. *P. baeocystis* Singer & A.H. Sm. emend. Guzmán. (Benedict, Brady & Tyler, 1962a; Beug & Bigwood, 1981, 1982; Leung, Smith & Paul, 1965; Repke, Leslie & Guzmán, 1977).

•47. *P. banderiliensis* Guzmán (Guzmán, 1983).

•48. *P. barrerae* Cifuentes *e*t Guzmán emend. Guzmán (Guzmán, Montoya-Bello and Bandala-Muñoz, 1988; Guzmán, G. 2000).

•49. *P. bispora* Guzmán, Franco-Mol & Ram-Guill. (Guzmán, Franco-Molano and Ramirez-Guillén, 2007).

50. *P. bohemica* Sebek [=*P. coprinafacies* sensu Herink, non sensu Krieglsteiner] (Gartz, 1994b; Gartz,1996[1996]; Gartz & Müller, 1989; Semerdzieva & Wurst, 1986; Semerdzieva *et al.*, 1986; Stijve & Kuyper, 1985; Stribrny, Borovička and Sokol, 2003).

•51. *P. brasiliensis* Guzmán. (Guzmán, 1983). (Guzmán, 1983).

•52. *P. brunneocystidiata* Guzmán et E. Horak. (Guzmán, 1983).

•53. *P. cabiensis* Guzmán Torres & Ramirez-Guillén sp. nov. (Guzmán, Ramírez-Guillén and Torres**.**
2004).

54. *P. caeruleoannulata* Singer ex Guzmán; =true name for P. *uruguayensis* Singer ex Guzmán, =*Stropharia siccipes* var. lugubris Rick. (Stijve & Meijer, 1993; Guzmán & Cortez, 2004).

55. *P. caerulescens* Murrill var. *caerulescens* [= *P. caerulescens* var. *albida* R. Heim; *P. caerulescens* var. *mazatecorum* R. Heim; *P. mazatecorum* R. Heim; *P. caerulescens* var. *nigripes* R. Heim]. (Heim & Hofmann, 1958a; Heim & Hofmann, 1958b).

56. *P. caerulescens* var. *ombrophila* (R. Heim) Guzmán [= *P. caerulescens var. mazatecorum*; *P. ombrophila* R. Heim; *P. mixaeensis* R. Heim]. (Heim & Wasson, 1958).

57. *P. caerulipes* (Peck) Sacc. (Leung, Smith & Paul., 1965).

???*P. callosa* (Fr. ex Fr.) Quélet (see *P. strictipes*). (See Discussion).

•58. *P. carbonaria* Singer. (No bluing noted. Guzmán, 1983).

•59. *P. caribaea* Guzmán, T. J. Baroni *et* Tapia, sp. nov. = *P. caerulescens* s. Pegler 1983. (Guzmán, Tapia, Ramírez-Guillén, Baroni, Lodge, Cantrell and Nieves-Rivera. 2003).

•60. *P. chaconii* Guzmán, Escolona and Ramirez-Guillén**.** (Guzmán, Escolona, Ramirez-Guillén, and James Q. Jacobs. 2004).

•61. *P. chiapanensis* Guzmán. (Guzmán, 1995a).

•62. *P. columbiana* Guzmán. (Guzmán, 1983).

63. *P. coprinafacies* (Rolland) Pouzar sensu auct. non sensu Herink, non sensu Krieglsteiner. (Auert *et al*, 1980; Semerdzieva & Nerud, 1973).

???*P. coprophila* Guzmán.* (See Discussion).

•64. *P. cordispora* R. Heim. (Guzmán, 1983).

65. P. cubensis (Earle) Singer [= *Stropharia cubensis* Earle; *P. cubensis* var. *caerulescens* (Murrill) Singer & A.H. Sm.; *Stropharia subcyanescens* Rick; *Stropharia cyanescens* Murrill; *Stropharia caerulescens* (Pat.) Singer]. (Allen & Merlin, 1992a; Gartz, 1991; Gartz, 1994b; Heim & Hofmann, 1958b; Margot & Watling, 1981; Perkel *et al.*, 1980; Repke, Leslie & Guzman, 1977).

66. *P. cyanescens* Wakef., non sensu Krieglsteiner. (Benedict *et al.*, 1962; Beug & Bigwood, 1982; Gartz, 1993a; Gartz, 1996; Gartz, 1998; Margot & Watling, 1981; Repke, Leslie & Guzmán, 1977; Stijve & Kuyper, 1985; Stribrny, Borovicka and Sokol, 2003).

67. *P. cyanofibrillosa* Guzmán & Stamets. (Stamets, Beug, Bigwood, and Guzmán, 1980).

•68. *P. dumontii* Singer ex Guzmán. (Guzmán, 1983).

69. *P. eucalypta* Guzmán *et* Watling. (Margot & Watling, 1981).

•70. *P. fagicola* R. Heim *et* Cailleux emend. Guzmán = *P. fagicola* var., = *P. wassoniorum* Guzmán *et* S. H. Pollock, = *P. xalapensis* Guzmán et A. López. (Guzmán, 1983, 2005).

•71. *P. fagicola* R. Heim var. *mesocystidiata* Guzmán, = P. fagicola R. Heim et Cailleux Emend. Guzmán. No bluing noted. (Guzmán, 1983, 2005).

•72. *P. farinacea* Rick ex Guzmán; = P. tenax s. Rick. [= *P. albofimbriata* (Rick) Singer]. (Guzmán, 1983).

73. *P. fimetaria* (P.D. Orton) Watling [= *P. caesioannulata* Singer; *Stropharia fimetaria* P.D. Orton]. (Benedict, Tyler & Watling, 1967).

•74. *P. fuliginosa* (Murrill) A.H. Sm.

•75. *P. furtadoana* Guzmán.

•76. *P. gallaeciae* Guzmán & M.L. Castro. (Guzmán, Gastón and M. L. Castro, 2003).

•77. *P. galindii* Guzmán [= *Psilocybe galindoi* Guzmán s. Singer; =*P. galindii* Guzmán]. (Guzmán, 1983; Guzmán, 2005).

•78. *P. goniospora* (Berk. *et* Broome) Singer [= *P. lonchophora* (Berk. *et* Broome) Horak ex Guzmán; *P. graveolens* Peck]. (No bluing noted. Guzmán, 1983, 2005).

•79. *P. graveolens Peck.* (Guzmán, 1983, 2005).

•80. *P. guatapensis* Guzmán, Saldariaga, Pineda, G. Garcia *et* Veláquez. **(**Guzmán, Saldariaga, Pineda, Garcia and Veláquez, 1994).

•81. *P. guilartensis* Guzmán, F. Tapia *et* Nieves-Rivera emend. Guzmán. (Guzmán, Tapia, Nieves- Rivera and Betancourt. 1997).

•82. *P. heimii* Guzmán. (Guzmán, 1983).

•83. *P. heliconiae* Guzmán, Saldariaga, Pineda, Garcia and Veláquez. **(**Guzmán, Saldariaga, Pineda, Garcia and Veláquez, 1994).

•84. *P. herrerae* Guzmán. (Guzmán, 1983).

•85. *P. hispanica* Guzmán. (Guzmán, 2000, 2005).

86. *P. hoogshagenii* R. Heim var. *convexa* Guzmán [= *P. semperviva* R. Heim & Cailleux]. (Heim & Hofmann in Heim & Wasson, 1958).

87. *P. hoogshagenii* R. Heim var. *hoogshagenii* [= *P. caerulipes* var. *gastonii* Singer; *P. zapotecorum* R. Heim sensu Singer]. (Heim & Wasson, 1958; Stijve & Meijer, 1993).

•88. *P. indica* Sathe & J.T. Daniel. (Guzmán, 2005. It needs Revision [Guzmán).

•89. *P. isabelae* Guzmán. (Guzmán, Gastón; Ramirez-Guillén, Florencia and Y. P. Munguia, 2003).

•90. *P. jacobsii* Guzmán. (Guzmán, 1983).

•91. *P. jaliscana* Guzmán. (Guzmán, G. 2000).

•92. *P. josecastilloae* Guzmán. (Guzmán, 2005).

•93. *P. karalensis* K. A. Thomas, Manim *et* Guzmán. (Thomas, K. A., Manimohan, P., Guzmán, G., Tapia, F. and F. Ramirez-Guillén. 2002).

•94. *P. kumaenorum* R. Heim. (Thomas, 2008a).

•95. *P. laurae* Guzmán. (Guzmán, G. 1998a).

•96. *P. lazoi* Singer [doubtful a neurotropic species, considered first by Guzmán (1983) as a synonym of *P. zapotecorum*, but Singer (1986) claimed that this is not a bluing fungus independent of that of Guzmán (1983a)].

97. *P. liniformans* Guzmán & Bas var. *liniformans*. (Stijve & Kuyper, 1985).

98. *P. liniformans* var. *americana* Guzmán & Stamets. (Stamets, P., Beug, M. W., Bigwood, J. & G. Guzmán. 1980; Stamets, 1996).

•99**.** *P. mairei* Singer* [= *Hypholoma cyanescens* Maire; *Geophila cyanescens* (Maire) Kühner *et* Romagn.; non *Psilocybe cyanescens* sensu Krieglsteiner]. (Guzmán, 1983).

•100. *P. makarorae* P. R. Johnst. *et* P. K. Buchanan.

•101. *P. mammillata* (Murrill) A.H. Smith; = *Atylospora cinchonensis* Murrill, = *Psathyra cinchonensis* (Murrill) Murrill (Guzmán, 1983).

•102. *P. meridensis* Guzmán. (Guzmán, 1983).

•103. *P. meridionalis* Guzmán, Ram.-Guill and Guzm.-Dav., sp. nov. (Guzmán, G; Walstad, L; Gándara, Etelvina; and Florencia Ramírez-Guillén, 2008).

•104. *P. mescaleroensis* Guzmán, Walstad, E. Gándara, & Ram.-Guillén., sp. nov. (Guzmán, Walstad, Gándara and Ramírez-Guillén, 2007).

•105. *P. mesophylla* Guzmán, J. Q. Jacobs *et* Escolona**.** (Guzmán, Escolona, Ramirez-Guillén, and James Q. Jacobs, 2004).

•106. *P. mexicana* R. Heim. (Allen, J. W., Sihanonth, P., Gartz, J. and Gianluca Toro, 2013; Gartz, 1995a; Gnirss, 1959; Hofmann, A., Heim, R. Brack, A. and H. Kobel, 1958a).

107. *P. microcystidiata* Guzmán *et* Bononi (Guzmán, 2005).

108. *P. moseri* Guzmán. (Guzmán, 1995a).

109. *P. moravica* Borovička (Borovička, 2003, 2008).

110. *P. moravica* var. *sternberkiana* Borovička. (Borovička, 2003, 2008).

111. *P. muliercula* Singer & A.H. Sm. [= P. wassonii R. Heim], = *P. mexicana* var. *brevispora* R. Heim. (Heim & Wasson, 1958).

•112. *P. muscorum* (P. D. Orton) M. M. Moser = *Deconica muscorum* P. D. Orton, = *Psilocybe bullacea* s. Bres., = *P. inquilina* s. Noodel., = *P. physaloides* s. M. M. Moser. (Guzmán, Ramírez-Guillén, F. & M. Contu, 2002).

•113. *P. naematoliformis* (Guzmán) Guzmán [= *Psilocybe naematoliformis* Guzmán; *Naematoloma naematoliformis* (Guzmán) Guzmán]. (Guzmán, 1999b, Guzmán, 2004).

114. *P. natalensis* Gartz et al. (Gartz, 1995; Gartz *et al.*, 1995; Reid & Eicker, 1999).

•115. *P. natarajanii* Guzmán [= *P. aztecorum* var. *bonetii* (Guzmán) Guzmán sensu Natarajan & Raman].

•116. *P. neocaledonica* (Guzmán & Hora) Guzmán [= *Psilocybe neocaledonica* Guzmán & Hora; *Naematoloma neocaledonica* (Guzmán & Hora) Guzmán]. (Guzmán, 1999b; Guzmán, 2004).

•117. *P. neorhombispora* Guzmán = *Hypholoma neorhombisporum* (Guzmán) Guzmán, 2004, 2005).

118. *P. novoxalapensis* Guzmán *et* J. Q. Jacobs, sp. nov. (Guzmán, Gastón., Jacobs, James Q., Ramírez-Guillén, Florencia., Murriata, Dulce and Etelvina Gándara. 2005; Guzmán).

•119. *P. oaxacana* Guzmán, Escolona *et* J. Q. Jacobs**.** (Guzmán, Escolona, Ramirez-Guillén, and James Q. Jacobs. 2004).

•120. *P. ochreata* (Berk. *et* Broome) E. Horak ex Guzmán. (No bluing noted. Guzmán, 1983).

•121. *P. oktedii* Hyndman et Thomas. (Hyndman and Thomas, 2008-2009, in press).

•123. *P. ovoideocystidiata* Guzmán & Gaines. (Allen, Gartz, Sihanonth & Molter, 2009).

•124. *P. papuana* Guzmán *et* E. Horak. (Guzmán & Horak, 1978; Guzmán 1983).

•125. *P. paulensis* (Guzmán *et* Bononi) Guzmán [= *P. banderiliensis* var. *paulensis* Guzmán *et* Bononi].

126. *P. pelliculosa* (A.H. Sm.) Singer & A.H. Sm. (Beug & Bigwood, 1982; Repke, Leslie & Guzmán, 1977; Tyler, 1961b).

•127. *P. pericystis* Singer.

•128. *P. pileocystidiata* Guzmán & Ramirez-Guillén. (Guzmán, Escolona, Ramirez-Guillén, and James Q. Jacobs. 2004.

•129. *P. pintonii* Guzmán. (Guzmán, 1983).

•130. *P. pleurocystidiosa* Guzmán. (Guzmán, 1983).

•131. *P. plutonia* (Berk. *et* M.A. Curtis) Sacc., = *Agaricus* (*Psilocybe*) *plutonius* Berk. *et* Cooke, see *Psathyra cubispora* Murrill. (Guzmán, Ramírez-Guillén and Torres**,** 2004).

•132. *P. portoricensis* Guzmán, Nieves-Rivera *et* Tapia. (Guzmán, G., Tapia, F., Nieves-Rivera, A. M. and C. Betancourt. 1997).

•133. *P. pseudoaztecorum* Natarajan & Raman [= *P. aztecorum* var. *aztecorum* sensu Natarajan *et* Raman; "*P. subaztecorum*" Guzmán (1995a)]. (Guzmán, 2005 says this needs a revision).

??? *P. pseudobullacea* (Petch) Pegler* (False positive by Marcano *et al.*, 1994). (See Discussion).

•134. *P. puberula* Bas *et* Noordel.

135. *P. quebecensis* Ola'h *et* R. Heim. (Ola'h, 1967; Ola'h & Heim, 1967).

•136. *P. ramulosa* (Guzmán *et* Bononi) Guzmán [= *P. zapotecorum* var. *ramulosum* Guzmán *et* Bononi].

•137. *P. rhombispora* (Guzmán) Guzmán [= *Naematoloma rhombispora* Guzmán]. (Guzmán, 1996b; Guzmán, 2004).

•138. *P. rickii* Guzmán *et* Cortez sp. nov. (Guzmán, G. & V. G. Cortez, 2005).

•139. *P. rostrata* (Petch) Pegler; = *Stropharia Rostrata* Petch.

•140. *P. rzedowskii* Guzmán. (Guzmán, 1983).

141. *P. samuiensis* Guzmán Band,-Muñoz, *et* J. W. Allen, = P. samuiensis Guzmán, J. W. Allen *et* Merlin s. Stamets nom. nud. (Gartz, Allen & Merlin, 1994; Surachai Pornpakakul; Sunisa Suwancharoen; Amorn Petsom; Sophon Roengsumran; Nongnuj Muangsin; Narongsak Chaichit; Jittra Piapukiew; Prakitsin Sihanonth; John W. Allen, 2009)**.**

•142. *P. sanctorum* Guzmán.

•143. *P. sardoa* Guzmán *et* Contu. (Guzmán, Ramírez-Guillén, F. *et* M. Contu, 2002).

•144. *P. schultesii* Guzmán *et* S.H. Pollock. (No bluing noted. Guzmán, 1983).

•145. P. semiangustipleurocysitidiata Guzmán, Ram.-Guill. *et* M. Torres. (Guzmán, 2005).

•146. *P. semiinconspicua* Guzmán *et* Trappe. (Guzmán and Trappe. 2005)

147. *P. semilanceata* (Fr.: Secr.) P. Kumm. [= *P. semilanceata* var. *caerulescens* (Cooke) Sacc.: *P. cookie* Singer; non *P. callosa* (Fr.: Fr.) Quél., which is *P. strictipes* Singer & A.H. Sm.]. (Babakhanian *et al.*, 1998; Benedict, Brady & Watling, 1967; Beug & Bigwood, 1982; Brenneisen & Borner, 1988; Christiansen & Rasmussen, 1982; Christiansen, Rasmussen & Tønnesen, 1981; Gartz, 1991; Gartz, 1992b; Gartz, 1993a; Gartz, 1994b; Gartz, 1996; Heim 1963a; Heim, Genest, Hughes & Belec, 1966; Heim, R., Cailleux, R., Wasson, R. G. and P. Thevenard, 1967; Hofmann, Heim & Tscherter, 1963; Jokiranta *et al.*, 1984; Mantle & Waight, 1969; Margot & Watling, 1981; Ohenoja et al., 1987; Michalis, 1977; Pedersen-Bjergaard *et al.*, 1997; Repke & Leslie, 1977; Repke, Leslie & Guzmán, 1977; Semerdzieva & Nerud, 1973; Semerdzieva & Wurst, 1986 Semerdzieva *et al.*, 1986; Stijve & Kuyper, 1985; Stribrny, Borovicka and Sokol, 2003).

•148. *P. septentrionalis* (Guzmán) Guzmán [= *P. subaeriginascens* Höhn. var. *septentrionalis* Guzmán].

149. *P. serbica* Moser *et* Horak, non-sensu Krieglsteiner. (Moser *et* Horak, 1968; Semerdzieva & Nerud, 1973).

•150. *P. sierrae* Singer [= *P. subfimetaria* Guzmán & A.H. Sm.]. Guzmán (2005) lists *P. sierrae* as possibly a doubtf. sp. ? = *P. maulensis Singer*, but describes *P. subfimetaria* as the correct name for *P. sierrae* (Guzmán, 1983).

151. *P. silvatica* (Peck) Singer *et* A.H. Smith; = *Psathyra silvatica* Peck, = *Hypholoma silvaticum* (Peck) A. H. Smith, = *Psilocybe tenax pp. s. auct.* (Repke, Leslie & Guzman, 1977; Repke *et al.*, 1977).

•152. *P. singeri* Guzmán. (Guzmán, 1983).

•153. *P. singularis* Guzmán, Escolona *et* J. Q. Jacobs**.** (Guzmán, Escolona, Ramirez-Guillén, *et* J. Q. Jacobs. 2004).

154. *P. strictipes* Singer *et* A. H. Sm. [= *P. callosa* (Fr.: Fr.) Quél. sensu Guzmán, 1983; *P. semilanceata* var. *obtusa* Bon; *P. semilanceata* var. *microspora* Singer?] (See *P. callosa*). (Leung, Smith & Paul. 1965).

155. *P. stuntzii* Guzmán *et* J. Ott. (Beug *et* Bigwood, 1982; Guzmán *et* Ott, 1976; Repke, Leslie & Guzmán, 1977; Repke *et al.*, 1977).

•156. *P. subacutipilea* Guzmán, Saldariaga, Pineda, Garcia and Veláquez. **(**Guzmán, Saldariaga, Pineda, Garcia and Veláquez, 1994).

157. *P. subaeruginascens* Höhn. var. *subaeruginascens* [= *P. aerugineo-maculans* (Höhn.) Singer & A.H. Sm.]. (Guzmán, 1983).

158. *P. subaeruginosa* Cleland. (Perkel *et al.*, 1980; Picker & Rickards, 1970).

•159. *P. subbrunneocystidiata* P. S. Silva and Guzmán, sp. nov. (Da Silva, Guzmán, Cortez, Ramírez- Guillén and Rosa M. B. Silveria. *2007).*

•160**.** *P. subcaerulipes* Hongo. (Guzmán, 1983).

161. *P. subcubensis* Guzmán. (Keller *et al.*, 1999).

•162. *P. subfimetaria* Guzmán *et* A. H. Smith; = *P. sierrae* Singer. (Guzmán, 2005).

•163. *P. subheliconiae* Guzmán, Ram.-Guill. *et* Torres. (Guzmán, 2005).

•164. *P. subhoogshagenii* Guzmán Torres & Ramirez-Guillén sp. nov. (Guzmán, Ramírez-Guillén and Torres, 2004).

•165. *P. subtropicalis* Guzmán. (Guzmán, 1995a).

166. *P. subyungensis* Guzmán. (Keller *et al.*, 1999).

•167. *P. subzapotecorum* Guzmán. (Guzmán, G. 2000).

•168. *P. tampanensis* Guzmán & S.H. Pollock. (Guzmán, 1983).

•169. *P. tasmaniana* Guzmán & Watling. (Guzmán, 1983).

??? P. thailandensis Guzmán & Allen. (See Discussion).

170. *P. teofilae* Guzmán & Ramírez-Guillén, sp. nov. (Guzmán, Gastón., Jacobs, James Q., Ramírez- Guillén, Florencia., Murriata, Dulce and Etelvina Gándara. 2005).

•171. *P. tuxtlensis* Guzmán. (Guzmán, Gastón., Ramirez-Guillén, Florencia and Y. P. Munguia (2003).

•172. *P. uxpanapensis* Guzmán. (Guzmán, 1983).

•173. *P. venenata* (S. Imai) Imaz. *et* Hongo [= *P. fasciata* Hongo; *Stropharia caerulescens* S. Imai, = *S. venenata* S. Imai]. (Guzmán, 1983, 2005).

•174. *P. veraecrucis* Guzmán *et* Pérez-Ortiz. (Guzmán, 1983, 2005).

•175. *P. villarrealiae* Guzmán. (Allen, J. W., Gartz, J., Sihanonth, P., and F. C. Suarez, 2009).

•176. *P. wassoniorum* Guzmán & S.H. Pollock. (Guzmán, 1983).

•177. *P. wayanadensis* K. A. Thomas, Manin *et* Guzmán. (Thomas, K. A., Manimohan, P., Guzmán, G., Tapia, F. and F. Ramirez-Guillén. 2002).

178. *P. weilii* Guzmán, Tapia *et* Stamets. (Stamets, 1996).

•179. *P. weldenii* Guzmán. (Guzmán, 1983).

180. *P. wrightii* Guzmán. (Guzmán *et* Cortez, 2004; Rossato, Cortez, Limberger *et* Guzmán).

•181. *P. xalapensis* Guzmán *et* A. López; = *P. fagicola* R. Heim emend. Guzmán. (Guzmán, 1983).

182. *P. yungensis* Singer & A.H. Sm. [= *P. yungensis* var. *diconica* Singer & A.H. Sm.; *P. yungensis* var. *acutopapillata* Singer & A.H. Sm.; *P. isaurii* Singer; *P. acutissima* R. Heim]. (Heim, 1963a; 1963b).

•183. *P. zapotecoantillarum* Guzmán, Baroni and Lodge, sp. nov. (Guzmán, Tapia, Ramírez-Guillén, Baroni, Lodge, Cantrell and Nieves-Rivera. 2003).

•184. *P. zapotecocaribaea* Guzmán, Ramírez-Guillén and Baroni, sp. nov. (Guzmán, Tapia, Ramírez- Guillén, Baroni, Lodge, Cantrell and Nieves-Rivera. 2003).

185. *P. zapotecorum* R. Heim emend. Guzmán. (Heim & Hofmann, 1958b; Ott & Guzmán, 1976).

Cortinariaceae
***Galerina* Species:**
186. *Galerina steglichii* Besl. (Besl, 1993; Gartz, 1995).

Cortinariaceae
***Gymnopilus* Species:**
187. *Gymnopilus aeruginosus* (Peck) Singer. (Gartz, 1994b; Hatfield, Valdez & Smith, 1978).

•188. *G. braendlei* (Peck) Hesler.

•189. *G. intermedius* (Singer) Singer.

190. *G. liquiritiae* (Fr.) P. Karst. (Koike *et al.*, 1981).

•191. *G. luteofolius* (Peck) Singer.

•192. *G. luteoviridis* Thiers.

193. *G. luteus* (Peck) Hesler. (Hatfield, Valdez & Smith, 1978).

194. *G. purpuratus* (Cooke & Massee) Singer. (Gartz, 1989c; Gartz, 1991; Gartz, 1992b; Gartz, 1993a;
Gartz, 1994b, Gartz, 1996; Kreisel & Lindequist, 1988).

•195. *G. sapineus* (Fr.) Maire [= *Pholiota sapinea* sensu auct.].

196. *G. spectabilis* (Fr.) A.H. Sm.* [= *G. spectabilis* (Fr.) Singer; *Pholiota spectabilis* Fr.; *Gymnopilus junonius* (Fr.) P.D. Orton; *G. spectabilis* var. *junonia* (Fr.) J.E. Lange; *Pholiota junonia* (Fr.) P. Karst.; *Ph. spectabilis* var. *junonia* (Fr.) J.E. Lange; *G. junonius* seems to be the true name]. (Hatfield, Valdez & Smith, 1978).

•197. *G. subpurpuratus* Guzmán-Davalos & Guzmán]. (Gartz, 1989c; Gartz, 1991; Gartz, 1992b; Gartz, 1993a; Gartz, 1994b; Gartz, 1996).

198. *G. validipes* (Peck) Hesler. (Hatfield, Valdez & Smith, 1977; Unsigned, 1972b).

199. *G. viridans* Murrill. (Hatfield, Valdez & Smith, 1978).

Cortinariaceae
***Inocybe* Species:**
200. *Inocybe aeruginascens* Babos. (Gartz, 1986c; Gartz, 1986d; Gartz, 1993a; Gartz, 1994b; Gartz, 1995c; Gartz, 1996; Gartz & Drewitz, 1985; Semerdzieva *et al.*, 1986; Stijve & Kuyper, 1985; Stijve, Klan & Kuyper, 1985) Also contains the newly discovered tryptamine alkaloid by Jochen Gartz, *aeruginascin.*

??? *I. calamistrata* (Fr.) Gill.* (See Discussion).

201. *I. coelestium* Kuyper. (Stijve *et* Kuyper, 1985; Stijve, Klan *et* Kuyper, 1985).

202. *I. corydalina* Quél. var. *corydalina.* (Gartz, 1995c; Stijve *et* Kuyper, 1985; Stijve, Klan *et* Kuyper,
1985).

203. *I. corydalina* var. *erinaceomorpha* (Stangl *et* J. Veselsky) Kuyper. (Stijve *et* Kuyper, 1985; Stijve, Klan *et* Kuyper, 1985).

204. *I. haemacta* (Berk. *et* Cooke) Sacc. (Stijve & Kuyper, 1985; Stijve, Klan & Kuyper, 1985; Stribrny, Borovicka and Sokol, 2003).

205. *I. tricolor* Kühner. (Stijve & Kuyper, 1985; Stijve, Klan *et* Kuyper, 1985).

Hygrophoraceae
??? *Hygrocybe psittacina (See Discussion).**

***Strophariaceae* (same as the genus *Psilocybe*).**
Weraroa
•206. *Weraroa novaezelandiae*
This newly discovered pouch fungi is a psilocybian species known from New Zealand that rapidly bruises blue when touched. It is now known and used for ludible purposes.

Figure: New Zealand Pouch Fungi known as *Weraroa novaezelandiae*.

Presented below are 7 images of a new species, *Psilocybe allenii*. Local PNW Internet shroomers from San Jose, California and Washington State refer to this species as *Psilocybe cyanofriscosa* and/or *Psilocybe cyanofriscana.* In 2006, Shroomery member Quarkus allegedly coined it with a local epithet as, *Psilocybe cyanofriscosa*. However it has also been observed and collected from southern California north to British Colombia, Canada.

***Psilocybe allenii* Borovička, Rockefeller *et* Werner *sp. nov*. Univ. of Washington, Seattle.**

***Psilocybe allenii* (syn=*Psilocybe cyanafriscosa*) was and still is a local epithet for this species in the Bay area of San Francisco, Fruiting abundantly south of the bay along the I-5 Corridor and north to British, Columbia, Canada.**

***Psilocybe allenii* Borovička, Rockefeller *et* Werner *sp. nov*. Ballard, Seattle. 2010.**

A fine cluster of *Psilocybe allenii* Borovička, Rockefeller *et* Werner *sp. nov*. Found in a mulched garden bed surrounding a classroom building at the University of Washington in Seattle. This species grows in colonies, clumps and clusters, as well as singular.

Tall specimens of *Psilocybe allenii* Borovička, Rockefeller *et* Werner *sp. nov*. Observe the white filaments on the stipe. Laurelhurst District, Northeast Seattle, near Lake Washington.

Bluing cluster of *Psilocybe allenii* Borovička, Rockefeller *et* Werner *sp. nov*. In Alder.

In this new listing the author (JWA) has corrected and added to the known species references to their known chemical analysis and on their ability to stain blue and/or green when damaged.

FALSE POSITIVES:

Guzmán, Allen & Gartz (2002) [2000] wrote that:
"Concerning confusions in the chemical studies of the neurotropic fungi. It seems that there has been a problem with the mis-identifications of collected fungi. Unfortunately it has frequently been observed that during many of the chemical studies of the neurotropic fungi, there are no taxonomic bases, or sometimes a mixture of different species were studied and then described as a single species. Guzmán, found a mixture of *Panaeolus* spp. and *Psilocybe mexicana*, together with *P. coprophila* (Bull.: Fr.) P. Kumm., all of them were identified as *P. coprophila* (in ENCB Herbarium at México City), this included material used by Leslie and Repke to isolate psilocybine (Guzmán, 1983)."

***Concerning Panaeolina foenisecii* Maire:**
In 1992, Allen, J. & M.D. Merlin. 1992c, wrote their "Observations regarding the suspected psychoactive properties of *Panaeolina foenisecii* Maire." In: Christian Rätsch (editor) *Yearbook for Ethnomedicine and the Study of Consciousness* vol. 1(1):99-115. November.
Several accidental intoxications attributed to *Panaeolina foenisecii* Maire in adolescent children, teenagers, and the elderly are presented. This paper was originally included in Allen, Merlin, and Jansen's 1991 paper, "An Ethnomycological Review of Psychoactive Agarics in Australia and New Zealand," but was later decided by the authors to publish it separately.

Partially excerpted and brought up to date for this report:
"During the past 35 years, a number of mycologists have listed this species in their field identification guides as being poisonous/hallucinogenic, probably basing their assumption on information provided by case histories noted in the above mentioned research by Allen and Merlin (1992c). After re-examining past research and the additional evidence described above, it is our conclusion (John W. Allen and Mark D. Merlin), as well as that of Jochen Gartz (1985), Gastón Guzman (1989), Tjakko Stijve (1989), Roy Watling (1989), Anthony Young (1989) and Rolf Singer (1991, Pers. Comm.), and Richard Evans Schultes (pers. Comm. 1987) that *Panaeolina foenisecii* is not psychoactive.

It is possible that when *Panaeolina foenisecii* is collected from lawns, macroscopic and taxonomic identification is made and specimens are passed on for chemical identification. Sometimes, other species known to macroscopically resemble *Panaeolina foenisecii* are unintentionally included in these collections. The other species could include *Panaeolus subbalteatus* Berk. *et* Broome and/or *Panaeolus castaneifolius* (Murr.) Ola'h=*Panaeolina castaneifolius* (Murr.) Smith. According to Tjakko Stijve (1989, pers. comm.), this would explain why some collections of *Panaeolina foenisecii* have been reported to be positive for psilocybin."

Gartz, Jochen. 1985f. Zum Nachweis der Inhaltsstoffe einer Pilzart der Gattung *Panaeolus*. *Pharmazie* vol. 40(6): 431-432.
100 specimens of *Panaeolina foenisecii* were analyzed. No psychoactive alkaloids were detected. See Allen and Merlin, 1992c for related information concerning the suspected properties allegedly found in analyzed specimens of *Panaeolina foenisecii* Maire. In German.

Stijve, Tjakko., Hischenhuber, C., and D. Ashley. 1984. Occurrence of 5-hydroxylated indole derivatives in *Panaeolina foenisecii* (Fr.) Kuehner from various origin. *Zeitschrift für Mykologie* vol. 50(2):361-368.
16 collections of *Panaeolina foenisecii* from 3 countries are examined by HPL and TLC for tryptamine content. All collections were negative. For further data on alleged psychoactive properties of *Panaeolina foenisecii* Maire see Allen and Merlin, 1992c.

Concerning:
Panaeolus ater
Panaeolus antillarum
Panaeolus goosensiae
Panaeolus semiovatus

None of these above four species of *Panaeolus* have ever been found to contain psilocine or psilocybine while they may have other tryptamine compounds in them they do not get anyone high.

Panaeolus ater has been mentioned in a few field guides as possibly hallucinogenic due to its relationship to other neurotropic species of *Panaeolus*.

Ott in his book, "*Pharmacotheon*" listed *Panaeolus antillarum* as a psilocybian mushroom because of an erroneously report by Stijve of the amount of the alleged chemical content in specimens collected in Thailand and Hawaii by JWA. And that also was not as published by Stijve, but was slightly noted in: Merlin, Mark D. and J. W. Allen (1992a, see above reference to Hawaiian species). Furthermore, Guzmán, Allen *et* Gartz (2002 [2000]) also reported that, "another species, this time a coprophilous fungus *Panaeolus antillarum* (Fr.) Dennis [= *Psilocybe antillarum* (Fr.) Sacc., *Panaeolus solidipes* (Peck) Sacc., *P. phaleanarum* (Fr.) Quél., *Anellaria sepulchralis* (Berk.) Singer] is also excluded. This fungus has often been erroneously reported in news items and medical journals from Australia during the late 1940s to the mid 1970s and had been mis-identified as a *Copelandia* spp. During that period numerous accidental intoxications occurred due to ingestions of *Copelandia* species. At the time of those published reports, some Australian mycologists, physcians, and law enforcement officials informed the local media that *Panaeolus antillarum*, a coprophilous mushroom was the alleged 'hysteria fungus,' an epithet used by locals and those who consumed such fungus as a means to describe the maddening effects that caused several dozen accidental inebriations by fungi lovers seeking edible fungi. Those medical case studies and news items noted that those who ate the 'hysteria fungi' had consumed the species known as *Panaeolus antillarum*, a non-active dung fungus. However, it was later determined that the actual fungus involved in those inebriations was actually a species

of *Copelandia* that macroscopically resembled *Panaeolus antillarum*. Later, Australian members of the drug sub-culture who were biker-surfers along the Gold Coast of Queensland near Brisbane came to refer to *Copelandia* species as 'blue meanies' and were often consume by those people who use the fungi as a drug. This confusion occured because both fungi present white fruit bodies and sometimes grow together in the same cow or buffalo dung heaps as well as the manure of elephants and other four-legged ruminants. However *Panaeolus antillarum* does not stain blue and is also considered to be an edible fungus widly distributed in the tropics, although it also occurs infrequently in Europe (Bon, 1987; Palacios *et* Laskibar, 1995 (see Gerhardt), as *Panaeolus phalanearum,* Gerhardt, 1996)."

Panaeolus goosensiae, a species previously only known of from Central Africa collected by Allen in Hawaii was identified and chemically analyzed by Tjakko Stijve and in a private communication to the JWA was found to be void of any alkaloids of psilocine and/or psilocybine (Pers. Comm. to JWA, 1991). This data was published in: Merlin and Allen (1993).

Allen. 1993. Species identification and chemical analysis of psychoactive fungi in the Hawaiian Islands. *Journal of Ethnopharmacology* vol. 40:21-40. October-December.
Several species of *Copelandia* and *Panaeolus subbalteatus* are reported from Hawaii. Chemical analyses of some of the Hawaii species are described. *Copelandia bispora*, *C. cambodgeniensis*, *Panaeolus goosensieae*, and *Amanita muscaria* are reported for the first time from the Hawaiian archipelago.

Allen, J. W. and M. D. Merlin. 1992. Psychoactive fungi use in Koh Samui and Koh Pha-Ngan, Thailand. *Journal of Ethnopharmacology* vol. 35(3):205-228.
A detailed narrative on the ludible use of *Psilocybe* and *Copelandia* species among tourists in Thailand. Mushroom omelettes and distribution of species in Southeast Asia is also noted.

Panaeolus semiovatus has never been known to be an active psilocybian mushroom and no chemical analysis has been performed to prove that it is.

Concerning: ***Psilocybe atrobrunnea* (Lasch.) Gillet.**
In 1987, Høiland reported the occurrence of psilocybin in a single collection of *Psilocybe atrobrunnea*. However, this species is not hallucinogenic. Stamets (1996) briefly mentioned that this species might be, "possibly active" as were specimens of *Psilocybe semilanceata* harvested in Norway by Høiland. Stamets also stated that, "no other studies are known to me" (Stamets, 1996).

This also includes *Psilocybe coprophila* Guzmán and *Psilocybe pseudobullacea* as not hallucinogenic according to Guzmán (1983) and Guzmán, Allen *et* Gartz (2002)[2000], who reported that "*P. atrobrunnea*, *P. coprophila*, P. *pseudobullacea* and others were excluded as neurotropic fungi, although they had been previously reported as hallucinogenic in numerous field guides published over the past 3 and a half decades of study.

Concerning Psilocybe pseudobullacea:
Guzmán, in Guzmán, Allen & Gartz (2002) [2000] reported that:
"*Psilocybe pseudobullacea* (Petch) Pegler is a not recognized as a bluing species (Guzmán, 1983, 1996) and no neurotropic properties have been found. However, Marcano *et al.* (1994) reported that they have isolated psilocybine and psilocine from Venezuelan specimens. It is probable that the Venezuelan material might possibly belong to an as yet undetermined neurotropic species. Høiland (1978) reported psilocybine in *Psilocybe atrobrunnea*. It is probable that Høiland's fungus is close to *Psilocybe coprinifacies* or *Psilocybe maire*, since *Psilocybe atrobrunnea* is not a neurotropic fungus (Guzmán, 1983)."

Concerning Psilocybe callosa:
"This mushroom is actually *Psilocybe strictipes*, first brought to light to both the academic and public community by Paul Stamets in "*Psilocybin Mushrooms of the World*." Gartz, Stijve, Allen, and others, including the late Gary Menser all believed that Singer and Smith's identification of *Psilocybe strictipes,* as a larger version of *Psilocybe baeocystis* was incorrect. Stamets wrote two great pages on the confusion caused by the misidentification of *Psilocybe strictipes* over the years and the fact that everyone's field identification guides also followed the error began by Singer and Smith in *Mycologia* vol. 50. 1958 (see Stamets, 1996).
More than 120 colored photographs and botanical descriptions of entheogenic and toxic mushrooms are presented in Paul Stamets' Field Guide, with a forward by Andrew Weil. This is the finest and most complete ultimate published identification guide for psilocybian fungi."

Concerning *Psilocybe thailandensis Guzman* and Allen.
This was an unintentional error by Stijve (1992) in his paper on active species of both Copelandia and *Panaeolus* species. The same error was later carried into Jonathan Ott's, *Pharmacotheon*.

Stijve, Tjakko and A. A. R. de Meijer. 1993. Macromycetes from the State of Paraná, Brazil. 4. The psychoactive species. *Arq. Biol. Technol*. vol. 36(2):313-329.
Psilocybine fungi are reported for the first time from Brazil in the following species: *Psilocybe caeruleoannulata*, *Psilocybe hoogshagenii* var. *hoogshagenii*, *Psilocybe subyungensis*, *Psilocybe uruguayensis*, and *Pluteus glaucus*. An additional unidentified species of *Pluteus* was also found to contain psilocybine and psilocine.

In this above referenced paper, Stijve and de Meijer (1993) noted the chemical analysis of *Psilocybe thailandensis* Guzmán and Allen, a non-existing named species that was later renamed *Psilocybe samuiensis* Guzmán Bandala and Allen. See Reference above about *Psilocybe thailandensis* and *Psilocybe samuiensis* below:

Guzmán, Gastón., Bandala, V. and John W. Allen. 1993. A new bluing *Psilocybe* from Thailand. *Mycotaxon* vol. XLVI:155-160. January-March.
The Latin description of *Psilocybe samuiensis* Guzmán, Bandala and Allen is presented.

The error concerning the name *Psilocybe thailandensis* was then further carried from the article by Stijve (1992) and was later republished in, "*Trout's Notes on Some Simple Tryptamines*."

Trout, K., and Friends. *2002. Trout's Notes on Some Simple Tryptamines.* Mydriatic Publications. A Better day Publication (no State listed). 272-pages.
This fine volume of tryptamine data and references by K. Trout, "A brief Overview & Resource Compendium" contains the most comprehensive collection of information on most plant tryptamines, while devoting a good portion of the study to psilocybian mushroom compounds. 31 - photographs by John W. Allen. A 2nd edition is now available in full color (Trout, 2007).

Guzman originally suggested the name *Psilocybe thailandensis* for a species first discovered on Koh Samui Island by **JWA**. At the time, Allen had informed Guzmán that since this species had only been observed and harvested for herbarium deposit from Koh Samui Island in the Gulf of Thailand that it should be named *Psilocybe samuiensis* Guzmán, Bandala and Allen. No paper was ever published naming this species as *Psilocybe thailandensis*. Later this species was also collected in Ranong Province, Thailand facing Burma and the Andaman Sea and at Angkor Wat in Xiem Riap, Kampuchea and identified by Guzmán (Pers. Comm., 2005).

Concerning *Gymnopilus lateririus:*
In Guzmán-Davalos, Laura and Gastón Guzmán. 1995. Toward a Monograph of the Genus *Gymnopilus* (*Agaricales*) from Mexico. *Mycologia* vol. 25(98-100):197-212, they "described this species with greening in the stipe."

Concerning the chemical analysis of the species noted below studied by Jochen Gartz:
Gerronema fibula
Gerronema warzii
Hygrocybe psittacina
Inocybe calamistrata
***Psathyrella candolleana* (Gartz, 1986; Stijve *et* Kuyper, 1988).**

Trout (2007) wrote inhis book on some simple tryptamines that the following three species
Psathyrella candolleana* (Fr.) Maire
Gerronema fibula* (Bull. ex Fr.) Singer
Gerronema* swartzii (Fr. ex Fr.) Kroesel

"were not found to contain psilocine and/or psilocybine in every testing situation; this could be due to different chemo types within a species, variations in environmental conditions affecting chemistry, or improper identification (resulting in either a false positive or a false negative). More information and citations for the research groups who completed chemical testing on the bold-faced numbered species can be found in "Trout's, Some Simple Tryptamines," second edition (2007) by Keeper of the Trout & Friends, Mydriatic Productions.

Additionally, see below for references to false positives."

"SUMMARY"

According to a study by Gartz (1986), psilocybine and derivatives were found in methanolic extracts of two species of the genus *Gerronema*, and one each in specimens of *Psathyrella*, *Inocybe* and *Hygrocybe*. UIT is the 1st evidence of the occurrence of these alkaloids in *Gerronema* and *Hygrocybe*. And a few extracts of *Inocybe aeruginascens* Babos contained L-tryptophan. The presence of psilocybine/ psilocine derivatives in 3 additional species of the genus *Inocybe* was also demonstrated."

Later, Allen (Allen and Gartz, 2000), wrote in "*Teonanácatl: A Bibliography of Entheogenic Fungi*," co- authored with Jochen Gartz, the following explanation of errors Gartz published in regarding the reference to his work.

"Gartz claimed that he detected tryptamine derivatives in fungi of the genera *Gerronema fibula, Gerronema swarzii* (=*Rickenella* spp.), and *Inocybe corydalina, Inocybe calamistrata* and *Inocybe haemacta* (In German)."

2 years after the Gartz errors on the alleged detection of these compounds, Tjakko Stijve and his colleague, Th. W. Kuyper (1988) published the following detraction of facts as presented by Gartz (1986).

"Stijve, Tjakko and Th. W. Kuyper. 1988. Absence of psilocybin in species of fungi previously reported to contain psilocybin and related tryptamine derivatives. *Persoonia* vol. 13(4):463-465.
Seven taxa of 10 agarics previously reported in the scientific literature by Gartz (1986) as psychoactive are analyzed for psilocybine and other related tryptamine compounds. All seven were found to be negative. The negative specimens reported by Stijve and Kuyper after analyzing species provided to them came from the same herbarium collections that Gartz analyzed included the following: *Psathyrella candolleana, Gymnopilus spectabilis, Gymnopilus fulgens, Hygrocybe psittacina var. psittacina*, *Hygrocybe psittacina var. californica (*Hesl. *et* Smith*), Gerronema fibula, Gerronema swartzii*, None were psilocybian. Neither is *Inocybe calamistrata*, although it does have a deep-sea green stipe in some collections, while both *Inocybe haemacta* and *Inocybe corydalina* are known psilocybian species."

Concerning: *Panaeolus ater* and *Panaeolus semiovatus*. As noted above**, t**hese are not neurotropic fungi and some field guides have erroneously described them as poisonous and/or hallucinogenic.

Concerning *Panaeolus sphinctrinus* (all variations considered):
In (2002)[2000], Guzmán, Allen & Gartz presented their hypothesis concerning false positives, which Dr. Tjakko Stijve also reported in regards to the misidentification of *Panaeolus sphinctrinus.* This species was once believed by ethnobotanist Richard Evans Schultes as the primary species of mushrooms known by the priests of the ancient Aztec Empire as "*Teonanácatl."* Since Richard Evans Schultes wrote that the epithet was more than

likely a speicies of fungi that he later learned was *Panaeolus sphinctrinus*. That particular species was first collected in Mexico by Schultes and Reko in the early to mid 1930s and locals told him that it was the sacred mushroom he was interested in finding. Actually the specimens collected by Schultes and Reko were later re-examined by Rolf Singer who found a mixed collection of several species. Among there were some *Psilocybe cubensis*, *Psilocybe caerulescens*, *Psilocybe mexicana*, and *Panaeolus sphinctrinus*. Because of the identification by Schultes of the species as the same one used in Aztec ritual ceremonies, every author interested in this new field of ethnomycology soon came to list it in their writings as the sacred mushroom of the Aztec Empire. However, years later, Schultes learned that it was not an active species. He tried to repair some of the misunderstandings about the fungus he first wrote of as 'teonanácatl' and also realized he noted that it was used by the Mazatec Indians of Oaxaca. Later he wrote that no Indian ever used it ritualistically in healing and curing ceremonies. Today, many books still cite Schultes' identifications and further spread the mis-information to newer readers who then pass it on to others authors and scholars. One author recently had a new paperback edition of an important book and the new publishers had used a painting of *Panaeolus sphinctrinus* on the cover that read as "*Teonanácatl: Sacred Mushrooms of Visions.*"

It is easy to see how a rumor spreads from one published paper to dozens over the past 60-years. There were several chemical studies on various species of *Panaeolus* and *Panaeolina foenisecii* that claimed that the studied species were active. Later analysis revealed that most of those above noted species turned out to contain no active alkaloids. Thus many species are now known to be the result of false positives. One may follow the chronology of the literature of this species to show how this error spread over the years.

The following short essay about *Panaeolus sphinctrinus* provides the reader why it is not a psilocybian mushroom, regardless that a few published papers claimed to have found the presence of psilocybine/psilocine in three separate chemical analytical studies that many years later had apparently turned out to be false positives. At the same time, dozens of published citations in field guides also listed this species or described it as possibly hallucinogenic/toxic, and many of these very same field guides written by scholarly mycologists also carried the error into reprinted editions of their earlier published guides and even more new field guides further spread the urban legend.

Furthermore, many books later written and published in regards to the discoveries by R. Gordon Wasson and his colleagues regarding indigenous tribal groups residing in the montane regions of the high Sierra Mazateca in the Mexican State of Oaxaca wrote that the species was most likely used ceremoniously by the priests and followers of the mighty Olmecs, Toltecs, and Aztecs, and most probably the Mayans. Such notations of this species appeared in the early works of Richard Evans Schultes and Blas Pablo Reko in the mid to late 1930s. Schultes published two important papers on the sacred mushrooms of the Aztecs, providing transcribed descriptions of the species and brought to the attention of the public, the term, "teonanácatl." This word soon came to imply any mushroom used ceremoniously before, during and after the conquest of Nueva España in the 1500s a. d. In 1958, Singer and Smith (1958) wrote a two-part monograph on the genus *Psilocybe*. Rolf Singer and Alexander H. Smith, in their two - part paper appearing in issue number 50 of

Mycologia, presented a review on the use of the mushrooms and from then on, most books on ethnobotanical and/or neurotropic plants and mushrooms, noted that this species was also included in books on shamanism and/or ritual use of entheogenic plant substances, and the authors would always cite the Wasson's papers on his mushroom discoveries in Mexico between 1953-1959 and those authors usually mentioned that *Panaeolus sphinctrinus* was a psilocybian species used by the Mazatec. Interestingly, no indigenous tribal-groups in Mexico and those along the border into the West Coast of Guatemala have ever heard the epithet, "*teonanácatl*." And not a single indigenous Indian knows this word. For centuries, the Mazatec Indians had no written language and they spoke Nahuatl, the language of their ancestors, the Olmecs, the Toltecs and the Aztecs. Although they were unlettered, they were not illiterate. Many sabios, sabias, brujos, curanderos, curanderas, shamans (male/female), sorcerers, etc., always passed on down to their next generation, the secrets they carried since the conquest began.

From Mushroom Pioneers:
Many scholarly works on the ethnomycological study of the sacred mushrooms, including the updated edition of Richard Evans Schultes and Albert Hofmann's masterpiece on entheogenic plants, "*Plants of the Gods*" retained an error when Christian Rätsch became the new co-editor and co-author of "P*lants of the Gods*." Earlier, prior to both Dick Schultes and Albert Hofmann's recent deaths, Dick Schultes discussed this matter with me and agreed that the Mazatecs did not use *Panaeolus sphinctrinus* (syn. =*Panaeolus papilionaceus*), as a divinatory sacrament, admitting that the original identification he was provided with had been reported to him by locals who really did not know their mushrooms. And that in his eagerness to study these special mushrooms he listened to what he was told and then shared that knowledge with the academic community. The presentation of their section on *Panaeolus sphinctrinus* as the "teonanácatl" mushroom of the Aztecs is incorrect. The following short essay will show how this error has spread across the years and then relate how the scholars now say it is not as originally presented in both the first edition of the book and its recent reprint where Christian Rätsch retained the note written by Dick Schultes in the original printings of "*Plants of the Gods*," that *Panaeolus sphinctrinus* was used by Mazatec healers, when in fact it took almost 40-years to learn the truth that that species was not an active mushroom (Allen, 2001).

Rolf Singer and the Misidentification of *Teonanácatl*.
"Both Schultes' and Schultes & Reko's original 1938 collections of Oaxacan fungi were forwarded from Mexico to the Farlow Herbarium at Harvard University. They represented two different collections. These collections were accidentally placed on a single herbarium sheet and were later separated in 1941 by mycologist Rolf Singer at the University of Chicago and the Field Museum of Natural History.

In 1958, mycologists Rolf Singer and Alexander H. Smith conducted follow up research on the previous studies by Schultes and Reko. Singer, in Singer and Smith (1958b), described the labels for both collections of Schultes and Reko's fungi collections but was confused by Schultes' written description of a species that Singer believed was *Panaeolus sphinctrinus*. Interestingly enough, Schultes' macroscopic description of this species actually fit the description of *Psilocybe mexicana* Heim. The first label on this herbarium sheet read as follows:

"Springy meadows in rainy season. Huautla, July 27, 1938. Stem: 1-2 mm. diam: 10 cm. High; hemispherical but often cuspidate; gills dark brown-black, whole plant coffee brown, black when dry. Mexican name is *she-to, tso-ska*. Said to be poisonous in overdose of 50-60 mushrooms, but in moderate quantity it produces hilarity and general narcotic feeling of well-being for an hour. Excess doses said to produce permanent insanity."

It appears that Schultes may have collected two different species of mushrooms in the springy meadows. One variety being *Panaeolus campanulatus* var. *sphinctrinus* and the other being *Psilocybe mexicana*. Singer in Singer and Smith (1958), had noted that "Springy meadows was the known habitat for *Psilocybe mexicana* and cuspidate is a characteristic feature of the genus *Psilocybe*, as are the brown gills which were mentioned and the coffee brown color of the mushroom." However, the black gills as reported by Schultes would definitely fit the description of a *Panaeolus* species. Schultes had not reported that his collection occurred in manure or from the ground. If they were coprophilous Schultes would have mentioned it.

Furthermore, *she-to* and *to-ska* are epithets used by the *Mazatec* and *Chinantec* to describe *Psilocybe mexicana* (see Allen, 1997b and Allen, 1997d). The author also found the epithets *to-shka* and *shi-to* being used to identify a species of *Panaeolus*.

A 2nd collection deposited in a herbarium by Schultes and Reko was later misidentified by Rolf Singer as *Stropharia caerulescens* =[syn. *Psilocybe caerulescens* Murr]. I note that Singer may have confused *Stropharia cyanescens* Murr. =(syn. *Psilocybe cubensis*. The paper on this second sheet read as follows:

"Plantae Utiles Mexicana, Oaxaca. Common Name (Mexican) *nanacate*. Tribe: *Mazatec*. Indian name: *kee-sho*. Habitat: freshets during the rainy season. Locality: Huautla. Uses: from four to eight are eaten to produce a temporary narcotic state of hilarity. Said to be poisonous if taken in excess, causing permanent insanity" (Singer & Smith 1958b).

Singer mistakenly noted these mushrooms to be *Stropharia caerulescens* were synonymous with the description and habitat of *Psilocybe cubensis* (Earle) Sing.]. Later Singer realized that he had misidentified this species when he learned that the word *kee- sho* referred to the Mazatec Indian landslide mushroom later identified as *Psilocybe caerulescens var. mazatecorum*. Ott (1993), in a personal communication to JWA, believed these mushrooms to be *Psilocybe caerulescens* Murr., a mushroom known to occur in sugar cane mulch and at roadside landslides, yet the habitat for this collection was listed as freshets, which as one may surmise, are the dung of cattle. Thus it appears that this second collection was probably *Psilocybe cubensis* (Earle) Singer. Interestingly, in 1923, *Psilocybe caerulescens* Murrill was originally discovered and identified in Huntsville, Alabama, yet it has never been reported from Alabama since. However, this species was later reported from Florida by Singer and Smith (1958) and Jacobs (1975). However, Jacobs also had errors in a paper he wrote on the active fungi of Mississippi (See References).

Schultes' notes on specimens stored on a single sheet in the herbarium caused Singer (1958) to be confused. As noted earlier, Schultes had identified one of his collections' errors regarding his identification of *Panaeolus campanulatus* var. *sphinctrinus* as a possible hallucinogenic divinatory fungus. However, Singer then wrote, "The genus of *Panaeolus* was not used by the

Mazatec Indians of the Huautla region either for magico-religious ceremonies or as a sacrament in shamanic healings." Additionally, Singer and Smith (1958) wrote, "we must insist, that the phenomena which belonged in the class of cerebral mycetismus in the terminology of Ford (1923), and not fully identified (*Panaeolus campanulatus* var. *sphinctrinus*) (Schultes 1939, 1940), as being comparable with the hallucinatory-euphoric and lasting effects which have been described in literature as belonging to and coming from certain mushrooms of the genus *Psilocybe*. Aside from that we feel for certain that the species known as *Panaeolus campanulatus* var. *sphinctrinus* is not now and never has been used as a drug catalyst for divinatory purposes or religious ceremonies by present day Indians in Mesoamerica", nor was it used as a sacrament by their pre-Colombian ancestors.

Schultes (1978) later wrote that "Wasson and Heim, and Singer and Guzmán [all] failed to find *Panaeolus campanulatus* var. *sphinctrinus* in use and, as a result, have assumed that it should not be included in the list of hallucinogenically used Mexican mushrooms." The late French mycologist Roger Heim (1963), also asserted that "the Indians do not take *Panaeolus campanulatus* var. *sphinctrinus* in their rituals", and Singer (1958) after one short field trip categorically stated that "*Panaeolus campanulatus* var. *sphinctrinus* is not used and perhaps, had been mistaken for *Psilocybe mexicana* Heim." The noted Mexican authority on the sacred mushrooms of Mexico, Gastón Guzmán (1977), called *Panaeolus campanulatus* var. *sphinctrinus* as a "false *teonanácatl*" and P. Antoine (1970), claimed that this belief has spread and still exists. However, eight years later, Singer (1978b) still believed that no species of *Panaeolus* belonged to the group of Mexican hallucinogenic mushrooms that were known as *teonanácatl*. In 1979, Schultes wrote, "certain shamans and curanderas of the Mazatec and Chinantec Indians do employ the mushroom known as *Panaeolus campanulatus* var. *sphinctrinus* in curative and divinatory ceremonies. These *Panaeolus* species are known to the Indians as *t-ha-na-sa, shi-to* and *to-shka*. They are bell-shaped or ovoid-campanulate shaped in the cap and appear to be yellowish-brown in color." Yet Schultes later informed me that they were probably not used by any Indians in Mesoamerica and were misidentified by him, Singer and others. An interesting note is that one of the early Spanish codices provided documentation that a yellow mushroom was also described as being called *teonanácatl*. The author also found these latter two epithets used by the Mazatec in describing *Psilocybe mexicana*.

Specimens of *Panaeolus sphinctrinus* collected in Mexico by French Canadian mycologist Gyorgy Miklos-Ola'h (1969) were found to contain psilocine and Ola'h classified this species as 'latent' psilocybian.

However, as late as 1983, Guzmán still maintained that "in Mexico, no *Panaeolus* species is used as a sacred or divine mushroom among the Indians of Oaxaca, and that includes the Mazatec, Chatina, Zapotec, and Mijes, and of the Indians in the state of Mexico, in spite of the fact that the species of *Panaeolus* are very common." Guzmán still maintains that the Mazatec Indians say that *Panaeolus* species are not good to eat "*son malos*" (they are dangerous or poisonous). *Panaeolus* species were collected independently as one of the sacred hallucinogenic mushrooms by two groups of investigators, Weitlaner's group and by Schultes and Reko. Previous chemical analyses of these collections revealed that some species of *Panaeolus* and even *Panaeolus campanulatus* var. *sphinctrinus* were falsely identified as containing the indoles psilocybin and psilocin (Ola'h 1970; Ott 1976; Tyler & Groger 1964).

However, one should consider that in a single collection of a particular species, there may be more than two species collected---for example, one species might macroscopically resemble another as in the case of *Panaeolina foenisecii*, as opposed to *Panaeolus subbalteatus*. Both species at times macroscopically resemble one another."

Those who seek such look-a-like species often still throw them into their collection baskets and bags as active species. In Thailand, Australia, Florida to Texas and the Pacific Northwest, many pickers of magic mushrooms also collect both *Panaeolus papilionaceus* and throw them in with liberty caps in the PNW and with *Copelandia* species world wide. Yes they macroscopically resemble what foragers are seeking but luckily no one has poisoned another and still they eat them with the good active species together, manure and all.

***Psilocybe allenii* Borovička, Rockefeller *et* Werner. *sp. nov*. Ballard, Northwest Seattle, Wa.**

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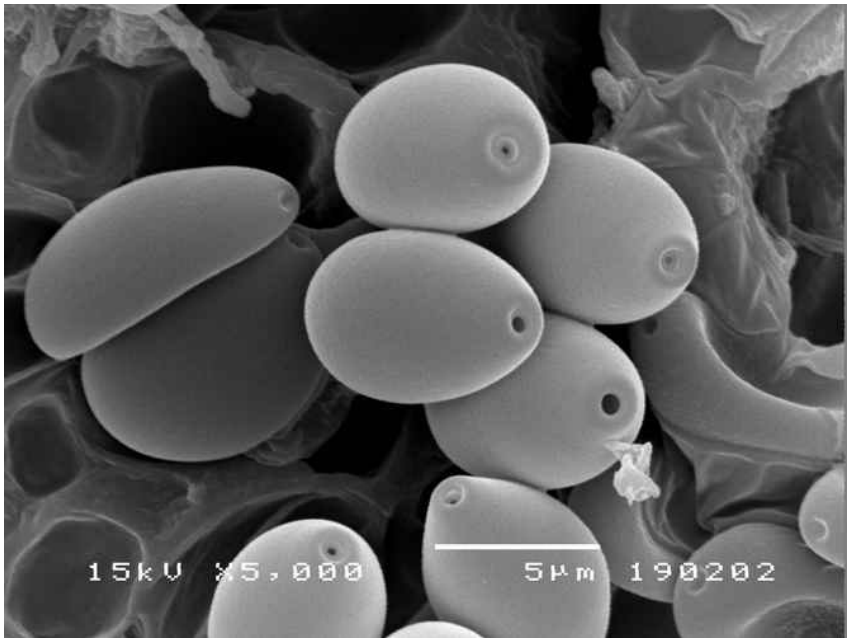

SEM (Scanning Electron Microscopy) image of *Psilocybe allenii* Borovička, Rockefeller *et* Werner., *sp. nov.* Photo: Prakitsin Sihanonth.

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A Final Note Concerning Other PNW Unidentified Species of Bluing Psilocybes

In the past 15-years, 2 other species of *Psilocybe* have not yet been examined or taxonomically studied and named. One species was misidentified in a photograph by Jeremy Bigwood who listed it as *Psilocybe cyanofibrillosa*. When the author posted a photograph of the Bigwood image with that of his [JWA] identification of it as *Psilocybe*

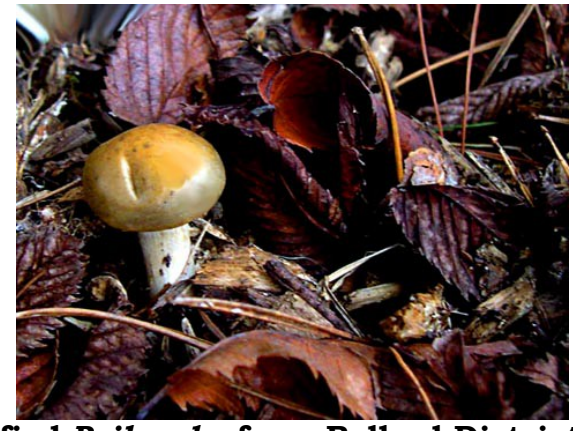
cyanofibrillosa along with a similar photograph from David Arora's first edition of Mushrooms Demystified in which Arora mislabeled the species as *Psilocybe cyanescens*. San Francisco mycologist Alan Rockefeller brought to my attention that the species in David Arora's field guide was actually a species known by local mushroom enthusiasts in the Bay area of San Francisco who gave it the local epithet of *Psilocybe cyanofriscosa/Psilocybe friscana*, now known as *Psilocybe allenii* Borovička, Rockefeller and Werner. JWA based his original identification of the Arora photograph as *Psilocybe allenii* based on Alan Rockefeller's personal communication to me about the species. But this species might possibly be a species previously known from Indonesia as *Psilocybe subaeruginascens.* Alan Rockefeller had previously believed that the Bigwood photograph was *Psilocybe allenii* (Syn.=*Psilocybe cyanofriscosa*). However, there are many macroscopically different characteristics of this species that separate it from both *Psilocybe cyanofibrillosa* and *Psilocybe allenii*. But this is a very strong psychoactive *Psilocybe* and its stipe is solid as that of *Psilocybe cyanescens*, but has a thick cap and stipe, and is hardly hollow and does not become wavy like *Psilocybe cyanescens* which some friends claimed it was.

A 2nd species, growing around a mulched Maple Tree in the University/Ravenna District of Seattle, Wa., also superficially resembles *Psilocybe cyanescens*, however, the difference again is in the thick leathery caps that almost want to become wavy but do not do so. The stipes are also very thick like in the Bigwood photograph. It is believed that this species might be *Psilocybe subaeruginascens*, an active species known to occur in parts of Indonesia and/or a related species found in some southern regions of Japan. These are basically just a couple of more unidentified species that sometimes appear in parts of the Seattle area every two to three years. Other friends have also collected them as I had with members of some of the more popular mushroom forums on the Internet. Some of those who found the species along with this author also thought they were *Psilocybe cyanescens*. But as the seen in the photos posted on the next few pages, two new unidentified bluing *Psilocybe*s are very different than that of *Psilocybe cyanescens*.

Unidentified *Psilocybe* species from the Pacific Northwest, U.S.A. Possibly *Psilocybe subaeruginascens*. Photo: Jeremy Bigwood & Michael Beug.

Unidentified *Psilocybe* species from the Pacific Northwest, U.S.A. Seattle, University Village.

Unidentified *Psilocybe* species. University of Washington campus.



Unidentified *Psilocybe* from Ballard District, Seattle, Washington.

An Unidentified *Psilocybe* species from University Village, Seattle, Washington.

Presenting here for the first time, a second new unidentified bluing *Psilocybe* species from the Pacific Northwest of America. This species was first observed by the author in 1985 on Capitol Hill in Seattle Washington in a mixed mulched area with alder and other hardwoods off Broadway at a Nursing Home. The first time this was observed the species was in a large gigantic cluster and had over 122 mushrooms in that one cluster. It seems to want to become wavy but the caps as noted above are very leathery like in their physiological structure and the stipe as noted above is very thick, no hollowness in the stipe that is usually common with other species of *Psilocybe* mushrooms. The images below were taken about 7-years ago growing around a single maple tree where eventually two trees apart and all mulch that run on a street Island that for about 30 blocks from the University District's Ravenna Park to Green Lake in Seattle.

Out of blocks of double trees bordering the east to west center of Ravenna Blvd. all the way west to Green Lake, many of the mulched trees along the lane separator for years were known to have *Psilocybe cyanescens* in the mulch beds circling the trees all the way to Green Lake. When the author first saw the mushrooms, it was thought that they were a mutated form of *Psilocybe cyanescens.* However, on approaching their parameter around the tree and having a closer look-see, the macroscopic characteristics of this interesting mushroom became apparent and showed that it was not *Psilocybe cyanescens*. Below are several images of this new as yet unidentified species of fungi.

An unidentified new bluing **Psilocybe** near Ravenna Park, Seattle, Wa.

The unintentional misidentification of a psychoactive species from Fiji by R. Gordon Wasson as published in an article appearing in a 1959 issue of the *Herbalist.*

By John W. Allen[1] and Mark D. Merlin [2]

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Introduction

I first became aware of the presence of entheogenic mushrooms as occurring on the Island of Fiji after reading a private communication written to R. Gordon Wasson concerning an accidental ingestion of psilocybian mushrooms. The letter was written in response to Wasson's May 13, 1957 and June 10 (International Edition) of a *Life Magazine* publication, "Seeking the Magic Mushroom," in which R. Gordon Wasson wrote of his re discovery of an hallucinogenic mushroom cult in Mexico (Wasson, 1957).

Fig. 1. The Islands of Fiji.

In "Wild Mushrooms: A World of Wonder and Adventure," Wasson drew attention to four historically noted specific cases of accidental ingestion of toxic mushroom. Species which were at the time, believed to have been the cause of a psilocybian nature (Magnus,

c. A. D., 1250; Glen, 1816; Verrill, 1914; Douglas, 1917). Wasson also provides us with some historical background information regarding some anecdotal details both on edibles as well as toxic species and introduces to the reader, a partial list of foreign epithets for some of these mushrooms throughout the world. His paper describes several past incidents of accidental ingestions of both toxic and early noted possible cases of psilocybian inebriations, focusing on three specific case studies, one of which is outstanding in its description of the identification and subsequent physical and mental effects caused by an accidental ingestion of a psilocybian mushroom species. This noteworthy description was sent to Wasson in a letter from a gold miner in Fiji in 1957.

The lead author [JWA] first came across Wasson's *Herbalist* article in the early 1970s, having been inspired to read it after learning about and reading Wasson's extraordinary report of his "discovery" of a magic mushroom cult in the Mexican State of Oaxaca that was published in the May 13, 1957 issue of *Life Magazine*.

In this article of the *Herbalist*, Wasson referred to accidental mushroom ingestion's that caused "disturbances of visions" and feelings of euphoria. The causative actions were later determined to be from the ingestion of psilocybian containing mushrooms.

In May of 2009, I had successfully cloned a strain of *Psilocybe cubensis*, whose spores were obtained from a print mailed to me from a student in Switzerland, who in the previous year (Pers. Comm., 2008) had collected and bio-assayed some specimens of *Psilocybe (Stropharia) cubensis*, while vacationing with his family. As a result of the Wasson article on Fiji, I became interested in Fiji mushrooms and recalled reading the 1959 Wasson article. I also remembered that as a co-author of an article (Guzmán *et al*. 2000) that included *Psilocybe cubensis* in my paper on the "Worldwide Distribution of the Neurotropic Fungi: An Analysis and Discussion" that *Psilocybe cubensis* was reported from Fiji. This in turn led me to reread the Wasson paper and that is when I noticed two errors written by R. Gordon Wasson that in turn led me to write this report.

Fig. 2. *Psilocybe cubensis*, the Fiji strain of 'White Albino' grown from a spore print collected in Fiji, 2008.

According to Kenneth McKenney, an employee of the Emperor Gold Mining Co. Ltd., who wrote to Wasson from Vatukoula, Fiji, after reading about his mushroomic discoveries in Mexico in *Life Magazine* that he had a remarkable, unintentional experience after ingesting several mushrooms he had harvested in Fiji in 1958. In his 1959 *Herbalist* article, Wasson quoted from the gold miner's letter sent to him on April 19, 1958:

"Yesterday somebody handed me a June 10, 1957 copy of Life International containing your article on hallucinogenic mushrooms. It was given to me because of an experience I had on Sunday the 13th of this month when, for seven hours, I lived in a fantasy world as a result of eating local mushrooms.

I am a geologist, 29 years old, New Zealand graduated, and for the first time in my life my body and soul parted company and my mind leapt free.

I picked the mushrooms, which from your illustrations appear to be a species of *Stropharia* [*Stropharia=Psilocybe*, and the species is obviously *Psilocybe cubensis*], about 4 o'clock in the afternoon. To me they looked innocent enough. Their yellow tinge I thought due to the sun they had been in all day. They grew in dung. That evening my wife fried about half a pound of them in butter and, as she does not care for mushrooms, I ate the lot, down to the last drop of thick brown juice. They were delicious.

Twenty minutes later I had the most peculiar sensation of suddenly quivering to life; it was if a certain note, to which my whole being responded, was struck. Rapidly my perception reached a state of awareness beyond anything I have ever experienced. Each nerve vibrated with life; to pass from one room to the other was a sensation of extraordinary transport. My thoughts ran so quickly I was unable to converse with anyone. Between one word and the next so many mental explosions fired my brain I could not continue; often I would walk outside as if the house were not big enough to contain me. Once I said to my wife---"How could you understand, your world is so tiny." For the first few hours I was held by the magic of the mushrooms in a condition of split-level reality. I could both see myself in the flesh and float in what seemed to be a pure state of mind. Later in the hospital when I thought I was going to die I had a distinct feeling of being "taken away."

When I realized that these feelings were persistent and increasing, that I was in fact suffering from "mushroom poisoning," I rang up the doctor. He advised me to take an emetic. I mixed a strong glass of salt and water but such was my delight with these dark flowers even in the face of his serious warning that I spat out the first mouthful of emetic in ecstatic abandon. Even on drinking the glassful I was able to vomit only a little. By now the mushrooms had assumed a living entity of their own and my body was reluctant to be rid of them. I felt no illness neither than nor later, in fact at 4 A.M. when the drug had worn off I was consumed with an enormous sense of well-being.

Shortly after our telephone conversation the doctor arrived. He insisted I be taken to the nearest hospital, twenty miles away, and have my stomach washed free of the mushrooms. The ambulance ride was heroic. Most of the time I was besieged with

visions and hallucinations conditioned by the speed of the night flying past. On between my transports I became aware of myself in the flesh. My fingers were tingling and felt weightless; I was distinctly groggy; I thought of death. Finally I remember leaning back in the ambulance and placing my hands behind my head, where they immediately became wings on which I flew to the hospital, and thinking—"If I am going to die, I'm going to die gladly."

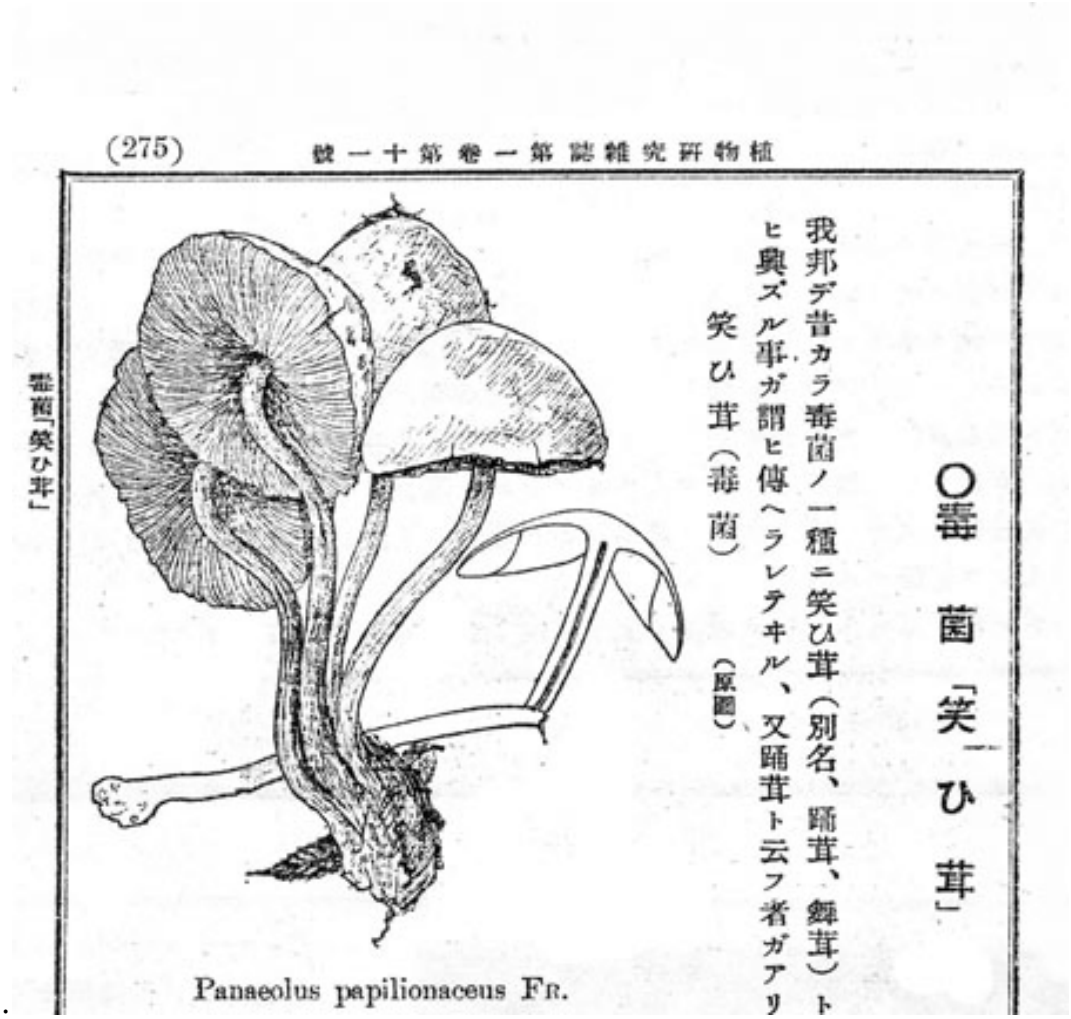

Fig. 3. Kawamura's 1918 sketch of *Panaeolus papilionaceus*.

I felt little pain while the stomach tube was in use. An hour or so later the doctor suggested I go to bed as there was no further danger and sleep off the effects, to which I replied that as the worst of it was over I intended on staying up and enjoying my poisoning. This I did. In a state of high excitement I laughed with my visions and enjoyed my hallucinations until five in the morning. I awoke again at seven quite fresh, suffering only from a tender throat where the tube had rubbed me sore. Now, six days later, I am still numbed by the enormity of that night.

As far as I have been able to determine the Fijians do not eat these mushrooms although they enjoy the standard variety. Their name for the mushrooms is *'viu-ni-tevoro'* which

Fig. 4. *Copelandia* (*Panaeolus*) *cyanescens*.

freely translated means devil's parasol, tevoro being devil and viu the name given to the native fan-palm the leaf of which is used in the same way as a parasol. Nor have I unearthed any legendary power of ritual associated with fungoid growth but these secrets are hard to come by and such information will take time…(Wasson, 1959)."

Following his inclusion of the letter sent to him by Mr. Kenneth McKenney, Wasson then added the following comment:

"*Viu-ni-tevoro*---Devil's Parasol! How that name, redolent with the awe-struck emotions of countless generations of unlettered Fijians, reminds us of the mushroom names that recur endlessly in our common vocabularies all over the world! "In Japan the very mushroom, "and the same name, curiously enough, is bestowed on *Panaeolus papilionaceus* in Japan as "*wa-rai-take* (Wasson, 1959; Allen, 1997)."

I am surprised that after 60 years since Wasson published his paper in the *Herbalist* no one else reported this error, and I am sorry Gordon is not alive so that it could bring it to his attention

The epithet, *Wa-rai-take*, as noted by Wasson, was first brought to the attention of the academic mushroom community by R. Gordon Wasson who read of it in a translated document of the article by Kawamura (1918) who described several studies of accidental

Fig. 5. Another close-up photo of *Copelandia* (*Panaeolus*) *cyanescens*.

intoxications of psilocybian mushrooms documented in Japanese folklore. Wasson used the epithet to describe the mushroom he assumed Mr. McKenney had consumed.

Remember, Mr. McKenney had already identified the mushroom he had eaten by a photographic description from one of Roger Heim's watercolor mushroom illustrations posted in Wasson's 1957 *Life* Magazine article as *Stropharia cubensis*.

We believe the mushroom illustration identified from Japan as *wa-rai-take* actually resembles a variation of *Panaeolus* (*Copelandia*) *cyanescens*, possibly *Panaeolus* (*Copelandia*) *tropicalis*, the latter is a dung-inhabiting species known to occur naturally in some regions of Japan (Guzman, Allen & Gartz, 2000). We based that assumption on the illustration in both a Japanese mycological publication (Kawamura (1918) and a similar sketch featured in a journal from Mainland China that showed the same illustration appearing in the Japanese journal and it too was labeled as *Panaeolus papilionaceus* (Yu, 1959).

According to Wasson, the Chinese character for Laughter mushroom is the same for *Wa-rai-take* in Japanese. In both journals, the illustration actually resembles mushrooms of the genus *Copelandia*. *Wa-rai-take* translates as 'laughing mushroom' and may also have been used when referring to the *Maitake* mushroom of the 11th century (Sanford, 1972) and Dr. Wasson identified the scientific name from published journal literature as *Panaeolus papilionaceus* (also sometimes referred to in Japan as *odoritake*, an alternative name implying, "jumping mushroom." and sometimes as *ō-wa-rai-take* (big laughing mushroom). However, *wa-rai-take* (laughing mushroom) and *ō-warai-take* (big laughing

mushroom) refer to *Panaeolus* and a species later identified as *Gymnopilus spectabilis*, a large meaty orange mushroom fruiting in decayed wood and on dead tree trunks. Worldwide there are 6 known active species of *Gymnopilus* with the alkaloids psilocine and/or psilocybine and other related tryptamine compounds (Wasson, 1973).

Fig. 6. ***Copelandia (Panaeolus) tropicalis.***

Later, in 1973, Wasson wrote of a lecture he presented in 1964 at a meeting of the Asiatic Society by contradicting his own words presented in his previous 1959 publication that the mushroom noted as *wa-rai-take* was never fully identified with a specific species. Wasson wrote, "In Japan, the *waraitake* (laughter mushroom) plays a similar role, but most Japanese who use the expression in conversation would be at a loss if asked to show a *waraitake*. The country's mycologists identify the term with three species of mushrooms. One is the *ōwaraitake*, *Pholiota* [*Gymnopilus*] *spectabilis* (Fr.) Quél. The second is the *shibiretake* or *waraitake modoki*, *Stropharia venenata* Imai. The third, for which there is no common Japanese name, is the cosmopolitan *Panaeolus papilionaceus* (Fr.) Quél. I do not know whether this knowledge is confined solely to those whose sole interest lies in the use of mycological semantics by their adversaries and their public, or whether—a most interesting possibility—there are regions where the country folk know the secret of the "laughter mushroom", having received it as little children from their mothers. If there is in some parts of Japan, a native tradition identifying the *waraitake* and revealing its effects, it is important that we should diligently lay hold of the vestiges of such folk-knowledge and discover their meaning (Wasson, 1973)."

Fig. 7. *Panaeolus papilionaceus* (the 'butterfly' mushroom).

As much as I hate to say it, it appears that R. Gordon Wasson erred twice in his identification of the McKenney mushroom as *Panaeolus papilionaceus* and in referring to it as *wa-rai-take*, which as the literature of today indicates was a more than likely a

species of *Gymnopilus*. I am amazed that Wasson failed to recognize and note that Mr. McKenney had already identified in his letter to Wasson that the mushroom species he had eaten was a *Stropharia* and that Mr. McKenney had based his identification on water colored mushroom painrings byRoger Heim in the *Life* Magazine article and that R. Gordon Wasson's identification of it as *wa-rai-take* (*Panaeolus papilionaceus*) was incorrect.

Fig. 8. The Not so White Albino Cube. The large caps and stalks were white.

Fig. 9. A side view of in vitro grown *Psilocybe cubensis* from Fiji.

Another interesting sidebar to the letter written by Mr. McKenney was his thoughts on passing away. Mr. McKenney's comment that, "If I am going to die, I'm going to die grandly" is very similar to a comment made by a women under the influence of what was identified as an accidental intoxication after eating a meal of *Pholiota* (*Gymnopilus*) *spectabilis*, the same Japanese mushroom referred to in the literature as *ō-wa-rai-take*), and now a report in Ohio from the mid-1960s when a lady stated that "if this were the way one died from mushroom poisoning, then she was all for it (Walters, 1965)."

Fig. 10. And another side-view here allows the viewer to notice the bluing oxidative process as psilocine escapes from the fruiting body of the fungi after handling.

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Douglas, B. 1917. Mushroom poisoning. *Torreya vol.* 17(10):171-175.

Glen, G. 1816. A case proving the deleterious effects of the *Agaricus campanulatus*, which was mistaken for the *Agaricus campestris*, or champignon. *London Medical and Physical Journal* vol. 36:451-453.
An early report of *Panaeolus* intoxication. A similar case is cited in an issue of *Gentleman's Magazine* dated August 1815. It is reported that the species in question was identified as *Panaeolus campanulatus*. For related data see Unsigned 1815.

Guzmán, G., Allen, J. W. and J. Gartz. 2000. A worldwide geographical distribution of the neurotropic fungi, analysis and discussion. *Anali dei Civ. Mus. Rovereto.* vol. 14:189-270.
An update of Allen, Gartz & Guzmán (1992) check list of the known species of hallucinogenic fungi and their worldwide geographical distribution. Over 214 species are identified as entheogenic. Included in this list are 44 newly identified psilocybian species plus an additional 30 other entheogenic mushrooms containing compounds other than psilocin/psilocybin and not described in their above noted study. More than 450 references are considered.

Kawamura, S. 1918. *Panaeolus papilionaceus*, a poisonous toadstool. *Journal of Japanese Botany. vol. 1:275-280.*
The author describes some accidental intoxications attributed to the ingestion of certain species belonging to the genus *Panaeolus* and *Gymnopilus*.

Sanford, J. H. 1972. Japan's laughing mushrooms. *Economic Botany* vol. 26:174-181.
Several case studies from Japan (including one from the 11th century) describe intoxications attributed to psilocybian fungi. *Panaeolus papilionaceus* and *Gymnopilus spectabilis* are mentioned as the suspected cause of these inebriations.

Unsigned. 1815. *Gentleman's Magazine*. August.
A report of an intoxication caused by a mushroom species identified as *Panaeolus campanulatus*. Since it is known today that this species is not a psilocybian mushroom, it must be assumed that the mushroom species in question may have been *Panaeolus subbalteatus* or a similar related species. For related literature, see Glen 1816.

Verrill, A. E. 1914. Discussion and Correspondence. *Science* n.s. 40(1029):408-410. September 18.

Walters, M. B. 1965. *Pholiota spectabilis*, an hallucinogenic mushroom. *Mycologia* vol. 57:837-838.
A report of intoxication in Ohio occurred by the accidental ingestion of a species of *Gymnopilus*. The intoxicated female reported that if she were to die from mushroom poisoning then this was the way to go.

Wasson, R. Gordon. 1957. Seeking the magic mushroom. *Life Magazine*. Pages 100-102, 109-120. May 13. International Edition, June 10. 1957.

Wasson, R. Gordon. 1959. Wild mushrooms: A world of wonder and adventure. *The Herbalist* vol. 24:13-28. Boston.
An ethnomycological and historical review of past accidental ingestions and native epithets of suspected species in which R. Gordon Wasson brings to the attention of the reader, four case reports of inebriations that occurred between 1815 and 1917, including three similar reports of contemporary intoxications that occurred in Poland, Colorado, and the Fiji Islands by individuals who had read R. Gordon Wasson's article in Life magazine and had written Wasson of their strange inebriations that were similar to what Wasson wrote of in his article that introduced magic mushrooms to the world (Wasson, 1957).

Wasson, R. Gordon. 1973. Mushrooms and Japanese Culture. *Transactions of the Asiatic Society of Japan*. December.
R. Gordon Wasson explores the etymology of Japanese mushroom names and reports on several historical tales of accidental ingestions of entheogenic mushrooms in Japan. Originally presented before the Transactions of the Asiatic Society of Japan's March 1964 meeting with some minor differences.

Yu, C. J. Hsiao-Tuan (laughing mushroom). *Journal of Mainland China (Ta-Lu Tsa-Chi*). No. 19:203-206. Taipei.
Also known as *The Continental Magazine*. This article describes several accidental human intoxications caused by the ingestion of *Panaeolus* and *Gymnopilus* species. In Chinese.

Discussion

The authors would like to address those whose interest lay within the confines of the world of ethnomycology, that in the mid to late 1800s, mycologist Bresadola had identified a bluing species of fungi he had collected in the Philippine Islands as *Copelandia papilionacea*. However, in 1871, two other mycologists Berkeley and Broome had also identified the same species from Sri Lanka as *Panaeolus cyanescens*. The first report of this fungus as a recreational drug in America occurred in 1972 when Dr. Steven Pollock (1974) mailed a single specimen found on Hawaii's North Shore surfing region of Oahu. Only a single specimen collected on farm land along the infamous North Shore's Surfing region was posted to Harvard ethnobotanist Dr. Richard Evans Schultes. Dr. Schultes in turn forwarded the specimen to French mycologist Dr. Roger Heim in hopes of having him verify the identity of the species. Heim later identified the mushroom as *Panaeolus cyanescens* Berkeley and Broome, section *Copelandia*. His identification of the specimen showed that the microscopic observations and the parameters of the spores and cystidia verified that the Hawaiian specimen was the very same species as originally described in the academic literature one and a half century earlier in 1871 by Berkeley et Broome in Sri Lanka (Heim, 1973).

As noted above, this particular species was first reported from the Philippines as *Copelandia papilionacea* Bresadola and was known by its common epithet, 'the butterfly' mushroom. It was later identified from Florida by Murrill who named the species *Westii* c*opelandia* and further confusion was then spread by University of Chicago's mycologist Rolf Singer who adapted the generic name from Bresadola. Over the years and up to the

present a lot of confusion was spread around as urban legends about the fungi that caused strange visions, laughter, and zany styled antics and nonsense in those who consumed them.=

From the early 1900s until the present concerning the true identities of mushrooms that in the terminology of Ford (1921), he referred to the cause of a strange malady that occurred after the accidental ingestions of fungi bringing about a change of consciousness in humans that became known as "*Mycetismus Cerebralis.*" There are at least more than two dozen medical reports from the last 150-years of accidental ingestions. Some of the documented case studies involving such wild mushrooms were consumed accidentally as a food source and some species consumed were thought to be similar to edible mushrooms they had eaten in the past. Since the 11th century, both *Panaeolus* (*Copelandia*) species and third genera, *Gymnopilus* were reported in the literature as the being the cause of intense laughter and silliness after eating these wonderful wild fungi.

As noted above, numerous mycologists around the world had published papers in which they mistakenly macroscopically identified several mushrooms of which belonged mostly to the genus *Panaeolus* as the cause of intoxications with symptoms that included, what at first appeared to be mild moments of distress, empathy, discomfort from the launching of the mushrooms special effects and these symptoms at first seemed to the inebriated person as somewhat very scary to those who thought that they were about to die. Afterwards when the initial come-on to the fungi settled down somewhat, the inebriated hapless victims began to realize they were not going to die and then came the laughter.

More confusion in the identification of species in the genus *Panaeolus* as a cause of the intoxications came about after the identification of *Psilocybe* species used in Mexico by indigenous tribal groups and the accidental erroneous identification by Richard Evans Schultes of *Panaeolus sphinctrinus* as the '*teonanácatl*' mushroom of the Aztecs. Because of Dr. Schultes misidentification of the species, based on accounts of its alleged by some of the Mazatec Tribal Groups in Oaxaca, many authors of field guides and literature covering the new histories of the psilocybian mushrooms, further caused more confusion in their publications regarding numerous species of *Panaeolus*, often misidentified by in the academic literature under the names of several species of *Panaeolus* mushrooms, the majority of which actually did not contain any hallucinogenic properties whatsoever. French Canadian mycologist Dr. Gyorgy-Miklos Ola'h of the University Laval in Quebec later compounded these errors when he published the first monograph covering the reported known species of the genus *Panaeolus*. Dr. Ola'h also published chemical analysis of the Schultes species and claimed that it was psilocybine active. After 50-years, it is now known that that species does not contain any active tryptamine alkaloids and that Dr. Ola'h had reported what is now known as a false positive in his analysis of the species, *Panaeolus sphinctrinus* (Heim, 1969; Heim, 1970).

In the academic literature, one would find that the literature carried errors regarding several species of fungi that earlier in the literature were reported as psilocybian fungi and had been identified by amateur mycologists, physicians, and professionals who erred in there macroscopic identifications of alleged species of active mushrooms. Several species of *Panaeolus* are listed and some are active and some are not: *Panaeolus*

campanulatus, Panaeolus sphinctrinus, Panaeolus semiglobatus, Panaeolus papalionaceus, Panaeolus castaneifolius, Panaeolus retirugis and *Panaeolus venonosus* and the latter species name implies that that species is poisonous and but is actually a true synonym for the primary true psilocybian *Panaeolus, Panaeolus subbalteatus,* recently renamed as *Panaeolus cinctulus*). Of the other species noted above all were most likely *Panaeolus subbalteatus* or just misidentified as species involved in the cause of the published academic medical reported intoxications.

The authors make note this report of error in early identification of species involved that did cause such inebriations. Over the years [JEA] had shown several hundred aficionados of psilocybian fungi, images of the deadly species, *Galerina autumnalis,* a species which at times is known to macroscopically resemble two separate yet macroscopically similar psilocybian species, the potent *Psilocybe cyanescens* and the less potent, *Psilocybe stuntzii*. Further implications of this misidentification by amateur foragers of psychoactive fungi and a majority of those to whom [JWA] had showed comparison photographs of both species (*Psilocybe cyanescens* and *Galerina autumnalis)* had informed [JWA] they had eaten the *Galerina* mushroom on numerous occasions and many who identified that they had eaten the deadly *Galerina,* had all reported a most rewarding experience. This in itself shows how even an amateur and/or expert mycologist can easily misidentify a species from it natural habitat as well as from a perfect macroscopic photograph of both a hallucinogenic species with that of a deadly species

At the time Wasson wrote his paper regarding the intoxication of *Stropharia* (*Psilocybe*) *cubensis* from the Island of Fiji, the neo history surrounding the possible identification of psilocybian fungi from historical records as well as from natural habitat collections, was in its contemporary infancy and many taxonomical identification errors were transmitted to many of those studying these fungi and many carried these misidentification errors into their major publications in the academic literature and into many profession field identification guides of the 1960s through the 1990s and into this new century, many such errors still exist.

A few extra paragraphs here describe the confusion that dangles over the identifications of both *Copelandia papilionacea* and *Panaeolus papilionaceus*. Since the latter is often referred to as the 'butterfly' mushroom it has now been renamed as a species of fungi that appears to be conspecific with *Panaeolus sphinctrinus*. But the name of *Panaeolus papilionaceus* may be the exact same fungi as *Copelandia cyanescens* and that the original identification of *Panaeolus papilionaceae* is actually *Copelandia cyanescens*. I also found some early taxonomic descriptions of *Panaeolus papilionacea* that almost fits the macroscopic description of *Panaeolus subbalteatus*. I talked to Dick Schultes about this misidentification because one late 18th century taxonomic report of *Panaeolus papilionaceus* reported that the cap becomes flat in age. It was this report that noted that *Panaeolus subbalteatus* does become flat with age while *Panaeolus papilionaceus* never becomes flat in age. Also *Panaeolus papilionaceus* has a conical shaped-cap while *Panaeolus subbalteatus* is never conical yet is bell-shaped at times and the stipes of both species are dissimilar. As noted above, *Panaeolus sphinctrinus has* now been renamed as *Panaeolus papilionaceus.*

Additionally, we also note a paragraph concerning Wasson's error from our colleague in Switzerland, Dr. Tjakko Stijve from Nestles who had also pointed out another slight error by Wasson in the original magazine article concerning the use of the Japanese epithets used in the Wasson article in the *Herbalist*.

So not adding this above info at the moment is fine because we need to add a few more short paragraphs to make sure our theories and hypothesis are absolutely correct. This is an important part of the Wasson error and would indeed help bring change to a lot of the published field guides which list many of the above non-active species as psilocybian mushrooms which give warnings for readers to beware of species described as either toxic, poisonous or, poisonous/hallucinogenic, etc.

The authors also wish to make note of a major error still carried in Dick Schultes' book with Albert Hofmann, a book often used in classes at university courses in Entheogenic Plant Studies and is still required reading in many Psychoactive Drug Plant Courses.

In "*Plants of the Gods*" by Richard Evans Schultes and Albert Hofmann, Dick Schultes lists *Panaeolus sphinctrinus* as the *'teonanácatl*' for naming all species of the sacred mushrooms used by the Aztec priests during the conquest of 'Nueva España.' Due to our writings and bringing the history of this mushroom, originally collected by Schultes and Reko in the 1930s in Mexico, and later misidentified by Rolf Singer as the mushroom noted by Schultes and Reko, Schulteds agreed with our conclusion that the mushroom was not a psilocybian species and never used by any Indians in Mexico in ritualistic or ceremonial usage in healing and curing ceremonies. This was later confirmed by Guzman, Heim, Rolf Singer, Alexander H. Smith, and others, who all agreed that we had uncovered a mistake made by those scolars that are listed here and by others in their works.

The senior author [JWA] has in his files, a private communication from Dr. Schultes' in agreement with this author's assessment of the actual status of this mushroom as not one used by the Toltec's, Olmec's or the Aztecs [JWA]. However, When Christian Rätsch became the new editor and new co-author for the revised edition of Schultes and Hofmann's, "*Plants of the Gods*," he failed to change a single word in Dr. Schultes' information published in the first edition of the book concerning this matter, leaving the errors to remain in the book and thus, more and more, perhaps in the thousands have bought this revised edition and today many ppublished works still carried the error which Dick Schultes believed should have been corrected if a reprint had ever been published.

Today, the identities of the original Bresedola, as well as that of the Berkeley and Broome identifications of the late 1800s and early 1900s are once again in question. Thus the authors of this paper leave to the scholars and/or readers, a reminder that further research into the original identifications of *Copelandia cyanescens* and *Copelandia papilionacea's* taxonomic particulars should be re studied and then compared to and measured with those of the taxonomic particulars of *Panaeolus papilionacea*. And remember that the species once believed to be many individual species of psilocybain fungi known to the people and priests of the ancient Aztec Empire and referred to as *Teonanácatl* is not an epithet known, recognized, or used by any Indians of Mesoamerica in this time and age.

Figure 11. A second flush of the Fiji albino strain is entirely different in cultivation after a month of growth every 6 days. These specimens appear to be very phallic in design.

Fig. 12. A third flush. The Fiji strain of *Psilocybe cubensis* shows the cap drying up.

TEONANÁCATL - A BIBLIOGRAPHY OF ENTHEOGENIC FUNGI ON CD REVIEWED BY DR. TJAKKO STIJVE

John W. Allen with Jochen Gartz. Copyright 2001–2009. John W. Allen, P.O. Box 45164. Seattle 98145-0164, WA, USA. E-mail: mjshroomer1@yahoo.com ISBN 158214399-4. Price: $39.99 plus $5.99 for shipping and handling. Revised 1012 Edition by John W. Allen.

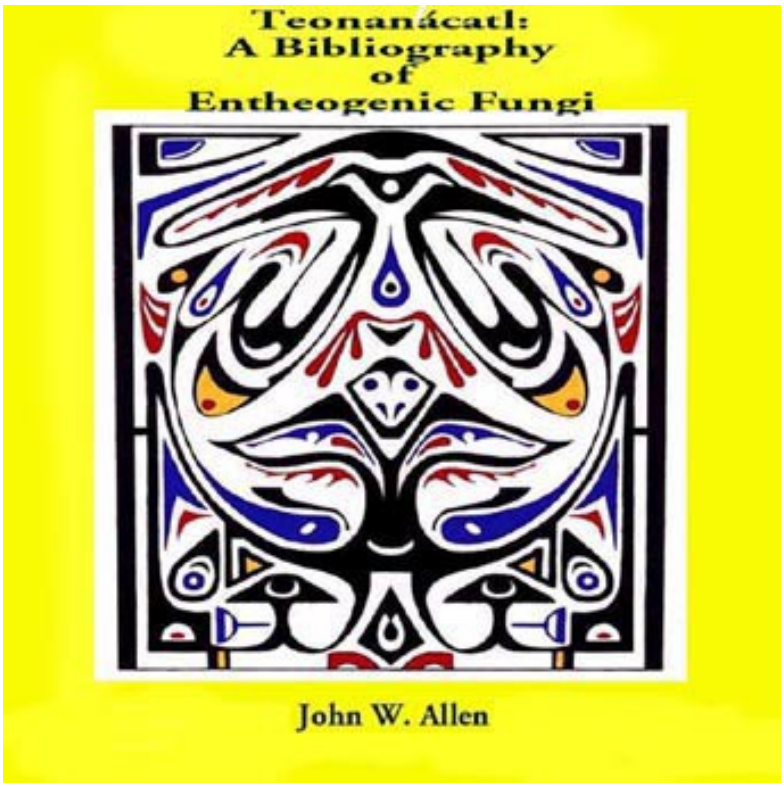

Fig. 1. Fact Finding Data Bibliography of Entheogenic Fungi. Cover art by Josh Bakehorn.

Teonanácatl, translated as "god's flesh" was the name for hallucinogenic mushrooms in the Nahuatl language of the Mazatec people. Entheogenic is Greek for "creating the god within", a modern term describing the action of psychoactive substances used for their religious of spiritual effects. Examples of these entheogens include LSD, mescaline, and psilocine/psilocybine, the active principle of many mushrooms. This literature review deals with those macro fungi, which are known as "Magic Mushrooms." This CD contains more than 2900 references, 2306 annotations, a cross-reference index with direct links to more than 10.000 cross-references to specific related sundry fields of study. Included are more than 1862 photographs and other illustrations, totaling the equivalent of 1100 pages in 296 megabytes in a folder with 3948 files in 51 folders. Collecting and filing this information must have been an enormous task. The work is dedicated to pioneers R. Gordon Wasson, Richard Evans Schultes and Albert Hofmann, who in the 1950s rediscovered the psychoactive mushrooms in Mexico. And whose existence was furthered into the world of academia and public interest through the late, Dr. Timothy Francis Leary. Well-known author Jonathan Ott gives in his foreword a brief historical survey of the use and study of those mushrooms. According to Ott, this bibliography is an "invaluable service to ethnomycologists the world over".

This is hardly exaggerated, because one finds an important part of the Wasson archives on this CD. Moreover, there is a voluminous appendix of more than 50 listings of "Historical References", including those to early Spanish publications on México by well-educated patronages as Bernardino de Sahagún (1499–1590), Gaspar de Covarrubias (1579), and Juan de Cordoba (1587) who were some of the first historians, clerics and botanists who described the ritual use of those inebriating mushrooms (los hongos que emborrachan) and their effects as told to them by those who participated in taking such fungi during and after the time of the conquest of Nueva España.

There are three chapters on psilocybine mushrooms. About 155 species of the known 206 species of active psilocybian fungi belong to the genus *Psilocybe*, which gave its name to the active principle. However, every year, new species, mostly those from the tropics are discovered and being described in the academic literature. Psilocine and/or psilocybine have also been reported in some fungi belonging to the genera *Conocybe*, *Copelandia*, *Galerina*, *Gymnopilus*, *Inocybe*, *Panaeolus*, *and Pluteus*. They are now also known to occur presumably in *Leucoagaricus* and *Weraroa*. The "Psilocybian Reference and Cross Reference Index" are easy to use, and the information thus found is surprisingly complete. I found effortlessly a number of papers by lesser known European authors, such as the study by Ceruti Scurti et al. (1972) about indole derivatives in *Panaeolus subbalteatus*, and the one by Stijve & Bonnard on psilocybine and urea in *Pluteus* spp. Many references are illustrated with the relevant book cover or, in case of a periodical; the title and summary of the paper are reproduced. There are (often superb) pictures of all psilocybin mushrooms. Of course, there are occasional errors. For example, there is a picture of *Inocybe calamistrata* with the legend: "Observe the bluing reaction from handling". There is no such reaction, because the colour of this mushroom's stipe is simply due to the presence of a stable pigment. This misinterpretation can be traced to a since long refuted paper by Gartz (1986), who erroneously reported not only psilocybine in this species, but also in a number of mushrooms from the genera *Gerronema*, *Hygrocybe* and *Psathyrella*. [This error in the text of the image of *Inocybe* in this bibliography has long since been repaired.]

The Cross Reference system also supplies information on the geographic distribution. For example, when clicking on "Africa", one obtains a list of publications about the occurrence of psychoactive mushrooms in that part of the world. One is somewhat surprised to learn that, in 1880 already, Karl Kalchbrenner drew attention to the presence of the 'Liberty Cap' in the South African Boschberg area. As a matter of course, much attention is paid to The Netherlands, where the possession, culture and sale of psilocybine mushrooms have been legal from 1995–2008. Author John Allen visited three Magic Mushroom farms, where he not only interviewed the owners, but also described the cultivation methods in a series of stunning pictorials. Occasionally, the total monthly production of these farms exceeded 20.000 kg. They started with various strains of *Psilocybe cubensis*, but soon the production was extended to species as *Psilocybe mexicana*, *Psilocybe tampanensis*, *Copelandia cyanescens* and even *Panaeolus subbalteatus*. That the latter mushroom should be offered to the public is rather disturbing. The psilocybine content is low. Consequently, one has to ingest a substantial amount to attain the desired "high", which is then often accompanied by gastrointestinal disorders. Meanwhile, a law has been passed making sales, possession and distribution of about 180 psychoactive mushrooms in The Netherlands illegal. Interestingly, this legislation is based on the list of species published in 1998 by Gaston Guzmán and co-authored by John W. Allen! The mushroom farms are closed now, but due to a loophole in the law it is still possible to sell

"Magic Truffles", i.e. sclerotia of *Psiloycybe mexicana* and *Psilocybe tampanensis* in the well-known Smart shoppes. Additionally, mushroom growing kits of several psychoactive species are still available [as are their spores, [JWA].

There are 356 references and 189 annotations about the Fly agaric (*Amanita muscaria*). Gordon Wasson's theory that this well-known mushroom should be the sacramental SOMA mentioned in the Rig-Veda, the most ancient religious Vedic text, prompted a series of publications on the possible role of the Fly agaric in the world religions. In this context, ethnomycologists Giorgio Samorini and Joseph Fericgla are more reliable than John Allegro, who's The Sacred Mushroom and the Cross is best considered an enormous joke. There is much information about the chemistry of *Amanita muscaria*. In the 1950s this referee was witness to a firm competition between the University Laboratories of Utrecht (The Netherlands) and Zurich (Switzerland) on who would be first to isolate the psychoactive substances from this mushroom. The game as won by the Swiss Conrad Hans Eugster who identified the active principles as ibotenic acid and muscimol. Consequently, this eminent scientist is remembered in a list of publications, whereas Fritz Kögl, who was a long time considered the mushroom chemist par excellence, and his Dutch co-workers, are now conveniently forgotten.

John W. Allen can be congratulated on this fine bibliography which renders many books, brochures, and articles virtually obsolete. Even if one is not interested in Magic Mushrooms, but rather in the genus *Psilocybe*, the purchase of this CD is warmly recommend. The price is low.

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Fig. 2. Lamai Beach Sunrise in the spring-summer months of 2005.

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Fig. 3. Two young Thai Kwai water buffalo (Bubalis Bubalus), Na Muang, Koh Samui, Thailand. One out of every 10 buffalo in Thailand are pink. All others become gray in age. There are over 70 million Kwai in Thailand.

Figure: Big Buddha, Koh Samui, Thailand. Protector of the author while in Thailand. May his light shine on all who travel to SE Asia. Photo: 2004.

ETHNOMYCOLOGICAL JOURNALS: SACRED MUSHROOM STUDIES VOLUME IX

ETHNOMYCOLOGICAL JOURNALS: SACRED MUSHROOM STUDIES VOLUME IX(1-2) 2013. Final Issue.

"This remarkable journal contains 3 new articles in the field of ethnomycology. (1) A multi-authored fascinating account and 23-year follow up study by John W. ALlen, Prakitsin Sihanonth, Jochen Gartz and Gianluca Toro on use of mind-altering mushrooms in South and Southeast Asia; (2) A new list of the chemical references to all known active species of psilocybian fungi, providing much needed clarification and notifications regarding dozens of false positives and mistaken psilocybian species as published in previous academic literature since the early 1900s to the present. All of which have been sufficiently corrected by the authors; and (3) A third paper in which ethnomycologist R. Gordon Wasson presented an opinion whereas he mistakenly erred in his identification of an active species from Fiji in 1959. The authors have combined impeccable scholarship with a knack for story telling that will entertain as well as illuminate their readers. Volume IX of Ethnonomycological Journals: Sacred Mushroom Studies is both a historical study and covers the etiology, cultivation, chemistry and SEM photography of SE Asian species and their use, as well as a travelogue; both adventure and social commentary are included. You don't have to eat mushrooms to expand your consciousness, just read this incredible journal.
196 pages and more than 230 colored photographs."
Stanley Krippner, Ph.D.
Co-author, Personal Mythology

"Good that you publish your journal IX (1-2) on the chemical references to psilocybian fungi. Go ahead. Congratulations."
Dr. Gaston Guzman.
Author of the Genus Psilocybe (revised edition forthcoming) and mycologist extraordinaire.